Lynx3 Series All-in-one Smart Camera Specifications

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ROSEEK®

Release History

Document No.	Version	Date	Description
RSDNF3002V101	1.01	Feb 21, 2024	(1) Added 3 accessories in Table 3-3
RSDNF3002V100	1.00	Feb 05, 2024	(1) First release (2) Added pre-installed OS code in the P/N, refer to Chapter 3.4
RSDNF3002V004	0.04	Jan 02, 2024	(1) Corrected some typos (2) Added the resistance of the ready power supply wires, refer to Table 3-3 (3) Added customized product code in the part number. Refer to Chapter 3.4
RSDNF3002V003	0.03	Aug 29, 2023	(1) Chapter 4.2.2: clarified the RS485 and RS422
RSDNF3002V002	0.02	Jul 20, 2023	(1) Chapter 3.4: clarified the 4G module standard
RSDNF3002V001	0.01	Jun 27, 2023	(1) Preliminary version 1st release

ROSEEK reserves the right to change without notice.

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1 Feature

1. **All-in-one design with waterproof IP67 rating**
2. **Motorized lens for easy installation**
3. Open x86 system for user's real-time image analysis algorithm
   Intel® ATOM™ X6425E, full-channel 8GB LPDDR4X-3200
4. **The on-chip GPU provides INT8 4TOPs AI computing power**
5. Solo/dual 2MP to 16MP global/rolling shutter CMOS sensors
   The synchronous trigger function can realize stereo vision
6. Enhanced long-life LED strobe light, up to 100m of lighting
7. Internal M.2 SSD supports up to 1TB capacity
8. Enhanced hardware video encoder
   H.264 4K@55fps, H.265 4K@64fps
9. The software is compatible with Lynx1 and Lynx2 smart camera
10. The external interface is same as Lynx2 smart camera
11. Power supply 24VDC or 48VDC (recommended)
12. Rugged full metal casing with IK10 rating
13. Wide operation temperature -40°C to +85°C
14. 3-year warranty

2 Application

2.1 Application

- Red Light Enforcement
- Speed Enforcement
- Vehicle Control
- Traffic Monitoring
- Intelligent Video Analysis

2.2 Related Products

- Squirrel2 Series LED strobe Light
- Squirrel1 Series LED strobe Light
- Beaver3 Series Vision Controller

Figure 2-1 Lynx3 Picture - Dual-camera

Figure 2-2 Lynx3 Picture - Solo-camera

Figure 2-3 Lynx3 Picture - Rear Panel

3 Specifications

3.1 Specifications - Platform

Table 3-1 Specifications

CPU Subsystem	**CPU Model**	Intel® ATOM™ X6425E (named Elkhart Lake), soldered onboard
	CPU Type	4-core X86, base 2.0GHz, burst 3.0GHz
	DRAM	8GB LPDDR4X-3200, full-channel, soldered onboard
	Storage	64GB eMMC5.1 flash for OS, soldered onboard 1x M.2 SSD slot for up to 1TB extended storage
I/O Port	**Display Port**	1x HDMI port for development
	USB Port	1x internal USB3.0 ports for encryption USB dongle or AI Accelerator 1x rear panel USB2.0 port for development
	Network Port	1x giga-Ethernet port
	Digital I/O	1x photo-isolated input, 2x photo-isolated outputs
	Serial Port	1x RS232, 1x isolated RS485, 1x isolated RS422
	CAN Port	1x isolated CAN bus, compliant with specifications 2.0A and B (active) with a bit rate up to 1 Mbit/s
Special Function	**Lens Control**	User can control the motorized lens via Ethernet even after installation
	LED Strobe	Constant-current LED drivers with sync to cameras
	Power Sync	Power sync to AC main supply
	Watchdog Timer	1 to 256 second, setup by software
	Temperature Monitor	Temperature sensor for mainboard monitor
	AI Acceleration	The on-chip GPU provides INT8 4TOPs AI computing power
	4G/LTE, GNSS (optional)	4G/LTE and GNSS module
	Wi-Fi (optional)	Wi-Fi module with AP mode support
Software Function	**OS Support (64-bit)**	Windows 10 IoT Enterprise, Ubuntu 20.04.1 Intel IoT
	Compatibility	Software is compatible with Lynx2 smart camera
	Protocol	ONVIF, RTSP, GigE, GB/T28181
	Web Server	Embedded web server for remote access via web browser
	Video Encoding	H.264 4K@55fps, H.265 4K@64fps
	Remote Update	Support Wake on LAN (WoL), remote debugging, software update and power on/off via Ethernet
Embedded Lens [1]		Motorized zooming, focusing and iris
Consumption		50W general, 80W max
Power Supply		22-28VDC or 40-52VDC (48VDC strongly recommended) [2]
Power Line Requirement		The total resistance of the power supply wires (two-wire series) is not more than 1 ohms, because the LED strobe light requires high pulse power
Operation Temperature		-40°C to +85°C wild temperature [3]
MTBF		350,000 hours
Construction		Rugged full metal casing, fanless, IP67 rating [4]
Dimensions and Weight		247x220x340mm, 8kg
Regulation		CE, IK10

Note:

[1] **CAUTION: The stepper motor of the motorized lens has a life limit. They are only used to adjust the lens during installation, commissioning and maintenance, and not to operate frequently every day. The camera has internal counting function. ROSEEK is not responsible for any malfunction caused by excessively frequent operations.**

[2] If no **external** LED strobes are connected, 150W switching power supply or above is recommended to ensure the system's long term operating stability. For example, the 150W switching power from Meanwell® (www.meanwell.com), P/N LRS-150-48 (output 48V, 3.3A). It is strongly recommended to use 48VDC power supply, because the LED power consumption is large, and 48VDC power supply can reduce the line voltage drop. If the camera is connected to a Squirrel2 LED strobe externally, please refer to Chapter 4.2.1 to select a suitable power supply.

[3] After being placed in the environment of -40°C for 12 hours, the camera can be started and run for 24 hours. The camera can run for 48 hours in the environment of +85°C. The camera can run for 48 hours in the cyclic environment (5 hours for a cycle) of the temperature from -40°C to +85°C.

[4] If the user needs the performance of IP68 protection level, please contact us.

[5] User must use NTP protocol or GNSS module to sync the time every time the camera is powered on, because the internal clock can only run for one week after a power outage.

[6] The EEPROM is guaranteed for 1,000,000 cycles of writing. The camera has internal counting function. ROSEEK does not accept liability for any damage caused by over 1,000,000 writing cycles.

[7] The switchable filters are guaranteed for 40,000 cycles of switching. The camera has internal counting function. ROSEEK does not accept liability for any damage caused by over 40,000 switching cycles.

3.2 Specifications - Sensors

Table 3-2 Specifications - Sensors

Sensor P/N	Pixel Number	Max FPS	Shutter	Sensor Description	Resolution (HxV)	Type	Sensitivity Ratio [1]
IMX385	2M	60	Rolling	SONY CMOS, 1/2", 3.75um	1920x1080	Color	6.0
IMX265	3.2M	55.6	Global	SONY CMOS, 1/1.8", 3.45um	2048x1536	Color	3.0
						Mono	4.9
IMX537	5.1M	62.6	Global	SONY CMOS, 1/1.8", 2.74um	2448x2048	Color	2.3
						Mono	3.7
IMX267	8.9M	32.2	Global	SONY CMOS, 1", 3.45um	4096x2160	Color	3.0
						Mono	4.9
IMX542	16M	17.7	Global	SONY CMOS, 1.1", 2.74um	5328×3040	Color	2.3
						Mono	3.7

Note:

[1] The sensitivity ratio is a linear ratio based on the sensitivity value of SONY CCD ICX445AQA. The higher this ratio is, the more sensitive the camera will be.

3.3 Recommended Part Number

Lynx3 series all-in-one smart cameras have powerful functions and also complex part number designation. The full definition of the part number is shown in Chapter 3.4. For easy selection, the following part numbers are a few examples.

Part Number **RSLX3-80MKG4-30SGB5-20N24-8C-NFNNNN-NNNW**

Description **platform:** X6425E, 8GB LPDDR4X-3200 full channel, 256GB M.2 SSD
Camera1: 8.9MP/max32.2fps mono CMOS IMX267, with 16-40mm 1" 3A lens (motorized zooming, focusing and iris control)
Camera2: 3.2MP/max55.6fps color CMOS IMX265, with 11-50mm 1/1.8" 3A lens (motorized zooming, focusing and iris control)
LED flash: 24 NIR (850nm) LEDs, beam angle 20 degrees
Others: electronic anti-fog function, pre-installed Windows 10 IoT Enterprise

Part Number **RSLX3-30MKB5-24SGB5-20N24-8C-NFNNNN-NNNU**

Description **platform:** X6425E, 8GB LPDDR4X-3200 full channel, 256GB M.2 SSD
Camera1: 3.2MP/max55.6fps mono CMOS IMX265, with 11-50mm 1/1.8" 3A lens (motorized zooming, focusing and iris control)
Camera2: 1080p/max60fps color CMOS IMX385, with 11-50mm 1/1.8" 3A lens (motorized zooming, focusing and iris control)
LED flash: 24 NIR (850nm) LEDs, beam angle 20 degrees
Others: electronic anti-fog function, pre-installed Ubuntu 20.04.1 Intel IoT

3.4 Ordering Information

The complete part number is composed of 32 characters, as shown below [1]

R S L X 3 - 3 0 S C 3 5 - 2 4 S C B 5 - 2 0 N 2 4

aaaaa	bb	c	d	ee	ff	g	h	jj	kk	mmm
prefix	camera1				camera2					LED flash

- N N - N N N N N N - N N N W - x x

n	p	q	r	s	t	u	v	w	x	y	z	##
memory	options							options		reserved		

P/N example

standard product RSLX3-80MKG4-30SGB5-20N24-8C-NFNNNN-NNNW

customized product RSLX3-80MKG4-30SGB5-20N24-8C-NFNNNN-NNNW-00

aaaaa product family prefix

	RSLX3	Lynx series all-in-one smart camera, the 2nd generation

bb sensor type of camera1

30	SONY IMX265, 3.2MP 1/1.8" global shutter CMOS, max 55.6fps
51	SONY IMX537, 5.1MP 1/1.8" global shutter CMOS, max 60fps
80	SONY IMX267, 8.9MP 1" global shutter CMOS, max 32.2fps
G0	SONY IMX542, 16MP 1.1" global shutter CMOS, max 17.7fps

c color of camera1

S	color
M	mono

d filter type of camera1 (refer to Chapter 5 for details)

C	fixed filter, IR-cut filter (Figure 5-1)
P	switchable filters, IR-cut and polarizer (Figure 5-1 and polarizer)
K	switchable filters, day/night (Figure 5-2)
G	switchable filters, day/night (Figure 5-3)

ee lens type of camera1 (motorized zooming, focusing and iris control, IR correction)

B5	11-50mm, 8MP resolution, 1/1.7" size, F1.4, Distortion < -10% to -0.1%
3F	3.8-16mm, 8MP resolution, 1/1.8" size, F1.5, Distortion < -48% to -2%
G4	16-40mm, 12MP resolution, 1.1" size, F1.5, Distortion < -9% to 1.2%
TC	30-120mm, 12MP resolution, 1.1" size, F2.5, Distortion < -4.3% to 1.7%

ff sensor type of camera2

00	for solo-camera type only
24	SONY IMX385LQR, 1080P color 1/2" rolling shutter CMOS, max 60fps
30	SONY IMX265, 3.2MP 1/1.8" global shutter CMOS, max 55.6fps
51	SONY IMX537, 5.1MP 1/1.8" global shutter CMOS, max 60fps
80	SONY IMX267, 8.9MP 1" global shutter CMOS, max 32.2fps
G0	SONY IMX542, 16MP 1.1" global shutter CMOS, max 17.7fps

g color of camera2

S	color
M	mono

	Z	for solo-camera type only
h	filter type of camera2 (refer to Chapter 5 for details)	
	C	fixed filter, IR-cut filter (Figure 5-1)
	P	switchable filters, IR-cut and polarizer (Figure 5-1 and polarizer)
	K	switchable filters, day/night (Figure 5-2)
	G	switchable filters, day/night (Figure 5-3)
	Z	for solo-camera type only
jj	lens type of camera2 (motorized zooming, focusing and iris control, IR correction)	
	B5	11-50mm, 8MP resolution, 1/1.7" size, F1.4, Distortion < -10% to -0.1%
	3F	3.8-16mm, 8MP resolution, 1/1.8" size, F1.5, Distortion < -48% to -2%
	G4	16-40mm, 12MP resolution, 1.1" size, F1.5, Distortion < -9% to 1.2%
	TC	30-120mm, 12MP resolution, 1.1" size, F2.5, Distortion < -4.3% to 1.7%
	00	for solo-camera type only
kk	beam angle of LED flash	
	20	20 degrees (reference: cover 2 lanes from 30 meters away)
	40	40 degrees (reference: cover 3 lanes from 20 meters away)
mmm	type of LED strobe	
	N24	NIR strobe (850nm light), 24 LEDs, for dual-camera type
	N30	NIR strobe (850nm light), 30 LEDs, for solo-camera type
	W24	white strobe (6000K white light), 24 LEDs, for dual-camera type
	W30	white strobe (6000K white light), 30 LEDs, for solo-camera type
	K24	far-red strobe (740nm light), 24 LEDs, for dual-camera type
	K30	far-red strobe (740nm light), 30 LEDs, for solo-camera type
n	DDR capacity	
	8	8GB LPDDR4X-3200, dual-channel
p	embedded M.2 SSD capacity (pre-installed at the factory)	
	N	none
	C	256GB
	D	512GB
	E	1TB
q	embedded AI accelerator	
	N	none
r	electronic anti-fog [2]	
	N	none
	F	embedded electronic anti-fog function
s	Wi-Fi module	
	N	none
	W	embedded 2.4GHz Wi-Fi module
t	GNSS module	
	N	none
	G	embedded GNSS module
u	embedded 4G/LTE module [3]	
	N	none
	A	yes, suitable for North American AT&T®

	V	yes, suitable for North American Verizon®
	E	yes, suitable for Europe, Middle East, Africa, Korea, Thailand
	S	yes, suitable for New Zealand, Australia, and South America
	C	yes, suitable for China
	J	yes, suitable for Japan
v	speed radar	
	N	none
	W	embedded speed radar (reserved for the future)
w	reserved for the future	
	N	none
x	heating coil for front windows [4]	
	N	none
	S	pre-install one heating coil for solo-camera type
	D	pre-install two heating coils for dual-camera type
y	aux interface	
	N	none
	L	the aux connector for LED strobe light, refer to Chapter 4.2.2
	C	the aux connector for CAN or RS422 bus, refer to Chapter 4.2.2
z	Pre-installed OS	
	U	Ubuntu 20.04.1 Intel IoT for free
	W	Windows 10 IoT Enterprise with activation license
##	customized product code	
	Blank	standard product
	xx	customized product code

Note

[1] The underlined option is the recommended option.

[2] The built-in electronic dehumidifier discharges water molecules out of the camera casing, so the internal surface of the front window glass does not fog in cold environments. The anti-fog function takes effect 12 hours after power on. **This option is highly recommended if the local temperature is likely to drop below 10 degrees Celsius.**

[3] For different countries, the standard or 4G/LTE is different, so it is necessary to indicate which country to use when ordering.

[4] Heating coils on the inner surface of the window glass can melt snow and ice on the outer surface. See Chapter 4.5.4 for details. **This option is highly recommended if the local winter is subject to frequent snowstorms.**

3.5 Free Accessories

When leaving the factory, it is equipped with 3 free aviation connectors, as shown below.

Figure 3-1 Free Accessories

3.6 Available Accessories for Purchase

Table 3-3 Available Accessories for Purchase

P/N	Description	Note
RSAN090M-03M **RSAN090M-08M** **RSAN090M-15M** **RSAN090M-25M** **RSAN090M-50M**	Ready-made cables with waterproof male aviation connectors. The cable length in meters: 03, 08, 15, 25, 50 The total resistance of the power supply wires (two-wire series) of these cables are: 0.15, 0.4, 0.75, 1.25, 2.5 ohms. The 50-meter cable can only be used with 48V power supply and without external LED strobe light.	Figure 3-2 Figure 4-7
RSAN250A	RJ45 aviation plug for network port	Figure 3-1 Note [1]
RSAN251A	Male 12-pin aviation plugs for power port	
RSAN252A	Male 14-pin aviation plugs for Aux port	
RSAN100N	A large stainless omni-directional bracket, weight 0.7kg	Figure 3-3 Figure 6-3

Note

[1] When leaving the factory, it is equipped with these 3 aviation connectors for free. If more parts are needed, the user can purchase additional ones.

Figure 3-2 the Ready Cable (P/N: RSAN090M-xxM)

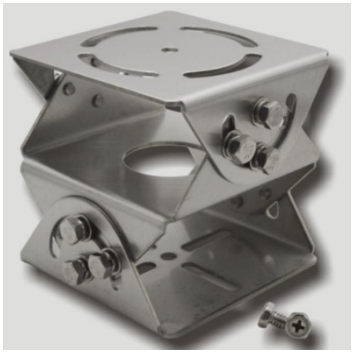


Figure 3-3 the Omni-directional Bracket (PN: RSAN100N)

3.7 Software Resources

Lynx3 series all-in-one smart camera is based on x86 architecture. It supports general OS and applications.

3.7.1 Supported Operating System

Windows 10 IoT Enterprise (64-bit), Linux (Ubuntu 20.04.1 Intel IoT)

Default OS: Linux (Ubuntu 20.04.1 Intel IoT)

If Windows 10 IoT Enterprise license is needed, please specify in order. Users can also download the image file from ROSEEK website and install it yourself, and then activate it with a license. Please refer to the document *Lynx3 Series Smart Camera - OS Recovery Instructions for Windows* or *Lynx3 Series Smart Camera - OS Recovery Instructions for Linux*

The Windows and Linux images have been deeply customized by ROSEEK, and the OS **does not crash** if the power is cut off while running. This means that users can cut off the power at any time without having to close the Windows software first.

CAUTION:

Users must only use the OS images from ROSEEK for system recovery or reinstallation. Installing any other version of operating system will cause system crash.

3.7.2 Recommended IDE

API functions are standard C language interfaces. ROSEEK developed the Demo with Microsoft Visual Studio 2013.

3.7.3 Abundant APIs

ROSEEK provides abundant APIs for ITS and intelligent surveillance. All these APIs are optimized and fully-tested for Lynx3 camera platform. It will be convenient to use high-efficiency ROSEEK APIs for user's algorithm:

- Support network protocols including ONVIF, GB/T28181, RTSP, TCP/IP, NTP
- Hardware H.264/H.265/MJPEG video encoding (not occupying CPU resources)
- Hardware JPEG compress/uncompress (not occupying CPU resources)
- High-efficiency image scaling

3.7.4 Encoding Performance

Lynx3 Smart camera greatly improves the encoding and decoding performance. It supports

H.264/H.265/JPEG encoding/decoding by hardware. The following table is its detailed encoding performance. So it can work as a high-end IP camera.

Table 3-4 Encoding Performance

Item	Format	Windows 10 IoT Enterprise		Ubuntu 20.04.1 Intel IoT	
		2K(1920x1080)	4K(4096x2160)	2K(1920x1080)	4K(4096x2160)
Encode (fps)	H.264	195	55	213	59
	H.265	250	64	268	67
	JPEG	282	87	362	100

3.7.5 Accelerate AI Workload

Lynx3 Smart camera supports the integrated GPU AI Acceleration. Please refer to Chapter 4.5.2.

Lynx3 Smart camera supports Intel® free AI toolkit OpenVINO™ to deploy high-performance deep learning inference. Lynx3 can use the integrated GPU to achieve 4TOPs computing power, which is used to accelerate the user's deep learning algorithm.

Note: H264 compression also uses GPU acceleration, so using GPU to implement AI inference will affect the frame rate of H264 compression. The user needs to balance the performance of the two according to the actual application.

3.8 System Block Diagram

The block diagram of Lynx3 series all-in-one smart camera is as follows:

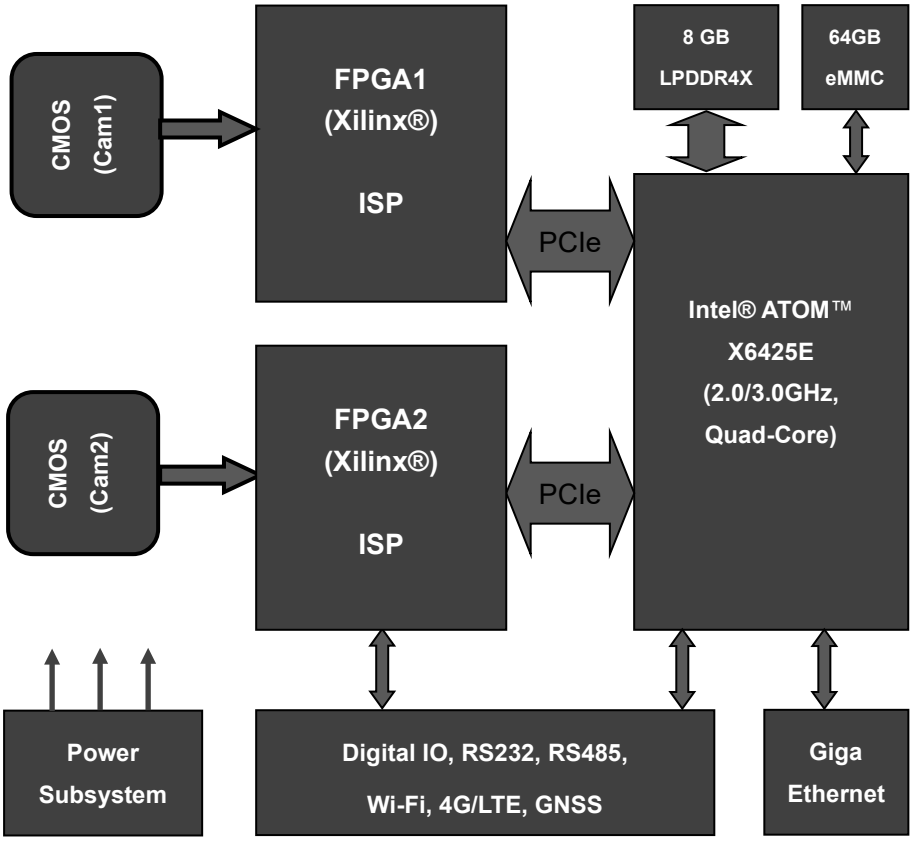


Figure 3-4 System Block Diagram

4 Application Information

4.1 Construction

4.1.1 Installation

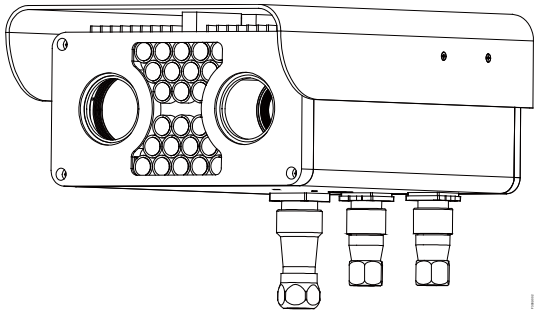


Figure 4-1 Profile - Dual-camera

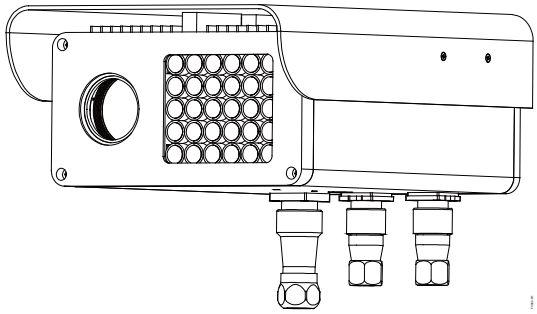


Figure 4-2 Profile - Solo-camera

Lynx3 series all-in-one smart camera is easy to use with the following features:

- Embedded fully motorized lens simplifies commissioning
- Embedded high power LED strobe light reduces the overall cost
- Rugged all-metal IP67 housing reduces maintenance costs
- The ready cable with the aviation connector simplifies installation
- The Wi-Fi AP function facilitates notebook access directly for field commissioning

After quickly installing the camera on the pole with the ready cables and Ethernet cable, workers can directly connect a notebook to it via SSID or hidden SSID on the ground. They can adjust the lens' focal length, focusing and iris easily via web viewer. Also the engineers can adjust and debug the camera remotely in office.

4.1.2 Sunshield

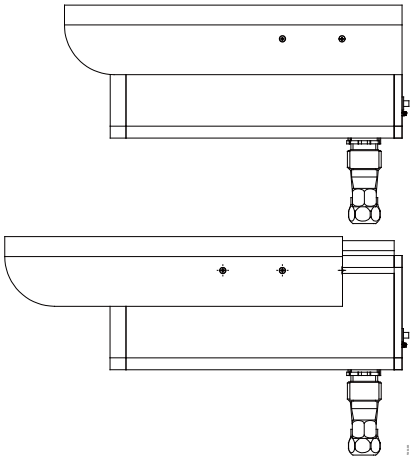


Figure 4-3 Sunshield

The camera sunshield can be moved forward by 60mm to enhance the function of sunshade and rain for the front windows.

4.1.3 Front Panel

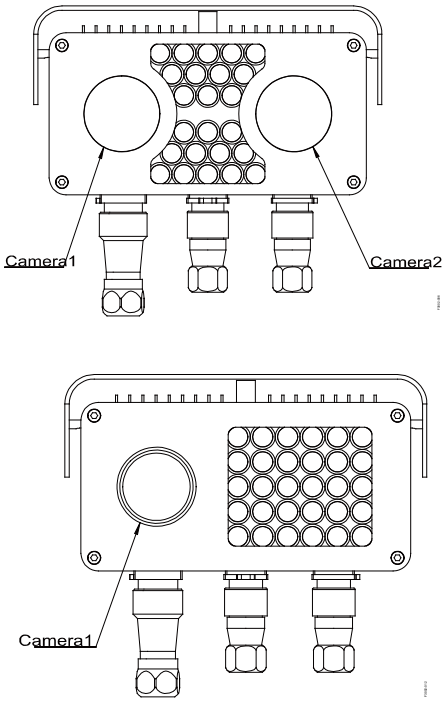


Figure 4-4 Front Panel

For dual-camera models, there is the camera1 window on the left of the front panel, the camera2 window on the right, and the 13-LED strobe light window in the middle.

For solo-camera models, there is only one camera window on the left of the front panel, and one 28-LED strobe light window on the right.

4.1.4 Rear Panel

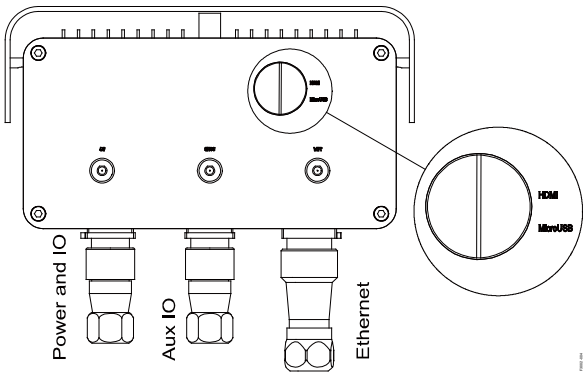


Figure 4-5 Rear Panel

There are six waterproof connectors on the rear panel, refer to the above figure.

After screwing out the round lid on the rear panel, there are one Micro-USB2.0 port and one HDMI port. The lid must be tightened to prevent water leakage before installation on site.

These two ports are for user software development and software deployment. The Micro-USB2.0 port extends the keyboard, mouse, and USB flash drive through the HUB, and the HDMI port is for a monitor.

The three antenna connectors are for the optional functions, refer to Chapter 4.5. If they are not used, the lids must be tightened to prevent water leakage before installation on site.

There are also two waterproof aviation connectors under the casing. An optional finished 25m cable (P/N: RSAN090M-xxM) with the aviation connector for the 12-pin aviation connector simplifies installation. But user has to make the Ethernet cable manually because the cable must pass through the waterproof plug.

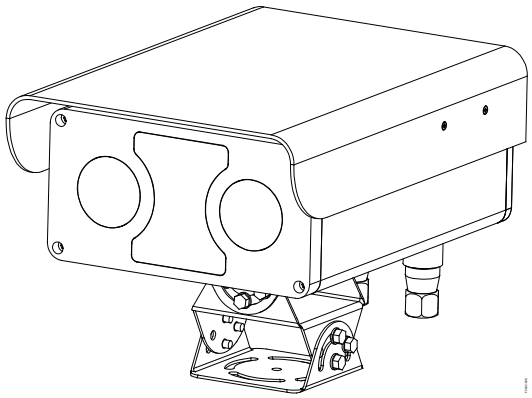


Figure 4-6 the Omni-directional Bracket

Maybe the aviation connectors are too big to install the camera on the stand, so there is an optional large omni-directional bracket (P/N: RSAN100N) to solve problem, refer to the above figure.

4.2 External Ports

4.2.1 Main Port

A 12-pin female waterproof aviation connector is used to power the camera and control peripherals, such as LED strobe light, gate machine. The matched plug is as standard configuration with the camera.

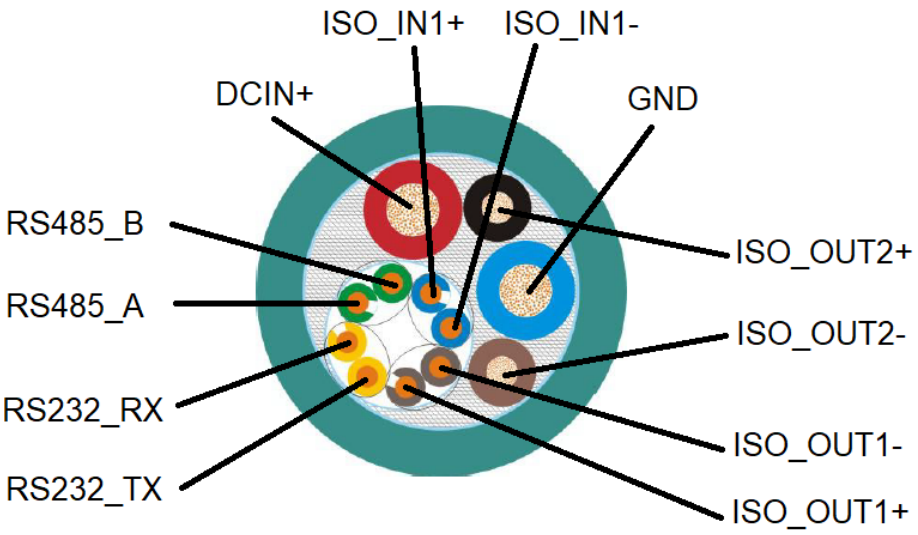


Figure 4-7 Cable Signal Definition

A finished 25m cable (P/N: RSAN090M-xxM) with an aviation connector is optional. It will simplify installation. It uses a customized cable by ROSEEK and is marked with the "Lynx1 Cable" on its surface. The cable structure diagram is as above.

The 50-meter-long cable (P/N: RSAN090M-50M) is only used for 48V power supply and cannot be used for 24V power supply. The power supply voltage drop of the 50-meter cable is too large, and Lynx3 may be unstable when powered by 24V. Users can solve this problem by placing the switch power near Lynx3 or using a thicker cable for power supply.

The matched plug male connector definition is follows:

Table 4-1 Terminal Definition of the Male Aviation Plug Connector

Pin Number	Cable Color (P/N: RSAN090M-xxM)	Name	Type	Description	Note
1	Brown	ISO_OUT2-	out	Photocoupler output 2 (-)	[5] [6]
2	Black	ISO_OUT2+	out	Photocoupler output 2 (+)	
3	Brown	ISO_OUT1-	out	Photocoupler output 1 (-)	
4	Whit-brown	ISO_OUT1+	out	Photocoupler output 1 (+)	
5	Blue	ISO_IN1-	in	Photocoupler input (-)	[4] [6]
6	White-blue	ISO_IN1+	in	Photocoupler input (+)	
7	Green	RS485_B	in/out	RS485_COM4 (B/-)	[3] [6]
8	White-green	RS485_A	in/out	RS485_COM4 (A/+)	
9	Orange	RS232_TX1	out	RS232_COM1 output	[2] [6]
10	White-orange	RS232_RX1	in	RS232_COM1 input	
11	Blue	GND	power	Power ground (for power and RS232)	[1] [6] [7]
12	Red	DCIN+	power	Power input: 22-28VDC or 40-50VDC (48VDC strongly recommended)	

Note:

[1] In the device, there are reverse polarity protection and surge protection for power input. However, the input voltage is not allowed to be over 52VDC, otherwise the fuse will break and camera needs depot repair. It is strongly recommended to use 48VDC power supply, because the LED power consumption is large, and 48VDC power supply can reduce the line voltage drop.

150W switching power supply or above is recommended to ensure the system's long term operating stability. For example, the 150W switching power from Meanwell (www.meanwell.com), P/N LRS-150-48 (output 48V, 3.3A).

If the Lynx3 camera is used with ROSEEK's Squirrel2 LED Strobe, special attention needs to be paid. The LED strobe light is a high-power pulse load, which has high requirements on the power supply. If the power supply is not selected properly, the system will work unstable, and the power supply is easily damaged. Recommended switch power supply list:

Table 4-2 Recommended Power Supply

Switch Power P/N (MEANWELL®)	1 Camera and 1 Squirrel2 Strobes	1 Camera and 2 Squirrel2 Strobes	Note
UHP-500-48	YES	NO	High reliability Fanless
UHP-750-48	YES	YES	
UHP-1000-48	YES	YES	
SDR-960-48	YES	YES	
LRS-450-48	YES	NO	High cost-effective Fans require maintenance
LRS-600-48	YES	YES	
SE-600-48	YES	NO	
SE-1000-48	YES	YES	

[2] This no-isolated RS232 is COM1 serial port. The supported baud rate (bps) list is: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

[3] This isolated RS485 is COM4 serial port. The supported baud rate (bps) list is: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. The RS485 port and RS422 port share the same COM4 serial port. If the user specifies the RS422 port in the P/N, the RS485 port will be disabled.

[4] The photocoupler input is by default a general input function, and its second function is AC power synchronization. It can be left float if it is not used.

In particular, this input can be used as power sync function. Because of the sine wave feature of 50/60Hz AC, the brightness of general light is changing periodically. To capture continuous steady images, user can set to expose images at the same position of one AC phase. This is called power sync function.

It can accept 5V-TTL, 3.3V-TTL or 12V input directly (series resistor is unnecessary). High tolerance: -50 to +1V is low level, +2.8V to +50V is high level. The input current is constant 2mA; and the voltage limit is from -50V to +50V. The block diagram is as follows:

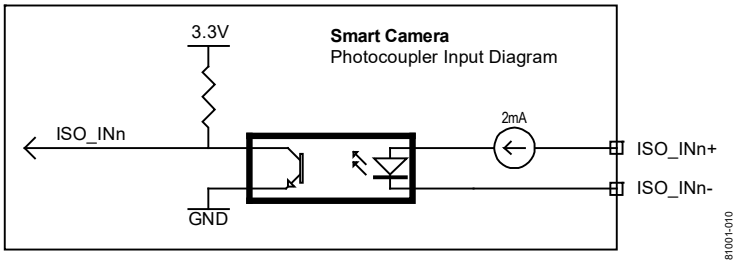


Figure 4-8 Photocoupler Input

[5] The two photocoupler outputs are primarily used to control flash. They can also be used as general isolated outputs (for example driving relay) also. The maximum load is 50V/30mA and the typical output delay is 10us. The block diagram is as follows:

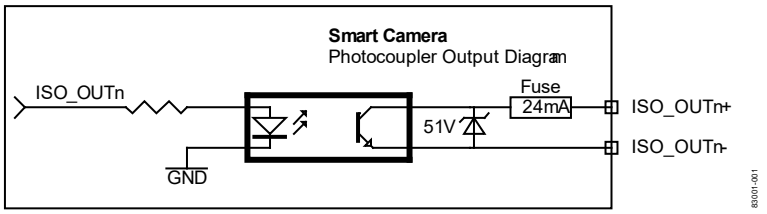


Figure 4-9 Photocoupler Output

[6] Some typical using methods for external devices are shown as below:

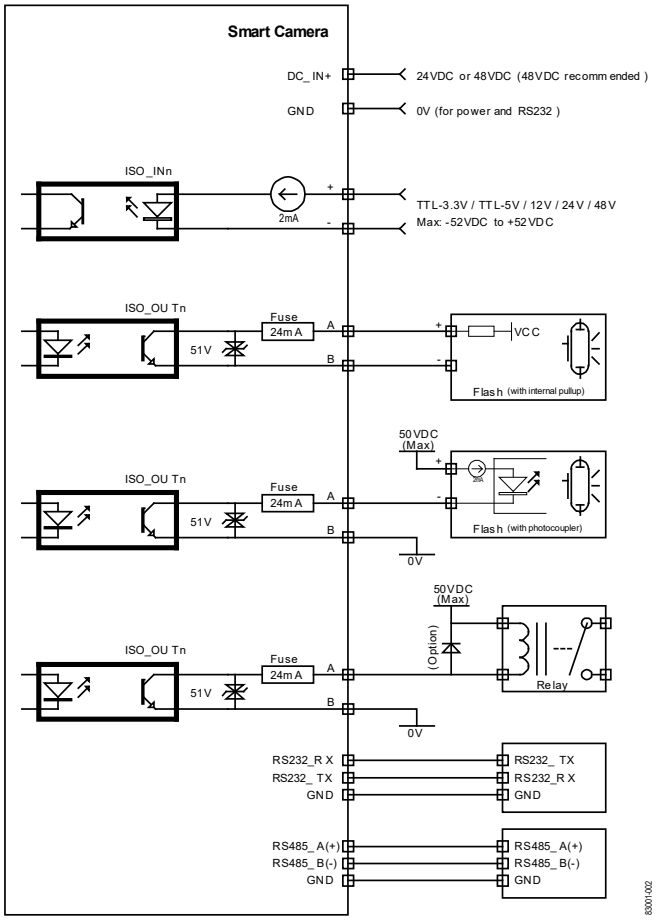


Figure 4-10 Typical External Devices Connection

[7] The resistance of the power supply wires (blue or red) is 25 ohm/km.

4.2.2 Aux Port

A 14-pin female waterproof aviation connector is used to provide interface for LED strobe light, RS422 or CAN. These interfaces are not standard configuration of the product.

LED interface is for up to 2 LED strobe lights, such ROSEEK Squirrel1 and Squirrel2 series LED strobe light, and user can control them independently. For example, users can light up one LED light, or light up two at the same time. ROSEEK's Squirrel2 series LED strobe light has aviation plug option, then it can seamlessly interface with the camera.

RS422 or CAN interface is for speeding radar. Users can also use RS422 interface to realize full duplex RS485.

The matched plug female connector definition is follows:

Table 4-3 Terminal Definition of the aux-IO Aviation Plug Connector

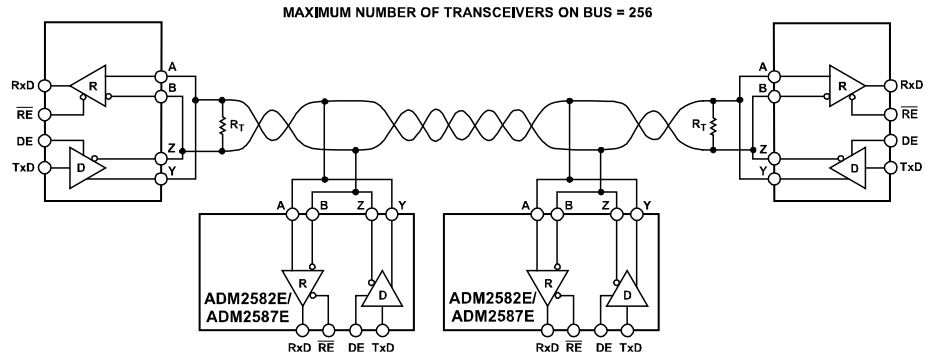
Pin Number	LED Strobe connection	CAN and RS422 connection	Type	Description	Note
14	LED_PWR_OUT	Float	NA	LED power (24V/48V)	[1]
12	LED_PWR_GND	Float	NA	LED power (GND)	
4	LED_TRIGGER1	Float	OUT	LED control signals	
6	LED_TRIGGER2	Float	OUT		
5	LED_TRIG_GND	Float	NA		
7	LED_TRIG_GND	Float	NA		
8	LED_RS485_A	ISO_COM2_RS422_TXY	I/O	RS485 for LED strobe RS422 for radar Electronic isolated	[2] [3]
9	LED_RS485_A	ISO_COM2_RS422_RXA	I/O		
10	LED_RS485_B	ISO_COM2_RS422_TXZ	I/O		
11	LED_RS485_B	ISO_COM2_RS422_RXB	I/O		
13	Float	ISO_COM2_RS422_IGND	NA		
2	Float	ISO_CAN_L	I/O	CAN bus for radar Electronic isolated	[4]
3	Float	ISO_CAN_H	I/O		
1	Float	ISO_CAN_GND	NA		

Note:

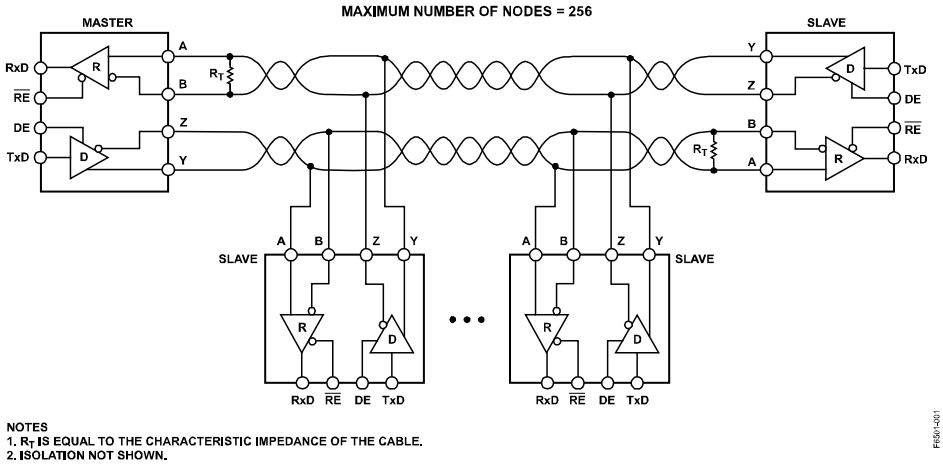
[1] LED_PWR_OUT and LED_PWR_GND are internally connected directly to the camera's input power. If Squirrel1 is connected, the camera must be supplied by 24VDC. If Squirrel2 is connected, the camera must be supplied by 48VDC.

[2] This isolated RS485/RS422 for connecting with external devices. The supported baud rate (bps) list is: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

[3] As RS485 interface, Pin-8 and Pin-9 must be connected together, and Pin-10 and Pin-11 must be connected together also. Refer to the followed figure.



Typical Half Duplex RS-485 Network



Typical Full Duplex RS-485 Network

Figure 4-11 Typical Half Duplex RS485 and Full Duplex RS485 Newwork

[4] This isolated CAN bus is compliant with specifications 2.0A and B (active) with a bit rate up to 1 Mbit/s. There are some dedicated API functions in the SDK to control this CAN bus.

4.2.3 Ethernet Port

There is a waterproof 100/1000M Ethernet port. The matched plug is as standard configuration with the camera. User has to make the Ethernet cable manually because the cable must pass through the waterproof plug. There is a standard RJ45 connector in the waterproof aviation connector shell.

If working in 1000M mode, CAT6 or CAT6A cables are recommended to achieve better communication and longer cable lengths.

The default IP address is 192.168.1.218. User can modify IP address, but the MAC address cannot be changed.

CAUTION:

The RJ45 Connector in the waterproof aviation connector has a key dimension, which is the dimension from the contact surface of the metal conductor to the top of the connector, as shown in the above figure. If this size is too much smaller than the standard size of 6.02mm, it is easy to cause poor contact failure. Refer to Figure 4-11.

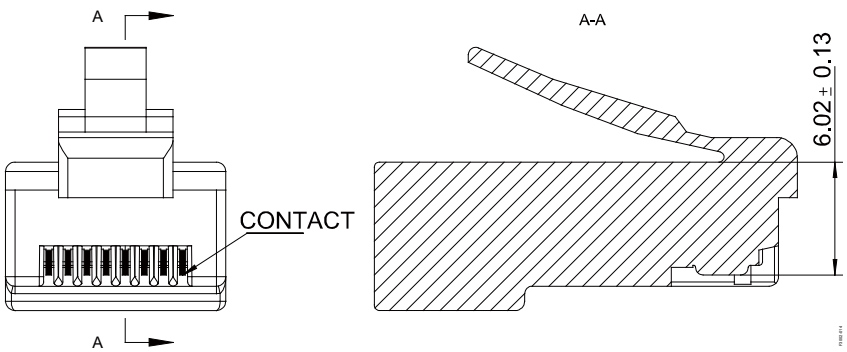


Figure 4-12 RJ45 Connector key dimensions

4.3 Peripherals

4.3.1 Motorized Lens

The motorized lens embedded in the Lynx3 camera simplifies field installation and commissioning. These lenses all support motorized zooming, motorized focusing, motorized aperture, and all support IR correction function. The installer can adjust the lens' focal length, focusing and iris easily via web viewer. Also the engineers can adjust and debug the camera remotely in office.

There are currently four motorized lenses supported

[1] RSLN-S1F17-08Z-1150EEC-14P-N

11-50mm, 8MP, 1/1.7" size, F1.4, Distortion < -10% to -0.1%, P/N code B5

[2] RSLN-S1F18-08Z-0416EEC-15P-N

3.8-16mm, 8MP, 1/1.8" size, F1.5, Distortion < -48% to -2%, P/N code 3F

[3] RSLN-C11F1-12Z-1638EEC-15P-N

16-40mm, 12MP, 1.1" size, F1.5, Distortion < -9% to 1.2%, P/N code G4

[4] RSLN-C11F1-12Z-30C0EEC-25P-N

30-120mm, 12MP, 1.1" size, F2.5, Distortion < -4.3% to 1.7%, P/N code TC

CAUTION:

The stepper motor of the motorized lens has a life limit. They are only used to adjust the lens during installation, commissioning and maintenance, and not to operate frequently every day. The camera has internal counting function. ROSEEK is not responsible for any malfunction caused by excessively frequent operations.

Table 4-3 Sensor and Lens Matching Table

Lens / Sensor		Lens P/N code			
		B5	**3F**	**G4**	**TC**
		1/1.7", 11-50mm	1/1.8", 3.8-16mm	1.1", 16-40mm	1.1", 30-120mm
IMX385	1/2", 2MP	YES	YES	YES	YES
IMX265	1/1.8", 3.2MP	YES	YES	YES	YES
IMX537	1/1.8", 5.1MP	YES	YES	YES	YES
IMX267	1", 8.9MP	NO	NO	YES	YES
IMX542	1.1", 16MP	NO	NO	YES	YES

4.3.2 LED Strobe Light

A 30-LED strobe light is integrated in the solo-camera model, and a 24-LED one is integrated in the dual-camera model.

Generally the 20 degrees LED strobe can cover 2 lanes from 30 meters away, and the 40 degrees LED strobe can cover 3 lanes from 20 meters away. For reflective license plates, the Lynx3 camera can clearly capture the characters on the license plate at a distance of 100 meters.

Table 4-4 LED Strobe Light Characteristics

LED Feature	High power LEDs with high efficient cooling design	
LED Type	White (6000K), NIR (850nm), far-red (740nm)	
LED Beam Angle	20° or 40°	
LED Driver	Two independent constant current LED drivers, pulsed or continued	
Pulsed Mode	**Max Trigger Frequency**	1KHz
	Min/Max Pulse Width [1]	20us / 6ms
	Trigger Delay Time	20us (constant)
	Max Duty Cycle	18%
	LED Pulsed Power	White: 330W for 24 LEDs, 410W for 30 LEDs
		NIR: 280W for 24 LEDs, 350W for 30 LEDs
		Far-red: 210W for 24 LEDs, 260W for 30 LEDs
	Self-protection Feature	Max duty cycle protection, max pulse width protection and temperature monitor & protection
Continued Mode	The LED emits light continuously, but the brightness is only 20%	

Lynx3 camera's LEDs are in line with European human eye safety requirements. For the needs of human eye safety certification, list the LED models used, as follows: NIR (850nm) LED is from OSRAM®, and the P/N is SFH 4715S; White (6000K) LED is from CREE® Xlamp® XP-G3 series, and the P/N is XPGDWT-B1-x. The LED relative spectral power distribution is as follows.

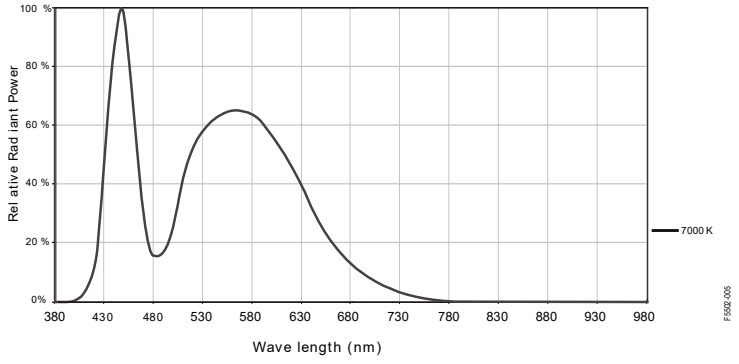


Figure 4-13 Relative Spectral - White LED

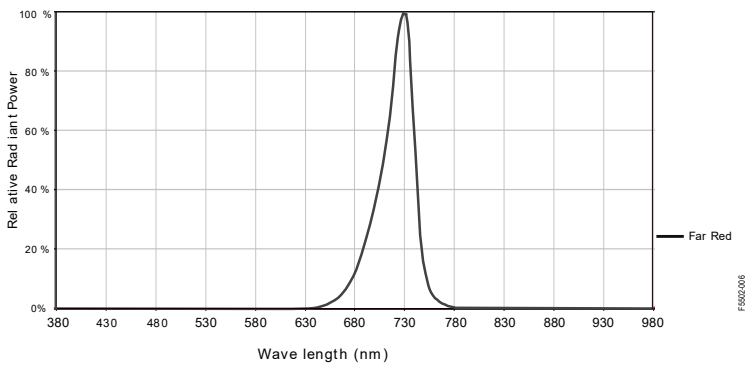


Figure 4-14 Relative Spectral - Far-red LED

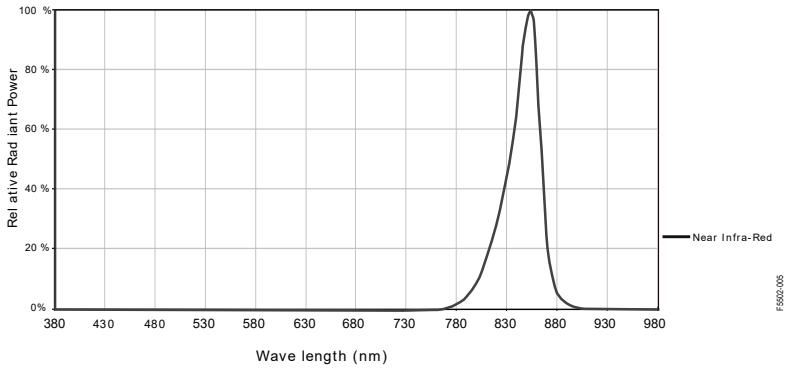


Figure 4-15 Relative Spectral - NIR LED

4.4 Ports for Development

4.4.1 Micro-USB2.0 Port

Referring to Figure 4-5, after screwing out the round lid on the rear panel, there is a Micro-USB2.0 port (host mode) for all kinds of peripherals, such as keyboard, mouse, USB flash drive. USB HUB extension is supported.

This port is for user software development and software deployment. The lid must be tightened to prevent water leakage before installation on site.

4.4.2 HDMI Port

Referring to Figure 4-5, after screwing out the round lid on the rear panel, there is a HDMI port for connection with monitor. This port supports resolution from VGA to 1080P.

This port is for user software development and software deployment. The lid must be tightened to prevent water leakage before installation on site.

4.4.3 Internal USB3.0 Ports

There is one internal USB3.0 port which are designed for encryption USB dongle or AI Accelerators. User must open the rear panel to access them.

CAUTION:

There is a seal ring for waterproof around the rear panel. The seal ring must be installed in place when fixing the rear panel. Otherwise the camera will not be waterproof.

4.4.4 LED Indicator

There are two indicator LEDs on the LED strobe panel.

The red one is the system status LED. It lights up to indicate that the camera is working properly, and it flashes to indicate that the camera is being upgraded or the system is recovering. It is by default active, but user can shut down it via API.

The green one is for users. It is by default off, and it can also be controlled via APIs.

4.5 Options

4.5.1 M.2 SSD

There is a M.2 SSD card slot in the camera. It can only be pre-installed at the factory.
The following M.2 SSD capacity is available: 000GB (default), 256GB, 512GB, 1TB.

4.5.2 AI Accelerator

Lynx3 can use the integrated GPU to achieve 4TOPs computing power, which is used to accelerate the user's deep learning algorithm. It supports Intel® free AI toolkit OpenVINO™.
There is NO any dedicated slot for an AI accelerator module.

4.5.3 Anti-fog Dehumidifier

The optional built-in electronic dehumidifier discharges water molecules out of the camera casing, so the internal surface of the front window glass does not fog in cold environments. The anti-fog function works after 12 hours of power on because the water is discharged slowly. Compared to the way of heating anti-fog method, the electronic dehumidifier anti-fog method consumes very little power, so it can run all the time.
It is highly recommended that all Lynx3 series all-in-one cameras installed in the cold zone are equipped with anti-fog option.

4.5.4 Heating Coil

In winter, snow and ice may form on the outer surface of the camera glass window, resulting in the Lynx3 camera not being able to image clearly. Lynx3 cameras can install heating coils on the inner surface of the window glass to melt snow and ice on the outer surface. The heating coil power consumption of each window is 8W.
This option is highly recommended if the local winter is subject to frequent snowstorms.
There are two control methods: automatic temperature control, manual remote control. The former requires the user to set a temperature threshold, below which the heating coil is automatically turned on. The latter requires the user to directly turn the heating coil on or off remotely. There are some dedicated API functions in the SDK to control this heating coil.

4.5.5 Wi-Fi

The optional embedded Wi-Fi module is available. It compatible to IEEE 802.11b/g/n WLANs, and it support 2.4GHz frequency.

The Wi-Fi supports AP mode, so user can directly connect a notebook to the camera via SSID or hidden SSID for field commissioning. The default SSID is "userap", and the default password is "55661685".

The antennas (P/N: RSAN080N) in the accessory are full-band antennas that support GNSS, 4G/LTE and Wi-Fi functions with the same model.

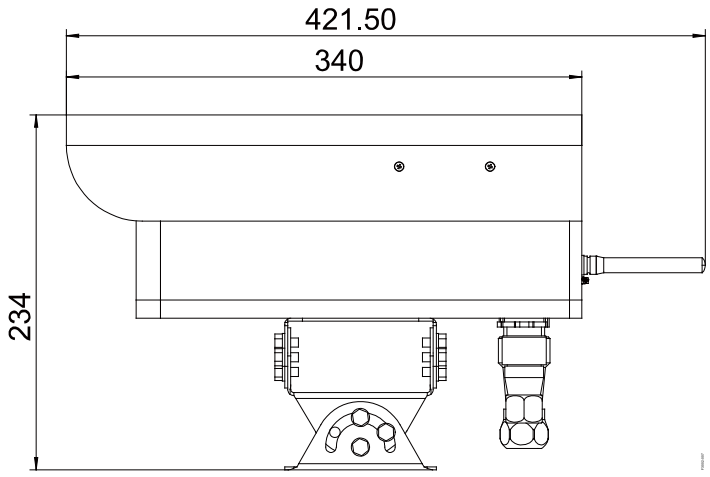


Figure 4-16 Dimensions of Antennas (P/N: RSAN080N)

4.5.6 GNSS

An optional embedded GNSS module is available. It supports GPS, BEIDOU.

In addition to providing location and altitude information, the GNSS function provides time information accurate to 1 millisecond.

Based on the embedded PPS synchronization technology, the camera hardware is able to achieve a time accuracy of 1 microsecond. But the camera's OS is not a real-time OS, so the user program can only get a time precision of 1 millisecond. If the user needs the time accurate to microseconds, please use the PPS interrupt function to calibrate the time.

GNSS module cold start time is 1 to 3 minutes depending on the environmental conditions, so the program needs to wait for the GNSS to start up.

The antennas (P/N: RSAN080N) in the accessory are full-band antennas that support GNSS, 4G/LTE and Wi-Fi functions with the same model.

4.5.7 4G/LTE

The optional embedded 4G/LTE module is available with performance of 150Mbps download and 50Mbps upload. The 4G/LTE function needs a 12×15mm Micro-SIM card in the camera. User must open the rear panel to insert the Micro-SIM card.

The antennas (P/N: RSAN080N) in the accessory are full-band antennas that support GNSS, 4G/LTE and Wi-Fi functions with the same model.

CAUTION:

There is a seal ring for waterproof around the rear panel. The seal ring must be installed in place when fixing the rear panel. Otherwise the camera will not be waterproof.

NOTE:

For different countries, the standard or 4G/LTE is different, so it is necessary to indicate which country to use when specifying the P/N. This 4G/LTE module is industrial grade and it can work within environment temperature -40°C to 85°C.

4.5.8 Speed Radar

It is planned to integrate the speed measuring radar function in Lynx3 camera in the future. If the user needs this feature, please contact us.

5 Filter Characteristics

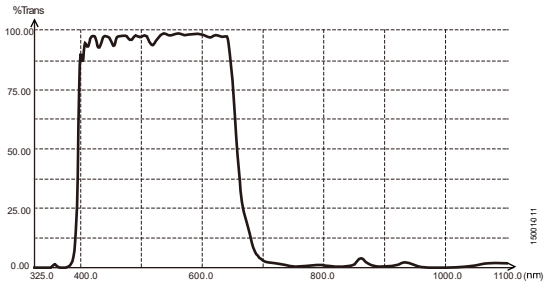
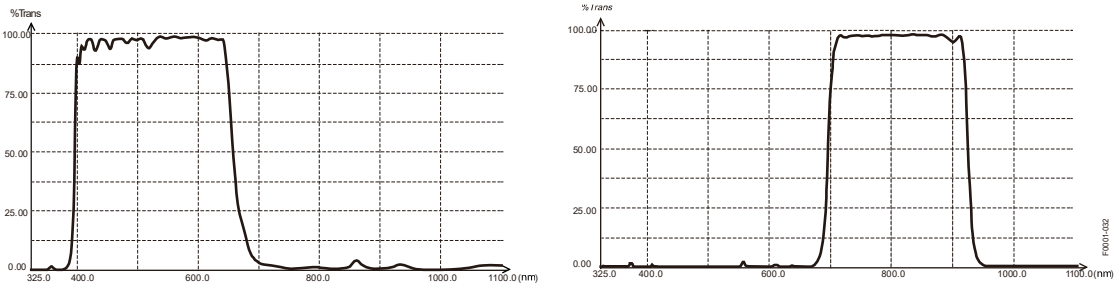
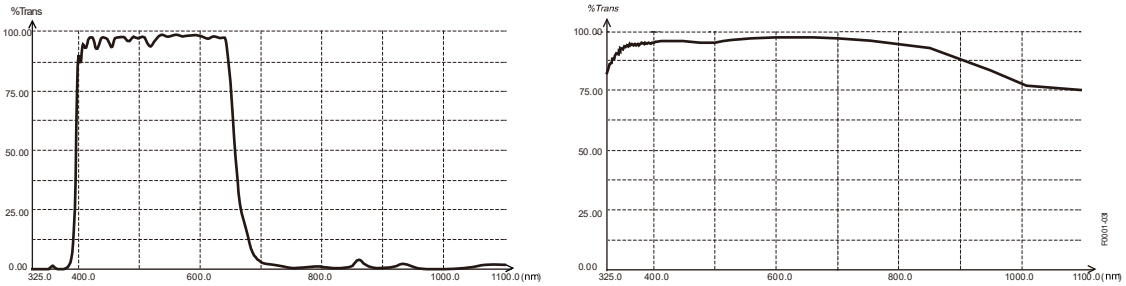


Figure 5-1 Fixed Filter - C type (IR-cut)



Switchable Filters - K and N type

Figure 5-2 Switchable Filters - K and N type



Switchable Filters - G type

Figure 5-3 Switchable Filters - G type

Note:

[1] Light wave unit: nm

[2] The filter cannot be changed or removed after leaving the factory

6 Dimensions

6.1 Camera Dimensions

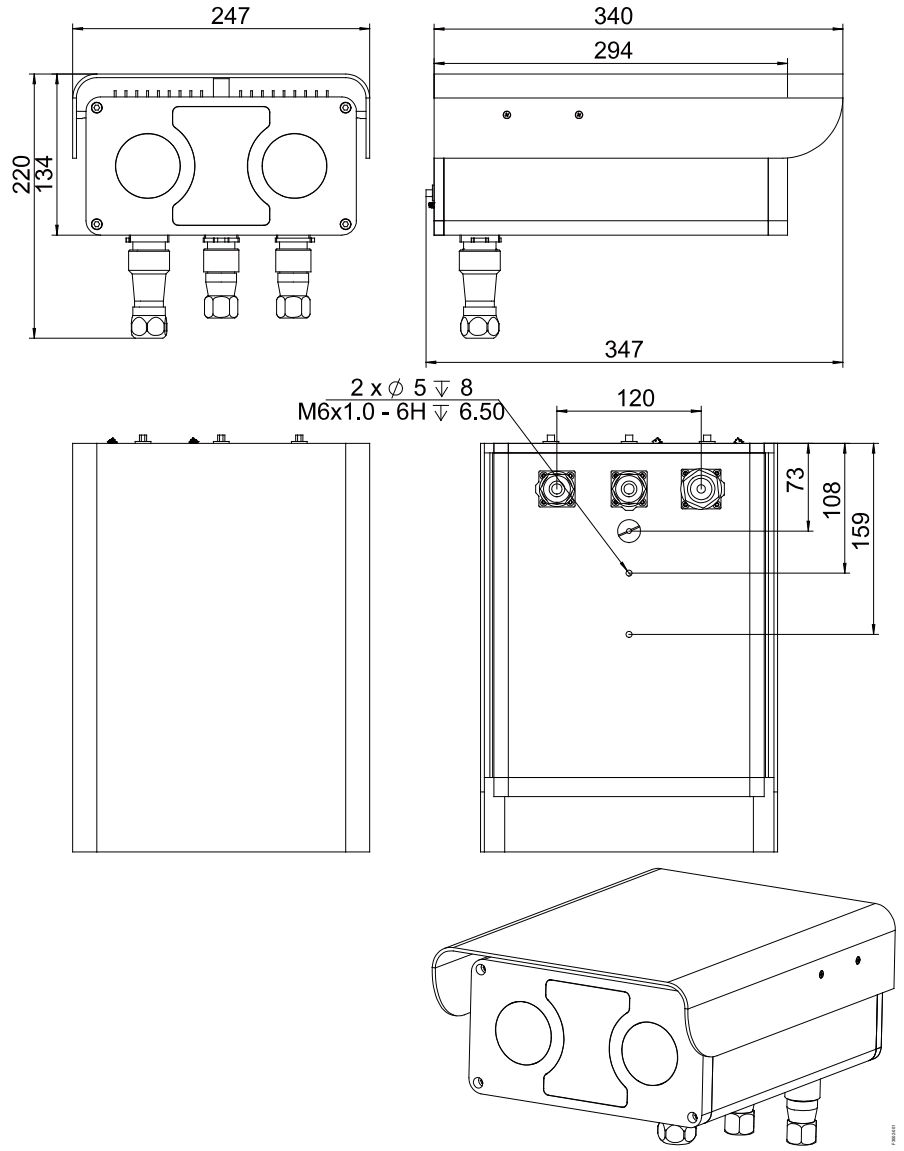


Figure 6-1 Dimensions

Note:

[1] Unit: mm

[2] Materials: aluminum alloy with anodizing process

[3] Color: silver

6.2 Bracket Dimensions

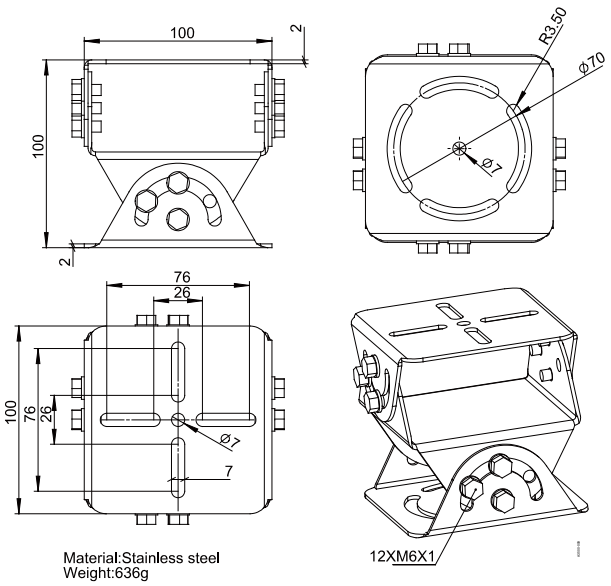


Figure 6-3 Bracket Dimensions (P/N: RSAN100N)

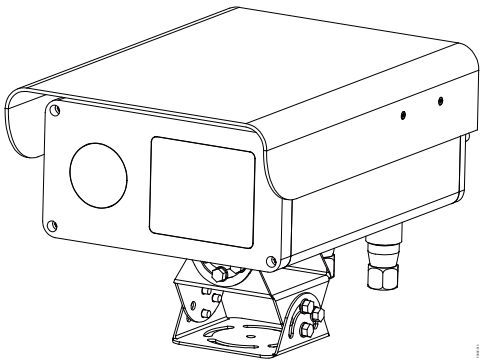


Figure 6-4 Profile after Installation

Note:

[1] Unit: mm

[2] Material: stainless steel

[3] Large sized omni-directional bracket is optional, may be purchased independently. P/N is RSAN100N.

7 Contact

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