

# User Manual

CM48 Series

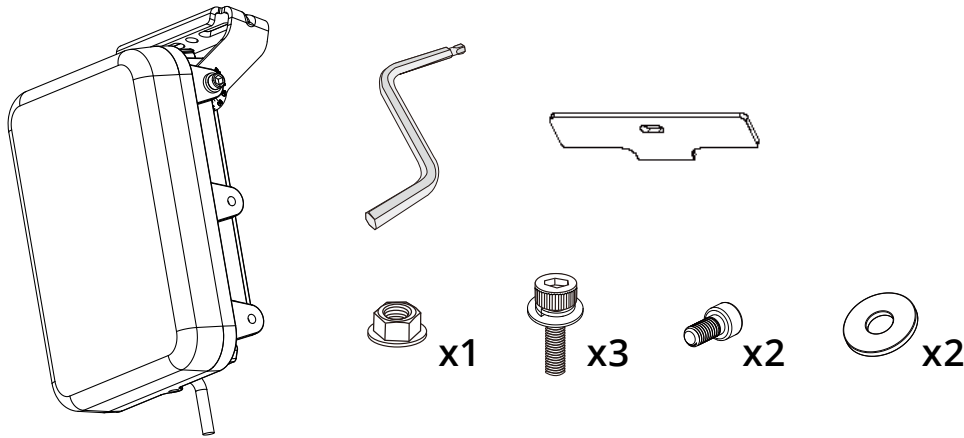
## Revision History

Doc. Ver.	Comment
Rev.1.0	Initial Release
Rev.1.1	Updated illumination range and beam angles. Added the rear panel plug opener.
Rev.1.2	Added safety instructions and warning messages.
Rev.2.0	Refine Manual & Style

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# Package Contents



The 1/4" screws and washers are used to secure the illuminator to an external camera housing.

## NOTE

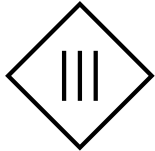
- The corner-mount (AM-412), pole-mount adaptor (AM-311/312), and other brackets are separately purchased.
- The screws and anchors for securing the illuminator to wall are user-supplied. Apply M6 anchors or screws.

## 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 observe IR lighting effects.
- The luminaire should be positioned so that prolonged staring into the luminaire at a distance closer than 2.5 m is not expected.
- The external flexible cable or cord of this luminaire cannot be replaced; if the cord is damaged, the luminaire shall be destroyed.
- The light source of this luminaire is not replaceable; when the light source reaches its end of life the whole luminaire shall be replaced.
- Please make sure Reinforce/Double insulation shall be maintained between LV supply and control circuits after installation.
- This flood light shall be used with an IEC/EN 61347-2-13 approved LED driver with SELV output equal to rated voltage of the luminaire, and output power of LED drivers shall be at least equal to rated power of the luminaire.
- Terminal block is not included. Installation may require advice from qualified personnel.



IR illuminators RISK GROUP 3 / WARNING IR emitted from this product. / Avoid eye exposure. Use appropriate shielding or eye protection. Do not look at the operating lamp.



Class III luminaires



Do not stare at the operating light source.

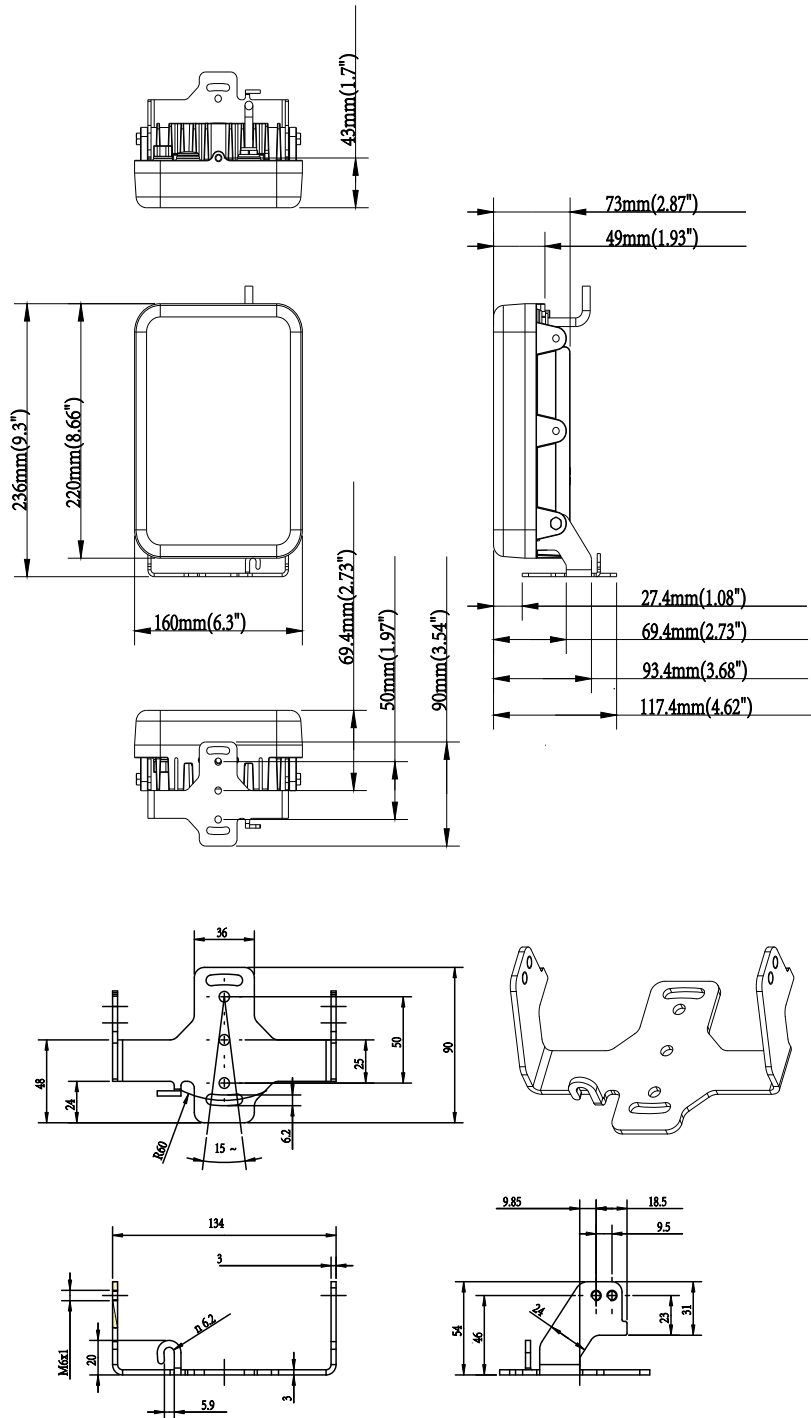


This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

## IMPORTANT

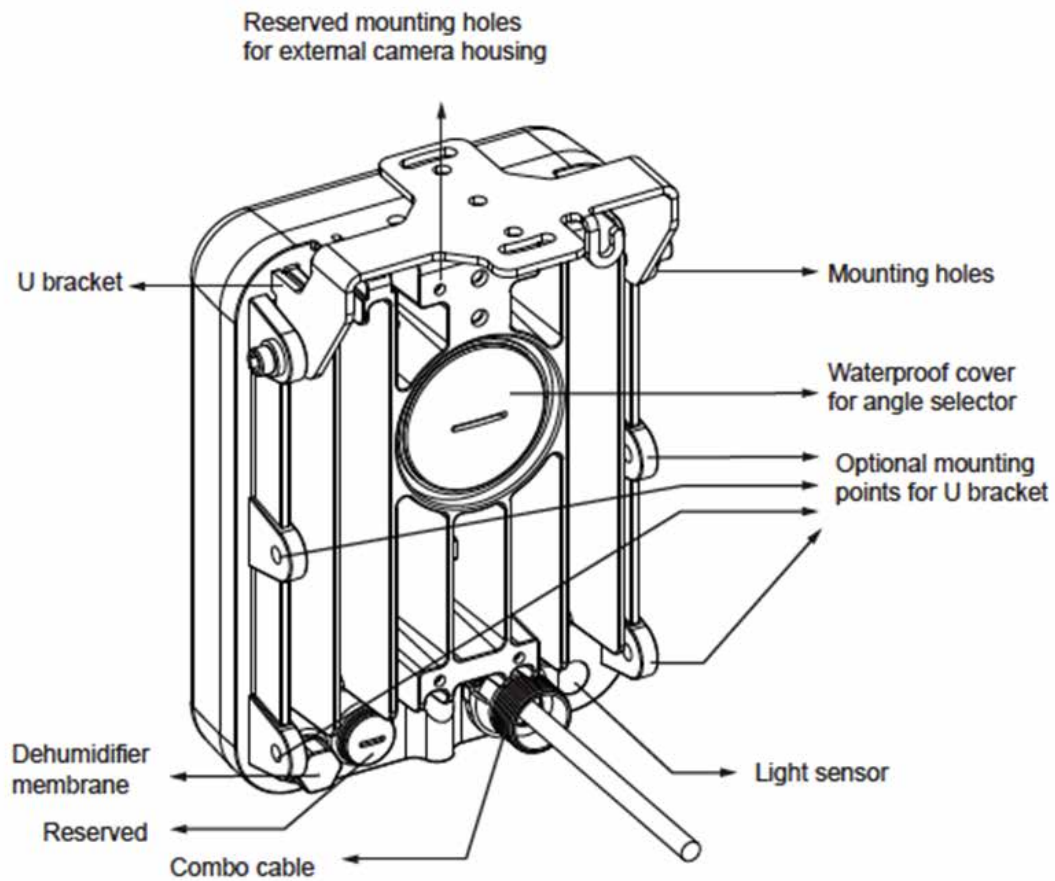
- Do not install the product with unstable brackets or installed on fragile mount surfaces.
- This product shall be used in compliance with local laws and regulations.
- Please avoid using chemical or aerosol cleaning fluids to clean the product. Use a clean cloth slightly moistened with water.
- This product contains no parts repairable by the users. Contact CaMate for services.
- Power off the Illuminator as soon as smoke or unusual odors are detected.
- Do not place the Illuminator on unsteady surfaces.
- Replacing or failing to properly install the waterproof components, e.g., cables or cable glands, will void our IP67 warranty.
- Refer to your datasheet for the operating temperature.
- Do not touch the Illuminator during a lightning storm.

# Mechanical Drawings & Standard Small U bracket



# Hardware Overview

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- Unit Weight: 2.1KG
- Max. Project Area: 34684.7 mm<sup>2</sup>

# Installation

## IMPORTANT

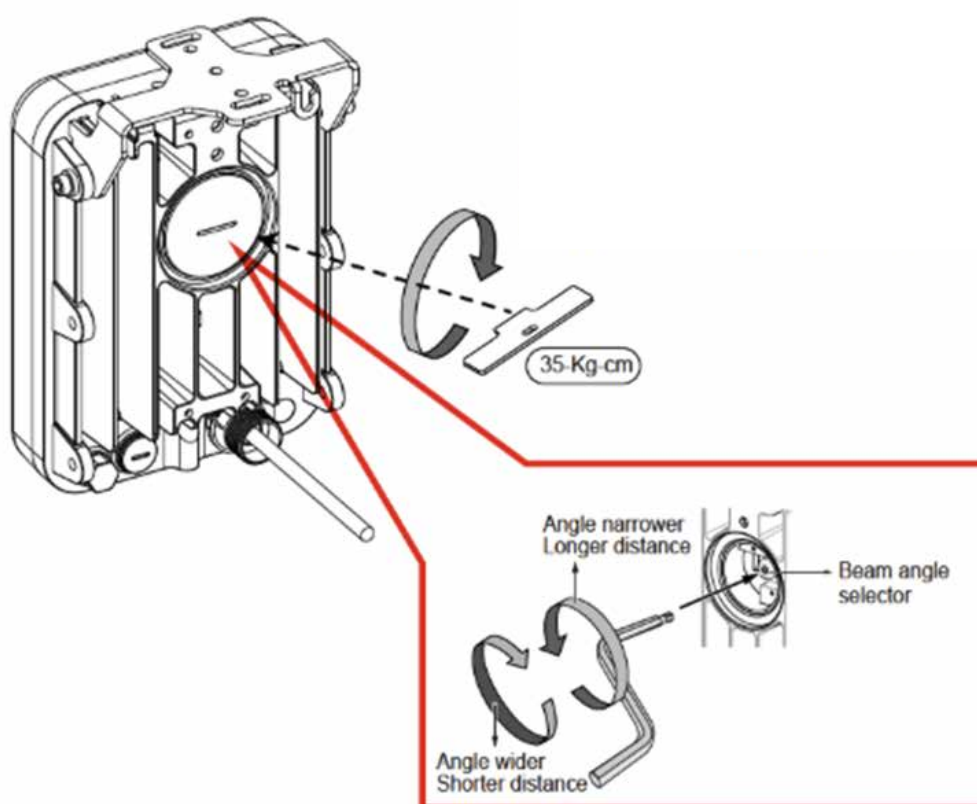
It is highly recommended that the illuminator should be installed at a position higher than 3 meters from the ground.

## Beam Angle Adjustment

You must first survey the installation site and determine the illumination distance. Use a coin or flat blade screwdriver to open the waterproof cover at the back of the illuminator.

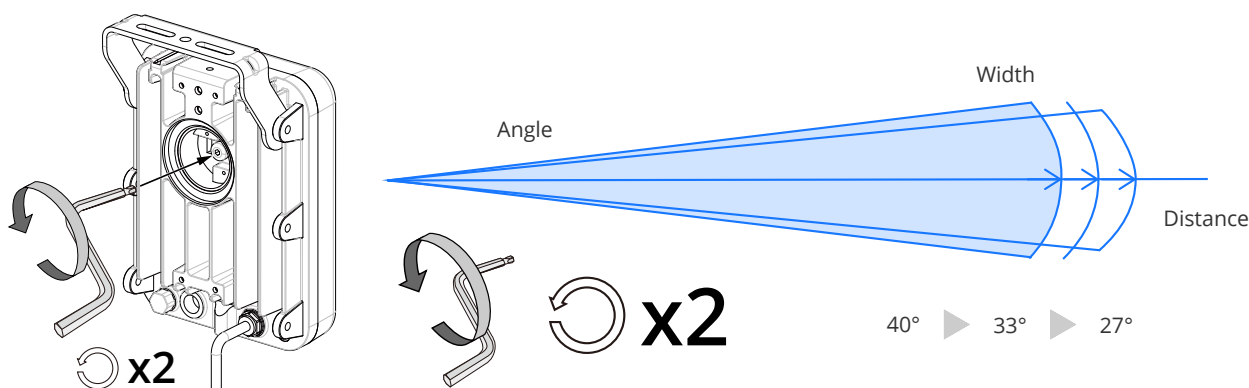
## TIPS

You may forget your current beam angle configuration. In this case, turn many full circles clockwise until the rotation resistance is felt (returns to the widest angle, reaches its mechanical stops), and then turn the selector counterclockwise according to the angle listed on the tables. Each full circle corresponds to a preset beam angle.





- Use the 4mm side of the allen wrench to turn the beam angle selector to an estimated illumination distance, e.g., 200 meters. See the tables on the next page for how to do it.
- The factory default for the beam angle selector is always at the Widest angle. When you turn the selector many rounds to its widest or the narrowest position, a rotation resistance can be felt. That means the mechanical stop is reached, and you should not use more force.
- Refer to the tables below for the configurable IR light beam angles and the definitions of the remote controller buttons. Each button changes to a preset beam angle.
- For example, if you need to change CM48I8-1040's beam angle to 30° (127m), turn the beam angle selector Counter-clockwise 2 full circles. If you are at the narrowest angle (10°) and prefer to turn to 24°, turn 3 full circles clockwise. When done, install the waterproof cover.
- Example



CM48I8-1040								
Rotate direction	Full circle	Beam angle	Single mount		Double mount		Triple mount	
			Distance(m)	Width(m)	Distance(m)	Width(m)	Distance(m)	Width(m)
<div> <div>Counter-clockwise</div> <div>Narrower</div> <div>Clockwise</div> <div>Wider</div> </div>	0	40°	100	72.8	141.4	102.9	173.2	126.1
	1	36°	107	69.5	151.3	98.3	185.3	120.4
	2	30°	127	68.1	179.6	96.3	220	117.9
	3	27°	137	65.8	193.7	93	237.3	113.9
	4	24°	150	63.8	212.1	90.2	259.8	110.4
	5	16°	206	57.9	291.3	81.9	356.8	100.3
	6	15°	215	56.6	304.1	80.1	372.4	98.1
	7	10°	250	43.7	353.6	61.9	433	75.8

CM48I8-2040								
Rotate direction	Full circle	Beam angle	Single mount		Double mount		Triple mount	
			Distance(m)	Width(m)	Distance(m)	Width(m)	Distance(m)	Width(m)
 Counter-clockwise Narrower  Clockwise Wider	0	40°	120	87.4	169.7	123.5	207.8	151.3
	1	36°	125	81.2	176.8	114.9	216.5	140.7
	2	29°	150	77.6	212.1	109.7	259.8	134.4
	3	27°	158	75.9	223.4	107.3	273.7	131.4
	4	20°	200	70.5	282.8	99.7	346.4	122.2

CM48I8-4080								
Rotate direction	Full circle	Beam angle	Single mount		Double mount		Triple mount	
			Distance(m)	Width(m)	Distance(m)	Width(m)	Distance(m)	Width(m)
 Counter-clockwise Narrower  Clockwise Wider	0	80°	60	100.7	84.9	142.4	103.9	174.4
	1	77°	62	98.6	87.7	139.5	107.4	170.8
	2	74°	64	96.5	90.5	136.4	110.9	167.1
	3	66°	67	87	94.8	123.1	116	150.7
	4	63°	69	84.6	97.6	119.6	119.5	146.5
	5	60°	71	82	100.4	115.9	123	142
	6	55°	75	78.1	106.1	110.4	129.9	135.2
	7	52°	79	77.1	111.7	109	136.8	133.5
	8	50°	82	76.5	116	108.2	142	132.5
	9	45°	86	71.2	121.6	100.8	149	123.4
	10	40°	90	65.5	127.3	92.7	155.9	113.5

CM48I8-90120								
Rotate direction	Full circle	Beam angle	Single mount		Double mount		Triple mount	
			Distance(m)	Width(m)	Distance(m)	Width(m)	Distance(m)	Width(m)
 Counter-clockwise Narrower	0	120°	45	155.9	63.6	220.5	77.9	270
	1	105°	50	130.3	70.7	184.3	86.6	225.7
 Clockwise Wider	2	90°	55	110	77.8	155.6	95.3	190.5

CM48I8-180						
Rotate direction	Full circle	Beam angle	Single mount	Double mount	Triple mount	
			Distance(m)	Distance(m)	Distance(m)	
Fixed angle	N/A	180°	40	56.6	69.3	

# Cable Pinouts & Basic Wiring

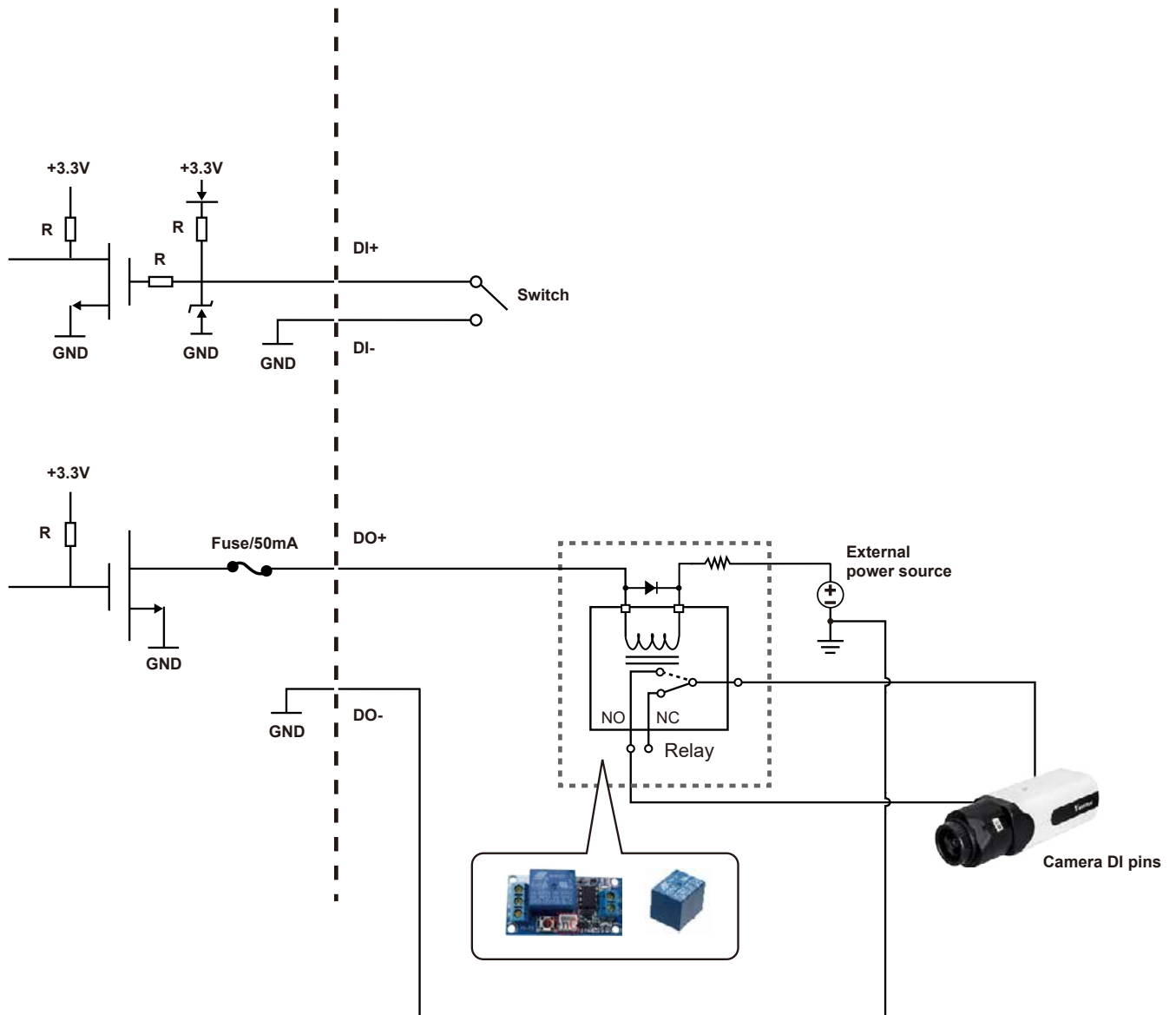
## Cable Pinouts



Name	Color	Gauge	Description
V+	Red	(20AWG)	Power input (AC/DC 24V $\pm$ 10% current controlled)
V-	Black	(20AWG)	
DI+	Green	(26AWG)	LED ON/OFF control * Dry contact Logic level 1(Open) = LED off Logic level 0(Close to GND) = LED on * Wet contact Logic level 1: 4V~40 V = LED off Logic level 0: 0.8V MAX = LED on
DI-	Yellow	(26AWG)	Ground
DO+	Purple	(26AWG)	Light sensor status output 1. Open = Day 2. Short = Night (300 lux for IR ON)
DO-	Blue	(26AWG)	Ground
RS485+	Orange	(26AWG)	RS485 interface control
RS485-	Brown	(26AWG)	

# Synchronization with Camera

## Digital I/O Pin Configuration for Camera Triggering



# IR Illuminator Bidirectional Detection and Activation

To ensure synchronized nighttime detection, configure the IR illuminator and its paired camera to automatically activate IR illumination and switch camera to Night Mode based on ambient lighting conditions. The wiring diagram below enables bidirectional triggering, allowing both the IR illuminator's light sensor and the camera's light sensor to work together.

## Wiring Overview

### Digital Output (DO)

- DO+ (Purple wire) = Open drain output, 45V Max (current must be under 100mA)
- DO- (Blue wire) = GND

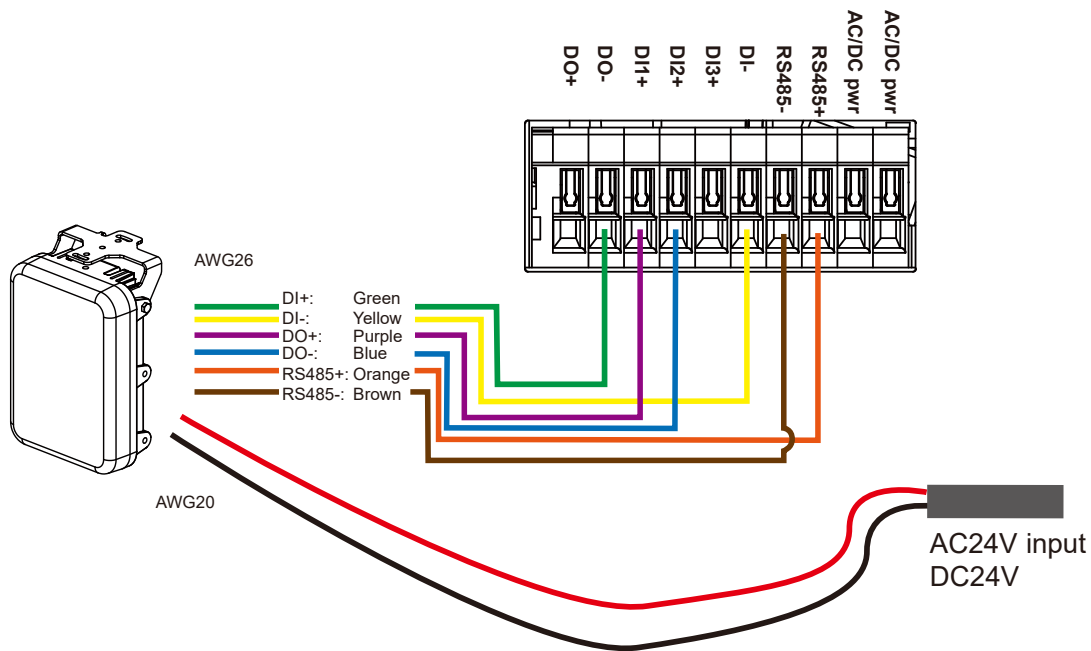
### Digital Input (DI)

- DI+ (Green wire) = TTL + voltage
- DI- (Yellow wire) = TTL - voltage (GND)
- If connected to a dry contact output:
  - Logic level 1 (Open) = IR LEDs off
  - Logic level 0 (Closed to GND) = IR LEDs on
- If connected to a wet contact output:
  - Logic level 1 (4V~40V) = IR LEDs off
  - Logic level 0 ( $\leq 0.8V$ ) = IR LEDs on

### RS-485

- RS485+ (Orange wire)
- RS485- (Brown wire)
- Receives RS-485 commands to control IR output or beam angle, depending on the illuminator model.

- When the illuminator is controlled and set by the VIVOTEK camera, two approaches can achieve synchronization, as detailed in the following sections. Refer to the wiring diagram below for different approaches.



## Approach 1: IR Illuminator Triggers Camera

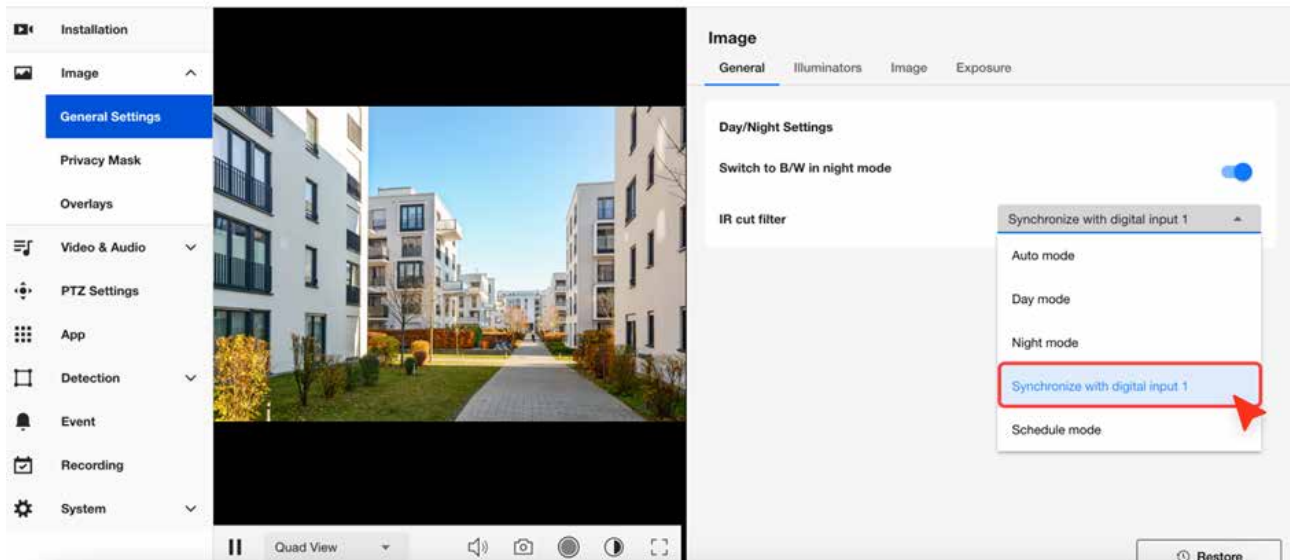
In this setup, the IR illuminator's light sensor controls the camera's Night Mode activation. When the illuminator's built-in light sensor detects low-ambient light (e.g., at night), it automatically turns on the IR LEDs and sends a signal to the camera's DI (Digital Input) via its DO (Digital Output), instructing the camera to switch to Night Mode.

### Connections

IR Illuminator DO+ → Camera DI1+ (Purple wire)

IR Illuminator DO- → Camera DI- (GND) (Blue wire)

For cameras equipped with an IR cut filter, navigate to **Image > General Settings > General > IR Cut Filter** and select "**Synchronize with Digital Input 1.**" This ensures that the IR cut filter operates in sync with the external IR illuminator.



## Approach 2: Camera Triggers IR Illuminator

In this setup, the camera controls the IR illuminator's On/Off state. When the camera's built-in light sensor detects low-ambient light (e.g., at night), it switches to Night Mode and sends a signal via its DO (Digital Output) to the illuminator's DI (Digital Input), activating the IR LEDs.

### Connections

IR Illuminator DI+ (Green wire) → Camera DO-

IR Illuminator DI- (Yellow wire) → Camera DI-

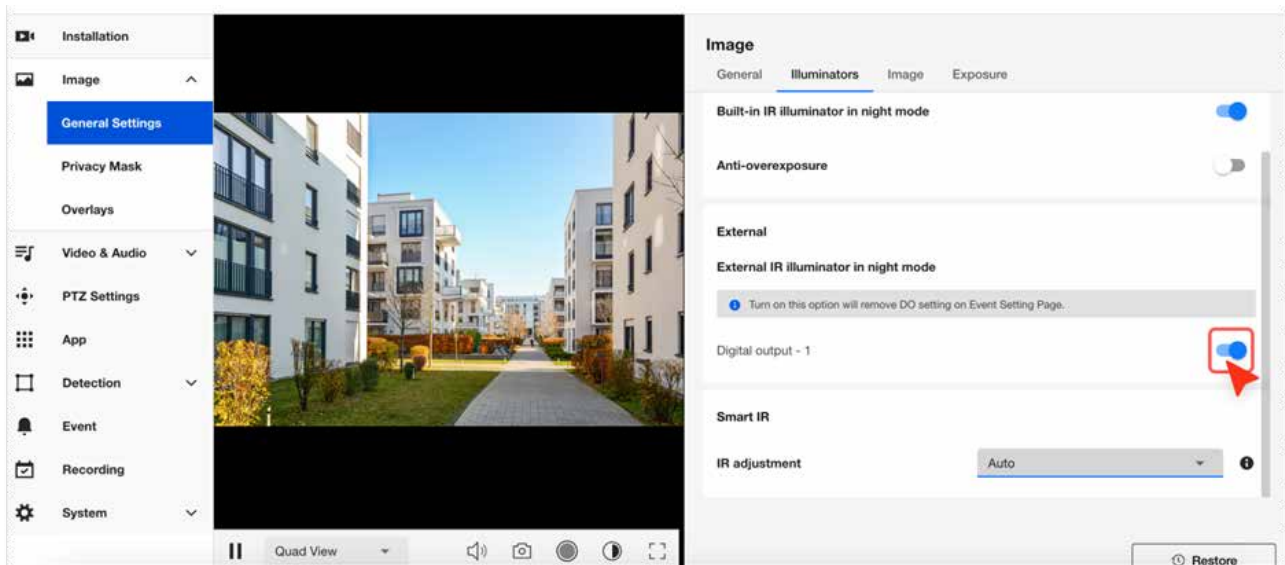


## Light Sensor Status Output

Open = Day Mode

Short = Night Mode (below 300 lux for IR to turn ON)

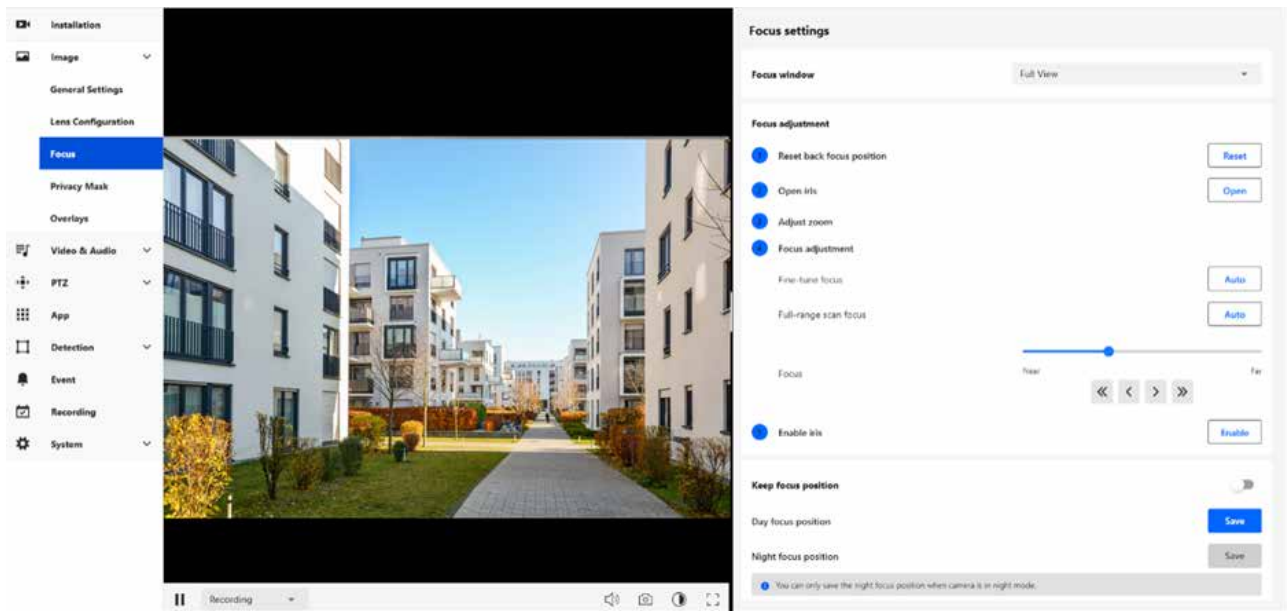
To enable and synchronize the camera and its paired external IR illuminator, navigate to **Image > General Settings > Illuminators > External**, and toggle on "Digital Output - 1." The setting triggers a digital output signal to activate the IR illuminator.



While both approaches can be used, we highly recommend following **Approach 1** to allow the illuminator to control the camera Day/Night switch. This ensures the camera image works properly. If your system is designed without any DO control via the illuminator, we still recommend connecting with the camera. In case of any corner cases, you can switch to using the camera to control the illuminator On/Off state.

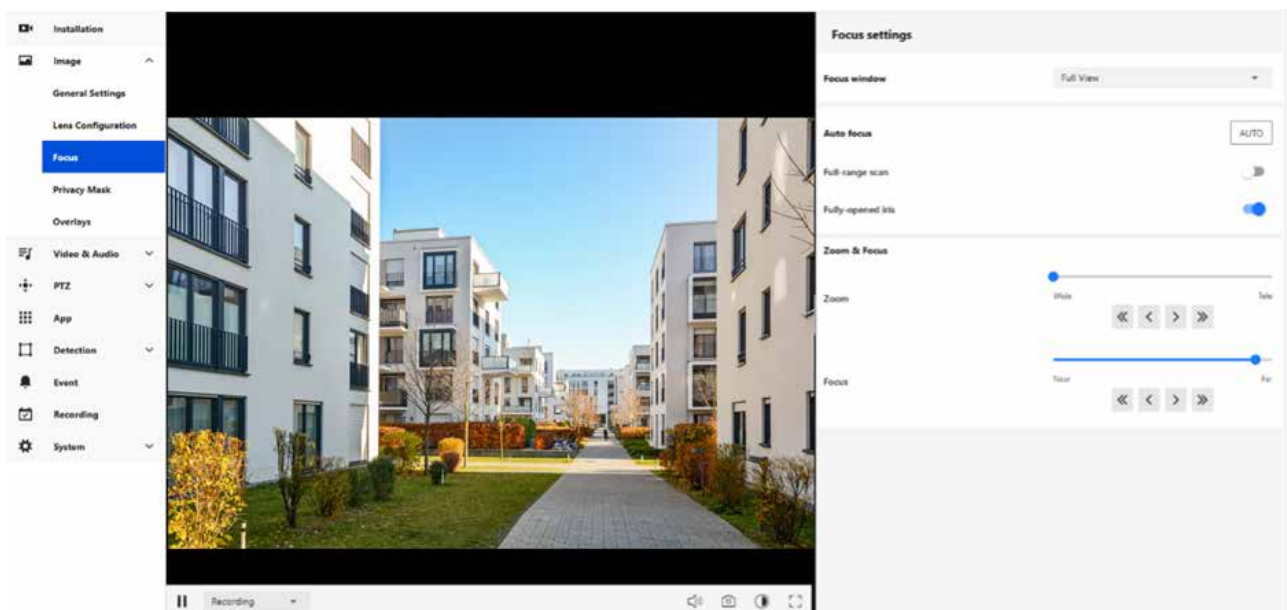
# Camera Configuration & Control

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.



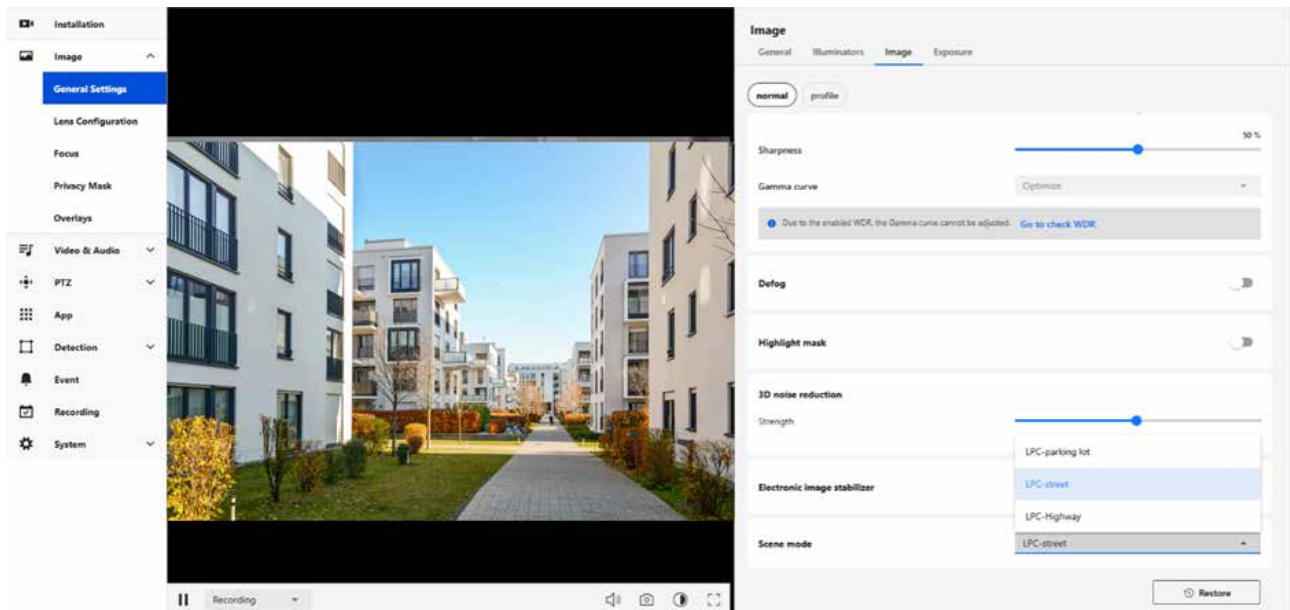
(Non-iCS lens)

If using an iCS lens model, use the auto focus function for an optimal image. The configuration page automatically displays different options according to the lens you installed.

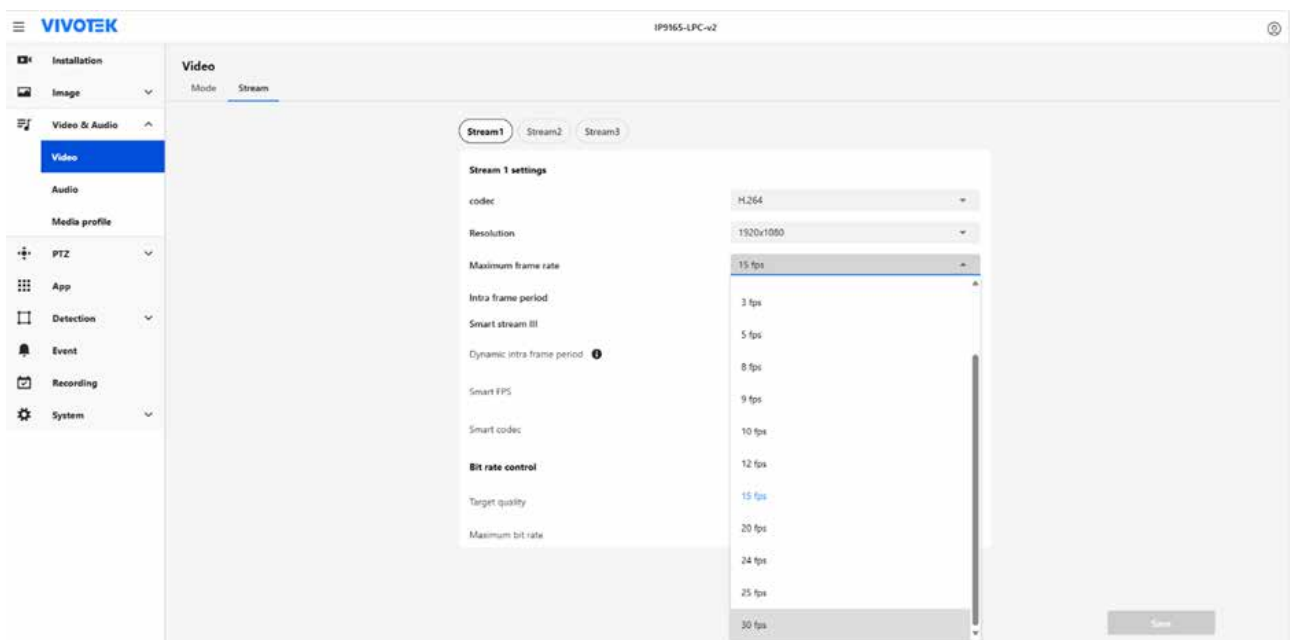


(iCS-lens)

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

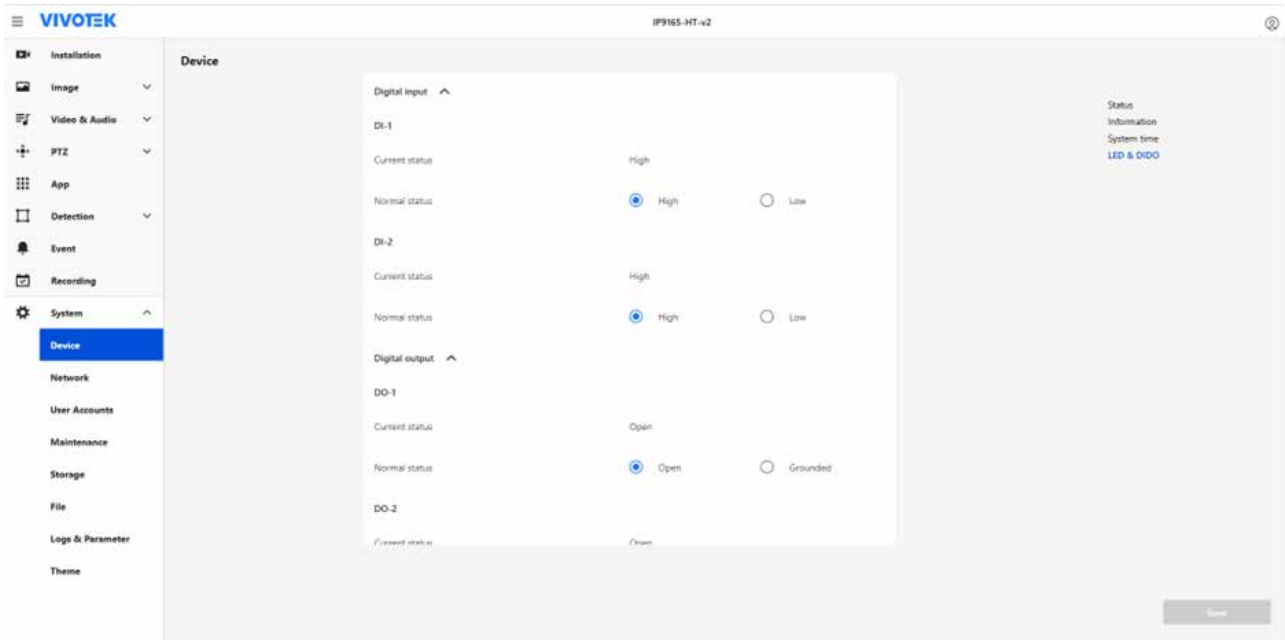


If preferred, e.g., shooting fast moving vehicles, select the 30fps frame rate.

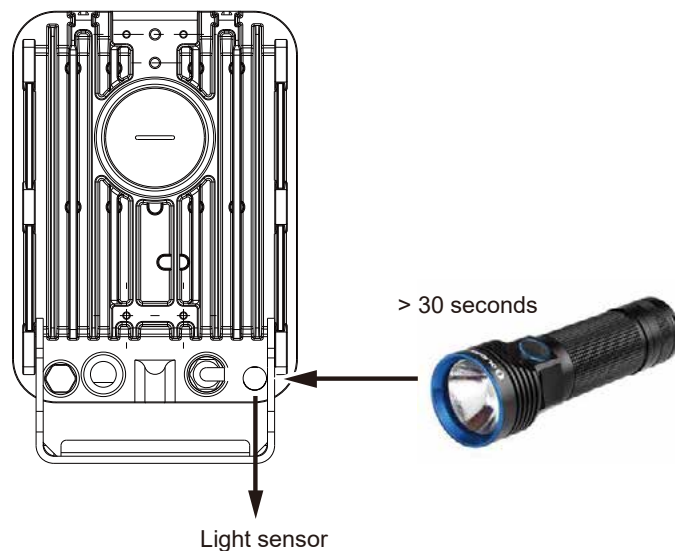


**NOTE**

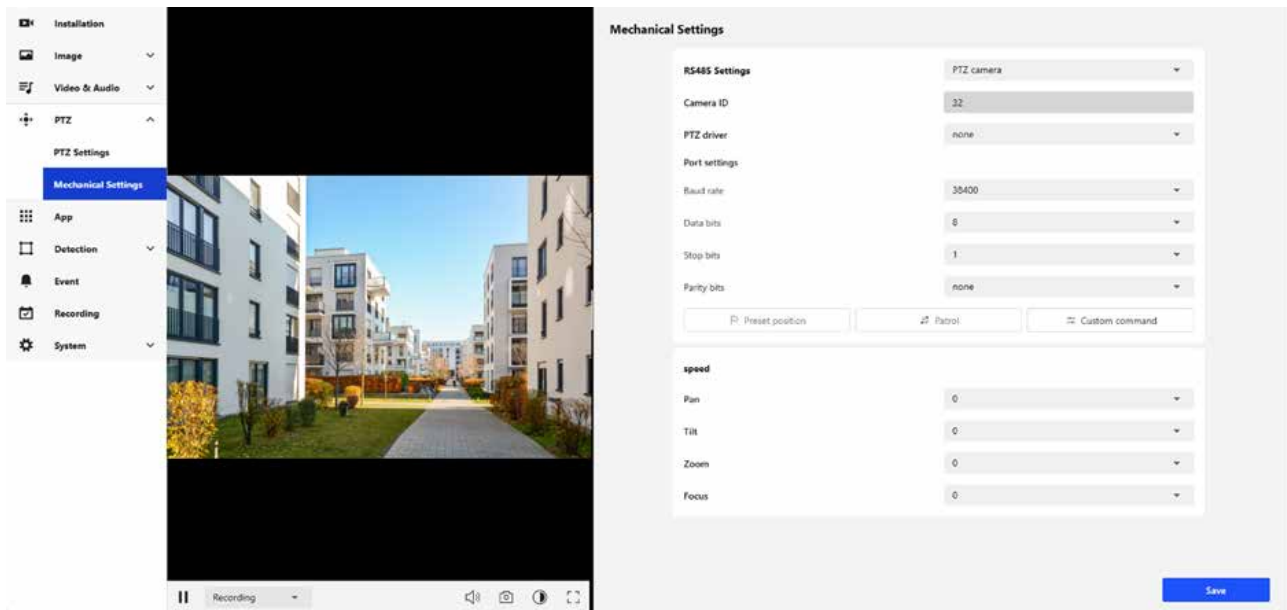
When doing the initial testing in lab or office, the light sensor of the IR unit may not react quickly as in the outdoor environment. The lighting level in your office may not be bright enough to trigger the light sensor. You can use a flashlight to shine on the light sensor for 30 seconds. Check the live view to see if the IR light is disabled.



The light sensor's slow reaction time can be problematic in real-world applications, such as when vehicle lights flash quickly in tunnels. 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.)



The parameters of IR illuminator can be controlled via the RS485 connection. You can enable the connection in the Configuration > PTZ > Mechanical Settings. 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
IR 850 motorized	CA80I8-1040	31
	CA80I8-2040	32
	CA80I8-4080	33
	CA80I8-90120	34
IR 940 motorized	CM48I8-1040	41
	CM48I8-2040	42
	CM48I8-4080	43
	CM48I8-90120	44

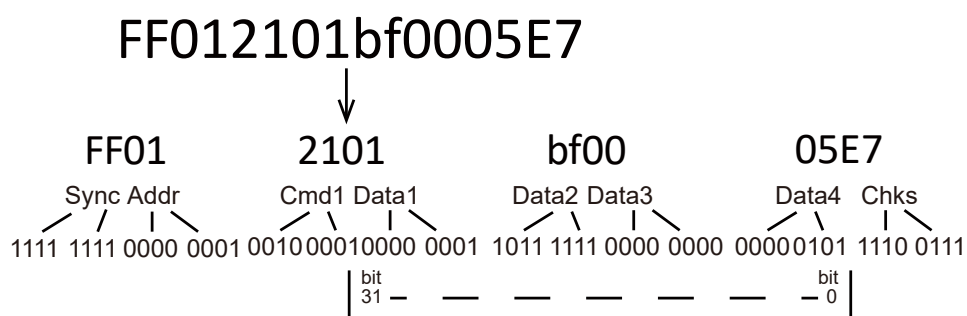
If you need to cascade multiple IR units via the RS485 bus, please contact VIVOTEK for further assistance or see the product page for more information.

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 are contained in each 8-bit field of message.

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

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

X

Command1

Button name

Command

TH 10%

FF012101b00003D6

Command2

Button name

Command

TH 20%

FF012101b00005D8

Command3

Button name

Command

TH 50%

FF012101b00007DA

Command4

Button name

Command

DIMMING 100%

FF012101b00009EB

Command5

Button name

Command

DIMMING 60%

FF012101b00007DA

Save

Cancel



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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