User Manual

GO-5100M-PGE-1   GO-5100C-PGE-1

GO-5101M-PGE-1   GO-5101C-PGE-1

CMOS Digital Progressive Scan
Monochrome and Color Camera with GigE Interface

Document Version: 1.1
Date: 2023/10/17

Thank you for purchasing this product.

⚠️Be sure to read this documentation before use.

This documentation includes important safety precautions and instructions on how to operate the unit. Be sure to read this documentation to ensure proper operation.

 The contents of this documentation are subject to change without notice for the purpose of improvement.

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About Technical Note

Technical Notes

Some additional technical information is provided on the JAI website as Technical Notes. In this manual, if a technical note is available for a particular topic, the above icon is shown. Please refer to the following URL for Technical notes.

https://www.jai.com/support-software/technical-notes

Notice/Warranty

Notice

The material contained in this manual consists of information that is proprietary to JAI Ltd., Japan, and may only be used by the purchasers of the product. JAI Ltd., Japan makes no warranty for the use of its product and assumes no responsibility for any errors which may appear or for damages resulting from the use of the information contained herein. JAI Ltd., Japan reserves the right to make changes without notice.

Company and product names mentioned in this manual are trademarks or registered trademarks of their respective owners.

Warranty

For information about the warranty, please contact your factory representative.

Certifications

CE Compliance

As defined by the Directive 2014/30/EU of the European Parliament and of the Council, EMC (Electromagnetic compatibility), JAI Ltd., Japan declares that GO-5100M-PGE-1, GO-5100C-PGE-1, GO-5101M-PGE-1, and GO-5101C-PGE-1 comply with the following provisions applying to their standards.

EN55032:2015/A11:2020 Class A

EN55035:2017/A11:2020

FCC

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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Warning

Changes or modifications to this unit not expressly approved by the party responsible for FCC compliance could void the user's authority to operate the equipment.

KC

<table>
<tr>
<td>
상　　호: JAI Ltd.,Japan
기자재명칭: Industrial camera
모　델　명: GO-5100M-PGE-1
제조자 및 제조국가: JAI Ltd.,Japan / JAPAN
R-R-JAi-GO-2400M-PGE-1
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기자재명칭: Industrial camera
모　델　명: GO-5100C-PGE-1
제조자 및 제조국가: JAI Ltd.,Japan / JAPAN
R-R-JAi-GO-2400M-PGE-1
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기자재명칭: Industrial camera
모　델　명: GO-5101M-PGE-1
제조자 및 제조국가: JAI Ltd.,Japan / JAPAN
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상　　호: JAI Ltd.,Japan
기자재명칭: Industrial camera
모　델　명: GO-5101C-PGE-1
제조자 및 제조국가: JAI Ltd.,Japan / JAPAN
R-R-JAi-GO-2400M-PGE-1
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제조년월은 제품상자의 라벨을 참조하십시오.

China RoHS

The following statement is related to the regulation on "Measures for the Administration of the Control of Pollution by Electronic Information Products ", known as "China RoHS". The table shows contained Hazardous Substances in this camera.

⑮ mark shows that the environment-friendly use period of contained Hazardous Substances is 15 years.

重 要 注 意 事 项

有毒有害物质或元素名称及含量表

根据中华人民共和国信息产业部『电器电子产品有害物质限制使用管理办法』， 本产品《有毒有害物质或元素名称及含量表》如下．

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
GO-5100M-PGE-1 GO-5100C-PGE-1 GO-5101M-PGE-1 GO-5101C-PGE-1	×	○	○	○	○	○
○:表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572-2011规定的限量要求以下。						
×:表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572-2011规定的限量要求。						

环保使用期限

电子信息产品中含有的有毒有害物质或元素在正常使用的条件下不会发生外 泄或突变、电子信息产品用户使用该电子信息产品不会对环境造成严重污染 或对其人身、财产造成严重损害的期限。

数字「15」为期限15年。

Usage Precautions

Notes on Cable Configurations

The presence of lighting equipment and television receivers nearby may result in video noise. In such cases, change the cable configurations or placement.

Notes on LAN Cable Connection

Secure the locking screws on the connector manually, and do not use a driver. Do not secure the screws too tightly. Doing so may wear down the screw threads on the camera. (Tightening torque: 0.147 Nm or less)
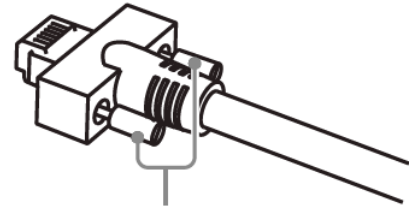
Caution: Secure manually. Do not secure too tightly.

Notes on Attaching the Lens

Technical Notes How to Clean a Sensor

Avoiding Dust Particles

When attaching the lens to the camera, stray dust and other particles may adhere to the sensor surface and rear surface of the lens. Be careful of the following when attaching the lens.

- Work in a clean environment.

- Do not remove the caps from the camera and lens until immediately before you attach the lens.

- To prevent dust from adhering to surfaces, point the camera and lens downward and do not allow the lens surface to come into contact with your hands or other objects.

- Always use a blower brush to remove any dust that adheres.

- Never use your hands or cloth, blow with your mouth, or use other methods to remove dust.

Phenomena Specific to CMOS Image Sensors

The following phenomena are known to occur on cameras equipped with CMOS image sensors. These do not indicate malfunctions.

- **Aliasing**: When shooting straight lines, stripes, and similar patterns, vertical aliasing (zigzag distortion) may appear on the monitor.

- **Blooming**: When strong light enters the camera, some pixels on the CMOS image sensor may receive much more light than they are designed to hold, causing the accumulated signal charge to overflow into surrounding pixels. This "blooming" phenomenon can be seen in the image but does not affect the operation of the camera.

- **Fixed pattern noise**: When shooting dark objects in high-temperature conditions, fixed pattern noise may occur throughout the entire video monitor screen.

- **Defective pixels**: Defective pixels (white and black pixels) of the CMOS image sensor are minimized at the factory according to shipping standards. However, as this phenomenon can be affected by the ambient temperature, camera settings (e.g., high sensitivity and long exposure), and other factors, be sure to operate within the camera's specified operating environment.

Notes on Exportation

When exporting this product, please follow the export regulations of your country or region.

Features

This camera is an industrial progressive scan camera equipped with a 2/3-inch global shutter CMOS image sensor with 5.1 effective megapixels (2464 × 2056). The unit is compact and lightweight in design and is equipped with GigE Vision Ver. 2.0 interface. The monochrome camera produces monochrome output while the color camera produces Bayer output.

▪ Compact and Lightweight

The unit's compact size (approx. 29mm × 29mm × 41.5mm, excluding lens mount) and lightweight design allows for easy assembly and installation.

▪ Gigabit Ethernet interface supporting GigE Vision Ver. 2.0

- High-speed transfer at up to 1 Gbps of uncompressed data, the ideal format for image processing.

- Connection of multiple cameras and computers supported through use of a switching hub, etc.

- Maximum cable length of 100 m.

- Support for IEEE802.af-compliant PoE (Power over Ethernet) allowing you to supply power to the camera via the LAN cable.

Note: Interface card or switching hub must support PoE. Alternatively, power can be supplied via the 6-pin connector using an optional +12 to +24V DC power supply.

▪ Output Formats

You can choose from 8-bit, 10-bit, and 12-bit* output for both monochrome and Bayer.

Note: *As the color camera cannot perform white balance when using 12-bit output, perform white balance on the application.

▪ High Frame Rate

This camera is capable of frame rates of up to 22.7 fps (8-bit format) for full 5.1-megapixel output. Even faster frame rates can be achieved when binning is utilized (Monochrome models only) or when a smaller ROI (region of interest) is specified.

▪ ALC (Automatic Level Control) Function

Combine the automatic gain control and automatic exposure control functions to allow handling of changes in various brightnesses.

Variety of Pre-Process Functions

- LUT (lookup table): For programmable control over gamma and contrast.

- Gamma correction: Gamma can be set to 0.45, 0.60, or 1.0 (off).

- Shading correction (flat field and color shading): Non-uniformity (i.e., shading) in the amount of light generated by the lens and lighting equipment can be corrected.

- Bayer white balance (Color models only): White balance can be automatically adjusted continuously. It can also be adjusted manually using R, and B gain.

Parts Identification

① Lens Mount (C-Mount)   ② RJ-45 Connector

③ POWER/TRIG LED   ④ LINK LED

⑤ ACT LED   ⑥ DC IN/TRIG Connector (6-Pin Round)

⑦ Mounting Holes (M3, 3mm depth)
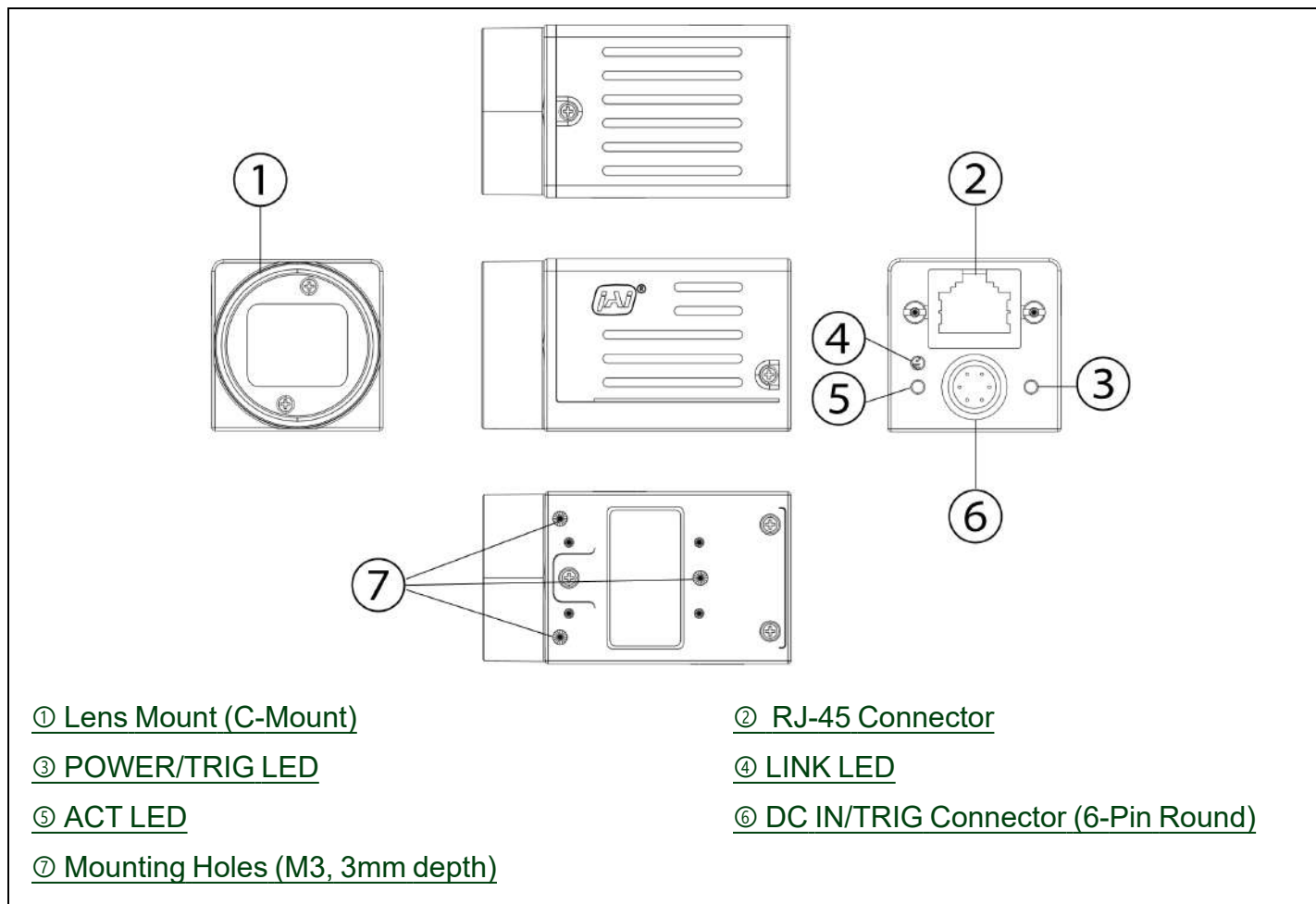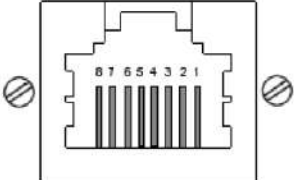
① Lens Mount (C-Mount)

Mount a C-mount lens, microscope adapter, etc. here.

Note: Before mounting a lens, be sure to refer to ① Lens and confirm the precautions for attaching a lens and the supported lens types.

② RJ-45 Connector

Connect a Gigabit Ethernet compatible LAN cable (Category 5e or higher, Category 6 recommended) here.

GigE Vision Interface		
Pin No.	**Input/Output**	**Signal**
1	In/Out	MX1+ (DA+)
2	In/Out	MX1– (DA–)
3	In/Out	MX2+ (DB+)
4	In/Out	MX3+ (DC+)
5	In/Out	MX3– (DC–)
6	In/Out	MX2– (DB–)
7	In/Out	MX4+ (DD+)
8	In/Out	MX4– (DD–)

③ POWER/TRIG LED

Indicates the power or trigger input status.

	LED	Status
🟠	Lit amber	Camera initializing
🟢	Lit green	Camera in operation
☀	Blinking green	During operation in trigger mode, trigger signals are being input. **Note:** The blinking interval is not related to the actual input interval of the external trigger.

④ LINK LED

Indicates whether the GigE network connection is established or not.

LED		Status
⬤	Off	The network link is not established (or in progress).
🟢	Lit green	1000Base-T link is established.

⑤ ACT LED
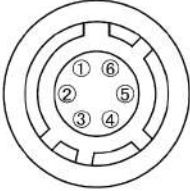
Indicates the GigE network status.

LED		Status
⬤	Off	Communication is not active.
☀	Blinking amber	Communication is active.

⑥ DC IN/TRIG Connector (6-Pin Round)

Connect the cable for a power supply (optional) or for DC IN / trigger IN here.

	Camera Side: HR10A-7R-6PB (73) (Hirose Electric or equivalent)				
	Cable Side: HR10A-7P-6S (Plug) (Hirose Electric or equivalent)				

Pin No.	Input/Output	Signal	Description
1	Power In	DC In	DC +12V ~ +24V
2	In	Opto In1	GPIO 5
3	Out	Opto Out 1	GPIO 1
4	Out	Opto Out 2	GPIO 2
5		Opto Common	
6	GND	GND	

Notes:

- See Recommended Circuit Diagram (Reference Examples) for the recommended Input/Output circuit diagrams.

- Refer to the GPIO (Digital Input/Output Settings) topic as well.

⑦ Mounting Holes (M3, 3mm depth)

Use these holes when attaching an MP-43 tripod adapter plate (optional) or mounting the camera directly to a wall or other structural system. (The smaller holes (×4) are M2 with a depth of 3 mm.)

Recommended Circuit Diagram (Reference Examples)

Related Setting Items: Digital IO Control

Technical Notes OPTO-In Circuit Characteristics

Recommended External Input Circuit Diagram
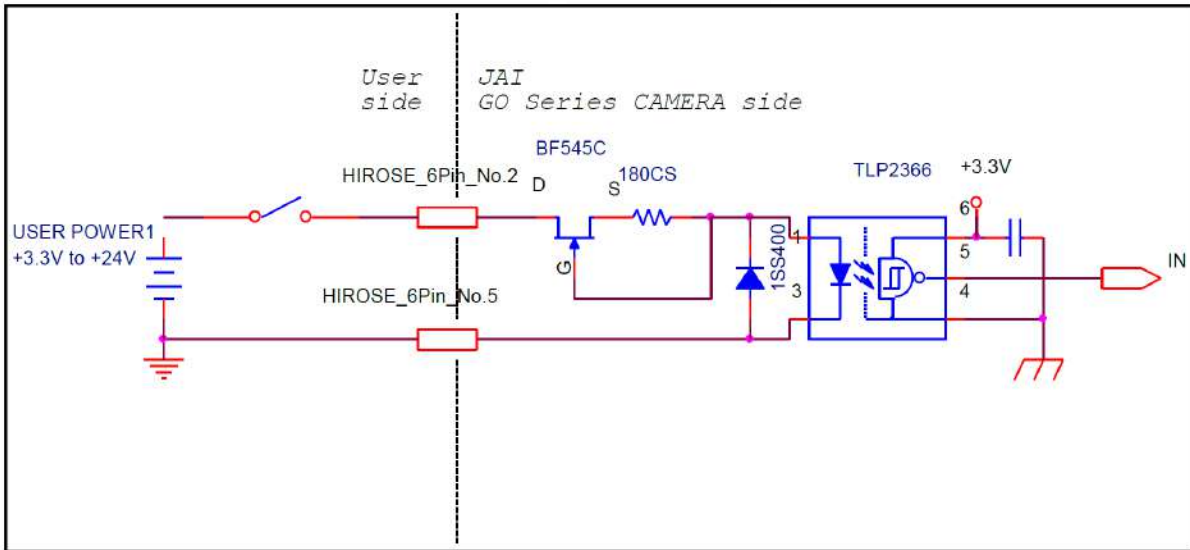
Recommended External Output Circuit Diagram (Reference Example)
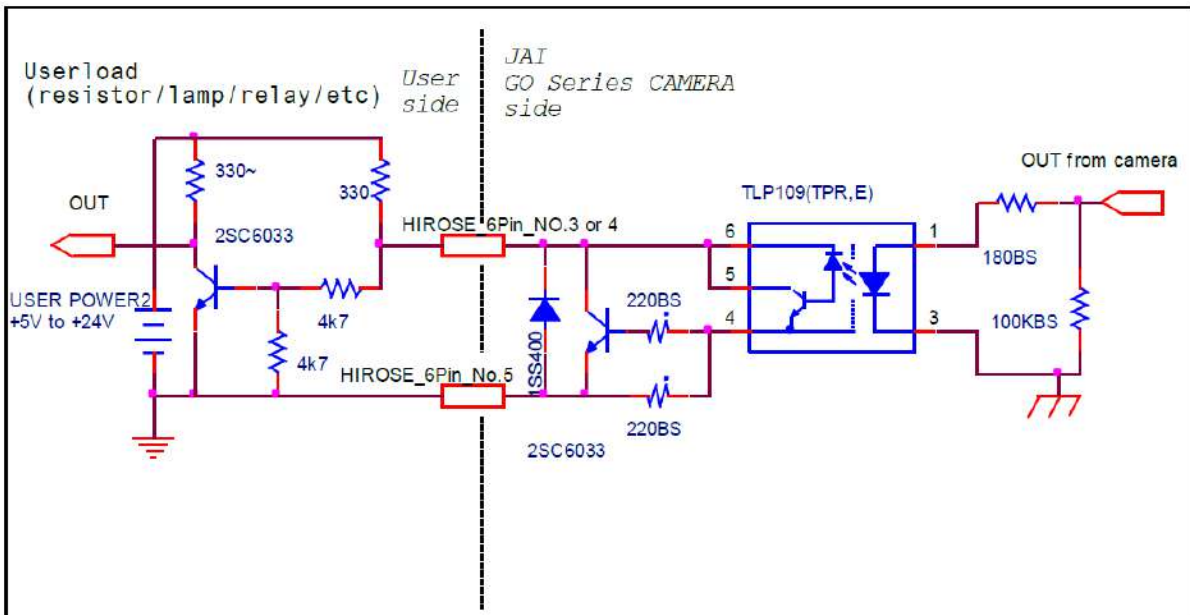
Characteristics of the Recommended Circuits for Opto OUT

OUTPUT LINE RESPONSE TIME
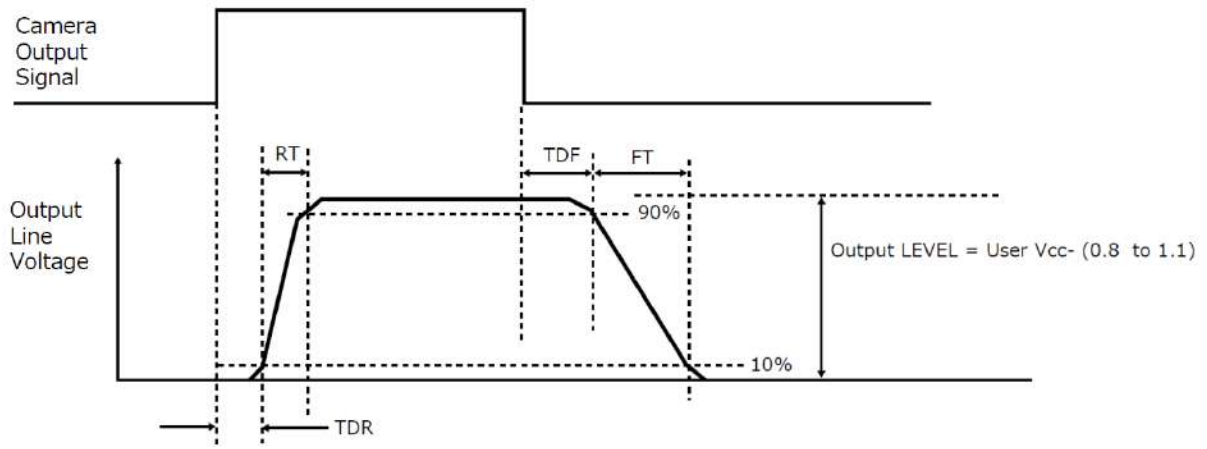
Preparation

Read this section to learn how the camera connects to devices and accessories. The preparation process is described below.

1	**Step 1: Install the Software (First Time Only)** • Install the software for configuring and controlling the camera (eBUS SDK for JAI) on the computer.
2	**Step 2: Connect Devices** • Connect the lens, LAN cable, AC adapter, computer, and other devices.
3	**Step 3: Verify Camera Operation** • Verify whether the camera is turned on and ready for use.
4	**Step 4: Verify the Connection between the Camera and PC** • Verify whether the camera is properly recognized via Control Tool.
5	**Step 5: Change the Camera Settings** • Refer to the procedure for changing the output format setting as an example and change various settings as necessary.
6	**Step 6: Adjust the Image Quality** • Refer to the procedures for adjusting the gain and black level as examples and adjust the image quality.
7	**Step 7: Save the Settings** • Save the current setting configurations in user memory.

Step 1: Install the Software (First Time Only)

When using the camera for the first time, install the software for configuring and controlling the camera (eBUS SDK for JAI) on the computer.

> **Note:** When you install eBUS SDK for JAI, eBUS Player for JAI will also be installed.

1. Download the eBUS SDK for JAI from the JAI website (https://www.jai.com/support-software/jai-software).

2. Install eBUS SDK for JAI on the computer.

Step 2: Connect Devices

① Lens

② Direct Mounting (or Use MP-43 Tripod Adapter Plate)

③ LAN Cable

④ Network Card

⑤ DC IN / Trigger IN Connection Cable

⑥ AC Adapter (Power Supply) (If Necessary)
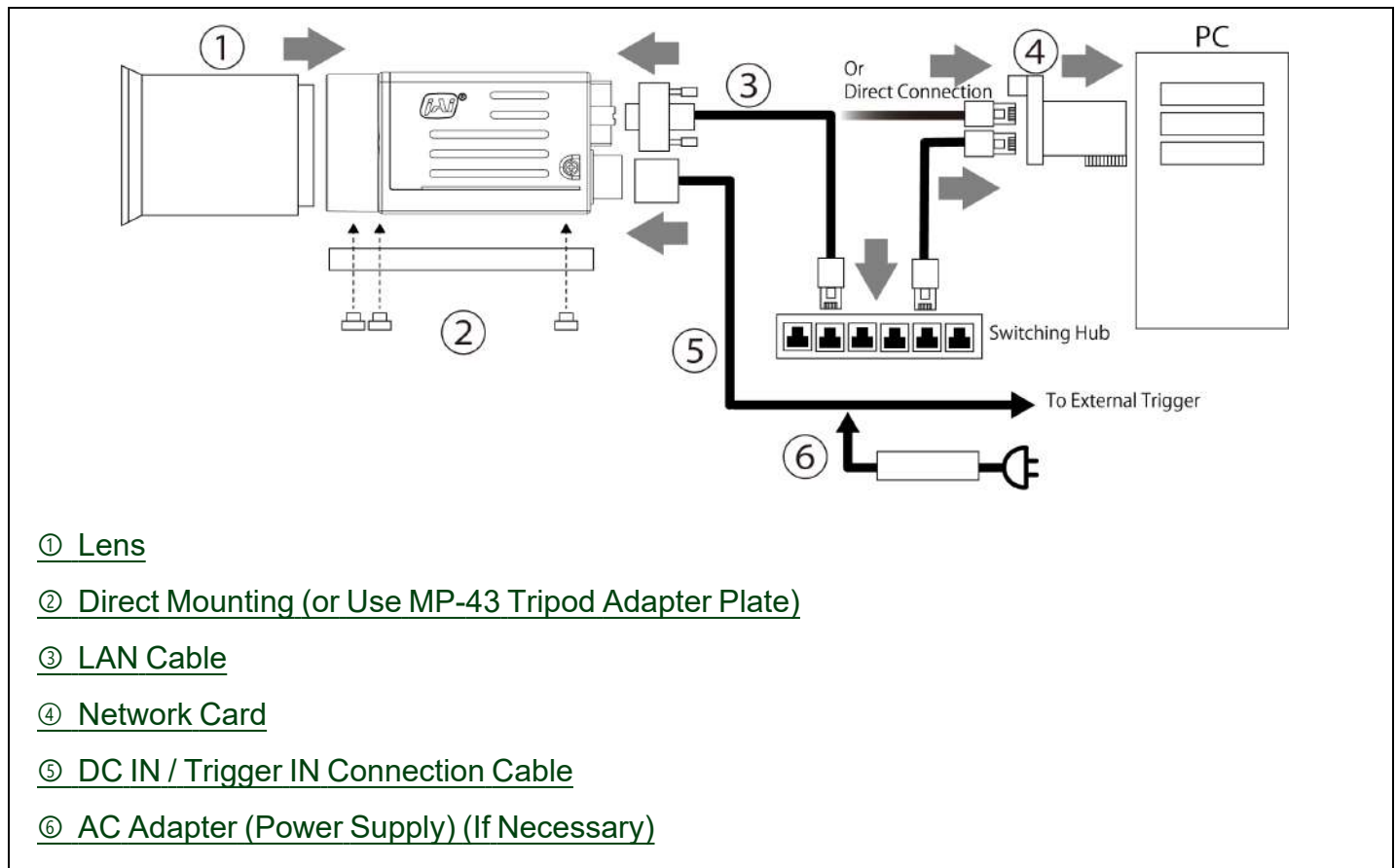
① Lens

C-mount lenses with lens mount protrusions of 9 mm or less can be attached.
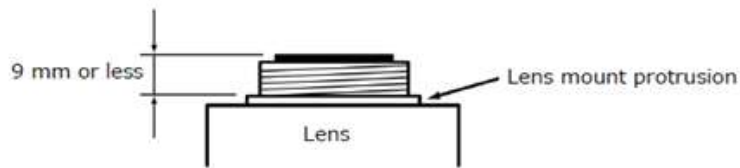
The diagonal of the camera's CMOS image sensor is 11 mm, the size of standard 2/3-inch lenses. To prevent vignetting and to obtain the optimal resolution, use a lens that will cover the 11 mm diagonal. Some lens manufacturers offer lenses with an 11 mm format. If not, a 2/3-inch lens is recommended.

Cautions:
- The maximum performance of the camera may not be realized depending on the lens.

- Attaching a lens with a mount protrusion of 10 mm or longer may damage the lens or camera.

Notes:
The following formula can be used to estimate the focal length.

Focal length = WD / (1 + W/w)

WD: Working distance (distance between lens and object)

W: Width of object

w: Width of sensor

② Direct Mounting (or Use MP-43 Tripod Adapter Plate)

When mounting the camera directly to a wall or other device, use screws that match the camera locking screw holes on the camera (Large: M3, small: M2, depth: 3 mm).

Use the supplied screws to attach the tripod adapter plate (lower mounting holes).

Caution: For heavy lenses, be sure to support the lens itself. Do not use configurations in which its weight is supported by the camera.

③ LAN Cable

Connect a LAN cable to the RJ-45 connector.

- Use a LAN cable that is Category 5e or higher (Category 6 recommended).

- When supplying power via PoE, connect to a PoE-compatible switching hub or a PoE-compatible network card.

  > **Note:** JAI does not recommend using a PoE injector. If a PoE injector is used, the camera may not be able to transmit images properly.

- Refer to the specifications of the cable for details on its bend radius.

Caution: See the Notes on LAN Cable Connection topic as well.

④ Network Card

Install this in the computer that will be used to configure and operate the camera. As the camera supports PoE, you can also use PoE-compatible network cards. Refer to the instruction manual of the network card and configure settings on the computer as necessary.

⑤ DC IN / Trigger IN Connection Cable

Performs external I/O such as power supply and trigger input.

⑥ AC Adapter (Power Supply) (If Necessary)

Connect the AC adapter and the round connector of the connection cable to the DC IN / Trigger IN connector on the camera.

Step 3: Verify Camera Operation

When power is supplied to the camera while the necessary equipment is connected, the POWER/TRIG LED at the rear of the camera lights amber, and initialization of the camera starts. When initialization is complete, the POWER/TRIG LED lights green. The ACT LED and LINK LED will light or blink according to the network status.

Verify whether power is being supplied to the camera and whether the camera is connected to the network by checking the rear LEDs.
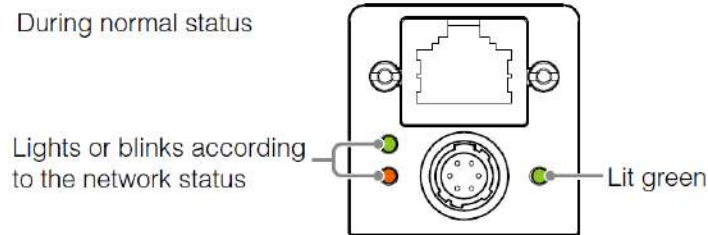
For details on how to read the LEDs, see the ③ POWER/TRIG LED section.

Note: Initialization of the camera will not complete unless it is connected to the network. If the power / trigger LED does not switch to green within minutes of supplying power, check the LAN cable and other connections. After initialization is completed once, the power / trigger LED will remain green, even if the network is disconnected.

Step 4: Verify the Connection between the Camera and PC

Verify whether the camera is properly recognized via Control Tool.

1. Launch eBUS Player for JAI

eBUS Player for JAI startup screen appears.

2. Select the camera you want to configure. Click the **Select / Connect** button.
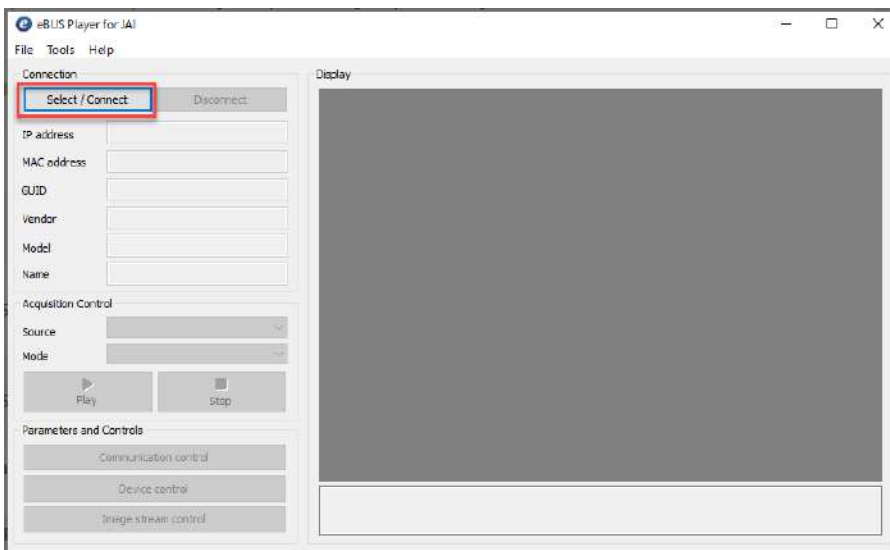
3. The connected camera is listed. Please select one camera and click **OK**.
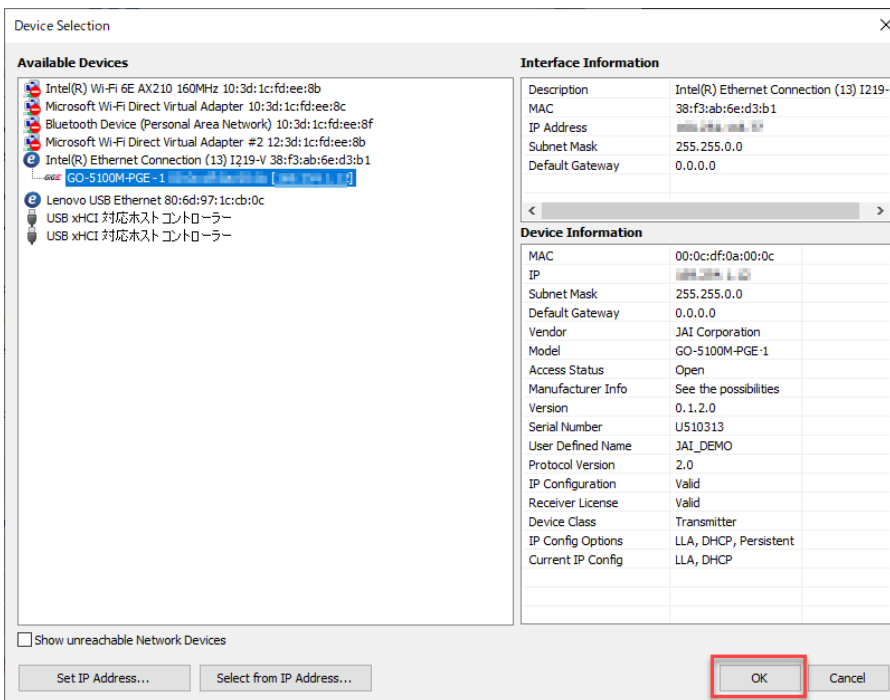
4. Check that the settings of the selected camera are displayed.
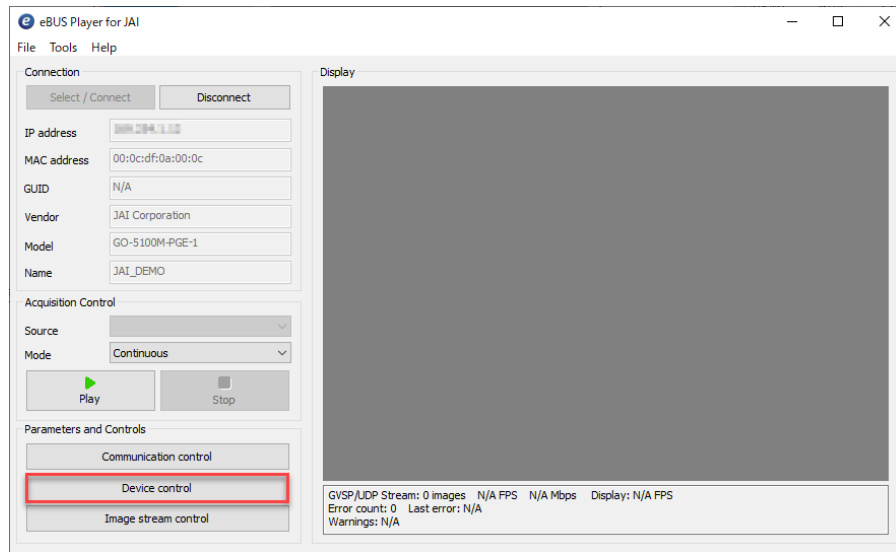
5. Click the **Device control** button. The screen shown below will be displayed. In this window, you can adjust various settings of the camera.
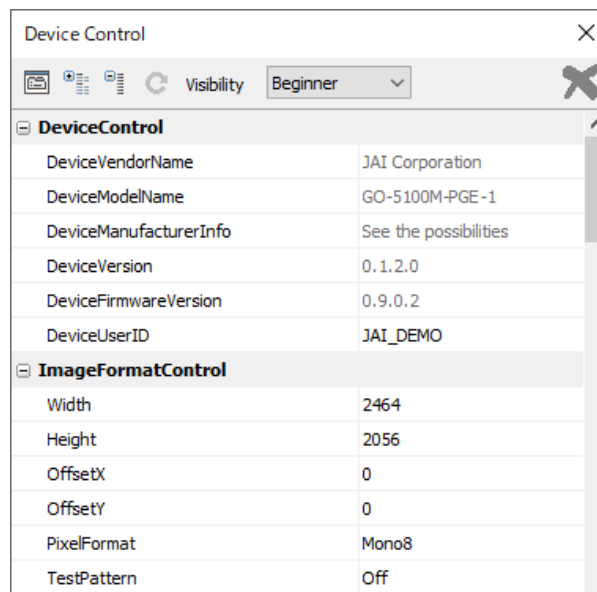
This completes the procedure for verifying whether the camera is properly recognized and whether control and settings configuration are possible.

Step 5: Change the Camera Settings

This section explains how to change settings by describing the procedure for changing the output format as an example.

■ Configure the Output Format

Configure the size, position, and pixel format of the images to be acquired. The factory settings are as follows. Change the settings as necessary.

Factory default values

Item		Default Value
ImageFormatControl	Width	2464
	Height	2056
	OffsetX	0
	OffsetY	0
	PixelFormat	Mono8 BayerRG8

■ Example: Configure the Width of ImageFormatControl

1. By selecting the item of Width, you can change the value as shown below.
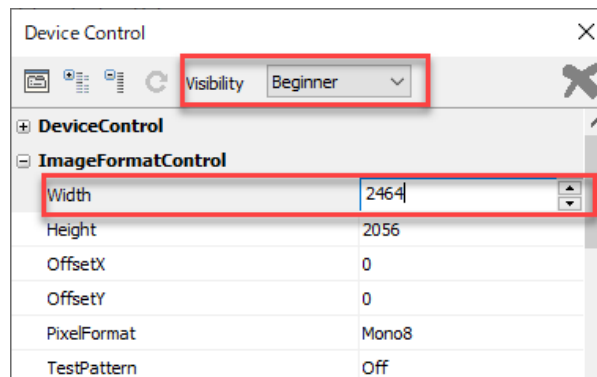
Note: Depending on the setting item, you need to change visibility. Please switch visibility (Beginner / Expert / Guru) as necessary.

Configure Exposure and External Trigger Settings

Configure settings related to exposure control methods and trigger control. The factory settings are as follows. Change settings as necessary, according to the intended purpose or application.

■ Factory Default Values

Item	Default
Trigger Selector	Frame Start
- Trigger Mode	Off
- Trigger Source	Line 5 - Optical In 1
- Trigger Activation	Rising Edge
Exposure Mode	Timed
Exposure Time	43864 (µs)
Exposure Auto *	Off

Note: *This item is only enabled when **Exposure Mode** is set to **Timed**.

Cautions:

- When **Exposure Mode** is set to **Off**, **Trigger Mode** cannot be set to **On**. Other settings may also be restricted depending on the exposure mode, so be sure to set the exposure mode before configuring the trigger settings.

- **Adjusting Packet Size**: With **Trigger Mode** set to **Off** and **Exposure Mode** set to **Continuous**, clicking the **Start Acquisition** button should produce a live image. If, however, you can only see a black screen, it may be the result of the packet size setting in the camera being larger than the packet size setting in the GigE NIC or switch. To correct the problem, you can either reduce the Packet Size setting to a value less than 1500 in the eBUS Player for JAI (under Transport Layer Control / Stream Channel Selector, or set your NIC or switch to support "Jumbo Frames." This setting is typically found in the Advanced Adapter Settings for the NIC or switch which can be accessed through the Device Manager on your PC.

Control via External Triggers

When Controlling the Exposure Time Using Specified Exposure Times

Configure the settings as follows.

Item	Setting Value / Selectable Range
Trigger Selector	Frame Start
- Trigger Mode	On
- Trigger Source	Any
- Trigger Activation	Rising Edge, Falling Edge
Exposure Mode	Timed
Exposure Time	8 bit: 1 ~ 7999810 (µs) * 10/12 bit: 1 ~ 7999630 (µs) *
Exposure Auto	Off, Continuous

Notes:

The maximum value for Exposure Time varies depending on the value configured for the Acquisition Frame Rate setting. Max. value for Exposure Time = (1 / Acquisition Frame Rate) - 188 µs (8-bit) or 369 µs (10-/12-bit)

The actual exposure time will consist of the image sensor's offset duration (13.7 µs) added to the setting configured on the camera. When ExposureMode is set to Timed and the exposure time is set to 1 µs, the actual exposure time will be as follows. 1 µs + 13.7 µs (offset duration of image sensor) = 14.7 µs.

When ExposureMode is set to TriggerWidth, the exposure is slightly longer than the width of the trigger signal. To achieve an exposure time of 14.7 µs and the exposure time offset is 13.7 µs, use 14.7 µs - 13.7 µs = 1 µs as the high or low time for the trigger signal.

1. Set **Exposure Mode** to **Timed**. (Timed is the default setting.)

AcquisitionControl	
AcquisitionMode	Continuous
AcquisitionStart	
AcquisitionStop	
AcquisitionFrameCount	1
AcquisitionFrameRate	22.7004 Hz
TriggerSelector	FrameStart
TriggerMode	On
TriggerSoftware	
TriggerSource	Line5
TriggerActivation	RisingEdge
ExposureMode	Timed
ExposureTime	43864 us
ExposureAuto	Off

2. Specify the exposure time in **Exposure Time**. The setting value for the exposure time can only be changed when **Exposure Auto** is set to **Off**. If **Exposure Auto** is set to **Continuous**, temporarily set it to Off before changing the exposure time.

3. Set **Trigger Selector** to **Frame Start**. (Frame Start is the default setting.)

4. Set **Trigger Mode** to **On**.

    If necessary, change the Trigger Source, Trigger Activation, and Exposure Auto settings.

▇ When Controlling the Exposure Time using the Pulse Width of the Trigger Input Signal

Configure the settings as follows.

Item	Setting Value / Selectable Range
Trigger Selector	Frame Start
- Trigger Mode	On
- Trigger Source	Any
- Trigger Activation	Level High, Level Low
Exposure Mode	Trigger Width

1. Set **Exposure Mode** to **Trigger Width**. When you select **Trigger Width**, **Trigger Mode** will automatically be set to **On**.
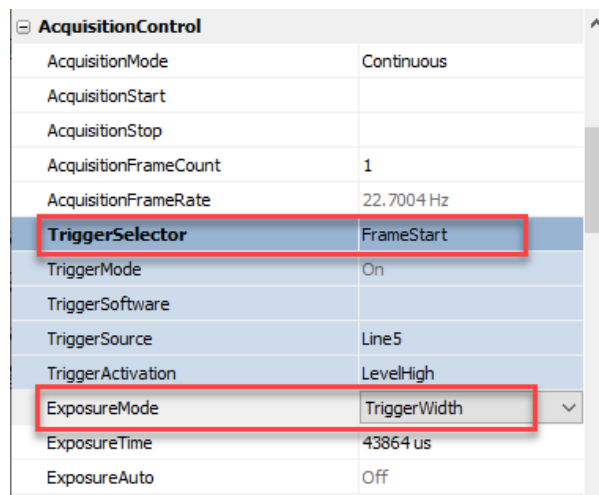
2. Set **Trigger Selector** to **Frame Start**. (Frame Start is the default setting.)

3. If necessary, change the Trigger Source and Trigger Activation settings.

Other Controls

In addition to exposure time, the following can also be controlled by external triggers. Select these control operations in Trigger Selector.

Trigger Selector Settings	Description
Acquisition Start	Start image acquisition.
Acquisition End	Stop image acquisition.
Acquisition Transfer Start	Output acquired images at a specified timing. (Up to 7 frames for 8-bit, and up to 3 frames for 10-/12-bit.)

Control Without External Triggers

▉ When Controlling the Exposure Time Using Specified Exposure Times

Configure the settings as follows.

Item	Setting Value / Selectable Range
Trigger Selector	Frame Start
- Trigger Mode	Off
Exposure Mode	Timed
Exposure Time	8 bit: 1 ~ 7999810 (µs) * 10/12 bit: 1 ~ 7999630 (µs) *
Exposure Auto	Off, Continuous

Notes:

The maximum value for Exposure Time varies depending on the value configured for the Acquisition Frame Rate setting. Max. value for Exposure Time = (1 / Acquisition Frame Rate) - 188 µs (8-bit) or 369 µs (10-/12-bit)

The actual exposure time will consist of the image sensor's offset duration (13.7 µs) added to the setting configured on the camera. When ExposureMode is set to Timed and the exposure time is set to 1 µs, the actual exposure time will be as follows. 1 µs + 13.7 µs (offset duration of image sensor) = 14.7 µs.

When ExposureMode is set to TriggerWidth, the exposure is slightly longer than the width of the trigger signal. To achieve an exposure time of 14.7 µs and the exposure time offset is 13.7 µs, use 14.7 µs - 13.7 µs = 1 µs as the high or low time for the trigger signal.

1. Set **Exposure Mode** to **Timed**. (Timed is the default setting.)

2. Specify the exposure time in **Exposure Time**. The setting value for the exposure time can only be changed when **Exposure Auto** is set to **Off**. If Exposure Auto is set to Continuous, temporarily set it to Off before changing the exposure time.

3. Set **Trigger Mode** to **Off**.

4. If necessary, change the Exposure Auto setting.

▮ When not Controlling the Exposure Time

Configure the settings as follows.

Item	Setting Value / Selectable Range
Exposure Mode	Off

The exposure will be performed with an exposure time equal to 1 / frame rate.

Step 6: Adjust the Image Quality

Display the camera image and adjust the image quality.

Display the Image

Display the image captured by the camera. When you click the **Play** button, the camera image appears in the right area.
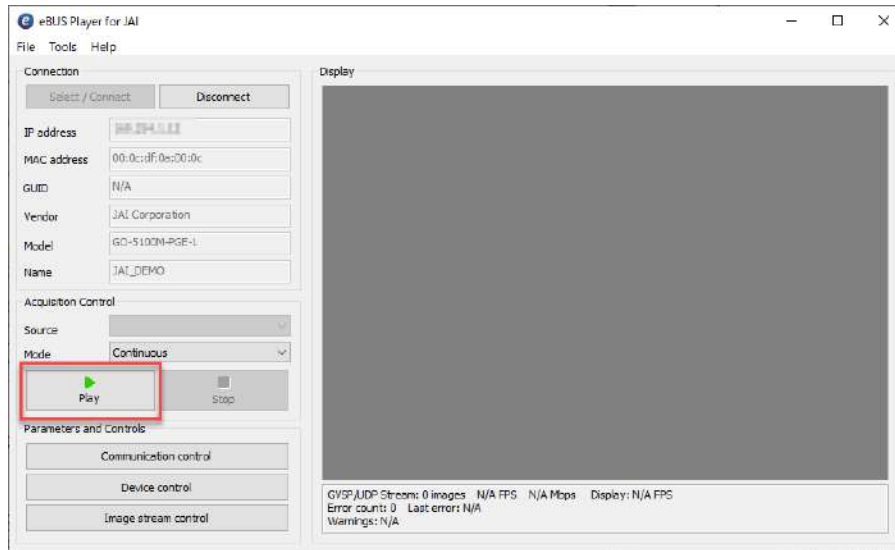
Adjust the Gain

You can adjust Gain manually or automatically.

Manual Adjustment

1. Open **AnalogControl** and set **GainAuto** to **Off** (Default).
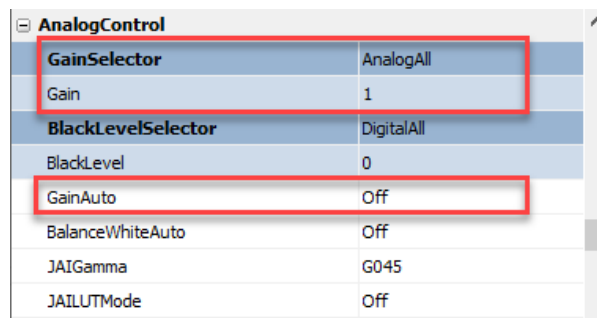
2. Configure the Gain settings.

    1. Expand Analog Control, and select the gain you want to configure in **Gain Selector**.
        For the monochrome model, only Analog All (master gain) can be configured.

For the color model, Analog All (master gain), Digital Red (digital R gain), and DigitalBlue (digital B gain) can be configured individually.

2. Set **Gain**.

The master gain (DigitalAll) can be set x1 (0dB) to x16 (+24dB) against the analog base gain. The resolution for gain setting is x0.01/step which is 0.05dB to 0.08dB, depending on the setting value. Values are configured by multipliers. For example, the values set for x1 and x16 are 100 and 1600 respectively.

For the color model, the Digital Red (digital R gain) and Digital Blue (digital B gain) can be set to a value from x0.45 to x5.62 (−7 dB to +15 dB) the Digital All (master gain) value. The resolution is set in 0.1 dB steps. Specify 0 for 0 dB, negative values for settings below 0, and positive values for settings above 0.

■ Automatic Adjustment

1. Open **AnalogControl** and set **GainAuto** to **Continuous**.
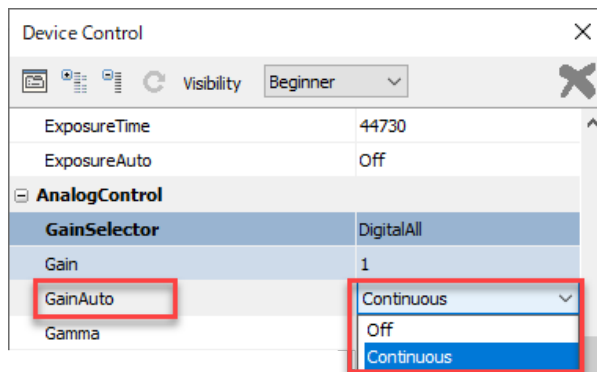
Adjusting the White Balance

Adjust the white balance using R and B gain. The white balance can also be adjusted automatically.

Note: The White Balance function is supported only on the color models.

Manual White Balance Adjustment

1. Expand **Analog Control**, and set **Balance White Auto** to **Off**. (Off is the default setting.)
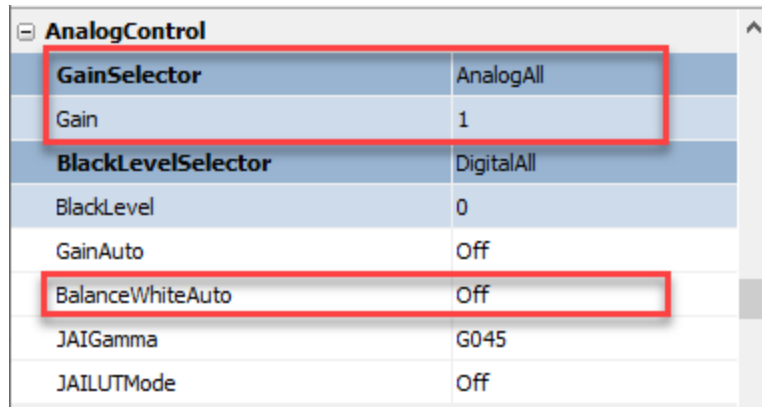
2. Select the gain to configure in **Gain Selector**, and set the gain value in **Gain**.

Automatic White Balance Adjustment

1. Place a white sheet of paper or similar object under the same lighting conditions as the intended subject, and zoom in to capture the white.

   White objects near the subject, such as a white cloth or wall, can also be used.

2. Select the **Balance White Auto** tab, and click **Continuous** or **Once** depending on your intended application.
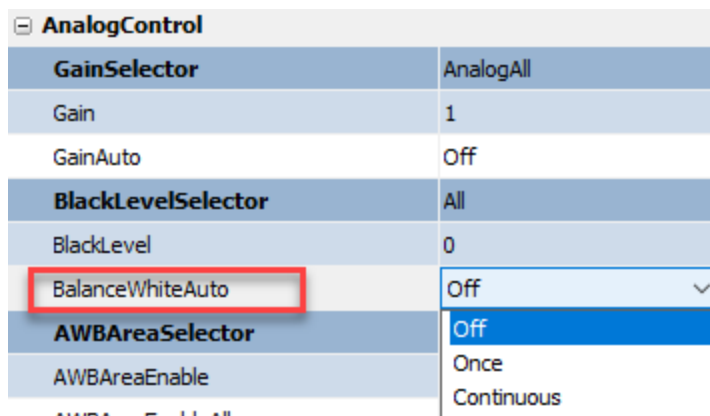
   The white balance is automatically adjusted.

Adjust the Black Level

1. Expand **Analog Control**, and select the black level you want to configure in **Black Level Selector**.

   For the monochrome model, only Digital All (master black) can be configured.

   For the color model, Digital All (master black), Digital Red (digital R), and Digital Blue (digital B) can be configured individually.

2. Specify the adjustment value in **Black Level**.

Step 7: Save the Settings

The configured setting values will be deleted when the camera is turned off. By saving current setting values to user memory, you can load and recall them whenever necessary. You can save up to three sets of user settings in the camera. (User Set1 to 3)
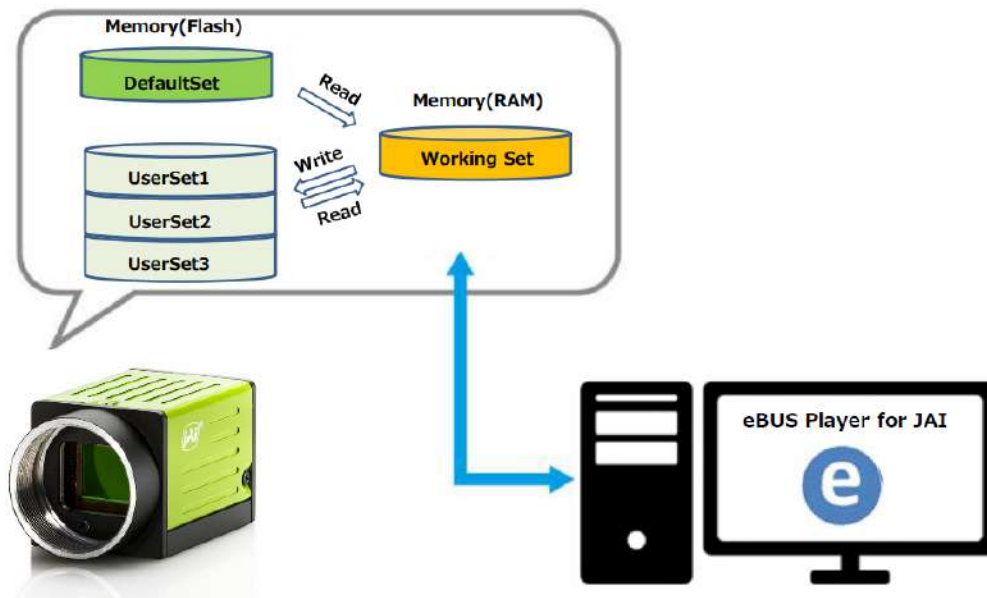
To Save User Settings

1. Stop image acquisition.

2. Expand **UserSetControl** and select the save destination (UserSet1 to UserSet3) in UserSetSelector.
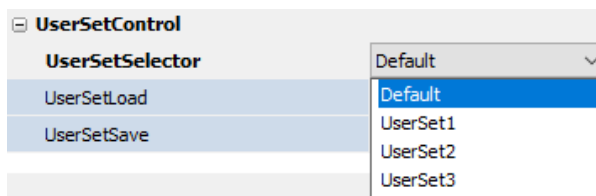
> **Note:** The factory default setting values are stored in Default and cannot be overwritten.

> **Caution:** Settings can only be saved when image acquisition on the camera is stopped.

3. Select **UserSetSave** and click the **UserSetSave** button.
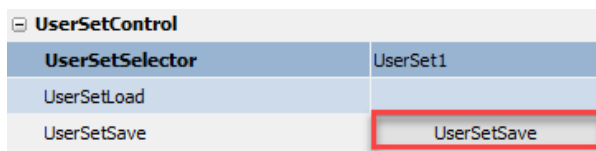
4. The current setting values are saved as user settings.

To Load User Settings

1. Stop image acquisition. User settings can only be loaded when image capture on the camera is stopped.

2. Select the settings to load (UserSet1 to UserSet3) in UserSetSelector.
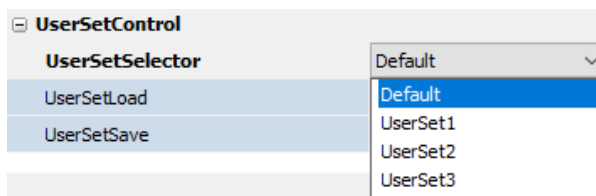
3. Select **UserSetLoad** and click the **UserSetLoad** button.
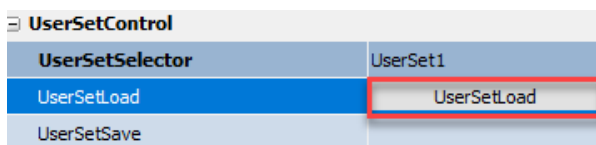
4. The selected user settings are loaded.

Note: When selecting **Default** for UserSetSelector, the factory settings are loaded.

Main Functions

This chapter describes the camera's main functions.

Basic Function Matrix

The combinations of settings for the basic functions that can be used together are as follows.

Exposure Mode	Frame Start Trigger	Binning Vertical & Horizontal 1)	Exposure Time	ROI	Balance White Auto 2)	Gain Auto	Exposure Auto	Sensor MultiROI 3)	Trigger Sequenccer Mode	Command Sequencer Mode
Off	Off	1x1 (Off)		✓	✓	✓		✓		
		1 x 2		✓		✓		✓		
		2 x 1		✓		✓		✓		
		2 x 2		✓		✓		✓		
Timed	Off	1x1 (Off)	✓	✓	✓	✓	✓	✓		✓
		1 x 2	✓	✓		✓	✓	✓		✓
		2 x 1	✓	✓		✓	✓	✓		✓
		2 x 2	✓	✓		✓	✓	✓		✓
Timed (EPS)	On	1x1 (Off)	✓	✓	✓	✓	✓	✓	✓	✓
		1 x 2	✓	✓		✓	✓	✓	✓	✓
		2 x 1	✓	✓		✓	✓	✓	✓	✓
		2 x 2	✓	✓		✓	✓	✓	✓	✓
Trigger Width	On	1x1 (Off)		✓	✓	✓		✓		
		1 x 2		✓		✓		✓		
		2 x 1		✓		✓		✓		
		2 x 2		✓		✓		✓		

Notes:
- 1) BinningVertical & BinningHorizontal: Operates only on the monochrome models.
- 2) Balance White Auto: Operates only on the color models.
- 3) Sensor Multi ROI: Operates only on the GO-5100MC-PGE-1 models.

GPIO (Digital Input/Output Settings)

Related Setting Items: Digital IO Control

The camera is equipped with GPIO (general-purpose input/output) functions for generating and using combinations of triggers and other necessary signals within the camera and of signals output from the camera to the system such as those used for lighting equipment control.

Valid Input/Output Combinations

The following signals can be used as sources for each output destination (Trigger Selector, Line Selector, Pulse Generator Selector). You can also connect two different sources to NAND paths in the GPIO and reuse the signal generated there as a source for a different selector.

| | Output Destination | | | | | | | | | | | Pulse Generator Selector |
| | Trigger Selector | | | | Line Selector | | | | | | | |
	Acquisition Start	Acquisition Stop	Frame Start	Transfer Start	Line2 OPT Out 1	Line3 OPT Out 2	Time Stamp Reset	NAND 0 In 1	NAND 0 In 2	NAND 1 In 1	NAND 1 In 2	Pulse Generator 0
LOW	Default	Default	✓	Default	Default	Default	Default	Default	Default	Default	Default	Default
HIGH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Line5 OPT 1 In	✓	✓	Default	✓	✓	✓	✓	✓	✓	✓	✓	✓
NAND 0 Out	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
NAND 1 Out	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Pulse Generator 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
User Output 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
User Output 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Software Trigger	✓	✓	✓	✓			✓					
Action 1	✓	✓	✓	✓								✓
Action 2	✓	✓	✓	✓								✓
FVAL					✓	✓	✓	✓	✓	✓	✓	✓
LVAL							✓					✓
Exposure Active					✓	✓	✓	✓	✓	✓	✓	✓
Frame Trigger Wait					✓	✓	✓	✓	✓	✓	✓	✓
Frame Active					✓	✓	✓	✓	✓	✓	✓	✓
Acquisition Trigger Wait					✓	✓	✓	✓	✓	✓	✓	✓
Use	Trigger Source				Line Source							Pulse Generator Clear Source

Acquisition Control

> **Related Setting Items:** AcquisitionControl

Perform operations and configure settings related to image acquisition in Acquisition Control. The following acquisition modes are available on the camera.

Acquisition Mode	Description
Single Frame	Acquire a single frame when the **Acquisition Start** command is executed.
Multi Frame	Acquire the number of frames specified in Acquisition Frame Count when the **Acquisition Start** command is executed.
Continuous	Acquire images continuously until the **Acquisition Stop** command is executed.

Change the Frame Rate

When Trigger Mode is disabled, you can change the frame rate in Acquisition Frame Rate.

> **Notes:**
> - The shortest frame period varies depending on the ROI, Pixel Format, and Binning Mode selected. The longest frame period is 0.125 Hz (8 sec.).
>
> - When Trigger Mode is enabled, the Acquisition Frame Rate setting is disabled.

Maximum Frame Rate

The maximum frame rate is as follows depending on the sensor's scanning range and the GigE bandwidth.

> **Note:** The Frame Rate Calculator, which calculates the maximum frame rate or trigger rate, is available for download from the product page on the JAI website (www.jai.com).
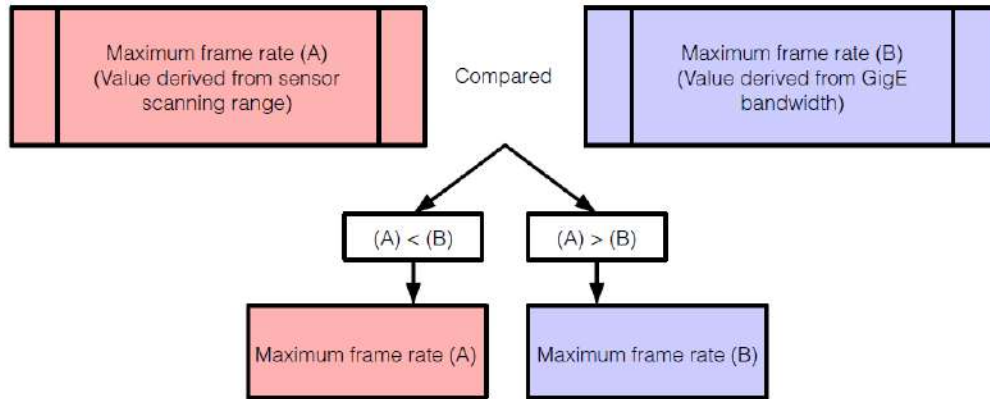
Maximum Frame Rate Period Formulas

▇ During continuous operation ([Frame Start] trigger is [Off] or [Exposure Mode] is [Off])

- Maximum frame rate of sensor

```
Sensor FR  =  1 / {H Period × (Height  +  VBlanking)}
```

- Maximum frame rate by interface

```
Interface FR  =  920 × 1000000 / (Height × Width × Pack value)
```

- Maximum frame rate

```
FR_Cont  =  Min(Sensor FR, Interface FR)
```

When the exposure time is longer than the frame interval

- Maximum exposure time at maximum frame rate

```
MaxExposureTime_TrOlrd  =  (1 / FR_Cont)  -  (14 × H Period)
```

- Exposure time outside of frame interval

```
NonOverlapExposureTime  =  ExposureTime  -  MaxExposureTime_TrOlrd
```

However, NonOverlapExposureTime calculation results that are 0 or below will be considered as 0.

- Maximum frame rate

```
FR_ContLongExposure  =  1/{(1/FR_Cont)  +  NonOverlapExposureTime}
```

When [Frame Start] trigger is [On] and [Trigger OverLap] is [Off]

- Maximum frame rate of sensor

```
Sensor FR  =  1 / {H Period × (Height  +  VBlanking)}
```

- Maximum frame rate by interface

```
Interface FR  =  920 × 1000000 / (Height × Width × Pack value)
```

- Maximum frame rate

```
FR_TrOloff  =  Min(Sensor FR, Interface FR)
```

- Exposure time possible within frames

```
MaxOverlapTime_TrOloff  =  (1 / FR_TrOloff)  -  (1 / Sensor FR)
```

- Exposure time outside of frame interval

```
NonOverlapExposureTime_TrOloff  =  ExposureTime  -  MaxOverlapTime_TrOloff
```

However, NonOverlapExposureTime_TrOloff calculation results that are 0 or below will be considered as 0.

For TriggerWidth, the trigger pulse is equivalent to ExposureTime.

- Maximum frame rate

```
FR_TrOloff  =  1 / {(1 / FR_TrOloff)  +  NonOverlapExposureTime_TrOloff}
```

■ When [Frame Start] trigger is [On] and [Trigger OverLap] is [Readout]

- Maximum frame rate of sensor

```
Sensor FR  =  1 / {H Period × (Height  +  VBlanking)}
```

- Maximum frame rate by interface

```
Interface FR  =  920 × 1000000 / (Height × Width × Pack value)
```

- Maximum frame rate

```
FR_TrOloff  =  Min(Sensor FR, Interface FR)
```

- Exposure time possible within frames

```
MaxOverlapTime_TrOlrd  =  (1 / FR_TrOloff)  -  (14 × H Period)
```

- Exposure time outside of frame interval

```
NonOverlapExposureTime_TrOlrd  =  ExposureTime  -  MaxOverlapTime_TrOlrd
```

However, NonOverlapExposureTime_TrOlrd calculation results that are 0 or below will be considered as 0.

For TriggerWidth, the trigger pulse is equivalent to ExposureTime.

- Maximum frame rate

```
FR_TrOlrd  =  1 / {(1 / FR_TrOloff)  +  NonOverlapExposureTime_TrOlrd}
```

Camera Model	VBlanking
GO-5100M/C-PGE-1	40
GO-5101M/C-PGE-1	34

Pixel Format	Binning Settings	Height	Width	H Period	Pack Value	Frame Rate (fps)
8 bit	1 x 1 (Full ROI)	2056	2464	13.414 µs	8	22.7
	2 x 1	1028	2464			45.4
	1 x 2	2056	1232			35.6
	2 x 2	1028	1232			69.8

Pixel Format	Binning Settings	Height	Width	H Period	Pack Value	Frame Rate (fps)
10 bit / 12bit*	1 x 1 (Full ROI)	2056	2464	26.343 µs	16	11.3
	2 x 1	1028	2464			18.1
	1 x 2	2056	1232			35.6
	2 x 2	1028	1232			35.5
10 bit Packed / 12bit*	1 x 1 (Full ROI)	2056	2464	26.343 µs	12	15.1
	2 x 1	1028	2464			30.2
	1 x 2	2056	1232			18.1
	2 x 2	1028	1232			35.5

The values during [Continuous]

> **Note:** *12-bit binning is not supported.

> **Caution:** Although the maximum frame rate value is determined by the GigE bandwidth range, when ROI is configured, the frame rate cannot exceed the sensor output's allowable frame rate value.

Exposure Mode

> **Related Setting Items:** AcquisitionControl

The following exposure modes are available on the camera.

Exposure Mode Setting	Exposure Operation
OFF	Exposure control is not performed (free-running operation).
Timed	Mode in which control is performed using exposure time. Acquire images using an exposure time configured beforehand on an external trigger.
Trigger Width	Mode in which control of the exposure time is performed using the pulse width of the trigger input signal. The exposure time will be the same as the pulse width of the trigger input signal. This allows long exposure.

> **Note:** The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in "Configure Exposure and External Trigger Settings".

The effect of the combination of Exposure Mode, Trigger Option and Trigger Mode is as follows.

Exposure Mode	Trigger Option	Trigger Mode (Frame Start)	Operation
OFF	N/A	N/A	Free-running operation. Exposure control by Exposure Time is not possible.
Timed	OFF	OFF	Free-running operation. Exposure control by Exposure Time is not possible.
		ON	Timed (EPS) Operation. Exposure can be controlled by Exposure Time.
	RCT	ON	RCT Operation. Exposure can be controlled by Exposure Time
Trigger Width	N/A	ON	Exposure is controlled by the pulse width of the external trigger

◼ Exposure Time

This command is effective only when Exposure Mode is set to Timed. It is for setting exposure time. The setting step for exposure time is 1 μsec per step.

- Minimum: 10 μsec

- Maximum: 8 seconds

> **Note:** Noise may make image unusable after 1 second)

◼ ExposureAuto

This is a function to control the exposure automatically. It is effective only for Timed. JAI ALC Reference controls the brightness. There are two modes, OFF and Continuous.

- **OFF**: No exposure control

- **Continuous**: Exposure continues to be adjusted automatically

In this mode, the following settings are available.

- ALC Speed: Rate of adjustment can be set (Common with GainAuto)

- ExposureAuto Max: The maximum value for the exposure time to be controlled can be set

- ExposureAuto Min: The minimum value for the exposure time to be controlled can be set

- ALC Reference: The reference level of the exposure control can be set (Common with GainAuto)

- ALC Area Selector: The portion of the image used for controlling exposure can be set (Common with GainAuto)

■ **ALC Channel Area**

High Left	High Mid-left	High Mid-right	High Right
Mid-High Left	Mid-High Mid-left	Mid-High Mid-right	Mid-High Right
Mid-Low Left	Mid-Low Mid-left	Mid-Low Mid-right	Mid-Low Right
Low Left	Low Mid-left	Low Mid-right	Low Right

Trigger Control

Related Setting Items: AcquisitionControl

The camera allows the following controls to be performed via external trigger signals.

Trigger Selector	Description
FrameStart	Start exposure in response to the external trigger signal input. Select this to perform exposure control using external triggers.
AcquisitionStart	Start image acquisition in response to the external trigger signal input.
AcquisitionEnd	Stop image acquisition in response to the external trigger signal input.
AcquisitionTransferStart	Output acquired images at a specified timing in response to an external trigger signal input. (Up to 7 frames for 8-bit, and up to 3 frames for 10-/12-bit.)

Note: The settings for exposure control and triggers are related to each other. Be sure to configure the settings described in "Configure Exposure and External Trigger Settings".

Shortest Repetition Period for Triggers

The reciprocal of the maximum frame rate is the time required to output one frame. The shortest repetition periods for triggers cannot be lower than that value.

Scanning Range	Shortest Period		
	8 bit	10 bit	12 bit
Full	44.1 ms	66.1 ms	88.1 ms
ROI 2/3 (Height=1370)	29.4 ms	44.1 ms	58.7 ms
ROI 1/2 (Height=1028)	22.0 ms	33.1 ms	44.1 ms
ROI 1/4 (Height=514)	11.0 ms	16.6 ms	22.1 ms
ROI 1/8 (Height=257)	5.52 ms	8.27 ms	11.0 ms
Binning Vertical 2 (Monochrome models only)	22.0 ms	33.1 ms	44.1 ms

The shortest periods of trigger in the table above are values for when the trigger overlap is set to "Readout." When the trigger overlap is set to "Off," the exposure time will be added to the periods.

When Exposure Mode is Timed

Example: When Trigger Source is set to Line 5 - Optical In 1 and OptIn Filter Selector is set to 10 µs

- **Trigger Overlap: OFF**
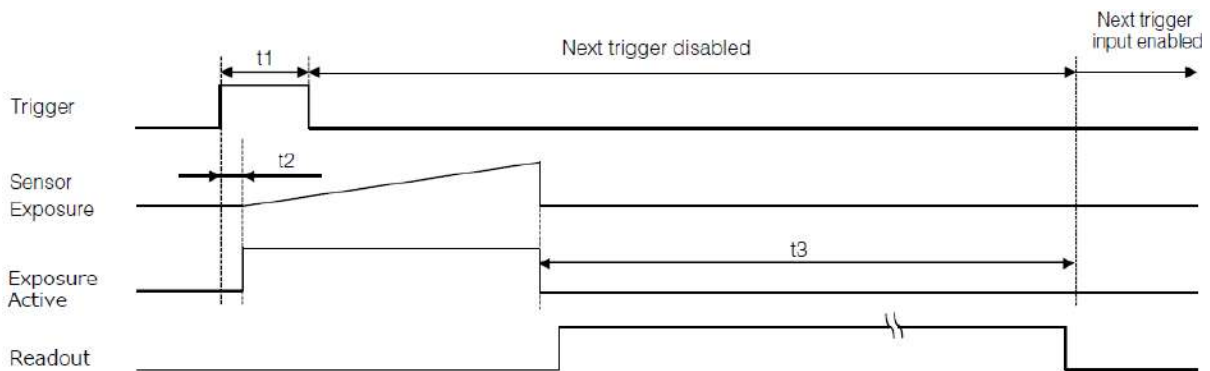
	t1	t2	t3 (Min)
8 bit		40 µs	28 ms
10 bit Packed	10 µs (Min)	79 µs	55 ms
10 bit			

Note: If the exposure time is longer than (input trigger cycle - t3), the next trigger input will not be accepted.

- **Trigger Overlap: ReadOut**

	t1	t2	t3 (Min)
8 bit		40 µs	173 µs
10 bit Packed	10 µs (Min)	79 µs	328 µs
10 bit			

Note: If the exposure time is longer than (input trigger cycle - t3), the next trigger input will not be accepted.

When Exposure Mode is Trigger Width

Example: When Trigger Source is set to Line 5 - Optical In 1 and OptIn Filter Selector is set to 10 µs

- **Trigger Overlap: Off**

	t1	t2	t3	t4 (Min)
8 bit		40 µs	40 µs	28 ms
10 bit Packed	10 µs (Min)	79 µs	79 µs	55 ms
10 bit				

Note: If the exposure time is longer than (input trigger cycle - t4), the next trigger input will not be accepted.

- **Trigger Overlap: ReadOut**
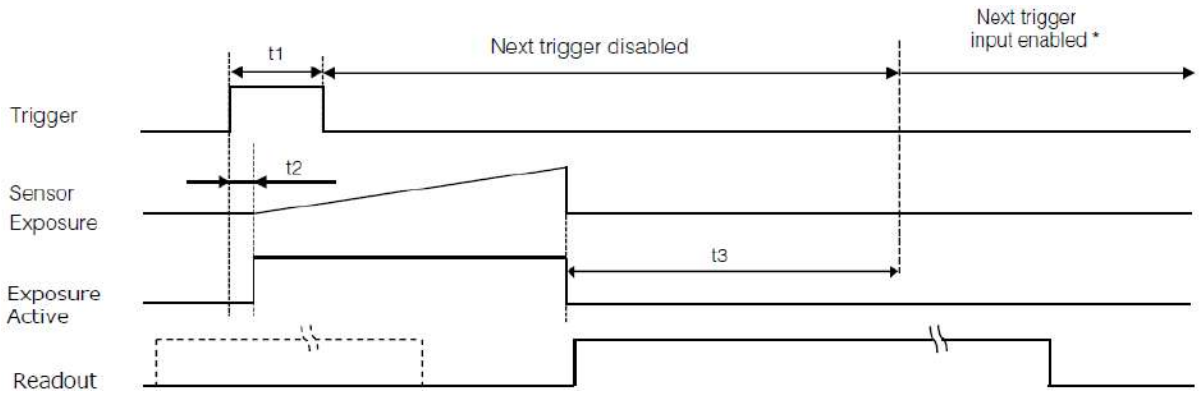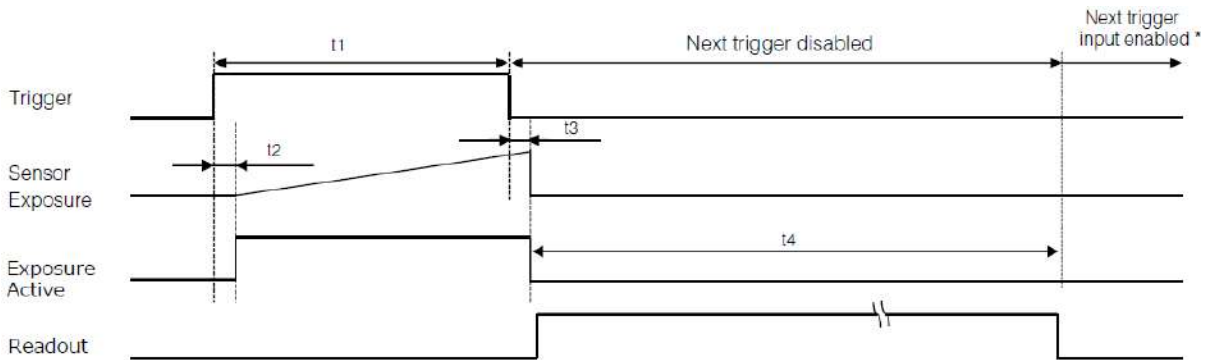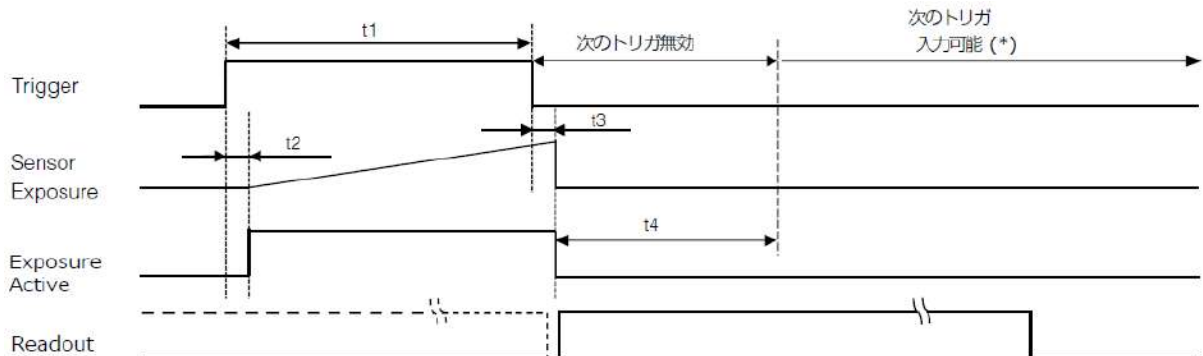
	t1	t2	t3	t4 (Min)
8 bit	10 µs (Min)	40 µs	40 µs	173 µs
10 bit Packed		79 µs	79 µs	328 µs
10 bit				

Note: If the exposure time is longer than (input trigger cycle - t4), the next trigger input will not be accepted.

Event Control

Related Setting Items: EventControl

"Event control" is a function that uses GVCP (GigE Vision Control Protocol) to output points of change in the camera's internal signal as event occurrence information or "event messages." When this information is output, the camera's internal timestamp counter value is added.

Event Message Occurrence Diagram
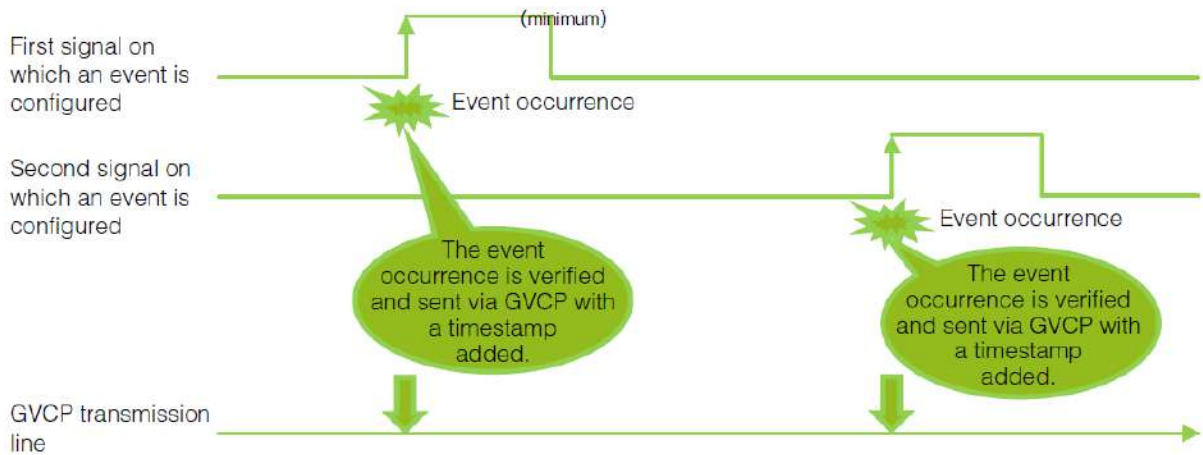
Internal Camera Blocks
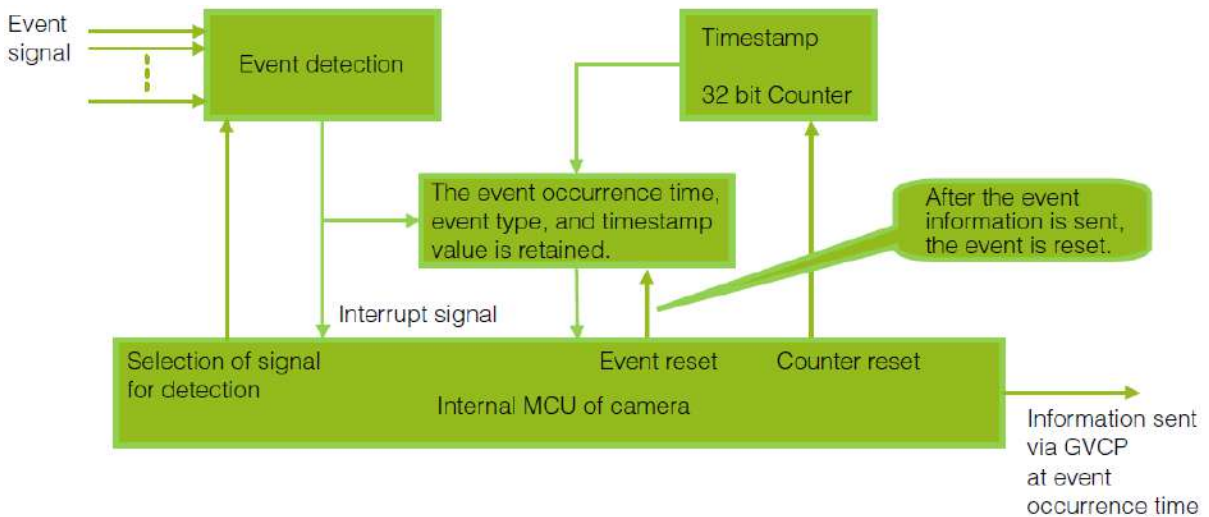
■ To Use the Event Control Function

Configure the settings as follows.

Item	Setting Value / Selectable Range	Description
Event Selector	AcquisitionTrigger FrameStart FrameEnd FVAL Start FVAL End ExposureStart ExposureEnd Line2RisingEdge Line2FallingEdge Line3RisingEdge Line3FallingEdge Line5RisingEdge Line5FallingEdge	Select the event for which to send notifications.
Event Notification	On	Output event messages.

Note: Event Notification is set to Off and event messages will not be output under factory default settings.

Gain Control

Related Setting Items: AnalogControl

[Analog All] can be used for gain control for both the monochrome and color camera. [Analog All] (master gain) uses the sensor's internal gain function and consists of analog gain + digital gain. Analog gain is used for lower gain, and analog gain + digital gain is used when the gain becomes high. R and B can be configured individually as digital gain on the color models.

Note: For details on how to configure the settings, see "Adjust the Gain".

The relationship between the gain setting value, gain amplification, and dB value is as follows. For example, a gain amplification of x5.62 will be 15 dB.

Monochrome
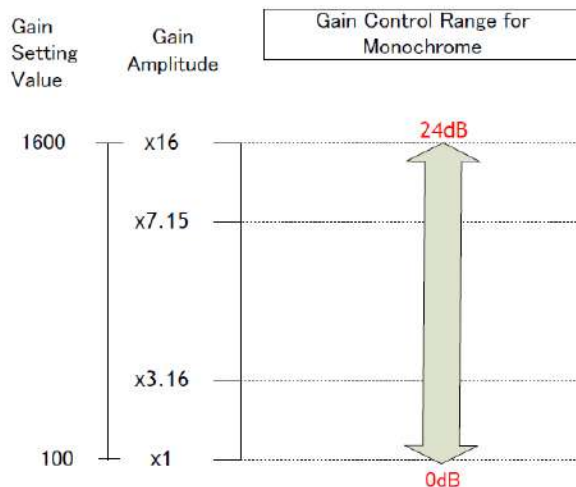
Bayer Color
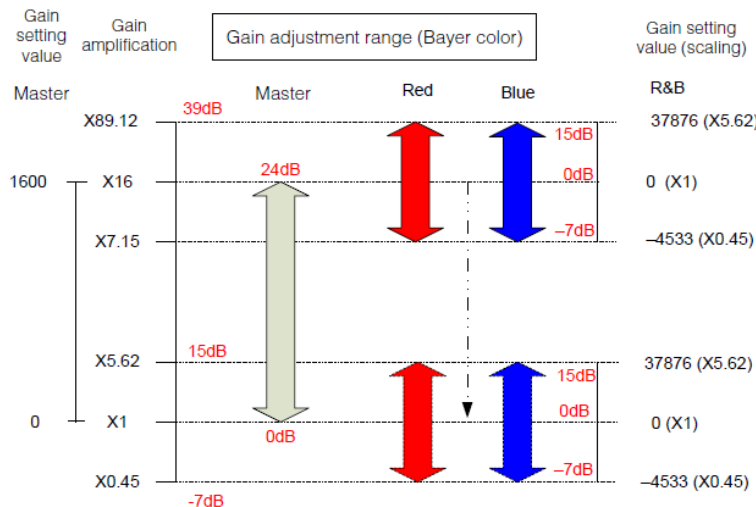
LUT (Lookup Table)

Related Setting Items: LUTControl

The LUT function is used to generate a non-linear mapping between signal values captured on the sensor and those that are output from the camera. You can specify the output curve using 257 setting points (indexes).

◼ To Use the LUT Function

Configure the settings as follows.

Item	Setting Value / Selectable Range	Description
JAI LUT Mode	LUT	Use LUT.
LUT Selector (Color models only)	Mono Model: Mono Color Model: Red, Green, Blue	Select the LUT channel to control.
LUT Index	0 ~ 256	Select the LUT index to configure. Indexes represent the possible pixel values captured on the sensor, from the lowest value (Index 0) to the highest (Index 256). For example, Index 0 represents a full black pixel and Index 255 represents a full white pixel.
LUT Value	0 ~ 4095	Set the LUT output value for the selected index.

◼ LUT Values

LUT values range from 0 at the lowest to 4095 at the highest. Linear interpolation is used to calculate LUT values between the index points.

Linear interpolation using points to the left and right is used to determine values between points.
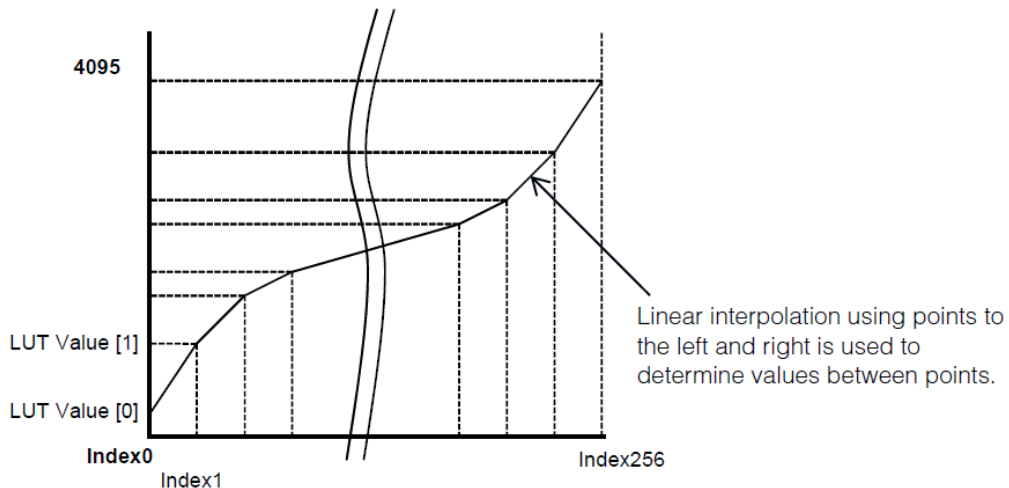
Gamma Function

Related Setting Items: AnalogControl

The gamma function corrects the output signals from the camera beforehand (reverse correction), taking into consideration the light-emitting properties of the monitor display. As the light-emitting properties of the monitor are not linear, the entire image may be darker or the gradation in the dark areas may be less noticeable when camera outputs are displayed without processing.

The gamma function can be used to correct the camera signals with an opposite-direction curve and produce a display that is close to linear.
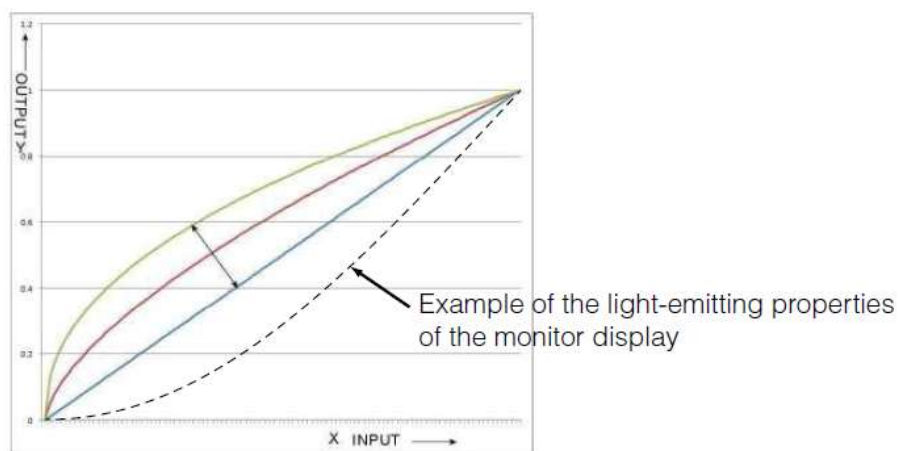
To Use the Gamma Function

Configure the settings as follows.

Item	Setting Value / Selectable Range	Description
Gamma	0.45, 0.60, 1.0 (Off)	Select the gamma correction value.
JAI LUT Mode	Gamma	Use gamma.

Note: You can use the LUT function to configure a curve with more detailed points. For details, see "LUT (Lookup Table)".

Line Status

Related Setting Items: Digital IO Control

The line status function allows you to verify the status of external input/output signals. You can verify the status of the following signals.

- Opt Out 1, Opt Out 2, Opt In 1

- Time Stamp Reset

- NAND Gate 0 In 1, NAND Gate 0 In 2, NAND Gate 1 In 1, NAND Gate 1 In 2

Defective Pixel Correction Function

Related Setting Items: JAICustomControlBlemish

Multiple defective pixels that are not adjacent to each other can occur on conventional CMOS sensor cameras. This camera features a function that interpolates defective pixels using the surrounding pixels. Up to 256 pixels can be corrected. Pixel interpolation can be performed via automatic detection or point-by-point manual settings.

Automatic Detection

Automatic detection can only detect lit defective pixels (i.e., white blemishes).

1. Shield the camera sensor. If a lens is attached, use the lens cap as a shield, for example.

2. Configure the threshold level for defective pixel detection. Specify the threshold value for the blemishes to be detected using the JAI Custom Control Blemish - Blemish Detect Threshold setting.

    - The threshold value is specified as a percentage

    - The default setting is "10" with 10% of the full scale (100%) specified as the threshold value.

3. Execute **Blemish Detect** to start automatic detection. After detection, the interpolation data is saved to the camera's internal memory.

■ **To check the number of interpolated pixels after automatic detection**

You can check the number of pixels interpolated via automatic detection by loading the BlemishNum data.

Manual configuration

1. Select the index in **Blemish Detect Position Index**.

   You can select from 0 to 255. However, configure the indexes in order starting with the smallest index. If you skip indexes while configuring settings, interpolation may not be performed.

2. Specify the pixel points for interpolation using the **Blemish Detect Position X** and **Blemish Detect Position Y** settings. Each point is saved to the camera's internal memory as you configure them.

   > **Note:** You can configure values that are within the total effective pixel area. Specify pixels for which interpolation is not necessary as -1. If 0 is specified, the first line or first pixel will be interpolated.

3. Set **Blemish Enable** to **True**, and execute interpolation. If False is specified, defective pixel interpolation is disabled.

ShadingCorrection

Related Setting Items: JAICustomControlShading

The shading correction is a function that corrects non-uniformity (i.e., shading) in the amount of light generated by the lens and lighting equipment. Using this function allows correction even if top, bottom, left, and right shading is not symmetrical in relation to the center of the screen (H, V).

The size of the correction block is 20 (H) × 17 (V) blocks and calculation errors in the correction data are minimized due to the small interpolation block. Each block is 128 × 128 pixels. The total size of the blocks is 2560 (H) × 2176 (V), but the actual number of effective pixels for the camera is 2464 (H) × 2056 (V). The ineffective peripheral areas will be deleted internally on the camera automatically.
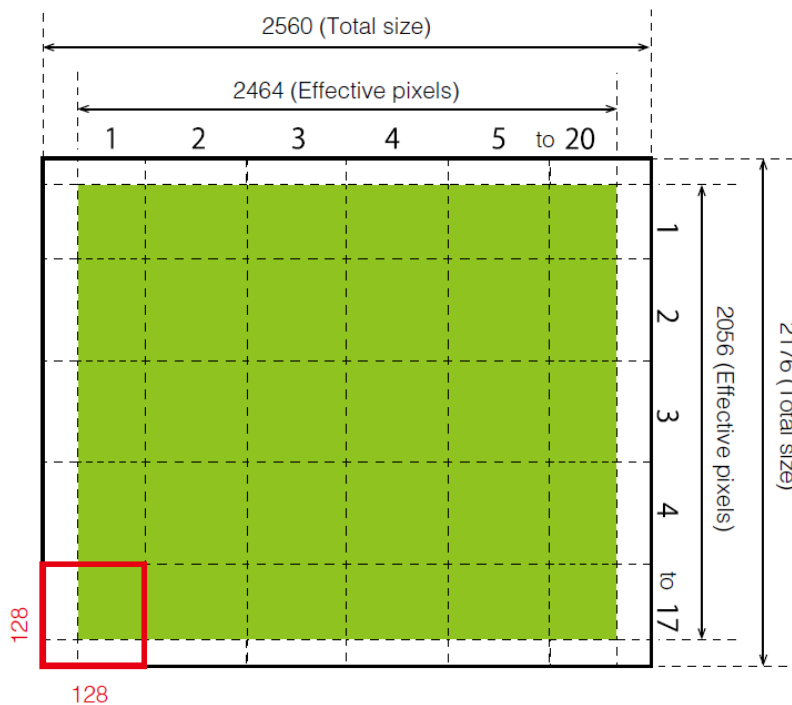
The following shading correction modes are available on the camera.

🟩 FlatShading

Correction is performed using the area of the screen with the highest brightness level as the reference, and adjusting the brightness levels of the other areas to match this level.
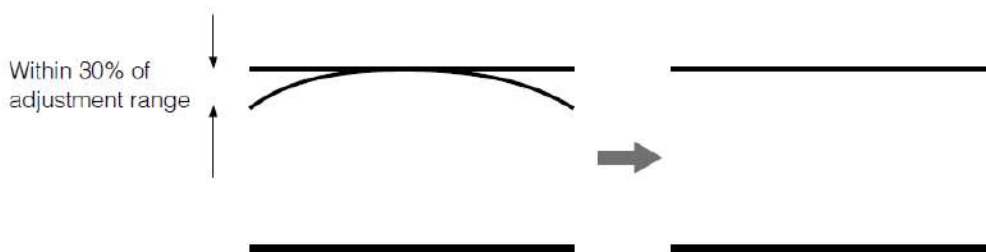
■ ColorShading (Color models only)

R-channel and B-channel properties are adjusted by using the G-channel shading properties as a reference.
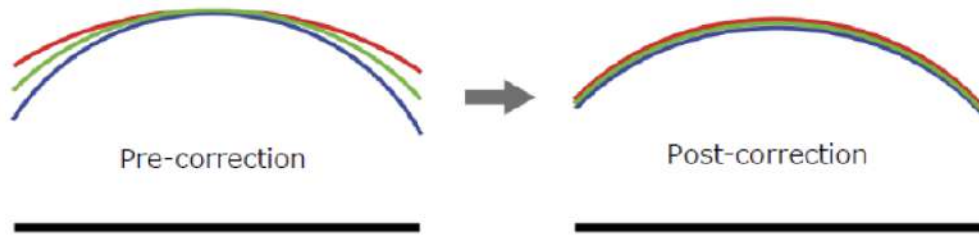
> **Cautions:**
> Proper correction is not possible under the following conditions.
>
> - If an area with a brightness level that is more than 30% less than the reference level exists within the screen
>
> - If the brightness level is saturated in parts or all of the screen
>
> - If the area in the screen with the highest brightness level is 300 LSB or less (during 10-bit video output)

To Use the Shading Correction Function

Configure the settings as follows.

Item	Setting Value	Description
ShadingCorrectionMode	• FlatShading • ColorShading (Color models only)	Select the shading correction mode.
ShadingMode	User1, User2, User3, Off	Select the user area to which to save the shading correction value.

Display a white chart under a uniform light, and execute **Perform Shading Calibration**.

> **Note:** After shading correction is executed, the shading correction value is automatically saved to the user area selected in **Shading Mode**.

Binning Function

> **Related Setting Items:** ImageFormatControl

The binning function allows you to combine the signal values of clusters of adjacent pixels to create improved virtual pixels. Using the function results in images with lower pixel resolution and higher sensitivity.

This camera performs vertical binning via internal addition processing on the sensor, and horizontal binning via digital addition or averaging processing. Pixels are added together during vertical binning, allowing for increased frame rates.

> **Notes:**
> - This function is supported only on the monochrome models.
>
> - This function cannot be used in video process bypass mode.
>
> - When Pixel Format is set to Mono12 or Mono12Packed, this function is disabled.

ROI (Region of Interest) Settings

> **Related Setting Items:** ImageFormatControl

The ROI (region of interest) function allows you to output images by specifying the areas to scan.

ROI Settings

Specify the area to scan by specifying width, height, and horizontal/vertical offset values under [Image Format Control]. For details on how to configure the settings, see "Step 5: Change the Camera Settings".

You can increase the frame rate by specifying a lower height, as the number of lines scanned decreases. The minimum area is as follows.

Camera Model	Width	Height
GO-5100M-PGE-1	Binning Off: 16	4
GO-5101M-PGE-1	Binning On: 8	
GO-5100C-PGE-1	16	4
GO-5101C-PGE-1		

Examples

Setting Example: 1	Setting Example: 2 (Monochrome models only)
Binning Horizontal = 1	Binning Horizontal = 2
Binning Vertical = 1	Binning Vertical = 2
Width Max: 2464, Height Max: 2056	Width Max: 1232, Height Max: 1028

> **Note:** For details on the frame rates for common ROI sizes, see "Frame Rate Reference".

Sensor Multi ROI Function

Related Setting Items: JAICustomControlMultiROI

Sensor Multi ROI is an ROI function that is configured and functions inside the sensor. You can configure up to 64 scanning regions (8 horizontal and 8 vertical).

By skipping areas that are not specified as regions of interest when scanning a frame, the sensor's ROI function outputs the specified regions in a compressed state. You can increase the frame rate due to the reduced scanning time for the compressed areas. However, you cannot make the line frequency faster by compressing in the horizontal direction.

Note: This function is supported only on GO-5100M-PGE-1 and GO-5100C-PGE-1.
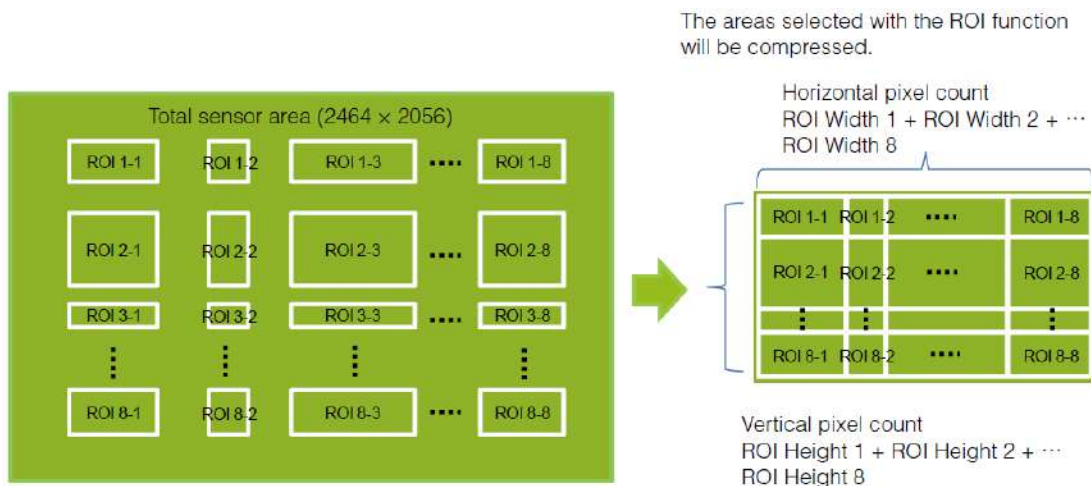
Restrictions

- The specified areas cannot overlap.

- The frame rate can be increased in relation to size of the area specified in the vertical direction, but not in relation to the horizontal direction.

- In the horizontal direction, the configuration for the second and subsequent row will be identical. In the vertical direction, the configuration for the second and subsequent column will be identical.

◼ Configuration

Configure each area so that they do not overlap. Both the horizontal and vertical settings must be configured as even values.

Horizontal ROI conditions

ROIOffsetH1 + ROIWidth1 < ROIOffsetH2

ROIOffsetH1 + ROIWidth1 < ROIOffsetH2

…

ROIOffsetH7 + ROIWidth7 < ROIOffsetH8

ROIOffsetH8 + ROIWidth8 < 2464

Vertical ROI conditions

ROIOffsetV1 + ROIHeight1 < ROIOffsetV2

ROIOffsetV2 + ROIHeight2 < ROIOffsetV3

…

ROIOffsetV7 + ROIHeight7 < ROIOffsetV8

ROIOffsetV8 + ROIHeight8 < 2056

Configure the eight index settings (Index 1 to 8). The OffsetH, Width, OffsetV, Height, Horizontal Enable, and Vertical Enable settings can be configured for each index.

When you configure the OffsetH, Width, OffsetV, and Height settings for an index and set Horizontal Enable or Vertical Enable to True for that index, the corresponding area is configured.

OffsetH、Width: 16 pixels/step

OffsetV、Height: 2 lines/step
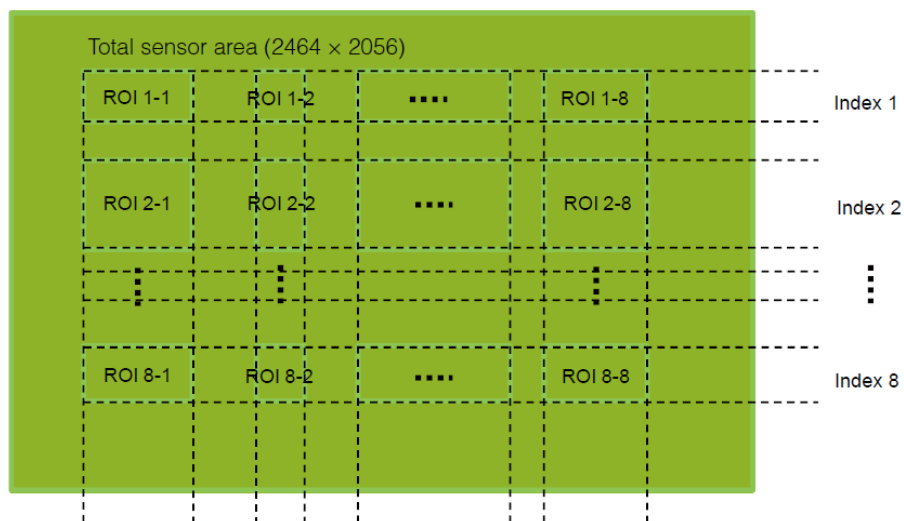
▇ Frame Rate Calculation Formula

FR = line frequency ÷ (ROIHeight1 + ROIHeight2 + … ROIHeight8 + 40)

There are two types of line frequencies.

- 10 bit = 1/0.0000134141 = 74.5484 kHz

- 12 bit = 1/0.0000263434 = 37.9602 kHz

Vertical invalid line: 40 (fixed)

> **Note:** Although the maximum frame rate value is determined by the sensor's line frequency, when multi-ROI is configured, the frame rate may be limited by the available GigE bandwidth.

Sequence Function

> **Related Setting Items:** SequencerControl

The Sequencer function lets you define up to 128 preset combinations of exposure time, gain, ROI, and other settings which can be stepped through each time a trigger is received. This is particularly useful for quickly capturing multiple exposures of objects under inspection to adjust for areas or components with significantly different levels of reflectance. The order of execution and the repetition of particular presets are based on user-defined parameters configured in [Sequencer Control].

Two operation modes (Trigger Sequencer mode and Command Sequencer mode) are available for the Sequencer function.

Trigger Sequencer Mode

With this mode, the Sequencer Trigger "pattern" is predetermined by the user. The user defines up to 128 different "indexes." Each index represents a combination of the following parameters:

- ROI (width, height, offset X, and offset Y)

- Exposure Time

- Gain Level (R/B Gain can also be configured on the color model)

- Black Level

- Binning Mode (monochrome only)

- LUT Enable (whether or not to enable the use of LUT for this index)

- Frame Count (the number of times to repeat this index before moving to the next)

- Next Index to execute in the predetermined pattern

In addition to these individual index parameters, two other parameters are applied to the entire sequence:

Sequencer LUT Mode defines whether Gamma or LUT is to be applied to the sequence. If Gamma is selected, the Gamma setting defined in the camera's Analog Control section will be applied to all exposures in the sequence. If LUT is selected, the LUT characteristics defined in Analog Control will be applied to any index where Sequencer LUT enable has been set to ON.

Reset Sequencer Reset causes the index selector to be reset to Index 1. Thus, the sequencer pattern will start over at the next trigger.

In Trigger Sequencer mode, patterns begin with the index of Sequencer Set Start. Subsequent triggers follow the user-defined values in Sequencer Index Frame Count and Sequencer ROI Next Index. Assigning a Next Index value of "1" to an index creates a loop back to the start of the sequencer pattern. Setting a Next Index value to "OFF" causes the value of Sequencer Repetition to be applied as described below.

Sequencer Repetition

This parameter applies to Trigger Sequencer patterns which include an index whose Sequencer ROI Next Index is set to OFF. When the index whose Sequencer ROI Next Index is set to OFF is finished executing, the value of Sequencer Repetition (range = 1 ~ 255) is decremented internally. If the result of the decrement is not zero, the Trigger Sequencer pattern starts over from Index1. If the result of the decrement is zero, the status changes to Acquisition Stop and external triggers are not accepted.

▊ Trigger Sequencer Examples

- User-defined Indexes (up to 128)
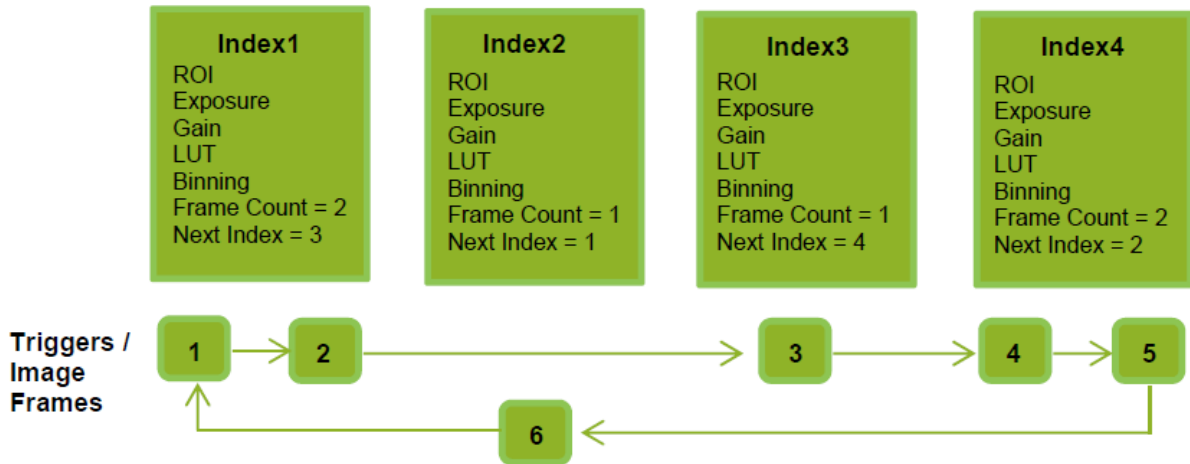
- Index Structure for Trigger Sequencer
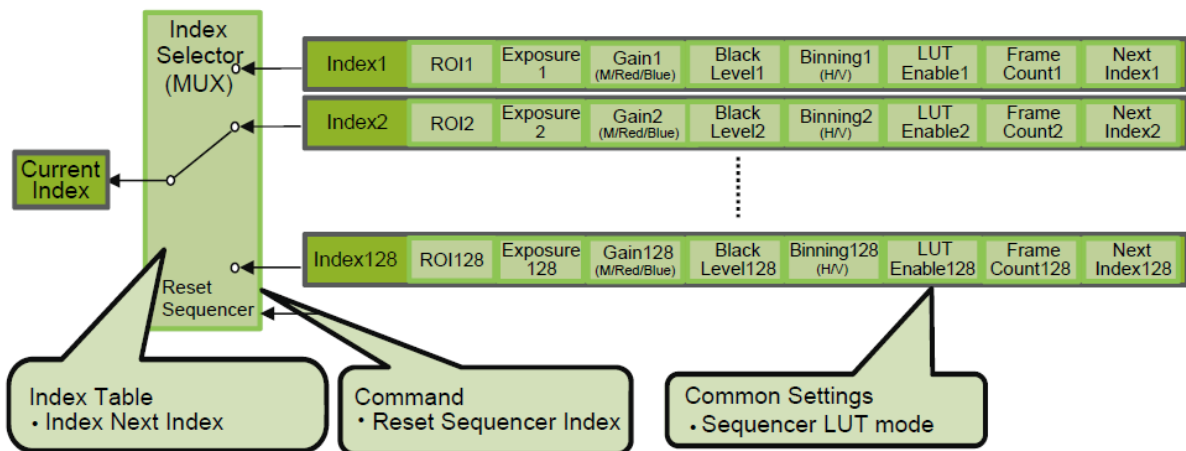
Command Sequencer Mode

This mode allows the user to vary the "pattern" of the sequence in response to external factors. Changes in the sequence can be initiated manually or in a programmatic fashion as the result of data from sensors/controllers or from the analysis of previous images.

In this mode, the user can define up to 128 different "indexes" each incorporating a combination of:

- ROI (width, height, offset X, and offset Y)

- Exposure Time

- Gain Level (R/B Gain can also be configured on the color model)

- Black Level

- Binning Mode (monochrome only)

- LUT Enable (whether or not to enable the use of LUT for this index)

The user must also enter a value from 1 to 128 in Command Sequencer Index. This indicates which index to execute each time a trigger is received. The same index will continue to be executed for all subsequent triggers as long as the value of Command Sequencer Index remains unchanged.

Changing the value of Command Sequencer Index to one of the other predefined indexes causes that index to be executed in response to subsequent triggers. This mode of operation enables users to develop applications that continually send new values to Command Sequencer Index in response to external factors such as changing light conditions, different types or sizes of objects being inspected, or other factors. This allows applications to change ROI, exposure, gain, etc., without being restricted to a predefined pattern.

As with Trigger Sequencer, Sequencer LUT Mode defines whether Gamma or LUT is to be applied to the sequence. If Gamma is selected, the Gamma setting defined in the camera's Analog Control section will be applied to all exposures in the sequence. If LUT is selected, the LUT characteristics defined in Analog Control will be applied to any index where Sequencer LUT enable has been set to ON.

Sequencer Index Frame Count, Sequencer ROI Next Index, and Reset Sequencer Index are not used in Command Sequencer mode and entered values are ignored.

Command Sequencer Examples

- User-defined Indexes (up to 128)
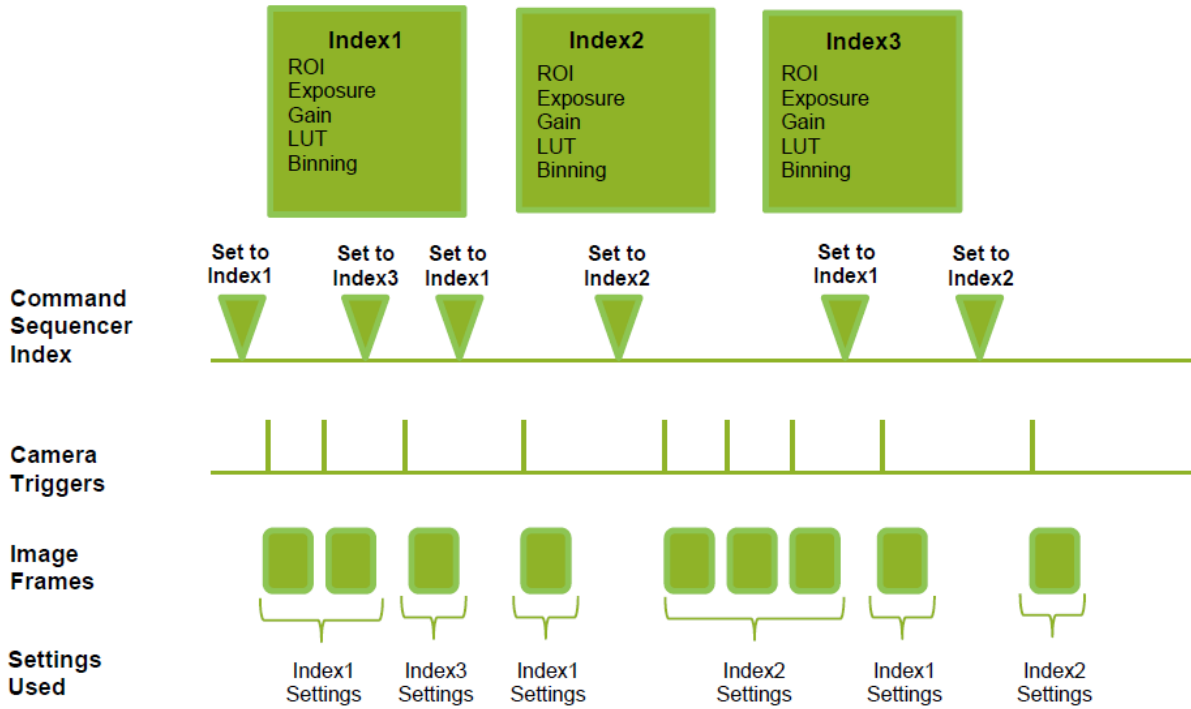
- Index structure for Command Sequencer
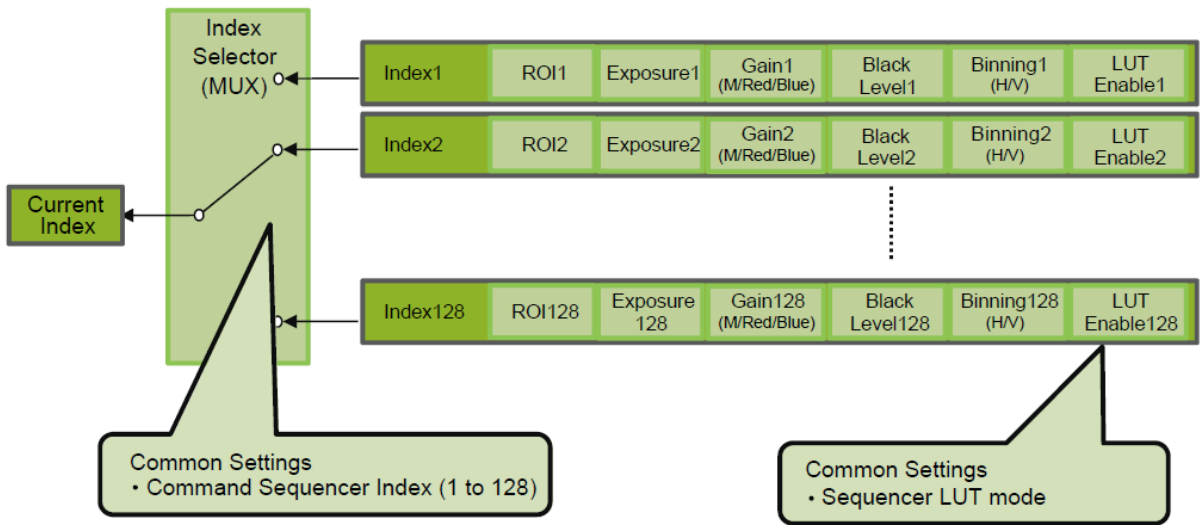
Delayed ReadOut

Delayed readout enables images captured by a Frame Start trigger command to be stored inside the camera and read out on demand at a later time using Acquisition Transfer Start trigger. This can be especially useful when multiple cameras need to be triggered at the same time, but simultaneous readout of all images would overwhelm the available network bandwidth. The delayed readout buffer can hold up to 7 frames in 8-bit mode or 3 frames in 10-bit or 12-bit modes.

> **Note:** For details, see "Trigger Control".

ALC (Automatic Level Control) Function

> **Related Setting Items:** JAICustomControlALC

The ALC (automatic level control) function combines the automatic gain control (AGC/Auto Gain Control) and automatic exposure control (ASC/Auto Shutter Control) functions, and is capable of handling various changes in brightness.

The function operates as follows in response to changes in brightness.

- If the lighting condition is changed from bright to dark ASC — AGC

- If the lighting condition is changed from dark to bright AGC — ASC
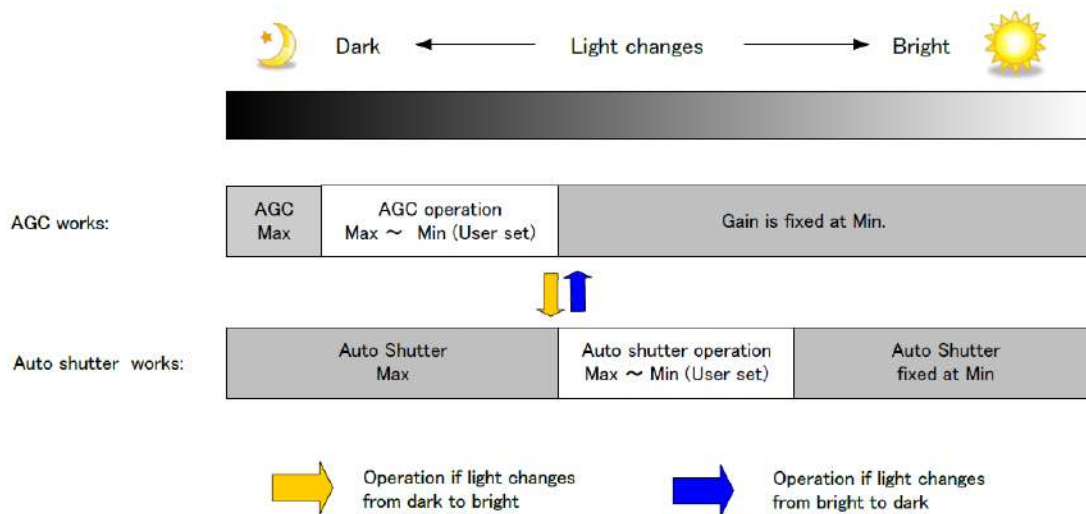
■ To Use the ALC Function

Set **Gain Auto** or **Exposure Auto** or both to **Continuous** mode. Configure the minimum value, maximum value, etc. for AGC and ASC under JAI Custom Control ALC. The target video levels for AGC and ASC are configured in ALC Reference. For example, when ALC Reference is set to 100%, video levels will be maintained at 100% for AGC and ASC.

🟩 **Automatic Gain Level Control**

Set **Gain** to **Continuous**.

Detailed Settings for Gain Auto (Automatic Gain Level Control)

When Gain Auto is set to Continuous, you can configure the conditions for automatic adjustment in detail.

Item	Description
ALC Reference	Specify the target level for automatic gain control. (This setting is also used for automatic exposure control.)
ALC Area Enable All	Select whether to specify all areas as auto gain metering areas or whether to specify the areas individually. • 0: Specify areas as auto gain metering areas (16 areas) individually. • 1: Specify all areas as auto gain metering areas.
ALC Area Selector	Individually select any of 16 areas for automatic gain metering. (This setting is also used for automatic exposure control.)
ALC Area Enable	Select True to enable the metering area selected in ALC Area Selector, or select False to disable it.
AGC Max.	Specify the maximum value for the automatic gain control range.
AGC Min.	Specify the minimum value for the automatic gain control range.
AGC/ASC Control Speed	Specify the reaction speed for automatic gain control. (This setting is also used for automatic exposure control.)

🟩 **Auto Gain Metering Areas (16 Areas)**

High Left	High Mid-Left	High Mid-Right	High Right
Mid-High Left	Mid-High Mid-Left	Mid-High Mid-Right	Mid-High Right
Mid-Low Left	Mid-Low Mid-Left	Mid-Low Mid-Right	Mid-Low Right
Low Left	Low Mid-Left	Low Mid-Right	Low Right

PTP (Precision Time Protocol) Function

Related Setting Items: TransportLayerControl

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The camera can work as the slave for Precision Time Protocol defined in IEEE 1588. When the IEEE 1588 master clock exists in the network where the camera is connected, this function synchronizes the camera to the time of the master clock.

- Transport to be used: Multicast UDP datagram (224.0.1.129); however, Delay Resp is a unicast UDP datagram.

- Destination port number:

    - 319 : Sync, Delay Req, Pdelay Req, Pdelay Resp

    - 320 : Announce, Follow Up, Delay Resp, Pdelay Resp, Management, Signaling

- Items for synchronization: Time synchronization is performed. Frequency tuning is not performed.

- PTP time data: 80 bit (elapsed time in 1 ns, with 00:00:00, January 1 1970 set as the origin)

- Timestamp (this camera): 64 bit* (PTP synchronization: LSB64bit* of PTP time data)

- Supported PTP messages: Announce message (receive only), Sync message (receive only), Follow Up message (receive only), Delay Req message (send only), Delay Resp message (receive only)

Cautions:
- The Timestamp Tick Frequency register value is fixed at 1,000,000,000 (1 GHz).

- When PTP synchronization is being performed, the Timestamp Reset function is disabled.

- Because GenICam treats the timestamp (64 bit) as a 64 bit signed integer, 63 bit is actually timestamp data without the sign bit.

■ **How To Configure**

1. Set **GevIEEE1588** (TransportLayerControl) to **True**.

2. After several statuses from Disable, when a Sync Message is received from the PTP server, **Slave** is Displayed in **GevIEEE1588 Status**.

Edge Enhancer

Related Setting Items: JAICustomControlMisc

This camera is equipped with an Edge Enhancer function for enhancing the contrast of lines or edges within images.

Edge Enhancer Function

The Edge Enhancer function is enabled when EdgeEnhancerEnable is set to True. Four enhancement levels are available: Low, Middle, High, and Strong.

Note: On this camera, this function is only available for monochrome models.
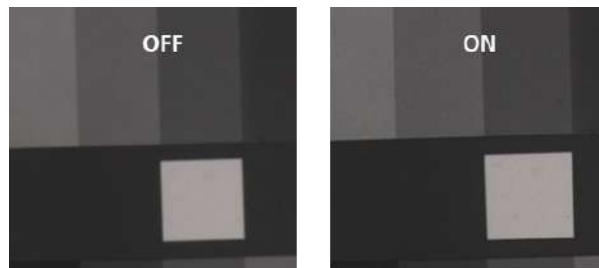
Counter and Timer Control Function

Related Setting Items: JAICustomCounterAndTimerControl

Note: This camera supports only the counter function.

The counter function counts up change points in the camera's internal signals using the camera's internal counter and reads that information from the host side. This function is useful for verifying error conditions via the count value using internal camera operations.

Counting is performed at frame trigger, frame start, exposure start, and exposure transfer end, and by comparing these values, you can determine the internal camera state at which missed triggers will occur.

Counter Occurrence Diagram
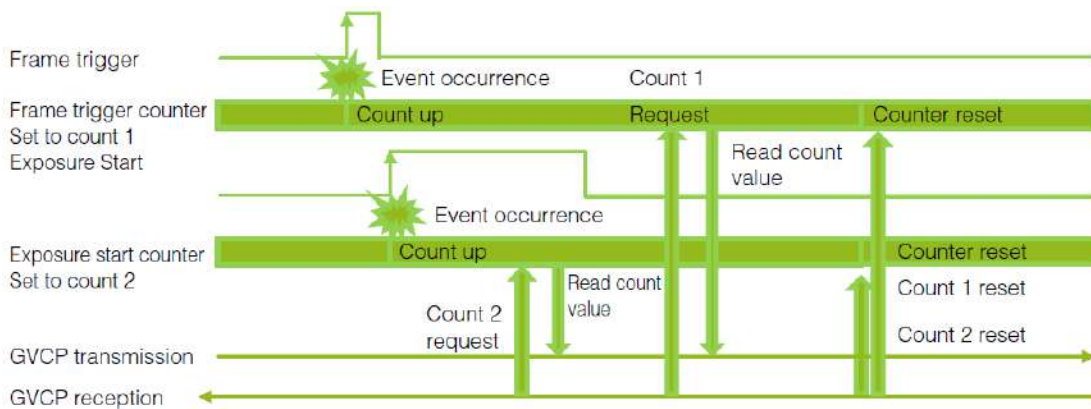
Note: To reset the counter itself, execute [Counter Reset] or enter "1" in [Counter Reset].

Internal Camera Blocks
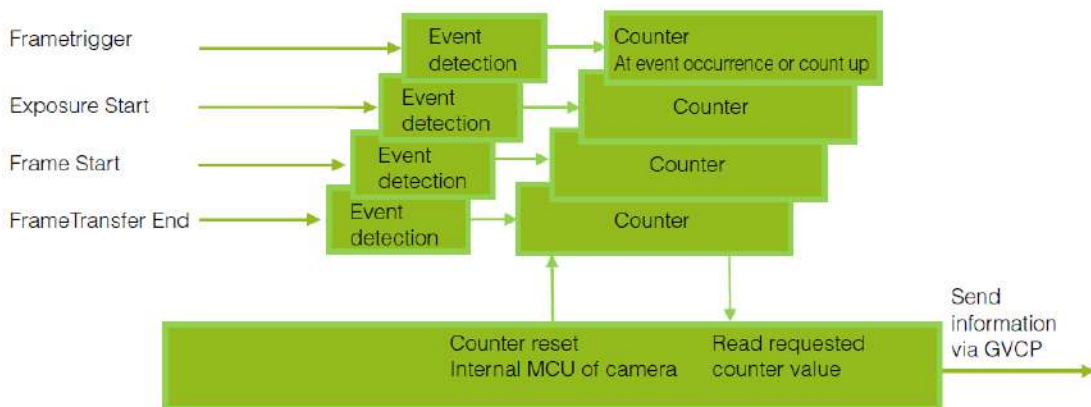
To Use the Counter Function

Configure the settings as follows. Three counters can be configured (Counter 0 to 2).

Item	Setting Value / Selectable Range	Description
Counter 0 ~ 2	Counter 0 ~ 2	Select the counter.
Counter 0 ~ 2 Event Source	Off Frame Trigger Frame Start Exposure Start Frame Transfer End	Select the counter event signal for which to read the count value.
Counter 0 ~ 2 Event Activation	Rising Edge (Fixed) or Falling Edge	Specify the timing at which to count.

Note: The four counter event signals are always counted up internally on the camera.

Non-Volatile Flash Memory

🔍 **Technical Notes**　Storing Data in On-Camera Flash Memory

The camera has non-volatile memory for users to store data. Refer to the technical note "Storing Data in On-Camera Flash Memory" for more information.

Note: JAI strongly recommends saving images to the PC or other storage location because the non-volatile flash memory may not have enough memory size to store large data.

Video Process Bypass Mode

The video process bypass mode is a function that bypasses internal video processing on the camera. When bypass is enabled, the sensor output and camera output data can be set to the same bit width. Operation using 12-bit outputs must be performed in bypass mode.

Video Process Bypass Mode	ON	OFF
Camera operation	All video processes except Gain all (excluding R/B Gain) and Blemish Compensation are disabled.	All video processes are enabled.
Camera output	8/10/12 bit	8/10 bit

■ **Differences in camera operation**

- **Video Process Bypass Mode = OFF**: All video processes are enabled.

- **Video Process Bypass Mode = ON**: All video processes except Gain all (excluding R/B Gain) and Blemish Compensation are disabled.

Note: Binning function cannot be used in video process bypass mode.

■ **To enable video process bypass mode**

1. Set **VideoProcessBypassMode** (JAICustomControlMisc) to **On**.
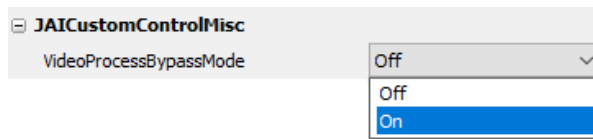
Settings List

This chapter lists the feature properties.

DeviceControl

Display/configure information related to the device.

Device Control Item	Setting Range	Default	Description
Device Vendor Name	-	"JAI Corporation"	Display the manufacturer name.
Device Model Name	-	-	Display the model name.
Device Manufacturer Info	-	"See the possibilities"	Display the manufacturer information.
Device Version	-	-	Display the hardware version.
Device Firmware Version	-	-	Display the firmware version.
Device Serial Number	-	-	Display the device ID.
Device User ID	Any	-	Set the user ID for the camera.
Device Temperature	-	-	Display the internal temperature (°C) of the camera.
Device Reset	-	-	Reset the device.

ImageFormatControl

Configure image format settings.

Image Format Control Item	Setting Range	Default	Description
Sensor Width	2464	2464	Display the maximum image width.
Sensor Height	2056	2056	Display the maximum image height.
Sensor Digitization Taps	12 Bit	12 Bit	Displays the digital tones output from the sensor.
Width Max	2464	2464	Display the maximum image width.
Height Max	2056	2056	Display the maximum image height.
Width	16(8)* ~ 2464(1232)* *When Binning = 2, the value in "( )" is applicable.	2464	Set the image width. **Related Topic:** ROI (Region of Interest) Settings
Height	4 ~ 2056 (1028)* *When Binning = 2, the value in "( )" is applicable.	2056	Set the image height.
Offset X	0 ~ 2448 (1224)* *When Binning = 2, the value in "( )" is applicable.	0	Set the horizontal offset.

Image Format Control Item	Setting Range	Default	Description
Offset Y	0 ~ 2052 (1024)* *When Binning = 2, the value in "( )" is applicable.	0	Set the vertical offset.
Binning Horizontal Mode	Sum Average	Sum	Set the addition process to be used during horizontal binning. (Monochrome models only) **Related Topic:** Binning Function
Binning Horizontal	1 ~ 2	1	Set the number of pixels in the horizontal direction for which to perform binning. (Monochrome models only)
Binning Vertical Mode	Sum	Sum	Display the addition process to be used during vertical binning. (Monochrome models only)
Binning Vertical	1 ~ 2	1	Set the number of pixels in the vertical direction for which to perform binning. (Monochrome models only)
Pixel Format	Mono Model Mono8 Mono10 Mono10 Packed Mono12 Mono12 Packed Color Model BayerRG8 BayerRG10 BayerRG10 Packed BayerRG12 BayerRG12 Packed	Mono8 BayerRG8	Set the pixel format. Mono12, BayerRG12, Mono12Packed and BayerRG12Packed are enabled when **Video Process Bypass** is set to **On**.
Test Image Selector	Off GreyHorizontalRamp GreyVerticalRamp GreyHorizontalRampMoving HorizontalColorBar* VerticalColorBar* MovingColorBar*	Off	Select the test image. *Color models only

AcquisitionControl

Configure image acquisition settings.

Acquisition Control Item	Setting Range	Default	Description
Acquisition Mode	Single Frame Multi Frame Continuous	Continuous	Select the image acquisition mode. **Related Topic:** Acquisition Control
Acquisition Start	-	-	Start image acquisition.
Acquisition Stop	-	-	Stop image acquisition.
Acquisition Frame Count	1 ~ 255	1	In **Multi Frame** mode, set the number of frames to acquire.
Acquisition Frame Rate (Hz)	0.125 ~ 22.7004 (Full)	22.7004	Set the frame rate as a frequency. (unit: Hz) The maximum value varies depending on the ROI, Pixel Format and/or Binning settings.
Trigger Selector	Acquisition Start Acquisition End Frame Start Acquisition Transfer Start	Frame Start	Select the trigger operation. **Related Topic:** Trigger Control
Trigger Mode	Off On	Off	Select the trigger mode.
Trigger Software	-	-	Execute a software trigger.
Trigger Source	Low High Software Pulse Generator0 User Output 0 ~ 1 Action 1 ~ 2 Line 5 - Optical In 1 Nand0 Out Nand1 Out	Line 5 - Optical In 1	Select the trigger signal source.
Trigger Activation	Rising Edge Falling Edge Level High Level Low	Rising Edge	Select the polarity of the trigger signal (i.e., location of signal at which trigger is applied).
Trigger OverLap	Off Readout	Off	Select the trigger overlap operation.
Trigger Delay (μs)	0 ~ 500000	0	Sets the time to delay the trigger.

Acquisition Control Item	Setting Range	Default	Description
Exposure Mode	Off Timed TriggerWidth	Timed(control via exposure time)	Select the exposure mode. **Related Topic:** Exposure Mode
Exposure Time	8 bit: 1 ~ 7999810 10/12 bit: 1 ~ 7999630	43864	Set the exposure time. The maximum value when **Trigger Mode** is set to **Off** varies depending on the [Acquisition Frame Rate Raw] value.
Exposure Auto	Off Continuous	Off	Set whether to enable auto exposure.

EventControl

Related Topic: Event Control

Configure event control settings.

Event Control Item	Setting Range	Default	Description
Acquisition Mode	AcquisitionTrigger FrameStart FrameEnd FVAL Start FVAL End ExposureStart ExposureEnd Line2RisingEdge Line2FallingEdge Line3RisingEdge Line3FallingEdge Line5RisingEdge Line5FallingEdge	AcquisitionTrigger	Select the event for which to send notifications.
Event Notification	Off On	Off	Select whether to output event messages.

AnalogControl

Configure analog control settings.

Analog Control Item	Setting Range	Default	Description
GainSelector	AnalogAll DigitalRed* Digital Blue*	AnalogAll	Select the gain to configure. *Color models only **Related Topic:** Gain Control
Gain	AnalogAll: 1 ~ 16 DigitalRed/Blue*: 0.4467 ~ 5.6235	AnalogAll: 1 DigitalRed*:1 Digital Blue*: 1	Set the gain value for the gain setting selected in [Gain Selector]. *Color models only
Black Level Selector	DigitalAll DigitalRed* Digital Blue*	DigitalAll	Select the black level to configure. *Color models only **Related Topic:** Adjust the Black Level
Black Level	- 133 ~ 255	0	Set the black level value.
Gain Auto	Off Continuous	Off	Enable/disable gain auto adjustment.
Balance White Auto Color models only	Off Once Continuous	Off	Enable/disable auto white balance. **Related Topic:** Adjusting the White Balance
Gamma	0.45 0.60 1.0	0.45	Set the gamma value. **Related Topic:** Gamma Function
JAI LUT Mode	Off Gamma LUT	Off	Select the JAI LUT mode.

LUTControl

Related Topic: LUT (Lookup Table)

Configure LUT settings.

LUT Control Item	Setting Range	Default	Description
LUT Selector *Color models only	Red Green Blue	Green	Select the LUT channel to control.
LUT Index	0 ~ 256	0	Set the LUT index table number.
LUT Value	0 ~ 4095	0	Set the LUT value.

SequencerControl

Related Topic: Sequence Function

Configure sequencer settings.

Sequencer Control Item	Setting Range	Default	Description
Sequencer Mode	Off On	Off	Enable/disable Sequencer Mode.
Sequencer Mode Select	Trigger Sequencer Mode Command Sequencer Mode	Trigger Sequencer Mode	Select the Sequencer Mode.
Sequencer Configuration Mode	Off On	On	Select **On** to change the settings within the index.
Sequencer Set Selector	1 ~ 128	1	Select the Trigger Sequencer mode and Command Sequencer mode index.
Sequencer Frame Number	1 ~ 255	1	Set the number of frames to display for the selected Sequencer Index. (Enabled only for Trigger Sequencer.)
Sequencer Set Next	1 ~ 128	1	Set the next index to be displayed for the selected Sequencer Index. (Enabled only for Trigger Sequencer.)
Sequencer Width	16 ~ 2464	2464	Set the width of the selected Sequencer Index.
Sequencer Height	4 ~ 2056	2056	Set the height of the selected Sequencer Index.
Sequencer Offset X	0 ~ 2448	0	Set the horizontal offset value for the selected Sequencer Index.

Sequencer Control Item	Setting Range	Default	Description
Sequencer Offset Y	0 ~ 2052	0	Set the vertical offset value for the selected Sequencer Index.
Sequencer Gain	100 ~ 1600	100	Set the gain for the selected Sequencer Index.
Sequencer Gain Red	- 4533 ~ 37876	1024	Set the red gain for the selected Sequencer Index.
Sequencer Gain Blue	- 4533 ~ 37876	1024	Set the blue gain for the selected Sequencer Index.
Sequencer Exposure Time	1 ~ 8000000	18000	Set the exposure time for the selected Sequencer Index.
Sequencer Black Level	- 133 ~ 255	0	Set the black level for the selected Sequencer Index.
Sequencer LUT Enable	False True	False	Enable/disable the LUT setting for the selected Sequencer Index.
Sequencer H Binning	1 2	1	Set the horizontal binning for the selected Sequencer Index.
Sequencer H Binning	1 2	1	Set the vertical binning for the selected Sequencer Index.
Sequencer Repetition	1 ~ 255	1	Set the repeat count for the sequencer.
Sequencer LUT Mode	Gamma LUT	Gamma	Set the sequencer LUT mode.
Sequencer Set Active	-	-	Displays the active LUT number.
Sequencer Command Index	1 ~ 128	1	Set this to change the Sequencer Index. (Enabled only for Command Sequencer.)
Sequencer Set Start	-	1	Set the index number that is used when executing **Sequencer Reset** in Trigger Sequencer mode or Command Sequencer mode.
Sequencer Reset	-	-	Reset the current index number to the number configured in Sequencer Set Start.

Digital IO Control

Related Topic: GPIO (Digital Input/Output Settings)

Configure settings for digital input/output.

Digital IO Control Item	Setting Range	Default	Description
Line Selector	Line2 - Opt Out 1 Line3 - Opt Out 2 Line5 - Opt In 1 Time Stamp Reset NAND Gate 0 In 1 NAND Gate 0 In 2 NAND Gate 1 In 1 NAND Gate 1 In 2	Line2 - Opt Out 1	Select the input/output to configure.
LineSource	Low High Acquisition Trigger Wait Acquisition Active Frame Trigger Wait Frame Active Exposure Active FVAL LVAL User Output 0 User Output 1 Line 5 - Opt In 1 Pulse Generator 0 Nand0 Out Nand1 Out	Low	Select the line source signal for the item selected in Line Selector.
Line Inverter	False True	False	Enable/disable polarity inversion for the selected input signal or output signal.
Line Status	False True	True	Display the status of the input signal or output signal (True: High, False: Low). **Related Topic:** Line Status
Line Mode	Input Output	Output	Display the input/output status (whether it is input or output).
Line Format	-	Opto Coupled	Display the current I/F type.
Line Status All	-	0x00	Display status of input signal.

Digital IO Control Item	Setting Range	Default	Description
User Output Selector	User Output 0 User Output 1	User Output 0	Set the user output signal.
User Output Value	False True	False	Set the value for the User Output selected in User Output Selector.

PulseGenerators

Configure pulse generator settings.

Pulse Generator Item	Setting Range	Default	Description
Clock Pre-scaler	1 ~ 4096	165	Set the division value for the prescaler (128-bit length) using the pixel clock as the base clock.
Pulse Generator Clock (MHz)	0.018127 ~ 74.25	0.45	Set the clock used for the pulse generator. This value is calculated using the Clock Pre-scaler value as a base.
Pulse Generator Selector	Pulse Generator 0	Pulse Generator 0	Select the pulse generator.
Pulse Generator Length	1 ~ 1048575	30000	Set the maximum count-up value as a clock count.
Pulse Generator Length (ms)	0.000013468 ~ 14.1222	66.6667	Set the maximum count-up value in milliseconds. This value is calculated using the Pulse Generator Length value as a base. The setting range varies depending on the Clock Pre-scaler value.
Pulse Generator Frequency (Hz)	70.810386 ~ 74250000	15	Set the maximum count-up value as a frequency. This value is calculated using the Pulse Generator Length value as a base.
Pulse Generator Start Point	0 ~ 1048574	0	Set the start point of the High interval as a clock count. When the counter reaches this value, the output will be 1.
Pulse Generator Start Point (ms)	0 ~ 14.1222	0	Set the start point of the High interval in milliseconds. When the counter reaches this value, the output will be 1. The setting range varies depending on the Clock Pre-scaler value.
Pulse Generator End Point	1 ~ 1048575	15000	Set the start point of the Low interval as a clock count. When the counter reaches this value, the output will be 0.
Pulse Generator End Point (ms)	0.000013468 ~ 14.1222	33.3333	Set the start point of the Low interval in milliseconds. When the counter reaches this value, the output will be 0. The setting range varies depending on the Clock Pre-scaler value.
Pulse Generator Pulsewidth (ms)	0 ~ 14.1222	33.3333	Display the High interval width of the pulse in milliseconds. The duration between the Start Point and End Point is calculated. The setting range varies depending on the Clock Pre-scaler value.
Pulse Generator Repeat Count	0 ~ 255	0	Set the repeat count for the counter. When this is set to **0**, a free counter is enabled with no repeat limit.

Pulse Generator Item	Setting Range	Default	Description
Pulse Generator Clear Activation	Off High Level Low Level Rising Edge Falling Edge	Off	Set the clear signal condition for the count clear input of the pulse generator.
Pulse Generator Clear Source	Low High Acquisition Trigger Wait Frame Trigger Wait Frame Active Exposure Active FVAL LVAL User Output 0 User Output 1 Action 1 Action 2 Line 5 - Opt In 1 Nand0 Out Nand1 Out	Low	Select the count clear input signal source.
Pulse Generator Clear Inverter	False True	False	Select whether to invert the polarity of the count clear input signal.
Pulse Generator Clear Sync Mode	Async Mode Sync Mode	Async Mode	Select the sync mode for the count clear input signal.

TransportLayerControl

Display information on transport layer control.

Transport Layer Control Item	Setting Range	Default	Description
Payload Size	-	5065984	Display the payload size.
GigE Vision Major Version	-	2	Display the GigE version.
GigE Vision Minor Version	-	0	Display the GigE version.
Is Big Endian	False True	True	Display the endianness.
Character Set	-	UTF8	Display the character set.
Interface Selector	-	0	Set the interface.
Mac Address	-	-	Display the MAC address.

Transport Layer Control Item	Setting Range	Default	Description
Current IP Configuration LLA	False True	True	Display whether the current IP configuration is calibrated by LLA (linklocal address).
Current IP Configuration DHCP	False True	True	Select whether to set the IP configuration to DHCP.
Current IP Configuration Persistent IP	False True	False	Select whether to set the IP configuration to persistent IP.
Current IP Address	-	-	Display the IP address.
Current Subnet Mask	000.000.000.000 ~ 255.255.255.255	255.255.0.0	Display the subnet.
Current Default Gateway	000.000.000.000 ~ 255.255.255.255	0.0.0.0	Display the default gateway.
GigE Vision Supported Option Selector	See the memo on "Supported GigEVision Options".	Link Local Address configuration	Select the supported options for GigE Vision.
Supported Option	False True	True	Enable/disable the supported options.
First URL	-	Local:XXXXXX	Display the first URL.
Second URL	-	-	Display the second URL.
Number Of Interfaces	-	1	Display the number of interfaces.
Persistent IP Address	000.000.000.000 ~ 255.255.255.255	0.0.0.0	Set the persistent IP address.
Persistent Subnet Mask	000.000.000.000 ~ 255.255.255.255	0.0.0.0	Set the persistent subnet mask.
Persistent Default Gateway	000.000.000.000 ~ 255.255.255.255	0.0.0.0	Set the persistent default gateway.
Message Channel Count	-	1	Display the message channel count.
Heartbeat Timeout	500 ~ 2147483647	3000	Set the timeout value for heartbeat.
Timestamp Tick Frequency	-	1000000000	Display the timestamp frequency.
Timestamp Control Latch	-	-	Latch the timestamp value.
Timestamp Control Reset	-	-	Reset the timestamp value.
Timestamp Tick Value	-	0	Display the timestamp value.
CCP (Control Channel Privilege)	-	Control Access	Display the control channel privilege.
MCHostPort (Message Channel Port)	-	-	Set the port number for the message channel.
MCDA (Message Channel Destination Address)	000.000.000.000 ~ 255.255.255.255	-	Set the destination IP address for the message channel.
MCTT (Message Channel Transmission Timeout (ms))	0 ~ 4294967295	400	Set the transmission timeout for the message channel. (unit: ms)
MCRC (Message Channel Retry Count)	0 ~ 4294967295	3	Set the retry count for the message channel.
MCSP (Message Channel Source Port	-	-	Display the port number of the message channel source.

Transport Layer Control Item	Setting Range	Default	Description
Stream Channel Selector	-	0	Select the stream channel.
Stream Channel Port	0 ~ 4294967295	0	Set the port number for the stream channel.
Do Not Fragment	False True	True	Enable/disable "Do Not Fragment."
Packet Size	1476 ~ 16020	1476	Set the packet size.
Packet Delay	0 ~ 4000000	0	Set the packet delay.
Stream Channel Destination Address	000.000.000.000 ~ 255.255.255.255	0.0.0.0	Set the destination IP address for the stream channel.
Stream Channel Source Port	-	0	Display the port number of the stream channel source.
IEEE 1588 **Related Topic:** PTP (Precision Time Protocol) Function	False True	False	TRUE : Enables PTP FALSE: Disables PTP
IEEE 1588 Status	PTP Stopped, PTP Initializing, PTP Faulty, PTP Disabled, PTP Listenning, PTP PreMaster, PTP Passive, PTP Uncalibrated, PTP Slave	PTP Disabled	Display the status of IEEE 1588.

Supported GigEVision Options: Link Local Address configuration, DHCP configuration, Persistent IP configuration, Stream Channel Source Socket, Message Channel Source Socket, Command Concatenation, Write Mem, Packet Resend, Event,Event Data, Pending Ack, Action, Extended Status Codes, Discovery Ack Delay, Discovery Ack Delay Writable, Test Data, Manifest Table, CCP Application Socket, Link Speed, Heartbeat Disable, Serial Number, StandardIDMode, IEEE1588Support, UnconditionalAction, ScheduledAction, PrimaryApplicationSwitchover, ExtendedStatusCodesVersion2_0, UserDefinedName, SingleLink, MultiLink, StaticLAG, DynamicLAG, PAUSEFrameReception, PAUSEFrameGeneration, StreamChannel0BigAndLittleEndian, StreamChannel0PacketResendDestination, StreamChannel0AllInTransmission, StreamChannel0UnconditionalStreaming, StreamChannel0ExtendedChunkData

ActionControl

Configure action control settings.

Action Control Item	Setting Range	Default	Description
Action Device Key	-	0x00	Set the action device key.
Action Selector	1 ~ 2	1	Select the action.
Action Group Key	-	0x00	Set the key that executes action 1.
Action Group Mask	-	0x00	Set the mask value that creates the action 0 group,
Action Queue Size	-	255	Set the size of action queue.

UserSetControl

Related Topic: Step 7: Save the Settings

Configure user settings.

User Set Control Item	Setting Range	Default	Description
User Set Selector	0: Default* 1: User1 2: User2 3: User3	0: Default	Select the user settings.
User Set Load	-	-	Load user settings.
User Set Save	-	-	Save the current setting values as user settings.

ChunkDataControl

Configure chunk control settings.

Chunk Data Control Item	Setting Range	Default	Description
Chunk Mode Active	False True	False	Set whether to enable the Chunk Data.
Chunk Selector	Image OffsetX OffsetY Width Height PixelFormat TimeStamp LineStatusAll ExposureTime GainAll GainRed GainBlue BlackLevelAll SequencerSetActive FrameTriggerCounter ExposureStartCounter FrameStartCounter FrameTransferEndCounter LineStatusAllOnFVALStart DeviceTemperature DeviceSerialNumber DeviceUserID	Image	Select the Chunk Data to be added.
Chunk Enable	False True	False	Select whether to output Chunk Data.

JAICustomControlALC

> **Related Topic:** <u>ALC (Automatic Level Control) Function</u>

Configure JAI ALC settings. These settings are also used for AGC (auto gain control).

ALC Control Item	Setting Range				Default	Description
ALC Reference	10 ~ 95				50	Set the target level for ALC. (unit: %)
ALC Area Selector	High Left	High Mid-Left	High Mid-Right	High Right	Low Right	Select the area for which to configure ALC Area Enable.
	Mid-High Left	Mid-High Mid-Left	Mid-High Mid-Right	Mid-High Right		
	Mid-Low Left	Mid-Low Mid-Left	Mid-Low Mid-Right	Mid-Low Right		
	Low Left	Low Mid-Left	Low Mid-Right	Low Right		
ALC Area Enable	False True				False	Enable/disable the photometry area selected in ALC Area Selector.
ALC Area Enable All	False True				True	**On**: Operate ALC with all areas designated as photometry areas, regardless of the individual enabled/ disabled photometry area states configured in ALC Area Selector. **Off**: Operate ALC according to the individual enabled/disabled photometry area states configured in ALC Area Selector.
ASC Exposure Min.	100 ~ 7999811				100	Set the minimum value for the Exposure Auto (ASC) control range.
ASC Exposure Max.	101 ~ 7999812				43864	Set the maximum value for the Exposure Auto (ASC) control range.
AGC Min.	100 ~ 1599				100	Set the minimum value for the Gain Auto (ASC) control range.
AGC Max.	101 ~ 1600				1600	Set the maximum value for the Gain Auto (ASC) control range.
AGC/ASC Control Speed	1 (slow) ~ 8 (fast)				4	Set the reaction speed for AGC/ASC. (8 is the fastest.)
ALC Status	Executing ASC, Executing AGC, Executing ASC and AGC Executing AWB, Executing ASC and AWB, Executing AGC and AWB, Executing ASC and AGC and AWB Convergent, Idle				Idle	Display the status of ALC.

JAICustomControlBlemish

Related Topic: Defective Pixel Correction Function

Configure settings for JAI white blemish correction.

Blemish Control Item	Setting Range	Default	Description
Blemish Enable	False True	1	Enable/disable blemish correction.
Blemish Detect	-	-	Execute blemish detection.
Blemish Detect Threshold	0 ~ 100	10	Set the blemish detection threshold.
Blemish Detect Position Index	0 ~ 255	0	Select the index for the target blemish coordinates (Blemish Data Position X/Y).
Blemish Detect Position X	- 1 ~ 2463	Varies depend on camera	Display the X coordinate (horizontal pixel position) of the target blemish selected in [Blemish Detect Position Index]. You can also manually enter the X coordinate of the blemish you want to correct.
Blemish Detect Position Y	- 1 ~ 2055	Varies depend on camera	Display the Y coordinate (vertical pixel position) of the target blemish selected in [Blemish Detect Position Index]. You can also manually enter the Y coordinate of the blemish you want to correct.
Blemish Number	-	Varies depend on camera	Display the number of target blemishes.

JAICustomControlShading

> **Related Topic:** ShadingCorrection

Configure shading correction settings.

Shading Control Item	Setting Range	Default	Description
Shading Correction Mode	Flat Shading Color Shading (Color models only)	Flat Shading	Select the shading correction method.
Shading Mode	Off User 1 User 2 User 3	Off	Set the area to which to save shading correction data. When this is set to **Off**, shading correction data is not saved.
Perform Shading Calibration	-	-	Execute shading correction.
Shading Detect Result	-	-	Display the shading correction results.

JAICustomControlMultiROI

Related Topic: Sensor Multi ROI Function

Configure settings for JAI sensor multi ROI.

Notes:
- This function is supported only on GO-5100M-PGE-1 and GO-5100C-PGE-1.

- ☐ Settings that can only be configured when image acquisition on the camera is stopped.

Multi ROI Item	Setting Range	Default	Description
Sensor Multi Roi Enable	False True	False	Enable/disable sensor Multi Roi.
Sensor Multi Roi Index	Index 1 ~ 8	Index 1	Select the index for the sensor Multi Roi mode.
Sensor Multi Roi Width	16 ~ 2464	160	Set the width for the selected sensor Multi Roi index.
Sensor Multi Roi Height	4 ~ 2056	128	Set the height for the selected sensor Multi Roi index.
Sensor Multi Roi Offset X	0 ~ 2052	0	Set the horizontal offset for the selected sensor Multi Roi index.
Sensor Multi Roi Offset Y	0 ~ 2054	0	Set the vertical offset for the selected sensor Multi Roi index.
Sensor Multi Roi Horizontal Enable	False True	False	Enable/disable Width/Offset X for the selected sensor Multi Roi index.
Sensor Multi Roi Vertical Enable	False True	False	Enable/disable Height/Offset Y for the selected sensor Multi Roi index.

JAICustomCounterAndTimerControl

Related Topic: Counter and Timer Control Function

Configure counter settings. (This camera only supports counter functions.)

Counter and Timer Control Item	Setting Range	Default	Description
Counter 0 ~ 2	Counter 0 ~ 2	-	Select the counter.
Counter 0 ~ 2 Event Source	Off Frame Trigger Frame Start Exposure Start Exposure Transfer End	Off	Select the counter event signal for which to read the count value.
Counter 0 ~ 2 Event Activation	Rising Edge Falling Edge	-	Display the timing at which to count.
Counter 0 ~ 2 Reset	-	-	Reset the counter.
Counter 0 ~ 2 Refresh	-	-	Update the count value.
Counter 0 ~ 2 Value	-	-	Display the count value.
Counter 0 ~ 2 Status	Counter Active	Counter Active	Display the counter status.

JAICustomControlAWB

Related Topic: Adjusting the White Balance

Configure settings for AWB functions.

Notes:
- This function is only supported on the color models.

- ☐ Settings that can only be configured when image acquisition on the camera is stopped.

Multi ROI Item	Setting Range				Default	Description
AWB Area Selector	High Left	High Mid-Left	High Mid-Right	High Right	Low Right	Select the area for which to configure AWB Area Enable.
	Mid-High Left	Mid-High Mid-Left	Mid-High Mid-Right	Mid-High Right		
	Mid-Low Left	Mid-Low Mid-Left	Mid-Low Mid-Right	Mid-Low Right		
	Low Left	Low Mid-Left	Low Mid-Right	Low Right		
AWB Area Enable	False True				False	
AWB Area Enable All	False True				False	**True**: Operate AWB with all areas designated as photometry areas, regardless of the individual enabled/disabled states configured in AWB Area Selector. **False**: Operate AWB according to the individual enabled/disabled photometry area states configured in AWB Area Selector.
AWB Control Speed	1 (slow) ~ 8 (fast)				4	Set the AWB control speed. (8 is the fastest.)
AWB Status	Complete Too Bright Too Dark Timeout Executing Trigger Error Convergent Idle				Idle	Display the status of AWB.

JAICustomControlMisc

Configure settings for other JAI functions.

Misc. Item	Setting Range	Default	Description
Video Process Bypass Mode	Off On	Off	Enable / disable video process bypass mode.
Enhancer Enable *Monochrome models only	False True	False	Enable / disable the Edge Enhancer function.. **Related Topic:** Edge Enhancer
Enhancer Level	Low Middle High Strong	Middle	Set the level of Edge Enhancer.
OptIn Filter Selector	10 µs 100 µs 500 µs 1 ms 5 ms 10 ms	10 µs	Select the surge protection filter.
Video Send Mode	Normal Mode Trigger Sequencer Mode Command Sequencer Mode	Normal Mode	Set the [Video Send Mode.

Miscellaneous

Troubleshooting

Check the following before requesting help. If the problem persists, contact your local JAI distributor.

Power Supply and Connections

Issue: The POWER/TRIG LED remains lit amber and does not turn green, even after power is supplied to the camera.

Cause and Solution:

- Camera initialization may not be complete due to a lack of power. Check the 6-pin power cable connection.

  Or the GigE connection may be not established. Check the ethernet cable connection.

Image Display

Issue: Gradation in dark areas is not noticeable.

Cause and Solution: Use the gamma function to correct the display. As the light-emitting properties of the monitor are not linear, the entire image may be darker or the gradation in the dark areas may be less noticeable when camera outputs are displayed without processing. Using the gamma function performs correction to produce a display that is close to linear. For details, see Gamma Function.

Settings and Operations

Issue: Settings cannot be saved to user memory.

Cause and Solution: You cannot save to user memory while images are being acquired by the camera. Stop image acquisition before performing the save operation.

Issue: I want to restore the factory default settings.

Cause and Solution: Load Default under User Set Selector in the Feature Properties tab to restore the factory default settings.

Specifications

Specifications	Description			
Scanning System	Progressive scan, 1 tap			
Synchronization	Internal			
Interface	1000Base-T Ethernet (GigE Vision 2.0), IEEE 802.3af			
Image sensor	Mono: Monochrome CMOS Color: Bayer color CMOS			
Image Size (Effective Image)	8.5 (H) × 7.09 (V) 、11.1 mm diagonal			
Pixel Size	3.45 μm x 3.45 μm			
Effective image pixel output	2464 × 2056			
Acquisition Frame Rate (max) The minimum value is 0.125 fps for all.	8-bit	H1, V1		22.7 fps
		Binning*	H1, V2	45.4 fps
			H2, V1	35.6 fps
			H2, H2	69.8 fps
	10bit Packed	H1, V1		15.1 fps
		Binning*	H1, V2	30.3 fps
			H2, V1	18.1 fps
			H2, H2	35.5 fps
	10bit	H1, V1		11.4 fps
		Binning*	H1, V2	18.1 fps
			H2, V1	35.6 fps
			H2, H2	35.6 fps
	*Binning: Monochrome models only			
SN ratio (traditional method)	Mono: 60 dB or more (typical) (0 dB gain, Black) Color: 60 dB or more (typical) Dark compression ON: 50 dB (typical) (0 dB gain, Green Black)			
Digital image output format	Full pixel: 2464 × 2056			
	ROI	Width		16 ~ 2464, 16 pixels/step
		OFFSET X		0 ~ 2448, 16 pixels/step
		Height		4 ~ 2056 lines, 2 line/step
		OFFSET Y		0 ~ 2052 lines, 2 line/step
	Binning Monochrome models only	H	1	2464(H)
			2	1232(H)
		V	1	2056(V)
			2	1028(V)
	Pixel Format			Mono: Mono8, Mono10, Mono10 Packed, Mono12, Mono12 Packed Color: BayerGR8, BayerGR10, BayerGR10 Packed, BayerGR12, BayerGR12 Packed
Acquisition Mode	Continuous / Single Frame / Multi Frame (1 ~ 255)			

Specifications	Description	
Trigger Selector	Acquisition: Acquisition Start/ Acquisition Stop Exposure: FrameStart Transfer: Acquisition Transfer Start	
Trigger Overlap	Off / Readout	
Trigger Input Signal	Line5 (Optical In1), Software, PG0, Action1/2,NAND 0 (out), NAND1 (out)	
Opt Filter (for Trigger Noise)	10μs(Typ), 100μs, 500μs, 1ms, 5ms, 10ms	
Exposure Mode	Timed	14.7 μs* (Min) ~ 8 秒 (Max) 、Variable Unit: 1 μs Exposure Auto Continuous: 10μs(Min) ~ 8s (Max*)、Variable Unit1μs
	Trigger Width	14.7 μs* (Min) ~ ∞ (Max)
	*Performance verified for up to 1 second.	
Exposure Auto	OFF / Continuous	
AGC/ASC Control Speed	1 ~ 8	
Video Send Mode	Normal ROI, Trigger sequence, Command sequence	
Digital I/O	Line Selector (6P): GPIO IN / GPIO OUT	
Black Level	Default level	33LSB (during 10-bit output)
	Video level adjustment range	0 ~ 100 (during 10-bit output)
	Adjustment range	–33LSB to +64LSB against reference level (during 10-bit output)
	Resolution adjustment	1 STEP = 0.25LSB
Gain Adjustment	Manual Adjustment Range	0 dB to +24 dB 1 step = x0.01 (0.005 dB to 0.08 dB) (varies by setting value)
	Auto Gain	Off / Continuous
	WB Gain*	R / B: - 7 dB ~ + 15 dB、1 Step = 0.1 dB
	WB Area*	16 (4 × 4) Area
	WB Range*	3000 K ~ 9000 K
	White Balance*	Off / Continuous / Once
	*Color models only	
Blemish Correction	Detection	Detect white blemishes using threshold values (black blemish correction performed only at factory)
	Correction	Interpolation using adjacent pixels (continuous blemishes not corrected)
	Correctable Pixels	256 Pixels
ALC	Adjusts exposure automatically using combination of AGC and auto shutter	
Gamma	0.45, 0.6, 1.0 (3 steps available)	
Dark compression	OFF (Linear) ON (Dark Compression)	
LUT	OFF: γ = 1.0, ON = 257 points can be set	
Vibration Resistance	10G (20 Hz ~ 200 Hz X-Y-Z direction)	
Shock Resistance	80G	

Specifications			Description
Power Supply	6-Pin Connector	Input range	DC +12 V to +24 V ±10% (via input terminal)
		Consumption (5100)	3.5W Typical (Default setting /25°C Environment /DC +12V), 3.9W (Max)
		Consumption (5101)	3.2W Typical (Default setting /25°C Environment /DC +12V), 3.6W (Max)
	PoE	Input range	DC +37 ~ + 57V
		Consumption (5100)	4.8W Typical (Default setting /25°C Environment /DC +48V), 5.3W (Max)
		Consumption (5101)	4.6W Typical (Default setting /25°C Environment /DC +48V), 5.0W (Max)
Lens mount	C-mount Lens mount protrusion length of 9 mm or less is supported		
Flange Back	17.526, tolerance: 0 mm to ~ -0.05 m		
Optical filter (IR cut filter)	Mono: Not provided Color: Half value of 670 nm		
Verified performance temperature / humidity	-5°C to +45°C / 20 to 80% (non-condensing)		
Storage temperature / humidity	-25°C to +60°C / 20 to 80% (non-condensing)		
Regulations	CE (EN55032:2015/A11:2020 class A and EN55035:2017/A11:2020), FCC Part15 Subpart B Class A, RoHS, WEEE, KC		
Dimensions (housing)	29mm × 29mm × 41.5mm (W x H x D)(excluding lens mount)		
Weight	65 g		

Notes:
- Approximately 5 minutes of warm-up are required to achieve these specifications.
- Design and specifications are subject to change without notice.

Caution: The performance specifications given for this camera have been verified for the Operating Temperature range shown in the Specifications table. The camera may be able to perform outside of the specified temperature range, but such performance has not been verified and is therefore not guaranteed.

- The camera's internal temperature should not exceed 72 °C during operation.

If the above temperature conditions are exceeded, take measures to dissipate heat according to your installation environment and conditions.

Package contents

- Camera body (1)
- Sensor protection cap (1)

- Dear Customer (sheet) (1)

## Optional accessories (not supplied)

- MP-43 tripod mount

Frame Rate Reference

| Pixel Count	Resolution (Screen Size)	ROI/Binning	Pixel Size (µm)	Image Size	Frame Rate (@8 bit)
5.1 MP	2464 × 2056	Full Pixel	3.45 × 3.45	2/3"	22.7 fps
2 MP	1920 × 1080	ROI	3.45 × 3.45	1/2" (7.6 mm)	55.5 fps
1.4 MP	1408 × 1050	ROI	3.45 × 3.45	1/2.6" (6.04 mm)	68.4 fps
1.3 MP	1280 × 1024	ROI	3.45 × 3.45	1/2.8" (5.66 mm)	70.1 fps
0.5 MP	800 × 600	ROI	3.45 × 3.45	1/4.6" (3.45 mm)	116.5 fps
0.5 MP	800 × 600*	ROI + 2 × 2 Binning	6.9 × 6.9	1/2.3" (6.90 mm)	116.5 fps
0.3 MP	640 × 480	ROI	3.45 × 3.45	1/5.75" (2.76 mm)	143.4 fps
0.3 MP	640 × 480*	ROI + 2 × 2 Binning	6.9 × 6.9	1/2.9" (5.52 mm)	143.4 fps

Note: *Monochrome models only
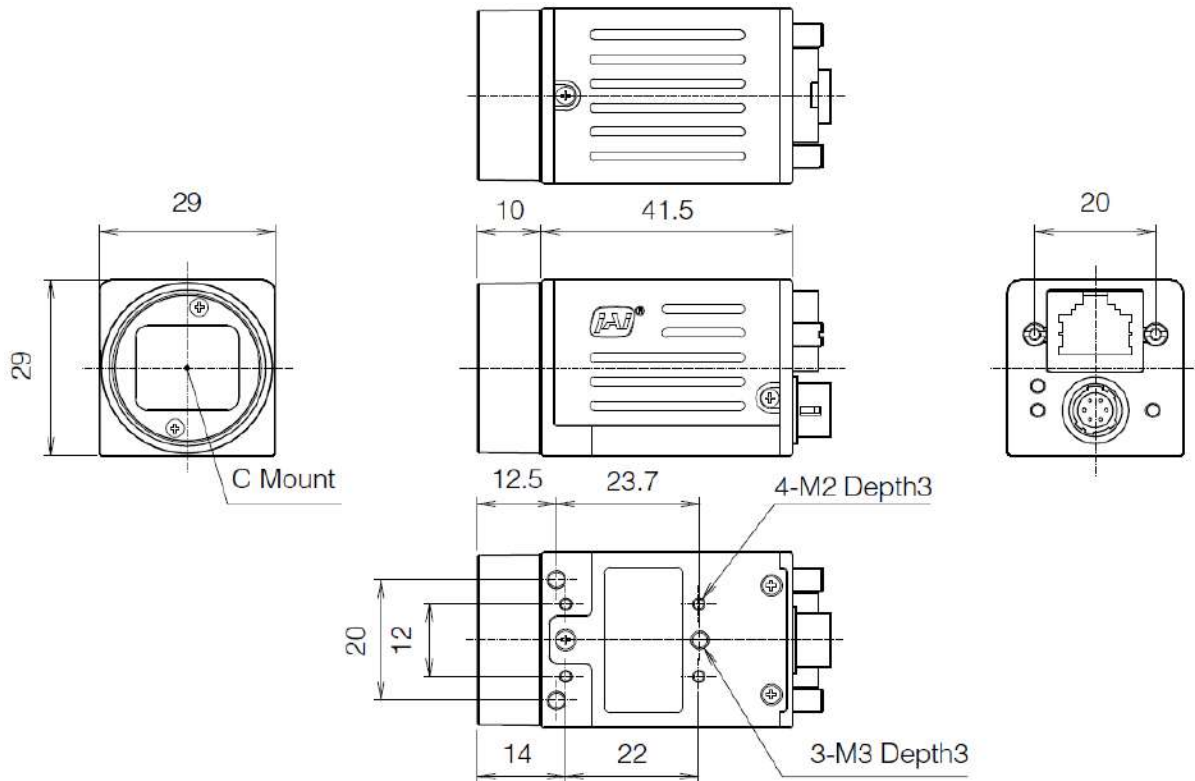
Spectral Response

Monochrome Model
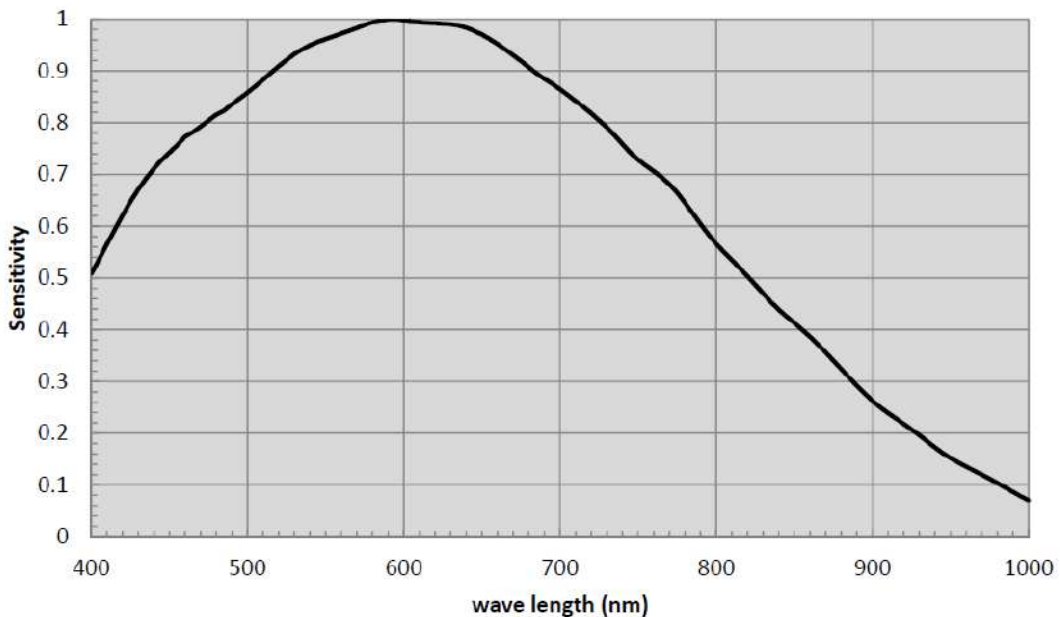
Color Model
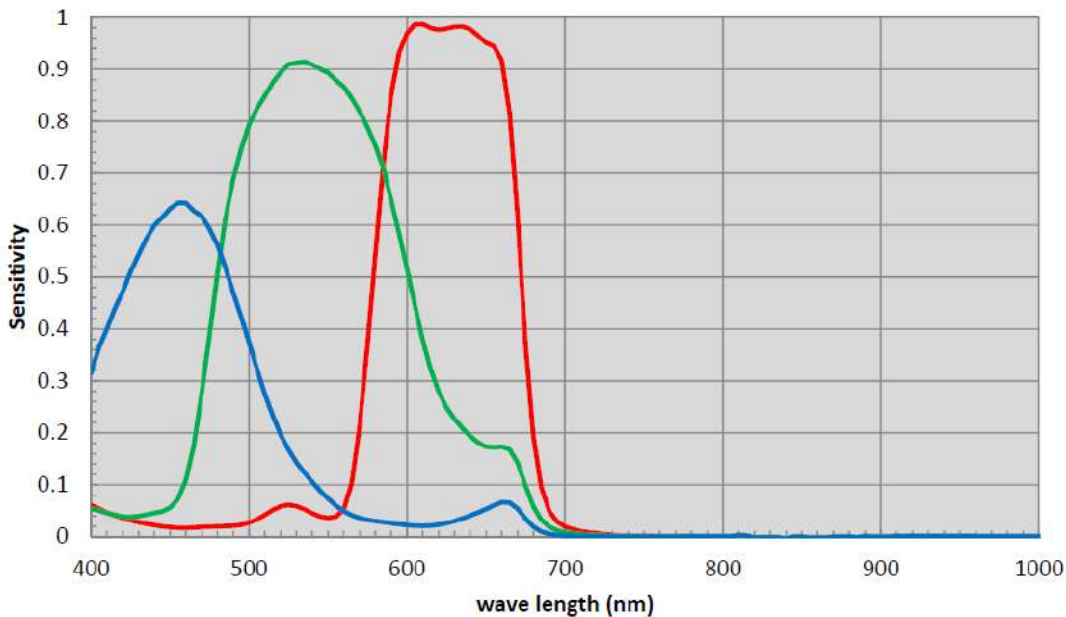
External Appearance and Dimensions

Notes:
- Dimensional tolerance: ± 0.3mm

- Unit: mm

User's Record

Model name:

Revision: ……………

Serial No: ……………

Firmware version: ……………

For camera revision history, please contact your local JAI distributor.

Revision History

Revision	Date	Device Version	Changes
1.1	2023/10/17	DV0100	Reworded the Temperature Caution (Specifications). Added a note regarding the use of a PoE injector (③ LAN Cable).
1.0	2023/09/15	DV0100	First Release.

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