

Smart Code Reader (5000 Series)

User's Manual



Foreword

General

This manual introduces the functions and operations of the smart code reader (hereinafter referred to as the "reader").

Safety Instructions

The following signal words might appear in the manual.

Signal Words	Meaning
 DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
 CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, reductions in performance, or unpredictable results.
 ESD	Indicates a device that is sensitive to electrostatic discharge.
 LASER RADIATION	Indicates a laser radiation hazard. Take care to avoid exposure to a laser beam.
 TIPS	Provides methods to help you solve a problem or save time.
 NOTE	Provides additional information as a supplement to the text.

Revision History

Version	Revision Content	Release Time
V1.0.0	First release.	August 2021
V1.1.0	Updated some functions and operations.	June 2023

Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, fingerprints, and car plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited: Providing clear and visible

identification to inform people of the existence of the surveillance area and provide required contact information.

About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.
- We are not liable for losses incurred due to operating the product in ways that are not in compliance with the manual.
- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user's manual, use our CD-ROM, scan the matrix code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.
- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please contact customer service for the latest program and supplementary documentation.
- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguards and Warnings

This section introduces content covering the proper handling of the reader, hazard prevention, and prevention of property damage. Read carefully before using the reader, comply with the guidelines when using it, and keep the manual safe for future reference.

Operation Requirements

- Transport, use and store the device under allowed humidity and temperature conditions.
- Prevent liquids from splashing or dripping on the device. Make sure that there are no objects filled with liquid on top of the device to avoid liquids flowing into it.
- Do not disassemble the device.
- Only use the device within the rated power range.
- Make sure that the power supply of the device works properly before use.
- Do not pull out the power cable of the device while it is powered on.

Installation Requirements

- Observe all safety procedures and wear required protective equipment provided for your use while working at heights.
- Do not expose the device to direct sunlight or heat sources.
- Do not install the device in humid, dusty or smoky places.
- Install the device in a well-ventilated place, and do not block the ventilator of the device.
- Strictly abide by local electrical safety standards, and make sure that the voltage in the area is steady and conforms to the power requirements of the device.
- Use the power adapter or case power supply provided by the device manufacturer.
- Connect the device to the adapter before power on.
- Do not connect the device to more than one power supply. Otherwise, the device might become damaged.
- The power supply must conform to the requirements of ES1 in IEC 62368-1 standard and be no higher than PS2. Note that the power supply requirements are subject to the device label.
- Connect class I electrical appliances to a power socket with protective earthing.

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1 Overview

1.1 Introduction

The reader is a reliable and cost-effective equipment. With a high-performance photosensitive sensor that provides up to 1000 Mb/s transmission speed, the reader can be applied to most industrial applications, and is able to work stably under extreme environments.

1.2 Features

- Comprehensive capabilities, and easy to install and operate.
- The illuminators are divided into different groups, and can be controlled separately; they can be changed to different colors, including red, white, and blue.
- Adjustable focal length; motorized focus and autofocus are supported.
- Gigabit Ethernet port; IP65 protection grade.
- Various IO ports that support different types of communication protocols, including Ethernet port, RS232 port and GPIO port.
- Reads multiple types of codes, and supports rating the quality of a code.
- Deep learning algorithms that support multiple parameters sequence for high recognition rate in various scenarios and complicated ones.

1.3 Packing List

Unpack and check if any item is damaged and complete against the table below.

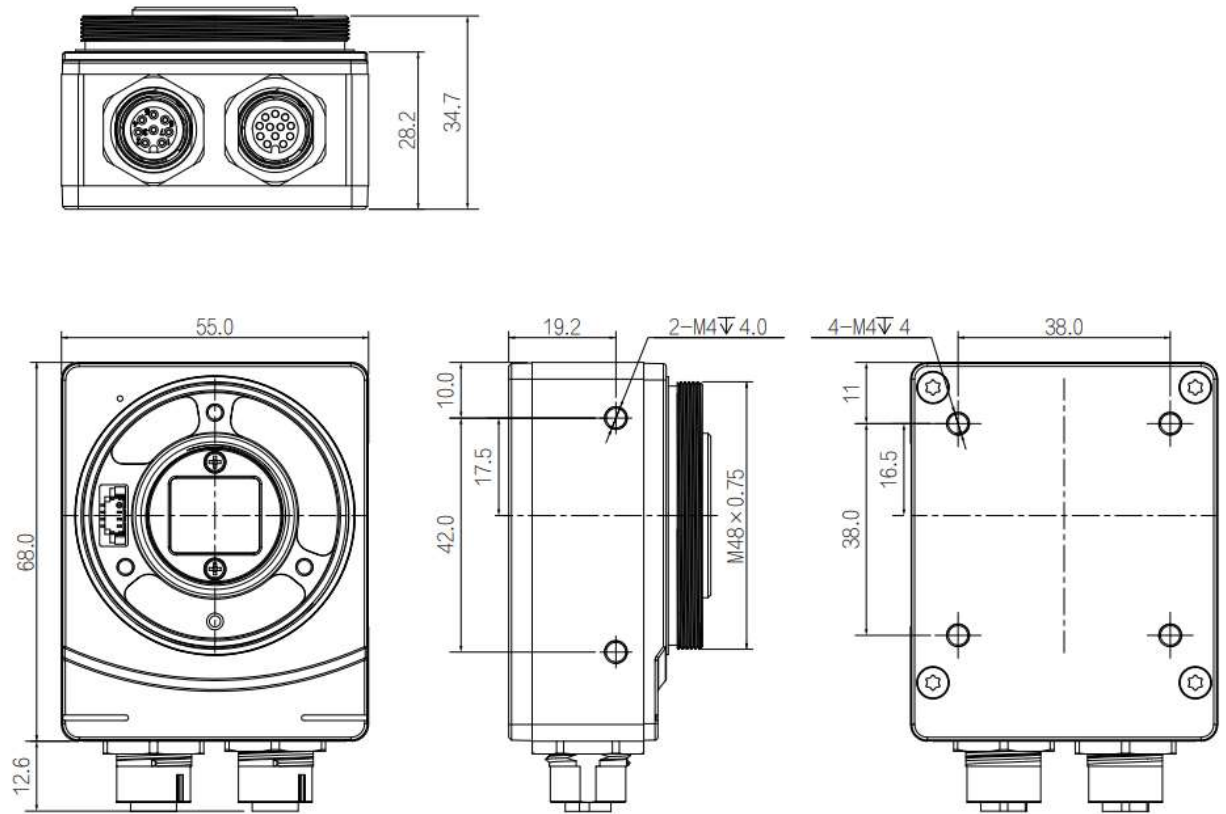
Table 1-1 Packing list

Item	Quantity
Code reader	1
M3 × 6 cross-head screws	4

1.4 Structure

1.4.1 Dimensions

Figure 1-1 Dimensions (mm [inch])

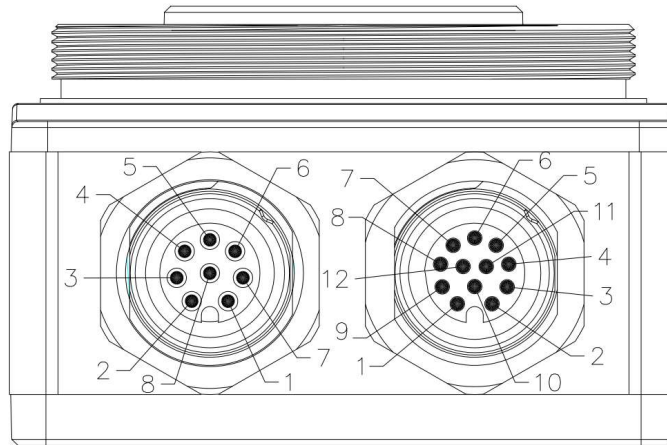


The dimensions diagram above does not include interface height.

1.4.2 Ports

- 12-pin port: Power, trigger IO, and RS-232 serial port.
- 8-pin port: Gigabit Ethernet port.

Figure 1-2 Port



Ethernet port

RJ-45 gigabit Ethernet port for video signal output.

Signal Port

Table 1-2 Pin function description

No.	Color	Function	Description
1	Brown-white	OPT_OUT2	Optocoupler isolated output 2
2	Gray	RS232_TXD	RS232 serial port for transmitting data
3	Purple	RS232_RXD	RS-232 serial port for receiving data
4	Black-white	SIGNAL_GND	RS232 serial port grounding
5	Yellow	OPT_IN1	Optocoupler isolated input 1
6	Purple-white	OPT_IN_GND	Optocoupler isolated input grounding
7	Red	POWER	Power supply for the reader
8	Black	POWER_GND	Reader power supply grounding
9	Green	OPT_OUT_GND	Optocoupler isolated output grounding
10	Orange	OPT_IN0	Optocoupler isolated input 0
11	Blue	OPT_OUT0	Optocoupler isolated output 0
12	Brown	OPT_OUT1	Optocoupler isolated output 1

1.5 Electrical Specifications

1.5.1 Power Supply and Ethernet Port

Table 1-3 Specifications of power supply and Ethernet port

Item	Description
Power supply	9–26 VDC; < 1% ripple; The reader is powered by the 12-pin M12

Item	Description
for the reader	connector. Use 24AWG wires or higher.
Data transmission	Gigabit Ethernet port.
Input/output port	1 RS-232 serial port (non-isolated). 2 optocoupler isolated input ports (LINE0–LINE1). 3 optocoupler isolated output ports (LINE2–LINE4).
EMC	- ESD (GBT17626.2/IEC61000-4-2): Contact discharge on the metal casing: 6 kV; air discharge: 8 kV. - Surge (IEC61000-4-5): - Ethernet port: Common mode 2 kV; differential mode 1 kV. - Power port: Common mode 0.5 kV; differential mode 0.5 kV.
Certification	RoHS.



The power supply must meet SELV and LPS standards.

1.5.2 IO Ports

1.5.2.1 Optocoupler Isolated Input

Table 1-4 Specifications of optocoupler isolated input port

Input Voltage	Description
26.0 VDC	The input voltage must not exceed this value. Otherwise, the reader might be damaged
0–24 VDC	Safe operating voltage range
0–11.5 VDC	Represents logic 0
> 11.5 VDC ¹	Represents logic 1

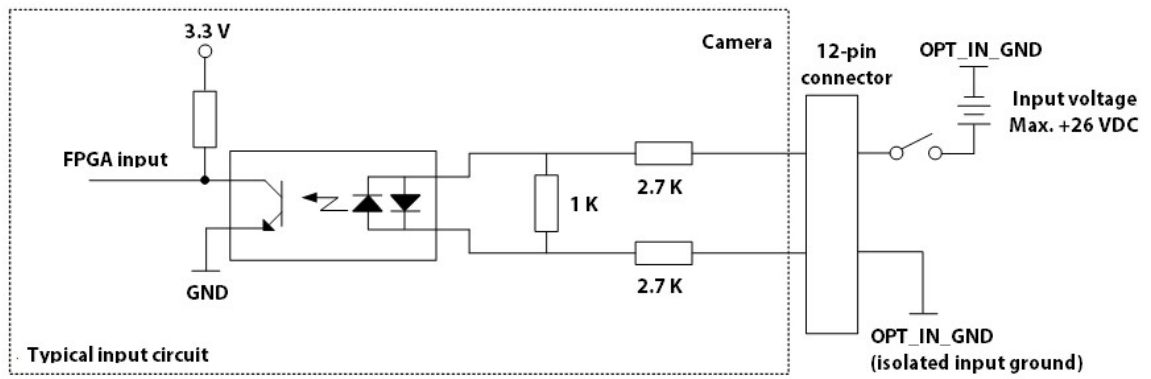


A bidirectional optocoupler² is used for optocoupler isolated input. The optocoupler isolated input grounding (OPT_IN_GND) and optocoupler isolated output grounding (OPT_OUT_GND) are separated.

¹ We recommend the triggering level to be between 12–24 V.

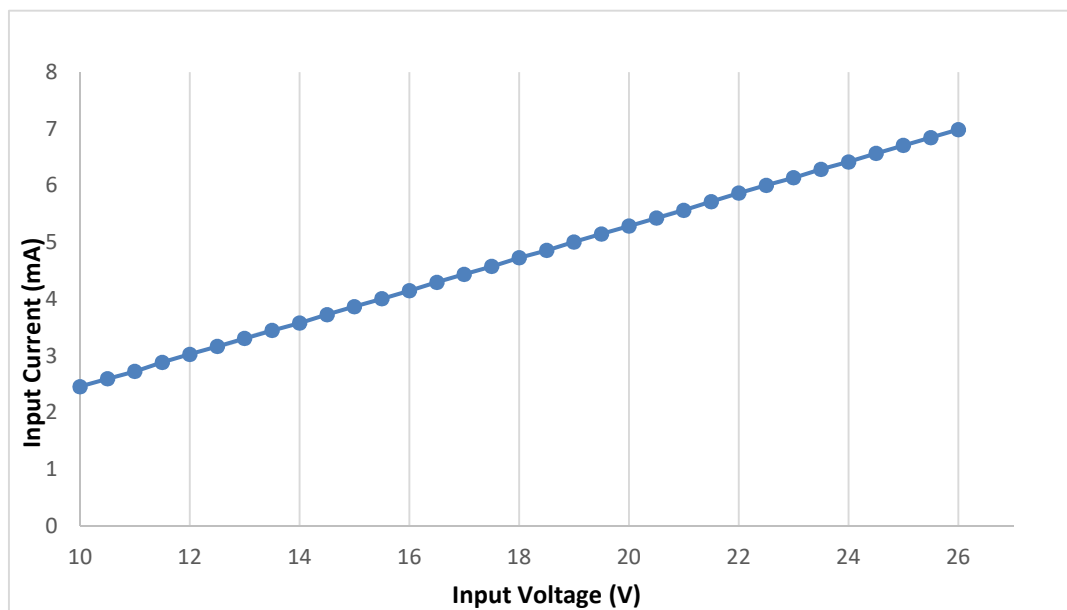
² It means OPT_IN can be used as an isolated common ground, and OPT_GND as isolated input. For example, when connecting an NPN sensor or a PLC, OPT_GND can connect to 24 V, and OPT_IN to the output of the photosensor; when connecting a PNP sensor or a PLC, OPT_IN can connect to the output of the photosensor, and OPT_GND to 0 V.

Figure 1-3 A typical circuit of optocoupler input



See the figure below for the relationship between sink current and input voltage of the optocoupler isolated input port.

Figure 1-4 Relationship between sink current and input voltage of optocoupler isolated input port



- The maximum sink current is 7 mA.
 - The value above is measured under 25 °C.
- Differences might be found among different readers.

See the table below for the relationship between input signal strength and trigger delay.

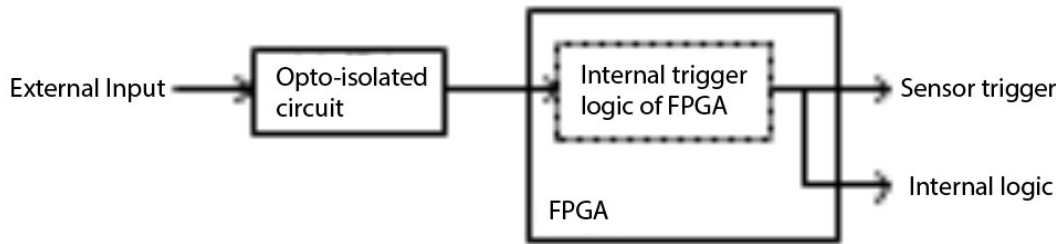
Table 1-5 Input signal strength and trigger delay relationship

Input Signal Strength (Vp-p)	Trigger Delay of Rising Edge t_{DR} (us)	Trigger Delay of Falling Edge t_{DF} (us)
11.5	99.5	82.5
12	62	96.5
20	11.3	97.5
24	8	101.5
26	6.75	101.5



Trigger delay means the time it takes for the signal to travel from the external optocoupler input port to the pins of the FPGA, without regard to the delay inside the FPGA.

Figure 1-5 Trigger input diagram



1.5.2.2 Typical Application of Optocoupler Input³

Figure 1-6 Typical wiring diagram of optocoupler input-Sourcing

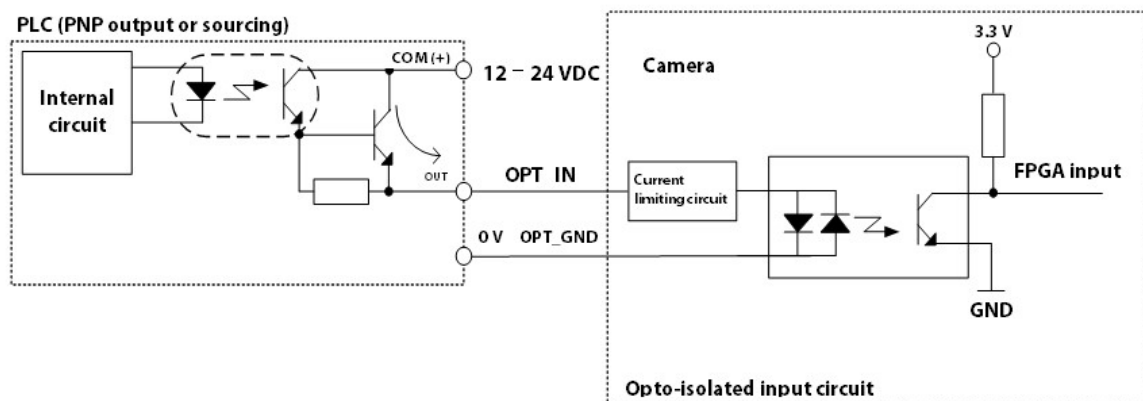
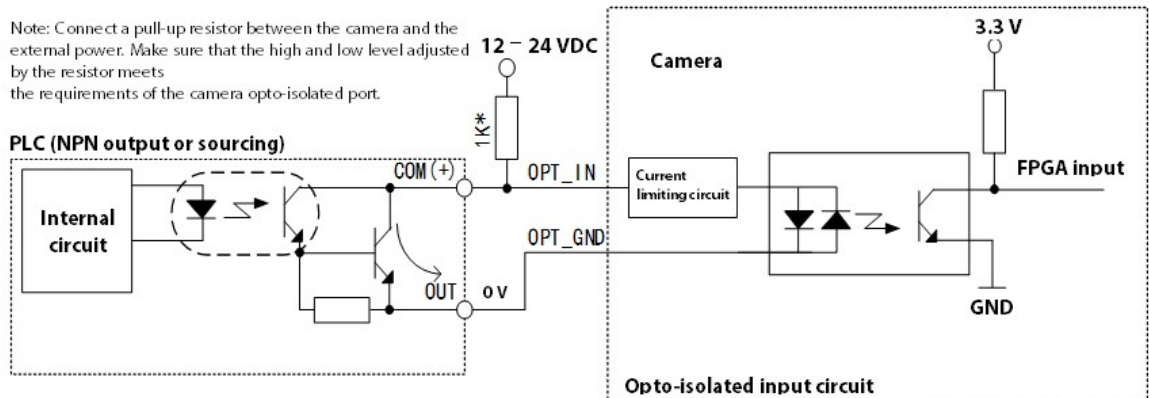


Figure 1-7 Typical wiring diagram of optocoupler input-Sinking



³For effective isolation, we recommend you power the sensor and reader separately.

Figure 1-8 Optocoupler-NPN sensor (1)

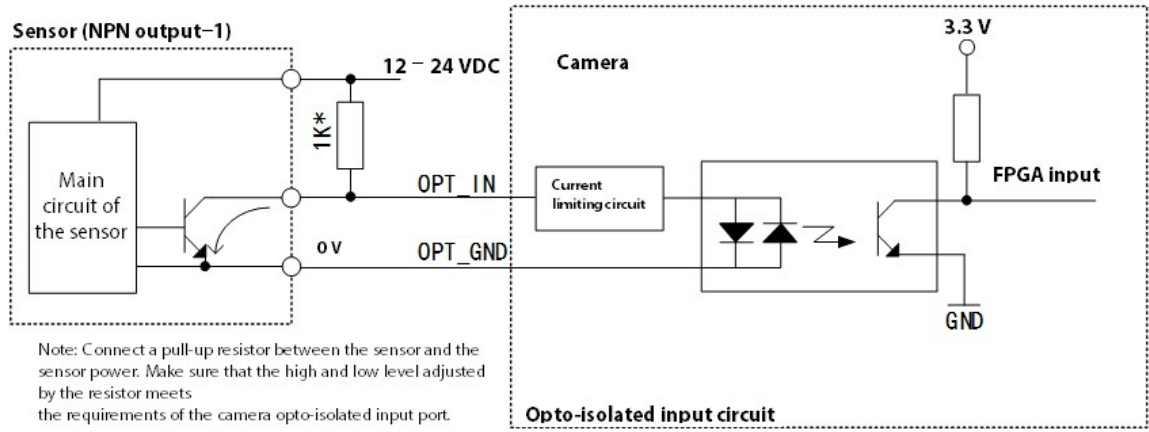


Figure 1-9 Optocoupler-NPN sensor (2)

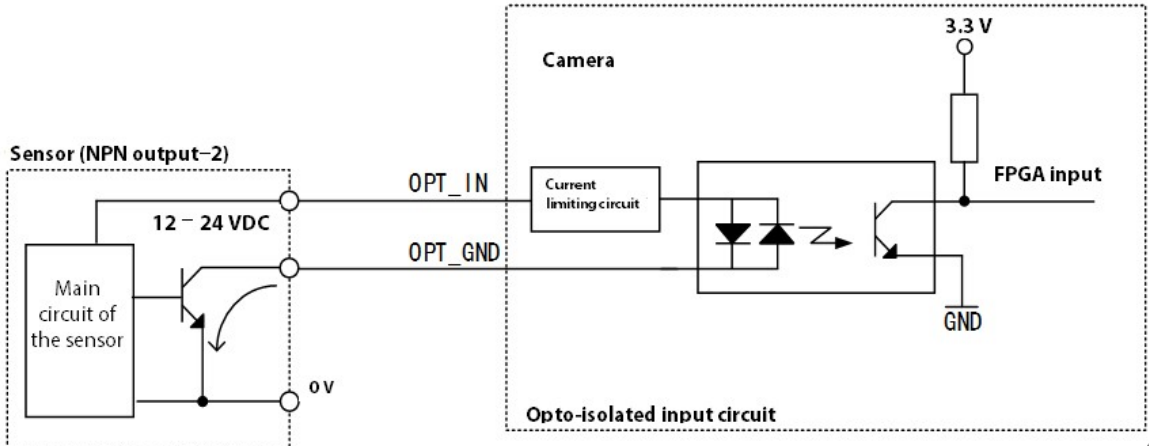
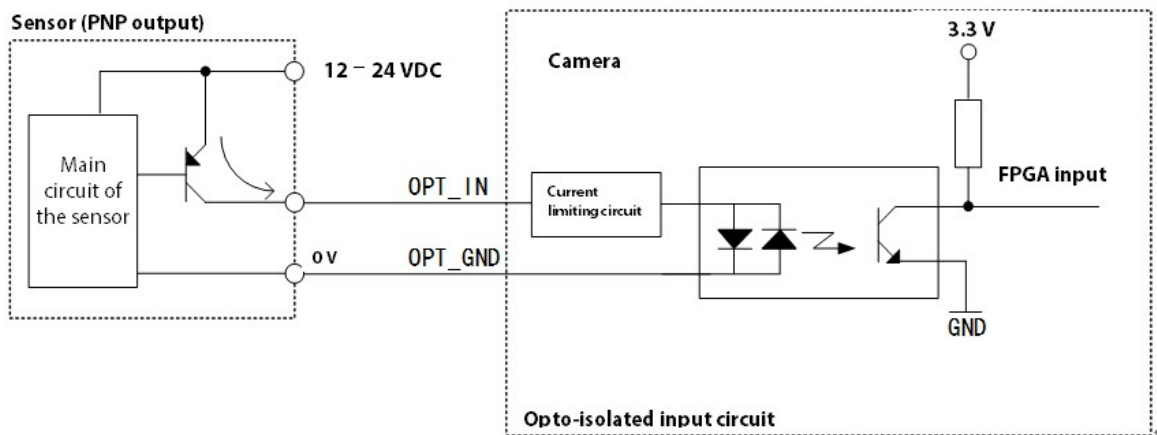


Figure 1-10 Optocoupler-PNP sensor



1.5.2.3 Optocoupler Isolated Output

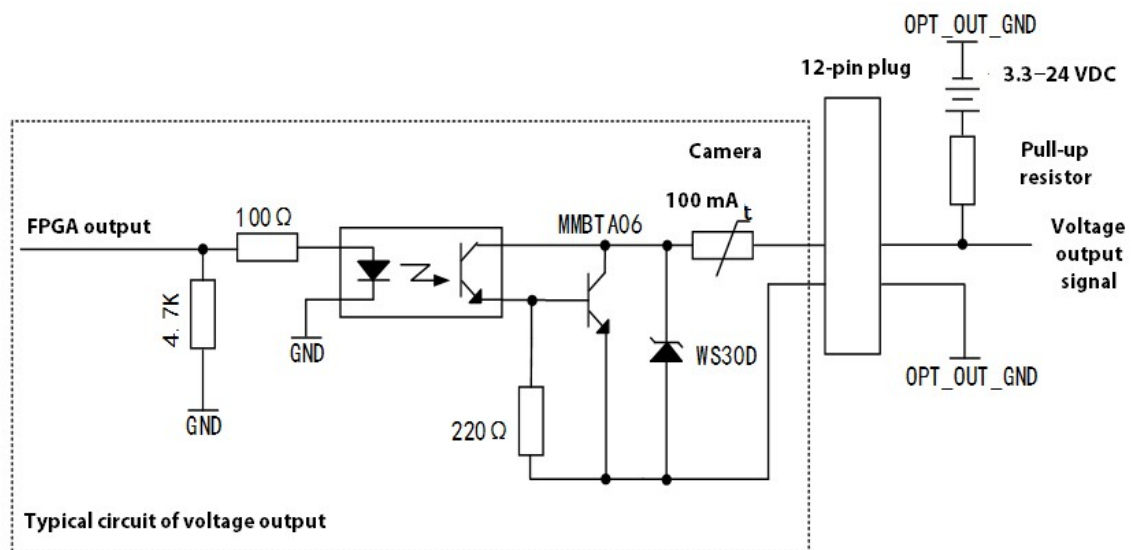
Table 1-6 Operating voltage description

Voltage	Description
26.0 VDC	The input voltage must not exceed this value. Otherwise, the reader might be damaged.
< 3.3 VDC	Incorrect I/O output might happen.
3.3–24 VDC	Safe operating range for I/O output.



Optocoupler isolated output is a sinking (NPN) output, and OPT_OUT_GND ("OPT_GND") is the optocoupler common port.

Figure 1-11 A typical circuit of optocoupler output



- The pull-up resistor shown in the figure above should be calculated by the maximum allowed current of the optocoupler isolated output port under given voltage⁴.
- The larger the pull-up resistor, the smaller the forward voltage drop of the optocoupler; the longer the output wave takes to rise or drop, the weaker the optocoupler's drive capability.
- Under different voltage, we recommend the resistance of the optocoupler should be: 5 V–270 Ω; 12 V–560 Ω; 24 V–1 kΩ.

See the table below for the rising/falling time, and trigger delay of rising edge/falling edge for a 1 kΩ pull-up resistor under different voltage.

⁴ Note: We recommend using a resistor with higher rated power, such as 1 W, to prevent the pull-up resistor from overheating and being damaged.

Figure 1-12 Pull-up resistor under different voltage

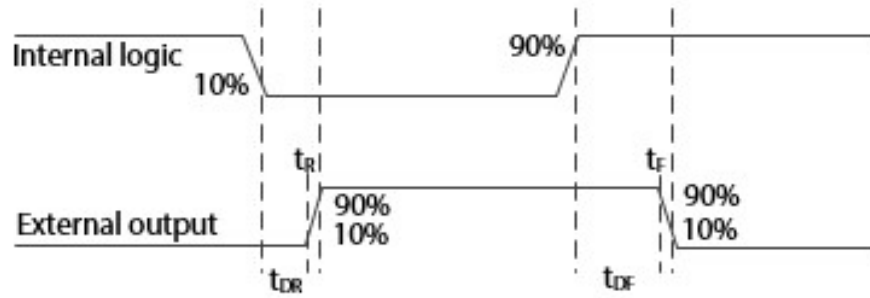


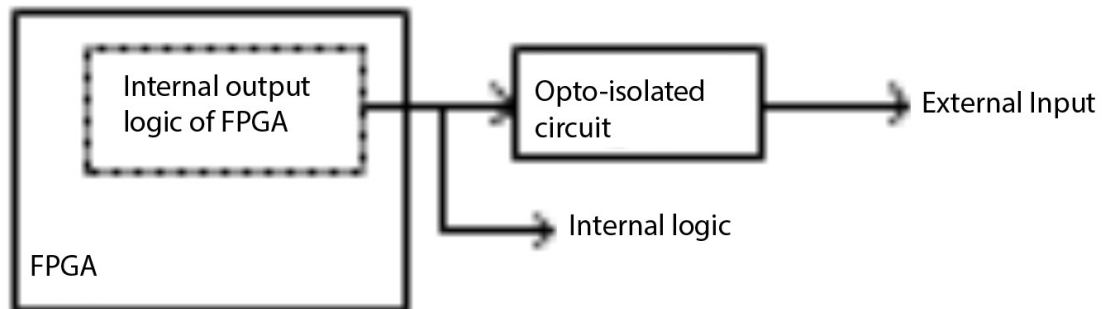
Table 1-7 Parameter description under different voltage

Voltage (V)	Rising Time t_R (μs)	Falling Time t_F (μs)	Rising Edge Trigger Delay t_{DR} (μs)	Falling Edge Trigger Delay t_{DF} (μs)
5	19.70	3.20	39.9	8.06
12	24.06	5.22	44.8	11.8
24	30.11	8.10	44.8	53.2



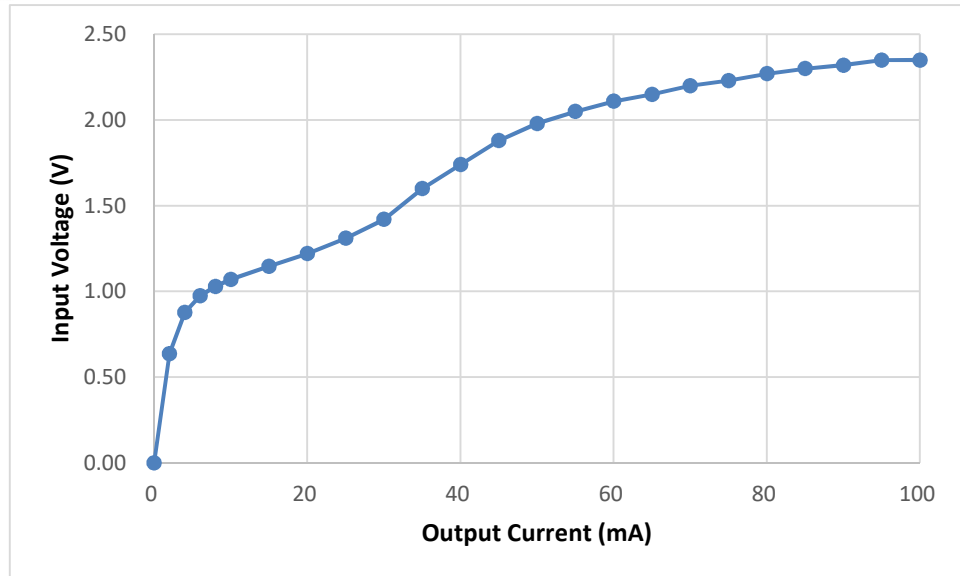
Output delay means the time it takes for the signal to travel from inside the FPGA to the pins of the optocoupler isolated output port, without regard to the delay inside the FPGA. The value above is measured under 25 °C. Differences might be found among different readers.

Figure 1-13 Logic of optocoupler output



See the figure below for the relationship between the forward voltage drop (between OPT_OUT and OPT_GND) of optocoupler output and the output current (the current that flows in the OPT_GND pin).

Figure 1-14 Relationship between forward voltage drop and output current



The maximum forward voltage drop of optocoupler output is 2.35 V. This is detected under maximum output current 100 mA.

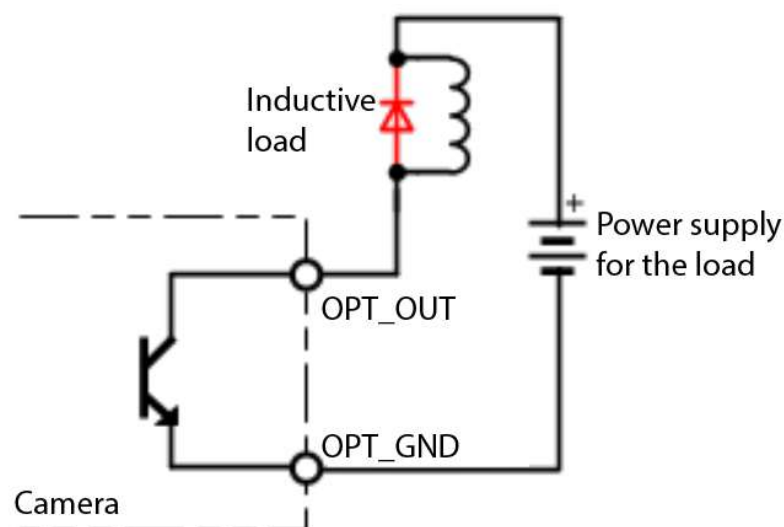


The value above is measured under 25 °C. Differences might be found among different readers.



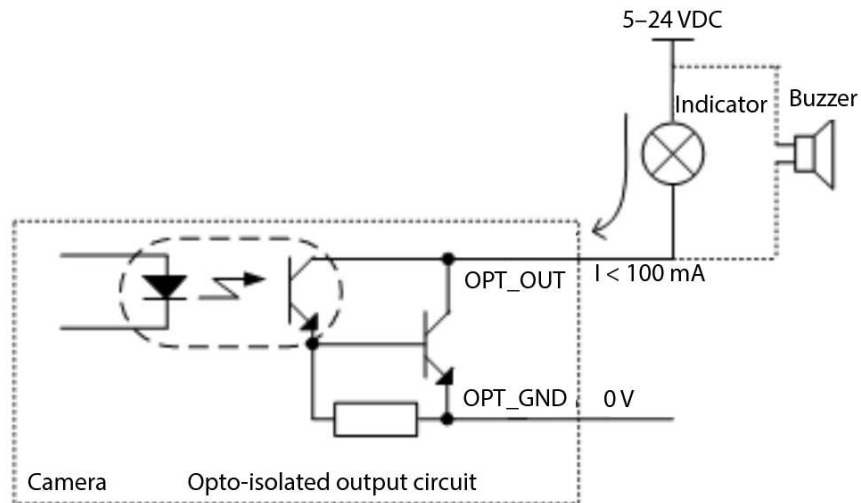
- The maximum current that is allowed to flow through the optocoupler isolated output port is 100 mA. Do not connect it to other components, or a voltage higher than the allowed value.
- You cannot replace the fuse in the port. If the fuse is blown due to short circuit or other situations, contact after-sales support.
- If inductive components are connected to the output port of the reader, such as an intermediate relay, they must have a built-in flyback diode, or you must connect a flyback diode (such as 1N4007) to the components. Otherwise, overvoltage will damage the optocoupler output port.

Figure 1-15 Reader is connected to an inductive component



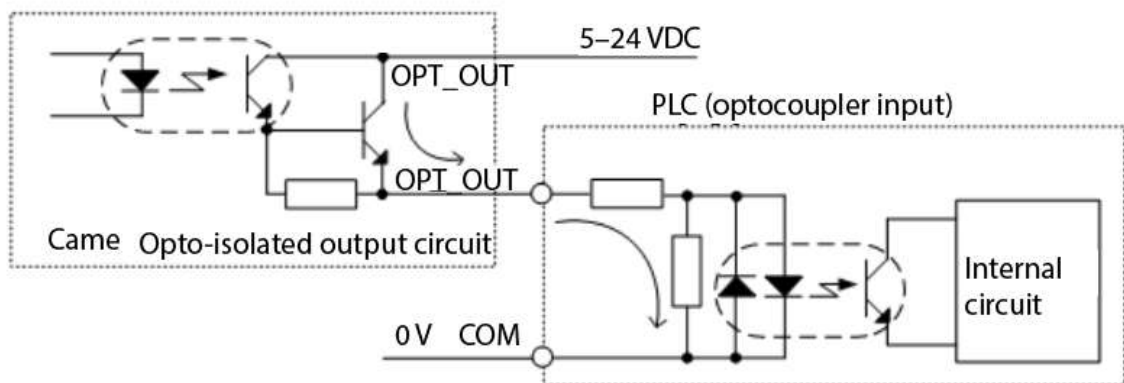
1.5.2.4 Typical Application of Optocoupler Output

Figure 1-16 Wiring diagram with an illuminator



- Connect the optocoupler output of the reader to the PLC through OPT_OUT_GND

Figure 1-17 Typical wiring diagram of optocoupler output-Sourcing



- Connect the optocoupler output of the reader to the PLC through OPT_OUT

Figure 1-18 Typical wiring diagram of optocoupler output-Sinking

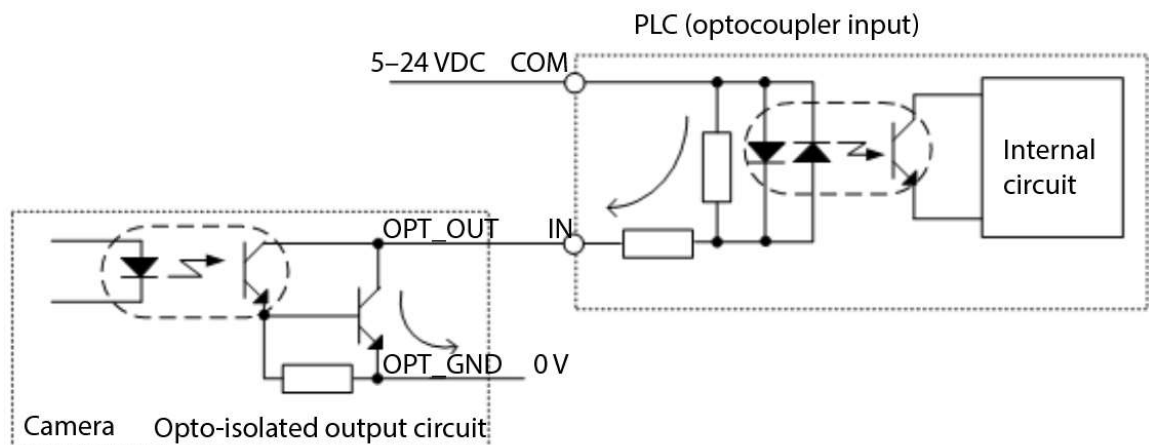
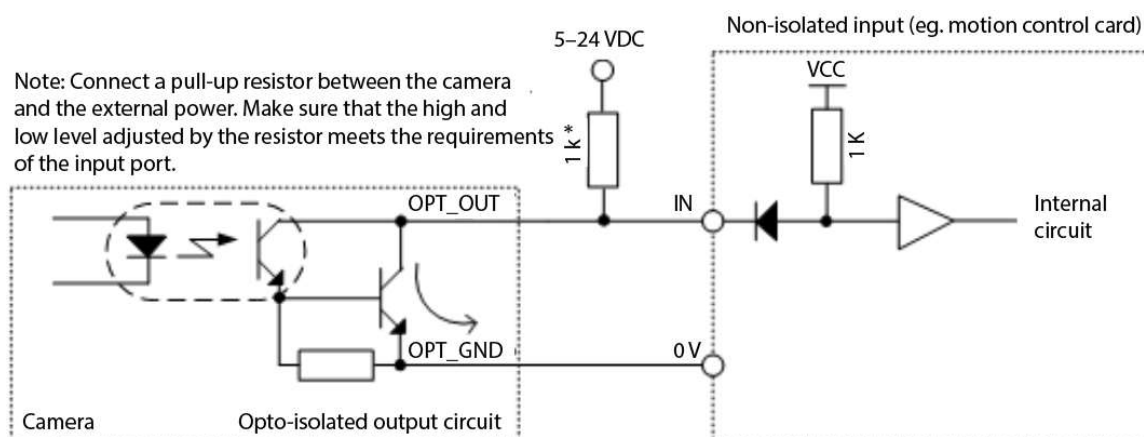


Figure 1-19 Typical wiring diagram of non-isolated optocoupler output



1.6 Indicators

Table 1-8 Indicator status description

Indicator and Status		Description
POWER (on the top of the reader)	On	The reader is powered on.
	Off	The reader is not powered on.
LINK (on the top of the reader)	On	Solid on means the reader is connected to the network. Flashing means data is being transmitted.
	Off	The reader is not connected to the network.
STATUS (on the top of the reader)	On	The reader is acquiring stream.
	Off	The reader is not acquiring stream.
OK/NG (on the wings of the reader)	On	Red: Failed to read a code; green: A code is read successfully.
	Off	Waiting to read a code.

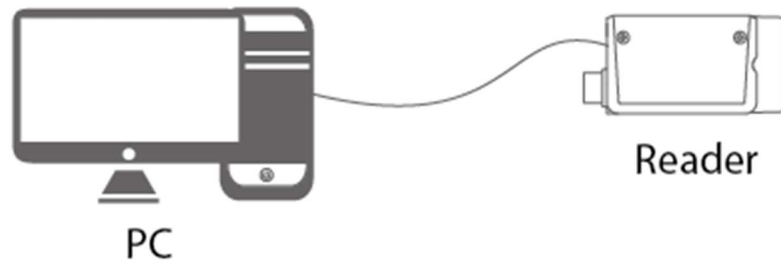
1.7 Environment Requirements

- Temperature and humidity.
The ambient temperature must not exceed 50 °C. It is best the reader works in an environment with air-conditioning.
 - ◇ Operating temperature on the casing: 0 °C to +60 °C (+32 °F to +140 °F).
 - ◇ Operating humidity: 20%–80% (RH), non-condensing.
 - ◇ Storage temperature: –30 °C to +80 °C (–22 °F to +176 °F).
 - ◇ Storage humidity: 20%–80% (RH), non-condensing.
- Do not coil the excessive portion of the cables. Fold them back and forth to ensure their EMI performance.
- During transportation and installation, do not touch the buttons to avoid damage to their protective covers.

2 Network Diagram

Use a network cable to directly connect the reader to a PC. The application installed on the PC can detect the reader. Change the IP address of the reader to the same network segment of the PC, and then the reader can work properly.

Figure 2-1 Network diagram



3 Installation

Follow the instructions below to install the reader and the application.

3.1 Preparation

Before installation, check if the reader is damaged and other accessories are complete against the packing list. See "1.3 Packing List".

3.2 Installing the Reader

During installation, you must take into account static electricity, electromagnetic interference (EMI), lightning, surge, and the heat dissipation of the reader.

3.2.1 Safety Protection

Although the reader is designed with protection against static electricity, electromagnetic interference, lightning and surge, it is best to reduce the risk for safety purposes with appropriate installation environment and methods.

This manual introduces some basic protection methods below. We recommend that you apply as many as possible.

- Use SSTP network cables. If a network cable is overly flexible, its protection performance will be compromised.
- Network cables should be as short as possible. If a cable is too long, arrange the excessive portion in an S shape to avoid the coupling effect of EMI.
- Use screened power cables. If a cable is too long, arrange the excessive portion in an S shape to avoid the coupling effect of EMI. It is acceptable to arrange a power cable and network cable side by side. Do not twist them together.
- Keep the power and network cables away from devices that have a high current or high voltage, or are powered on and off frequently, such as a stepping motor. These kinds of devices will generate strong electromagnetic radiation that will affect the signal transmission of the cables of the reader.
- The grounding cables of all devices, including the reader, must be connected together, and then ground them to a single point. If grounded to multiple points, voltage deviation among the devices is likely to happen, which will lead to a current, and ultimately electromagnetic interference.
- The power supplies of the reader and PC must be connected to the same AC power strip to ground them both to a single point. Do not directly connect high-power devices to this AC power strip.
- Attach a magnetic ring to the power and IO cables of the reader to absorb magnetic interference.

- Maintain certain environment humidity. Wear ESD gloves, clothes and shoes before operating the reader.

3.2.2 Heat Dissipation

When the environment is relatively stable, such as temperature, humidity, airflow, and installation position of the reader, the temperature of the cover of the reader will not increase anymore after 1–1.5 hours. Make sure that this temperature is not more than 50 °C (122 °F). When the cover of the reader is lower than 50 °C, the heat source inside the reader will be approximately 25 °C (77 °F) cooler than the cover, and will not be damaged.

To control the temperature:

- The ambient temperature must not exceed 30 °C (86 °F). It is best the reader works in an environment with air-conditioning.
- Install the reader on a surface made of metal or other materials that have good heat conduction. The surface must be large enough to dissipate heat, at least the same size as the back of the reader, which is also used to dissipate heat.
- Maintain proper airflow for better heat dissipation performance.

3.3 Installing EasyID

Install the EasyID on your PC to configure the reader.

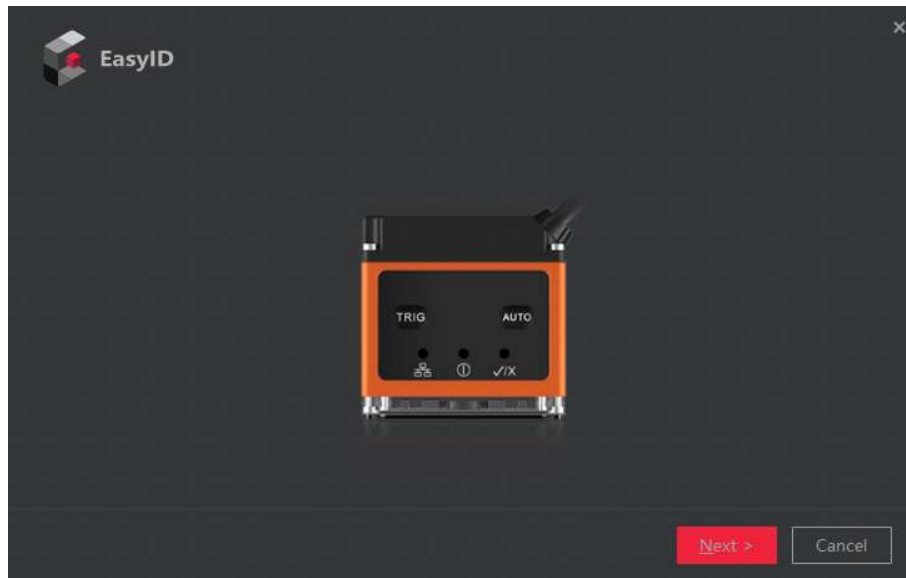
Step 1 Power on your PC.

Step 2 Double-click the EasyID installation file.



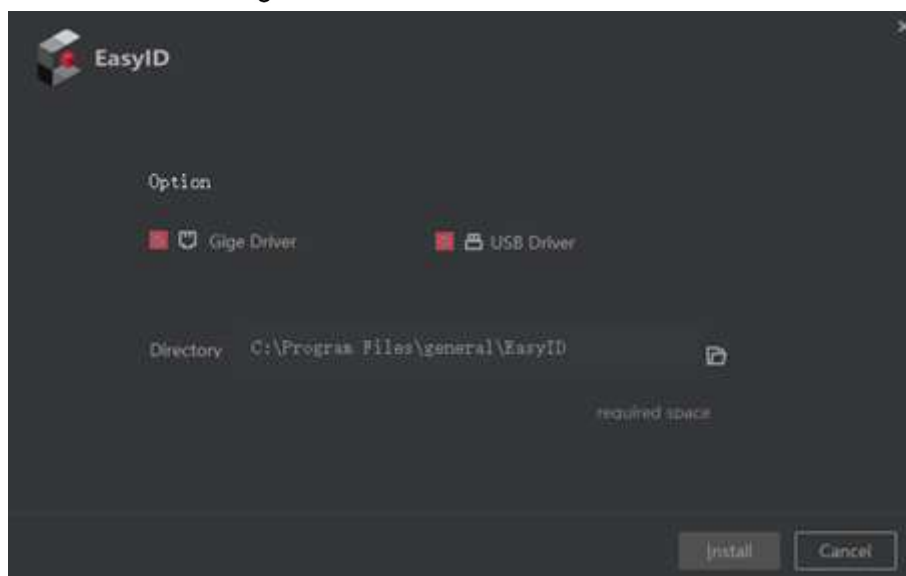
- Contact technical support or visit download center of website to get the installation file.
- If you have installed a MV Viewer older than 2.2.3, uninstall it first. Then follow the steps in this section to install the drivers (see Step 4), and then install the 2.2.3 version of MV Viewer. Otherwise, the reader will fail to acquire stream when using EasyID.
- If you have installed EasyID before, you will be prompted to uninstall it. Follow the on-screen instructions to uninstall the EasyID you have installed, and then install the new one.

Figure 3-1 Install EasyID



Step 3 Click **Next**.

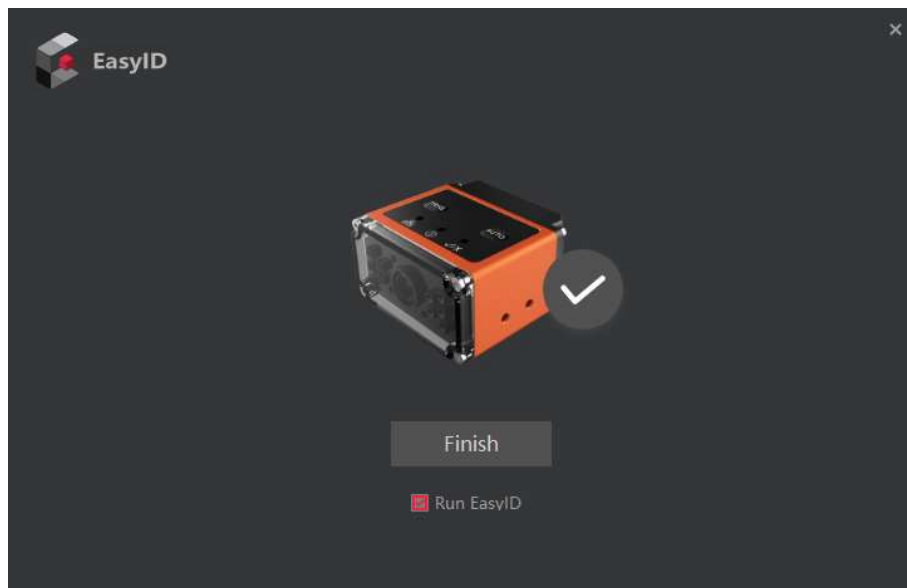
Figure 3-2 Install the drivers



Step 4 Select both **Gige Driver** and **USB Driver**, and the installation directory, and then click **Install**.

Step 5 After the installation is completed, select Run EasyID, and then click **Finish**.

Figure 3-3 Run EasyID



4 Configuration



- Make sure that the intelligent camera is connected with PC correctly.
- Install the client on PC. For details, see "3.3 Installing EasyID".

Run the client and on-line cameras can be detected. Make sure that the camera and PC are under the same IP network segment so that you can operate on the camera normally.

4.1 Configuration Guide



Double-click  on desktop. The client detects on-line devices automatically.



The default language is English. You can click **Help > Language** to change the language.

Figure 4-1 Software homepage

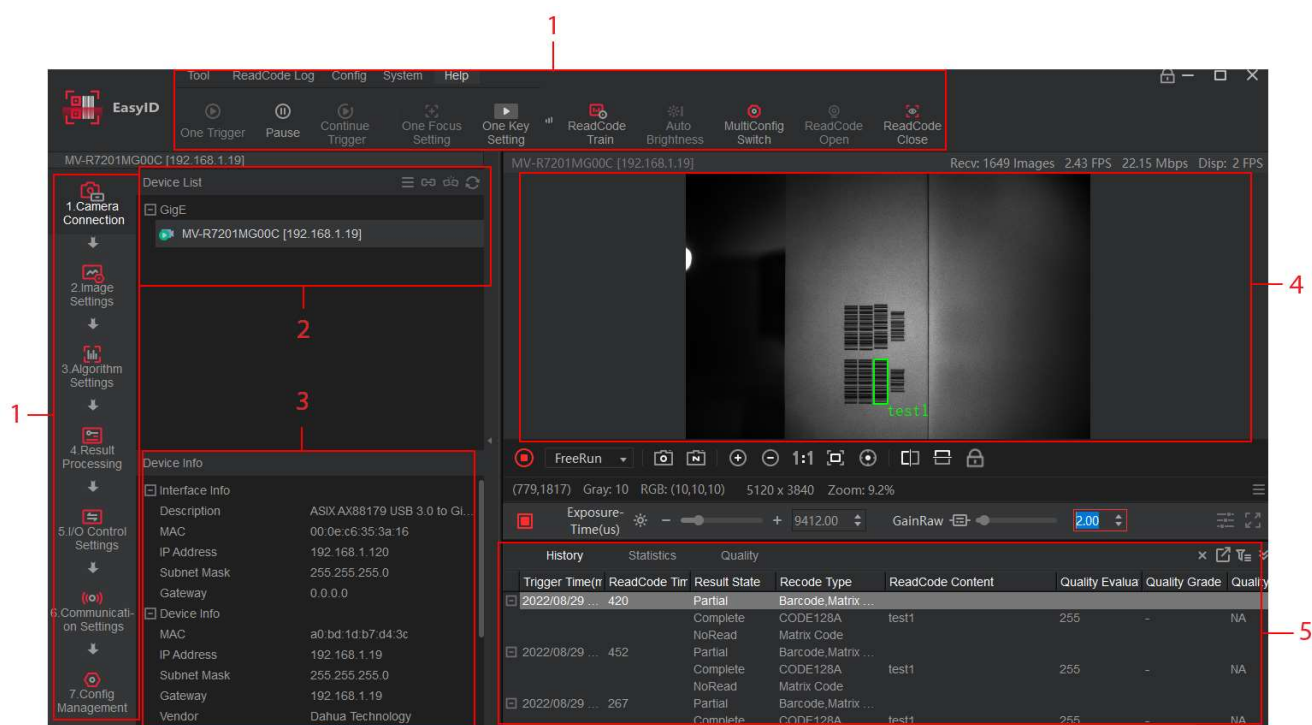


Table 4-1 Module description

No.	Description
1	Toolbar
2	Camera list
3	Device information area

No.	Description
4	Image area
5	Result area

See the table below for the description of each function.

Table 4-2 Description of toolbar parameter

Parameter	Description
Tool	Displays camera tools.
ReadCode Log	View and export code reading logs.
Config	- History Record: Enable single-item time consuming. - Statistics: Reading partial barcodes means the read is successful (when this function is disabled, if 10 barcodes need to be read and 8 barcodes are actually read, the barcode reading will fail). You can enable, disable, and clear statistics. - NTP Mode, Get System Time, Auto Time Sync, Connected Auto Time Sync, and Use Camera Time are available. - Discover the standard camera: Select it to find earlier version cameras.
System	Image Save, FTP Mode, TFPT Mode, Export Config Picture, SerialPort keyBoard, and Install Driver.
Help	Auto, Language, Context Help, and About.
	Incorrect IP address. Click the red logo above to change the incorrect IP address.
	The camera is connected.
	Click to connect cameras.
	The camera is connected properly.
	Supports sorting by IP address, MAC address, serial number, and device model.
	Connect all available cameras.
	Disconnect all cameras.
	Refresh
	Click the play button to make the camera pull the stream.
	Save a single image.
	Save images in real time.
	Split windows. Supports connecting multiple cameras.

	Select the mouse position, gray value, RGB value, resolution, and zoom ratio
	Clear all history records.
	View quality information.
	Export current code reading records.
	Filter results.
	Connect or disconnect cameras in the camera list.
	Click for one trigger.
	Stop pulling streams.
	Pull streams in real time.
	Automatically adjusts the camera focus to make the image more clear (only for cameras with auto focus function).
	The camera can adjust various parameters according to the current code to realize code reading.
	Provides training on the current code to improve the code reading rate.
	Automatically configure parameters such as exposure, and light source.
	Switch between multiple configurations to adapt to different complex code reading environments.
	Enable code reading, and then the algorithmic code reading mode is enabled.
	Disable code reading, and then the algorithmic code reading mode is disabled.
	Configure parameters of the camera such as exposure, gain, gamma, and light.
	Configure parameters of 1D and 2D codes.
	Configure results.
	Configure camera input and output.
	Configure camera network, serial port, and soft trigger.
	Import and export configuration files, and restart devices.
Devices List	View device list.
Device Info	View device information, including MAC address, IP address, version,

	and serial number.
History	View code reading records, trigger time, decoding time, result status, code reading type, code reading data, quality evaluation, quality level, and more.
Statistics	View code reading statistics. You can click Config > Statistics > Statistics Reset to clear statistics.

4.2 Connecting the Camera

Step 1 Start the client, all the detected devices are listed under **Device List**.



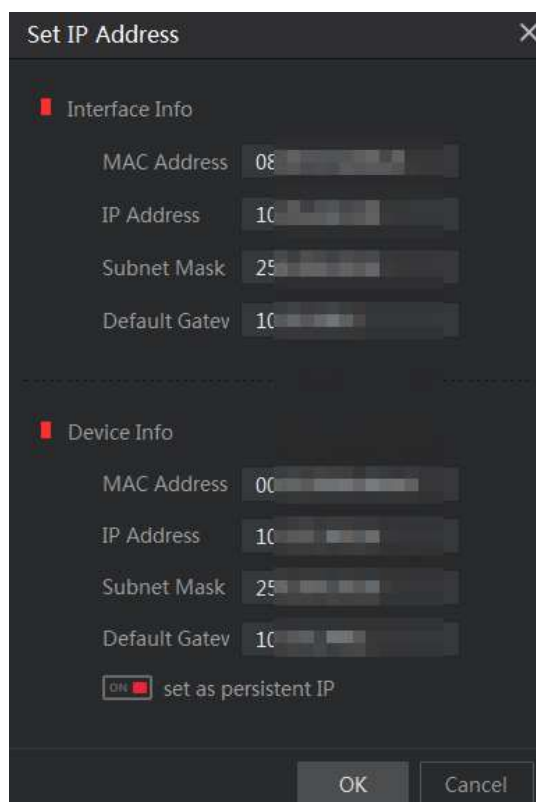
Camera devices in the same network segment with the PC. When new devices come online, click  to refresh the list.

Step 2 Select the camera to be connected, click  or double-click the camera to connect.



Click  to modify IP address when the camera shows as unable to connect. Refer to the port information to modify camera information.

Figure 4-2 IP configuration



Set IP Address

Interface Info

MAC Address: 08

IP Address: 10

Subnet Mask: 25

Default Gatev: 10

Device Info

MAC Address: 00

IP Address: 10

Subnet Mask: 25

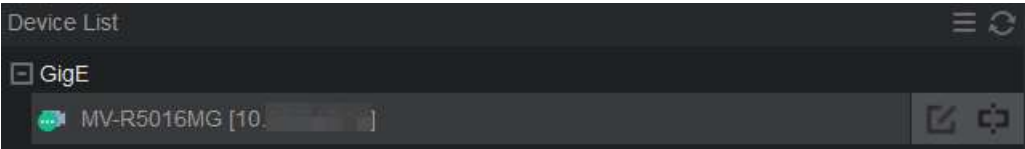
Default Gatev: 10

☒ set as persistent IP

OK Cancel

Step 3 The camera icon turns to  when successfully connected.

Figure 4-3 Camera connection interface



Related Operation

- Click to switch information display among IP address, MAC address, serial number and device model.
- Click to disconnect the camera.
- : Cameras can be connected.
- : Cameras with invalid IP addresses. They can only be connected after modifying IP.

4.3 Quick Configuration

Click **One Key Setting**, and then the device automatically configure parameters, such as automatic focus, image, illuminators, and algorithm, based on training. The device can also perform separate training, including one-click focus, code reading, and automatic brightness. For details, see the following description.



If the commissioning meets the code reading requirements, go to "4.6 Configuring Result Processing". If accurate commissioning is needed, go to "4.4 Image Settings".

Figure 4-4 Quick configuration

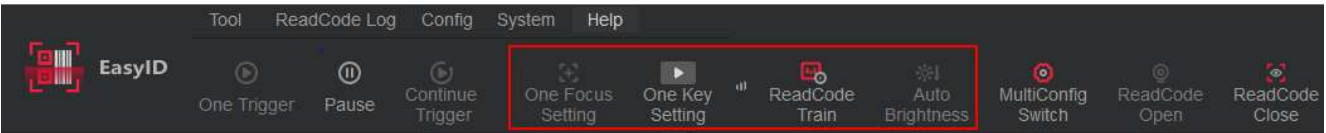


Table 4-3 Description of parameters

Parameter	Description
One Key Setting	The device automatically configures focus, image, light, and algorithm. Both static and dynamic statuses are supported
One Focus Setting	The device automatically configures focus.
ReadCode Train	The device automatically performs code reading training.
Auto Brightness	The device automatically performs illumination training.

4.4 Image Settings

On the **Quick Configuration** page, you can configure exposure, focus, ISP, light and trigger parameters.

Figure 4-5 Image configuration

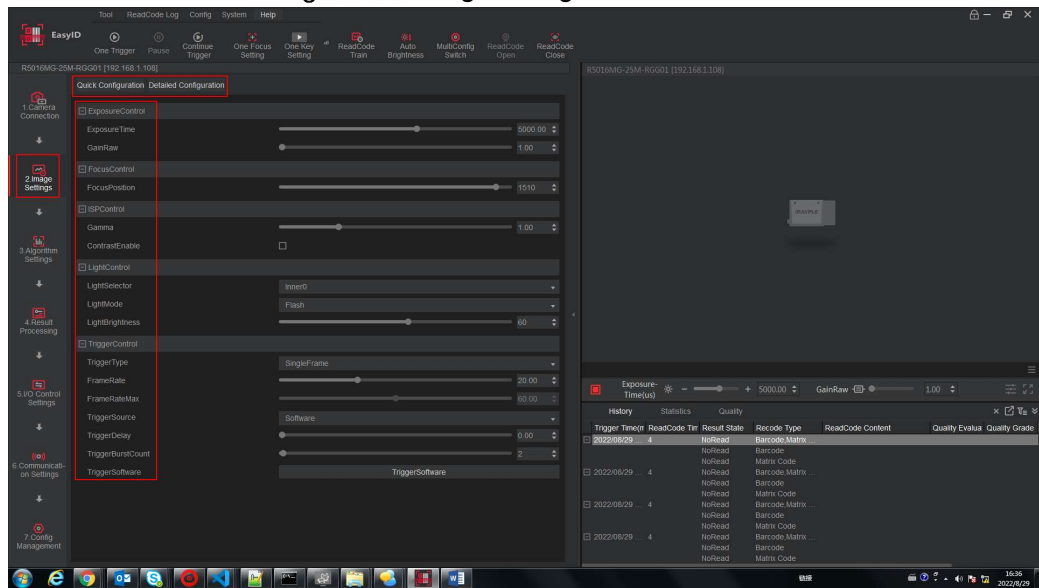


Figure 4-6 Quick configuration

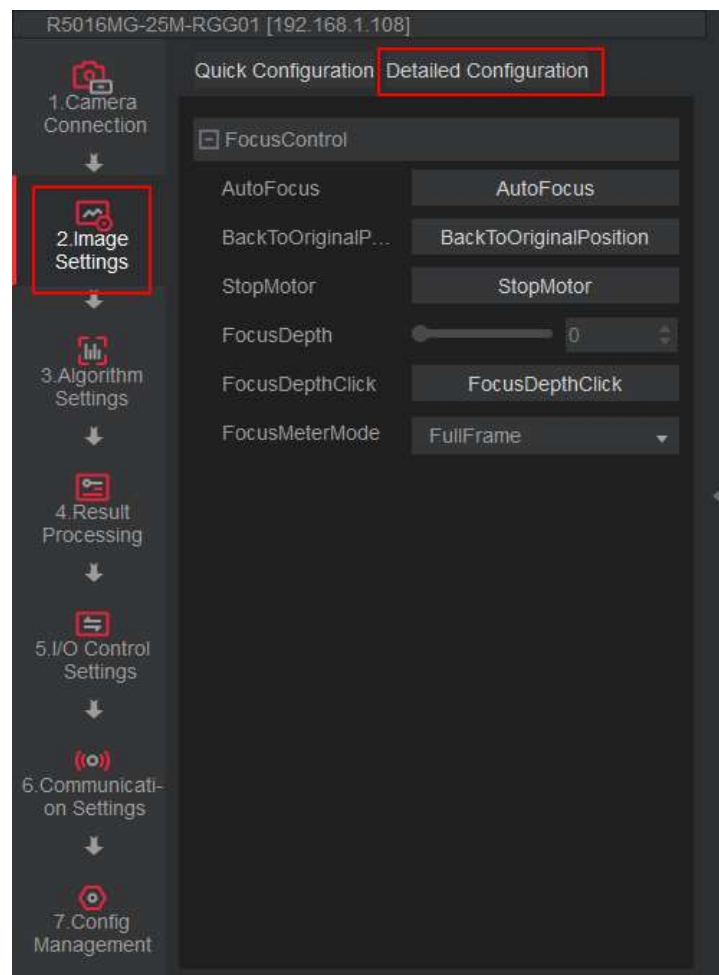


Table 4-4 Description of image parameters

Parameter	Range/Option	Description
Exposure Control	Quick Configuration Item	Quick Configuration Item

Parameter	Range/Option	Description
Exposure Time	Range: 20–200000; unit: μ s.	The longer the exposure time, the brighter the image.
Gain	1–23	The higher gain is, the brighter the image will be. The gain value affects the image quality.
Focus Control	—	—
Focus Position	0–1600	The higher the value, the closer the focus distance. The value range might be different depending on the device models.
ISP Control	—	—
Gamma	0–4	The larger the value, the more obvious the black and white contrast of the image.
Contrast Enable	Y/N	Enable or disable contrast. The contrast range is 0–255. It is 80 by default.
Light Control	—	—
Light Selector	Upper Left/Upper Right/Lower Left/Lower Right/External 0/External 1/External 2	Select the light source channel, including built-in light (upper left, upper right, lower left, and lower right), and external light (external 0, external 1, and external 2).
Light Mode	Off/Solid On/Flash	3 light modes are available, including solid on, off, and flash.
Light Brightness	10–100/10–20	In Flash mode, the brightness range is 10–100; in Solid On mode, the range is 10–20.
Trigger Control	—	—
Trigger Type	Free/Single Frame/Multiframe/Level	4 trigger modes are available, including free, single frame, multiframe, and level modes.
Frame Rate	0.5–maximum value	The frame rate range might be different depending on the device models.
Frame Rate Max	—	Displays the supported maximum frame rate.
Trigger Source	Software/Line 0/Line 1	Software trigger means triggering by communication or command. Line 0 and Line 1 means triggering by external input signal.
Trigger Delay	Range: 0–1000000; unit: μ s.	Trigger delay time.
Trigger Burst Count	1–255	It refers to the maximum number of frames that can be captured by one trigger, which is valid in multiframe mode.
Trigger Software	—	Click to simulate a software trigger.

Parameter	Range/Option	Description
Focus Control	Detailed Configuration Item	Detailed Configuration Item
Auto Focus	—	Click to automatically configure focus.
Back to Original Position	—	Click to reset the motor to original position.
Stop Motor	—	Click to stop the motor.
Focus Depth	—	Displays the current working distance.
Focus Depth Click	—	Click to estimate the current working distance
Focus Meter Mode	Full Frame/ROI	Configure the focus area.



Y: Enable this function; N: Disable this function.

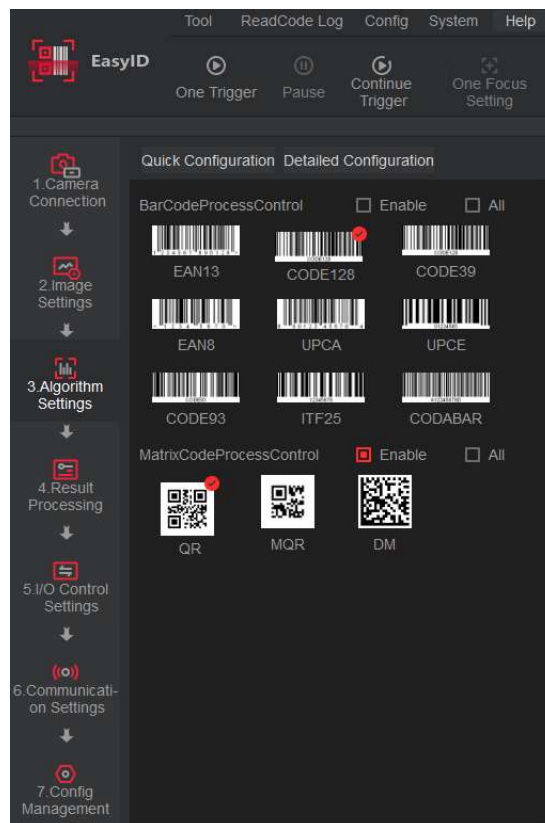
4.5 Configuring Algorithm

You can select algorithms of barcode or matrix code to configure the camera.

Step 1 Click **Algorithm Settings** on the left side of the client homepage.

Step 2 Select code type to be detected as needed.

Figure 4-7 Select code type



The screenshot displays the EasyID software interface, which is used for barcode and QR code scanning and processing. The interface is divided into several sections:

- Left Sidebar:** Contains a menu with 7 items: 1. Camera Connection, 2. Image Settings, 3. Algorithm Settings, 4. Result Processing, 5. I/O Control Settings, 6. Communication Settings, and 7. Config Management.
- Quick Configuration:** A section for selecting barcode types. It includes a list of barcode types (EAN13, CODE128, CODE39, EAN8, UPCA, UPCE, CODE93, ITF25, CODABAR) with checkboxes for 'Enable' and 'All'.
- Detailed Configuration:** A section for selecting the matrix code processing control. It includes a list of matrix code types (QR, MQR, DM) with checkboxes for 'Enable' and 'All'.
- Main View:** A large window displaying a live video feed of a barcode being scanned. The video feed shows a barcode on a dark background. A green box highlights the barcode area. The video feed also displays the following information:
 - Top: MV-R7201MG00C [192.168.1.19]
 - Top Right: Recr: 1502 Images 7.33 FPS 68.63 Mbps Disp: 7 FPS
 - Bottom Left: (-, -) Gray: - RGB: (-, -) 5120 x 3840 Zoom: 9.2%
 - Bottom Center: Exposure-Time(s) 9412.00 GainRaw 2.00
- History Table:** A table at the bottom of the interface showing the history of scans. The table has the following columns: Trigger Time, ReadCode Time, Result State, Retcode Type, ReadCode Content, Quality Evalua, Quality Grade, and Quality. The table contains 10 rows of data, all showing 'Complete' result states and 'ISO15415' quality grades.

Parameter	Range/Option	Description
Barcode Process Control	Quick Configuration Item	Quick Configuration Item
Barcode Process Control	EAN13/CODE128/CODE39/EAN8/UPCA/UPCAE/CODE93/ITF25/CODABAR	You can select multiple types of barcode, including EAN13, CODE128, CODE39, EAN8, UPCA, UPCAЕ, CODE93, ITF25, and CODABAR.
Matrix Code Process Control	QR/MQR/DM	You can select multiple types of matrix code, including QR, MQR, and DM. Some models also support VERICODE.

Step 3 On the **Detailed Configuration** page, configure parameters.

Figure 4-10 Detailed configuration of barcode

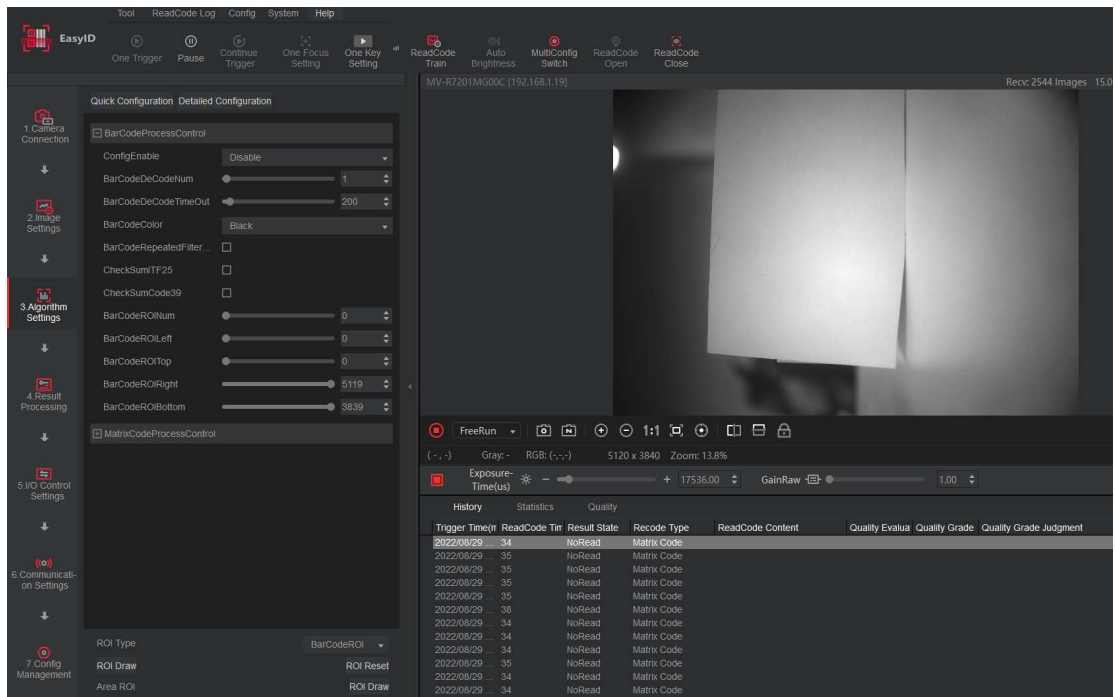


Figure 4-11 Detailed configuration of matrix code

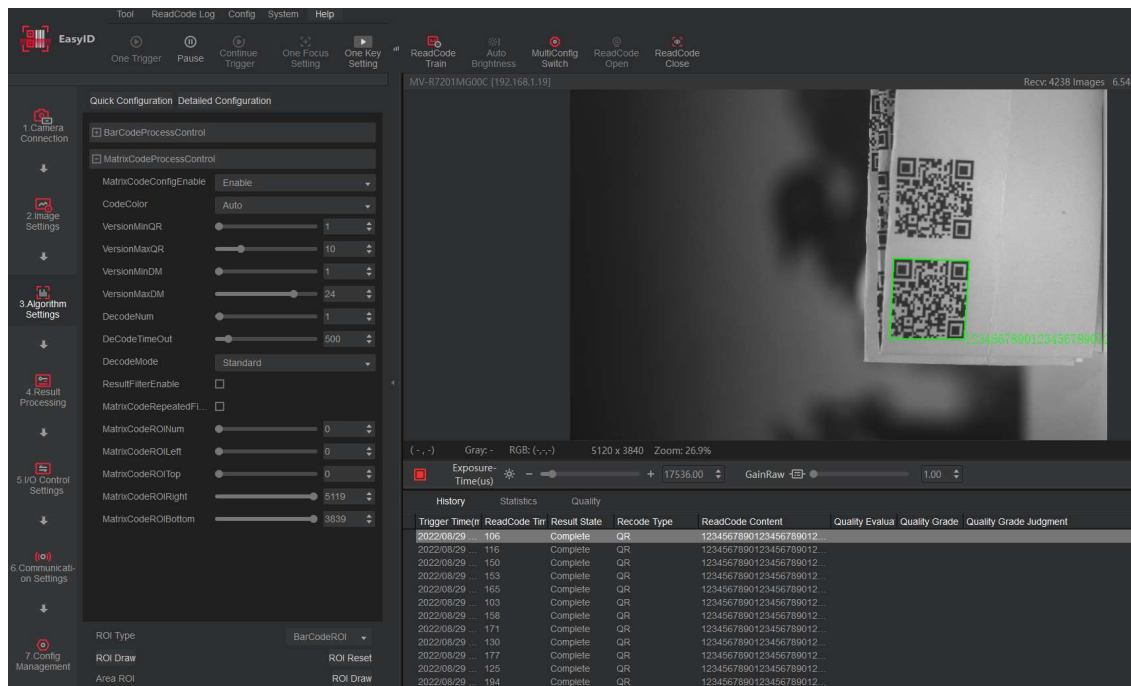


Table 4-6 Descriptions of algorithm parameters

Parameter	Range/Option	Description
Barcode	Detailed	Detailed Configuration Item
Process Control	Configuration Item	
ConfigEnable	Y/N	Enable or disable one-dimensional barcode.

Parameter	Range/Option	Description
BarCodeDecodeNum	0–32	The maximum number of one-dimensional codes to be read. It might be different depending on device models.
BarCodeDecodeTimeout	Range: 0–5000; unit: ms.	One-dimensional code reading timeout time. If it times out, the code reading will end.
BarCodeColor	Auto/Black/White	Auto is preferred. It supports both black code and white code
BarCodeRepeatedFilter	Y/N	Enable or disable the repeated barcode filtering function.
ChecksumITF25	Y/N	Enable or disable ITF verification.
ChecksumITF25Code39	Y/N	Enable or disable Code 39 verification.
BarCodeROI Num	0–1	The number of barcode ROI
BarCodeROILeft/Top/Right/Bottom	0–maximum resolution	You can draw the ROI area based on the four corner coordinate values of one-dimensional ROI as shown in Figure 4-12. Note that this function is different from the multi-ROI (Figure 4-13).
Matrix Code Process Control	—	—
MatrixCodeConfigEnable	Y/N	Enable or disable QR code.
CodeColor	Auto/Black/White	Auto is preferred. It supports both black code and white code
VersionMinQR	1–30	Minimum value of QR code version range.
VersionMaxQR	1–30	Maximum value of QR code version range.
DecodeNum	0–16	The maximum number of QR codes to be read. It might be different depending on device models.
DecodeTimeOut	Range: 0–5000; unit: ms.	QR code reading timeout time. If it times out, the code reading will end.
DecodeMode	Standard/Medium/Difficult	The capabilities and time-consuming of the three modes are gradually increased, and the standard mode is preferred.
ResultFilterEnable	Y/N	Enable or disable result filtering function. The device can filter results by code length and regular expression.
MatrixCodeRepeatedFilter	Y/N	Enable or disable the repeated code filtering function.
MatrixCodeROI Num	0–1	The number of QR code ROI

Parameter	Range/Option	Description
MatrixCodeROILeft/ Top/Right/Bottom	0—maximum resolution	You can draw the ROI area based on the four corner coordinate values of QR code ROI as shown in Figure 4-10. Note that this function is different from the multi-ROI (Figure 4-11).



Y: Enable this function; N: Disable this function.

Figure 4-12 ROI box

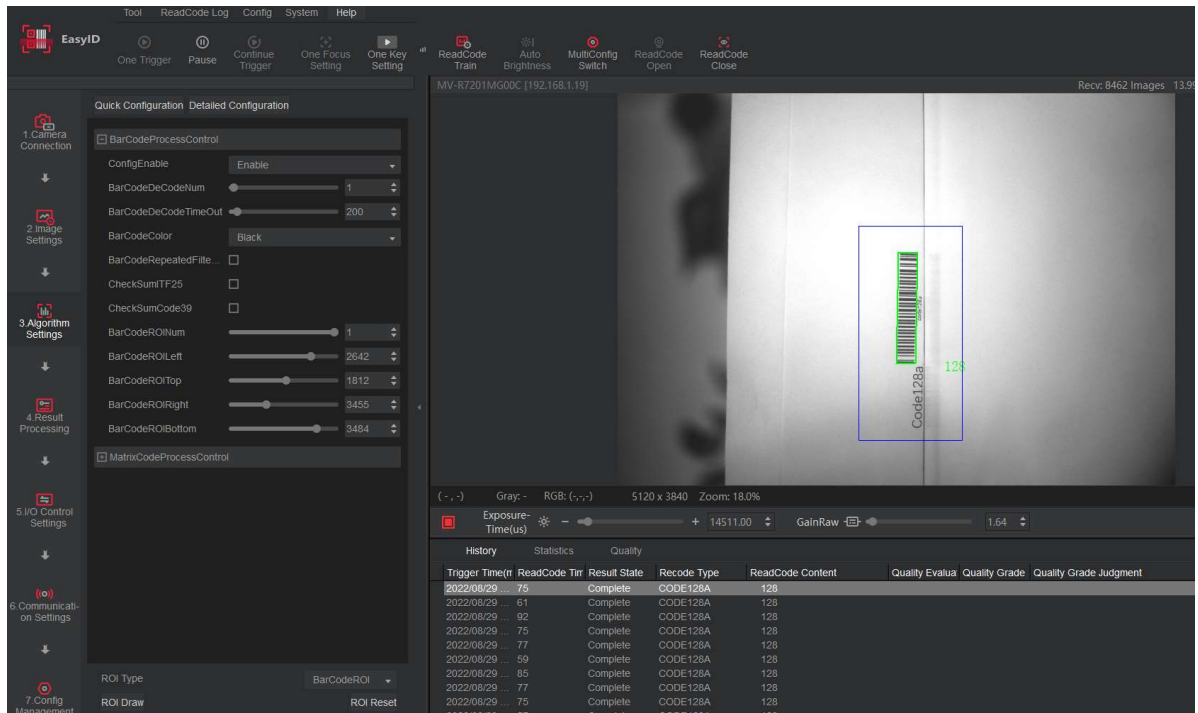


Figure 4-13 Multi-ROI box

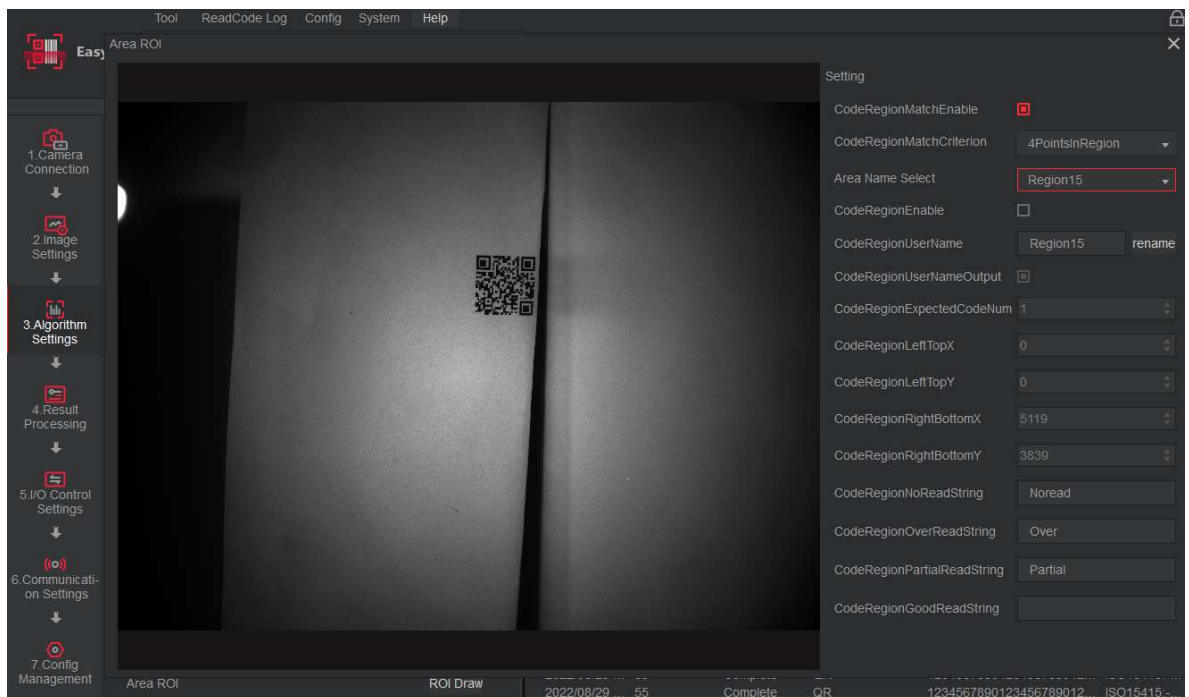


Table 4-7 Description of parameters

Parameter	Range/Option	Description
CodeRegionMatchEnable	Y/N	Enable or disable multi-region function.
CodeRegionMatchCriterion	4/3/2 Points in Region	It means that the number of corner points of the code successfully read in the area (there are 4 in total for one code). Take 3 points in region as an example. If all 3 points are in the region, the code reading is successful.
Area Name Select	Region 1–16	You can select the drop-down list to select the current operated region.
CodeRegionEnable	Y/N	Enable or disable the currently operated region.
CodeRegionUseName	Customizable	You can customize the region name.
CodeRegionUseNameOutput	Y/N	Enable or disable region name output.
CodeRegionExpectedCodeNum	Related to the number of codes that can be read	The expected number of codes that can be read per region.
CodeRegionLeft Top X/Y CodeRegionRightBottom X/Y	Related to the pixels of the device model	The coordinates of the upper left and lower right corners can be configured by directly selecting numbers or drawing box on the page.
CodeRegionNoReadString	Customizable	Outputs characters when the barcode is not read. You can customize it or keep it as default.
CodeRegionOverReadString	Customizable	Outputs characters when the number of codes exceeds the expected value. You can customize it or keep it as default.
CodeRegionPartialReadString	Customizable	Outputs characters when the number of codes is less than the expected value. You can customize it or keep it as default.
CodeRegionGoodReadString	Customizable	Outputs characters when the number of codes is the expected value. It is usually the default value.



Y: Enable this function; N: Disable this function.

4.6 Configuring Result Processing

This section allows you to set the detection results. Configuration items include transmission method, result packaging, end character of the strings, ISO15416 and code padding.

Figure 4-14 Code reading result configuration

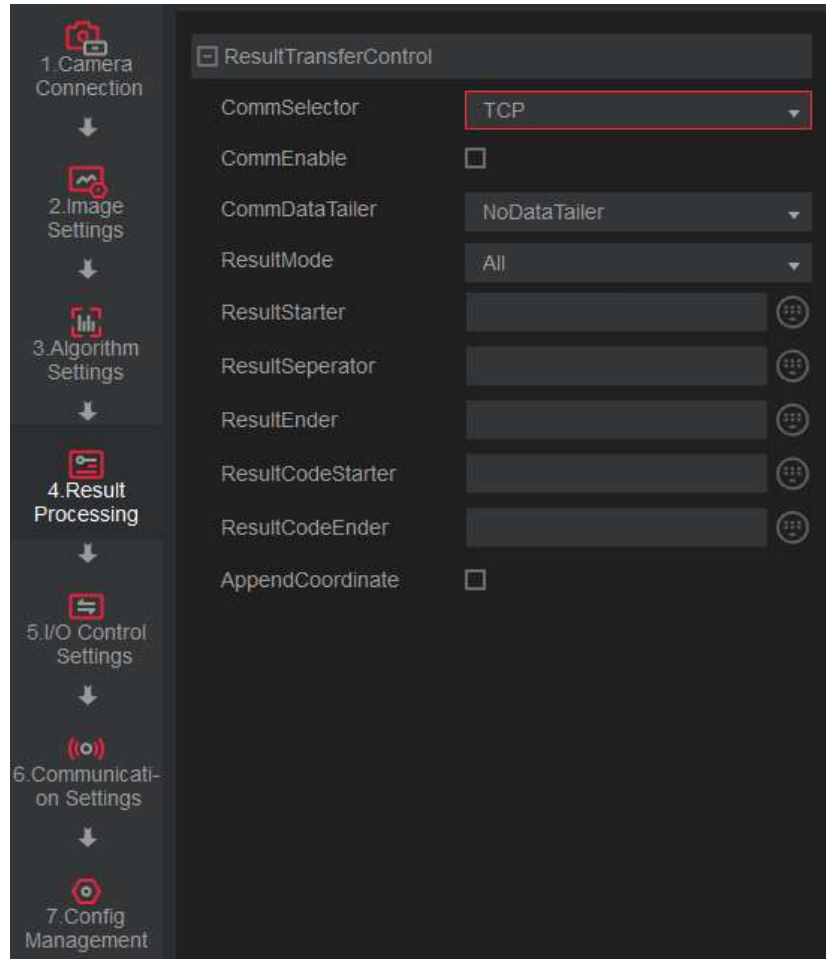


Table 4-8 Description of parameters

Parameter	Range/Option	Description
CommSelector	TCP/Profinet/ModbusTcp/FINS/EthernetIP/MC/Serial Port communication	Select the communication method when outputting data.
CommEnable	Y/N	Enable or disable the currently selected communication method.
CommDataTailer	No data/add carriage return/add line feed/add carriage return and line feed	The last tail data of the whole set of data

Parameter	Range/Option	Description
ResultMode	All/all read/partially read/partially or all read/partially or no read/no read/custom output	Control the data output logic according to the code reading result. All: Outputs data regardless of the result. All read: Outputs data only when the reading results meet all the configured conditions. Partially or full read: Outputs data as long as there is code reading. Partially or no read: The opposite of full read Logic. No read: No code is read.
ResultStarter	Customizable	The settings between the data can be customized or selected from the keypad list.
ResultSeperator	Customizable	The settings between the data can be customized or selected from the keypad list.
ResultEnder	Customizable	The settings between the data can be customized or selected from the keypad list.
ResultCodeStarter	Customizable	The settings of decoding results can be customized or selected from the keypad list.
ResultCodeEnd er	Customizable	The settings of decoding results can be customized or selected from the keypad list.
AppendCoordinate	Y/N	Enable or disable this function.



Y: Enable this function; N: Disable this function.

4.7 Configuring I/O Control Settings

This section mainly introduces I/O port and status.

Figure 4-15 I/O control

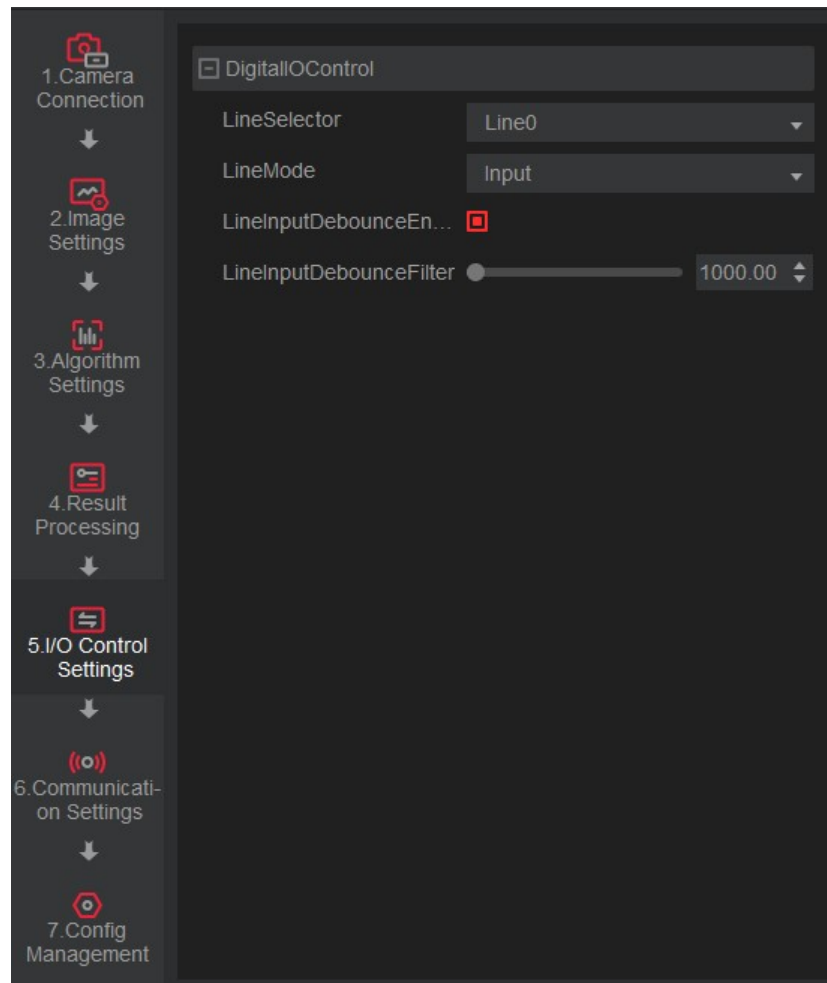


Table 4-9 Description of I/O control

Parameter	Range/Option	Description
Digital I/O Control	—	—
LineSelector	Select I/O channels.	The I/O channels might be different depending on the device models.
LineMode	Configure I/O functions	Select input or output. In general, you do not need to configure this parameter.
LineInputDebounceEnable	Y/N	Enable or disable this function.
LineInputDebounceFilter	Range: 1000-255000; unit: μ s.	Debounce time.



Y: Enable this function; N: Disable this function.

4.8 Communication Settings

Includes network communication, serial port, communication soft trigger settings.

Figure 4-16 Communication settings

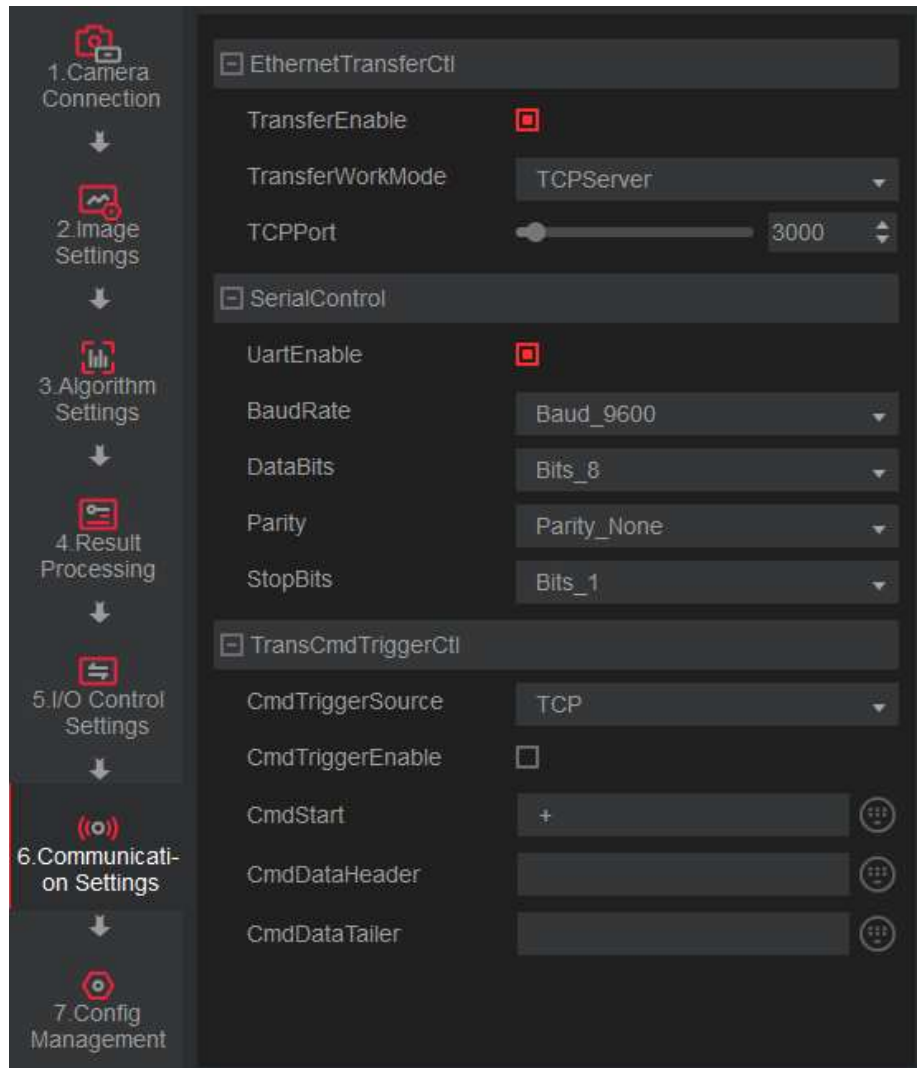


Table 4-10 Description of parameters

Parameter	Range/Option	Description
EthernetTransferCtl	—	—
TransferEnable	Y/N	Enable or disable network transmission.
TransferWorkMode	TCP Server/TCP Client/Profinet/Modbus Tcp/FinsUDP/FinsTCP/EthernetIP	Communication mode.
TCPPort	1024–65535	Port number.
SerialControl	—	—
UartEnable	Y/N	Enable or disable serial port transmission.

Parameter	Range/Option	Description
Serial Port Communication Mode	Common/HostLink	It is common mode by default.
BaudRate	9600/38400/57600/ 115200	It is 9600 by default.
DataBits	8/7/6/5	It is bit 8 by default.
Parity	None/Even/Odd	It is none by default.
StopBits	1/2	It is bit 1 by default.
TransCmdTrigerCtl	—	—
CmdTriggerSource	TCP/serial port	—
CmdTriggerEnable	Y/N	Enable or disable soft trigger.
CmdStart	Customizable	It can be customized or selected from the keypad list.
CmdDataHeader	Customizable	It can be customized or selected from the keypad list.
CmdDataTailer	Customizable	It can be customized or selected from the keypad list.



Y: Enable this function; N: Disable this function.

4.9 Configuration Management

After configuring the camera parameters, you can save to user configuration 1 or user configuration 2 as needed, and then load the corresponding configuration after startup. You can also restart the device to set the startup configuration and import and export related configuration files.

Figure 4-17 Configuration management

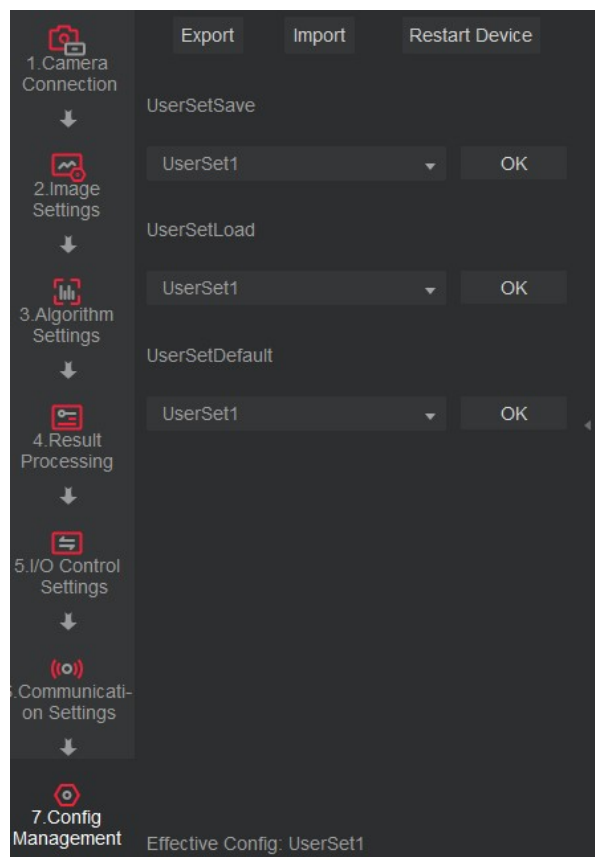


Table 4-11 Description of parameters

Parameter	Range/Option	Description
Export	—	Export configuration files.
Import	—	Import configuration files.
Restart Device	—	Restart the device.
UserSetSave	Default/UserSet1–8	Default: Common user configuration. Default settings might be different depending on the device models.
UserSetLoad	Default/UserSet1–8	Default: Common user configuration. Default settings might be different depending on the device models.
UserSetDefault	Default/UserSet1–8	Default: Common user configuration. Default settings might be different depending on the device models. We recommend you configure UserSetSave, UserSetLoad, and UserSetDefault as the same value, such as UserSet1.

4.10 Switching between Multiple Configurations

Figure 4-18 Switching configurations (1)

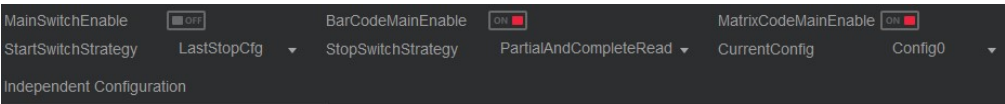


Figure 4-19 Switching configurations (2)

MainSwitchEnable ☐ Off BarCodeMainEnable ☒ On MatrixCodeMainEnable ☒ On

StartSwitchStrategy LastStopCfg StopSwitchStrategy PartialAndCompleteRead CurrentConfig Config0

Independent Configuration

Setting	Project	Config0	Config1	Config2	Config3	Config4	Config6	Config7
General	SwitchEnable	true	false	false	false	false	ise	false
Configuration	RepeatedCnts	1	1	1	1	1	1	1

Figure 4-20 Switching configurations (3)

MultiConfigPage

Default UserSet1 UserSet2 UserSet3 UserSet4 UserSet5 UserSet6 UserSet7 UserSet8

MainSwitchEnable ☐ Off BarCodeMainEnable ☐ Off MatrixCodeMainEnable ☒ On

StartSwitchStrategy LastStopCfg StopSwitchStrategy PartialAndCompleteRead CurrentConfig Config0

Independent Configuration

Setting	Project	Config0	Config1	Config2	Config3	Config4	Config5	Config6	Config7
General	SwitchEnable	true	false	false	false	false	false	false	false
Configuration	RepeatedCnts	1	1	1	1	1	1	1	1
BarCode	Ean13Enable	false	false	false	false	false	false	false	false
	Code128Enable	true	true	true	true	true	true	true	true
	Code39Enable	false	false	false	false	false	false	false	false
	Ean8Enable	false	false	false	false	false	false	false	false
	UpcaEnable	false	false	false	false	false	false	false	false
	UpceEnable	false	false	false	false	false	false	false	false
	Code93Enable	false	false	false	false	false	false	false	false
	Itf25Enable	false	false	false	false	false	false	false	false
	CodaBarEnable	false	false	false	false	false	false	false	false
	BarDeCodeNum	1	1	1	1	1	1	1	1
BarDeCodeTimeOut	1000	200	200	200	200	200	200	200	
ISP	ExposureTimes	9412.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us
	Gammas	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	GainRaws	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Figure 4-21 Switching configurations (4)

Setting	Project	Config0	Config1	Config2	Config3	Config4	Config5	Config6	Config7
ltr25Enable		false	false	false	false	false	false	false	false
CodaBarEnable		false	false	false	false	false	false	false	false
BarDeCodeNum		1	1	1	1	1	1	1	1
BarDeCodeTimeOut		1000	200	200	200	200	200	200	200
ExposureTimes		9412.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us	5000.00us
Gammas	ISP	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GainRaws		2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Inner0	InnerLight	Open	Open	Open	Open	Open	Open	Open	Open
Inner1		Open	Open	Open	Open	Open	Open	Open	Open
Inner2		Open	Close	Close	Close	Close	Close	Close	Close
Inner3		Close	Close	Close	Close	Close	Close	Close	Close
Mode		Flash	Flash	Flash	Flash	Flash	Flash	Flash	Flash
QrEnable		true	false	false	false	false	false	false	false
MqrEnable		false	false	false	false	false	false	false	false
DmEnable		false	true	true	true	true	true	true	true
MatrixDecodeNum		1	1	1	1	1	1	1	1
MatrixDecodeTimeOut		1000	500	500	500	500	500	500	500
VersionMinQr		1	1	1	1	1	1	1	1
VersionMaxQr		40	10	10	10	10	10	10	10
VersionMinDm		1	1	1	1	1	1	1	1
VersionMaxDm		30	24	24	24	24	24	24	24
MatrixCodeColor		Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto
MatrixImageMirror		Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Table 4-12 Description of parameters

Parameter	Range/Option	Description
MainSwitchEnable	ON/OFF	Only when it is on can configuration switching take effect. 8 configuration groups: Default; UserSet1–UserSet1. In every group, you can configure the parameters of Config 0–7. Note: After enabling it, the parameters in the group configuration will be locked and commissioning is not allowed.
StartSwitchStrategy	LastStopCfg/FirstStop	Start polling with the parameter when you last stopped polling/Start polling with the parameter when you first polled
BarCodeMainEnable	ON/OFF	Enable or disable barcode.
MatrixCodeMainEnable	ON/OFF	Enable or disable matrix code.
StopSwitchStrategy	Partial or all/All	Stop output in these two cases.
CurrentConfig	Config 0–7	8 configuration groups: The configuration groups that the

		reader is currently using.
Independent Configuration	Config 0–7	Different parameters can be configured in different groups according to the actual situation to facilitate polling.

4.11 Running Camera Visual Mode

4.11.1 Visual Operating Mode

Click **ReadCodeOpen** or **ReadCodeClose** to switch the visual operating mode of the camera. When code reading starts, the camera executes the algorithm and returns the image and processing results.



Click **ReadCodeClose**, the camera stops executing the algorithm and only displays images. You can also directly adjust exposure and gain values from the quick operation bar on top.

Figure 4-22 Quick operation bar

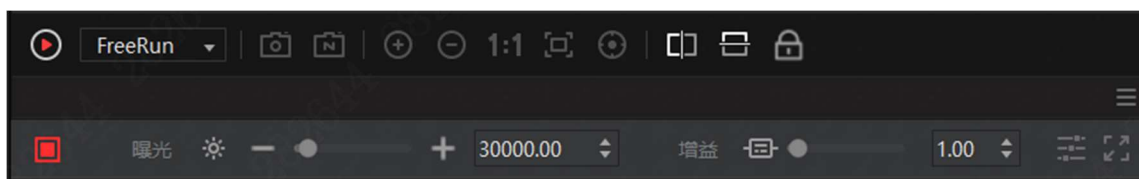


Figure 4-23 Visual mode (1)

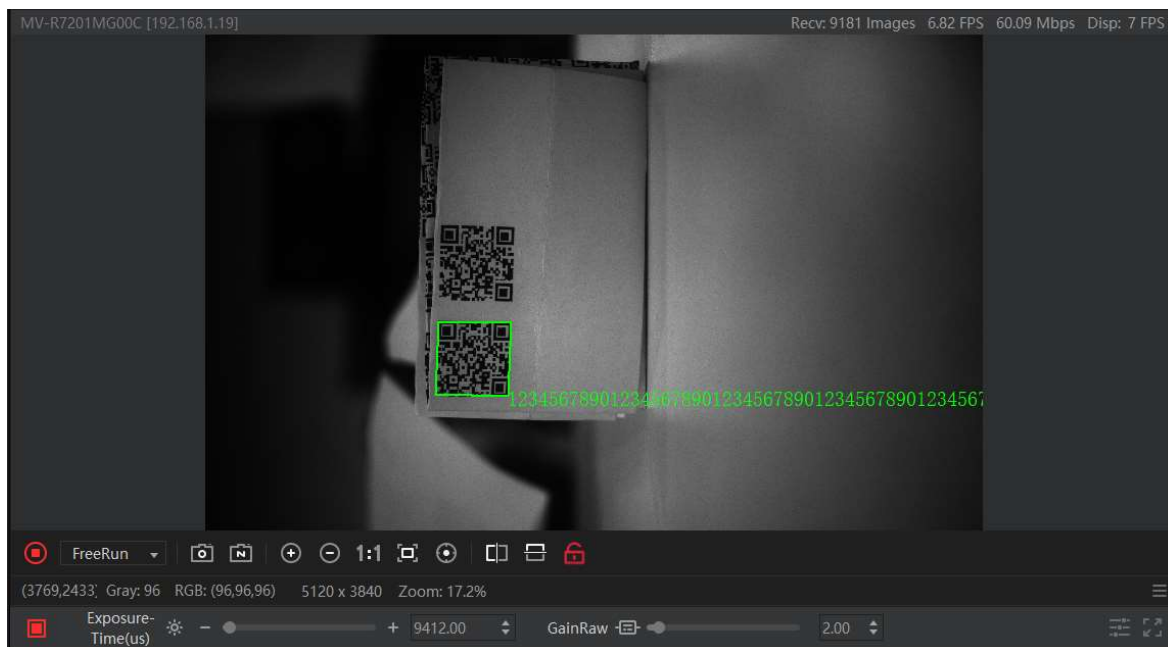
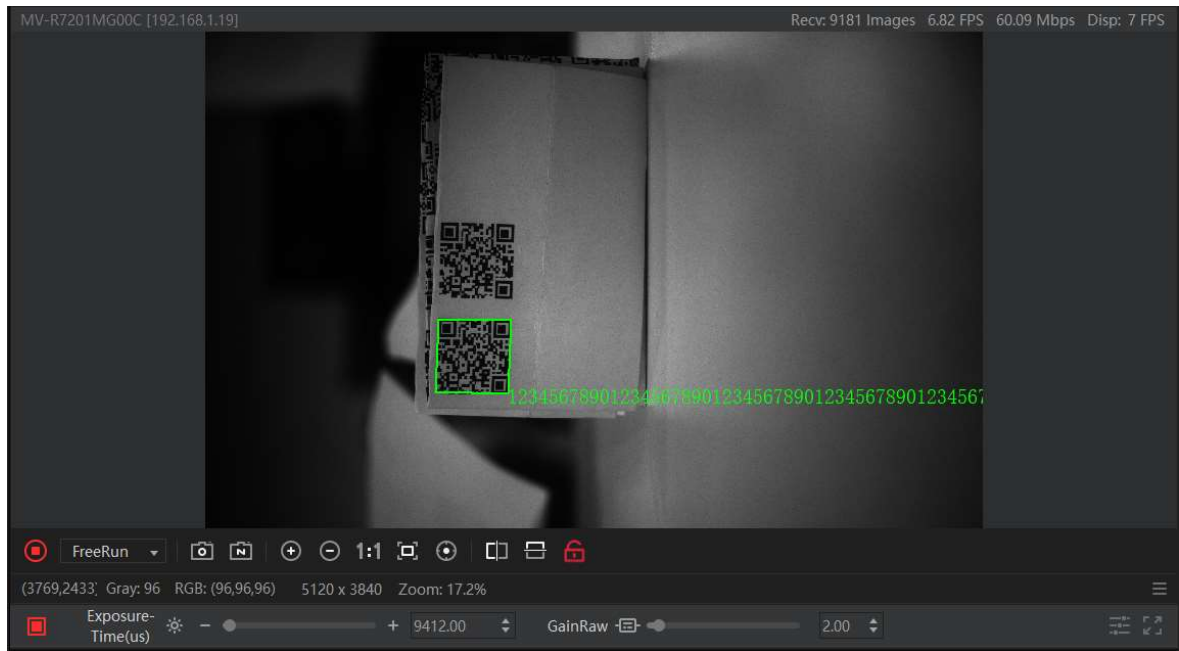


Figure 4-24 Visual mode (2)



4.11.2 Configuring Image Display

- Click  to view the image.
- When code reading starts, algorithm results will overlay on the image.
- Stream statistics show in the image status information, including image resolution, and coordination and pixel value of the point where the cursor is.
- Click  or , or scroll the mouse wheel to zoom in or out the image.

Figure 4-25 Image display

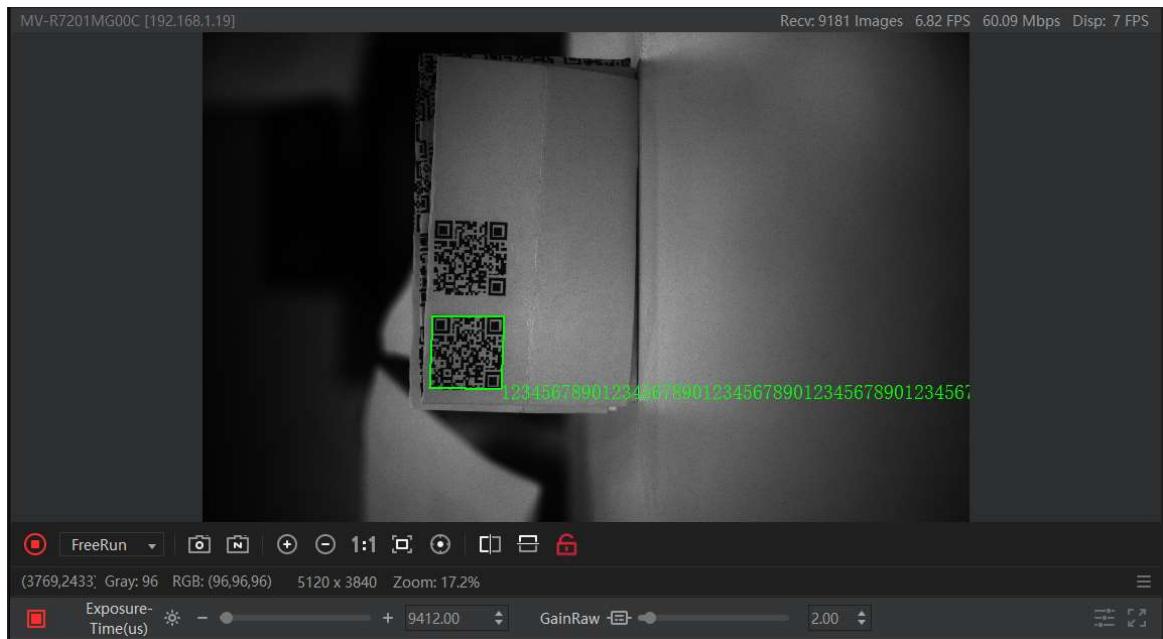
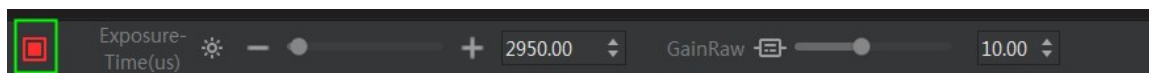


Table 4-13 Description of tool bar

Icon	Description
	Play the video image. Click FreeRun and select play mode among FreeRun , SingleFrame , MultiFrame and PhaseMode as needed.  You can only select play mode when the image is paused.
	Stop playing the video image.
	Capture images one by one or in batches.
	Zoom in/out.
	Displays the image in original size.
	Displays the image according to the window size.
	Displays the image at the center of the window.

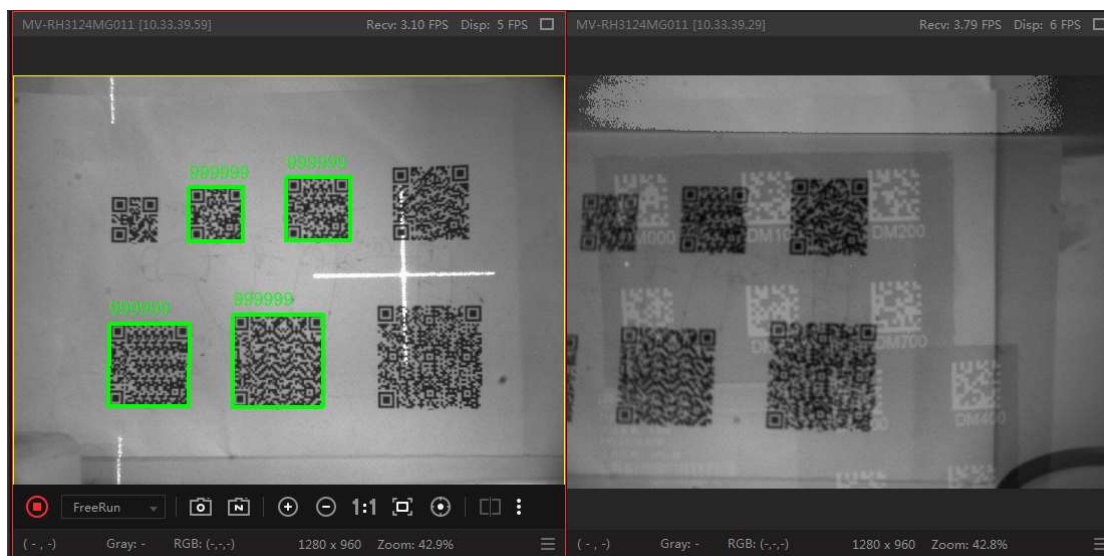
The client supports displaying images of up to 16 cameras simultaneously. Right-click the window split icon or connect cameras from the list to view images in splits.

Figure 4-26 Split images



For multiple camera images, all displayed configurations and results belong to the selected camera. You can view those of other cameras by switching camera.

Figure 4-27 Multiple camera images display in splits



4.11.3 Algorithm Detection Result

- Algorithm processing results can be displayed in lists.
- Click **Quality** to view the quality evaluation details.
- Click **Export** to export the results to your PC.
- Set filters to view data you want.

Figure 4-28 Algorithm result

History					Statistics		
Trigger Time(ms)	ReadCode Time(r)	Result State	Recode Type	ReadCode Content	Quality Paramter	Score	Grade
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Dec		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Sc		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Dcd		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Mine		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Mod		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Minr		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Def		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Cc		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Cm		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Rm		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Fpd		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_An		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Gn		

When code reading is started, enable **Statistics**, and then the related data is displayed. Click **Statistics Reset** to clear all data and start collecting again.

Figure 4-29 Statistics

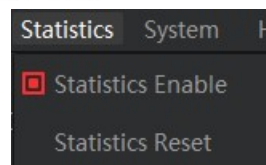


Figure 4-30 Statistics interface

History		Statistics	
15773		1601	14172
Total		Succeed	Failed
			10.15%
			Rate

Select a record of the read code, click **Quality** at the upper-right corner of the result section to view details of quality evaluation.

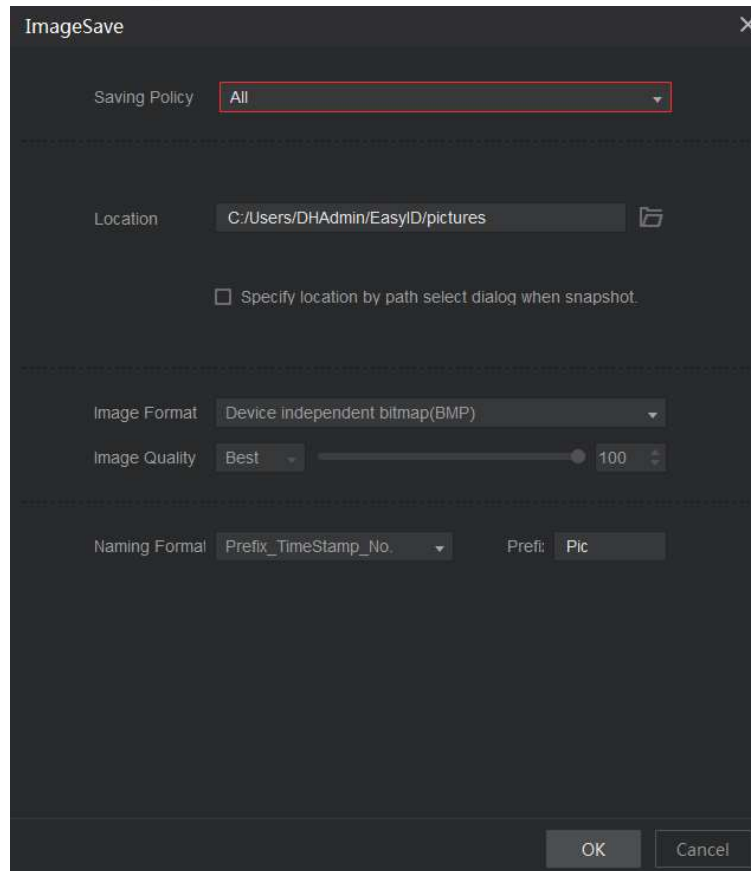
Figure 4-31 Information display

History					Statistics		
Trigger Time(ms)	ReadCode Time(r)	Result State	Recode Type	ReadCode Content	Quality Paramter	Score	Grade
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Dec		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Sc		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Dcd		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Mine		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Mod		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Minr		
2021/08/03 18:1...	7	NoRead	Barcode		Bar_ISO15416_Def		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Cc		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Cm		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Rm		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_Fpd		
2021/08/03 18:1...	7	NoRead	Barcode		QR_DPM_An		

4.12 Saving Image

Select **System > Image Save**.

Figure 4-32 Image save interface



You can save the image as original data, TIFF image, BMP image and JPEG image.

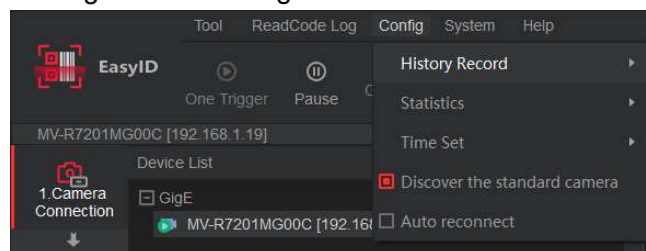
Select saving strategy from **All**, **Pass**, **Fail** and **Partial**.

Images can be saved in 2 ways.

- Click  under the image window to save all the images captured by the reader.
- Click  under the image window to save an image after every click.

4.13 Configuration Functions

Figure 4-33 Configuration functions



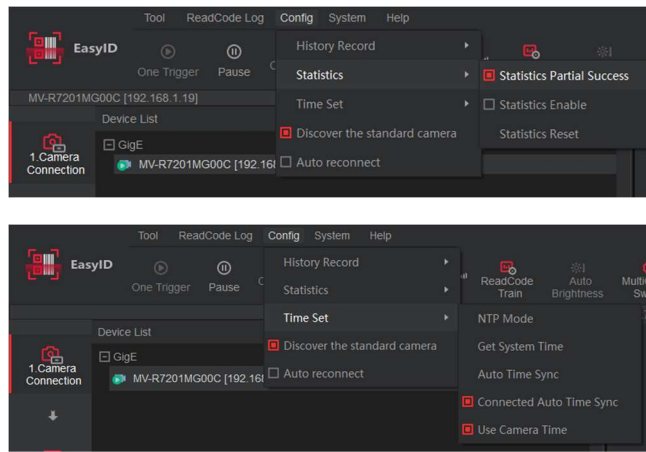
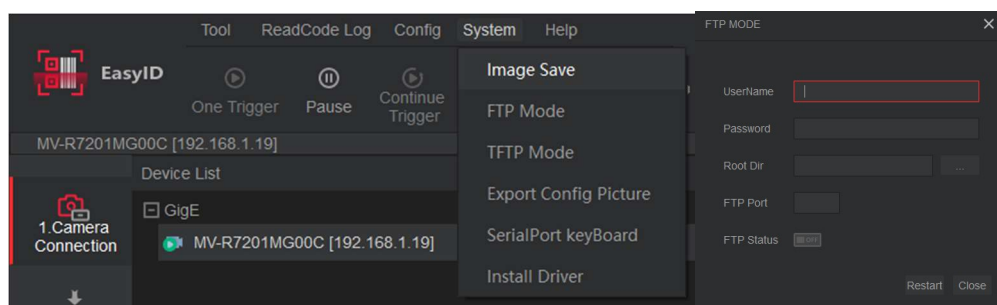


Table 4-14 Description of parameters

Parameter	Description
History Record	Enable single-item time consuming
Statistics	Reading partial barcodes means the read is successful (when this function is disabled, if 10 barcodes need to be read and 8 barcodes are actually read, the barcode reading will fail). You can enable, disable, and clear statistics.
Time Settings	NTP Mode, Get System Time, Auto Time Sync, Connected Auto Time Sync, and Use Camera Time are available.
Discover the standard camera	Select it to find earlier version cameras.
Auto Reconnect	Enable the function, and then the camera can be automatically reconnected after disconnection.

4.14 System Functions

Figure 4-34 System functions



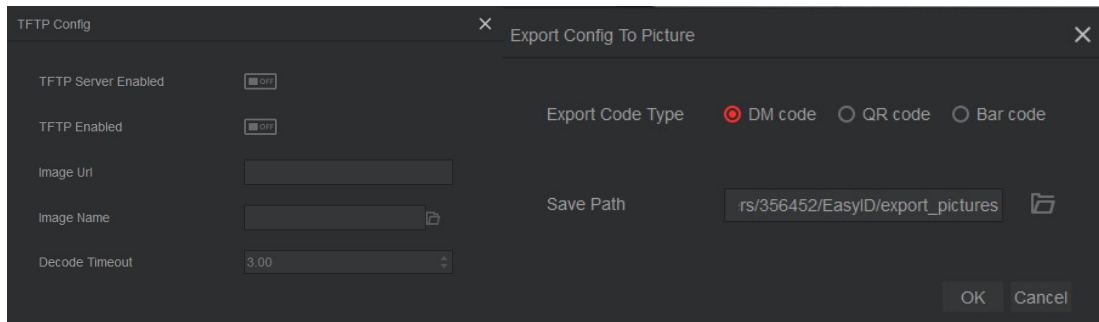


Table 4-15 Description of parameters

Parameter	Description
Image Save	You can save images according to the reading status, and select the storage path.
FTP Mode	Start the FTP server that comes with EasyID, which is generally used with the FTP image storage function of the camera. FTP image storage: You can store images according to different reading status, and customize the image name and storage path.
TFPT Mode	Start the FTP server that comes with EasyID. The commissioning function is encrypted.
Export Config Picture	Export the parameter configuration as a picture (Code128/DM or QR code), and the code reading device can read and configure the parameters by reading the code.
SerialPort keyBoard	Output focus or specify output to a certain position with mouse.
Install Driver	Install drivers.

Figure 4-35 Virtual keyboard output tool

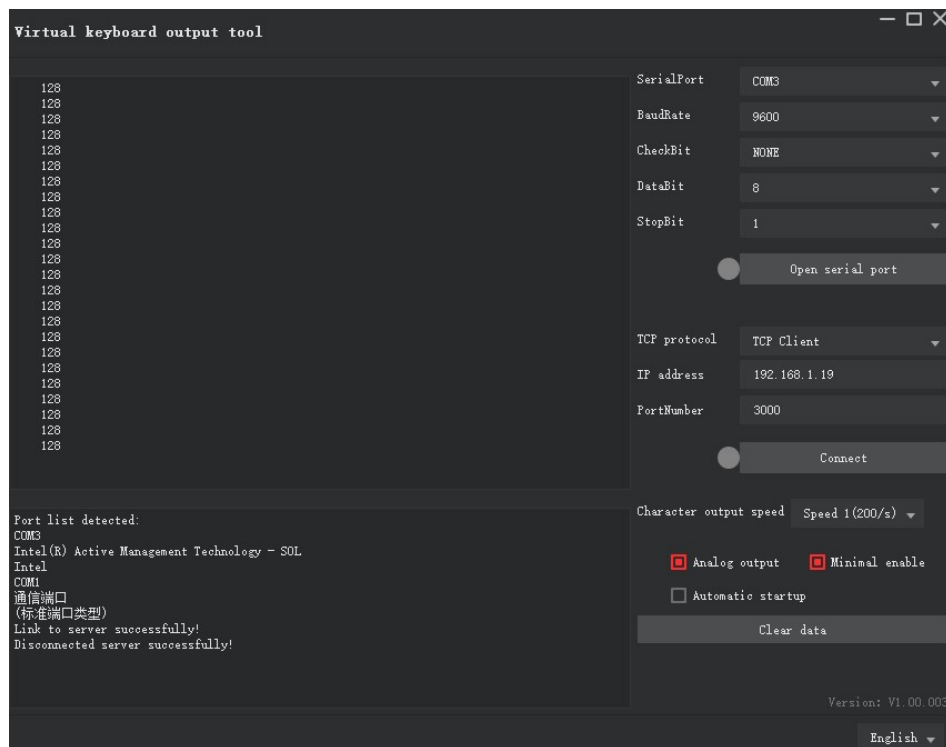


Table 4-16 Description of parameters

Parameter	Description
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Virtual serial port keyboard	For details on serial port configuration, see "4.8 Communication Settings". You can click Open serial port , and then use virtual keyboard through serial port.
Virtual network port keyboard	For details on network port configuration, see "4.8 Communication Settings". You can click Connect , and then use virtual keyboard through network port.
Character output speed	5 levels are optional: Speed 1 (200/s); Speed 2 (250/s); Speed 3 (330/s); Speed 4 (500/s); Speed 5 (1000/s). Under the premise of normal use, low speed transmission is preferred, which is more stable and reliable.
Analog output	Enable or disable output function of virtual keyboard.
Minimal enable	Enable or disable the minimization function.
Automatic startup	Enable or disable automatic startup.
Clear data	Click to clear the data.
Change language	Change the language between English and Chinese.
Display column	On the left is the display bar for content display.

5 Main Functions



- 3 user levels, including **Beginner**, **Expert** and **Guru**. Each corresponds to slightly different sets of parameters.
- Grayed out parameters cannot be changed under the current running mode.
- This chapter is used as a professional technical document. After subsequent supplements, you can contact the relevant technical personnel to obtain it.

6 FAQ

- No readers detected.

Reason:

- ◇ The reader does not start up.
- ◇ The reader and the client are not under the same LAN.

Solutions:

Restart the reader. Check whether the network connection is correct and indicator status is normal. Make sure that the reader and the client is under the same LAN.

- Readers detected but failed to connect.

Reason:

- ◇ The reader does not start up.
- ◇ The reader and the client are not under the same network segment.
- ◇ The reader is connected with other clients.

Solutions:

Restart the reader, modify its IP address to connect it to the same network segment as the client. You can also try disconnecting other connected clients and connect the current client again.

- Camera disconnection.

Reason:

- ◇ Network adapter or cable failures.
- ◇ Unmatched configurations of network adapter and reader.

Solutions:

- ◇ Perform cross verification for hardware. If failure happens, replace the corresponding hardware.
- ◇ Check the NIC configuration.

- The effect of the algorithm does not live up to expectation.

Reason:

- ◇ The image FoV or illumination does not meet the requirements.
- ◇ Illogical parameter configuration or algorithm failed to start.

Solutions:

- ◇ Check the reader FoV and the illuminator. Review the reader parameters such as trigger mode, trigger delay, input smoothing, exposure and gain and illumination.
- ◇ Check whether the algorithm is started. Review the algorithm parameters, including type, scale, timeout, number, filter and error code rate.

- Cannot enable external trigger.

Reason:

- ◇ Incorrect cable connection of external trigger.
- ◇ The trigger mode is not set to external trigger.

Solutions:

Select the required trigger mode and make sure that the external cable connection is correct.

7 Cleaning and Maintenance

This section mainly introduces the clean and replacement of the color filter.

To avoid dust on the image sensor, a piece of fully transparent glass is installed in black and white cameras. A low-pass color filter, which lets colors with lower frequency than NIR (Near Infrared) pass, is installed in color cameras. If you want to use a different color filter or not use a color filter at all, replace the whole color filter bracket outside the image sensor (no need to disassemble the cover).

If the color filter surface requires cleaning, use special detergent made from optical materials so that no marks left after cleaning.

Appendix 1 Cybersecurity Recommendations

Cybersecurity is more than just a buzzword: it's something that pertains to every device that is connected to the internet. IP video surveillance is not immune to cyber risks, but taking basic steps toward protecting and strengthening networks and networked appliances will make them less susceptible to attacks. Below are some tips and recommendations on how to create a more secured security system.

Mandatory actions to be taken for basic device network security:

1. Use Strong Passwords

Please refer to the following suggestions to set passwords:

- The length should not be less than 8 characters;
- Include at least two types of characters; character types include upper and lower case letters, numbers and symbols;
- Do not contain the account name or the account name in reverse order;
- Do not use continuous characters, such as 123, abc, etc.;
- Do not use overlapped characters, such as 111, aaa, etc.;

2. Update Firmware and Client Software in Time

- According to the standard procedure in Tech-industry, we recommend to keep your device (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the device is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
- We suggest that you download and use the latest version of client software.

"Nice to have" recommendations to improve your device network security:

1. Physical Protection

We suggest that you perform physical protection to device, especially storage devices. For example, place the device in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable device (such as USB flash disk, serial port), etc.

2. Change Passwords Regularly

We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

3. Set and Update Passwords Reset Information Timely

The device supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

4. Enable Account Lock

The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

5. Change Default HTTP and Other Service Ports

We suggest you to change default HTTP and other service ports into any set of numbers between 1024~65535, reducing the risk of outsiders being able to guess which ports you are using.

6. Enable HTTPS

We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

7. MAC Address Binding

We recommend you to bind the IP and MAC address of the gateway to the device, thus reducing the risk of ARP spoofing.

8. Assign Accounts and Privileges Reasonably

According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

9. Disable Unnecessary Services and Choose Secure Modes

If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

- SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
- SMTP: Choose TLS to access mailbox server.
- FTP: Choose SFTP, and set up strong passwords.
- AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

10. Audio and Video Encrypted Transmission

If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

Reminder: encrypted transmission will cause some loss in transmission efficiency.

11. Secure Auditing

- Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
- Check device log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

12. Network Log

Due to the limited storage capacity of the device, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

13. Construct a Safe Network Environment

In order to better ensure the safety of device and reduce potential cyber risks, we recommend:

- Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.
- The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
- Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.

- Enable IP/MAC address filtering function to limit the range of hosts allowed to access the device.