

RoHS

Operation Manual Ver. 1.0

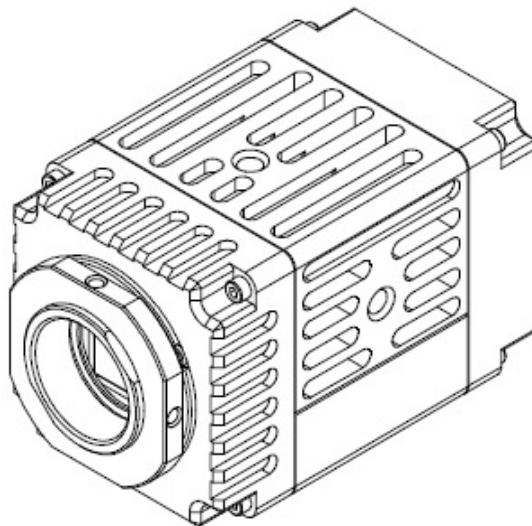
SWIR 1.3M/0.3M (Black & White)

GigE Vision compatible

Model

PXG130SP / PXG130S

PXG030SP / PXG030S



Primetech Engineering Corp.

Introduction

Thank you for your purchase of the Primetech Engineering product.
We ensure that you will enjoy this and other products from Primetech Engineering for many years.

- Keep this manual and warranty card handy for future reference.

For Safe Use of the Product

To ensure the safe use of this product, carefully read the warnings and cautions provided below prior to use:

	Warning	Failure to follow the warning message may result in death or serious injury.
	Caution	Failure to follow the caution message may result in injury or property damage.

Warning – Safety Precautions –

- Never disassemble or modify the product.
- Do not touch the connection cable pins or metal parts with wet hands.
- Do not use the product in a place exposed to rain or water droplets or where toxic gases (liquids) are generated nearby.
- If the product will not be used for an extended period of time, unplug the connection cable from the camera.
- When installing, inspecting or handling the product in a high place, implement sufficient measures beforehand to prevent the device and parts from falling.
- If you see smoke, smell a bad odor or hear an abnormal noise, immediately turn off the power supply and unplug the cable from the product.
- Do not use this product in a system that may cause a serious accident if the product exhibits an abnormality.

Caution – Precautions on Use –

- Use the product within the operating temperature range (0 to +35°C).
- Use the product at the specified power-supply voltage (+12 VDC).
- Avoid any strong impact or vibration to the product.
- Provide sufficient space around the installed product to prevent the product's internal temperature from rising.
- If the product is used in a dusty environment, be sure to implement dust-protection measures.
- Be sure to turn off the power supply after the cable has been unplugged and then plugged in again with the power on.
- Dust and smudges on the surface of the cover glass will appear as black stains on the image. Blow away any dust with air, etc., and wipe off any smudges using a cotton swab moistened with ethyl alcohol.
When cleaning smudges, be careful not to scratch the surface of the cover glass.
- Do not share the power supply with a motor or other type of noise-generating device.
- The SG (signal ground) and FG (frame ground) are connected inside the camera. Design the system in such a way as to prevent the looping caused by ground potential difference.
- Do not turn off the camera power supply while rewriting the contents of the built-in memory.

Supplemental Note

- By using it after the sensor temperature becomes constant after turning on the power, it is possible to capture more stable images.

Disclaimer

Primetech Engineering shall assume no responsibility for the following under any circumstance:

- Loss arising from fire, earthquake, a man-made disaster or an act of God; willful or accidental misuse of the product; or use of the product by a third party in an abnormal manner;
- Loss arising from repair or modification performed by the customer;
- Incidental loss (lost business profit, suspension of business, etc.) arising from the use of or inability to use the product; and
- Loss arising from malfunction, etc., caused by the combined use of connected devices.

FCC Statement

This Device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Revision History

Revision	Date of revision	Description of change
1.0	2021/8/6	Released the initial version.

Table of Contents

1.	Overview	7
1.1.	Characteristics	7
2.	System Configuration	9
2.1.	Included contents	9
2.2.	Items to be prepared by the customer	9
2.3.	Items to be prepared by the customer as needed	10
2.4.	System configuration example	10
3.	Specifications of Camera Parts	11
3.1.	Front/Top/Bottom/Side	11
3.2.	Rear panel	12
3.3.	Cable connection	13
3.4.	FAN	13
3.5.	GPIO signal specifications	14
4.	Detail of function	15
4.1.	DeviceControl	15
4.2.	ROI	15
4.3.	Decimation	16
4.4.	Reverse	16
4.5.	PixelFormat	16
4.6.	TestPattern	17
4.7.	AcquisitionControl	18
4.8.	TriggerControl	19
4.9.	ExposureControl	21
4.10.	DigitalIOControl	22
4.11.	Gain	23
4.12.	BlackLevel	23
4.13.	UserSetControl	23
4.14.	Gamma	23
4.15.	CrossLine	24
4.16.	Binalize	24
4.17.	Aperture (Edge enhancement)	24
4.18.	Black/White Inversion	24
4.19.	Sensor Temperature Control	25
4.20.	AE&AGC Control	25
5.	Camera connection / image confirmation method	26
5.1.	Outline	26
5.2.	Recommended PC specs	26
5.3.	Camera connection	27
6.	Other	31
6.1.	How to create gamma table	31
6.2.	How to load Gamma Table	32
6.3.	Packet Delay Settings	33
6.4.	Defect pixel correction setting	34
6.5.	PC settings	36
6.6.	If you thought it was a malfunction (abnormal phenomenon check sheet)	37
7.	Specification	39
7.1.	Image	39
7.2.	Optical, etc.	39

7.3.	Spectral sensitivity characteristics	40
8.	External dimensions	41
9.	Quality Assurance.....	42
9.1.	Quality Assurance Period.....	42
9.2.	Warranty coverage.....	42
9.3.	Repair procedure	42
9.4.	Repairs after the free warranty period has expired	42
9.5.	Other.....	42

1. Overview

This operation manual describes functions and procedures for the GigE Vision interface SWIR1.3M/0.3M (B/W) CMOS Camera (B/W).

1.1. Characteristics

·Interface

Compliant with the GigE Vision interface. Supports DC12V input using the attached AC adapter.

·Resolution

The number of effective pixels of the camera module is 1280(H) x 1024(V) for PXG130SP/PXG130S, 640(H) x 512(V) for PXG030SP/PXG030S.

·Diverse mode setting

The following modes can be set by sending commands from the host device.

- Image acquisition mode (Continuous / Multi Frame)
- Shutter function: Normal/triggered shutter
- Output bit length switching
- Read mode: Normal / Vertical decimation / Horizontal decimation / Image cropping (ROI)
- Frame rate control
- Exposure Time control
- Gain control
- Black level control
- Gamma correction
- User set control
- Image reverse function (H/V)
- Binarization function
- Cross line display
- Test pattern display
- Sensor temperature display / control function (Temperature control is PXG130SP / PXG030SP only)
- Defect pixel correction
- Edge enhancement
- Black and white inversion

- **Triggered shutter**

By using the external trigger, one still image can be obtained. Accurately capture objects moving at high speed.

- **Output bit length switching**

8 bit (MONO8) / 10 bit (MONO10) / 12 bit (MONO12) output can be selected.

- **Decimation function**

The decimation of 1/2 horizontal and 1/2 vertical can be selected.

- **Image cropping function (ROI)**

Image cropping is possible in one area, 8 pixel steps (H/V).

- **Frame rate**

The frame rate can be set arbitrarily.

- **Electronic shutter**

The exposure time can be set arbitrarily.

- **Gain**

The analog gain can be set arbitrarily.

- **Black level**

The black level can be set arbitrarily.

- **Gamma Correction**

OFF ($\gamma=1.0$) / ON (the γ can be arbitrarily set by the user) can be switched.

- **User set control**

Camera settings can be saved and recalled.

- **Image reverse**

The image can be flipped horizontally and vertically.

- **Binarization**

The binarized image can be get. The threshold is arbitrary.

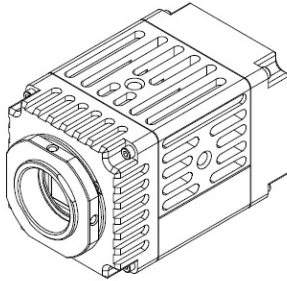
- **Camera module fixing**

The screw holes for fixing the camera module are located on the lower surface. Fixing the camera module on the front panel can minimize deviation of the optical axis.

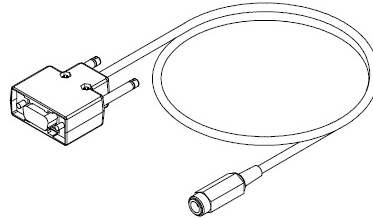
2. System Configuration

The included contents, the items to be prepared by the customer, and an example of the system configuration are shown below.

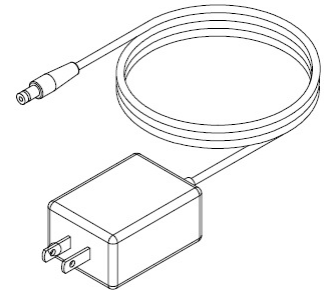
2.1. Included contents



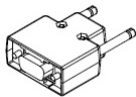
< Camera module x 1 >



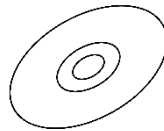
< Camera cable x 1 >



< Dedicated AC adapter x 1 >

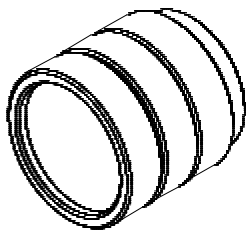


< Spare connector x 1 >

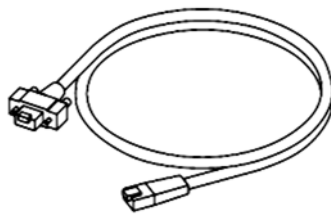


< CD-ROM x 1 >

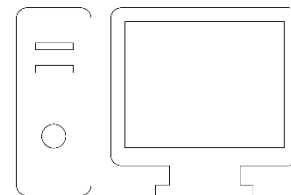
2.2. Items to be prepared by the customer



< C-mount lens >



< LAN cable ※1 >



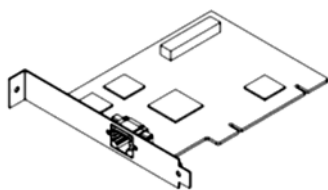
< The Data reception and image display devices such as PCs >

※1 LAN cable :

Use a LAN cable that supports 1000BASE-T (CAT5e or higher standard).

Use a LAN cable with excellent noise resistance. Depending on the characteristics of the LAN cable, the image may be distorted or the camera module may become unstable.

2.3. Items to be prepared by the customer as needed



< Network card ※2 >

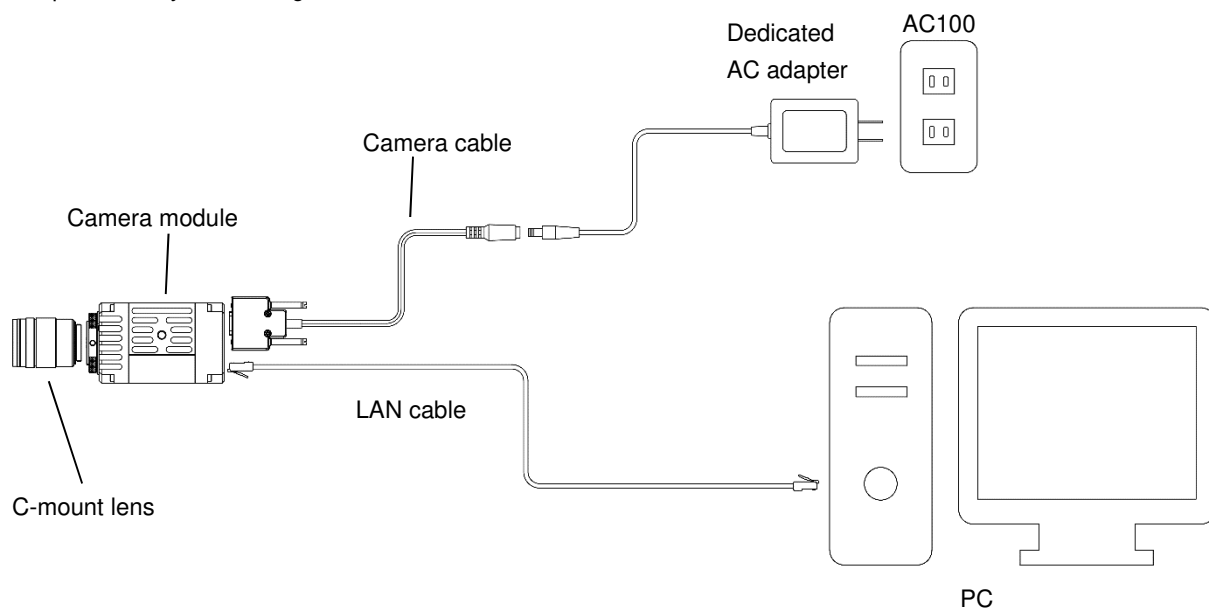
※2 Network card :

Insert the network card into the expansion slot of the host device (PC, etc.). Use a 1000BASE-T compatible, jumbo packet compatible one suitable for your system.

The LAN connector that comes with your PC is also can be used. In this case, a network card does not needed.

2.4. System configuration example

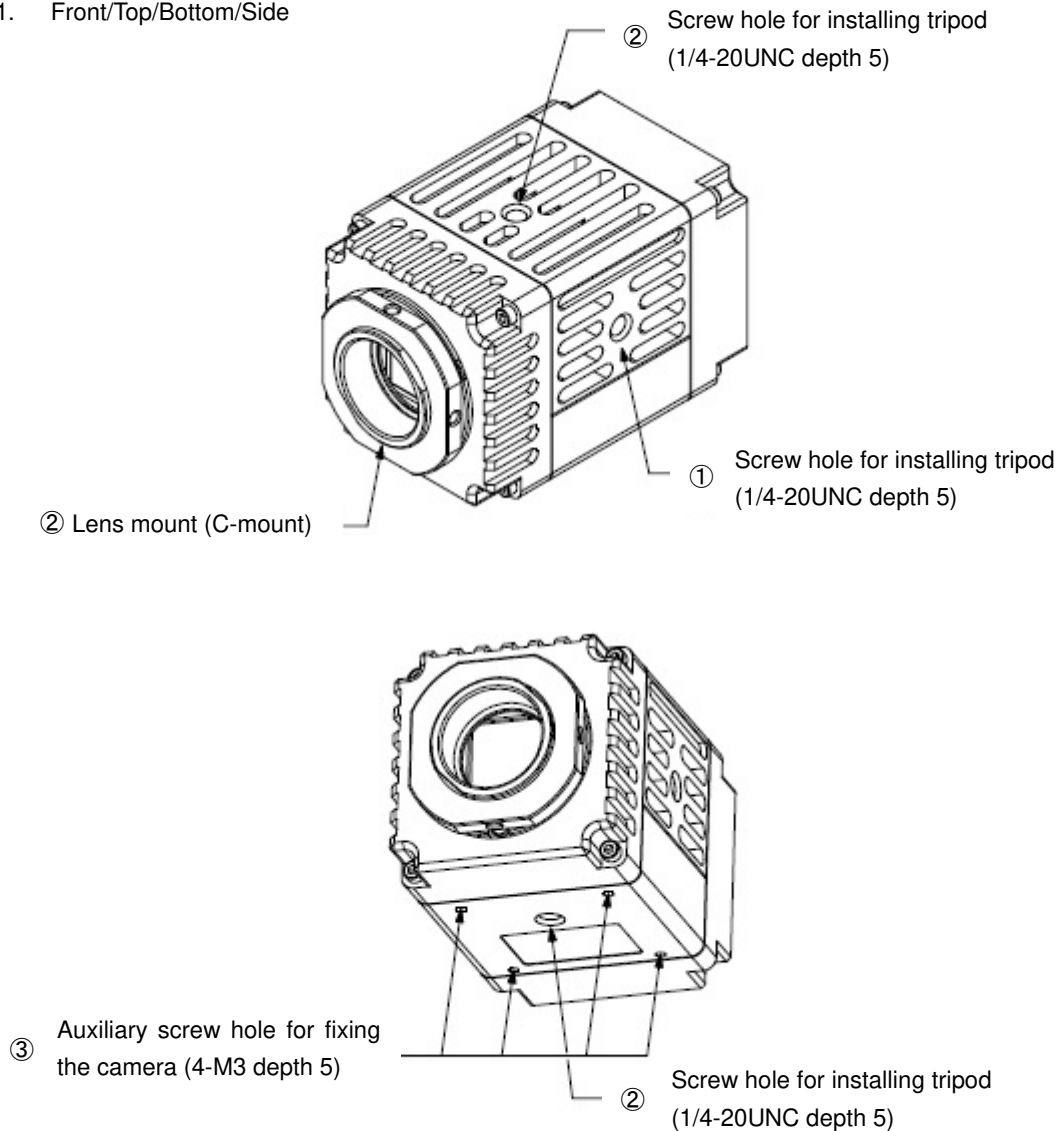
An example of the system configuration is shown below.



3. Specifications of Camera Parts

The specifications of each part of the camera are shown below.

3.1. Front/Top/Bottom/Side



① Lens mount (C-mount)

Attach C-mount lenses and optics to the camera module.

Note

Use a C-mount type lens with a protrusion amount of 9 mm or less from the lens mount surface.

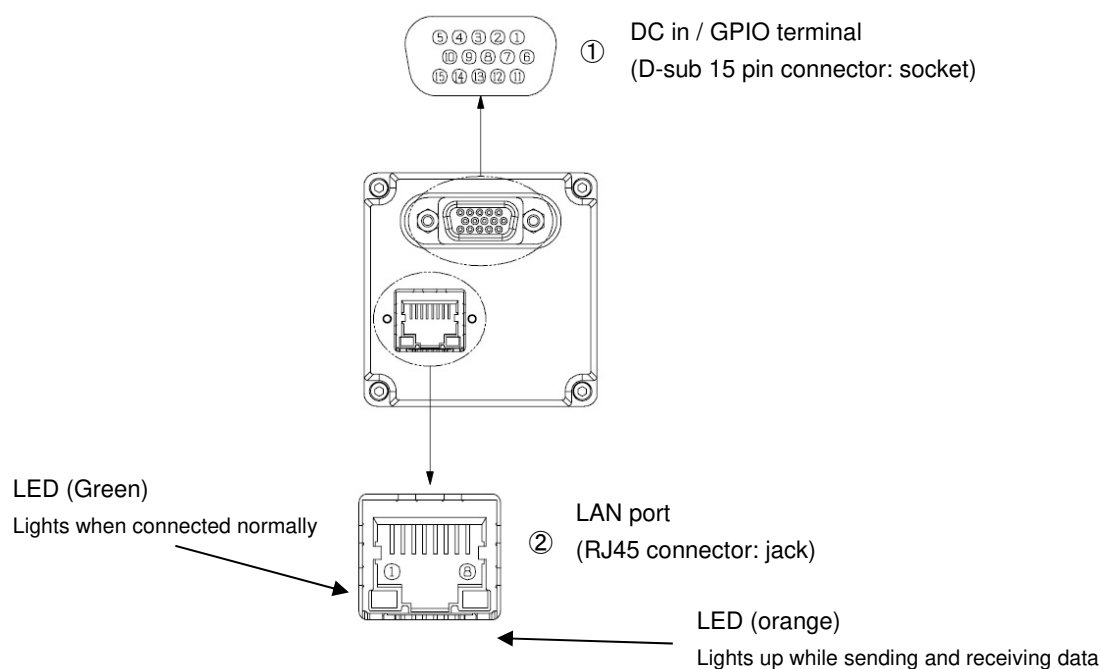
Please note that the resolution of the image output from the camera may differ depending on the performance of the lens. Even with the same lens, the performance of the lens may change depending on the aperture value. If you cannot obtain sufficient resolution, change the aperture value.

② Screw holes for installing tripod(Top, Side, Bottom)

When using a tripod, use this screw hole to attach it.

Use a screw that protrudes from the installation surface by 5 mm maximum (ℓ) and firmly tighten it using a hand driver. Ensure that the protrusion never exceed 5 mm.

3.2. Rear panel



① DC in / GPIO terminal (15 pin connector)

The connector model and pin assignment are shown below.

Connector model

	Model	Maker
Camera side	D02-M15STF-21L9E	JAE

Pin assignment

Pin number	Signals	Pin number	Signals
1	DC+12V-IN、 DC jack	9	GND_GPIO_OUT
2	DC+12V-IN	10	DC+12V-OUT
3	GPIO_IN1	11	GPIO_OUT1
4	GPIO_IN2	12	GPIO_OUT2
5	GPIO_IN3	13	GPIO_OUT3
6	GND_PWR、 DC jack	14	GPIO_OUT4
7	GND_PWR	15	GPOI_OUT5
8	GND_GPIO_IN	—	—

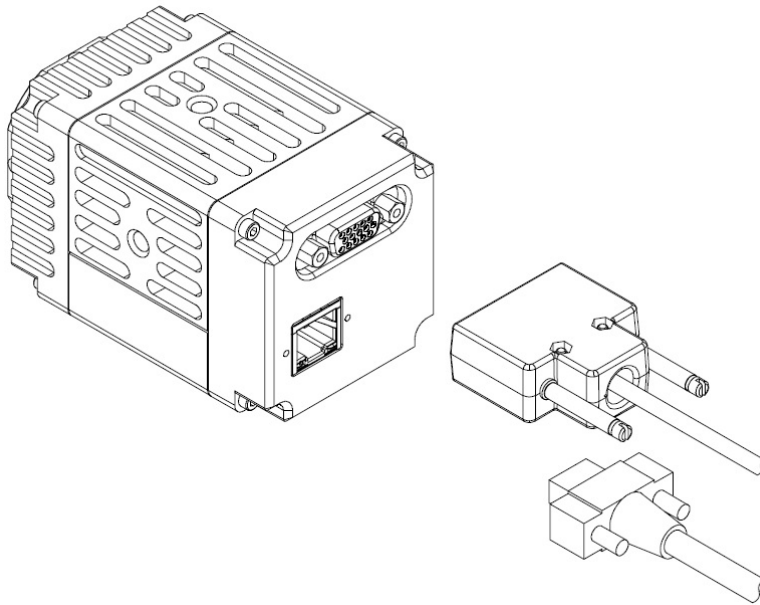
② LAN port

The pin assignments are shown below.

Pin assignment

Pin number	Signals
1	DA+
2	DA-
3	DB+
4	DC+
5	DC-
6	DB-
7	DD+
8	DD-

3.3. Cable connection



Connect the attached camera cable to the DC in / GPIO terminal and the LAN cable to the LAN port.

When connecting a LAN cable with fixing screws, turn the connector fixing screws on the left and right of the connector firmly to fix it. For the other connector of each cable, connect the attached AC adapter to the DC jack of the camera cable, and connect the LAN cable to the network card of the host device.

3.4. FAN

The PXG130SP and PXG030SP have a FAN for cooling inside.

This FAN is always running while it is powered on.

The hole of the middle body of the camera module serves as an air passage for this air cooling, so be careful not to block all the holes.

3.5. GPIO signal specifications

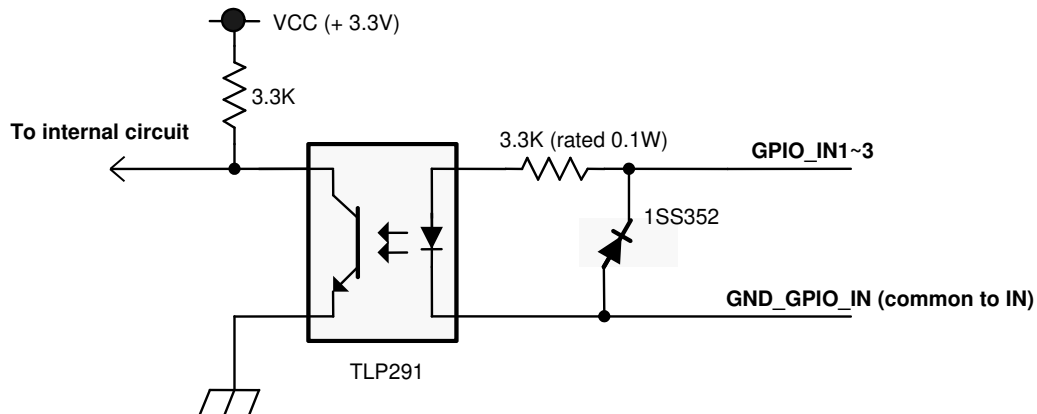
The GPIO signals specifications are shown below.

GPIO IN specification (Trigger in)

The voltage applicable to GPIO_IN should be + 5V to + 12 VDC.

When using with a power supply voltage higher than that, combine an appropriate resistor.

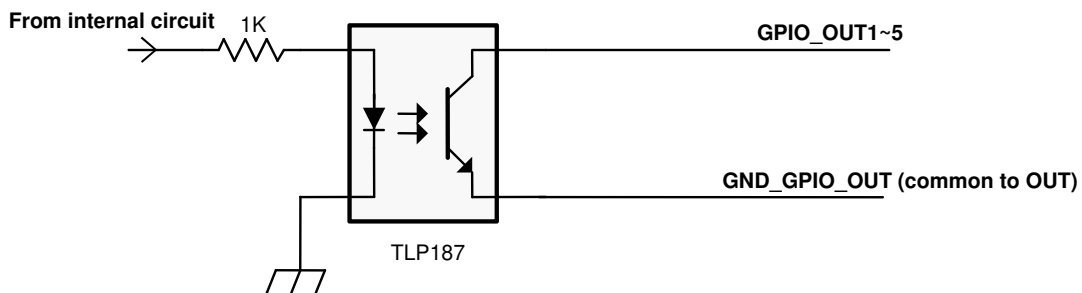
The circuit diagram is as follows.



GPIO OUT specification (ExposureActive or UserOutput)

GPIO_OUT can pass a current of ~25mA to GND_GPIO_OUT at the time of output.

The circuit diagram is as follows.



4. Detail of function

The functions of this camera are shown for each register.

4.1. DeviceControl

The DeviceControl registers are shown below.

DeviceControl register list

Name	Visibility	Access	Values
DeviceVendorName	Beginner	R	Primetech Engineering Corp.
DeviceModelName	Beginner	R	PXG030SP, PXG030S, PXG130SP, PXG130S
DeviceManufacturerInfo	Beginner	R	www.pte.jp
DeviceVersion	Beginner	R	Device version
DeviceID	Beginner	R	Device ID
DeviceFirmwareVersion	Beginner	R	Firmware version
DeviceReset	Guru	R	Device reset

4.2. ROI

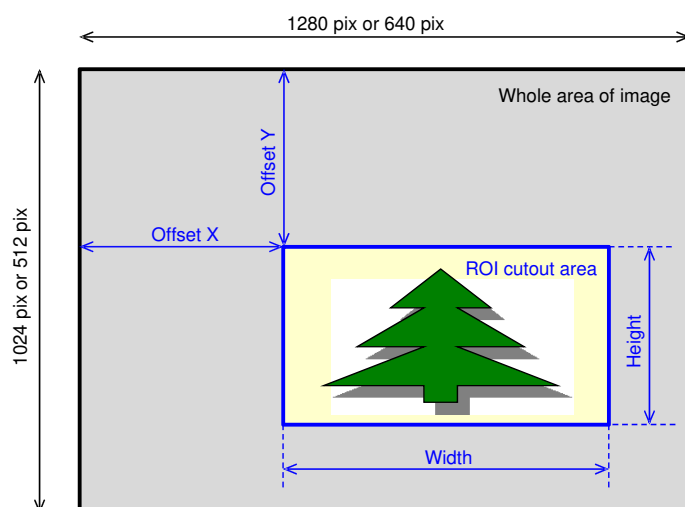
The ROI registers are shown below.

ROI register list

Name	Visibility	Access	Values
Width	Beginner	R/W	Image width 8~1280(PXG130SP, PXG130S)、 Image width 8~640(PXG030SP, PXG030S) 8 pix step
Height	Beginner	R/W	Image height 8~1024(PXG130SP, PXG130S)、 Image height 8~512(PXG030SP, PXG030S) 8 pix step
OffsetX	Beginner	R/W	Horizontal start position, 8 pix step
OffsetY	Beginner	R/W	Vertical start position, 8 pix step

Note) ROI and Decimation cannot be used at the same time.

Width and Height cannot be changed during video output (in Grab).



4.3. Decimation

The Decimation registers are shown below.

Binning register list

Name	Visibility	Access	Values
Decimation Horizontal	Expert	R/W	1:OFF, 2:1/2 decimation horizontal
Decimation Vertical	Expert	R/W	1:OFF, 2:1/2 decimation vertical

Note) ROI and Decimation cannot be used at the same time.

Decimation Horizontal, Decimation Vertical cannot be changed during video output (in Grab).

4.4. Reverse

The Reverse registers are shown below.

Reverse register list

Name	Visibility	Access	Values
ReverseX	Expert	R/W	True: ON False: OFF
ReverseY	Expert	R/W	True: ON False: OFF

4.5. PixelFormat

The PixelFormat register is shown below.

PixelFormat register list

Name	Visibility	Access	Values
PixelFormat	Beginner	R/W	Mono12 Mono10 Mono8

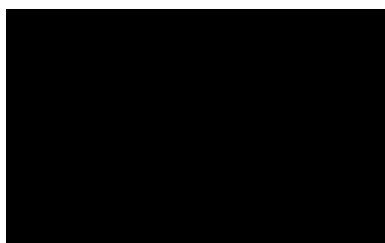
Note) PixelFormat cannot be changed during video output (in Grab).

4.6. TestPattern

The TestPattern registers are shown below.

TestPattern register list

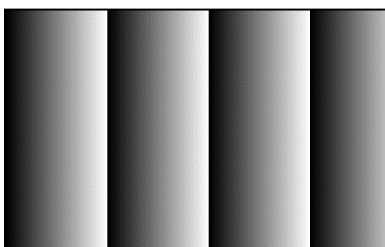
Name	Visibility	Access	Values
TestPatternGeneratorSelector	Beginner	R/W	Region0 (Region0 fixed)
TestPattern	Beginner	R/W	Off Black White GreyHorizontalRamp GreyVerticalRamp



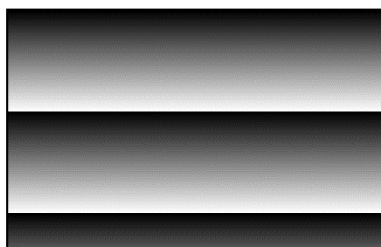
Black



White



GreyHorizontalRamp



GreyVerticalRamp

4.7. AcquisitionControl

The TriggerControl registers are shown below.

AcquisitionControl register list

Name	Visibility	Access	Values
AcquisitionMode	Beginner	R/(W)	MultiFrame Continuous
AcquisitionStart	Beginner	(R)/W	-
AcquisitionStop	Beginner	(R)/W	-
AcquisitionFrameCount	Beginner	R/W	Number of video transfer frame
AcquisitionFrameRate	Beginner	R/W	Video transfer frame rate, 0.1 fps step

The maximum frame rate setting depends on the Pixel Format, Decimation, and number of line (ROI) conditions. The relationship between the number of lines, Decimation and the frame rate is as follows.

PXG130SP, PXG130S (SXGA) frame rate

Number of line	MONO8	MONO10 MONO12
768 ~ 1024	12 ~ 60 fps	12 ~ 30 fps
512 ~ 768	12 ~ 80 fps	12 ~ 40 fps
~ 512	12 ~ 120 fps	12 ~ 60 fps
Decimation XY	12 ~ 240 fps	12 ~ 120 fps

PXG030SP, PXG030S (VGA) frame rate

Number of line	MONO8	MONO10 MONO12
384 ~ 512	12 ~ 240 fps	12 ~ 130 fps
256 ~ 384	12 ~ 300 fps	12 ~ 160 fps
~ 256	12 ~ 420 fps	12 ~ 240 fps
Decimation XY	12 ~ 420 fps	12 ~ 240 fps

4.8. TriggerControl

The TriggerControl registers are shown below.

TriggerControl register list

Name	Visibility	Access	Values
TriggerMode	Beginner	R/W	Off On
TriggerSoftware	Beginner	R/W	Execute
TriggerSource	Beginner	R/W	GPIO_IN1 GPIO_IN2 GPIO_IN3 Software
TriggerActivation	Beginner	R/W	RisingEdge LevelHigh FallingEdge LevelLow
TriggerDelay	Expert	R/W	0 ~ 80000 μ sec, 1 μ sec step

Note) TriggerMode cannot be changed during video output (in Grab).

Trigger mode is used to control the exposure timing with an external trigger.

External triggers are enabled when TriggerMode on and TriggerSource is GPIO_IN*.

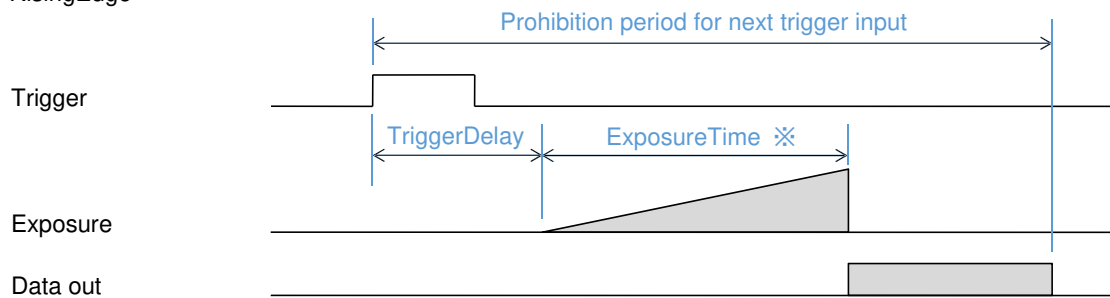
TriggerMode Off is the normal mode. It works with the camera's internal synchronization at the set frame rate and exposure time.

In normal mode, exposure and data transfer are processed at the same time.

However, in trigger mode, exposure and data transfer cannot be processed at the same time, and data transfer is processed after the exposure period.

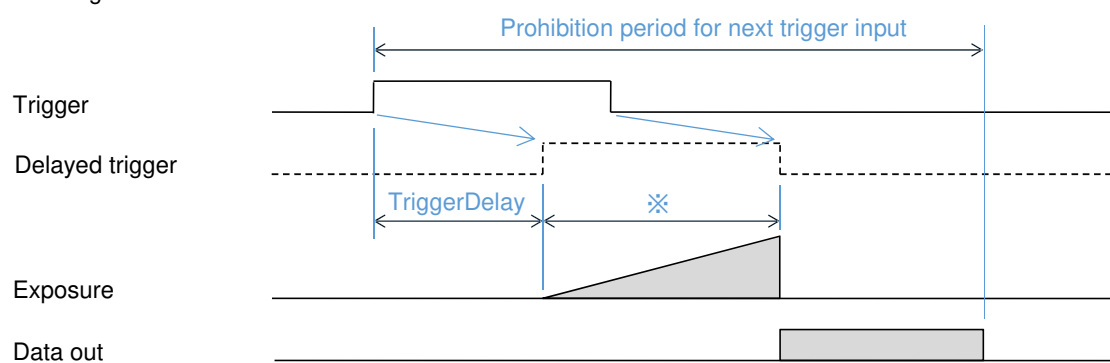
If the next trigger is entered during the exposure period or data transfer, that trigger will be ignored. At this time, the trigger frequency and the video frame rate will not match.

① RisingEdge



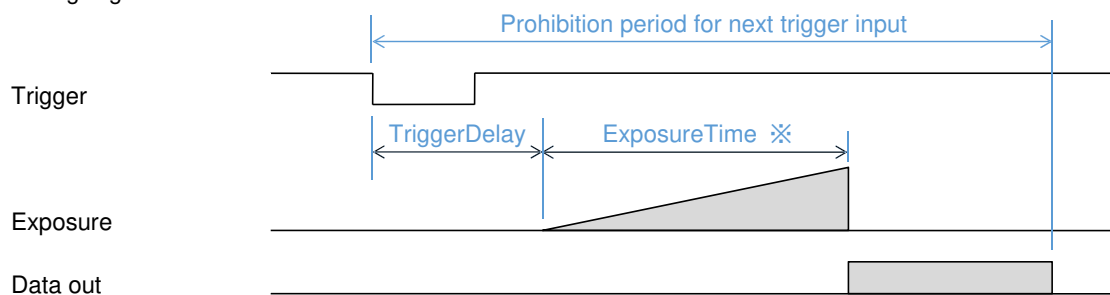
※The exposure time is the value set by ExposureTime register.

② LevelHigh



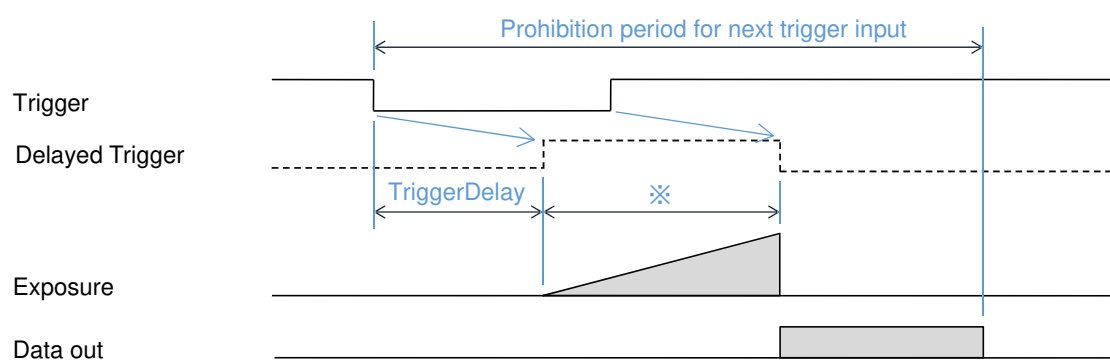
※The exposure time is the pulse width of the trigger.

③ FallingEdge



※The exposure time is the value set by ExposureTime register.

④ LevelLow



※The exposure time is the pulse width of the trigger.

4.9. ExposureControl

The ExposureControl register is shown below.

ExposureControl register list

Name	Visibility	Access	Values
ExposureTime	Beginner	R/W	15~80000 μ sec

The Exposure Time in the internal synchronization mode (when the Trigger Mode is OFF) is set as a discrete value for each horizontal period inside the CMOS sensor. Therefore, the value entered in this register is automatically rounded to a settable value.

The maximum and minimum depend on other settings and are as follows.

Minimum of ExposureTime = 1 horizontal period + α (several μ sec)

Maximum of ExposureTime = 1 period of the frame rate – 15 horizontal period + α (several μ sec)

The horizontal period depends on the number of pixels of the Image Sensor (SXGA / VGA), PixelFormat setting, and Decimation setting.

1 horizontal period = 7~22 μ sec

The longer the exposure time, the more white spots on the screen tend to be.

Therefore, PXG130S / PXG030S is recommend up to 40000 μ sec (frame rate is about 25fps).

For PXG130SP / PXG030SP, when the sensor is cooled, the picture is clear even if around 80000 μ sec (frame rate is about 12fps).

When TriggerMode on and LevelHigh / LevelLow mode, the ExposureTime register displays the exposure time by the external trigger.

In LevelHigh / LevelLow mode, writing to the ExposureTime register is invalid.

In TriggerMode on and RisingEdge / FallingEdge mode, the exposure time can be set with the ExposureTime register.

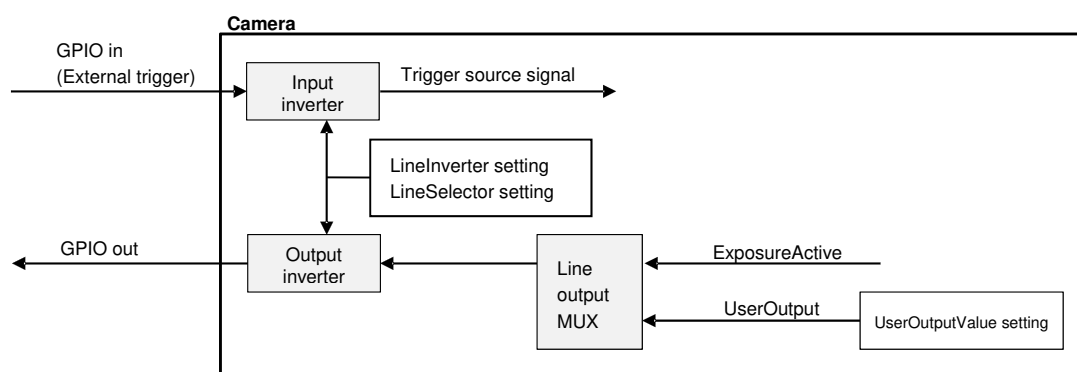
The settable range of exposure time in RisingEdge / FallingEdge mode is 30 ~ 80000 μ sec.

4.10. DigitalIOControl

The DigitalIOControl registers are shown below.

DigitalIOControl register list

Name	Visibility	Access	Values
LineSelector	Expert	R/W	Line1 (GPIO_IN1) Line2 (GPIO_IN2) Line3 (GPIO_IN3) Line4 (GPIO_OUT1) Line5 (GPIO_OUT2) Line6 (GPIO_OUT3) Line7 (GPIO_OUT4) Line8 (GPIO_OUT5)
LineInverter	Expert	R/W	False True
LineStatus	Expert	R	False True
LineSource	Expert	R/W	Off ExposureActive UserOutput1 UserOutput2 UserOutput3 UserOutput4 UserOutput5
UserOutputSelector	Expert	R/W	UserOutput1 UserOutput2 UserOutput3 UserOutput4 UserOutput5
UserOutputValue	Expert	R/W	False True



Digital IO Control processing system diagram

4.11. Gain

The Gain registers are shown below.

Gain register list

Name	Visibility	Access	Values
GainSelector	Beginner	R	ALL
Gain	Beginner	R/W	0.0~42.0dB

The CMOS sensor operates with analog gain up to 18.0 dB. 18.1dB to 42dB is a combination of analog gain and digital gain. When increasing gain, the number of white spots tends to be increased on the screen.

Therefore, PXG130SP / PXG030SP is recommend up to 20dB and PXG130S / PXG030S is up to 10dB

4.12. BlackLevel

The BlackLevel registers are shown below.

BlackLevel register list

Name	Visibility	Access	Values
BlackLevelSelector	Beginner	R	ALL
BlackLevel	Beginner	R/W	Mono12: 0~4095 Mono10: 0~1023 Mono8: 0~255

The recommended Black Level settings are 240 for Mono12, 60 for Mono10, and 15 for Mono8.

When the PixelFormat setting is changed, the BlackLevel setting value is automatically converted to the value corresponding to the changed mode.

4.13. UserSetControl

The UserSetControl registers are shown below.

UserSetControl register list

Name	Visibility	Access	Values
UserSetSelector	Beginner	R/W	Default UserSet1~15
UserSetLoad	Beginner	W	Execute
UserSetSave	Beginner	W	Execute
UserSetDefault	Beginner	R/W	Default UserSet1~15

4.14. Gamma

The Gamma register is shown below.

Gamma register list

Name	Visibility	Access	Values
Gamma	Beginner	R/W	Gamma 1.0 User Defined

Note) The factory default value of "User Defined" gamma is $\gamma=0.45$.

You can rewrite the gamma table via the viewer software.

4.15. CrossLine

The CrossLine register is shown below.

CrossLine register list

Name	Visibility	Access	Values
CrossLine	Beginner	R/W	Off On

4.16. Binalize

The Binalize registers are shown below.

Binalize register list

Name	Visibility	Access	Values
BinarizeEnable	Beginner	R/W	Off On
BinarizeValue	Beginner	R/W	Mono12: 0~4095 Mono10: 0~1023 Mono8: 0~255

4.17. Aperture (Edge enhancement)

The Aperture register is shown below.

Aperture register list

Name	Visibility	Access	Values
Aperture (Edge enhancement)	Beginner	R/W	OFF Weak Medium Strong

4.18. Black/White Inversion

The Black/White Inversion register is shown below.

Black/White Inversion register list

Name	Visibility	Access	Values
Black/White Inversion	Beginner	R/W	OFF ON

4.19. Sensor Temperature Control

The Sensor Temperature Control registers are shown below.

Since the PXG130S and PXG030S do not have a Perche element, the only item that can be used in the Sensor Temperature Control register is the Sensor Temperature.

Sensor Temperature Control register list

Name	Visibility	Access	Values
Control Mode	Beginner	R/W	OFF PID Control
Sensor Temperature	Beginner	R	Sensor Temperature [°C]
Target Temperature	Beginner	R/W	Target temperature for temperature control [°C]

The recommended set temperature for the Sensor is 15 ° C.

The Sensor temperature can be controlled to 15 ° C when the camera's ambient temperature is 35 ° C or less. If the ambient temperature is higher than 35 ° C, the Sensor temperature cannot be guaranteed controlled to 15 ° C.

But even in that case, by setting the control mode to PID Control, the sensor temperature is kept lower than the ambient temperature.

This camera is designed that the sensor cannot be heated by the Peltier element, so if the ambient temperature is low, the sensor temperature cannot rise beyond the natural rise of internal temperature of the sensor and the camera.

4.20. AE&AGC Control

The AE&AGC Control registers are shown below.

AE&AGC Control register list

Name	Visibility	Access	Values
Control Mode	Beginner	R/W	OFF Auto Gain Auto Gain, Exposure Auto Gain, Exposure, FR
Control Speed	Beginner	R/W	Fast Medium Slow
Current Brightness	Beginner	R	0~4095
Target Brightness	Beginner	R/W	0~4095
Auto Gain Max	Beginner	R/W	0~42dB
Auto Frame Rate Min	Beginner	R/W	12~(Frame rate max)
Auto Frame Rate Max	Beginner	R/W	12~(Frame rate max)
Area X Left Edge	Beginner	R/W	0~(Sensor width)
Area X Right Edge	Beginner	R/W	0~(Sensor width)
Area Y Upper Edge	Beginner	R/W	0~(Sensor height)
Area Y Bottom Edge	Beginner	R/W	0~(Sensor height)

5. Camera connection / image confirmation method

5.1. Outline

Use the viewer software "Sphinx GEV Viewer" to connect the camera and check the image.

5.2. Recommended PC specs

The recommended PC specifications are shown below.

OS	: Windows10 64bit or 32bit
Recommended PC specs	: Core2 2GHz or more
	: DDR3 2GB or more
	: Ethernet 1000BASE-T[required]

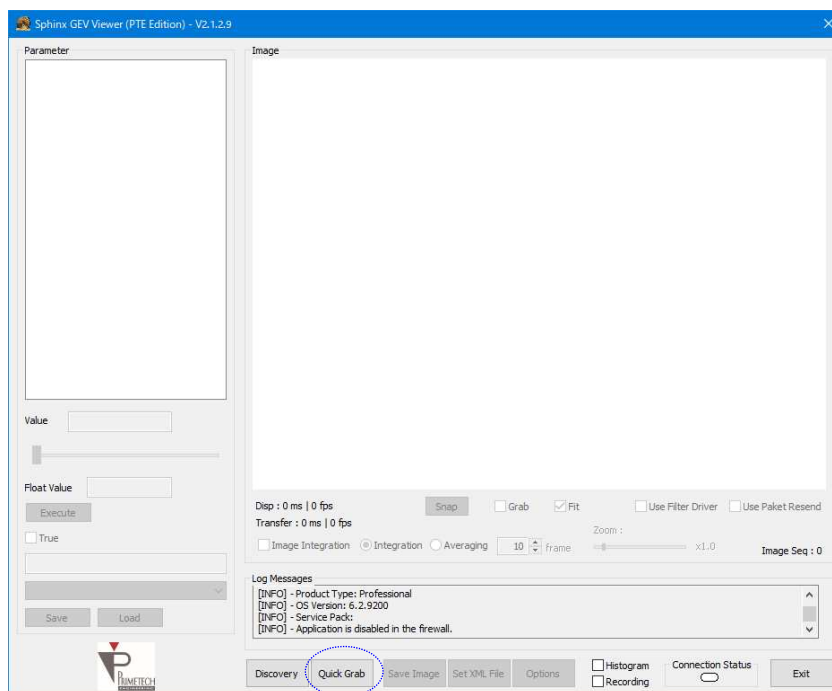
5.3. Camera connection

1. Connect the network port on the computer side and the camera network port.
2. Start the computer and turn on the camera.
3. Copy the "SphinxGEVViewerPTE_V *** _ ** _ *****" folder in the attached CD to your computer's local drive.
4. Launch Sphinx GEV Viewer

SphinxGEVViewer_x64.exe file is in the "SphinxGEVViewerPTE_V *** _ ** _ *****" → "Win64_x64" folder. When starting for the first time, Right-click the SphinxGEVViewer_x64.exe file and click "Run as administrator".



From the second time onward, you can start it by simply running SphinxGEVViewer_x64.exe.



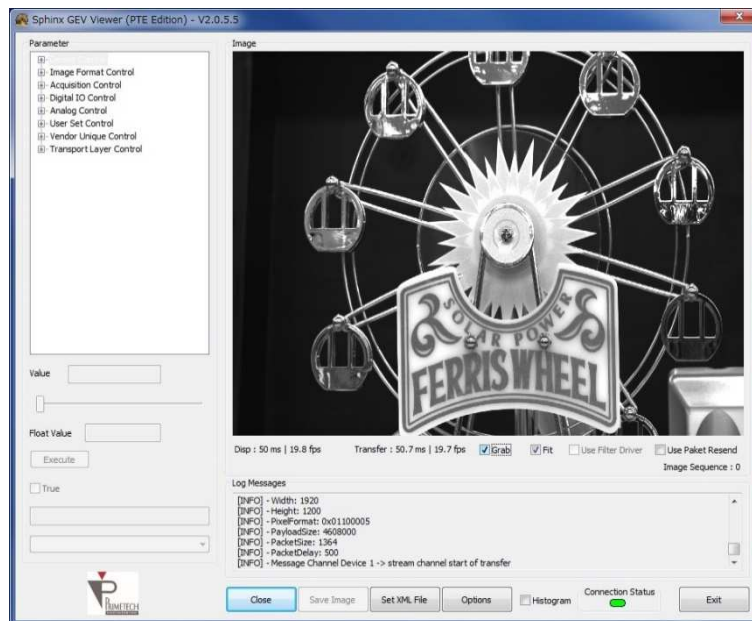
Screen when the application starts

5. With the green LED on the LAN connector lit, press the "Quick Grab" button. The camera will be in the Open / Grab state and the image will be displayed.

There are the following two frame rates displayed.

Disp: Drawing frame rate on PC (varies depending on PC specifications)

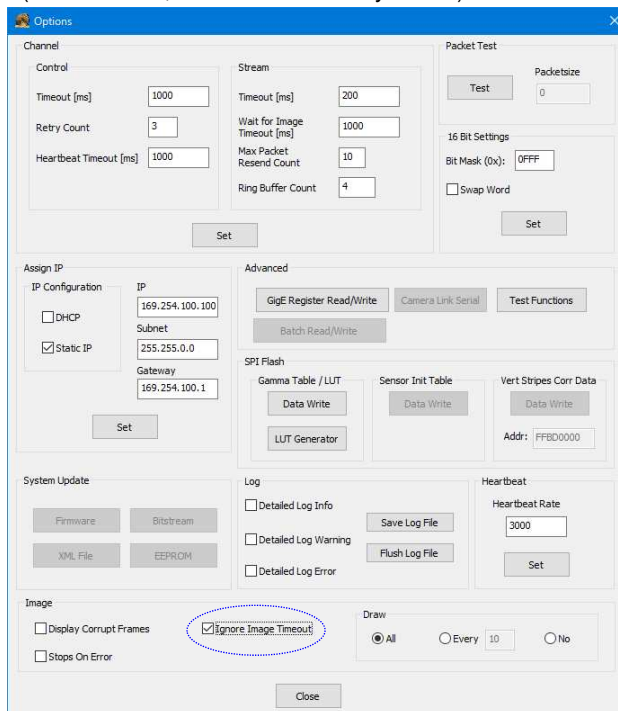
Transfer: Frame rate of data received from Ethernet (frame rate as a camera)



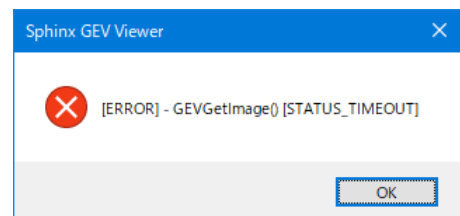
Video output

6. To change each function / setting, select each item in the left Parameter and change it.

Ext1. When the trigger mode is on, click the “Options” button and check the “Ignore Image Timeout”.
(If unchecked, a timeout error may occur.)



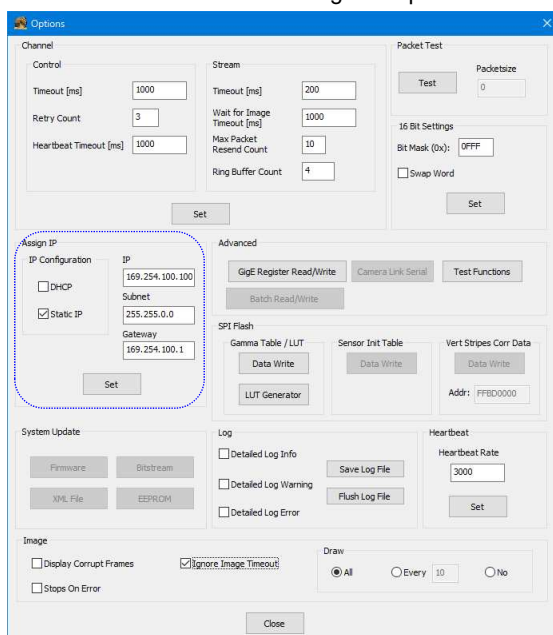
Options



Error Message

Ext2. Depending on the environment, it may take time to assign an IP address and search for a camera.
It may be shortened by fixing the IP setting of the camera / network card.

Camera side IP address setting example

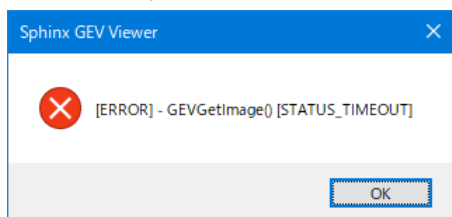


After entering the set value, please press the Set button.

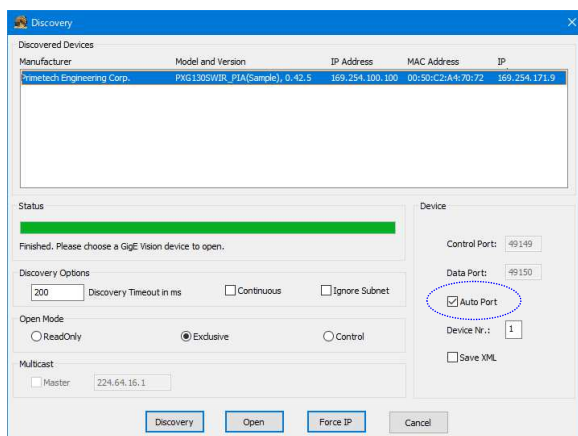
Press the Close button to disconnect from the camera and then turn the camera power on again.

The camera IP address is set to 169.254.100.100 at the shipment.

Ext3. Depending on the environment, the image may not be displayed and the following timeout error may occur.
Follow the procedure below.



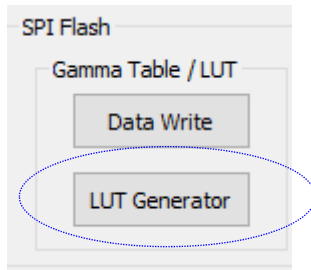
Press the Close button, press the Discovery button again, uncheck "Auto Port", and click the Open button.



6. Other

6.1. How to create gamma table

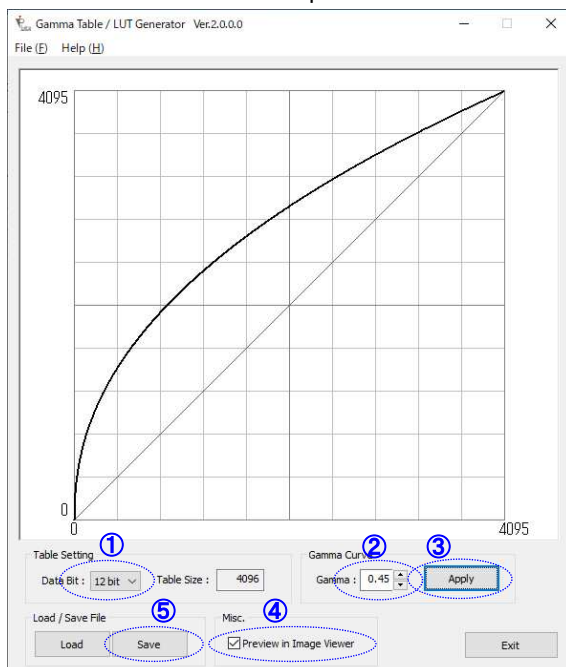
1. Click Options in the Sphinx GEV Viewer.
2. Click LUT Generator for Gamma Table / LUT in Options.



3. The Gamma Table / LUT Generator will start. Create an arbitrary γ table file.

4. Creating a γ table file

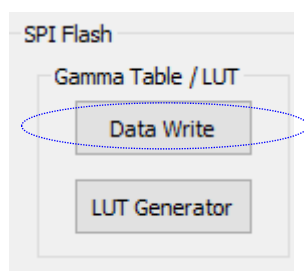
- ① **Data Bit** : select 12bit
(Set to the maximum data bit width. In the case of this camera, it is 12bit, so select 12bit.)
Select 12bit even when the Pixel Format setting value is Mono8 or Mono10.
- ② **Gamma** : Enter arbitrary γ value.(example: 0.45)
- ③ **Apply** : Click to reflect the set γ value in the graph.
- ④ **Preview in Image Viewer** : The set γ curve is reflected in the image on the Viewer.
However, the γ table have not been saved yet.
- ⑤ **Save** : Click to save the set γ curve as table in .txt format file.



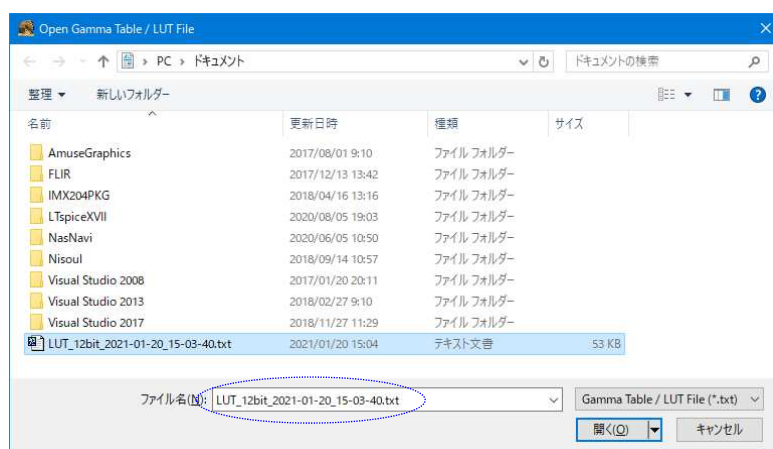
6.2. How to load Gamma Table

Load the created γ table file into the camera.

1. Click Data Write in Gamma Table / LUT in Option.

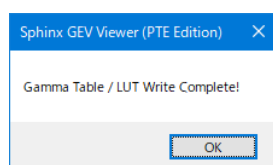


2. Open Gamma Table / LUT File opens and selects the table file to load.



3. Load the table file and rewrite the gamma table inside the camera.

When the rewrite end message arrives, the rewrite is complete.



4. Finally, turn the power inside the camera off and then on again.

Note) The changed gamma table will not be reflected in the camera unless the power is turned on again after the rewriting is completed.

6.3. Packet Delay Settings

The Ethernet bandwidth can be limited by setting the Packet Delay.

With this setting, the failure of image capture can be minimized.

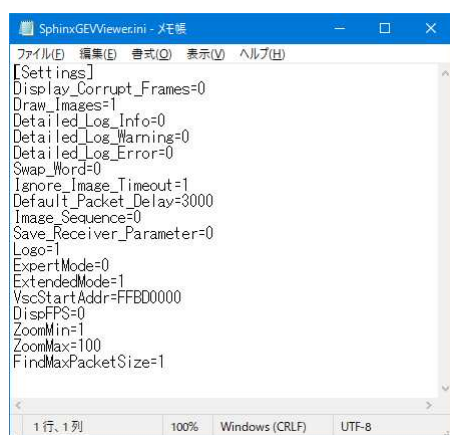
Please adjust according to the PC specs.

Note) By limiting the bandwidth, the capture failure can be reduced, but on the other hand, the maximum frame rate will drop, so please be careful.

1. How to change the initial value of Packet Delay

Open "SphinxGEVViewer.ini" in the same folder as SphinxGEVViewer.exe with a text editor.

2. Change the setting value of Default_Packet_Delay = XXX. The initial value of Packet Delay when the power is turned on again is changed. Default_Packet_Delay = 3000 at the time of installation.



Default_Packet_Delay is a setting that adjusts the packet-to-packet interval.

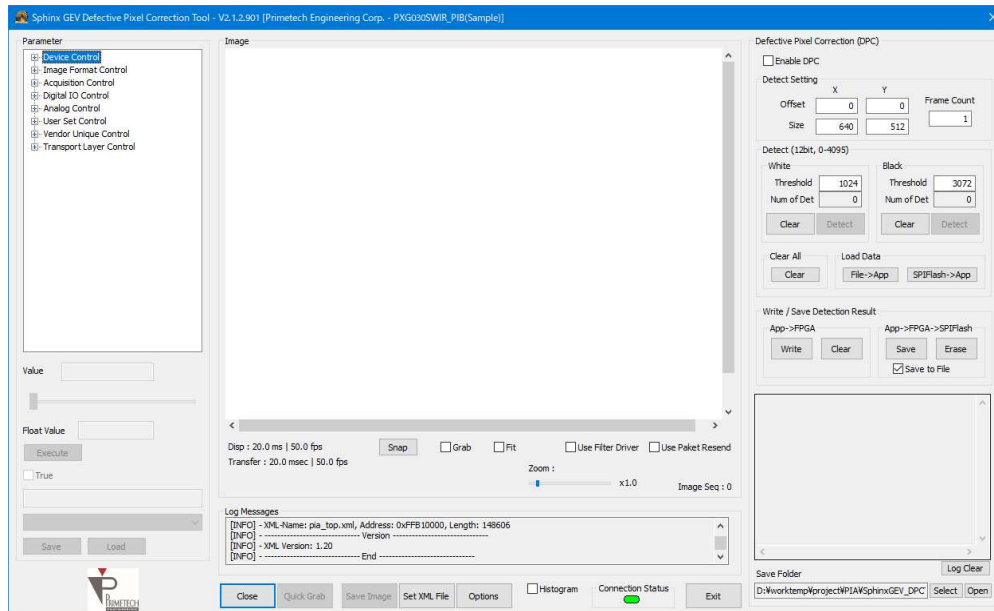
The higher the value, the lower the bandwidth limit.

6.4. Defect pixel correction setting

Use the dedicated software SphinxGEV_DPCTool to add / reduce defective pixels.

Execute SphinxGEV_DPCTool_x64.exe in the "SphinxGEVViewerPTE_V *** _** _*****"-> "Win64_x64" folder copied from the attached CD. At the first startup, right-click and select "Run as administrator" to start.

1. Screen when the application starts



2. Correction setting item

- ① **Enable DPC:** Check to enable the correction function.
- ② **Detect Setting**
 - Offset:** Sets the X / Y position of start detecting defective pixels.
 - Size:** Set the width / height of detecting defective pixels.
 - FrameCount:** Sets the number of images used to detect defective pixels.
- ③ **Detect**
 - White**
 - Theshold:** Set the detection threshold of white spots.
 - Detect:** Detect the pixels over the threshold as white defects.
 - Clear:** Clear the detected white defects date.
 - Black**
 - Theshold:** Set the detection threshold of black spots.
 - Detect:** Detect the pixels under the threshold as black defects.
 - Clear:** Clear the detected black defects date.
 - Clear All:** Clear the detected white & black defects date.
 - Load Data:** Press the "File-> App" button to load the detected data file.
Press the SPI Flash-> App button to read the detection data from the in-camera ROM.
- ④ **Log Clear:** Clear the displayed log.
- ⑤ **Save Folder**
 - Select:** Select the folder where to save the file.
 - Open:** Open the selected folder.

3. Correction procedure

- ① Connect the camera and put it in the image shooting state (check Grab).
- ② Uncheck "Enable DPC" to disable the correction.
- ③ Adjust the camera gain.
- ④ Set each item of Detect Setting, White / Black Threshold.
- ⑤ To create correction data for only white points or black points, press the SPI Flash-> App button of Load Data and read the current correction data.
- ⑥ When detecting white spots, make the entire image light-shielded.
- ⑦ Press the White Detect button to detect white spots.
- ⑧ The number of white spots detected is displayed in White Num of Det.
- ⑨ When detecting black spots, set the entire image to a brightness level of about 80%.
- ⑩ Press the Black Detect button to detect black spots.
- ⑪ The number of sunspots detected is displayed in Black Num of Det.
- ⑫ App-> FPGA White button sets the correction data to the FPGA in the camera.
To save the correction data in the camera, press the App-> FPGA-> SPI Flash Save button.

4. Note

Since the processing of the PC is heavy with the pixel defect correction software SphinxGEV_DPCTool, the image may be distorted or the display frame rate may be slowed down depending on the PC.
Please use Sphinx GEV Viewer for normal image confirmation.

6.5. PC settings

1. Firewall

Set the access permission to the Viewer app to the firewall.

If the permissions is not set, the camera can be detected by Discovery, but no image is displayed.

2. Jumbo Packet

This camera is set to communicate with a jumbo packet (jumbo frame) size of 8192 bytes.

Please use a network card that supports jumbo packets (jumbo frame support).

If the network card does not support communication with 8192 bytes of jumbo packets, sufficient communication performance may not be exhibited and the received frame rate may be lower than the set frame rate.

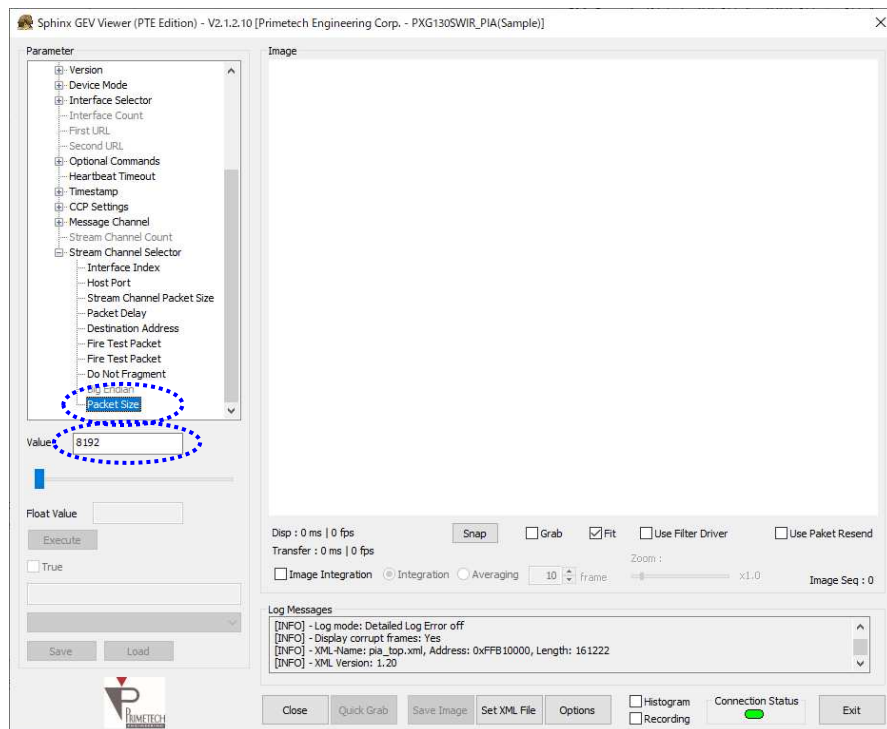
Jumbo packets for PC can be set in "Network Adapter" of Device Manager.

Select Jumbo Packet and set its value to a value greater than or equal to 8192 (9014 bytes or 9k).

If there is no jumbo packet setting item, by downloading and installing the driver for the network adapter from the manufacturer's website, the jumbo packet function may be available.

- How to check the communication packet size on Sphinx GEV Viewer

Launch Sphinx GEV Viewer and select "Transport Layer Control"-> "Stream Channel Selector"-> "Packet Size" in the "Parameter" field. Value is the packet size.



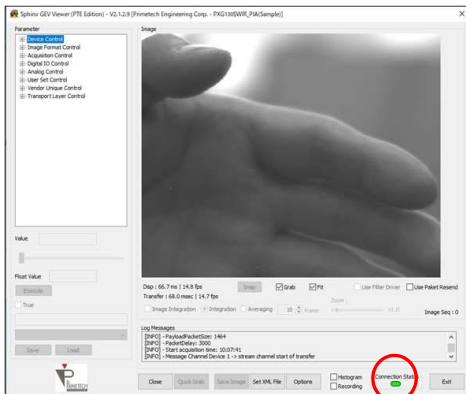
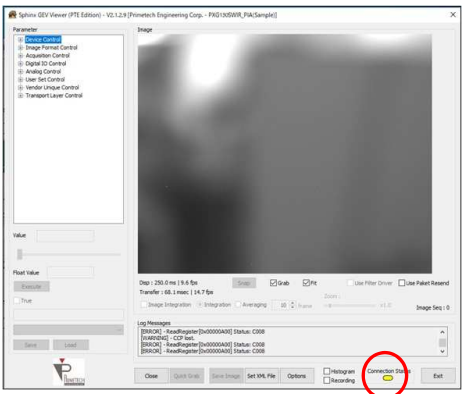
If this Value is 8192, communication is possible with a sufficient packet size. If this Value is less than 8192 (such as 1500), review the jumbo packet settings.

6.6. If you thought it was a malfunction (abnormal phenomenon check sheet)

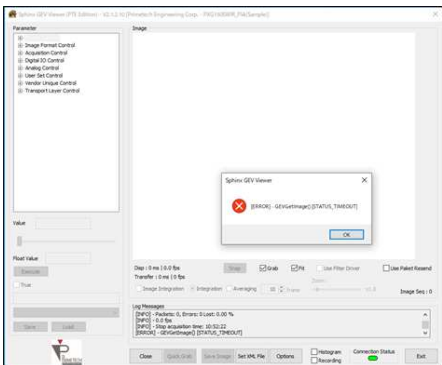
• Camera status

Rear panel	LAN connector	Reference Chapter
 ○ : LAN connector	The LAN communication status can be checked with the LED. When connected normally, the green LED lights up. When communication is normal, the orange LED flashes at high speed. 	None

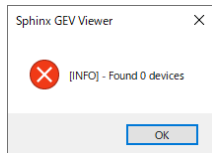
• Viewer app status

Communication is normal	Communication error	Reference chapter
 The image is displayed and the Connection Status stays lit green.	 The image disappears, the Connection Status lights up in yellow, and then the lights go out.	None

• Camera and Viewer app status

Communication error	Reference chapter
 If the STATUS TIMEOUT error cannot be cleared by software, restart the camera body.	None

- An error window appears

Example	Cause	Countermeasures	Reference chapter
	Access to the software is blocked by the firewall.	Change firewall settings.	6
	Without connecting the camera body and LAN cable, the "Quick Grab" button was pressed.	Connect the LAN cable. If the camera is not recognized, restart the camera power.	5

- Image does not appear

Cause	Countermeasures	Check	Reference chapter
The cable is not connected properly.	Reconnect the power cable and LAN cable.	When the LAN cable is connected normally, the green LED on the back of the camera lights up. The orange LED on the back of the camera flashes at high speed during communication.	5
Cable break	Replace the broken cable		5
Not transferring the necessary commands to the camera side.	Check the command.		5

- The image is blurry

Cause	Countermeasures	Check	Reference chapter
Out of focus.	Adjust focus.		None
No optical lens attached.	Attach the lens.		None

- The whole image is black

Cause	Countermeasures	Check	Reference chapter
With the lens mount cap attached.	Remove the cap.		None
Lens aperture is too narrow.	Adjust the lens aperture.		
Exposure time is too short.	Adjust the exposure.		4

- The whole image is white

Cause	Countermeasures	Check	Reference chapter
Lens aperture is too wide.	Adjust the lens aperture.		None
Gain is too high.	Adjust the gain.		4

7. Specification

7.1. Image

Image Sensor	PXG130SP	: SONY IMX990-AABA-C (With thermoelectric cooling element)
	PXG130S	: SONY IMX990-AABJ-C (No thermoelectric cooling element)
	PXG030SP	: SONY IMX991-AABA-C (With thermoelectric cooling element)
	PXG030S	: SONY IMX991-AABJ-C (No thermoelectric cooling element)
effective pixels	PXG130S(P)	: 1280 (H) × 1024 (V)
	PXG030S(P)	: 640 (H) × 512 (V)
Scan	Progressive scan	
Sensor size	1/2 inch (IMX990), 1/4 inch (IMX991)	
Color type	Monochrome	
Shutter	Global shutter	
S/N rate	40.0dB	
Pixel size	5 μm (H) × 5 μm (V)	

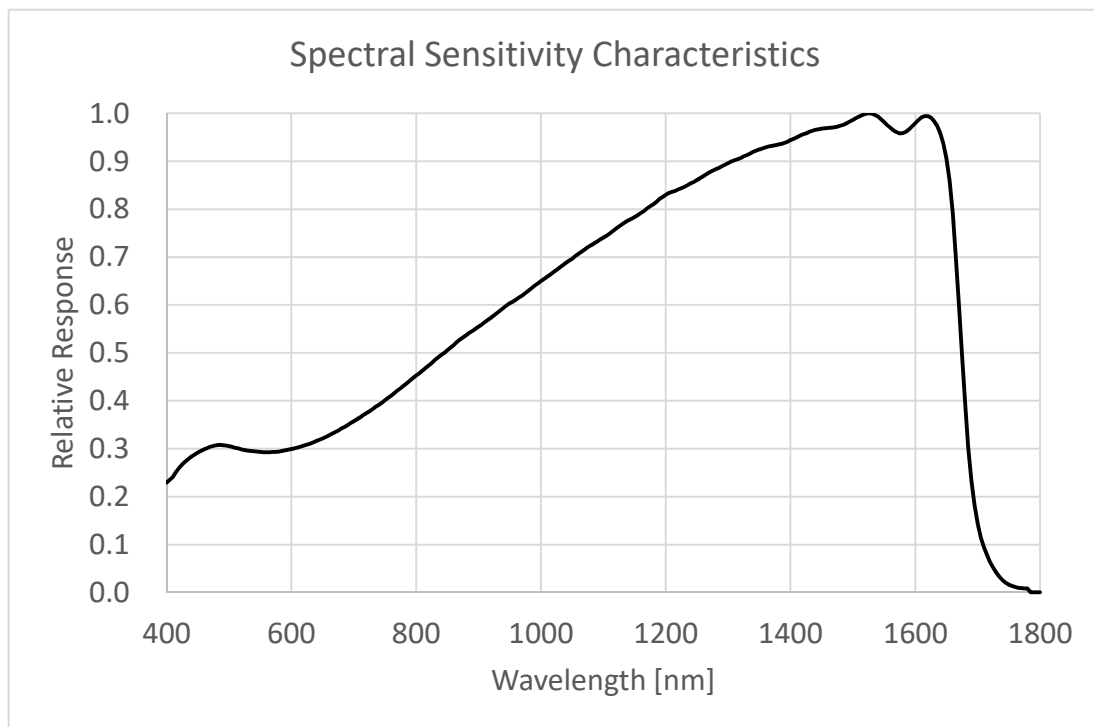
7.2. Optical, etc.

Lens mount	C mount	
Flange back	17.526±0.05 mm	
Synchronous	Internal synchronization, External trigger	
Video output bit length	MONO8 / MONO10 / MONO12	
Interface	1000BASE-T	
Protocol	GigE Vision	
Frame rate	MONO8	: max 60fps (PXG130S(P)), max 240fps (PXG030S(P))
	MONO10/MONO12	: max 30fps (PXG130S(P)), max 130fps (PXG030S(P))
Gain	0~42.0dB	
Gamma correction	Off (γ=1.0) / Variable	
Readout mode	Normal mode / Decimation mode / ROI mode	
Exposure time	30 μsec~ (PXG130S(P)), 22 μsec~ (PXG030S(P))	
Power-supply voltage	DC +12V±1V	
Power consumption	5.6W (PXG130SP/PXG030SP, Ambient temp 25°C, Sensor temp 15°C)	
	4.1W (PXG130S/PXG030S)	
Operating temperature	0~35°C (PXG130SP/PXG030SP, Recommended ambient temperature)	
	0~25°C (PXG130S/PXG030S, Recommended ambient temperature)	
Operating humidity	20~80% (No condensation)	
Storage humidity	20~80% (No condensation)	
Vibration resistance	TBD	
Impact resistance	TBD	
External dimensions	Width 40 mm x Height 40 mm x Depth 43 mm (excluding connector)	
Mass	Approx. 410 g	
MTBF	TBD	
Standard	VCCI compliant	
	RoHS compliant	
Accessories	Lens mount cap (1), Camera cable (1), AC adapter (1), Spare Connector (1), CD-ROM (1)	

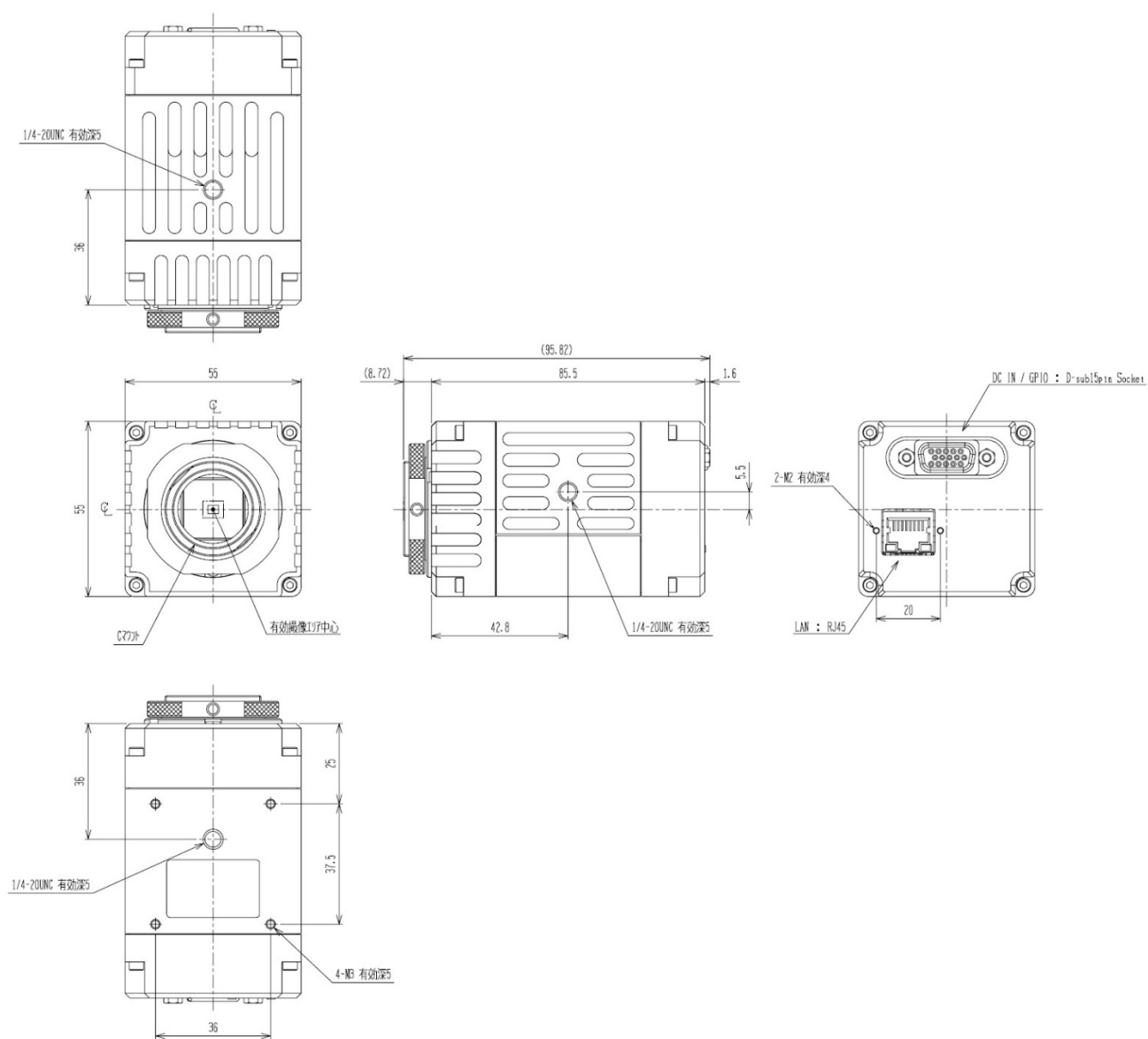
* Please note that the specifications and appearance are subject to change without notice for improvement.

7.3. Spectral sensitivity characteristics

(Lens characteristics and light source characteristics are excluded.)



8. External dimensions



单位 mm

9. Quality Assurance

9.1. Quality Assurance Period

The free warranty period is one year after delivery. The product will be repaired free of charge only if it breaks down within the warranty period under normal usage conditions. Even within the warranty period, repairs will be charged in the following cases.

- Malfunction due to misuse or improper modification, adjustment or repair.
- Failure due to dropping, flooding, etc. after purchase.
- Failure due to fire, earthquake, flood, lightning strike, other natural disasters, abnormal voltage, etc.

9.2. Warranty coverage

We guarantee the video camera module and the included items.

9.3. Repair procedure

The products to be repaired will only be accepted by sending. It does not support on-site repairs.

9.4. Repairs after the free warranty period has expired

If a failure occurs after the free warranty period has expired, it will be repaired for a fee.

9.5. Other

In addition, in the event of an unexpected failure or accident, we will respond after separate consultation.

The content of this manual is subject to change without notice.

Technical materials and data in this manual are only for reference of actual use. Nothing contained herein shall be construed as granting the rights to practice or use the intellectual properties of our company or any other third party.

Thus we assume no responsibility whatsoever for any violation resulting from such use.

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