

iLOX Series A

Smart Camera User Manual

V25.12. 2025

Preface

Preface

Purpose

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

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Disclaimer

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

Latest Manual Version

For the latest version of this manual, see the Download Center on our web site at: <http://www.contrastech.com/service/005001007.html>

Technical Support

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

Warranty

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

Do not remove the camera's serial number label

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

Do not open the camera housing

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

Prevent ingress or insertion of foreign substances into the camera housing

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

Avoid electromagnetic fields

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

Clean with care

Avoid cleaning the sensor if possible.

Handle this camera with care

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

Read the manual

Read the manual carefully before using the camera.

CHAPTER 1

PRODUCT DESCRIPTION

Product Introduction

With its ultra-compact design, this product can be easily installed in various confined spaces, breaking the limitations of deployment scenarios. Coupled with its flexible and convenient focusing method, it can accurately meet diverse application requirements such as short-distance detection.

In terms of operation and debugging, the product supports cross-platform web access and is equipped with a guided configuration process, which greatly reduces the difficulty of equipment debugging. Meanwhile, it has built-in easy-to-use algorithm tools that allow users to quickly implement core functions such as presence/absence detection, front-back identification, and dimension measurement without complex secondary development.

Widely used in numerous industries including PCB manufacturing, electronic products, automotive manufacturing, consumer goods, food and beverage, pharmaceuticals, and hardware, this product helps enterprises improve the precision of product quality control, reduce manual intervention, cut production costs through automated and intelligent means, and comprehensively enhance their market competitiveness.

Product Features

- Ultra-compact design for seamless integration into confined installation spaces
- Built-in user-friendly algorithms
- Cross-platform web access with a guided configuration process
- Flexible manual focusing to handle various short-distance application scenarios
- Rich I/O interfaces including Ethernet, RS232 and GPIO, supporting multiple communication protocols
- 100M industrial Ethernet interface with IP65 protection rating

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

Status LED Description

Status LED	Description
LINK Indicator	Network indicator is solid green after network is connected normally.
POWER Indicator	It is solid when the power supply is normal; off when it is abnormal.
OK/NG Indicator	If the project is OK, the indicator is solid green; if the project is NG, the indicator is solid red.

The dimensions is in millimeters:

There are M3 screw holes on the back of the device for fixing the device.

Camera Housing and Base Mounting Hole Size(mm):

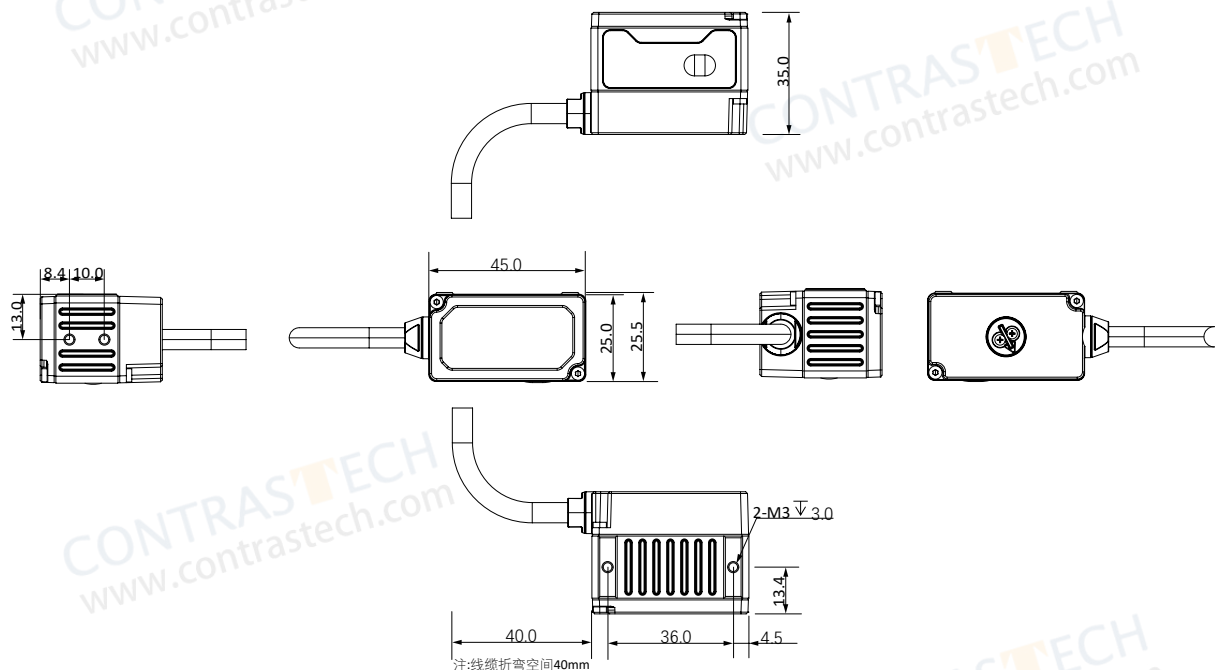


Fig. 1-1: 45.0 x 35.0 x 25.5 Mechanical Dimensions (in mm) of the Smart Cameras with 7mm lens housing (The installation uses M3 screws).

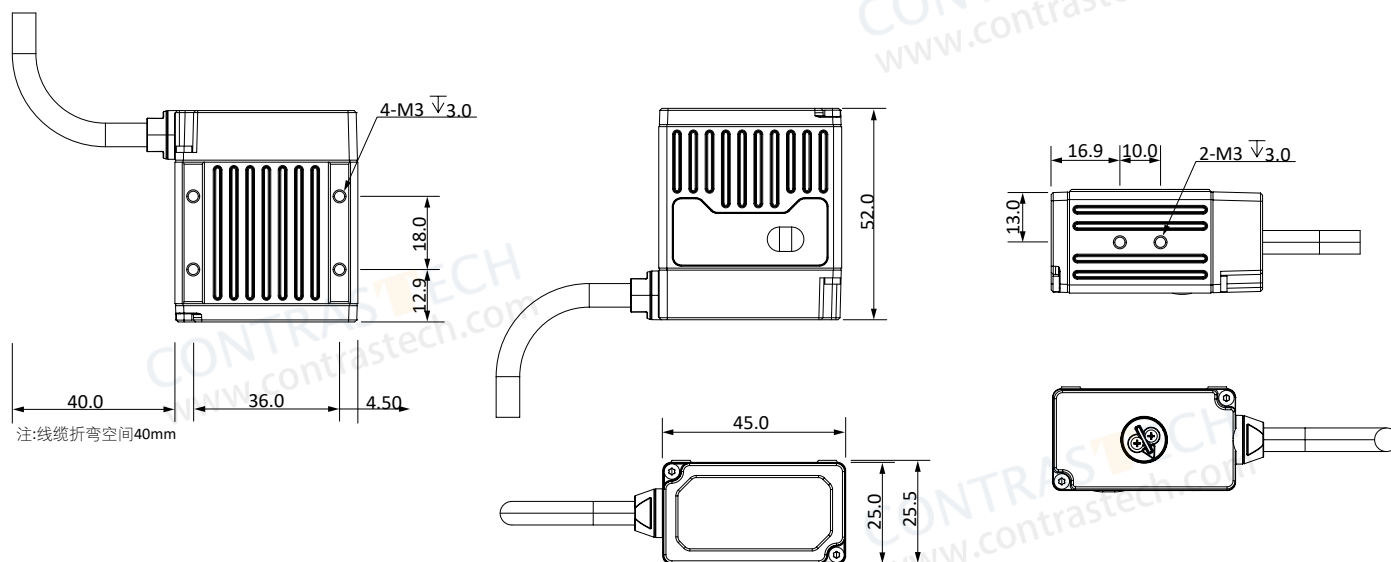


Fig. 1-2: 45.0 x 52.0 x 25.5 Mechanical Dimensions (in mm) of the Smart Cameras with 16mm lens housing (The installation uses M3 screws).

Figure	Model
Fig.1-1	iLOX-A1607
Fig.1-2	iLOX-A1616

POWER AND I/O INTERFACE DEFINITION

CHAPTER 2

I/O Connection Definition and Assignments

Different models of smart camera power supply and I/O interface correspond to different pin signal definitions.

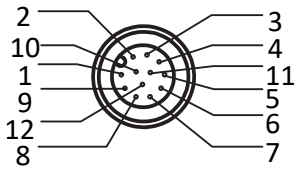


Table 2-1:
Numbering and assignments
for 12-pin power, input/output,
Ethernet, and serial port signal.

Color	Pin	Signal	Signal Source	Designation
Red	1	POWER_IN	Power input	DC 5.5 female receptacle
Black	2	GND	Power supply ground	DC 5.5 female receptacle
Brown	3	OPT_OUT0	Optocoupler output	Scattered wire
Purple White	4	OPT_GND	Optocoupler GND	Scattered wire
Yellow	5	OPT_IN0	Optocoupler input	Scattered wire
Blue	6	GPIO	Configurable IO	Scattered wire
Green	7	MDI1+	RJ-45 network port	RJ-45 network port
Green White	8	MDI1-	RJ-45 network port	RJ-45 network port
Orange	9	MDI0+	RJ-45 network port	RJ-45 network port
Orange White	10	MDI0-	RJ-45 network port	RJ-45 network port
Purple	11	RS-232 RX	Receiving data by serial port	Scattered wire
Gray	12	RS-232 TX	Transmitting data by serial port	Scattered wire



- The DC 5.5 female receptacle of the cable can be connected to the DC 5.5 male connector of the power adapter.
- The scattered-lines part of the cable can be used based on your needs.
- The grounding and power supply ports of bidirectional and configurable IO cable are the common ports.
- If the power ports are connected in reverse, the device will not be able to operate.
- If the input port of the IO cable is connected in reverse, the input function will not be available, but if the output port of the IO cable is connected in reverse, it will cause damages on the circuits.

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

ELECTRICAL FEATURE AND WIRING

CHAPTER 3

Power Supply and Network Ports

Parameter	Description
Power Supply	DC +9V ~ +26V, < 1% ripple, powered through 12-core M12 connector. 26AWG cable or thinner cable.
Data Output Ports	100M Ethernet
I/O Port	1 opto-isolated input 1 opto-isolated output 1 GPIO port (can be configured to input or output mode)



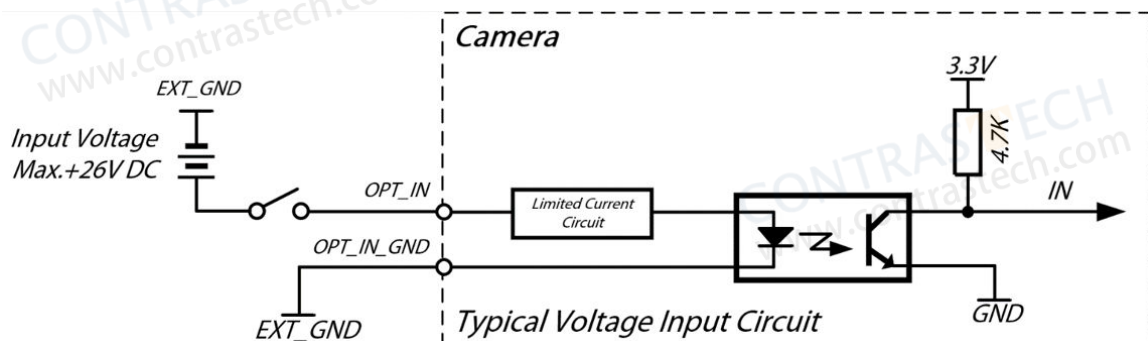
- The power supply must comply with SELV and LPS specifications.
- The device shell is sprayed with insulating paint.

I/O Electrical Feature

■ Opto-isolated Input

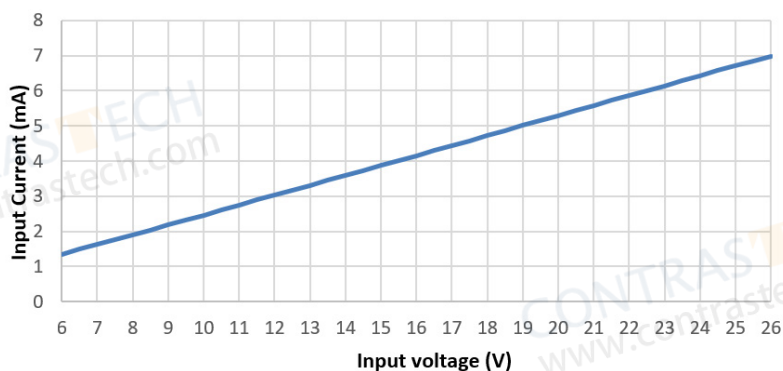
Input Voltage	Description
+26VDC	Extreme voltage. The input voltage cannot exceed the value. Otherwise, the device might be damaged.
+0~+24VDC	Security working voltage range of I/O input.
+0~+6VDC	Logic 0
+6~+9VDC	The input status changes, and the logic status is unsteady within this voltage range.
>+9VDC	Logic 1

The typical circuit diagram of the opto-isolated input port is as follows:



I/O Electrical Feature

The relationship between the sink current and input voltage of the opto-isolated input port is as follows.



- The maximum input current of the opto-isolated input can be up to 7mA.
- Values in the line chart are obtained at an environmental temperature of 25° C (+77° F). Therefore, the actual values may vary among the different models of the camera in the different environments.

The relationship between the input signal amplitude and trigger delay is as follows.

Input Signal Amplitude (Vp-p)	Rising Edge Trigger Delay tDR (us)	Falling Edge Trigger Delay tDF (us)
9	18.8	23.70
12	7.20	31.30
20	3.00	38.40
24	2.40	40.10
26	2.20	41.40



The trigger input delay measures the time delay value from the external opto-isolated input port to the FPGA input pin, which means the internal logic delay of the FPGA is not included.

Minimum input pulse width of the trigger input signal is described in the table below:

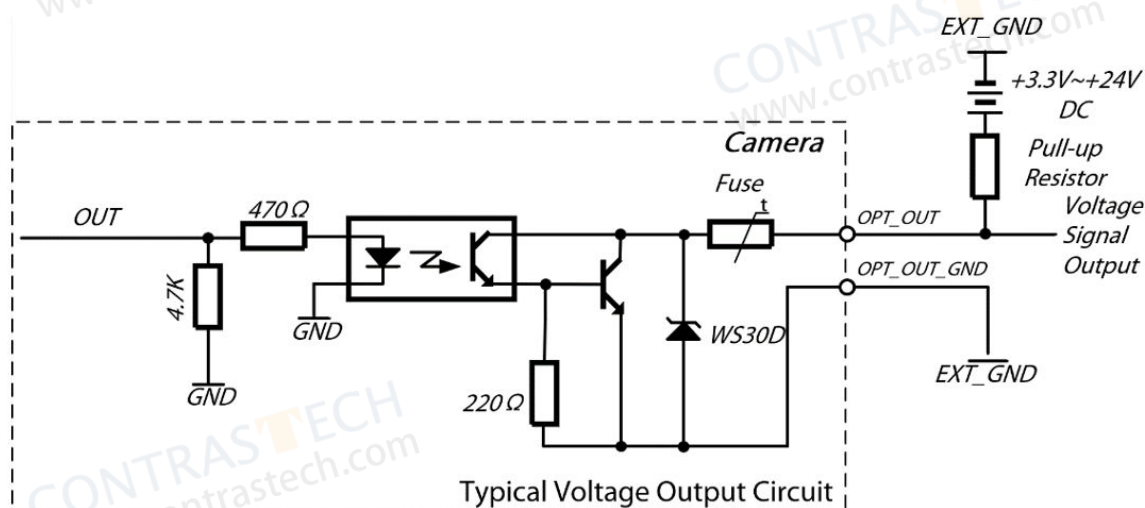
Input Signal Amplitude (Vp-p)	Minimum Positive Pulse Width (us)	Minimum Negative Pulse Width (us)
9	36.00	90.00
12	10.10	90.00
20	3.10	90.00
24	2.40	90.00
26	2.10	90.00

I/O Electrical Feature

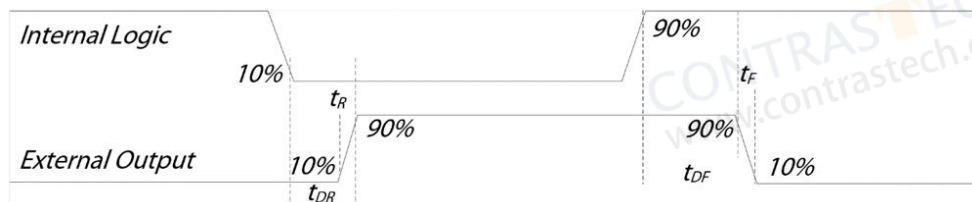
■ Opto-isolated Output

Voltage	Description
+26VDC	Limiting voltage. Input voltage must not exceed this limit. Otherwise, it may cause damages to the devices.
<+3.3VDC	Possible error on I/O output.
+3.3~+24VDC	Security working range of I/O output

The typical circuit diagram of the opto-isolated output is as follows.



The rising/falling time and the rising/falling edge trigger delay time when using the 1 kΩ pull-up resistor are described in the table below.



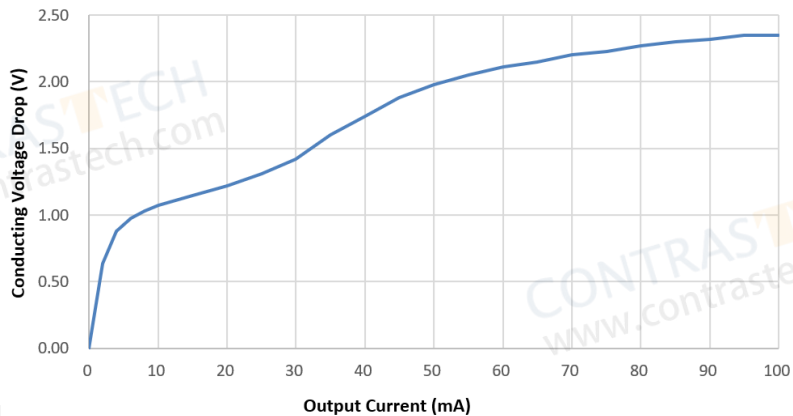
External Power Voltage (V)	Rising Time t_R (us)	Falling Time t_F (us)	Rising Edge Trigger Delay t_{DR} (us)	Falling Edge Trigger Delay t_{DF} (us)
5	19.70	3.20	39.9	8.06
12	24.06	5.22	44.8	11.8
24	30.11	8.10	44.8	53.2



- The output delay measures the delay time value from FPGA internal logic output to the external opto-isolated output pin, which means the FPGA internal logic delay is not included.
- Values in the line chart are obtained at an environmental temperature of 25° C (+77° F). Therefore, the actual values may vary among the different models of camera in the different environments.

I/O Electrical Feature

The relationship between the output conducting voltage drop and output current is shown in the chart below.



- The maximum conducting voltage drop at the opto-isolated output end is 2.35V. This result is obtained under the maximum output current 100mA.
- Values in the line chart are obtained at an environmental temperature of 25° C (+77° F). Therefore, the actual values may vary among the different models of camera in the different environments.

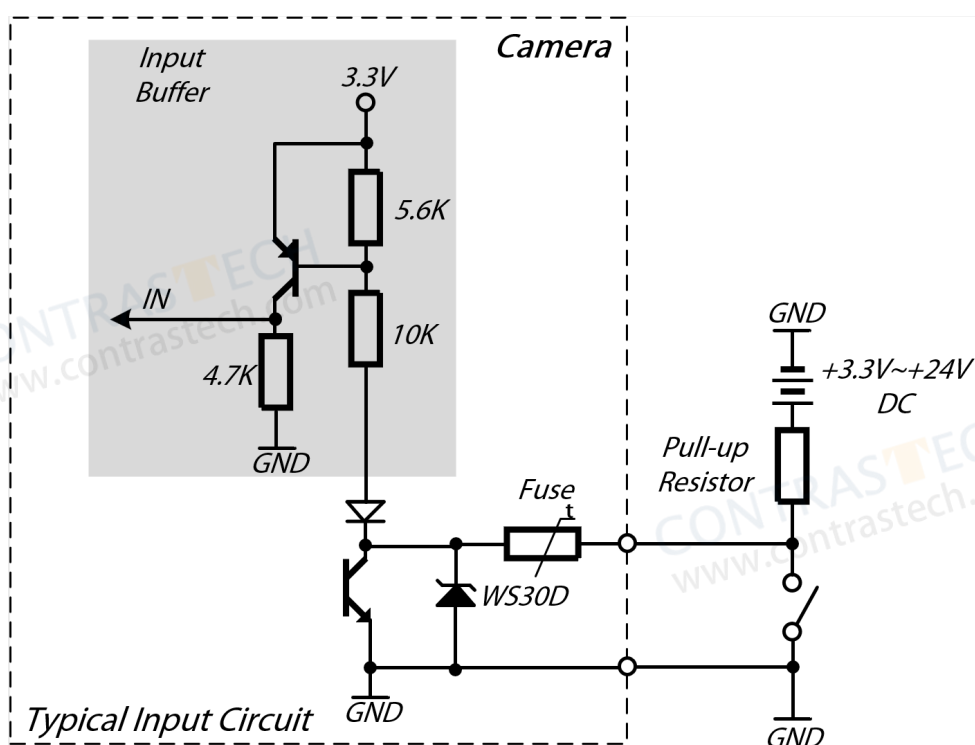
I/O Electrical Feature

GPIO

GPIO as Input Port

Input Voltage	Description
+26VDC	Limiting voltage. Input voltage must not exceed this limit. Otherwise, it may cause damages to the devices.
+0~+24VDC	The security working voltage range in input mode (min 3.3 VDC in external pull-up condition)
+0~+0.8VDC	Logic 0
>+0.8~+2.2VDC	The input status changes, and the logic status is unsteady within this voltage range.
>+2.2VDC	Logic 1

The typical circuit diagram of GPIO input port is as follows.



The relationship between the GPIO input signal amplitude and trigger delay is described in the table below.

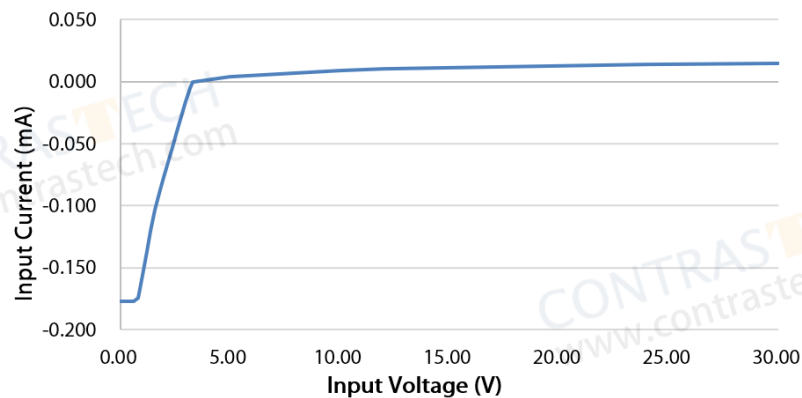
Input Signal Amplitude (Vp-p)	Rising Edge Trigger Delay tDR (us)	Falling Edge Trigger Delay tDF (us)
3.00	6.783	0.339
5.00	6.563	0.200
9.00	6.164	0.106
10.00	6.416	0.960



- The trigger input delay measures the time delay value from the external GPIO port to the FPGA input pin, which means the internal logic delay of the FPGA is not included.
- The shortest input positive pulse supported by the GPIO input port is about 20μs (typical value); the shortest input negative pulse is about 2μs (typical value).
- The GPIO interface delay is less than the opto-isolated interface.

I/O Electrical Feature

The relationship between the sink current and input voltage of external power supply is as follows.



- The maximum sink current of the GPIO input port is 15μA. This value is measured at an external input voltage of 30V.
- Values in the line chart are obtained at an environmental temperature of 25° C (+77° F). Therefore, the actual values may vary among the different models of the device in the different environments.

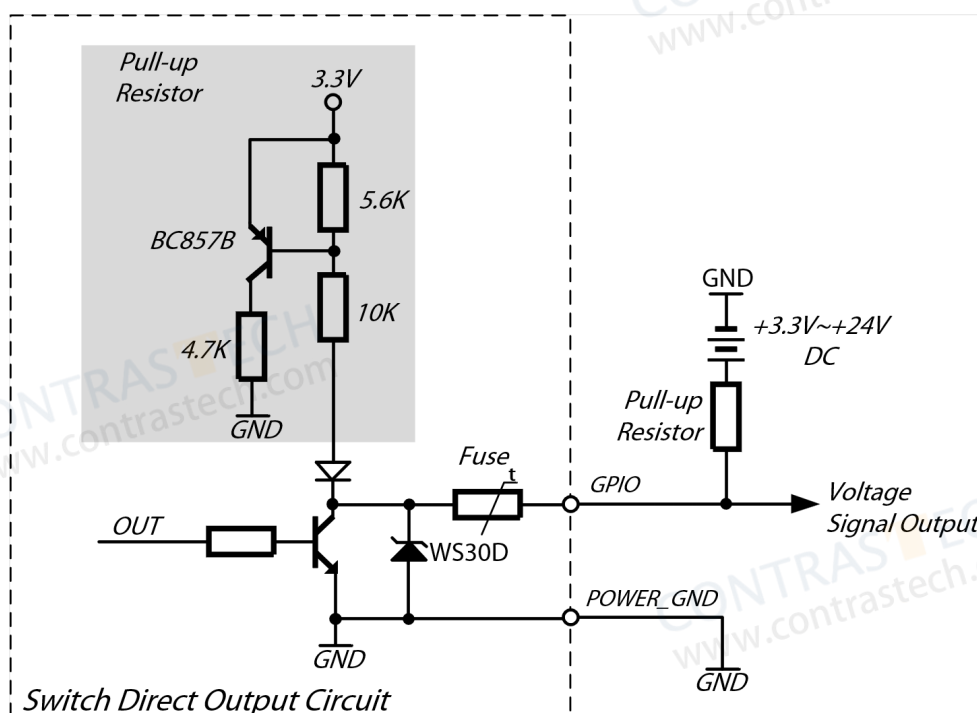
I/O Electrical Feature

GPIO

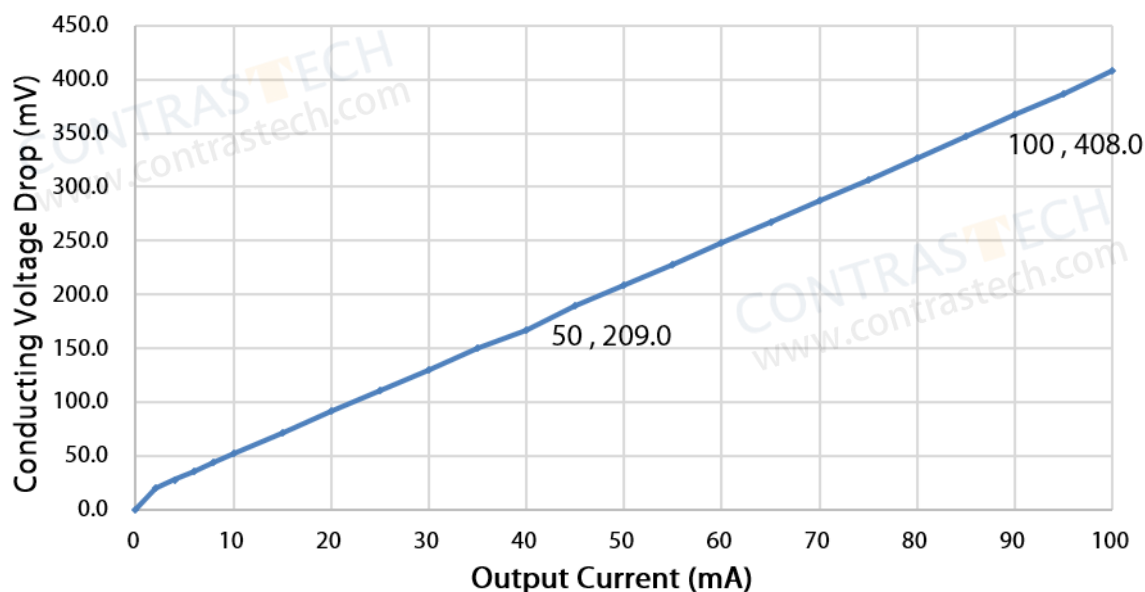
GPIO as Output Port

Voltage	Description
+26VDC	Limiting voltage. Output voltage cannot exceed the limit. Otherwise, the device might be damaged.
+3.3~+24VDC	The security working voltage range in output mode
<3.3VDC	Possible error on I/O output.

The maximum of the sink current when the GPIO is as output port is 50mA. The typical circuit is as follows.



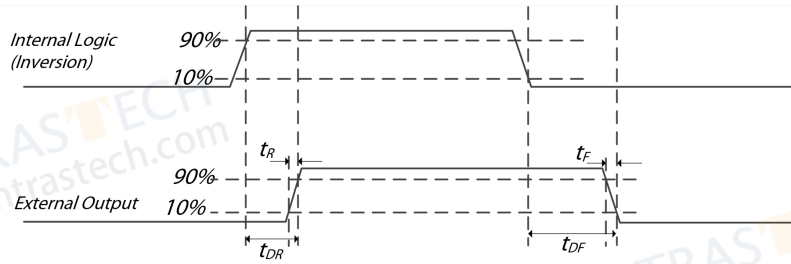
The relationship between the voltage drop (between GPIO and GND) and output current (flows into GPIO pin) are shown in the figure below.



Values in the line chart are obtained at an environmental temperature of 25° C (+77° F). Therefore, the actual values may vary among the different models of device in the different environments.

I/O Electrical Feature

The maximum conducting voltage drop when the GPIO is as the output port is 0.41V (100mA output current).



The rising/falling time, and rising/falling edge trigger delay time are shown as below when the pull-up resistance is 470 Ω .

External Power Voltage (V)	Rising Time t_R (us)	Falling Time t_F (us)	Rising Edge Trigger Delay t_{DR} (us)	Falling Edge Trigger Delay t_{DF} (us)
Null	-	-	5.43	0.35
5	0.16	0.02	1.80	39
12	0.22	0.04	2.37	71



- The output delay refers to the time delay between the FPGA pins and GPIO pins, which means the internal logic delay of the FPGA is not included.
- When no external pull-up resistor exists, the shortest output positive pulse is 11 μ s and the shortest output negative pulse is 1 μ s.
- The GPIO interface delay is less than the opto-isolated interface.

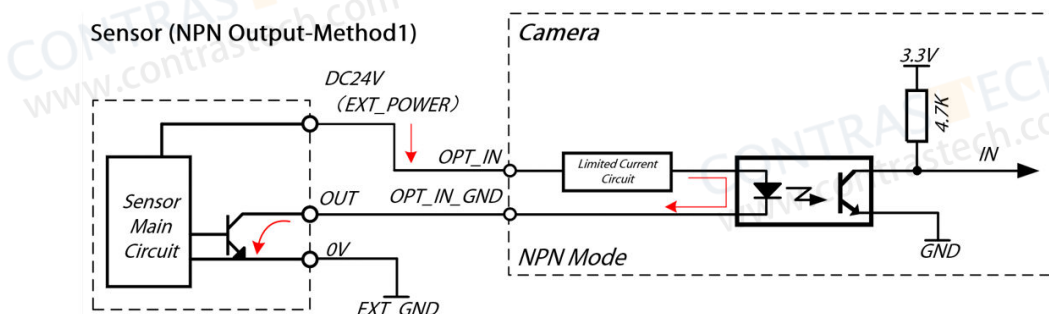
External I/O Wiring

■ Opto-isolated Input

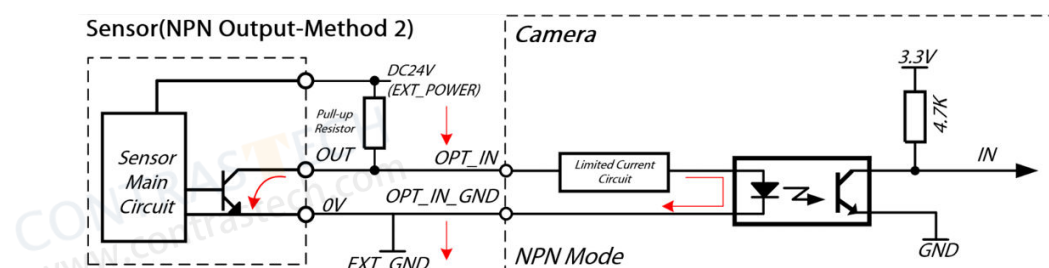
The opto-isolated input can be used with the the cameras supporting the NPN, PNP, and push-pull output structures.

NPN Output Structure

- Method 1: No Pull-up Resistor (Recommend)

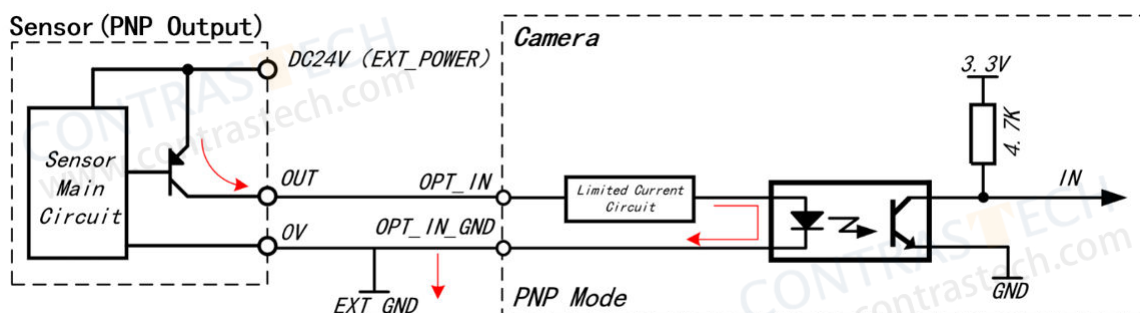


- Method 2: Add Pull-up Resistor

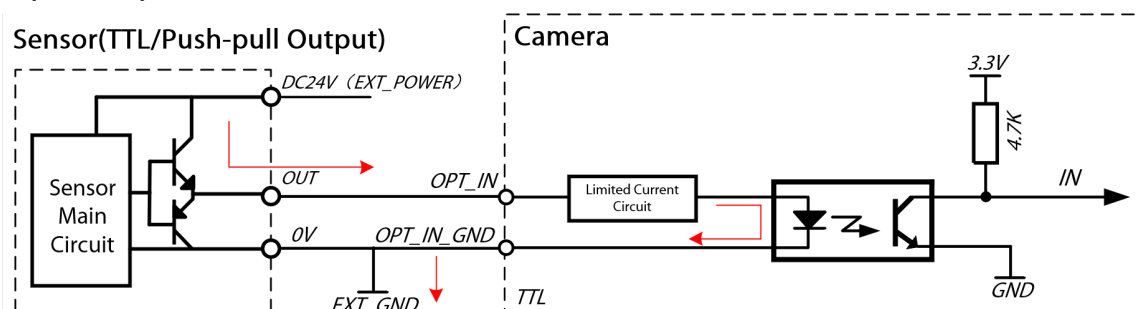


- “EXT_POWER” refers to the external positive port of power supply; “EXT_GND” refers to the external power grounding port. The power supply can be the independent switch-type power supply, and also can be of the sensor.
- This wiring method is suitable for the sensors with NPN open-collector output structure.
- If the external pull-up resistance is adopted, the voltage and pull-up resistance shall be 1kΩ at 3.3V, 1kΩ at 5V, 2.4kΩ at 12V, 4.7kΩ at 24V. If user needs to improve the current capacity, the pull-up resistor shall be less than 1kΩ, and the rated power of shall be more than 1W.
- In some models, the “OPT_IN_GND” and “OPT_OUT_GND” are integrated as one common port, namely “OPT_GND”.

PNP Output Structure



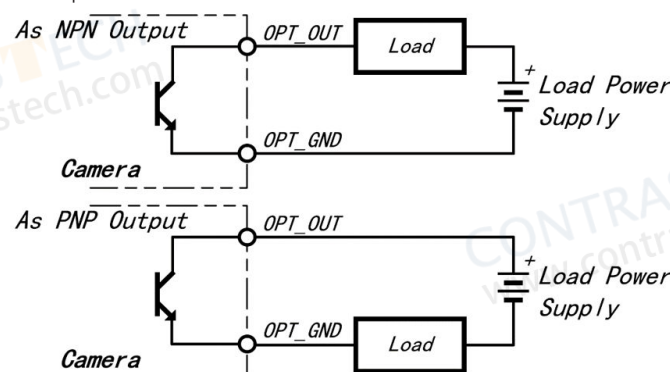
TTL or Push-pull Output Structure



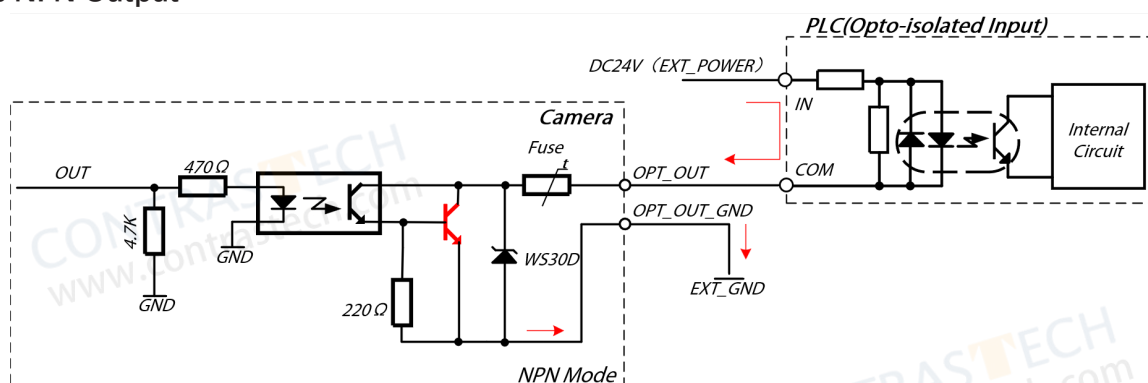
External I/O Wiring

■ Opto-isolated Output

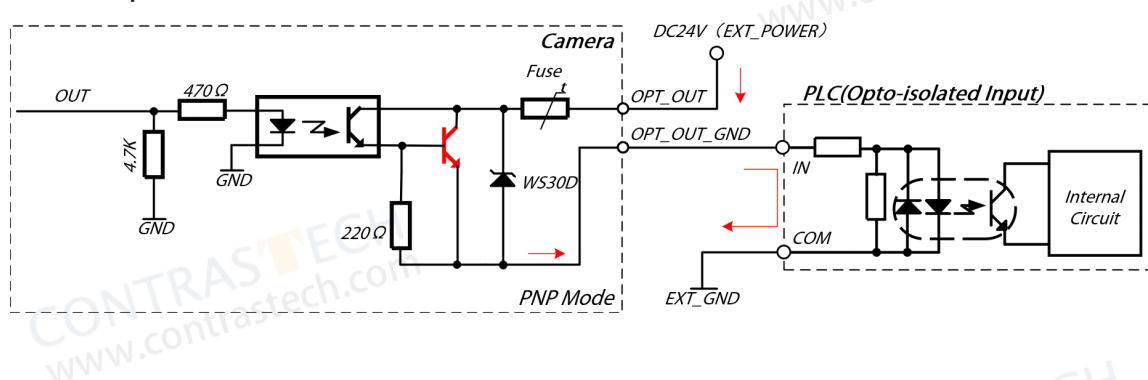
The transistor output port of camera is separated from the internal loop by using an opto-isolator. Therefore, the transistor output port can be used as NPN output or PNP output.



Camera as NPN Output



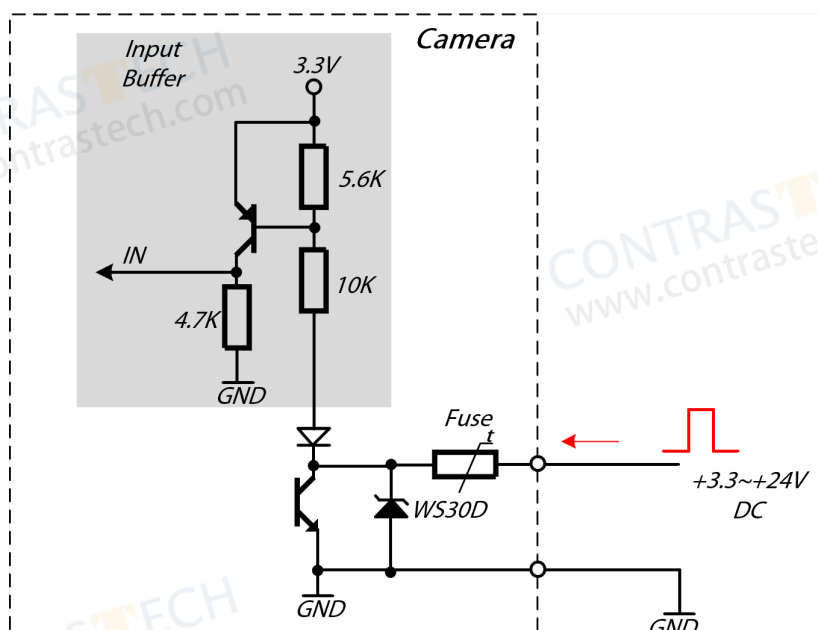
Camera as PNP Output



External I/O Wiring

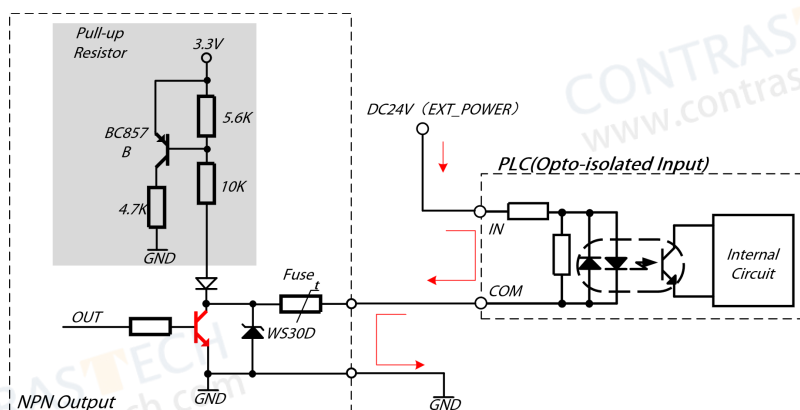
GPIO

GPIO as Input Port



GPIO as Output Port

When the GPIO is as the output port, it is similar to the opto-isolated output, and the difference between them is that the GPIO output should adopt the non-isolated wiring method, and the signal grounding port of GPIO and device should connect to the common grounding port.



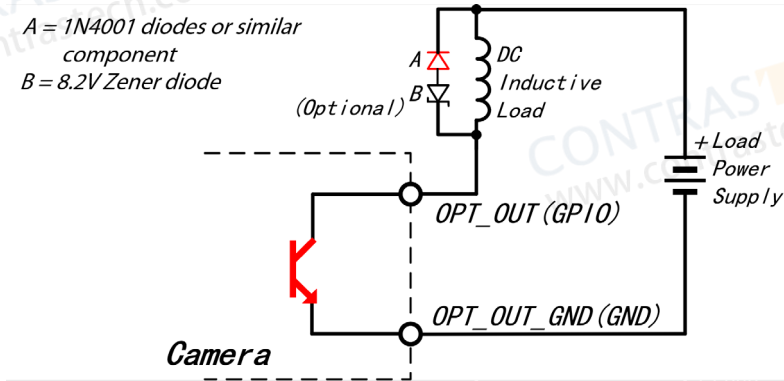
- Do not apply the voltage or connect load on the output terminals which exceeds the maximum value.
- Do not replace the fuse of the interface. If the fuse blows due to the overcurrent, such as short circuit, please contact our after-sales to provide the maintenance service.
- GPIO is the bidirectional port, and before connecting to the external power supply, please identify and set the correct the directions (output or input). Do not change the directions during the running of the device. The wrong settings of directions will cause damages to the circuit of the GPIO interface.
- Please do not use the GPIO output solution in the situation with serious electrical interference, because the GPIO is the non-isolated design which means its anti-interference performance is not good enough. We recommend you use the opto-isolated input port or output port.
- If the external pull-up resistance is adopted, the voltage and pull-up resistance shall be 1kΩ at 3.3V, 1kΩ at 5V, 2.4kΩ at 12V, 4.7kΩ at 24V. If the user needs to improve the current output capacity, the resistance should be less than 1kΩ, and the rated power of it should be more than 1W.

External I/O Wiring

Wiring Method of Relay or Other Inductive Loads

To drive the inductive load, such as relay, using device output signals, please use relay with built-in flyback diodes, or use the external flyback diodes. Otherwise, the overvoltage will cause damages on the output interface.

The diagram below is an example of the suppression circuit of DC inductive load. In most solutions, one additional diode A is required. If you need the faster shutdown speed, we recommend you use the Zener diode B. Please ensure that the Zener diode can meet the current requirements of the circuit.



How to Avoid EMI and ESD

In the industrial environment, there are some equipment generating EMI, and the vision camera is apt to be influenced by ESD. Serious EMI and ESD can lead to false triggering or sudden stop of streaming. EMI and ESD will also bring instability to the image quality, and interfere the reliability of image transmission between camera and PC.

In order to avoid the problems mentioned above caused by EMI and ESD, we recommend you take the following measurements:

- Use high quality shielded cables, which can have a good effect on shielding EMI and ESD.
- Appropriate cable length is important. If the cable length is longer than expected, please fold the redundant part instead of looping it.
- Data transmission cable is suggested to be paralleled with the power cable.
- Camera cable should not be closely paralleled with other cables which has heavy current or has situations of voltage switching, such as stepper motor drive, solenoid valve.
- You are advised to connect all the grounding (GND) wires to a single point, i.e. single point grounding. For example, a distribution board can be used to connect the grounding wires of the whole system to a single point. This is done to avoid plenty of ground circuits (which are a major cause of EMI problems).
- Use a line filter for the main power supply of the camera, or a separate power supply for camera is recommended.
- Please keep camera and its cables away from the device generating sparks, such as brushed motors, relays, etc. A metal shielding shell is recommended if it is necessary.
- The following measurements can be taken to reduce the risk of ESD:
 - The mounting surface shall be adopted with conductive material.
 - The humidity in the installation environment shall be properly controlled. Dry air is easy to produce ESD.

CHAPTER 4 INSTALLATION AND SETUP

When installing the devices, please avoid the situations which can generate the static electricity, electromagnetic interference, lightning strike, or surge. Also, the device needs the sufficient space to dissipate the heat.

Software Installation

■ iLOGIX Installation

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

Close the Firewall

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

System Requirements

To ensure that the normal operation of the client, the requirements to the PC are as follows.

Recommend Configuration

- Operating System: 64-bit Windows 10 or above
- CPU: Intel i5-10500
- Memory: 8GB or above
- Graphics Card: 1440*900 or above
- NIC: GigE

Standard Configuration:

- Operating System: 64-bit Windows 10 or above
- CPU: Intel E3940
- Memory: 4GB
- Graphics Card: 1440*900 or above
- NIC: 100M

Installation Steps

1.You can download the iLOGIX software from:

<http://www.contrasttech.com/service/005001008.html>

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

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

Hardware Installation

■ Camera Installation

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

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

- iLOGIX Series Smart camera
- Applicable switch or network card
- The computer with a GigE network adapter installed
- The computer must be equipped with appropriate operating system
- Standard Ethernet cable (CA5 or above).

Steps:

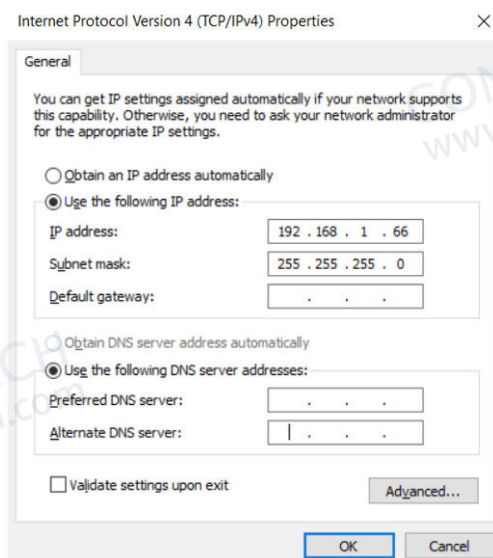
- Use M3 screws to fix the device to the installation position.
- Use the supplied 12-pin cable to wire the device to a suitable power adapter or switch power supply.
- Connect the device to a switch or NIC via network cable.

Network Settings

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

Local Network Configuration :

- Select Control Panel > Network and Internet > Network and Sharing Center > Change Adapter Configuration. Select the corresponding network port and right-click Properties from the shortcut menu. A dialog box is displayed.
- Double-click Internet Protocol Version 4 (TCP/IPv4). The IP address setting interface will be popped up. Configure the network port to the static IP address: 192.168.1.X, Ensure that the PC and the device are on the same LAN.
- Open "Advanced" in the properties, set Speed and Duplex as Auto-Negotiation or 100 Mbps. Shown as below:



Software Operation

The client supports the web version. After connecting the device, the user can perform the project management on the client software. The wizard-type guideline can walk the user through configuring the project. The main steps include Shooting Setup, Master Registration, Algorithm Setup, Communication Setup. Also supports the functions of device management and monitoring, and the web version is integrated in the client software; therefore, the user does not need to install the additional software.

■ Client

Please refer to the document Getting Started with iLOGIX for details.

■ Web Client

● Compatibility Requirement

The following browsers are highly recommended.

- Google Chrome: Version 127.0 or later.
- FireFox: Version 116.0 or later.
- Edge: Version 95.0 or later.

● Web Client Operation

Procedure

Step 1 Enter the IP address of the camera in the browser, and press **[Enter]** to enter the web client. After entering the web client, enter the username and password to login the configuration interface. If user forgets the password of the camera, please refer to the Password Reset.

Step 2 The functions and operations of the web client and desktop client are the same. The function introduction and operation guidance, please refer to the document Getting Started with iLOGIX for details.



- The default IP address of camera is 192.168.1.108. Before using the web client, user shall configure the IP address of the PC to make it in the same network segment with the camera; otherwise, user cannot login the web client.
- User does not need to install any plug-ins on the browser.

CHAPTER 5 FAQ

Trouble Shooting

Trouble:

■ Client Cannot Find Camera

Possible Reason:

- Camera are not started normally, and the power supply cannot meet the requirements.
- Abnormal network cable connection.
- The camera and the client are not under the same network segment.
- Firewall forbidden the network access.
- IP Conflict: The IP address of camera conflicts with the PC's or other devices.

Solutions:

- Power Supply: Make sure that the power supply and cable are suitable.
- Network Connection: Check the indicator of the camera, and make sure the network connection is normal. Also, make sure the device and client are on the same network segment.
- Disable the firewall, or add the client software into the allow-list.

■ Camera Disconnection

Possible Reason:

- Hardware problems, such as poor contact of network card and network cable.
- Unmatched configurations of network adapter and camera.

Solutions:

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

■ Algorithm Processing Does Not Meet Expectations

Possible Reason:

- Image FOV or illumination does not meet the requirements.
- Improper parameter configurations.

Solutions:

- Check the parameters of camera FoV and the illumination. Review the camera parameters, such as trigger mode, trigger delay, exposure and gain, illumination, etc.
- Check the parameters of the algorithm, especially the ROI box, polarity, filtering conditions, etc.

■ External Trigger Cannot be Enabled

Possible Reason:

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

Solutions:

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

■ Unable to Login the Web Client

Possible Reason:

- The IP address of the camera was not defined which means it is the private IP address.
- IP address of the camera was changed.

Solutions:

Use client to find camera and check its IP address, and then use the correct IP address to log in the web client.

CHAPTER 6

TECHNICAL SUPPORT

Technical Support

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

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

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

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