IP9172-LPC (Freeway)
License Plate Capturing Solution

Installation Guide

Rev. 1.0

Document part no.: 625050600G

UNPACKING:
Unpack carefully. Electronic components can be damaged if improperly handled or dropped. If an item appears damaged in shipment, place it properly in its carton and notify the shipper.

⚠ **IMPORTANT!:**
1. Read and follow Instructions: All operating and user instructions should be read and followed before the unit is to be operated.
2. Electrical Connections: Only a qualified electrician is allowed to make electrical connections.

Ⅰ Specifications

Model Number	LPC enclosure
Power Input	24V AC or DC
Max. Output power budget	24W (freeway); 288W at pulsed mode; enabled by the onboard capacitors. -20°C ~ 60°C (-4°F ~ 140°F):Max. 60W, AC/DC 24V -40°C ~ 60°C (-40°F ~ 140°F): Max. 100W, AC/DC 24V
Power Consumption	Window heater: 10W; Blower: 2W; Camera: 6 ~ 8W
Environmental Operation Temp.	-20°C ~ +50°C (-4°F ~ +149°F)
Protection Level	IP68, IK10
Mounting Bracket	Fully-cable Management
Construction	Die-cast Aluminum Alloy
Coating	White epoxy powder coating
Dimensions	502.8 (L) x 170 (W) x 400 (H) mm
Net Weight	6,482g (9.24 lb)

Please note the following for different applications:

If you use IP9172-LPC for highway, you must select the LPR scene mode.

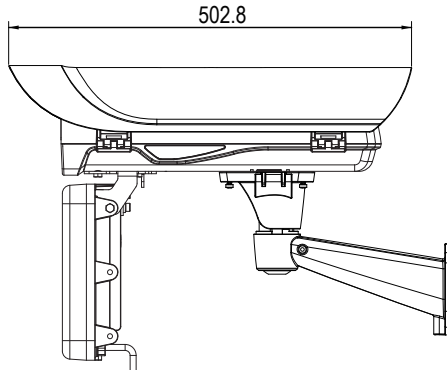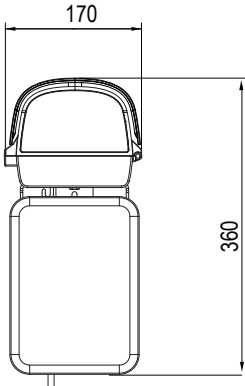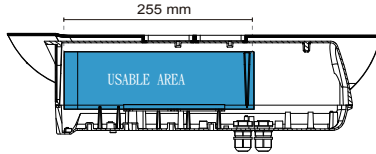Depending on the car speed at your surveillance scene, please select an appropriate scene mode:
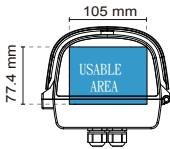
Maximum car speed	Scene mode
180km/hr (110mph)	LPC-Highway
250km/hr (155mph)	LPC-Freeway

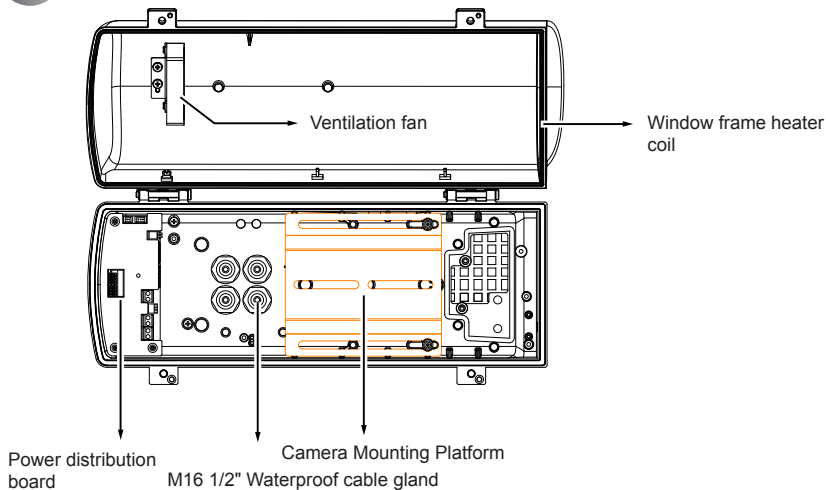The Scene mode option can be found in **Application** > **Media** > **Image settings**.

Swivel Positions and Directions

170 mm

502.8 mm

158.5 mm

135.5 mm

400 mm

105 mm

255 mm

77.4 mm

USABLE AREA

USABLE AREA

170

502.8

360

4
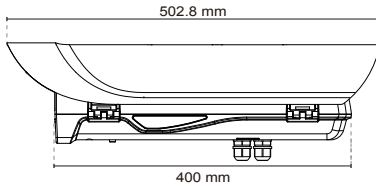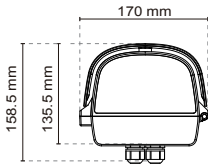
III Component Description

Ventilation fan

Window frame heater coil

Power distribution board

M16 1/2" Waterproof cable gland

Camera Mounting Platform

IV Installation Suggestions

If you plan to install this camera enclosure into a tropical, sea coastal, or an environment where salt water or corrosive industrial waste water/moist are present, please seal each stainless steel screws and fittings with a silicon grease compounds. This will help prevent electrolysis to occur and extend the life span of the camera and housing.

⚠ **IMPORTANT:**
1. Disconnect devices: A readily accessible disconnect device in the building installation wiring should be incorporated.
2. Electrical Connection: Only a qualified electrician is allowed to make electrical connections.

⚠ **WARNING:**

• Please avoid eye exposure or apply appropriate protection, such as wearing a pair of Infrared protection glasses, when working with the product. Always use camera live view to oberve IR lighting effects.

1. Install the wall-mount bracket to a preferred location at your installation site. Drill mounting holes and a cable routing hole (if preferred) on a wall. Install the bracket. Prepare and route the wiring, Ethernet and 24V power source.
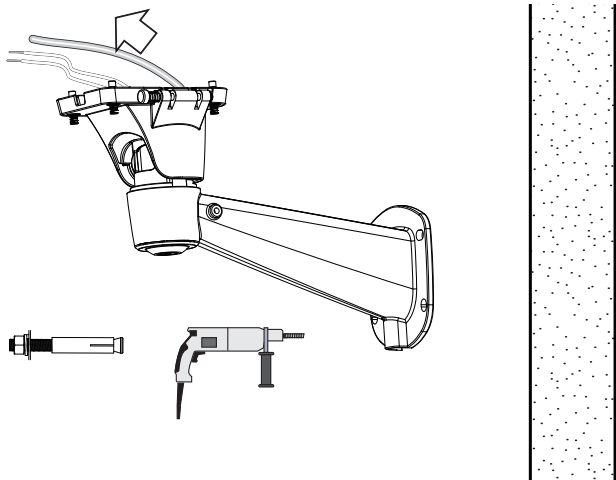
2. Flip the housing over and place it on a clean, stable surface. Secure the IR illuminator to the bottom of the housing using the included wrench and 2 hex screws.

x 2
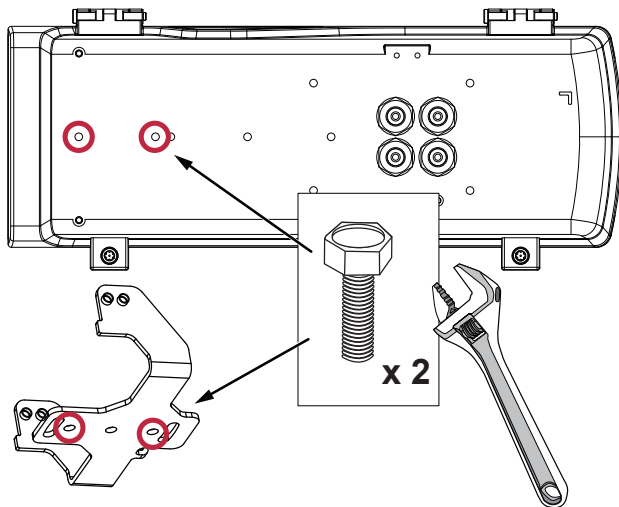
3. Secure the U bracket to the IR illuminator using the included hex screws.
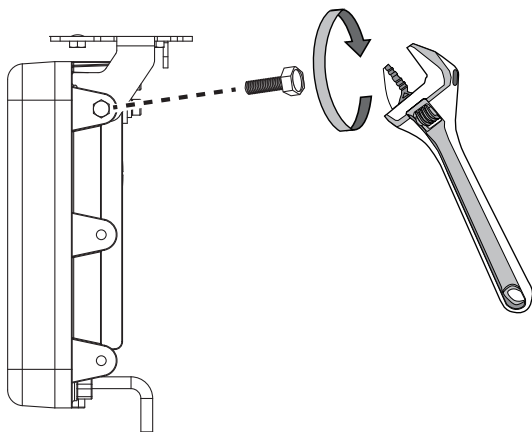
4. Prepare power wires, a ground wire, and a CAT5e Ethernet cable. Pass them through the M16 waterproof connectors under the housing.

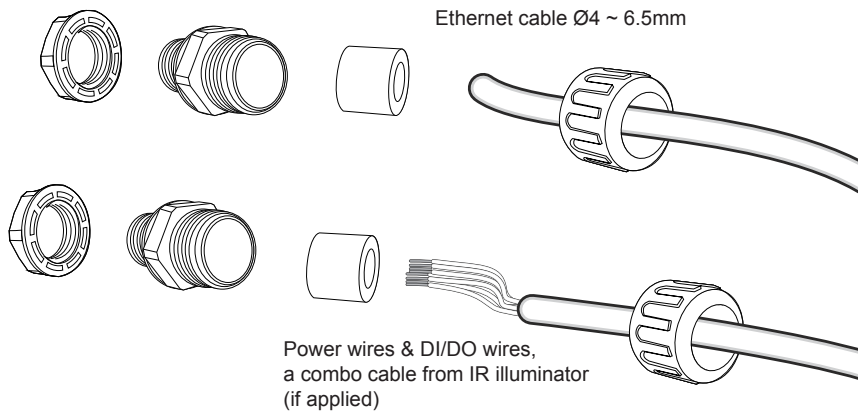Ethernet cable Ø4 ~ 6.5mm

Power wires & DI/DO wires,
a combo cable from IR illuminator
(if applied)

You may need to remove the RJ45 connector, and use a crimping tool to connect the Ethernet wires to an RJ45 connector inside the enclosure. Use an Ethernet cable of the width of 4 ~ 6.5mm.

o: white/orange stripe
O: orange solid
g: white/green stripe
B: blue solid
b: white/blue stripe
G: green solid
br: white/brown stripe
BR: brown solid

o
O
g
B
b
G
br
BR

1
2
3
4
5
6
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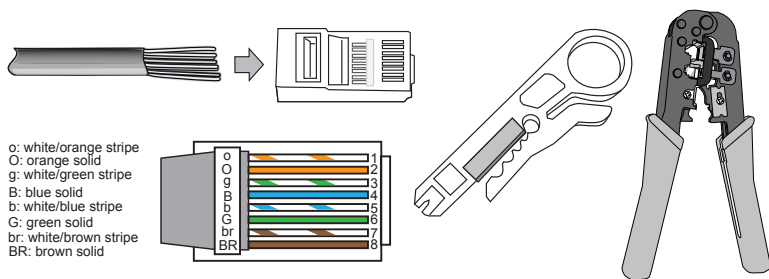
5. When done, tighten up and install the waterproof connectors.

**6.** You can turn the IR illuminator so that its flat side is parallel with the housing, and that you can turn the assembly over and work on the inside of the housing. Put a foam pad below before you work on the wiring to avoid scratching the surface.


7. Assemble the camera components, e.g., the CS ring and lens module. Secure the mounting plate to the bottom of the camera (the label side) using the included screw.
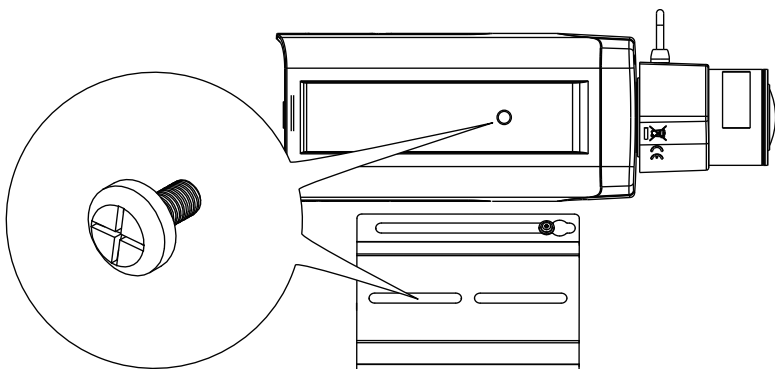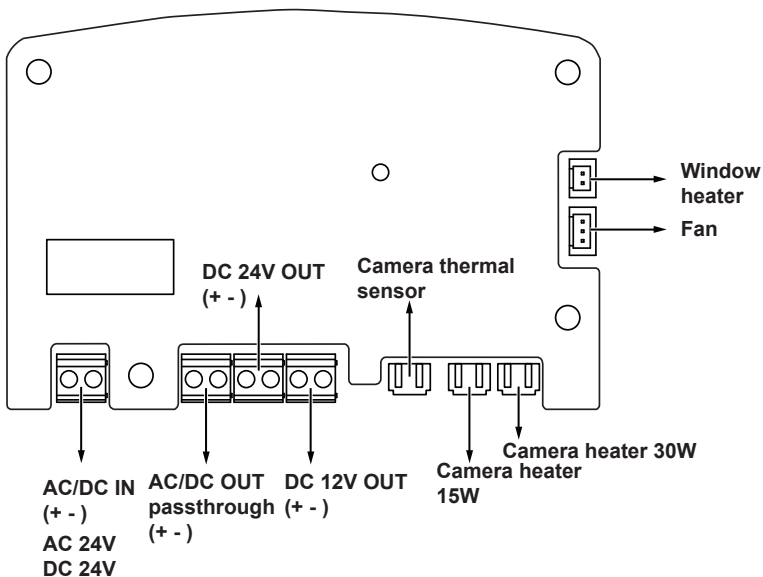

There is a plastic mount pad in the package. You do not need the mounting pad using the VIVOTEK camera.

8. Adjust the camera's position so that the lens module can flush align with the tempered glass. Secure the camera using the screws and washers to the bottom of the housing.

Lens flush w/ edge of enclosure
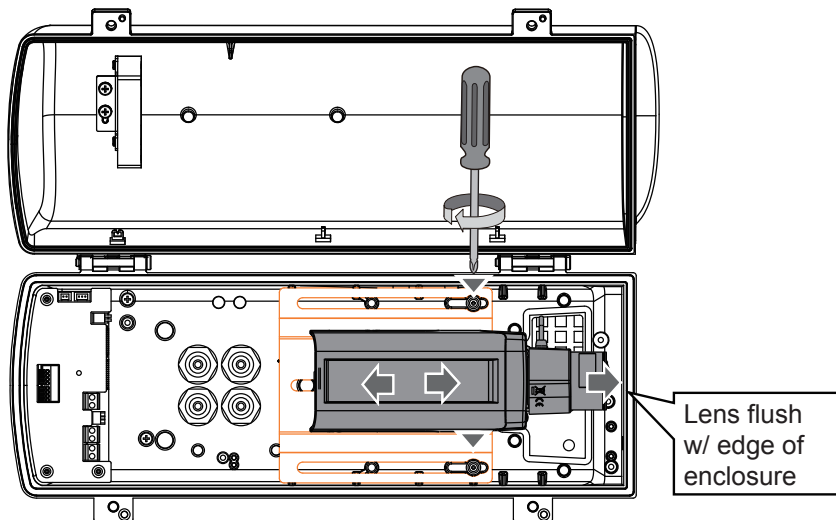
9. Connect 24V power source to the power input terminal. Connect power wires from the DC 12V output to the camera. Connect the 24V power output to drive the external IRs.


Window heater

Fan

DC 24V OUT (+ -)

Camera thermal sensor

Camera heater 30W

Camera heater 15W

AC/DC IN (+ -)
AC 24V
DC 24V

AC/DC OUT passthrough (+ -)

DC 12V OUT (+ -)

⚠ IMPORTANT:

You should prepare a power adaptor of the sufficient capacity for supplying 24V input. Below are the requirements:

Working temperature	Total consumption	Power adaptor
-20°C ~ 60°C (-4°F ~ -140°F):	60W	3A
-40°C ~ 60°C (-40°F ~ 140°F):	100W	5A

10. Connect the Ethernet cable to the camera's RJ45 socket.

11. Also pass the combo cable of the IR illuminator through a waterproof connector.

12. Connect the day/night signal lines from the IR unit to the DI/DO connectors on the camera's terminal block. The IP9172 is shown here.
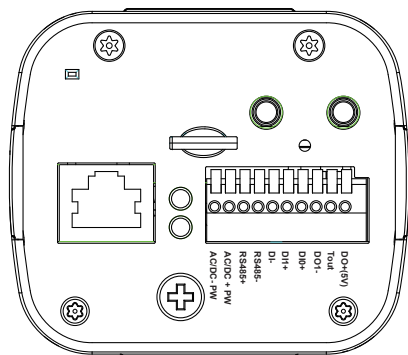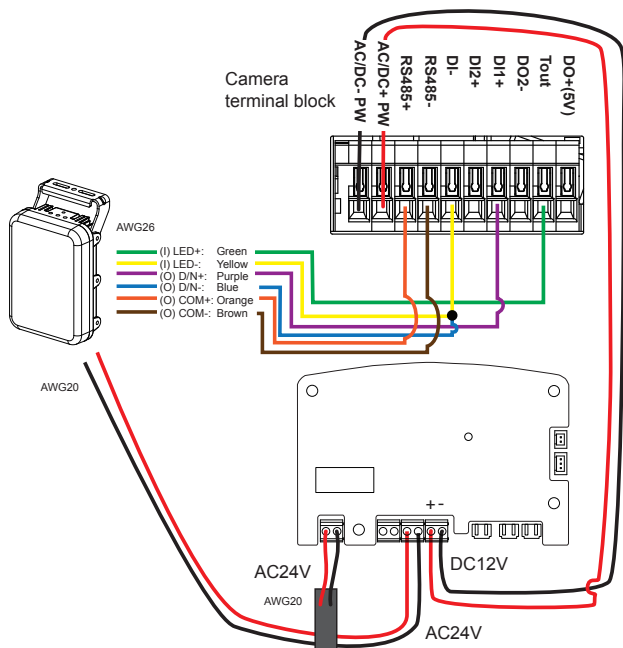

The day/night mode DI connection enables the synchronization of IR light and the automated day/night switching mechanism on the camera.

Cable Pinouts (IR Illuminator)

Name	Color	Gauge	Description
V+	Red	(20AWG)	Power input
V-	Black	(20AWG)	12~24V DC±10% 24V AC±10% (50~60Hz), (14.5VDC current controlled)
(I) LED+	Green	(26AWG)	LED ON/OFF control; pulsed LED control synchronized with camera sensor exposure time.
(I) LED-	Yellow	(26AWG)	Ground
(O) D/N+	Purple	(26AWG)	Light sensor status output 1. Open = Day 2. Short = Night (20 lux for IR ON); day/night switch will have a 30 sec. delay.
(O) D/N-	Blue	(26AWG)	Ground
(O) COM+	Orange	(26AWG)	RS485 interface control
(O) COM-	Brown	(26AWG)	

A sample connection diagram consisting of CaMate's IR illuminators and the camera is shown below. Please refer to your camera's documentation if your camera comes with different pinouts.


Camera terminal block

AWG26

(I) LED+: Green
(I) LED-:   Yellow
(O) D/N+: Purple
(O) D/N-:   Blue
(O) COM+: Orange
(O) COM-: Brown

AC/DC- PW
AC/DC+ PW
RS485+
RS485-
DI-
DI2+
DI1+
DO2-
DO2-
Tout
DO+(5V)

AWG20

AC24V

AWG20

DC12V

AC24V

13. You can connect the ground wires together and connect them to the DI- ground pin on the terminal. Use a small flat blade screwdriver to press the lever on the terminal block.
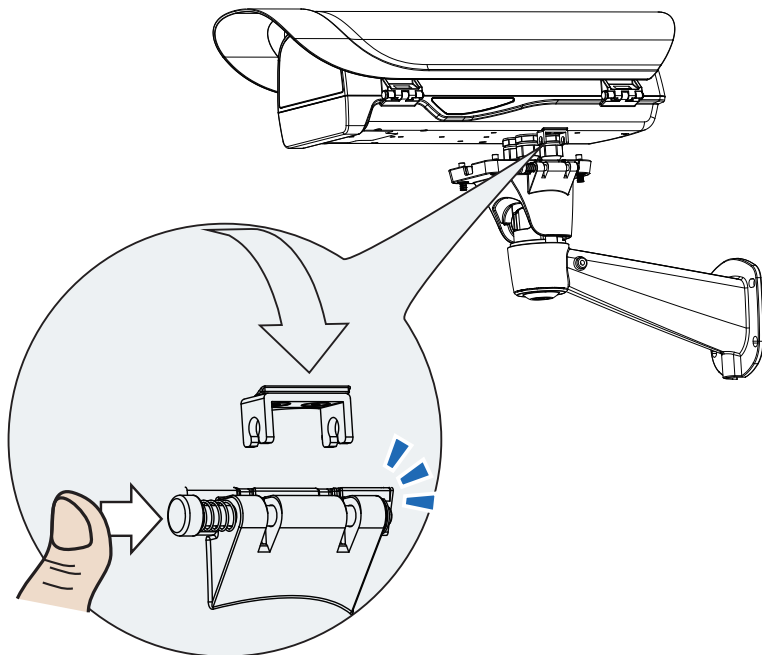

(O) D/N-   (I) LED-
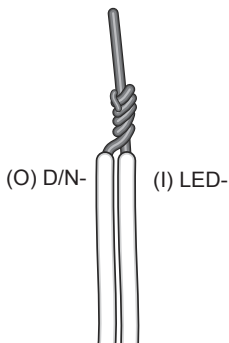
The default for the DI status is listed below:

DI	Normal: High Current Status: > High - Day mode. > Low - Night mode (IR is on)

**14.** Secure the intersection bracket to the bottom of the housing by driving two screws.
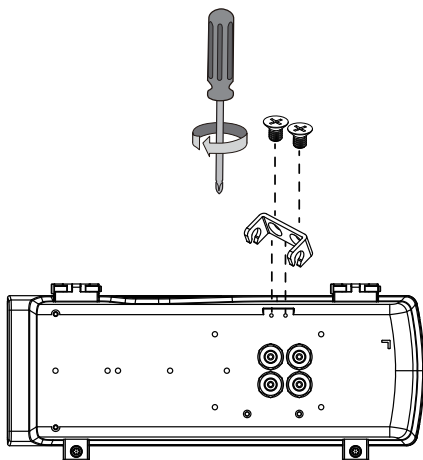
15. Install the housing to the wall-mount bracket by aiming and pressing the spring mortise, and hook the bracket onto the groove in the spring mortise.
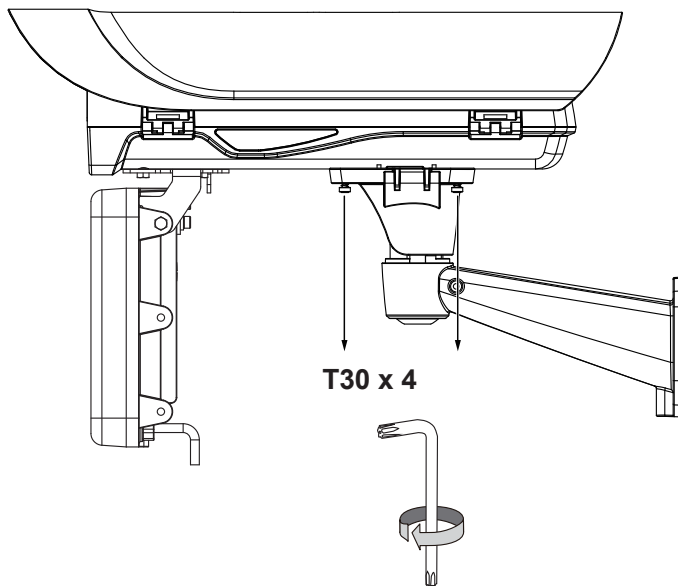
⚠️

When mounting the housing, please carefully place the cable within the cutout on the bracket. There is a cutout for routing the cable.
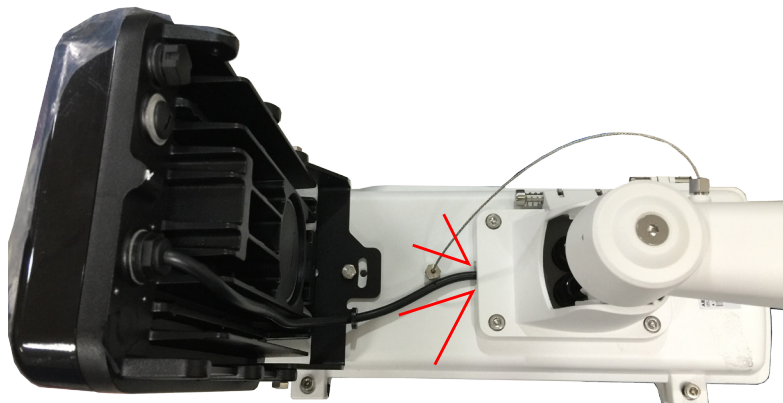
**16.** Secure the housing to the bracket by fasteninng 4 T30 screws.

T30 x 4

17. Adjust zoom and focus and open a web console to the camera to tune for the best image. When zoom and focus is done, Close the top cover and fasten the hex screws from below.

18. Firmware configurable options:

Make sure that the external IR is turned on in the night mode, and that the IR cut filter option is synchronized with the digital input you connected (default is Tout).

When the "**Turn on external IR illuminator in night mode**" is selected, a digital output signal will be triggered to turn on the IR illuminators.
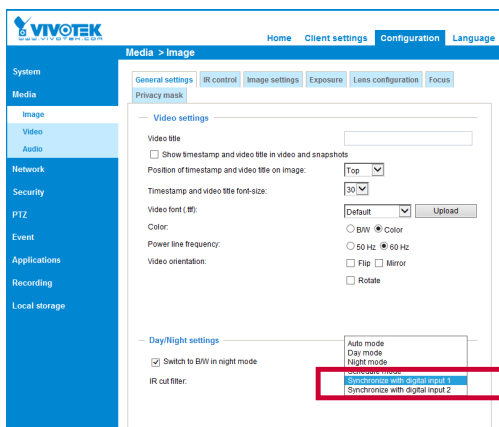

Use the **Media** > **Image** > **Focus** function to tune for a best image focus on your target area. If using a non-iCS lens model (RBF lens), you should manually tune the focus to be close to the optimal, and then use the auto scan focus function.
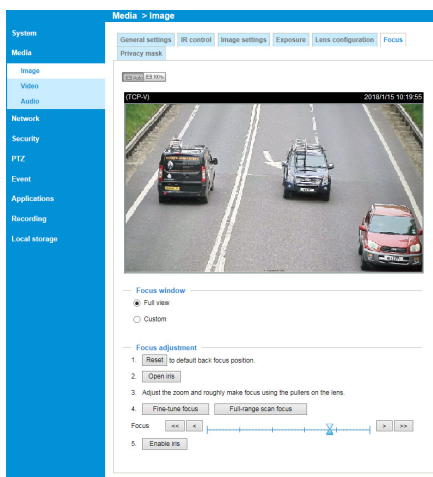
Non-iCS lens

If using an iCS lens model, use the auto focus function for an optimal image.

The configuration page automaticallly displays different options according to the lens you installed.
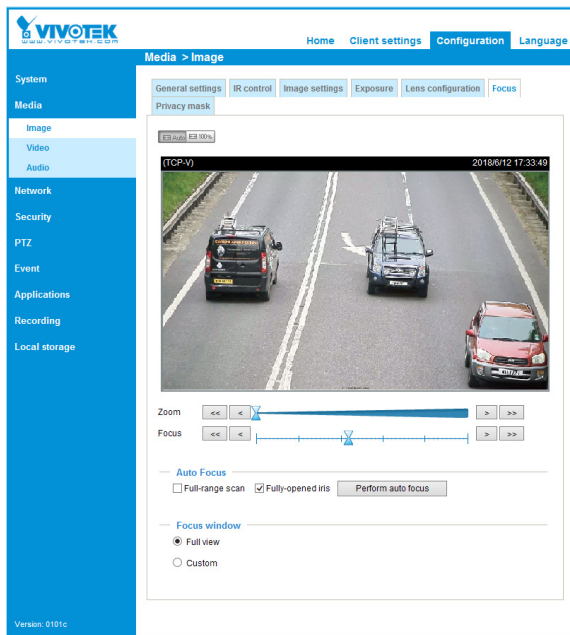
**iCS lens
(reserved for future
implementation)**

In the **Configuration** > **Media** > **Image settings** page, select an application scenario, LPC Highway or Freeway mode. The related parameters, such as shutter time, will be automatically changed for the scenario.

If preferred, e.g., shooting fast moving vehicles, select the **60fps** or **55fps** frame rate.

In the night mode, check if the input signals are correctly detected. You may simulate the night mode by blocking the IR unit's light sensor. Change the triggering parameters if necessary. Note that the IR unit does not immediately turns on or off. There is a 30-second buffer time.
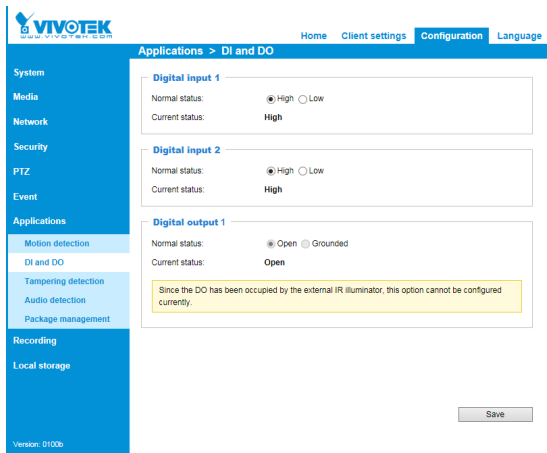
NOTE: When doing the initial testing in lab or office, the light sensor of the IR unit may not react quickly as in the outdoor environment. The lighting level in your office may not be brigth enough to trigger the light sensor. You can use a flash light to shine on the light sensor for 30 seconds. Check the live view to see if the IR light is disabled.
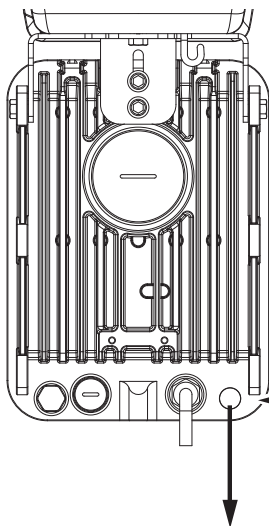
The light sensor does not react quickly for that in realworld applications, vehicle lights in tunnels can flash and pass by quickly.

To turn on the IR light, blind the IR light sensor to check (camera enters the night mode and IR should be turned on within 30 seconds.)

> 30 seconds

Light sensor

Enter Configuration > Media > Image > IR control. Configure the Spectrum mode.
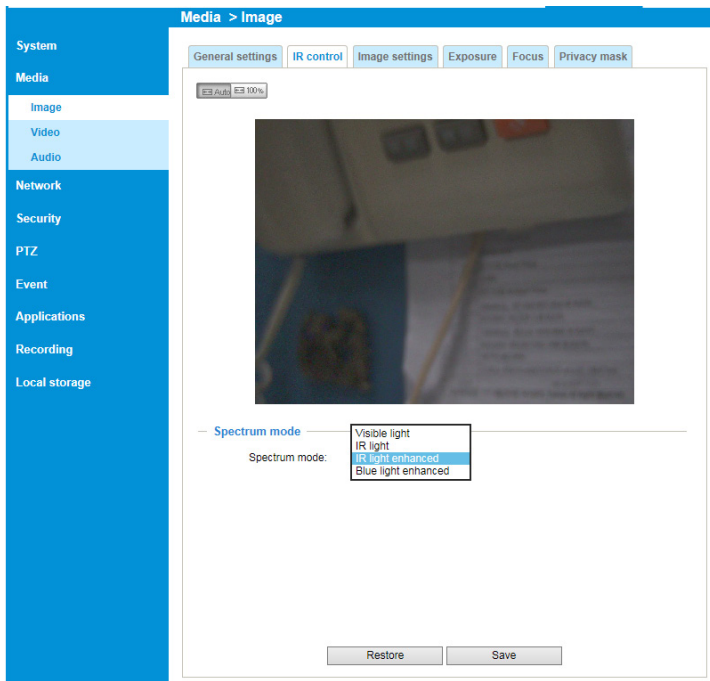
Mode	Spectrum enhanced	ICR	Head light filter	Remark
Visible light	N/A	On	Off	
IR light	N/A	Off	On	Default
IR light enhanced	Yes	Off	On	
Blue light enchanced	Yes	On	Off	

When the Spectrum enhancement is enabled, image contrast is increased to enable better results for license plate recognition.

The parameters of IR illuminator can be controlled via the **RS485** connection. You can enable the connection in the **Configuration** > **PTZ** > **Mechanical** window. Select the defaults for the IR illuminator: **Pelco D**, baud rate - **38400**, Data bits - **8**, Stop bit - **1**, Parity - **none**.
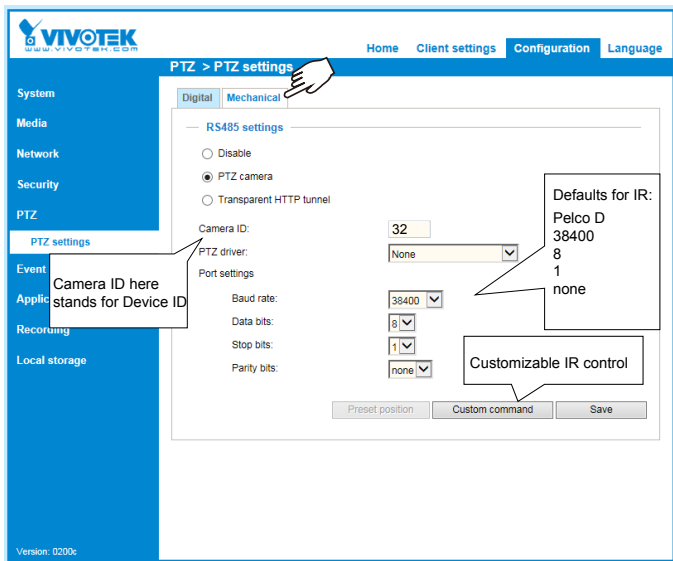
The Default device ID for IR units are listed below:

| Model		Device ID
IR 850	CM48I8-1040	1
	CM80I8-1040	1
	CM48I8-2040	2
	CM80I8-2040	2
	CM48I8-4080	3
	CM80I8-4080	3
	CM48I8-90120	4
	CM80I8-90120	4
	CM48I8-180	5
IR 940	CM48I9-1040	11
	CM48I9-2040	12
	CM48I9-4080	13
	CM48I9-90120	14
W5	CM48W5-1040	21
	CM48W5-2040	22
	CM48W5_4080	23
	CM48W5-90120	24

Model		Device ID
IR 850 motorized	CA48I8-1040	31
	CA80I8-1040	31
	CA48I8-2040	32
	CA80I8-2040	32
	CA48I8-4080	33
	CA80I8-4080	33
	CA48I8-90120	34
	CA80I8-90120	34
IR 940 motorized	CA48I9-1040	41
	CA48I9-2040	42
	CA48I9-4080	43
	CA48I9-90120	44
W5 motorized	CA48W5-1040	51
	CA48W5-2040	52
	CA48W5_4080	53
	CA48W5-90120	54

If you need to cascade multiple IR units via the RS485 bus, please contact CaMate (http://www.lidlight.com/) for a mobile app through which you can change device ID, baud rate, and so on.

With a motorized IR unit, the IR light zoom control buttons will be available on the home page of the camera web console. Click to change the IR lights angles. When IR lights zoom in, the light beams become narrower, the farther the lights can reach. When zoomed out, the wider the coverage, yet the range decreases.
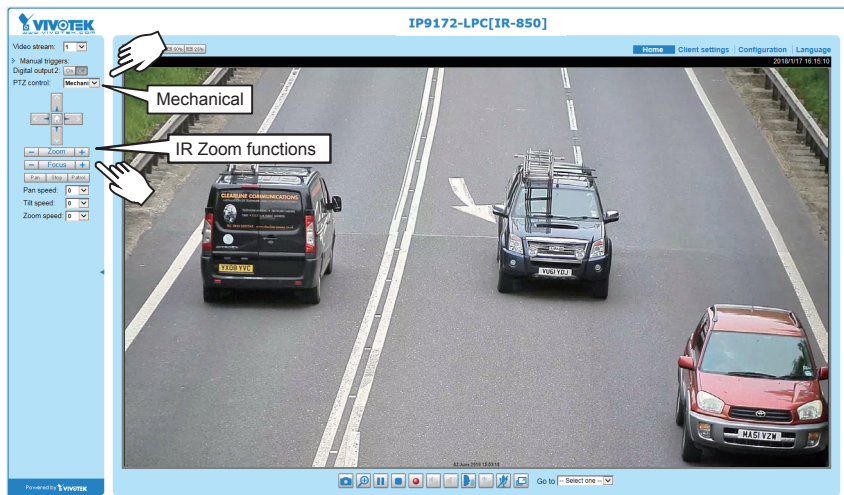
Use the zoom buttons to control the coverage of your IR lighting.

You can also create custom buttons on a web console, such as IR brightness (Lux), threshold, dimming, etc. The camera default ID is 0. Make sure it is different from that of the IR unit.

The IR control commands come in an 8 byte format. A sample command is shown below:
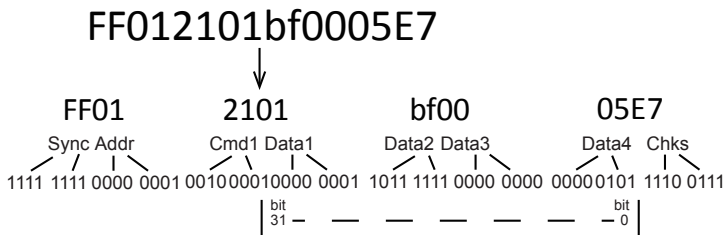
The format uses Hexadecimal 0-9, A-F. Each 8-bit byte contains two 4-bit hexadecimal characters. Two hexadecimal characters contained in each 8-bit field of message.

Below is the table of configurable data bit (Data1 ~ Data4) values:

bit 31 ~ 24	Device ID: 01 (default) ~ 127
bit 23 ~ 21	Baud rate (0)1200, (1)2400, (2)4800, (3)9600, (4)19200, (5)38400 (default), (6)57600, (7)115200 bps
bit 20 ~ 16	Brightness: (0) ~ (31), brightness from 0 ~ 100% (default), increment unit is 2.5%
bit 15 ~ 13	LED control mode: (0) DI, (1) Direct, (2) Timer, (3) Light sensor, (4) DI pulse, (5) LPR, (6) LED dimming by light sensor (default).
bit 12	LED status: (0) Off ready only (default), (1) On
bit 11 ~ 10	Fade in/out: (0) Off, (1) Fast, (2) Slow.
bit 9	DI activation polarity: (0) Low (default), (1) High,
bit 8	DO activation polarity: (0) Low (default), (1) High.
bit 7 ~ 6	Reserved
bit 5 ~ 4	DO mode: (0) Light sensor state (default), (1) LED state, (2) Diagnostic
bit 3 ~ 1	Light sensor day/night threshold: (0) 1 Lux, (1) 5 Lux, (2) 10 Lux, (3) 20 Lux, (4) 50 Lux, (5) 100 Lux, (6) Infinite.
bit 0	LED indicator control: (0) Off, (1) On (default)

You can create custom command buttons by entering the Button name and the command itself:

>Custom command

Custom command

Leaving the "Button name" field empty means the command button will not be displayed in the homepage.

	Button name	Command
Command 1:	TH10%	FF012101B00003D6
Command 2:	TH20%	FF012101B00005D8
Command 3:	TH50%	FF012101B00007DA
Command 4:	DIMMING100%	FF012101BF0009EB
Command 5:	DIMMING60%	FF012101B00007DA

Save   Close

Below are some of the command samples:

Threshold 10%	Brightness 100%	FF012101bf0005E7
	Brightness 90%	FF012101bc0005E4
	Brightness 80%	FF012101b80005E0
	Brightness 70%	FF012101b40005DC
	Brightness 60%	FF012101b00005D8
Threshold 20%	Brightness 100%	FF012101bf0007E9
	Brightness 90%	FF012101bc0007E6
	Brightness 80%	FF012101b80007E2
	Brightness 70%	FF012101b40007DE
	Brightness 60%	FF012101b00007DA
Threshold 50%	Brightness 100%	FF012101bf0009EB
	Brightness 90%	FF012101bc0009E8
	Brightness 80%	FF012101b80009E4

| Brightness 70% | FF012101b40009E0 |
| Brightness 60% | FF012101b00009DC |

The customized buttons will appear on the main page for easy access to IR control.
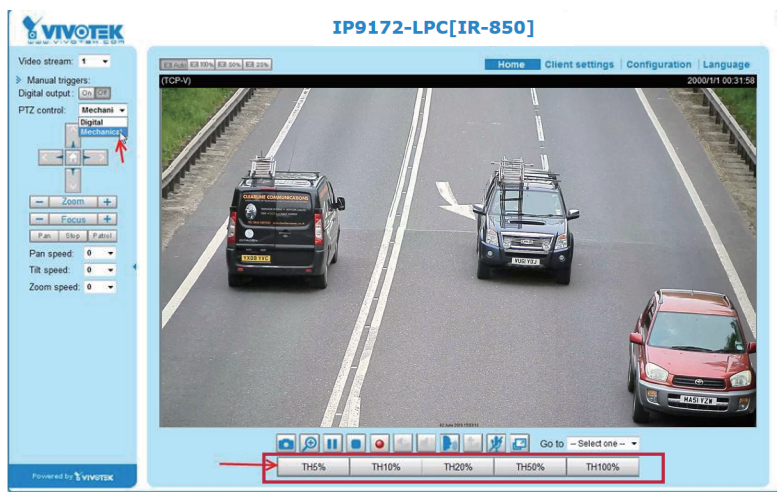
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