See the possibilities

Tentative Version

User Manual

Wave Series SWIR Line Scan Cameras

WAL-1001-GE
WAL-2001-GE

High Performance SWIR Cameras with GigE Interface

Document Version: Tentative

Date: 2026-06-02

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.

Table of Contents

About Technical Note

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 and Warranty

This section describes the notice and warranty of the camera.

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 2004/108/EC of the European Parliament and of the Council, EMC (Electromagnetic compatibility), JAI Ltd., Japan declares that the following model(s) comply with the following provisions applying to their standards.

Models	Comply with
WAL-1001-GE	EN 55032:2015+ A1 + A11 EN 55035:2017+ A11 EN IEC 61000-6-2:2019 EN IEC 61000-6-4:2019
WAL-2001-GE	

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

상 호:	JAI Ltd. Japan
기자재명칭:	Industrial Camera
모 델 명:	WAL-1001-GE
제조자 및 제조국가:	JAI Ltd., Japan / JAPAN

TBD

상 호:	JAI Ltd. Japan
기자재명칭:	Industrial Camera
모 델 명:	WAL-2001-GE
제조자 및 제조국가:	JAI Ltd., Japan / JAPAN

TBD

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.

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)
WAL-1001-GE	×	○	○	○	○	○
WAL-2001-GE						

○: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 Attaching the Lens

Technical Notes How to Clean a Sensor

Avoiding Dust Particles

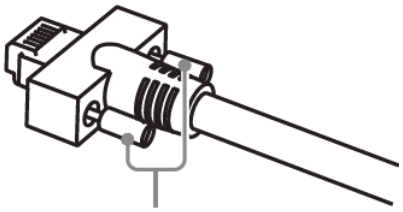
When attaching the lens to the camera, stray dust and other particles may adhere to the sensor surface and rear surface of the lens. Be careful of the following when attaching the lens.

- 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.

Notes on LAN Cable Connection

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

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.

Phenomena Specific to InGaAs Image Sensors

The following phenomena are known to occur on cameras equipped with InGaAs 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 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.
- **Response Non-Uniformity (Fixed pattern noise)**: Owing to inherent constraints in the manufacturing process, subtle discrepancies exist in the photo response characteristics of individual sensor pixels, which manifests as fixed columnar or linear artifacts in the image.
- **Dark Current Temperature Dependence**: As temperature rises, the dark current of the sensor increases exponentially. In dark-field imaging, this manifests as snowflake noise or striped noise on the video monitor screen, and the noise intensifies significantly with increasing temperature.
- **Pixel Cross-talk**: Infrared photons have a long diffusion distance in InGaAs material, which easily causes signal interference between adjacent pixels. It is intuitively reflected in blurred image edges and aliasing of fine textures (similar to details sticking together and being indistinguishable).
- **Defective pixels**: Defective pixels (white and black pixels) of the InGaAs 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.
- **High-Light Inversion**: Excessively high light intensity results in intensity inversion, characterized by an alternating dark-bright-dark response as light brightness increases. This phenomenon can be avoided by reducing the light intensity.

Notes on Exportation

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

Features

This camera is a high performance linear scan camera that uses an InGaAs global shutter SWIR sensor. The interface is 1000BASE-T GigE Vision (Specification v2.0) . The table below shows the basic information of the camera.

Model Name	Image Sensor	Effective Pixels	Pixel Size	Max Line Rate
WAL-1001-GE	InGaAs	1024 x 1	12.5 µm x 12.5 µm	29kHz
WAL-2001-GE	InGaAs	2048 x 1	12.5 µm x 12.5 µm	40kHz

Features Overview

- Video output:
  - WAL-1001-GE: Mono8, Mono10, Mono12, Mono14
  - WAL-2001-GE: Mono8, Mono10, Mono10p, Mono12, Mono12p, Mono14
- Supports horizontal image flip
- Image calibration functions include FFC (Flat Field Correction), DPC (Defective Pixel Correction), Sharpness (WAL-1001-GE only), Spatial Correction (WAL-2001-GE only), Destripe, black level control and LUT
- Exposure time range: 2µs~9992µs exposure control in 1µs step
- Dynamic Range (DR): 65dB (TBD)
- Signal-to-Noise Ratio (SNR): 54dB (TBD)
- Lens mount: C-Mount

Package Contents

- Camera body (1)
- Dear Customer (sheet) (1)

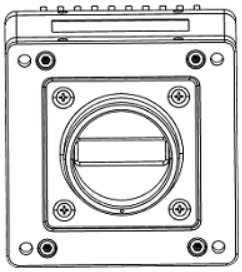
Parts Identification

This section describes the lens mount, connectors, LEDs, and mounting holes of this camera.

Lens Mount (C-Mount)

Mount a C-mount lens here.

- Back flange distance: 17.526 mm
- Thread pitch: 0.794 mm



> **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.

Connectors

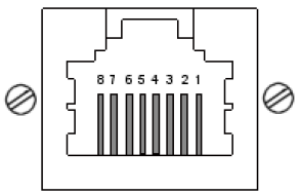
This section explains the connectors on this camera.

RJ-45 Connector

Connect a LAN cable to the RJ-45 connector.

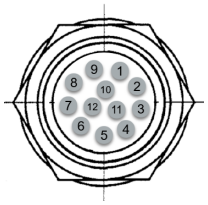
- Use a LAN cable that is Category 5e or higher (Category 6 recommended).
- Refer to the specifications of the cable for details on its bend radius.

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

	Pin No.	IO	Signal
GigE Vision Interface (RJ45 with Locking Screws) 	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-)

DC IN / TRIG Connector (12-Pin Round)

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



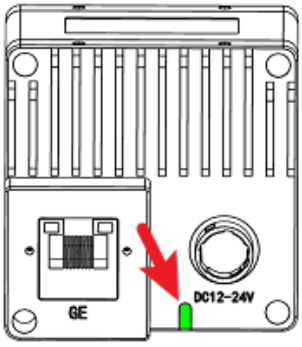
WAL-1001-GE (Camera Side: HR10A-10R-12PB (71))

Pin No.	Input/Output	Signal	Description
1	GND	GND	Power Ground
2	Power IN	DC_PWR	Power In, DC+12V to 24V
3	Input	RS422_0_RX_A	Differential Input Positive
4	Input	RS422_0_RX_B	Differential Input Negative
5	Input	RS422_1_RX_A	Differential Input Positive
6	Input	RS422_1_RX_B	Differential Input Negative
7	Input	OPT_IN	Optocoupler isolated input
8		OPT_IN_GND	Optocoupler isolated input GND
9	Output	OPT_OUT	Optocoupler Isolated Output
10		OPT_OUT_GND	Optocoupler Isolated Output GND
11	Bidirectional IO	GPIO1_A	Multiplexed single-ended trigger I/O. Functions as either input or output, but not both simultaneously.
12	Bidirectional IO	GPIO1_B	Multiplexed single-ended trigger I/O. Functions as either input or output, but not both simultaneously.

LED

POWER/TRIG LED

Indicates the power and trigger status.



	LED	Status
	Solid orange	Camera initializing
	Solid green	Idle, waiting for image capture
	Blinking green (rapid)-100ms	Image acquisition in free run mode
	Blinking green (slow)-1000ms	Image acquisition in trigger mode
	Solid red	Fault
	Alternating between green and red -500ms	Firmware update
	Blinking red (rapid)-100ms	Link abnormal

LINK LED

Indicates whether the GigE network connection is established or not.

LED		Status
	Off	The network link is not established
	Solid orange	1G Link is established

ACT LED

LED		Status
	Off	No network connection established, or no physical connection
	Blinking green	(Tx) Network communication in progress (Rx) Network communication in progress
	Solid green	Link idle, no data transmission

Mounting Holes

Use these holes when mounting the camera directly to a wall or other structural system.

Location	Description
Front	M3, Depth 3mm
Top	M3, Depth 3mm
Bottom	M3, Depth 3mm
Side	M3, Depth 3mm

> **Note:** Refer to "Dimensions" for the location of the mounting holes.

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 configuration 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.
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** Perform basic settings for image quality.
7	**Step 7: Save the Settings** Save the current setting configurations in user memory.

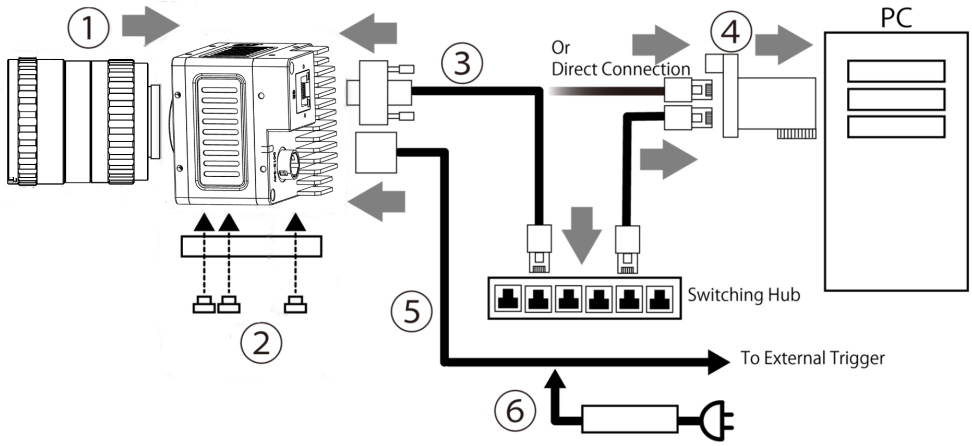
Step 1: Install the Software (First Time Only)

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.
2. Install eBUS SDK for JAI on the computer.

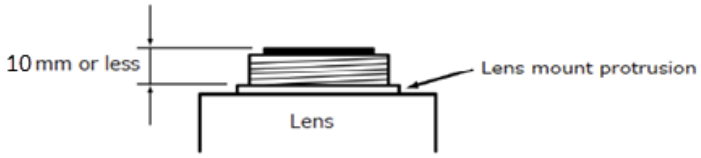
Step 2: Connect Devices



1. Lens
2. Mounting
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 10 mm or less can be attached.



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

Note: 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 (12.8mm)

2. Mounting

When mounting the camera directly to a device, use screws that match the mounting holes on the camera. (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.

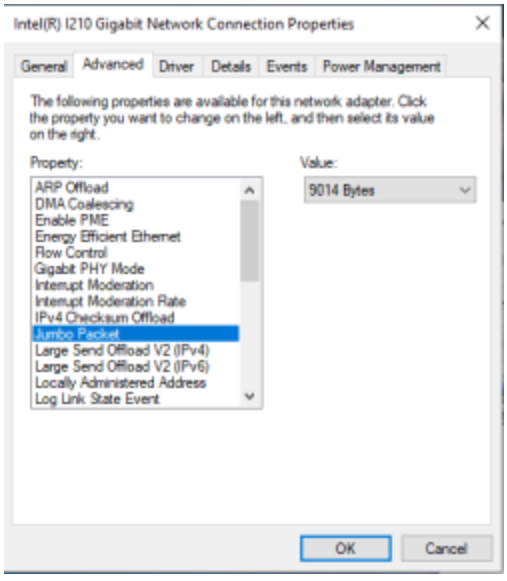
- Use a LAN cable that is Category 5e or higher (Category 6 recommended).
- Use a LAN cable that is STP cable.
- Refer to the specifications of the cable for details on its bend radius.

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

4. Network Card

Install this in the computer that will be used to configure and operate the camera, or use the computer's built-in Gigabit network card. Refer to the instruction manual of the network card, and configure settings on the computer as necessary.

Ensure to set 9014 Bytes for “Jumbo Packet” (in the network card properties).



5. DC IN / Trigger IN Connection Cable

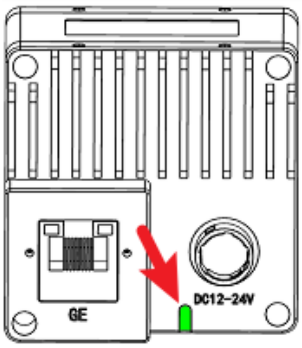
Performs external I/O such as power supply and trigger input.

> **Note:** Refer to the DC IN / TRIG Connector (12-Pin Round) topic as well.

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



Verify whether power is being supplied to the camera by checking the rear LED. When properly turned on, the power LED is lit green.

> **Note:** For details on how to read the LEDs, see POWER/TRIG LED.

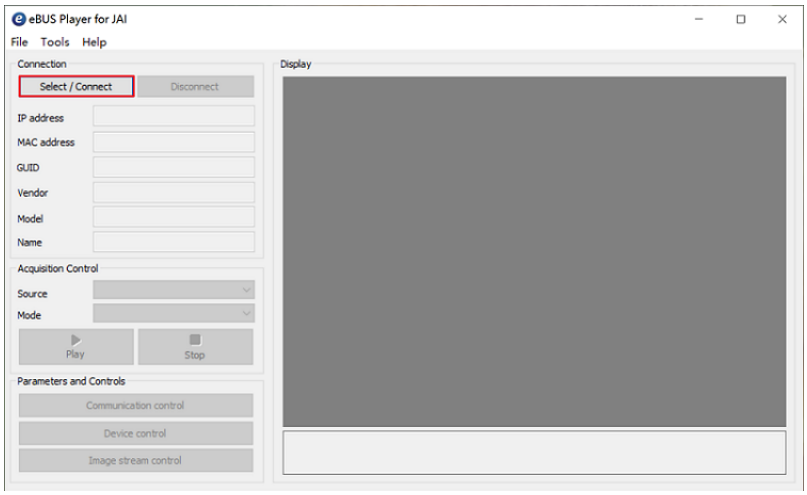
Step 4: Verify the Connection Between the Camera and PC

Verify whether the camera is properly recognized via Control Tool.

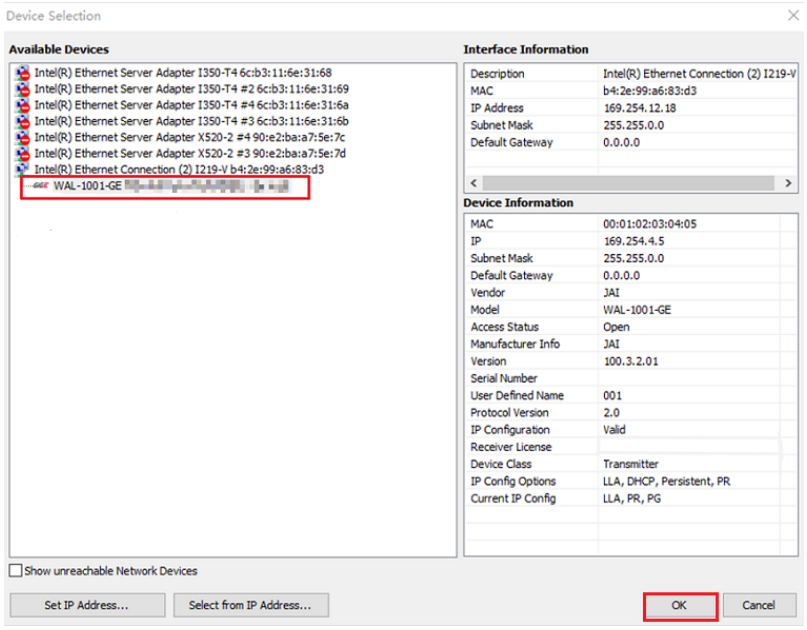
1. Launch eBUS Player for JAI.

   eBUS Player for JAI startup screen appears.

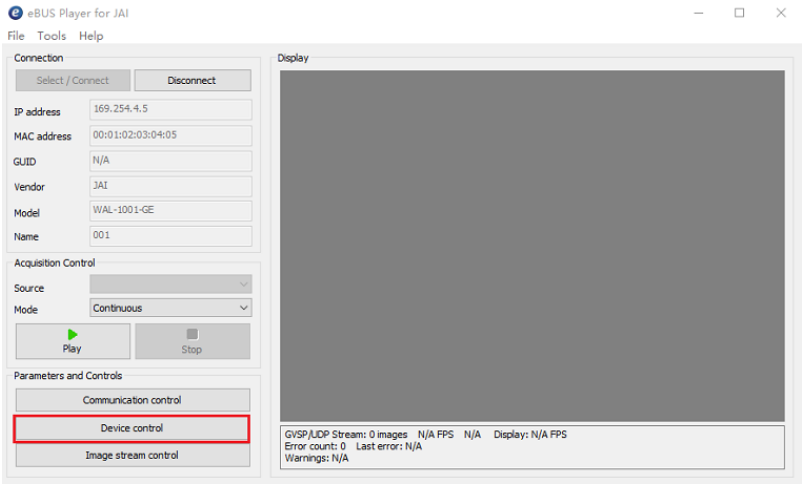
2. Select the camera you want to configure. Click the **Select / Connect** button.



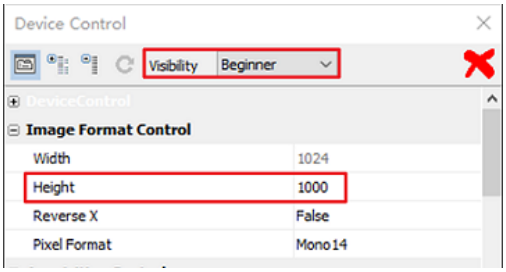
3. The connected camera is listed. Please select one camera and click **ok**.



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

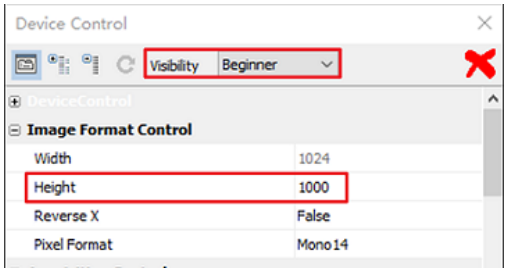
Configure the size, position, and pixel format of the images to be acquired. The factory settings of the WAL-1001-GE are as follows. Change the settings as necessary.

Factory Default Values (ImageFormatControl): WAL-1001-GE

Item	Default Value
Width	1024
Height	500
OffsetX	0
OffsetY	0
PixelFormat	Mono14

Example: Configure the Height of ImageFormatControl

For the camera WAL-1001-GE , only the height can be configured, by selecting the item of **Height**, you can change the value as shown below.



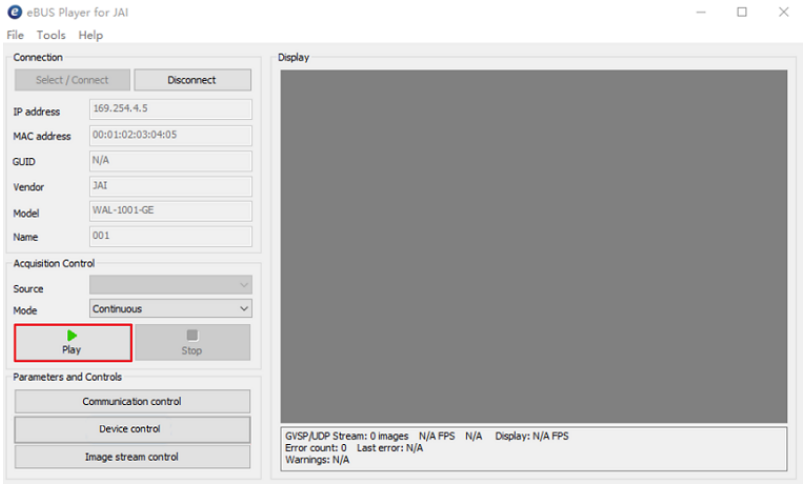
> **Note:** Depending on the setting item, the user needs to change visibility. Please switch visibility (Beginner / Expert / Guru) as necessary.

Step 6: Adjust the Image Quality

Display the camera image and adjust the image quality.

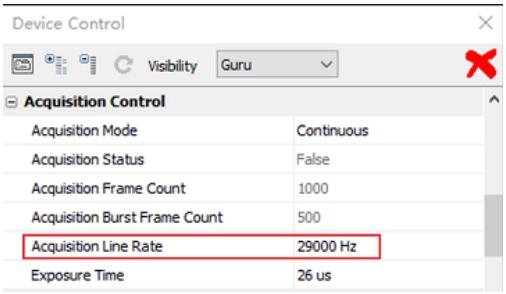
Display the Image

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



Adjust the LineRate

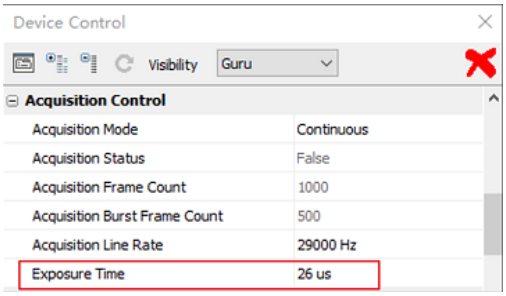
Adjust the line rate according to the system requirements using the **Acquisition Control** function. By selecting the item of **Acquisition Line Rate**, you can change the value as shown below.



> **Note:** If the camera's trigger mode is **On**, its line rate will be adjusted according to the external trigger source.

Adjust Exposure Time

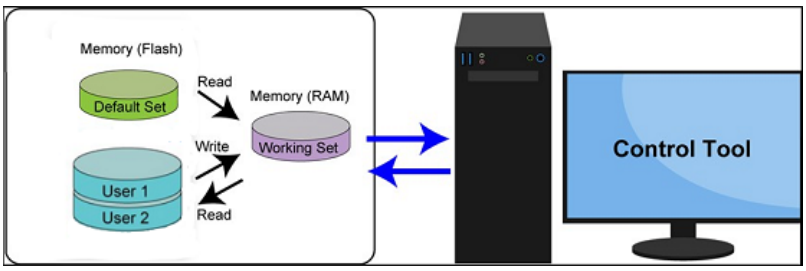
By selecting the item of **Exposure Time**, you can change the value as shown below.



Step 7: Save the Settings

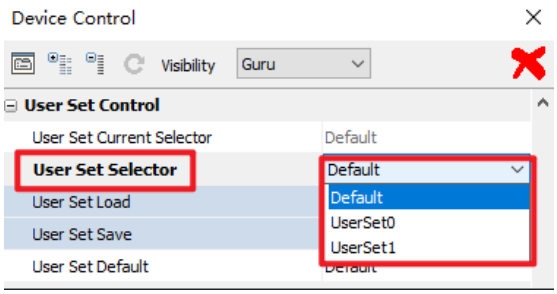
The setting values configured in eBUS player for JAI will be deleted when the camera is turned off. By saving current setting values to user memory, you can load and recall them whenever necessary. You can save up to two sets of user settings in the camera. (UserSet1 to 2)

> **Note:** Changes to settings are not saved to the computer.

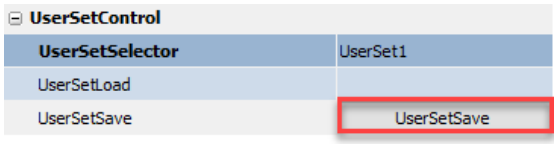


To Save User Settings

1. Stop image acquisition.
2. Expand **User Set Control** and select the save destination (UserSet0, UserSet1) in **User Set Selector**.



3. Select **User Set Save** and click the **UserSetSave** button.



4. The current setting values are saved as user settings.

Main Functions

This chapter describes the camera's main functions.

Pixel Format

Supported Pixel Formats

Mono8, Mono10, Mono12, Mono14

> **Note: PixelFormat** can only be adjusted when image acquisition on the camera is stopped.

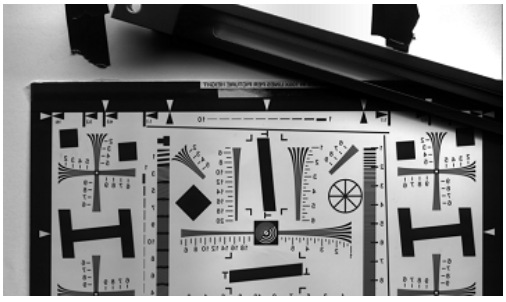
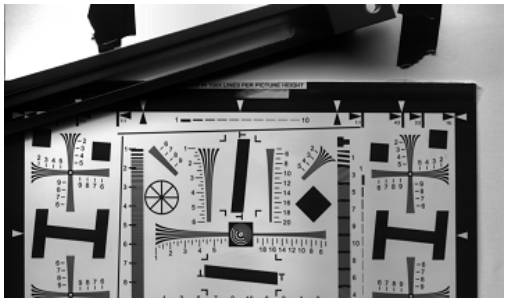
Change the Line Rate

When **FrameTriggerMode** and **LineTriggerMode** are set to **Off**, you can set the line rate using **AcquisitionLineRate**. This function can be used to match the scanning speed of the camera to the conveying speed of the object.

> **Note:** You can also save the setting, and have it applied whenever the power is subsequently turned on, but this requires addition operations. (Step 7: Save the Settings).

ReverseX

The ReverseX function allows you to flip an image horizontally.

ReverseX = Off	ReverseX = On
	

How to Configure

1. Check **ReverseX** to enable the ReverseX setting.

Gain Controls

The camera provides two types of gain controls to adjust image brightness according to the application environment. Each gain method has different characteristics in terms of precision, and noise impact.

Gain

Gain is the camera's analog gain, it refers to the hardware amplification of the original infrared electrical signal before analog-to-digital conversion. All pixels in the sensor are affected by this setting. The camera provides two analog gain modes (**Level_High** and **Level_Low**) to support different imaging environment, which directly determine the signal intensity and noise level of images.

- **Level_High**: use this mode when the signal is weak.
- **Level_Low**: use this mode when the signal is sufficient strong.

> **Notes:**
> - The default **Gain** is **Level_High**. Level_High is commonly used in general industrial scenarios.
> - The modification of the analog gain impacts the dynamic of the signal and thus implies a change of the noise level.

DigitalGain

Applied after digitization, digital gain multiplies the image signal numerically to fine-tune brightness (1 ~ 32, step: 0.1). It allows for precise control in small increments and is useful for applications requiring detailed brightness calibration.

Black Level Function

The black level defines the reference signal level for "black" in an image. Proper black level adjustment is essential for maintaining image contrast, dynamic range, and noise suppression.

1. Applies a uniform offset (BlackLevel) across the entire image. No pixel-level or noise-adaptive correction is performed. This mode is recommended for applications that operate under stable lighting conditions where simple brightness adjustment is sufficient

   Use this mode when you want to adjust the overall brightness of the image with a fixed offset.

2. Specify the black level adjustment value using **BlackLevel**. The setting range varies depending on the **PixelFormat** (Mono8: 0 ~ +255, Mono10: 0 ~ +1023, Mono12: 0 ~ +4095, Mono14: 0 ~ +16383).

LUT (Lookup Table)

The LUT (Look-Up Table) function allows you to apply a non-linear mapping between the sensor's captured signal values and the output values from the camera. This is useful for adjusting image tone, contrast, or dynamic range to suit specific application needs.

How to Configure

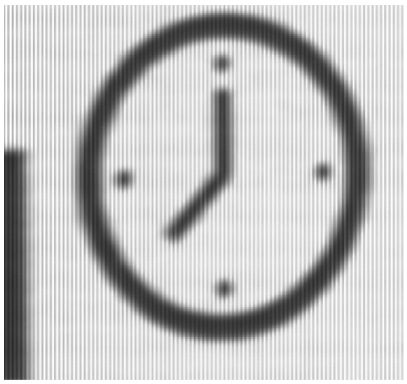
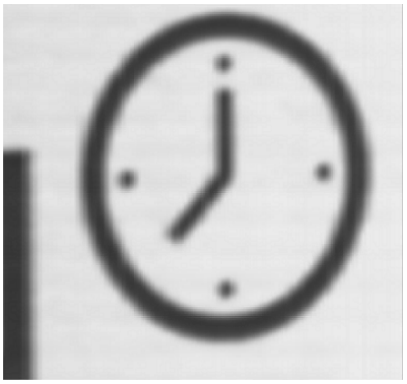
The camera support three default LUT options, giving users the flexibility to optimize image output for a variety of industrial scenarios.

1. Check **LUTEnable** to enable the LUT settings.
2. Choose an option using **LUTMode**.
    - **GlareSuppression**: Reduces highlights in brightly lit scenes to prevent overexposure and detail loss. This option is ideal for environments with high-intensity LED lighting, and/or highly reflective metal or glossy surfaces
    - **BlacklightCompensation**: Enhances visibility in backlit scenes by lifting shadow areas. This option is ideal for objects darker than the background, and/or applications involving backlight inspection.
    - **HDR**: Expands dynamic range by balancing highlights and shadows to preserve detail. This option is ideal for high-contrast scenes, and/or inspections requiring fine gradation detection.

Caution: **LUTMode** can only be selected when image acquisition on the camera is stopped.

Destripe Function

Due to the characteristics of the sensor, faint odd-even column patterns appear on images. The Destripe function calibrates the odd and even columns to identical response and eliminates such differences. This is useful for improving image uniformity and clarity, and applicable to silicon wafer inspection scenarios.

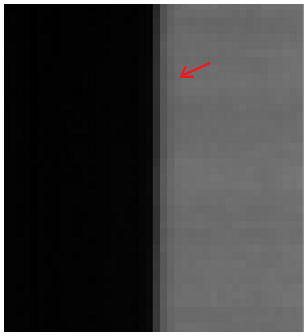
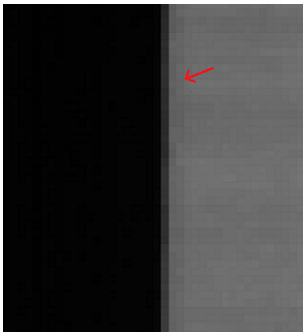
Destripe Off	Destripe On
	

How to Configure

1. Check **DestripeEnable** to enable the Destripe settings.

Sharpness Function (WAL-1001-GE only)

There are too many transition pixels at the edge of the silicon wafer, which causes image blurring and affects the detection rate. The Sharpness function greatly reduces the edge transition pixels and improve image clarity, and applicable to wafer inspection scenarios.

Sharpness Off	Sharpness On
	

How to Configure

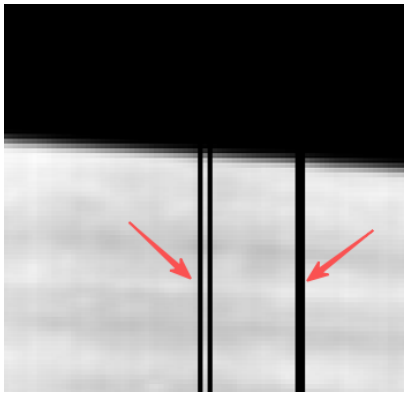
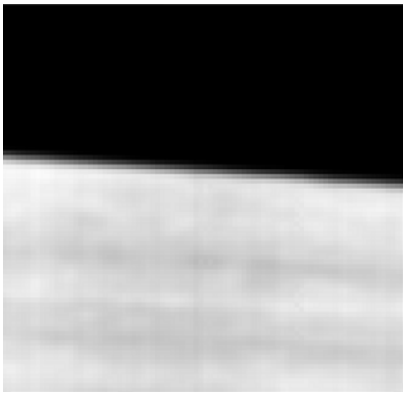
1. Check **SharpnessEnable** to enable the Sharpness settings.
2. Adjust the **Sharpness** value.

> **Notes:**
> - **Sharpness** range: 0 ~ 2, default value: 0.5.
> - The larger the value, the stronger the edge enhancement.

Defective Pixel Correction (DPC)

Every sensor includes a number of defective pixels. A pixel is identified as defective when its response deviates from the local background beyond the preset threshold in dark image, corrected image, or a saturated image. Pixel defects arise from semiconductor sensor design flaws and manufacturing factors, and gradually accumulate throughout the sensor service life.

Some pixels on the sensor show abnormal response, resulting in obvious dark or bright columns in the output images. This correction can eliminate such response difference that may affect image quality.

DPC= Off	DPC= On
	

How to Configure

1. Check **DPCEnable** to enable the defective pixel correction.

> **Notes:**
> - **DPCEnable** is checked by default. Every camera has its own factory defective pixel correction data.
> - Changes in ambient temperature, camera settings (e.g., high sensitivity and long exposure), and other factors may cause new defective pixels to appear. Users need to execute **DefectPixelAdd** to add defective pixels manually to eliminate them.

2. Use **DefectivePixelX** to add the defective pixel's X position, range: 0 ~ 1023.

3. Execute **DefectPixelAdd** to add the defective pixel and check the effect.

> **Notes:**
> - If wrong defective pixel is added, delete it via Execute **DefectPixelDelete**.
> - Execute **DefectPixelDelete** to remove only the latest added defective pixel.

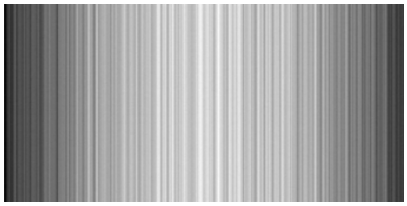
4. Execute **DefectPixelSave** to save the added pixels.

> **Note:** After executing **DefectPixelSave**, the added defective pixels will stay effective even when the camera is powered off.

> **Note:** You can execute **DefectPixelRestore** to restore the factory defective pixel correction data.

Flat Field Correction (FFC)

Flat Field Correction (FFC) is a key image calibration process used in industrial line scan cameras to ensure high image uniformity and accuracy. This correction compensates for optical non-uniformities that may affect image quality. This correction help produce cleaner, more uniform images, enabling reliable inspection and analysis in industrial imaging applications.

FFC= Off	FFC= On
	

How to Configure

1. Use the following parameters to specify the region where FFC should be applied:

- **FFCCalOffetX**: Starting X-coordinate for the calibration area.
- **FFCCalWidth**: Width of the calibration area.

> **Note:** The range of both the **FFCCalOffetX** and **FFCCalWidth** is 0~1023.

2. Execute **FPNCalibration**.

> **Notes:**
> - Adjust the average gray value to 30% of the full-well gray value during calibration.
> - The full-well gray value varies with the pixel format. (Mono8: 255 DN, Mono10: 1023 DN, Mono12: 4095 DN, Mono14: 16383 DN)
> - For example, when the **PixelFormat** is **Mono8**, the corresponding full-well gray level is 255 DN. Before execute **FPNCalibration**, adjust the average gray value to approximately 76 DN.

3. Execute **PRNUCalibration**.

> **Notes:**
> - PRNU correction is performed under the condition that the image is flat with or without a lens attached. However, if there is shading due to a lens, light sources, etc., correction is performed to flatten the image including the effects of such shading.
> - Adjust the average gray level to 70% of the full-well gray value during calibration.
> - The full-well gray value varies with the pixel format. (Mono8: 255 DN, Mono10: 1023 DN, Mono12: 4095 DN, Mono14: 16383 DN)
> - For example, when the **PixelFormat** is **Mono8**, the corresponding full-well gray level is 255DN. Before execute **PRNUcalibration**, adjust the average gray value to approximately 178 DN.

4. Execute **FFCCalculate** and wait for completion.
5. Check **FFCEnable** to enable and validate the correction.
6. Execute **FFCSave** to store the correction parameters.

> **Notes:**
> - Only one set of FFC parameters can be saved into flash. Saving a second set will overwrite the first one.
> - You can also save the setting, and have it applied whenever the power is subsequently turned on, but this requires addition operations. (Step7: Save the Settings)

Miscellaneous

Troubleshooting

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

Power Supply and Connections

Issue: The POWER LED does not turn green, even after power is supplied to the camera.

Cause and Solution: Camera initialization may not be complete due to lack of power. Check the 12-pin power cable connection.

Image Display

Issue: The output image is all black.

Cause and Solution: Maybe the lens aperture is set too large, or the lens cap is not removed, or the light source is not turned on. Check the lens, appropriately reduce the aperture value, and check the light source.

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 to restore the factory default settings.

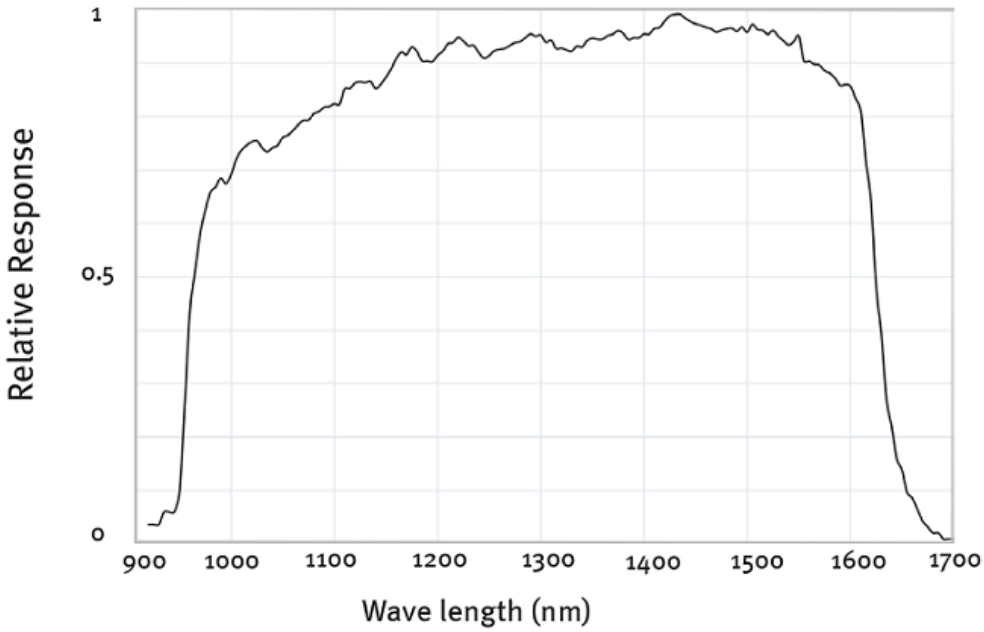
Specifications

Item	Specifications
Image Sensor	InGaAs global shutter line scan image sensor
Effective Pixels	WAL-1001-GE: 1024 x 1 WAL-2001-GE: 2048 x 1 (pixel shift)
Pixel size	12.5 µm x 12.5 µm
Spectral Range	900nm to 1700nm
Line Rate	WAL-1001-GE: up to 29kHz WAL-2001-GE: up to 40kHz
Quantum Efficiency	83.25% @1435nm (typical peak value)
Dark and Bright SN DarkLevel@10bit Bright SN 890LSB@10bit	Dark SN: 55dB (TBD) Bright SN: 35dB (TBD) Individual Gain: off, DSNC Correction: On, PRNU Correction: On
Signal-to-Noise Ratio (EMVA1288)	54dB (TBD)
Interface	GigE Vision
Video Output	WAL-1001-GE: Mno8, Mono10, Mono12, Mono14 WAL-2001-GE: Mono8, Mono10, Mono10p, Mono12, Mono12p, Mono14
Acquisition mode	Continuous / Single Frame / Multi Frame (1~8000)
Trigger Mode	Frame Trigger Mode Line Trigger Mode
Trigger Source	Frame Trigger Source: Trigger Software, Line 1, Line 2, Line 3, Line 4 Line Trigger Source: Encoder, Line 0, Line 1, Line 2, Line3
Trigger Activation	Rising Edge, Falling Edge, Level_High, Level_Low
Trigger Divider	Frame Trigger Divider: 1 ~ 8 Line Trigger PreDivider: 1 ~ 40 Line Trigger Multiplier: 1.0, 2.0, 4.0, 8.0, 16, 32 Line Trigger PostDivider: 1 ~ 40
Gain	Gain: Level_High, Level_Low Digital Gain: 1 ~ 32
Exposure Time	2 µs ~ 9992 µs
Black Level	0 ~ +255 @Mono8bit 0 ~ +1023 @Mono10bit 0 ~ +4095 @Mono12bit 0 ~ +16383 @Mono14bit

Item	Specifications
ISP	**DPC** (Defective Pixel Correction) **FFC (Flat Field Correction)**: FPN and PRNU corrections **LUT**: 3 preset options (GlareSuppression, BlacklightCompensation, HDR) **Destripe** **Sharpness** (WAL-1001-GE only) **Spatial Correction** (WAL-2001-GE only)
Power Supply Voltage (12-pin)	Input Range: DC +12V ~ +24V +/-15%; Consumption: 4.3W Typ @12V DC (TBD)
Lens Mount	C-Mount Lens mount protrusion length of 10 mm or less is supported.
Flange Back	17.526mm, tolerance: 0 mm to -0.05 mm
Verified Performance Temperature / Humidity	- 20°C to +55°C (20 to 80% non-condensing)
Storage Temperature / Humidity	- 40°C to + 60°C / 20% to 80% (non-condensing)
Vibration Resistance	10G (20 Hz~ 200 Hz X-Y-Z direction)
Shock Resistance	80G
Regulations	CE (EN 55032:2015+A1+A11, EN 55035:2017+A11, EN IEC 61000-6-2:2019, EN IEC 61000- 6-4:2019), FCC Part15 Class A, KC, RoHS (TBD)
Dimensions (Housing)	WAL-1001-GE: 60.0 mm x 60.0 mm x 57.6 mm WAL-2001-GE: 60.0 mm x 60.0 mm x 55.5 mm
Weight	309g (TBD)

Note: These cameras do not support PoE.

Spectral Response

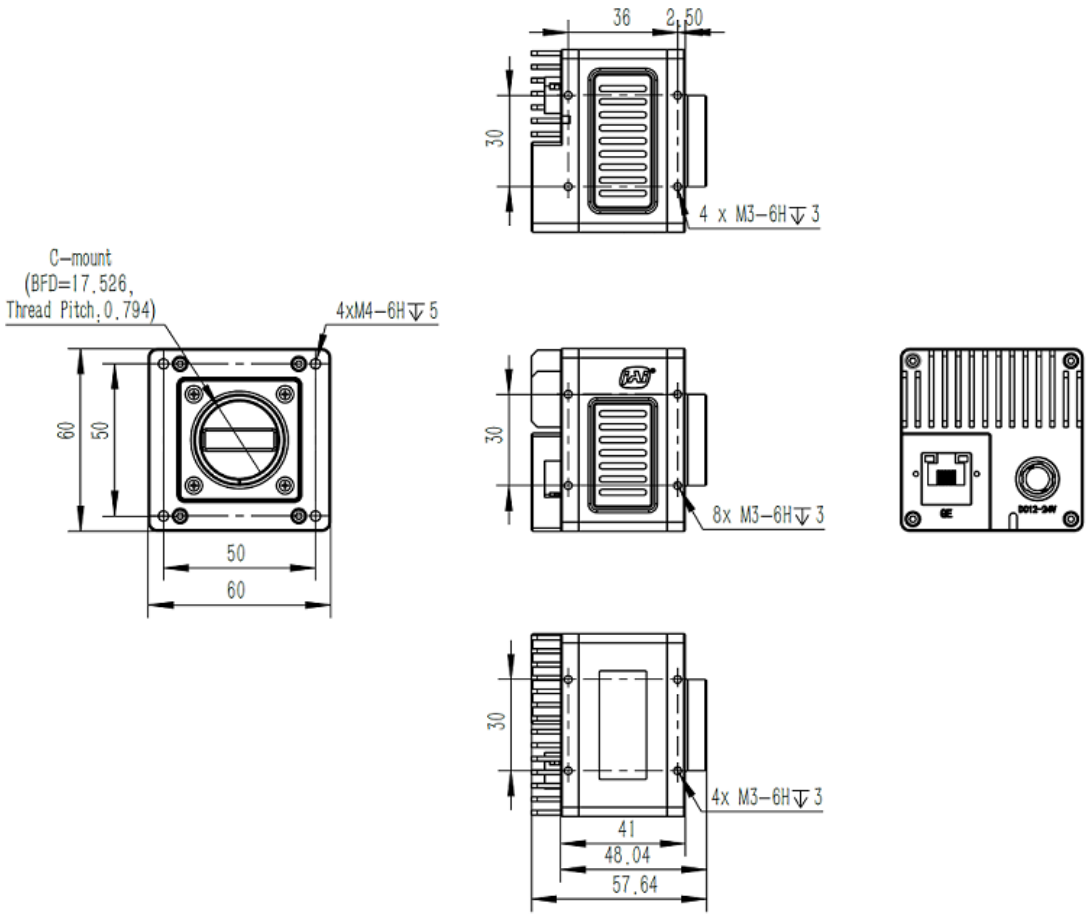


Note: The typical peak value is 83.25%.

Dimensions

This section shows the dimensional drawings of the camera.

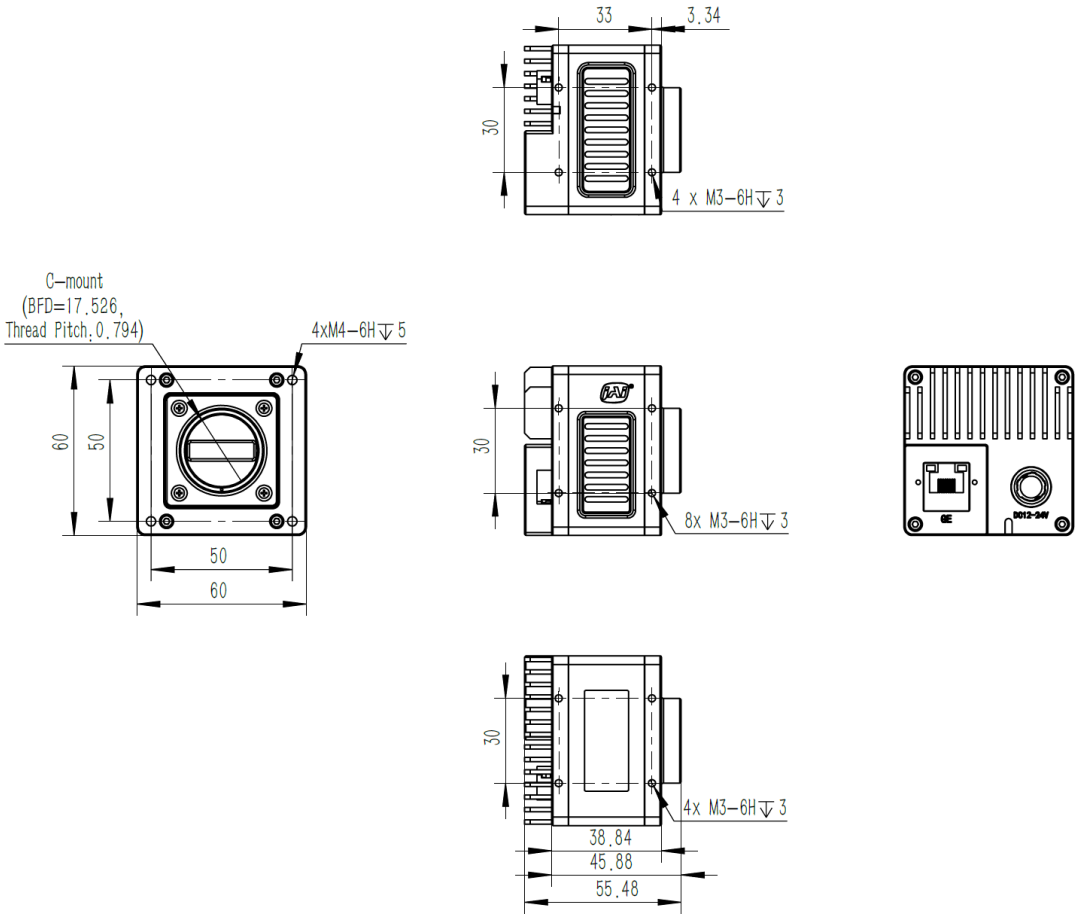
WAL-1001-GE



Notes:

- Dimensional Tolerance: ± 0.2mm
- Unit: mm

WAL-2001-GE



Notes:

- Dimensional Tolerance: ± 0.2mm
- Unit: mm

Revision History

Revision	Date	Changes
Tentative	2026/06/02	for Marketing Launch