BA (/ BC) 50 series code reader users manual

Version: ELCO-USG-01

Release: Sep. 2023

catalogue

1 purpose

This manual is designed to help users and field engineers quickly install, configure, and use the BA (/ BC) 50 series image-type code reader.

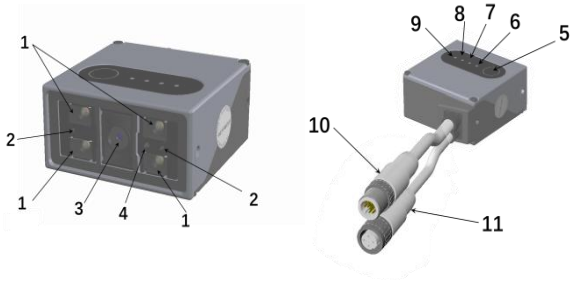
2 product description

2.1 List of product models

model	resolution ratio	focal distance	illuminant	communication	Support code system
BC50-K80RP-MRS	1280x800	80mm	Red polarization	Serial port + Ethernet, support RS232 / TCP / IP and Profinet communication	Support for 1D / 2D codes 1D- Code 128 (GS1-128) Code 93 Code 39 CODABAR EAN/UPC Interleaved 2 of 5 2D- Data Matrix(ECC200) QR
BC50-K130RP-MRS		130mm			
BC50-K200RP-MRS		200mm			
BC50-K80R-MRS		80mm	Red routine		
BC50-K130R-MRS		130mm			
BC50-K200R-MRS		200mm			
BC50-K80B-MRS		80mm	Blue routine		
BC50-K130B-MRS		130mm			
BC50-K200B-MRS		200mm			
BC50-K80W-MRS		80mm	White routine		
BC50-K130W-MRS		130mm			
BC50-K200W-MRS		200mm			
BA50-K80RP-MRS		80mm	Red polarization		Only 1D code is supported Code 128 (GS1-128) Code 93 Code 39 CODABAR EAN/UPC Interleaved 2 of 5
BA50-K130RP-MRS		130mm			
BA50-K200RP-MRS		200mm			
BA50-K80R-MRS		80mm	Red routine		
BA50-K130R-MRS		130mm			
BA50-K200R-MRS		200 mm			

Table1. List of product models

2.2 main unit



1-Built-in light source
2-Position the LED lights
3-The lens
4-Read the code status light
5-Function key
The 6-PWR power supply indicator lamp
The 7-COM communication indicator light
8-OK Read code status indicator lamp
9-R / T, status light
10-M12-17 P-pin-connecting cable
11-M12-4D-hole-connecting line

Fig1.BA (/ BC) 50 Location and name of main components

3 lighting system

3.1 Built-in light source

The BA (/ BC) 50 is equipped with a built-in light source for the auxiliary lighting of the code reader. As shown in FIG. 1, the lighting system is composed of four LED light sources and divided into upper and lower groups, which can be controlled separately by software commands. The optional lighting modes are:

(1) Only on the upper light source in strobe mode;
(2) In the strobe mode, only open the lower light source;
(3) Turn on all the light sources in the strobe mode;
(4) Turn on all the light sources in the normal bright mode;
(5) Turn off all light sources.

pay attention to

When lighting, please do not look directly at this LED light source, which may damage the eyes. In addition, in the use process, it can also be closed through the software.

3.1.1 Locate LED lights

This series uses two red positioning LED lights for auxiliary positioning of the reader, the LED lights through function keys (see section4) To open or close.

pay attention to

If this positioning LED lamp is lit, please do not look at the lamp, which may harm the eye. In addition, it can also be closed through function keys and software.

3.2 The LED status indicator lamp

The following table lists all the functions of the LED status indicators:

grade	name	function	explain
6	P WR	Power supply status indicator lamp	After the power is on, the light is always on green
7	C OM	Communication status indicator light	A green strobe indicates a network communication A yellow strobe indicates an RS232 communication
8	O K	Read the code status indicator lamp	Green indicates a successful code reading Red indicates a failed code read
9	R/ T	The Ready / Triger indicator light	Red color indicates the Read y The green color indicates the T rigger

Table2The.LED status indicator lamp status

4 function key

To facilitate the configuration, BA (/ BC) 50 also provides function keys. This feature preset three modes and distinguished by key time:

function	Key length	explain	pilot lamp
Position the LED lights on / off	1-3 s	Assist for adjusting the installation position of the code reader	COM lights up
automatic exposure	4-6 s	Automatically configure the exposure parameters for the image settings, Group 1	OK lights up
Code self-learning	7-9 s	Automatically configure the decoding parameters for the image settings, Group 1	R / T, and the light is on

Table3. Description of the function button

pay attention to

1. Function key trigger is only used in the offline state (software not open).

2. The key duration is defined as the time interval between pressing and releasing the function key. If the button exceeds 9s, the device will be ed again.

3. When selecting the mode, the selection can be confirmed by the indicator status of the long button, such asTable 3As shown. The different indicator lights are in turn on and orange during the long press selection mode. For example, to enter automatic exposure mode, press the function button until the OK light turns orange.

4. After successfully entering the target mode, the corresponding indicator light of this mode switches from orange always bright to orange flashing, indicating that the mode is running.

5. If the mode ends successfully, the indicator light corresponding to the mode flashes green. Click the function key again (double click to turn off the location LED light), you can save the current configuration and write it to the upper computer software configuration program, and the indicator light returns to the normal operating mode.

6. After entering the target mode, you can terminate or exit by clicking the key again. If the selected mode is still running, terminate it and return to the normal flow. Cannot cancel if the selected mode runs successfully.

5 install

5.1 Install the reader

1. Select the appropriate location to install the reader within the recommended read distance range.
2. For bracket mounting, attach the reader to the holder for detailsFig 2-Fig 4。
3. In order to facilitate the subsequent adjustment of the position and Angle of the code reader, please do not tighten the screw for the time being.
4. According to the images acquired by the reader (see section**11**), Further adjust the read distance of the reader.
5. Hold the screws to ensure the reader (and mounting bracket) remains in the desired position.

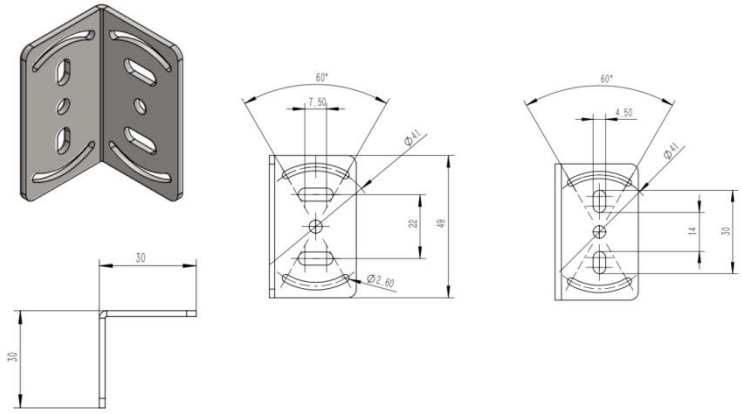


Fig2. BA (/ BC) 50 Installation bracket size (mm)

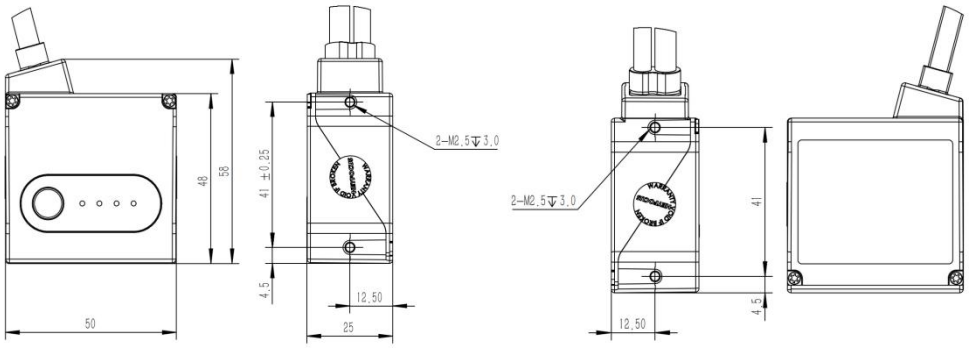


Fig3. BA (/ BC) 50 size (mm)

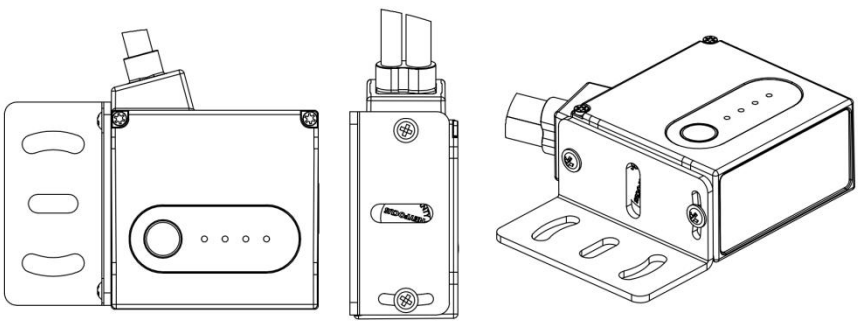


Fig4. Schematic diagram of the stent installation

5.2 Connect the HW interface

The BA (/ BC) 50 series simultaneously supports a variety of communication interfaces: RS232 serial port, Ethernet TCP / IP, industrial Ethernet Pr ofinet, and hardware PNP / NPN interface.

5.2.1 The PIN pin and wiring definition for the hardware I / O

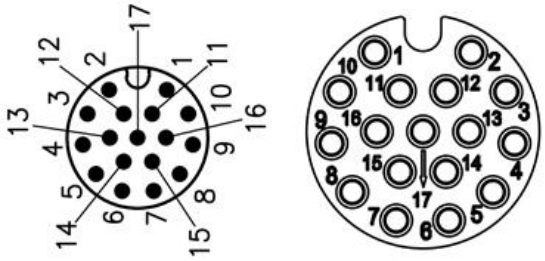


Fig5. PIN of power & I / O cable, foot definition

	PIN	Line color	description
supply electricity	17	brown	Vdc, input power cathode +
	15	Brown white	Vdc, input power cathode +
	13	blue	Power supply negative electrode GND / RS232 GND
	16	Blue and white	Power supply negative electrode GND / RS232 GND
RS232 I/O	5	pink	RS232_TX
	6	yellow	RS232_RX
n.a.	7	green	obligate
	8	white	obligate
PNP/NPN import	10	purple	DIN _ 1 _ A: Port A for the PNP / NPN 1st route input
	12	hoary	DIN _ 1 _ B: Port B for PNP / NNP 1st route input
	11	skewbald	DIN _ 2 _ A: Port A for PNP / NPN Route 2 input
	9	red	DIN _ 2 _ B: Port B for PNP / NPN Route 2 input
	14	black and	ISO _ GND photocoupling ground

		white	
PNP/NPN output	3	black	DOUT _ 1 _ A: Port A for the PNP / NPN 1st route output
	1	orange	DOUT _ 1 _ B: Port B for PNP / NPN # 1st output
	2	Orange white	DOUT _ 2 _ A: Port A for PNP / NPN 2nd way output
	4	gray	DOUT _ 2 _ B: Port B for PNP / NPN 2nd way output

Table4. Interface definition of the power & I / O cables

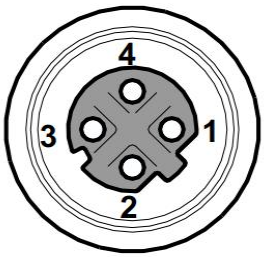


Fig6. Ethernet cable PIN pin definition

PIN	Line color	description
1	Orange white	TX_P
2	Green white	RX_P
3	orange	TX_N
4	green	RX_N

Table5. Interface definition of the Ethernet cable

5.2.2 RS232 Serial port

If the signal is triggered or output by serial port of RS232, the field engineer may refer to itTable 6, Direct connect the RS232 signal to the connecting line M12-17P.

P IN	Line color	connecting pin
5	pink colour	RS232_TX
6	yellow	RS232_RX
13/16	Blue / blue white	RS232_GND

Table6. RS232 input and output

5.2.3 Ethernet TCP / IP and industrial Ethernet Profinet

For the Ethernet TCP / IP and Profinet, connect the M12-4D-hole-connecting cable using the optional accessory M12-4D-pin-RJ 45 network port.

5.2.4 Hardware PNP / NPN trigger

BA (/ BC) 50 also supports two PNP / NPN trigger inputs. Users and site engineers can select any one-way or two simultaneous inputs as required. Each of the inputs can arbitrarily choose one of the trigger modes.

pay attention to

The voltage of the trigger signal shall be in the range of 12 V-24V, and its current shall exceed 5 mA.

5.2.4.1 PNP detonate by contact

When triggered by PNP, the connection of the input end can be referred toTable 7AndTable 8:

PIN	Line color	connecting pin
10	purple	PNP trigger signal
14	black and white	Common with the negative power source of the trigger signal

Table7. PNP Trigger-1st way input DIN _ 1

PI N	Line color	connecting pin
11	skewbald	PNP trigger signal
14	black and white	Common with the negative power source of the trigger signal

Table8. PNP Trigger-2nd way input DIN _ 2

5.2.4.2 NPN detonate by contact

When triggered by NPN, the connection of the input end can be referred toTable 9AndTable 10:

PIN	Line color	connecting pin
10	purple	NPN trigger signal
12	hoary	Positive positive source
14	black and white	Common with the negative power source of the trigger signal

Table9. NPN trigger-1st way input DIN _ 1

PIN	Line color	connecting pin
11	skewbald	NPN trigger signal
9	red	Positive positive source
14	black and white	Common with the negative power source of the trigger signal

Table10. NPN trigger-2nd way input DIN _ 2

pay attention to

If the external NPN trigger signal has its own power supply (i. e., not sharing the same power source with the code reader), it is necessary to ensure that the negative power source of the NPN, the power source of the code reader (13-blue / 16-blue and white) and the ISO optical coupling ground (PIN 14-black and white) of the code reader coexist.

5.2.5 Hardware PNP / NPN output

BA (/ BC) 50 simultaneously supports two PNP / NPN output. Users and field engineers can select 1 output or use 2 output simultaneously. Each of the output can arbitrarily choose one of the output modes.

5.2.5.1 PNP output

If the PNP output is required, the connection of the output end can be referred toTable 11AndTable 12:

PIN	Line color	connecting pin
3	black	Positive positive source
1	orange	PNP output signal

Table11. PNP output-1st way output DOUT _ 1

PIN	Line color	connecting pin
2	Orange white	Positive positive source
4	gray	PNP output signal

Table12. PNP output-2nd way output DOUT _ 2

5.2.5.2 NPN output

If the NPN output is required, the connection of the output end can be referred toTable 13AndTable 14:

PIN	Line color	connecting pin
3	black	NPN output signal
1	orange	Connected to the negative electrode of the code reader power source

Table13. NPN output-1st way output DOUT _ 1

PIN	Line color	connecting pin
2	Orange white	NPN output signal
4	gray	Connected to the negative electrode of the code reader power source

Table14. NPN output-2nd way output DOUT _ 2

5.3 computer configuration

The host running the ELCO configurator shall meet the following requirements:

- Operating system: Windows 7 or higher
- System type: 64-bit
- Processor: at least 2.00 GHz
- Memory: at least 1GB RAM
- Hard drive: 1 GB (32-bit); 2GB (64-bit)
- Screen resolution: Please use the system-recommended resolution
- Communication: 100 Base-T Ethernet

6 performance parameter

Table15. BA (/ BC) 50 performance parameters

model	The BA (/ BC) 50 series		
surface	size		50 mm x 48 mm x 25mm
	material quality		aluminium
source	service voltage		12 - 24Vdc
I/O	TCP/IP		
	Profinet		
	RS232		The RS232 level
	PNP/ NPN	Enter * 2	V_{IN}: 12 - 24Vdc, I_{IN} ≥ 5mA.
		output *2	V_{OUT}: 5 - 24Vdc, I_{OUT}140 mA (average current).
sensor	**Resolution: CMOS 1280x800 Imaging speed: 60 frames / s**		
Read the specifications	Support code system		Data Matrix (ECC 200), QR (Model 2).
			Code 128 (GS1-128), Code 93, Code 39, CODABAR, EAN/UPC, Interleaved 2 of 5
	minimum resolution		5 mil
	Read the distance		See **Table 16**, **Table 17**, **Table 18**
environment	operating ambient temperature		0 ~ 50 ℃
	Storage environment temperature		-20 ~ 70 ℃
	relative humidity		<= 90% (no condensate)
	IP grade		IP65

Table16. BC50-K80R-MRS read distance (V at 80mm focal length: 61x38mm)

code system	exposure time	gain	Barcode resolution	Read the distance	The proximal field of view (Horizontal x vertical)	Far end field of view (Horizontal x vertical)
Code39	500 us	4	6 mil	30 mm - 100 mm	27 x 18 mm	81 x 52 mm
			8 mil	30 mm - 120 mm	27 x 18 mm	95 x 62 mm
			12 mil	40 mm - 155 mm	34 x 22 mm	122 x 79 mm
			20 mil	70 mm - 200 mm	56 x 36 mm	155 x 100 mm
Code128	500 us	4	6 mil	40 mm - 110 mm	34 x 22 mm	88 x 57 mm
			8 mil	40 mm - 130 mm	34 x 22 mm	102 x 67 mm
			12 mil	50 mm - 145 mm	41 x 27 mm	114 x 75 mm
			20 mil	80 mm - 215 mm	61 x 38 mm	166 x 105 mm
Interleaved 2 of 5	500 us	4	8 mil	35 mm - 125 mm	30 x 20 mm	99 x 64 mm
			12 mil	35 mm - 155 mm	30 x 20 mm	122 x 79 mm
			20 mil	50 mm - 205 mm	41 x 27 mm	162 x 100 mm
Data Matrix (ECC200)	500 us	4	5 mil	50 mm - 75 mm	41 x 27 mm	59 x 38 mm
			7.5 mil	45 mm - 100 mm	38 x 24 mm	81 x 52 mm

			10 mil	40 mm - 115 mm	34 x 22 mm	91 x 59 mm
			15 mil	35 mm - 135 mm	30 x 20 mm	106 x 70 mm
			20 mil	30 mm - 150 mm	27x18 mm	118 x 77 mm

*** Note: The above table is the test results of the Grade A test card on the reader along the X axis. The code resolution, contrast level and other environmental factors will affect the test results.**

Table17. BC50-K130R-MRS read distance (field of view at 130mm focal length: 95x60mm)

code system	exposure time	gain	Barcode resolution	Read the distance	Proximal field of view (horizontal x vertical)	Distal FOV (horizontal x vertical)
Code39	500 us	4	6mil	90 - 155 mm	72 x 46 mm	119 x 77 mm
			8mil	70 - 165 mm	56 x 36 mm	127 x 82 mm
			12 mil	70 - 220 mm	56 x 36 mm	168 x 108 mm
			20 mil	70 - 260 mm	56 x 36 mm	199 x 128 mm
Code128	500 us	4	6 mil	95 - 155 mm	77 x 49 mm	119 x 77 mm
			8 mil	75 - 175 mm	72 x 46 mm	135 x 87 mm
			12 mil	70 - 210 mm	66 x 42 mm	160 x 103 mm
			20 mil	85 - 280 mm	68 x 44 mm	212 x 136 mm
Interleaved 2 of 5	500 us	4	8mil	80 - 170 mm	66 x 42 mm	131 x 85 mm
			12mil	70 - 220 mm	56 x 36 mm	168 x 108 mm
			20mil	70 - 310 mm	56 x 36 mm	235 x 150 mm
Data Matrix (ECC200)	500 us	4	10 mil	90 - 165 mm	72 x 46 mm	127 x82 mm
			15 mil	90 - 215 mm	72 x 46 mm	164 x 105 mm
			20 mil	90 - 235 mm	72 x 46 mm	180 x 114 mm

*** Note: The above table is the test results of the Grade A test card on the X axis of about 10 degrees of the reader. The resolution, contrast level and other environmental factors of the code will affect the test results.**

Table18. BC50-K200R-MRS read distance (field of view at 200mm focal length: 158 x100 mm)

code system	exposure time	gain	Barcode resolution	Read the distance	Proximal field of view (horizontal x vertical)	Distal FOV (horizontal x vertical)
Code39	500 us	6	12 mil	100 - 220 mm	83 x 52 mm	173 x 109 mm
			20 mil	90 - 320 mm	74 x 47 mm	248 x 157 mm
Code128	500 us	6	12 mil	100 - 215 mm	83 x 52 mm	169 x 107 mm

			13 mil	100 - 230 mm	83 x 52 mm	180 x 114 mm
			15 mil	100 - 245 mm	83 x 52 mm	192 x 121 mm
			20 mil	95 - 310 mm	79 x 50 mm	242 x 153 mm
Interleaved 2 of 5	500 us	6	12mil	100 - 210 mm	83 x 52 mm	165 x 105 mm
			20mil	95 - 350 mm	79 x 50 mm	270 x 172 mm
			24mil	90 - 415 mm	74 x 47 mm	320 x 204 mm
Data Matrix (ECC200)	500 us	6	15 mil	125 - 215 mm	102 x 64 mm	169 x 107 mm
			20 mil	120 - 250 mm	98 x 62 mm	195 x 124 mm
			24 mil	120 - 270 mm	98 x 62 mm	210 x 133 mm

*** Note: The above table is the test results of using the Grade A test card to tilt the code by about 15 degrees on the X axis of the reader. The resolution, contrast level and other environmental factors of the code will affect the test results.**

7 Packaging list and accessories

7.1 packing list

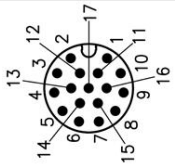
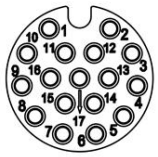
Table19. packing list

number	content	number
1	A BA (/ BC) 50 image-type code reader	1
2	mounting bracket	1
3	M2.5X4 Dishead self gasket screw	4

The dimensions of the readers and supports are shown in the section**5.1**hit the targetFig 2-Fig 4。

7.2 Optional accessories

Table20. Optional accessories

content	model	length	Pin	
Power supply & I / O cables 17 core, M12 transfer fly line	MRSCAB-PIO-F02	2 m		
	MRSCAB-PIO-F05	5 m	1-Orange 2-Orange white 3-Black 4-Gray 5-Pink 6-Yellow 7-Green 8-White 9-Red	10-Purple 11-Red and white 12-Grey white 13-Blue 14-Black and white 15-Brown white 16-Blue and white 17-Brown
Ethernet cable 4 core, M12 to RJ 45	MRSCAB-ETH-M02	2 m		1-Orange white 2-Green and white 3-Orange 4-Green
	MRSCAB-ETH-M05	5 m		

8 ELCO configurator Software interface

After opening the program, the software main interface such asFig 7As shown.

Fig7. Software main interface

The following functions are provided on the left side of the main interface:

- **Automatic search: Automatic search for devices.**
- **Manual search: manually.**
- **Tool: for auxiliary test serial port and network communication.**
- **Help: Switch between languages and help documents.**

On the right is the equipment information area and the task list area respectively. The device information area shows the model number, serial number, and firmware version information of the current connected device. The task list is related to the firmware updates for the configuration files and devices.

9 Find the device

ELCO configurator There are two optional device search methods for the communication between the host and the reader: automatic search and manual search.

9.1 dead work

Before finding equipment and establishing communication, all:

Check 1: Confirm that the current firewall settings of the host do not hinder communication between ELCO configurator software and device.

- If the host does not open the firewall, the communication between the software and the device is not affected.

1. During the first run of ELCO configurator, the main opportunity popup alarm, e. gFig 8As shown, select the appropriate network type (private or public network) and click Allow Access.

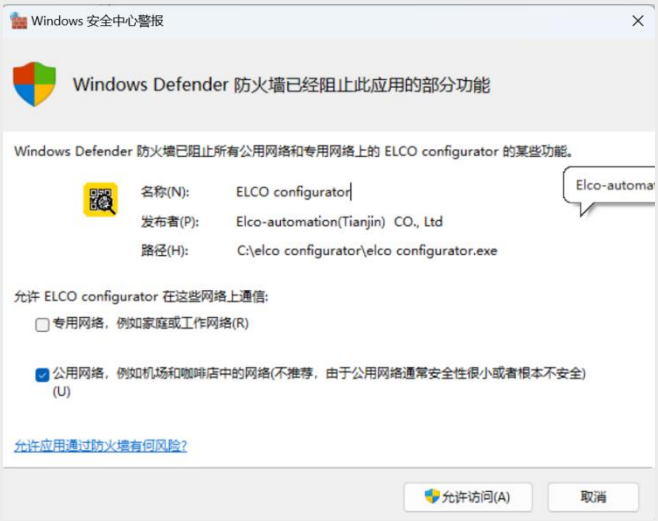


Fig8. Windows Security Center alert

2. Follow the following guidelines to add ELCO configurator to the firewall.
   a) Go to Start> Control Panel, for the Win10 system, you can enter "Control panel" directly in the search box.
   b) Enter all control panel items> Windows Defender Firewalls, e. gFig 9As shown.
   c) Check the network currently connected (public or private).
   d) Click to allow apps or features through the Windows Defender firewall.
   e) Enter allowed applications and functions e. gFig 10As shown, click Change Settings.
   f) Check the ELCO configurator application, and check the corresponding configuration

according to the current network.

g) If the ELCO configurator does not appear in the list, allow another application to add it to the list by clicking.

h) Click OK to save the changes.

- If the host has the firewall enabled, add ELCO configurator to the application and functions allowed by the firewall to help the device connect.

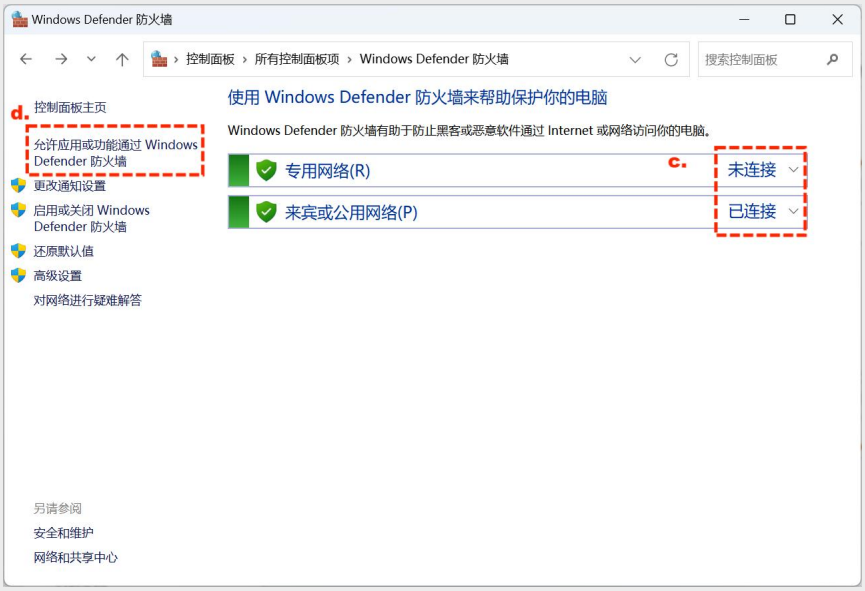


Fig9The. Windows Defender Firewall

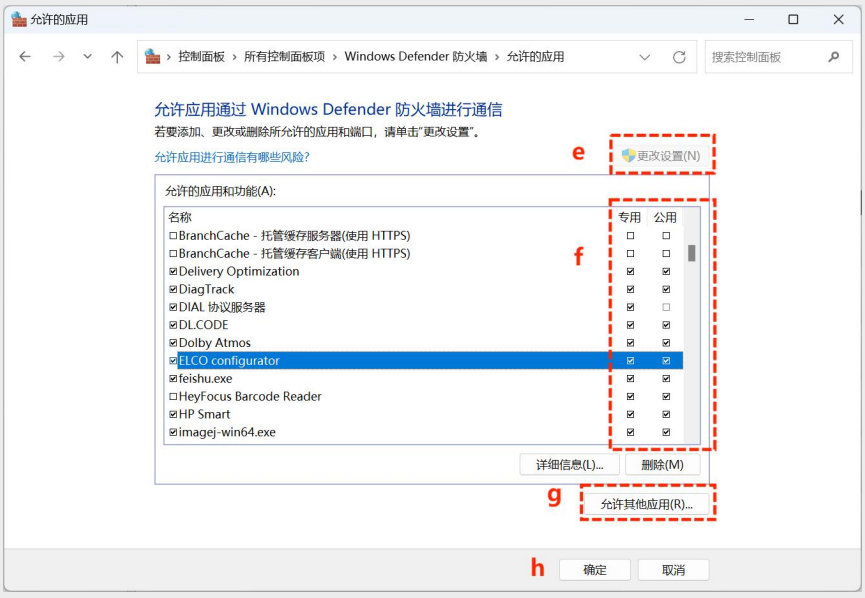


Fig10. Allowed applications and functions

pay attention to

If the application is not added to the application and function allowed by the firewall, or the network selected when adding the application is not the current connected network, an error will be reported when connecting to the device, such asFig 11As shown.

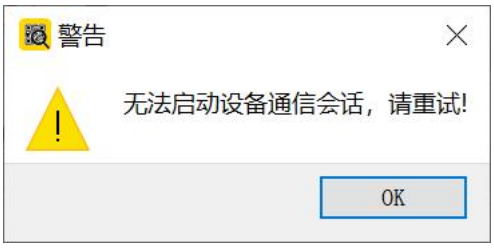


Fig11. Starting the device communication session failed

Check 2: Ensure that the IP address of the reader is compatible with the host address, or that the IP address of the reader is in the same network field as the address of the host.

- If the reader is directly connected to the host through the Ethernet port, the default IP address of the reader is 192.168.5.25, and the IP address of the host shall be updated to 192.168.5.X.
  a) If the IP address of the host is other fields within the 192.168.X.X range, it can be paired by any of the following methods: 1) Change the IP address of the host to make it compatible with the reader.2) The subnet mask is 255.255.0.0.
  b) If you have modified the IP address of the reader, change the IP address of the host to the matching address.
- If the reader is connected to the host via the server, query the IP address that the router assigns to them and change the subnet mask of the host to 255.255.0.0.

How to change the IP address of the host?

1. Enter the Start> Control Panel. For the Win10 system, you can directly enter "Control Panel" in the search box.
2. Go to Network and Internet> Network and Internet> Network and Sharing Center> Change Configurator settings.
3. Select the local connection network that is connected to the reader, and right-click the properties.
4. in compliance withFig 12. As shown, go to the Internet Protocol Version 4 (TCP / IPv4)> attribute.
5. Change the IP address and the subnet mask, and save it.

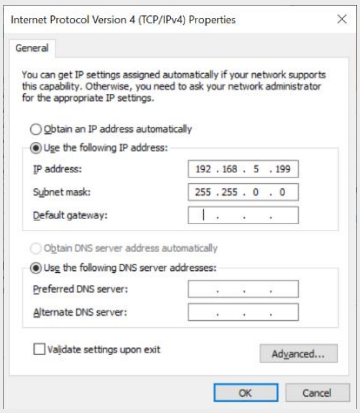


Fig12. Change the host IP address

9.2 automatic searching

1. in compliance withFig 13As shown, click AutoFind, ELCO configurator will find and list all devices in the LAN network.
2. Select the device to be connected in the device selection area and click Connect to device ().
3. Once the connection is established, the details of the code reader are printed in the current device details. All of the task options of the task list will become visible, as shown in FigFig 14。

Fig13. interface

a) If you want to disconnect the device, click to disconnect the device ().

b) If you want to change the device environment variable, click on the.

Fig14. After connecting the equipment

pay attention to

In the connection, the IP address of the reader should be compatible with the host, otherwise an error will occur, such asFig 15As shown. Please the previous content for fault analysis.

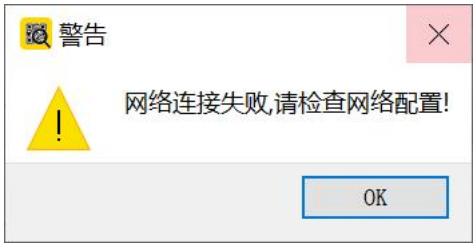


Fig15. The network connection has failed

9.3 Manual search

1. Such asFig 16As shown, click Manual Find, in the pop-up window:

(1) Enter the IP address of the code reader. The factory-based default IP address is 192.162.5.25. If you have changed the IP address of the reader, enter the appropriate correct IP address.

(2) If the host has multiple network cards, please select the host address that matches the code reader, otherwise it will jump out of the boxFig 17Error reminder shown.

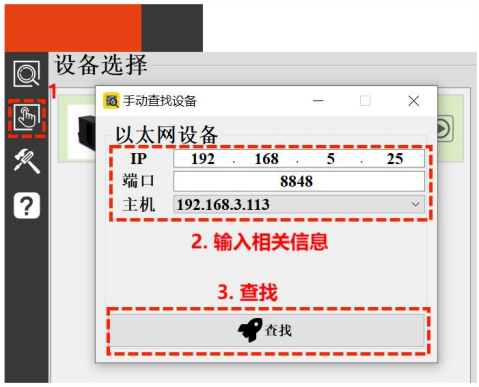


Fig16. Manually find the devices

2. After the device is found, click Connect to the device to realize the connection. 

pay attention to

Make sure that the readers IP address is compatible with the hosts IP address.

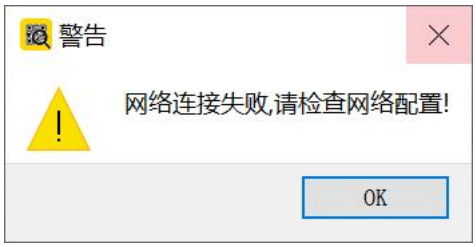


Fig17. Network connection failed

9.4 Edit Network Configuration

Click Edit Network Configuration () to configure the network environment parameters in the open device environment configuration interface:

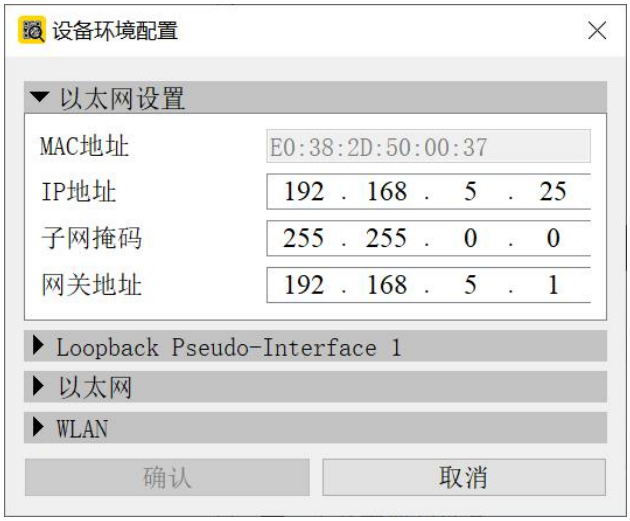


Fig18. Equipment environment configuration

- Change the IP address of the reader: Enter the appropriate IP address and the appropriate gateway address.
- If the Subnet mask is 255.255.255.xxx, the last field of the Gateway Address cannot be set to 255.

10 task list

The task list on the main interface contains the following:

Fig19. task list

- **Open the device configuration: set the configuration items of the reader, namely the basic settings and the advanced configuration. Where: The basic setting focuses on the image and decoding related configuration, including the general setting, decoding configuration and data output format. Please refer to the chapter for details 11.2**. Advanced configuration is responsible for the configuration information related to the input (trigger signal) output, including the configuration parameters of the internal trigger, RS232, TCP / IP, PNP / NPN / N, Pro finet and other input and output. Please refer to the chapter for details**12**Advanced configuration。
- **Download configuration to computer: Save the current configuration information to the local host, please refer to the section for details**13**maintenance**。
- **Update configuration to device: Update configuration items to device from local host, see section for details**13**maintenance**。
- **Restore factory settings: restore the reader configuration to the default factory settings, see section for details**13**maintenance**。
- **Download firmware to computer: Save the current firmware to the local host, please refer to the section for details**13**maintenance**。
- **Update firmware to device: Update specified version of firmware to device from disk / directory, see section for details**13**maintenance**。

11Basic Settings

Go to Task List> Open Device Configuration to the default basic settings page.in compliance withFig 20As shown, the basic setting focuses on image and decoding related configuration, including conventional settings, decoding configuration, data output format and statistical data configuration.

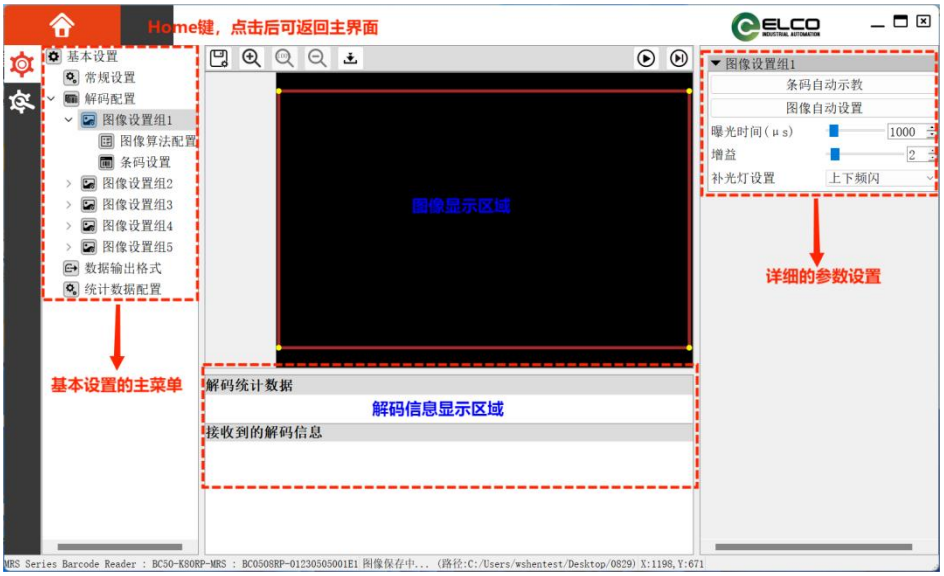
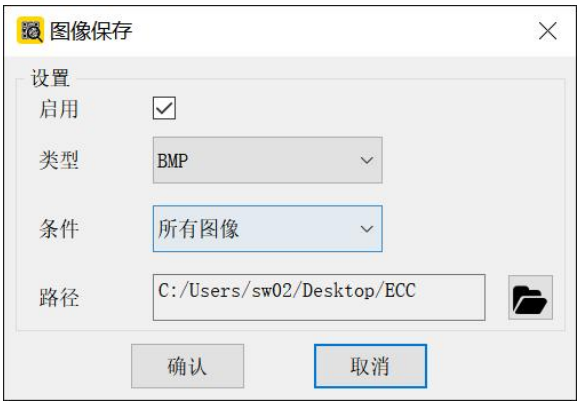
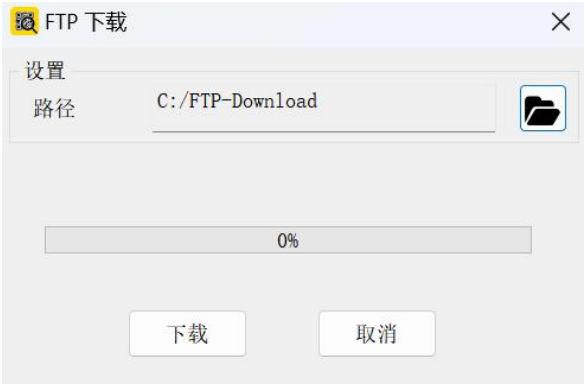


Fig20. Basic Settings

In addition to the configuration of the above parameters, a row of function buttons is provided above the image display area for the debugging of the configuration:

	Cycle start	Continuous photography and decoding. Once enabled, the icon switches to a cycle stop icon. Unable to modify the image configuration and decoding parameters during loop startup. If you want to modify, you should first click the pause button before the subsequent operation.
	Single start	Single photography and decoding
	Image saving settings	Save the collected image to a local directory or a disk. 

<table>
<tr><td></td><td></td><td>Fig21. save the image
in compliance withFig 21As shown, you can configure the image to be saved with the following options:
● Enable: If enabled, images that will automatically meet the currently configured types and conditions during the drawing.
● Type: To determine the format of the image preservation (. BMP,. PNG perhaps. JPG).
● Condition: Determine which images will be saved (all images, successful or failed images).</td></tr>
<tr><td>  </td><td>Amplification display</td><td>Image is displayed by zoom-in. As shown, in the upper right corner of the image is provided a thumbnail of the image display area, where the red box shows the range of the current image display area.
 
1) Change the display area by dragging the slider (below and right) and the red box in the upper right corner.
2) The size of the display area can be changed by clicking the proportional display icon and reducing the display icon.</td></tr>
<tr><td>  </td><td>Equal proportions are shown</td><td>Display by actual image size (default)</td></tr>
<tr><td>  </td><td>Minimize the display</td><td>Shout display image, effective on enlarge display only.</td></tr>
</table>

	FTP download	Download the images on the reader ontology FTP server locally.  Fig22. Download images in compliance withFig 22As shown, select the path for the image saved (folder must be empty) and click Download.

11.1 The regular setting

in compliance withFig 23, General settings include image size, pixel fusion, and image mirrors.

- **Image size: Cut the image by entering a numerical value or by dragging the blue selection box.**
  - Box Start X: Defines the horizontal coordinates (in pixels) in the upper left corner of the image cut area.
  - Box starting point Y: Defines the vertical coordinates (in pixels) in the upper left corner of the image cut area.
  - Box width: Defines the width of the image cut area (in pixels).
  - Box height: Defines the height of the image clipping area (in pixels).
- **Pixel fusion: do 2x2 fusion of images.**
- **Vertical mirror: processes and displays reflections along the vertical direction.**
- **Horizontal mirror: processes and displays reflections along the horizontal direction.**

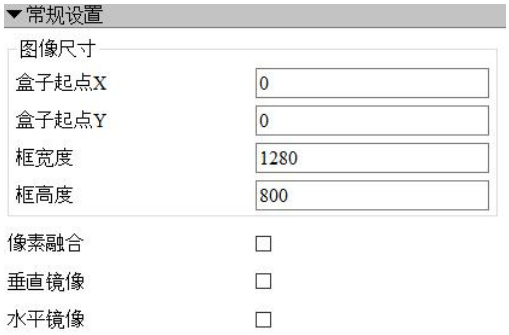


Fig23. Regular Settings

11.2 Decode configuration

Five sets of image settings are provided in the decoding configuration. When decoding, the software will execute the selected image setting group until the decoding is successful, and the decoding result status is red, green and yellow (red: decoding failure; green: successful decoding; yellow: unset decoding).

For example, such asFig 24As shown, because only group 2 parameters are enabled and decoded successfully, only the parameter configuration of image setting group 2 takes valid and group 2 is marked green.

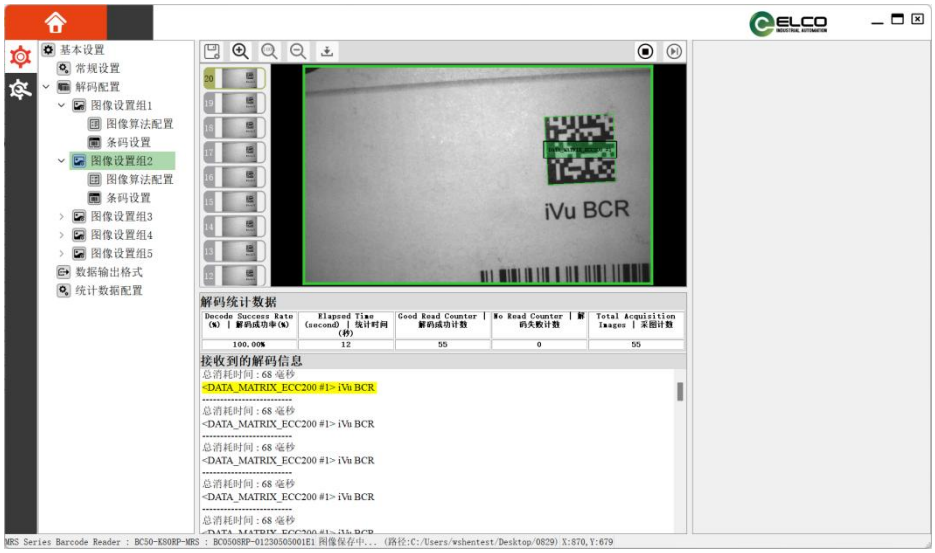


Fig24. Decode configuration

If 1,2, and 3 are checked simultaneously, the multiple sets of parameters are enabled: image set group 1: set the decoding failure, image set group 2: set the code successfully, set the software will first execute the image set group 1, and then execute the image set group 3, group 2 without the code does not take the drawing.

in compliance withFig 25As shown, because group 1 failed, group 2 failed not taken, and group 3 was decoded, group 1 is marked red, Group 2 yellow, and Group 3 green.

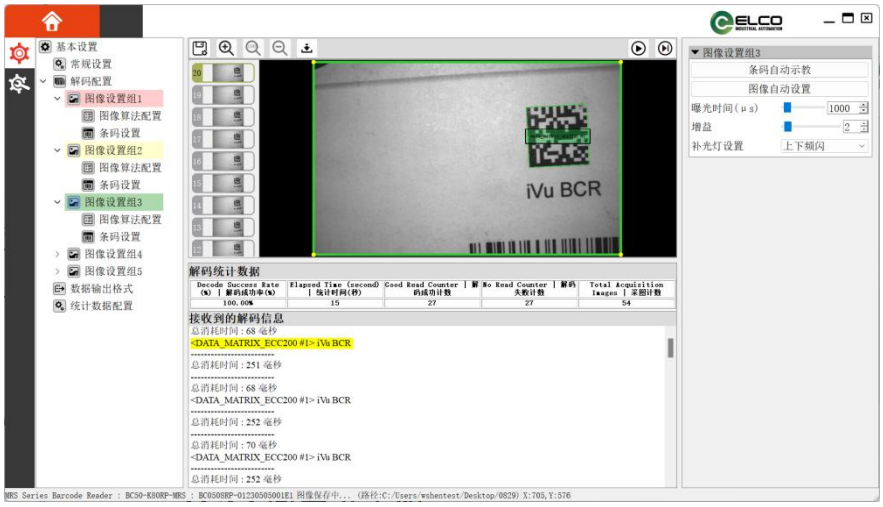


Fig25. Enables multiple image parameter groups

11.2.1 Image setting group

Each parameter group includes image settings, image algorithm configuration and barcode settings, and both can be manually configured separately. The image setting contains all the parameters related to the image quality, the image algorithm configuration provides some decoding image pre-processing method that can be used to help to read better, and the barcode setting is used to select the type of barcode.

In addition, to help with the configuration, the software provides the barcode automatic teaching function, including the image automatic setting and the code self-learning function. The specific operations are performed as follows:

1. Click the barcode under the selected image setting group.
2. In the open barcode auto display interface, select the barcode type to be decoded.
3. Click Start and wait for the current progress to become 100%.
4. Click Yes in the save results interface to save the current results, e. gFig 26。

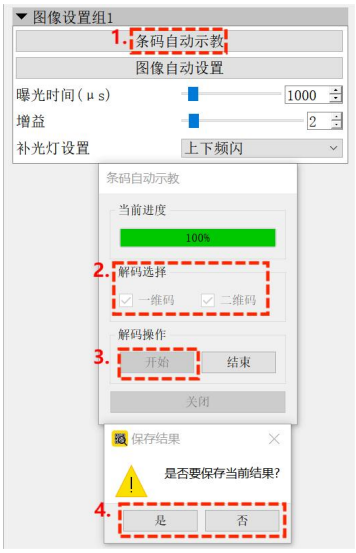


Fig26. Bar code automatic teaching

11.2.1.1 Image Settings

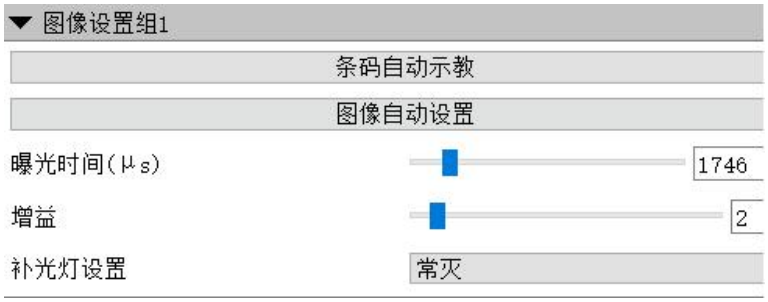


Fig27. Image Settings

Image quality was determined by exposure time, gain and fill light settings.as shown in the figureFig 27As shown, using the image setting group 2 as an example, the image setting can be automatically configured by the system (image automatic setting) or the image quality parameters can be manually adjusted:

- **Image automatic setting: the software automatically adjusts the image parameters. Specific operations such as**Fig 28As shown.

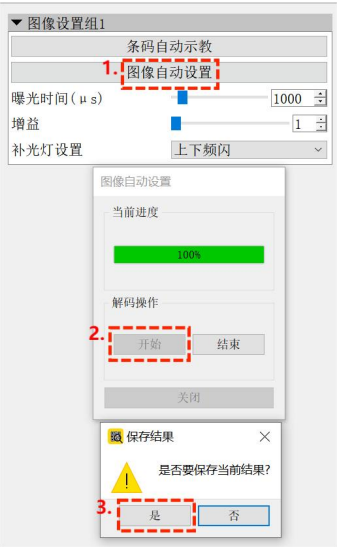


Fig28. Image auto set

- **Exposure time (μ s): defines the time interval at which the CMOS sensor receives the optical signal. The setting of the exposure time should be adjusted according to the environmental state (lighting, barcode contrast, material reflection, movement, etc.). Usually, long exposure can produce brighter images but cause barcode to become blurred.**
- **Gain: The image can be illuminated / dimmed by adjusting the size of the gain. The size of the gain was changed from 1 x to 16 x. Increasing the gain brings a brighter image, but also blur the image.**
- **Light light setting: Auxiliary lighting can be provided through built-in LED lights. The lighting system is composed of 4 LED lights, and it can be controlled independently. The optional lighting modes are:**

  1) Upper strostrobe: only the upper light source is turned on in strobe mode.

  2) Lower strobe: Only on the lower light source in strobe mode.

  3) Up and down strostrobe: turn on all light sources in strobe mode.

  4) Chang Liang: Turn on all the light sources in the normal bright mode.

  5) Often go out: turn off all the lights.

pay attention to

1) If the image or barcode area is too dark, the user can increase the visibility of the image by increasing the exposure time and gain.
2) The brightness of the image is determined by the exposure time, gain and fill light. Once one of the parameters, review the other parameters for best image quality.

11.2.1.2 Image algorithm configuration

in compliance withFig 29As shown, the image algorithm configuration provides some image preprocessing methods, such as:

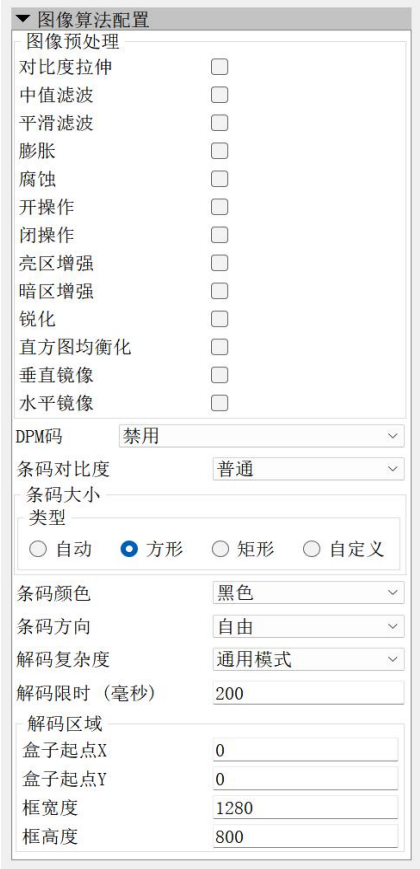


Fig29. Image algorithm configuration

- Contrast degree pull deep
- median filtering
- smoothing filtering
- expand
- corrode
- Open the operation
- closed operation
- Bright area enhancement
- Dark zone enhancement
- sharpen
- histogram equalization
- Vertical mirror image
- Horizontal mirror image

pay attention to

The filter size is required when performing median filtering, smooth filtering, expansion, corrosion, open operation, and close operation. Different filter sizes determine how many pixels in the size range around each image pixel will participate in the calculation.

At the same time, for better decoding, some other decoding-related parameters are also configured in the decoding configuration:

- **DPM code: to decide whether to enable the DPM code.**
- **Barcode contrast: define the symbol contrast threshold to be used during decoding, and the decoding time may be reduced by setting high contrast values for very high contrast symbols.**
- **Barcode size: allows to read any size type of DataMatrix code (automatic), square, rectangle, or accurately set the number of modules of the DataMatrix code to be read (custom).**
- **Barcode color: determines whether the color of the barcode is black or white.**
- **Bar code direction: Decode the one-dimensional code in the specified direction.**
- **Decoding complexity: Set the decoding complexity of the selected system of the current setting group. The higher the complexity, the longer the decoding time is required.**
- **Decoding time (milliseconds): Set the total decoding time for the selected system of the current setting group.**
- **Decoding area: Select the appropriate decoding area by entering a numerical value or dragging the red selection box.**

11.2.1.3 Barcode Settings

In the barcode setting, the automatic configuration of barcode types and decoding algorithm parameters can be realized through code self-learning. The specific operation is shown in FigFig 30As shown:

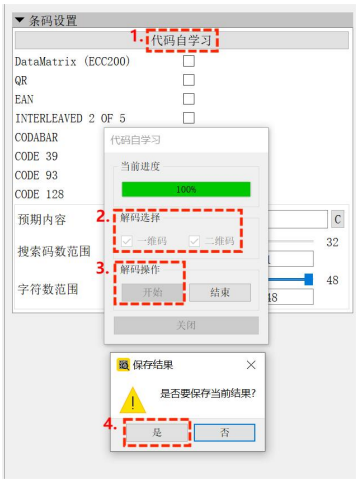


Fig30. Code for self-learning

Furthermore, the software supports manual detailed settings for each specific barcode type, e. gFig 31As shown:

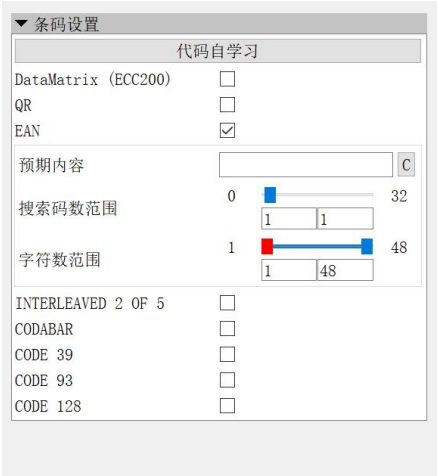


Fig31. Barcode Settings

- **Expected content: Allow to check whether the decoded content matches the expected content. If consistent, the read will be considered a good read, otherwise it will be considered a read failure. The test criteria support the use of the wildcard character *.**
- **Search code number range: the number of barcodes allowed to be decoded by the barcode type. You can enter a number or drag a double slider for selection. The decoding is considered to fail if the number of successful barcodes is not within the search number.**
- **Character number range: the character length of the barcode information. You can enter a number or drag a double slider for selection.**

The above three parameters are more focused on evaluating the decoding results of the same code system (good read or failed read).

11.3 Data output format

The final output information depends entirely on the configured barcode settings (see section**11.2.1.3**), And the data-output format.

Fig32. Data output format

The Data output format defines the format of the output information. The output information format is mainly composed of start character, decoding information, end character, decoding state, total number of decoding, total decoding time and output data template. It consists of the following contents:

- **Output starter**
- **Output end**
- **Decoding failed prompt**
- **Enable the barcode output separator**
- **Multiple barcode separator: Visible after the barcode output separator is enabled.**

Here, when setting the start, end, and decoding failure prompt, click the rear C key and click the corresponding character from the outgoing ASCII table, seeFig 33:

Fig33. Set the output information start / end / failure prompt

■ **Part of the read:**

Enable the barcode type partial reading

Enable barcode number section reading: complement the missing part with decoding failure character

give an example

1. For a single barcode scenario:
   If the decoding content is ABCD123456, output start = <STX>, output end = <85>, decoding failure prompt = <86>:
   - ■ Decode the expected content
     - ● If decoding the expected content =AB *, which matches the decoding content and is considered a good read, then the output information is <STX> ABCD123456 <85>.
     - ● If the decoding expected content =AB * 7, then the decoding content does not match and the read is considered to fail, then the output result is <STX> <86> <85>.

2. For the scenario of multiple barcodes (2 barcodes with the same code):
   If the barcode information is ABC123, ABCD456, output start = <STX>, output end = <85>, decoding failure prompt = <86>, multiple barcode separator =%:
   - ■ Search code number range is 2-2:
     - ● If both barcodes are decoded, the output information is <STX> ABC123%ABCD456 <85>.
     - ● If only the ABC123 is solved:

       Enable barcode number part read: the output information is <STX> ABCD123 <85>

       Enable the barcode number section reading,

Enable to complement the missing part with the decoding failure character: the output information is <STX> ABCD123% <86> <85> (complement the decoding failure with the failure character).

Disable barcode number part reading: if the read is considered failed, the output result is <STX> <86> <85>.

3. For multiple barcode (2) different code system scenarios:

If the barcode information is EAN123, and ECC456, output start = <STX>, output end = <85>, decoding failure prompt = <86>, multiple barcode delimiter =%. If only the decoding gives the EAN123:

- **Enable barcode type partial reading: the output information is <STX> EAN123 <85>.**
- **Disable barcode type reading: output is <STX> <86> <85>.**

If the expected content is simultaneously configured: the information EAN123 of the barcode 1 matches the expected content, and the information ECC456 of the barcode 2 does not match the expected content:

- **Enable barcode type partial reading: the output information is <STX> <86>%EAN123 <85> (complement the successful decoding result but does not meet the expected content).**
- **Disable barcode type reading: output is <STX> <86> <85>.**

■ **Decoded state output:**

Decoding state output mode: users can choose to enable or disable decoding state output, output mode includes character output, bit output.

If you select the character output, in the setting, click the rear C button behind, and click the corresponding character from the outgoing ASCII table, seeFig 34:

Successful Read: Deine the character successfully decoded

Failed read: defines the character of the failed decoding output

Fig34. Set the character output of the decoding state

If the bit output is selected, when the successful reading is set, check the check box of the output bit. The default output bit of the successful read is the first digit, and the default output bit is the first digit, seeFig 35:

Fig35. Set the bit output for the decoding state

- **Decode total quantity output: see**Fig 32, Users can choose to enable or disable the function, if enabled, output the total number of decoding.

give an example:

Bar code setting enable ECC200 (search code range: 1-1), EAN (search code range: 2-3), CODABAR (search code range: 1-1), front code enable decoding successful 1 ECC200 (code information is: abc123), 1 EAN (code information: 56897005), enable bar code type part reading, barcode data part read and decoding failure to complement the missing part, the separator is: / /, if enable decoding total number output, will output the following content:

<Start> 4 / / abc123 / / Fail / / Fail / / 56897005 <End>

- **Decoded total time output: see**Fig 32, The user can choose to enable or disable the function and, if enabled, will output the total decoding time: the total consumption time in the received decoding information, in the following format:

<Start> 230... <Code information>... <Finder>

Note: If the decoding state output is enabled, the total quantity data and the total time output, the output format is as follows:

<Start> <Decoding Status> <> Separator> <Total Number of Decoding> <separator> <Total Decoding Time> <Separator>> Code <Information> <End>

- **Output data template: When setting the output data template, click the rear B button, and select the corresponding type from the outgoing window. The default output data template: {code_content}, see**Fig 36。

Fig36. Set up the output data template

The output data template contains:

Code _ content: If configured, the code,

Code _ type: If configured, the barcode type is output,

Code _ pos: If configured, the coordinates of the barcode,

decode_length: If configured, the length of the code is output.

If the output data template is configured as: {code_content} {code_type} {code_pos} {decode_length},

The output format is as follows:

<Start> <Code Information> <separator> <Type of Code> <separator> <Code coordinates> <separator>> <Length of Code>> End>

Note: The output is in the same order as the configuration type.

11.4 Statistical data configuration

The display of decoding statistical data is determined by the configuration of statistical data. The default enabling items are: decoding success rate (%), statistical time (seconds), decoding success count, decoding failure count, and drawing count, seeFig 37:

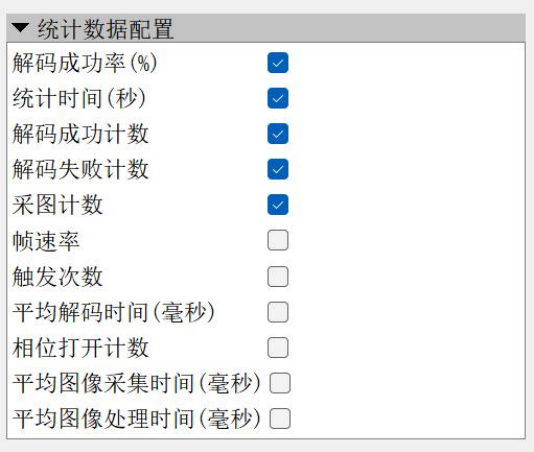


Fig37. Statistical configuration

- Decoding success rate (%): the number of successful decoding times / the number of triggers
- Statistics time (seconds): the time elapsed after the start of the statistics
- Decoded success count: number of successful ded success
- Decoding failure count: the number of decoding failures
- Drawing count: the number of total drawings
- Frame rate: number of drawings per second
- Number of triggers: Total number of triggers
- Average decoding time (milliseconds): the average of the last ten decoding times
- Phase Open Count: The count that triggers a phase opening
- Average image acquisition time (milliseconds): the last ten readers averaged the image time
- Average image processing time (milliseconds): Average decoding time + average image acquisition time

12 Advanced configuration

The BA (/ BC) 50 series code reader supports internal triggering and multiple hardware triggering and communications, such as TCP / IP, RS 232 serial port, and hardware PNP / NPN input and output. These settings can all be done in an advanced configuration.

Fig38. Advanced configuration

pay attention to

1. Reference to the section before performing the input / output communication configuration**5.2**, Complete the hardware connection.
2. as shown in the figureFig 38As shown, click on the Advanced Configuration to enter the input / output configuration page.

12.1 Enter the configuration

BA (/ BC) 50 supports both trigger mode and phase mode.among:

- **trigger mode:**

  Continuous mode, period (milliseconds): the user defines when and triggers the cycle.

  External trigger: triggered by connected external trigger signals.

- **Phase mode:**

  That is, the gating trigger allows the device to collect single or multiple images within a given range Code results.

12.1.1 trigger mode

Trigger mode includes continuous mode (default), period (milliseconds), and external trigger.

Fig39. trigger mode

- **Continuous mode (by default):**

In continuous trigger mode, the reader performs mapping and decoding at the default frame rate.

- **Cycle (in milliseconds):**

If the cycle mode is enabled, the user can set the cycle interval time by itself.

- **External trigger:**

BA (/ BC) 50 provides a variety of external triggers, such as: hardware PNP / NPN trigger, Ethernet TCP / IP trigger, RS232 serial port trigger, industrial Ethernet Profinet trigger, industrial Ethernet Ethernet / I The P trigger and the Modbus TCP trigger.

Trigger signal delay (milliseconds): If the trigger delay is enabled, the corresponding delay time can be set.

12.1.1.1 Hardware PNP / NPN trigger

BA (/ BC) 50 supports up to two hardware PNP / NPN input. This input type (PNP or NPN) depends entirely on how the hardware is wired. Before the configuration, refer to the section**5.2**Complete the hardware connection.among

- Hardware input 1: corresponds to the DIN _ 1 in the table.
- Hardware input 2: corresponds to the DIN _ 2 in the table.

Fig40. External trigger

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Complete the following input configuration based on the hardware connection mode.

   Enable the input 1 or 2 trigger configuration: enable the hardware interface corresponding to the hardware input connection mode. If the hardware interface of the trigger signal is connected as DIN _ 1, the input 1 trigger configuration is enabled. Otherwise, enable the input 2 trigger configuration.

   - **Signal trigger mode: Use the leading edge of the trigger as the trigger.**

graphFig 41A configuration schematic based on an external trigger triggered by input 2 is given in.

Fig41. Hardware input: an external trigger mode

12.1.1.2 The Ethernet TCP / IP trigger

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. When the device is triggered by an external Ethernet signal, it can be used as a TCP server or as a client.

   - **Enable TCP Server: If enabled, the reader can be triggered as a TCP server.**

- **Local port: the listening port number of the code reader, and the port setting range is: 10000-65536.**
- **Max customer: the maximum number of devices allowed to connect.**
- **Trigger information: the trigger information used to trigger the drawing. Click the C button and select the trigger information in the ASCII code table jumping out. The reader is triggered only triggered when the content of the trigger information is consistent with it.**

Fig42. Ethernet trigger-The code reader acts as a TCP server

■ **Enable TCP Client: If enabled, the reader will be triggered as a TCP client.**

- **Host IP address**
- **Host port: the port that the host listens for.**
- **Reconnection interval (ms): Reconnection time when the device connection failed.**
- **Trigger information: It is used to trigger the drawing drawing. Click the C button and select the trigger information in the ASCII code table jumping out. The reader is triggered only triggered when the content of the trigger information is consistent with it.**

Fig43. Ethernet trigger-The code reader acts as a TCP client

pay attention to

To ensure a successful connection, make sure that the configured port number is not occupied.

12.1.1.3 The RS232 serial port trigger

Fig44. RS232 Trigger the configuration

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the serial port trigger configuration, check the enabled serial port.
4. Set the trigger information: click the C button to select the trigger information from the ASCII code table. The reader is triggered only triggered when the content of the trigger information is consistent with it.
5. In the RS232 configuration, select the corresponding RS232 serial port parameter, referenceFig 44。

12.1.1.4 Industrial Ethernet Profinet trigger

BA (/ BC) 50 supports two trigger modes, character trigger and bit trigger. The specific configuration instructions are as follows:

■ The PLC uses the character trigger mode to trigger the code reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the P rofinet trigger configuration, check to enable the P rofinet trigger.

4. Select a character trigger in the Pr ofinet trigger type.
5. Set the trigger information: click the C button to select the trigger information from the ASCII code table. The reader is triggered only triggered when the content of the trigger information is consistent with it.

Fig45. Profinet trigger- -character trigger

■ The PLC uses the bit trigger mode to trigger the reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the P rofinet trigger configuration, check to enable the P rofinet trigger.
4. Select a bit trigger in the Pr ofinet trigger type.
5. Set the input bits for the bit trigger: tick the single or multiple trigger bits. As long as a single input bit or multiple input bits are included in the output setting of the PLC, the reader is considered triggered.
   Note: Position 1 is only a clearance position.

Fig46. Profinet trigger- -bit trigger

Refer to the sections on how to configure the PLC devices12.5.1。

12.1.1.5 Industrial Ethernet Ethernet / IP trigger

BA (/ BC) 50 supports two trigger modes, character trigger and bit trigger. The specific configuration instructions are as follows:

■ The PLC uses the character trigger mode to trigger the code reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the Ethernet / IP trigger configuration, check to enable the Ethernet / IP trigger.
4. Select the character trigger in the Ethernet / IP trigger type.
5. Set the trigger information: click the C button to select the trigger information from the ASCII code table. The reader is triggered only triggered when the content of the trigger information is consistent with it.

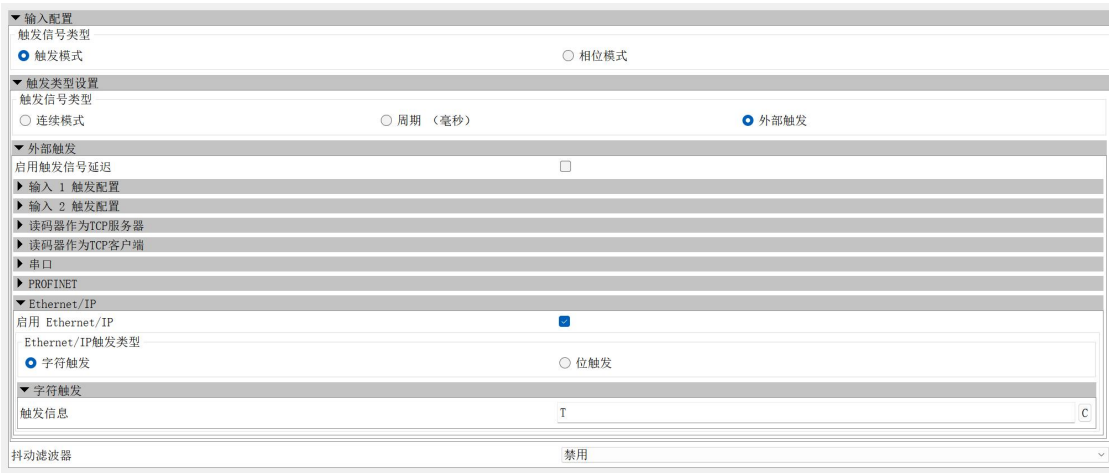


Fig47. Ethernet / IP Trigger- -character trigger

■ The PLC uses the bit trigger mode to trigger the reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.

Fig48. Ethernet / IP trigger-bit trigger

2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the Ethernet / IP trigger configuration, check to enable the Ethernet / IP trigger.
4. Select a bit trigger in the Ethernet / IP trigger type.
5. Set the input bits for the bit trigger: tick the single or multiple trigger bits. As long as a single input bit or multiple input bits are included in the output setting of the PLC, the reader is considered triggered.

   Note: Position 1 is only a clearance position.

Refer to the sections on how to configure the PLC devices12.5.2。

12.1.1.6 Modbus TCP From the machine

BA (/ BC) 50 supports two trigger modes, character trigger and bit trigger. The specific configuration instructions are as follows:

■ Modbus TCP The slave machine uses the character trigger mode to trigger the code reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.
2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the Modbus TCP slave trigger configuration, check to enable the Modbus TCP slave trigger.
4. Select a character trigger in the Modbus TCP slave trigger type.
5. Set the trigger information: click the C button to select the trigger information from the ASCII code table. The reader is triggered only triggered when the content of the trigger information is consistent with it.

Fig49. Modbus TCP slave trigger type-character trigger

■ Modbus TCP The slave uses the bit trigger mode to trigger the reader

1. Go to Advanced Configuration> Input Configuration, select Trigger Mode> External Trigger in Trigger Signal Type.

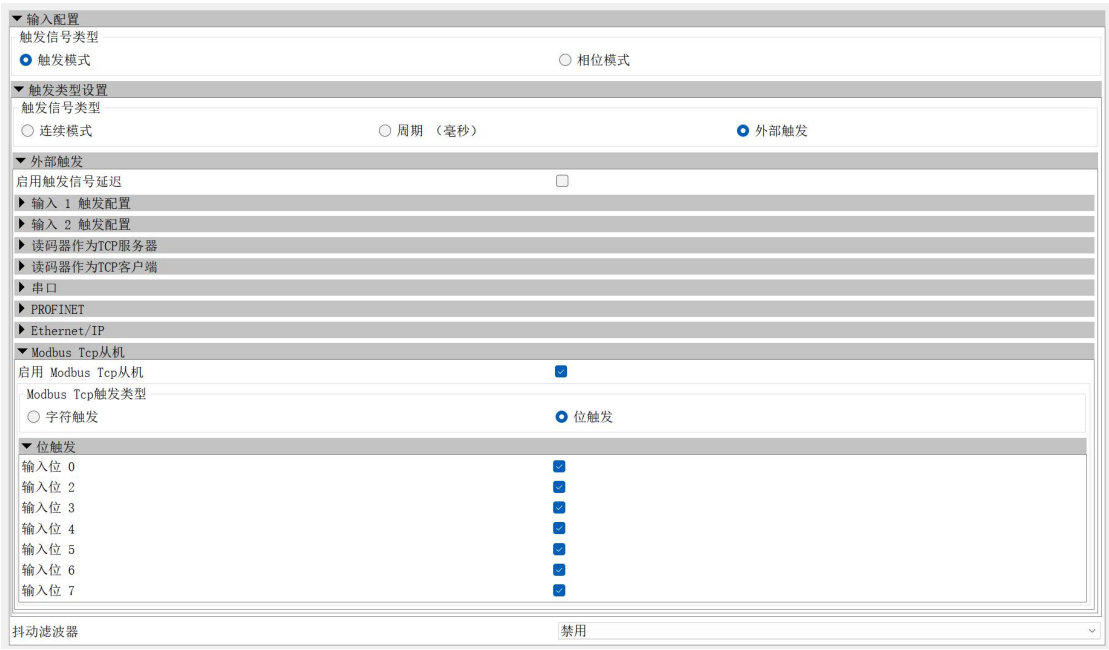


Fig50. Modbus TCP slave trigger type-bit trigger

2. **Enable the signal trigger delay: whether the trigger signal is delayed.**
3. Under the Modbus TCP slave trigger configuration, check to enable the Modbus TCP slave trigger.
4. Select a bit trigger in the Modbus TCP slave trigger type.
5. Set the input bits for the bit trigger: tick the single or multiple trigger bits. As long as a single input bit or multiple input bits are included in the output setting of the Modbus TCP, the reader is considered triggered.
   Note: Position 1 is only.

Refer to the section on how to configure the Modbus12.6。

12.1.2 Phase mode

Phase mode includes phase trigger settings: phase on, phase off, and trigger type settings.

Fig51. Phase mode

Phase-trigger settings:

1. Go to Advanced Configuration> Input Configuration, select Phase Mode in the Trigger Signal Type.
2. Configure the phase trigger:

- **Phase opening: determines the starting position of the trigger signal.**

  include:

  Enter 1 to trigger the configuration

  Enter 2 to trigger the configuration

  The code reader acts as a TCP server

  The code reader acts as a TCP client

  gorge line

  PROFINET

Fig52. Phase open

Refer to the section for the specific configuration of the phase start type**12.1.1**。

- **Phase off: determines the end position of the trigger signal.**

  include:

  Enter 1 to trigger the configuration

  Enter 2 to trigger the configuration

  The code reader acts as a TCP server

  The code reader acts as a TCP client

  gorge line

  PROFINET

  overtime:

  If timeout, set the corresponding timeout time.

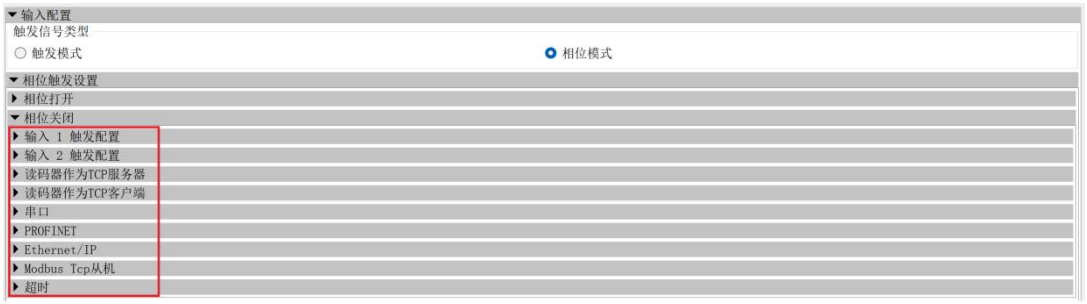


Fig53. Phase closure

Refer to the section for the specific configuration of the phase shutdown type**12.1.1**。

- **Phase-wise output mode:**
  - **To Enable the fusion output: To decide whether to enable the fusion output. If enabled, during the phase opening, the reader continuously reads the read code until the phase is off, and the repeat code is output only once.**
  - **Enable successful reading: to decide whether to enable successful reading. If enabled, the phase off and output after reading the successfully configured code number, if not enabled, the phase is not automatically closed until the phase off signal, phase off and output.**
  - **Number of successful reads: Configure the number of successful reads.**
  - **Fill the missing part with decoding failure: If enabled and the number of successful reads does not reach the configured number of successful reads, the missing part is filled with failure.**
  - **Enable coordinate sequence output: If enabled, the content is decoded in the configured order. Coordinate order output contains two types: left to right, up to down:**

    Left to right: output the X-axis coordinates of the vertex in the upper right corner of the barcode.

    Up to bottom: output the Y axis coordinates of the vertex in the upper right corner of the barcode.

Fig54. Phase-wise output mode

- **Trigger type setting: Select a trigger type.**
  - Continuous mode
  - Cycle (millisecond)
  - External trigger

Fig55. Trigger type

Refer to the section for the specific configuration of the trigger type**12.1.1**。

pay attention to:

Enable the reader as a TCP server or client, and to ensure a successful connection, make sure that the configured port number is not occupied.

12.2 Output configuration

BA (/ BC) 50 supports a variety of output interfaces, such as RS232 serial port, TCP / IP, Profinet, and hardware output. The output configuration can be set in the Advanced Configuration> Output Configuration:

- **Output information configuration: Configure the RS232 serial port, TCP / IP (client and server), and Profinet.**
- **Hardware output configuration: control two hardware PNP / NPN output at the same time.**

12.2.1 RS232 Serial port output

1. Go to Advanced Configuration> Output Configuration> Output Information Configuration, select serial port in output interface type.
2. In the RS232 configuration, select the corresponding RS232 serial port parameter, referenceFig 56。

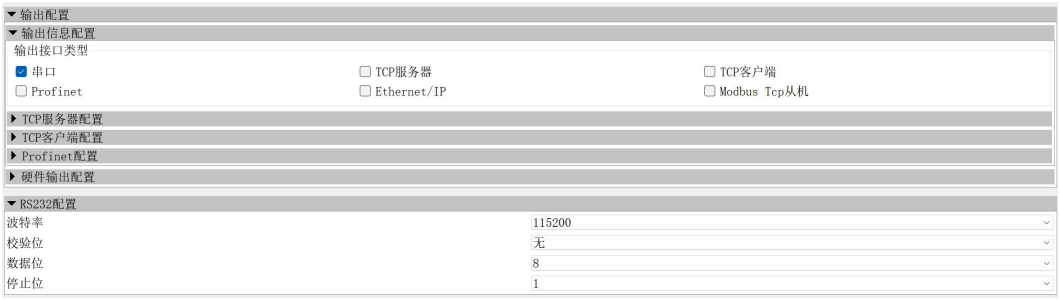


Fig56. Serial port output

12.2.2 The Ethernet TCP / IP output

The reader can output data as both a TCP server and a client.

- Output by TCP server: output through the TCP server port of the reader.

  1. Go to Advanced Configuration> Output Configuration> Output Information Configuration, select the TCP server in the Output Interface Type.
  2. Configure the TCP server parameters:

     Local port: the listening port number of the code reader.

     Max customer: the maximum number of devices allowed to connect.

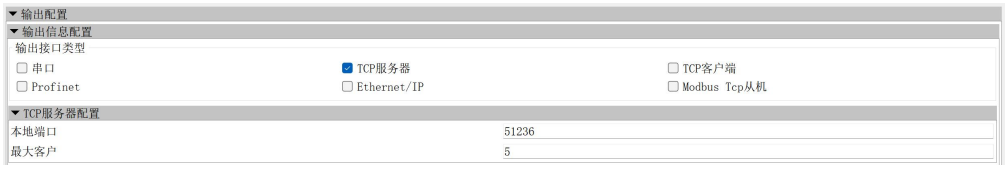


Fig57. Output the data with the TCP server side port

- Output in TCP client: output through the TCP client port of the reader.

  1. Go to Advanced Configuration> Output Configuration> Output Information Configuration and select TCP Client from Output Interface Type.
  2. Configure the TCP client parameters:

     Remote IP address

     Remote port

     Reconnection interval (milliseconds): Reconnection time when the device connection failed.

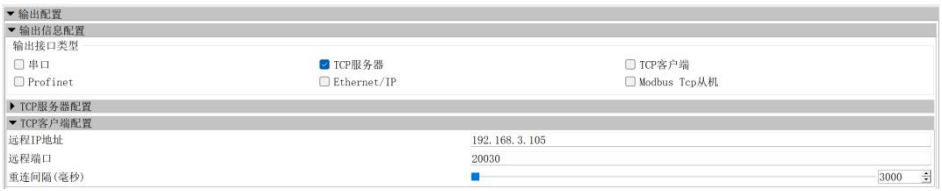


Fig58. Output data on the TCP client port

pay attention to

To ensure a successful connection, make sure that the configured port number is not occupied.

12.2.3 Industrial Ethernet Pro finet output

When the code reader acts as the input signal source of the PLC device and outputs the signal to it, both the PLC device and the code reader should be configured. For the specific configuration, please refer to the following instructions:

Refer to the sections on how to configure the PLC devices12.5.1。

pay attention to

The same BA (/ BC) 50 device can only support one output module, so only one input module can be configured in the relevant configuration of the PLC to communicate with the reader.

The output configuration of the BA (/ BC) 50 reader refers to:

1. Go to Advanced Configuration> Output Configuration> Output Information Configuration and select P rofinet in the Output Interface Type.
2. **Profinet Configuration, with reference to**Fig 59：
   - Select the appropriate number of PLC registers reserved.

Fig59. Pro finet Output configuration

pay attention to

The number of PLC register reserved in the reader must coincide with the size of the input module of the PLC.

12.2.4 Industrial Ethernet Ethernet / IP (EIP) output

When the code reader acts as the input signal source of the PLC device and outputs the signal to it, both the PLC device and the code reader should be configured.

Refer to the sections on how to configure the PLC devices12.5.1。

The output configuration of the BA (/ BC) 50 reader is as follows:

Go to Advanced Configuration> Output Configuration> Output Information Configuration, select Ethernet / IP in the output interface type, seeFig 60。

Fig60The. Ethernet / IP output configuration

12.2.5 Modbus TCP Deliver from the machine output

The output configuration of the BA (/ BC) 50 reader is as follows:

Go to Advanced Configuration> Output Configuration> Output Information Configuration, select the Modbus TCP slave in the output interface type. SeeFig 61：

Fig61. Modbus TCP slave output configuration

Refer to the section on how to configure the Modbus12.6。

12.2.6 Hardware PNP / NPN output

1. in compliance withFig 62As shown, the code reader provides two modes of hardware output. The output mode (PNP or NPN) depends entirely on the wiring mode of the hardware. Before the configuration, refer to the section**5.2**Complete the hardware connection.among
   - Hardware output 1: corresponding to DOUT _ 1.
   - Hardware output 2: corresponding to DOUT _ 2.

2. Enter the Advanced Configuration> Output Configuration and enable the corresponding hardware interface based on the hardware connection mode.

3. Set the configuration for the selected output.

   - Pulse width (milliseconds): Continuous width of the output pulse signal.
   - Trigger event: decide to output a signal on reading success or reading failure and use it as a trigger for a subsequent device.

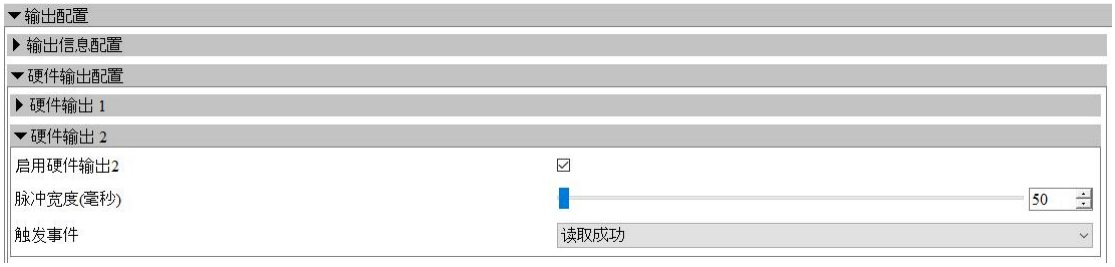


Fig62. Hardware output configuration

12.3 Networking mode

BA (/ BC) 50 supports the networking mode. Users can enable the networking and select the master-slave mode:

Fig63. Networking-host mode

- **Host mode:**
  - Number of slave: maximum number of slave allowed, effective value threshold: 1-6.
  - Local port: The port number with the setting range of 8880-9999.

Note: To ensure a successful connection, please ensure that:

1. The configured port number is not occupied.
2. The trigger mode of the host can be: input configuration-> continuous mode, input configuration-> cycle mode, input configuration-> external trigger.

Fig64. Networking- -slave mode

- **From machine mode:**
  - **Host IP Address: It is configured as the IP address of the host**
  - **Host Port: Port number configured for the host**

After networking success:

1. The input and output of the slave are invalid, the slave shares the trigger signal of the host, and a reader can read the data and output by the host. The NG information is only uploaded when all the information is NG.
2. Output in the data output format of the host.
3. Support one master and slave, the maximum number of slave allowed is 6.

12.4 FTP configure

BA (/ BC) 50 supports image preservation as an FTP server

Fig65.FTP configure

as shown in the figureFig 65As shown, you can configure the image to be saved by the following:

- Enable FTP: If enabled, save the image in offline mode, and the image is saved in the reader ontology FTP server

- Image type: determines which images will be saved (all images, decoded successfully images, or decoded fail images)
- Number of pictures: number of saved pictures, effective value threshold: 5-200
- Image format: decide the format of the image saved (. JPG or. BMP)

	FTP download	Download the images saved on the native FTP server to the local directory or disk while exporting the configuration files.  Fig66.FTP download Note: If the selected directory is not empty, empty it first  Fig67. Empty the download folder

12.5 PLC configure

1. Rereference before configthe PLCFig 68, Complete the hardware connection between the PLC and the BA (/ BC) 50 series code readers.

Fig68. Schematic diagram of the PLC wiring

2. Refer to chapter**12.1**And chapter**12.2**, Arrange the input / output function of the BA (/ BC) 50 reader accordingly.

3. Refer to chapter**9.4**, Confirm the IP address of the current BA (/ BC) 50 reader in the LAN (e. g. 192.168.0.30).

12.5.1 Profinet linkage

Taking the PLC equipment model: S7-1200, equipment BC50 series as an example, the Profinet configuration details of the PLC are described below.

1. in compliance withFig 69As shown, open the Management General Site Description file (GSD) under the selection menu, import the BC50 GSD file from the computer folder, and then click Install.

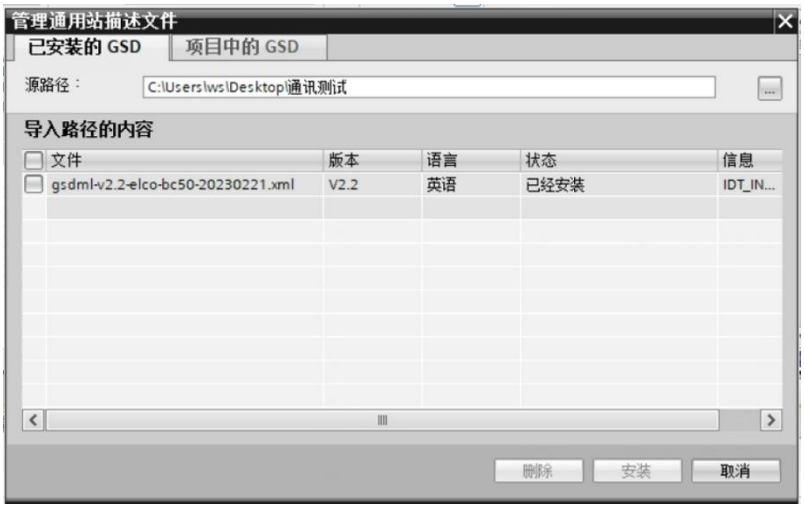


Fig69. PLC Profinet-Import the GSD file in the PLC

2. Click on the green network port of the PLC icon to enter the general Settings of the PLC module (seeFig 70), Confirm whether the IP address of PLC belongs to the IP address of BC50 to realize the connection between BC50 and PLC. If not, modify the IP address of the PLC.

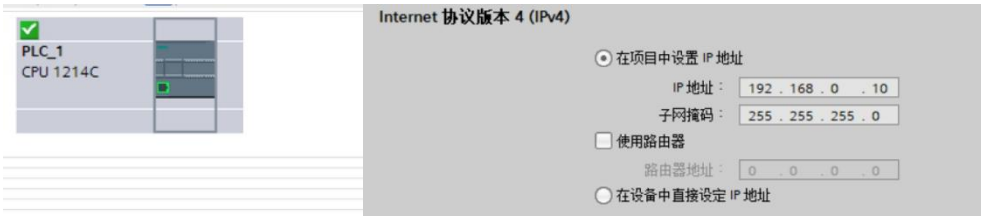


Fig70. PLC Profinet-Set up and confirm the IP address of the PLC

3. in compliance withFig 71As shown, return to the device and network interface and manually drag the added BC50> BC50 on the right device list to the network configuration screen on the left.

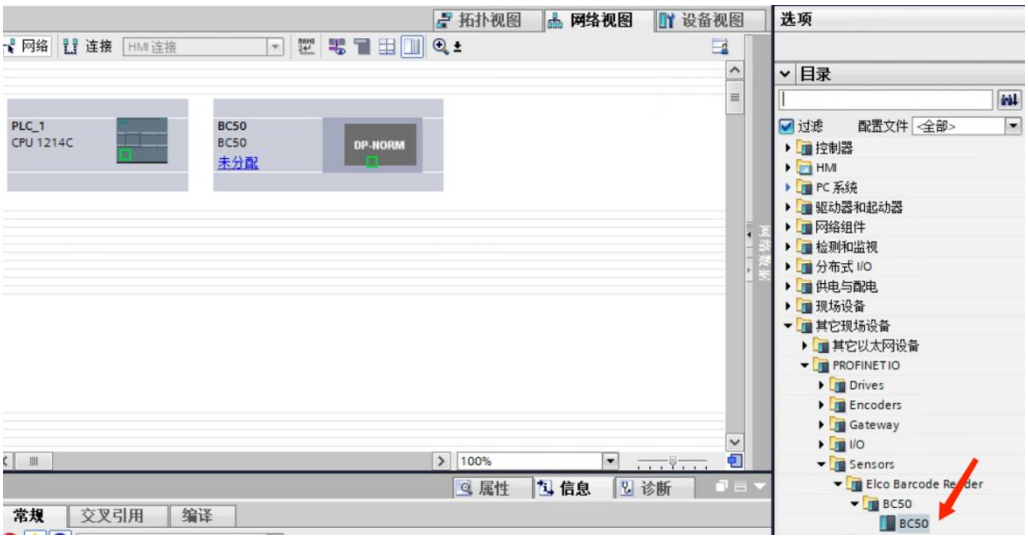


Fig71. PLC Profinet-Manually drag the BC50 reader into the network configuration

4. in compliance withFig 72As shown, click the unassigned interface in the network configuration BC50 icon on the right, select the PROFINET interface corresponding to PLC (PLC _1 _ PROFINET interface _ 1 in the figure), and a green connection line will appear in the icon of PLC and BC50.

Fig72. PLC Profinet-Connect PLC with BC50 reader through Profinet interface

5. in compliance withFig 73As shown, double-click the green network port of the BC50 icon to change the IP address to the current IP address of the BC50 reader (such as 192.168.0.30).

Fig73. PLC Profinet-Set the IP address of the reader for the P rofinet connection with the PLC

6. in compliance withFig 74As shown, cancel "automatically generate PROFINET device name" and name BC50 manually (set as BC50-001 in the figure) to distinguish it from other devices.

Fig74. PLC Profinet-Manual naming for the BC50 code reader

7. Double-click the icon of the BC50 to enter the separate hardware Settings interface (seeFig 75), Then right-click the BC50 icon and select the assigned device name.

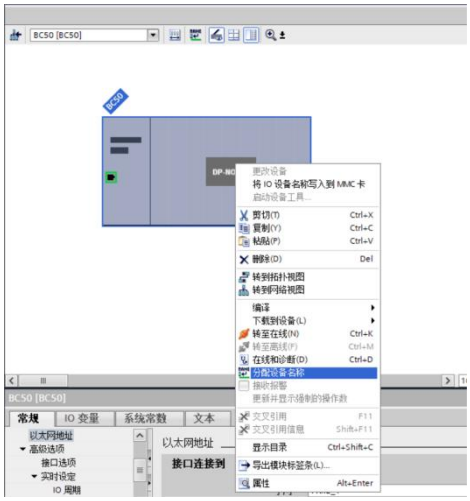


Fig75. PLC Profinet-Configure the device name for the BC50 code reader

8. in compliance withFig 76As shown, in the jump-out window, select the interface type for online access as PN / IE, click on the update list, and search for the BC50 hardware. Select the BC50 hardware and click Assign Name to assign the new name BC50-001 to the BC50 sensor in the network.

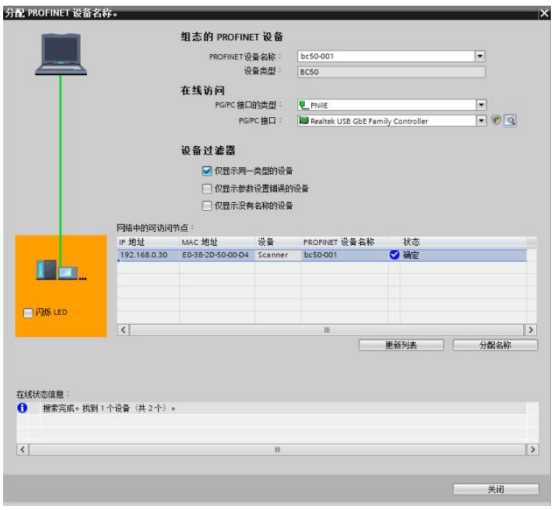


Fig76. PLC Profinet-Assign the PROFINET device names

9. Click Online, select PLC device (such as PLC _ 1), click "Go to Online", asFig 77As shown.

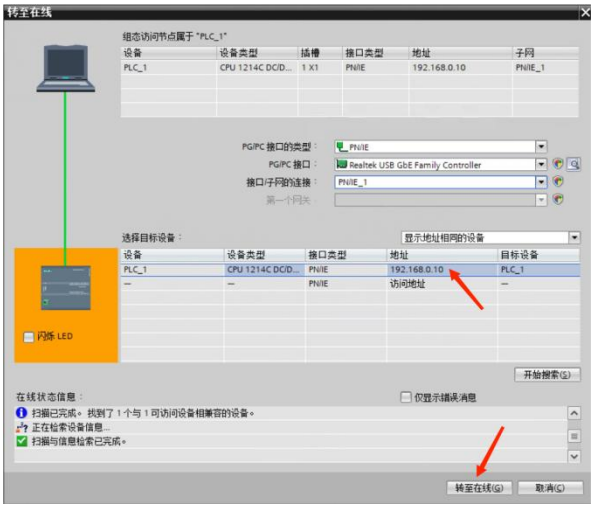


Fig77. PLC Profinet-PLC transferred to online

10. in compliance withFig 78As shown, in offline mode, select the PLC device connected to the BC50 code reader, and right-click to download all the hardware and software configurations.

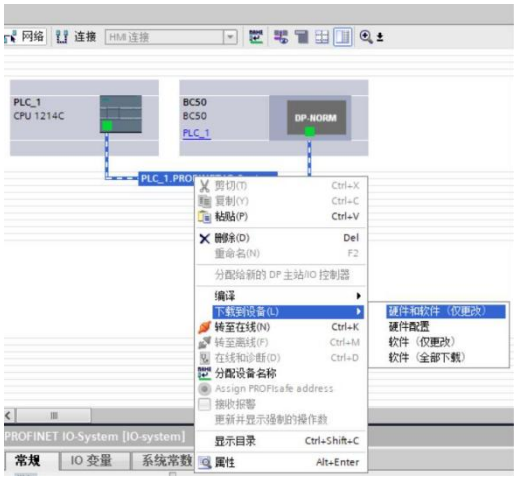


Fig78. PLC Pr ofinet-Download the current configuration to the device

11. After downloading the parameters, you can see that all the devices are displayed in green, indicating that the PLC and the BC50 readers are truly connected. If the device displays red, it should be not set incorrectly and need to use diagnostic information to check.

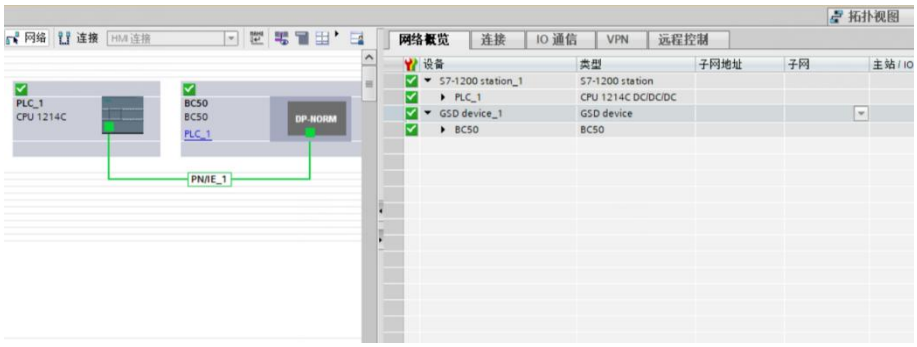


Fig79The. PLC Profinet-PLC was successfully connected with the BC50 code reader

12. When configuring the input and output of the PLC, you need to view the input and output address of the PLC device. The following example, PLC is 64 bytes input and 8 bytes output, where the input address is% I132-%I195 and the output address is%Q76-%Q83.

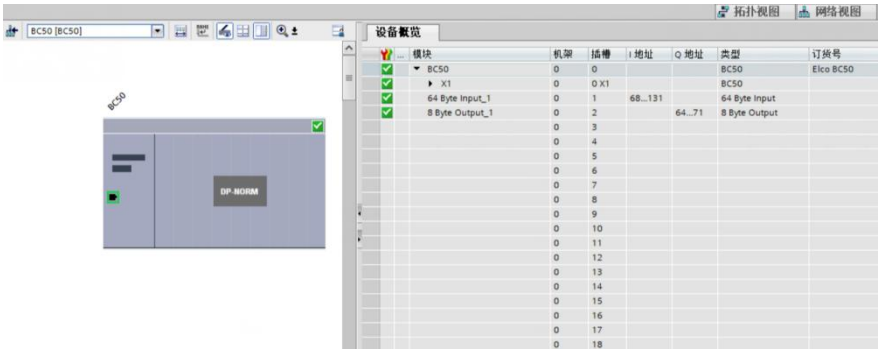


Fig80. PLC Profinet-PLC input / input output

■ BC50 reader as input to PLC:

● The number of PLC registers set at the Profinet output of the BC50 reader (see section**12.2.3**) Consiconsistent with the address interval of the PLC input. If the BC50 Profinet output register reserves 64 PLC, the PLC is a 64-byte input (the input address field is%I132-%I195). If you need to modify the input address interval of the PLC, you need to modify the save in offline mode and download the current configuration to the PLC device.

● If the output of the reader is 16ECCABC123, and the input address of the PLC starts at%I132, then the value detected in the PLC is:

%I132	1
%I133	6
%I134	E
%I135	C
%I136	C
..	..

Table21.BC50 reader as PLC Profinet input

■ The PLC triggers the BC50 code reader:

● The BC50 reader triggers in bit-trigger mode

1. Determine the Profinet-bit trigger (see section**12.1.1.4**) The corresponding PLC output address. For example, in this case, since the output of the PLC starts from%Q76, the address of the X-bit trigger pair is%Q76.X, and the address of the third bit trigger is%76.3. If multiple trigger bits (e. g. 0 and 3 bits) are checked simultaneously, the corresponding addresses are%76.0 and%76.3.

   Note: Position 1 is only a clearance position.

2. Set the parameter value of the address corresponding to the trigger bit: the display format corresponding to the modified trigger bit is Boolean type, and then the modified value is set to True.

3. Write the above configuration to ensure that the above configuration takes effective.

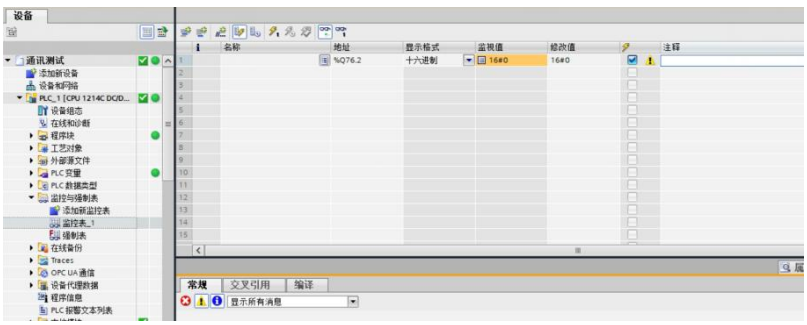


Fig81. PLC-View the real-time data emitted by the BC50 reader

- The BC50 reader triggers in character trigger mode

1. Determine the Profinet character trigger (see section**12.1.1.4**) The first output address of the corresponding PLC. For example, in this case, since the output of the PLC starts at%Q76, the corresponding address for the character trigger pair is% QB 76.
2. Sets the display type for the trigger address: Character.
3. Set the trigger character for the trigger address: Set the trigger character in the modify value bar (with the chapter**12.1.1.4**The trigger characters set in are consistent).
4. Write to all of the current configurations.

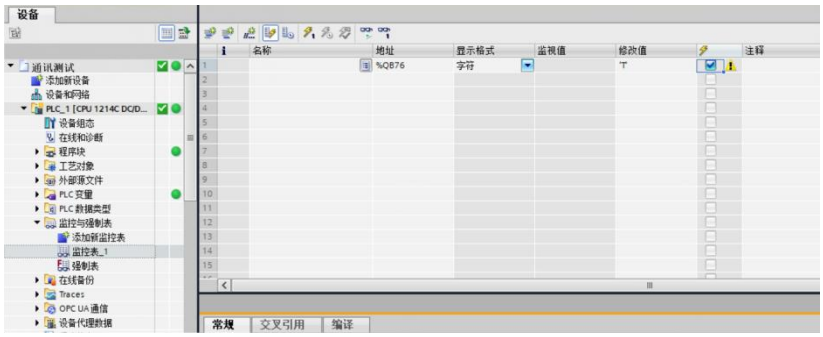


Fig82. PLC-BC50 reader triggers in character trigger mode

pay attention to

1. The same BC50 device only supports only one input module, so only one output module for the communication part associated with the PLC can be configured.

2. Only when any byte in the PLC configuration output module changes will the reader device receive the contents of the PLC output module and be continuously triggered.

12.5.2 The PLC Et hernet / IP (EIP) configuration

Taking the PLC equipment model: OMRON NX1P2-9024DT, equipment BC50 series as an example, the EIP configuration of PLC is introduced in detail.

1. as illustrated in following figureFig 83As shown, click on Tools> EtherNet / IP Connect Settings (N).

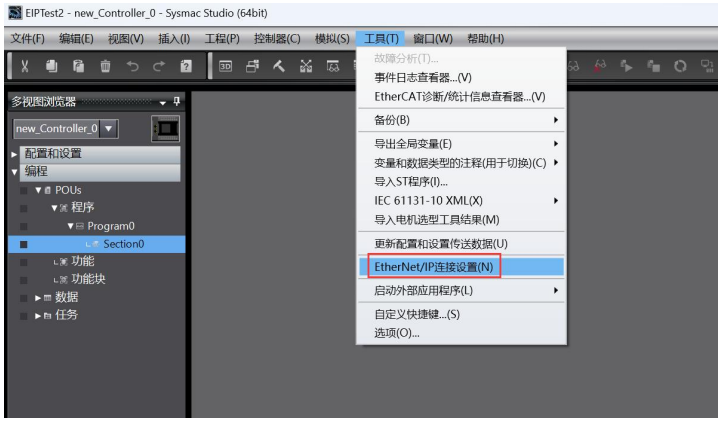


Fig83. PLC EIP-Enter the EIP connection settings

2. in compliance withFig 84As shown, in all the PLC devices in the current LAN listed, double-click the record in the list to enter the built-in EtherNet / IP port setting connection settings interface.

Fig84. PLC EIP-EIP equipment list record

3. in compliance withFig 85As shown, in the toolbox on the right, right-select the EDS library. Click install in the EDS page, and select the eds file in the file browser window, EIP_ELCO_BC50_XXX.eds.

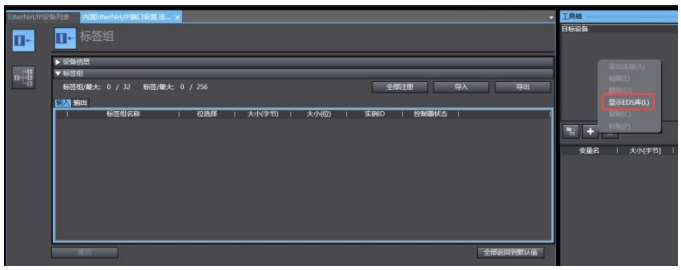


Fig85. PLC EIP-shows the EDS library

4. in compliance withFig 86As shown, after installing EIP _ ELCO _ BC50_XXX.eds successfully, the BC50 can be seen in the EDS library in the right side window.

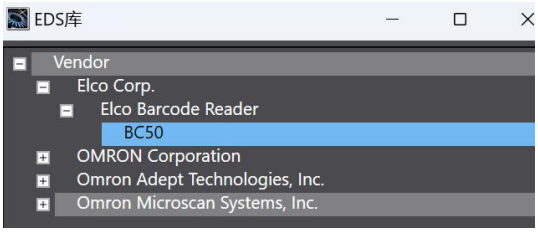


Fig86The. PLC EIP-eds file was installed successfully

4. Click the Add Target device on the right (seeFig 87), In the toolbox on the right, set the node address: 192.168.250.111 (IP address of BC50 equipment), model name: BC50, revision: 2, egFig 88。

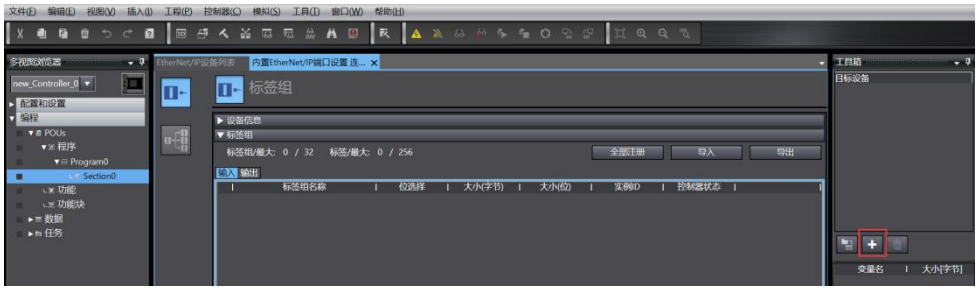


Fig87. PLC EIP-Add the target device

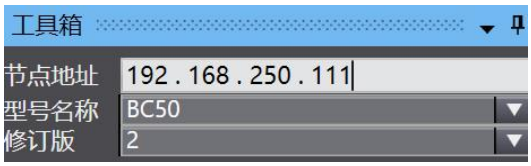


Fig88. PLC EIP-Set the target device information

Note: To ensure available communication, please configure the IP of the PC, PLC, and BC50 devices for the same network segment.

5. in compliance withFig 89As shown, click Programming> Data> Global Variable, right-click new, and create a two-byte array.

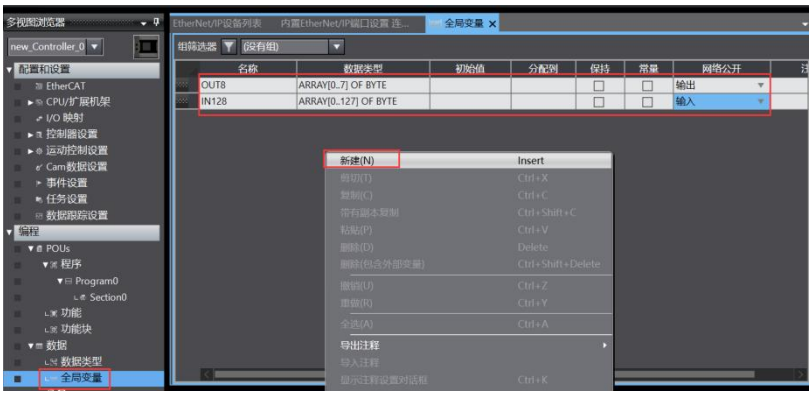


Fig89. PLC EIP-Set the global variable input and output

6. Click on Configuration and Settings> Task Settings, and click on the VAR icon in the Task Settings interface.in compliance withFig 90As shown, click the icon + in the outgoing interface, select the new global variables INT128 and OUT 8 in the previous step, and add them to the main task Primary Task for real-time monitoring.

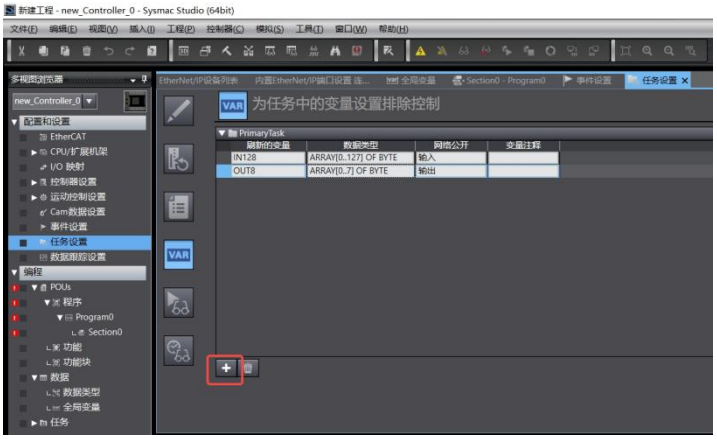


Fig 90. PLC EIP-Add the global variable to the main task

7. in compliance withFig 91As shown, in the built-in EtherNet / IP port setting connection setting interface, click All Register. And in the outgoing interface (seeFig 92), Select all variables and click Register.

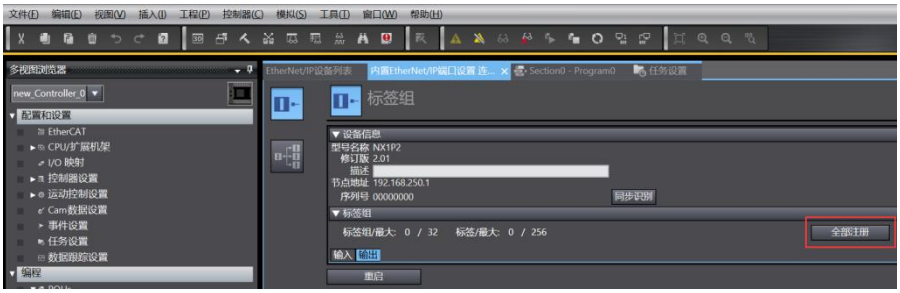


Fig91. PLC EIP-Register the global variable

Fig92. PLC EIP-Registration setting interface

8. On the input / output page, right-click and select "Create a new label group" to configure the input and output respectively, with the data configuration as shown in the picture.

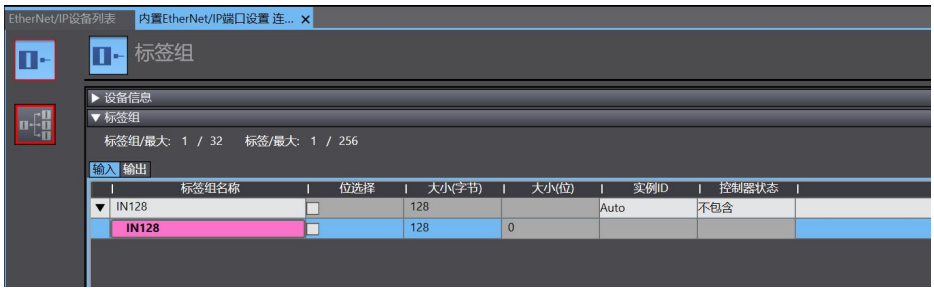


Fig93. PLC EIP-Set up the input information

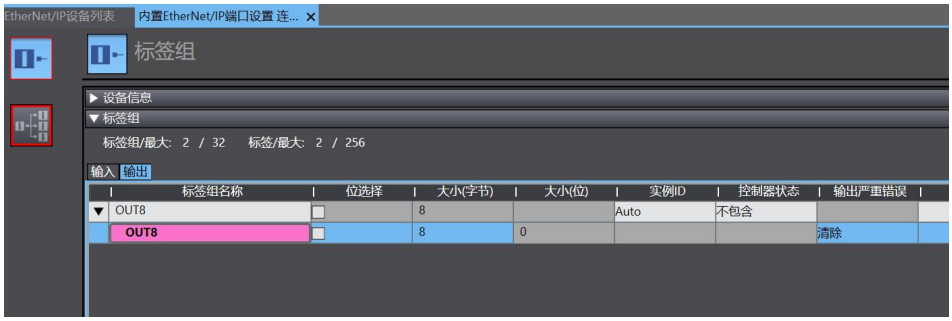


Fig94. PLC EIP-Set up the output information

9. Click tool> EtherNet / IP Connection Settings (N). In the built-in EtherNet / IP port setting connection setting interface, click the left connection icon, open the connection configuration interface, click the "+" button, select the pull-down data in the target device, and configure the target variable. The starting variable is shown in the figure.

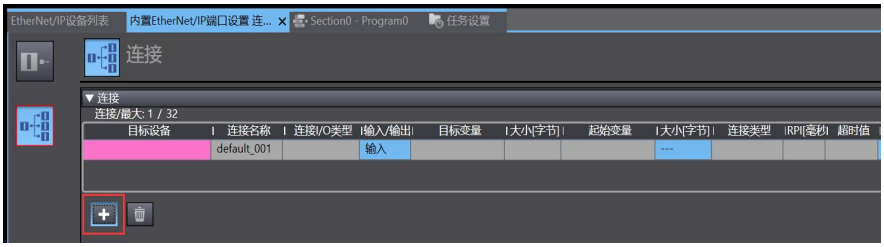


Fig95. PLC EIP-Go into the connection interface

10. in compliance withFig 96As shown, click +, select the configured device in the target device, and set the target variable, size [bytes], the starting variable to bind the global variable to the connected device.

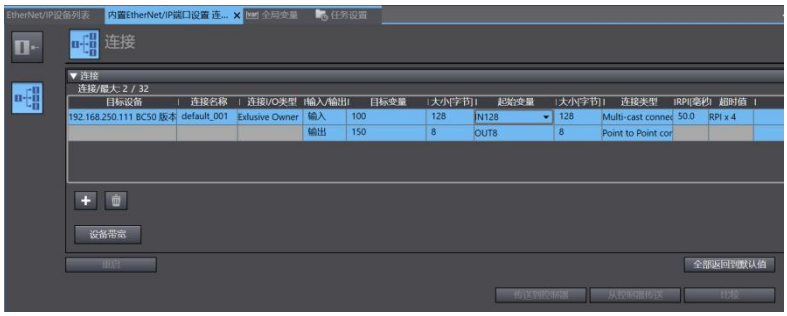


Fig96. PLC EIP-Configure the connected devices

11. Click Controller> Communication Settings, open the Communication Settings window, select Ethernet-Direct connection, enter the IP address of PLC, click Ethernet Communication Test, and the input box will prompt the test is successful.

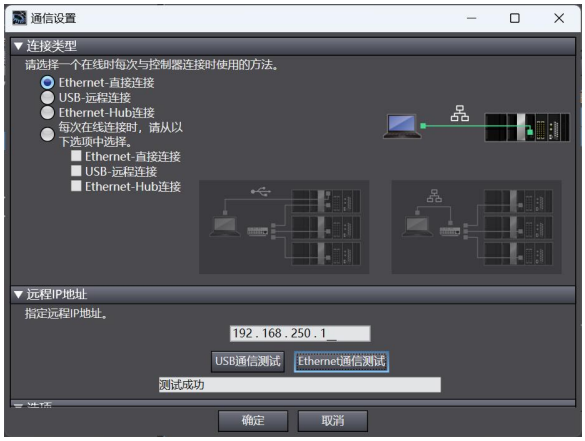


Fig97. PLC EIP-E thernet Connect and perform the communication test

Note: If the PLC is connected to the BC50 via a switch, the Ethernet-Hub connection should be selected.

12. Click the online icon first, then select the controller> transfer> transfer to the controller, then completed the tested configuration is uploaded to the PLC device, seeFig 98。

Fig98. PLC EIP-Upload the configuration into the PLC device

13. Click the online icon, click the View> Monitor window, and open the Monitor (Engineering) 1, egFig 99As shown, add a previously configured global monitoring variable.

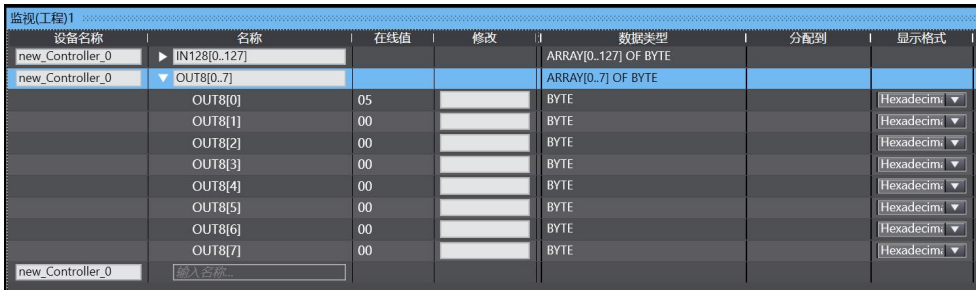


Fig99. PLC EIP-Adds a global variable in the monitoring window of the PLC device

■ The BC50 code reader serves as an input to the PLC-EIP

● PLC-EIP supports a maximum input of 128 characters. Click the global input variable to modify the display format of the corresponding byte, then the output of the reader will be displayed in the input variable byte by byte, seeFig 100。

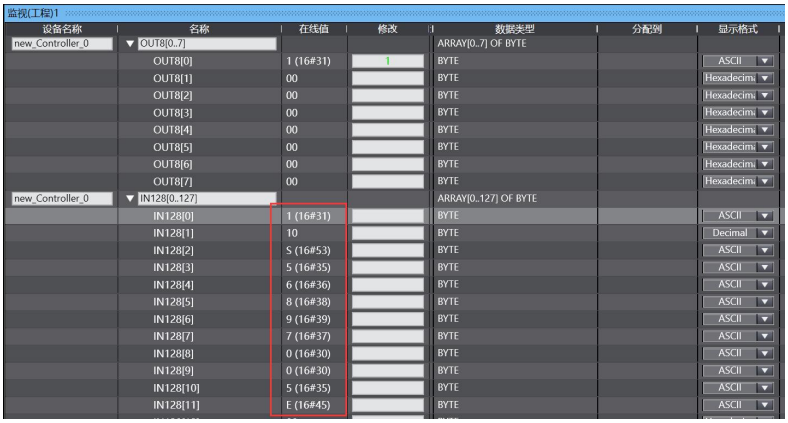


Fig100. PLC EIP-BC50 as an output

■ The PLC triggers the BC50 code reader:

● The BC50 reader triggers in bit-trigger mode

1. Set the display format of OUT 8 [0] as: B inary.
2. Set the trigger bit for OUT 8 [0]: Write the binary value of the eight digits corresponding to the trigger bit in the modification bar.refer toTable 22, If both 0 and 3 bit triggers are allowed, the corresponding value of 0 and 3 bit is 0, then input 0000 1001. Similarly, if only a 0-bit trigger is allowed, write to 0000 0001.

The X position	7	6	5	4	3	2	1	0
price	0	0	0	0	1	0	0	1

Table22. PLC EIP-bit trigger example illustration

3. Write the above configuration to ensure that the above configuration takes effective.

● The BC50 reader is triggered in character trigger mode (seeFig 101)

1. Set the display format of OUT 8 [0] as ASCII.

2. Set the trigger character for OUT 8 [0]: Write the trigger character in the modified value bar (with the chapter**12.1.1.5**The trigger characters set in are consistent).in compliance with T.

3. Write to all of the current configurations.

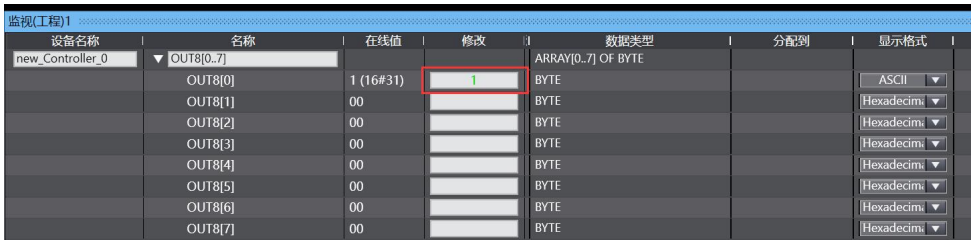


Fig101. PLC EIP-Character trigger

12.6 Modbus The configuration

The Modbus description given below is based on the Modbus P ool general software on the network (for information about the Modbus slave BA (/ BC) 50 reader).

1. Open Modbus Pool, click the Connection> connect in the toolbar, open the Connection Setup window, IP address input the IP address of BA (/ BC) 50 reader, keep the port number in default (default value 502), click "OK".

   Note: The ModubsPool shall be in the same network segment as the BA (/ BC) 50 reader.

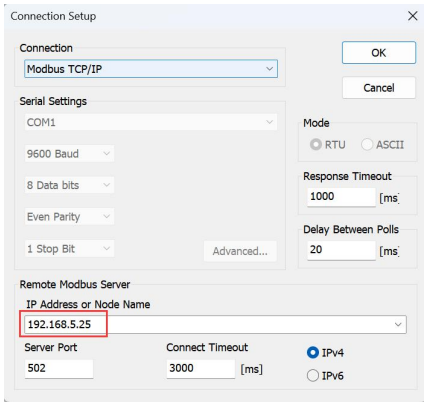


Fig102. PLC Modbus-Modbus Connection configuration

2. Once the device is successfully connected, the default F=03, indicating the read save register.

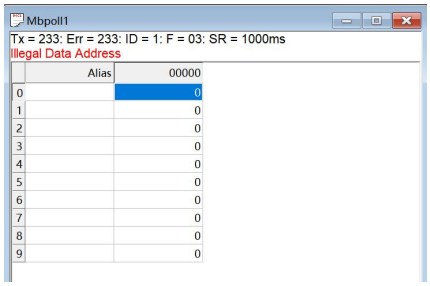


Fig103The. PLC Modbus-Modbus was connected successfully

3. Click the toolbar: Fire> New new window and enter Setup> Read / Write Definition. In the outgoing configuration window, configure Function as 04 Read Input Registers (3x) to indicate the read input register. Click OK to save the configuration.(Quantity: BA (/ BC) 50 supports up to 64 registers)

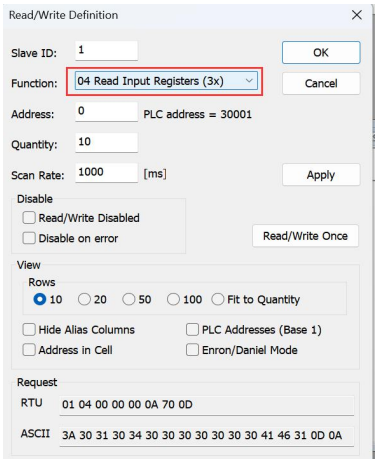


Fig104. PLC Modbus-Set BA (/ BC) 50 as the input register on the Modbus slave

■ The BA (/ BC) 50 reader is triggered in character trigger mode (seeFig 105)

1. Double-click the first column in the first line of window 1 to open the Write Single Register window and enter the ASCII code corresponding to the trigger character set in the section in Value (referenceFig 106, If the ASCII code corresponding to T is 84), click "Send" to trigger the device drawing decoding.

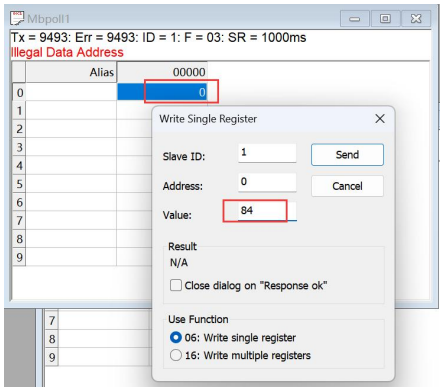


Fig105. PLC Modbus-Character trigger

ASCII 值	控制字符	ASCII 值	控制字符	ASCII 值	控制字符	ASCII 值	控制字符
0	NUT	32	(space)	64	@	96	、
1	SOH	33	!	65	A	97	a
2	STX	34	”	66	B	98	b
3	ETX	35	#	67	C	99	c
4	EOT	36	$	68	D	100	d
5	ENQ	37	%	69	E	101	e
6	ACK	38	&	70	F	102	f
7	BEL	39	,	71	G	103	g
8	BS	40	(	72	H	104	h
9	HT	41	)	73	I	105	i
10	LF	42	*	74	J	106	j
11	VT	43	+	75	K	107	k
12	FF	44	,	76	L	108	l
13	CR	45	-	77	M	109	m
14	SO	46	.	78	N	110	n
15	SI	47	/	79	O	111	o
16	DLE	48	0	80	P	112	p
17	DCI	49	1	81	Q	113	q
18	DC2	50	2	82	R	114	r
19	DC3	51	3	83	X	115	s
20	DC4	52	4	84	T	116	t
21	NAK	53	5	85	U	117	u
22	SYN	54	6	86	V	118	v
23	TB	55	7	87	W	119	w
24	CAN	56	8	88	X	120	x
25	EM	57	9	89	Y	121	y
26	SUB	58	:	90	Z	122	z
27	ESC	59	;	91	[	123	{
28	FS	60	<	92	/	124	|
29	GS	61	=	93	]	125	}
30	RS	62	>	94	^	126	~
31	US	63	?	95	—	127	DEL

Fig106. PLC Modbus-ASCII mapping table

■ The BA (/ BC) 50 reader is triggered in M odbus-bit trigger mode

1. In window 1, tick the box for Display> Binary.
2. in compliance withFig 107As shown, check the M odbus trigger bit set by the BA (/ BC) 50 reader in the outgoing window. Where the rightmost box represents the 0th digit, increasing from right to left. If both 0-bit and 3-bit trigger are set, click OK after checking the chart and clicking OK.

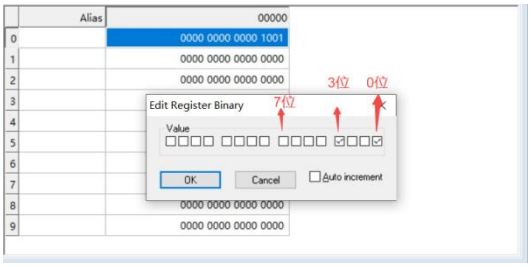


Fig107The. PLC Modbus-bit trigger

13 maintenance

Update the profile

Go to Task List> Update Configuration to Device (refFig 19), Select the configuration file to be updated in the outgoing file browser window (extension:. config). If the update is successful, the code reader will automatically restart.

Download the profile

Enter the Task list> Download Configuration to the computer to save the current configuration to the local computer.

factory data reset

Go to Task List> Restore Factory Settings, and you are prompted to confirm that by selecting Yes in the open dialog box, all environmental parameters will resume the factory default values, including device configuration files and network configuration.

Update firmware

Go to Task List> Update firmware to device and select the firmware file to be updated in the outgoing File browser window (extension:. package). Once the update is successful, the code reader will automatically restart.

pay attention to

1. If you want to use the users own profile, download the current configuration locally before updating the firmware, and update the saved profile to the device with the update profile function after the firmware.
2. Update the configuration or update the firmware removes the original settings, please be careful.

Download firmware

Enter the Task List> Download the firmware to your computer to save the current firmware to the local computer.

Figure list

Table list