

10GigE Vision
InGaAs CAMERA
ARTCAM-992SWIR-TEC-10GigE
INSTRUCTION BOOKLET

ARTRAY

ARTRAY CO., LTD.

Contents

1. Attention	- 3 -
2. Introduction	- 6 -
3. Main Features	- 6 -
4. The Product.....	- 6 -
5. Connect the Camera	- 7 -
5.1. How to Connect a Camera.....	- 7 -
5.1.1. When connecting to a PC.....	- 7 -
6. Specifications.....	- 8 -
6.1. Specification	- 8 -
6.1.1. Analog / Digital Gain Settings.....	- 9 -
6.1.2. Dimensional Outline	- 10 -
6.1.3. Sensor Package Information	- 11 -
6.1.4. Sensor Position and the Light Receiving Surface	- 11 -
6.1.5. Field of Vision: Lens versus Sensor (For Reference Only).....	- 12 -
6.2. Quantum Efficiency	- 13 -
6.3. External Trigger Function	- 13 -
6.4. Trigger Timing	- 14 -
7. Recommended System Requirements.....	- 15 -

1. Attention

■ About this manual

1. Before using the camera, please read this manual thoroughly.
2. Please keep this manual safe and keep as a reference when needed.
3. Please contact us if the manual is lost or damaged. We will provide a replacement.
4. Please note that we cannot guarantee safety if this product is used in any manner other than its intended purpose.
5. Please be sure to follow all safety instructions provided in this manual.
6. All contents are subject to change.
7. The diagrams in this document are simplified or abstracted for illustrative purposes.
8. Please contact us if you find any unclear points or mistakes in this manual.
9. Quoting, copying or altering some or all parts of the manual without our permission is prohibited.
10. Please be advised that the Company shall not be held liable for any claims for damages or lost profits arising from the use or operation of this product, even in the event of errors or omissions in this manual as described in Item 8.
11. Please understand that our oversea branches do not provide maintenance or repair services.

■ About the Icons

To keep the safety of the user, other people and their properties, please pay attention to the following icons.



Warning

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Caution

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

■ For Safe Use



Warning

● Using the product in the conditions described below may result in fire or electric shock. Please stop using the device immediately and disconnect the USB cable from the camera. For repairs or replacement in the event of a malfunction, please contact us using the contact information provided at the end of this document. Do not attempt to disassemble, modify, or repair the product yourself, as this is extremely dangerous.

- If smoke comes from the camera, the camera becomes unusually hot, or you notice any unusual smell or sound.
 - If any foreign object or liquid enters the camera.
 - If the camera has been damaged due to impact
- Do not place the camera in an unstable location. It may fall and cause injury.



Caution

- Do not expose the product to steam or fumes to avoid electric shocks and fires.
- Do not leave the product in high temperature places such as inside of vehicles or under direct sunlight. High temperature may cause damages to the camera, or even cause fires.
- Do not cover the product with cloth or other materials. The product may get extremely hot and the heat may cause deformations on the parts or even cause fires.
- Please avoid dropping or shocking the product as the product may be damaged.
- Do not touch the cable with a wet hand. Such action may cause electric shocks.
- Please avoid continuously contacting the surface of the camera to your skin when the camera is being used. The surface temperature of the camera may cause burns.

■ Other Notices

- Please do not use the camera under strong lights such as sun light or laser light for a long period. Also, please do not expose the camera under strong lights even when the product is not being used because the sensor might be damaged.

■ Maintenance

- Wipe any dirt off the camera using a soft cloth or tissue paper. Do not use alcohol, thinner or benzene, as doing so may cause the material to degrade or the paint to peel.

■ Precautions Regarding Radio Interference

- Using the camera near a radio or television receiver may cause interference with reception.

■ Export Control

This product is a List Control item subject to the Foreign Exchange and Foreign Trade Act and its relevant legislations No.1 10 (2) and (4). When exporting an InGaAs camera to regions outside Japan, it is necessary to comply with the Foreign Exchange and Foreign Trade Act as well as the export regulations of the Ministry of Economy, Trade and Industry (METI). Since an export license is required, please ensure compliance with the relevant laws and follow the proper procedures.

In addition, regarding InGaAs cameras, please keep records of the end users and provide these records upon our company's request.

Reference: METI Security Export Control website <https://www.meti.go.jp/policy/anpo/index.html>

Please contact us if you require a Parameter Sheets or an Item-by-Item Comparison Table.

The above is based on the applicable laws and regulations in effect at the time of issuance of this document. Please ensure to check the latest laws and regulations before exporting this product.

■ Guarantee

To reduce environmental impact, this product does not include a printed warranty certificate. Instead, your warranty is tracked electronically via your shipment and user registration dates.

For more details, please refer to the pdf below:

Hardware Warranty: <https://artray.co.jp/file/download/ARTRAY%20Warranty.pdf>

With regard to the quality, functionality, and instruction manual of this product, we do not guarantee its fitness for the customer's intended purpose or its merchantability. Furthermore, we assume no liability for any direct or indirect damages arising therefrom.

Please do not use this product for applications that require a high level of reliability. This product is not intended for use in medical devices, nuclear facilities or equipment, aerospace equipment, transportation systems, or any other equipment critical to human safety. We shall not be held responsible for any damages on the users' property, equipment or personal safety caused by this product.

■ Dispose

When disposing of this product, we kindly ask that you either return it to us, or dispose of it as industrial waste in accordance with relevant laws and regulations. Please ensure that measures are taken to prevent any third party from reusing it, and keep a record of the disposal.

2. Introduction

This manual is to identify the specification of ARTCAM-992SWIR-TEC-10GigE, NIR camera adopting InGaAs (Indium gallium arsenide) sensor and supports 10GigE Vision output.

3. Main Features

●NIR Detection with High Sensitivity

The InGaAs sensor can detect radiation invisible to human eyes and CCD/CMOS cameras in the wavelength range between 400 nm to 1700 nm band.

●High Frame Rate

ARTCAM-992SWIR-TEC-10GigE uses a higher resolution sensor of 2560×2048 pixel and delivers image at 71 fps.

●10GigE Vision interface

We use a high reliability 10GigE Vision interface for industrial applications.

4. The Product

- 1) Camera
- 2) AC adapter (AC100-240V -> DC12V)

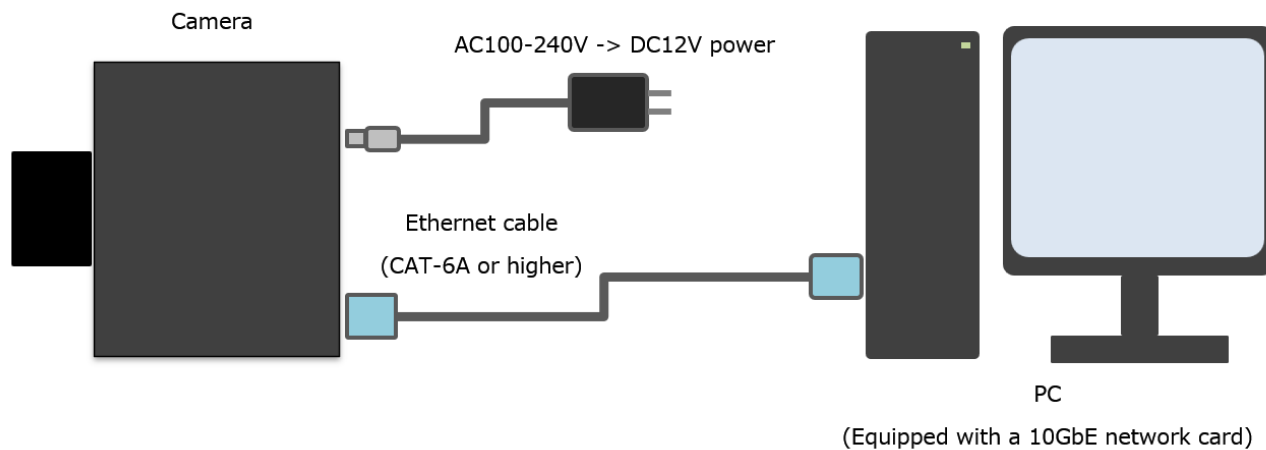
<Options>

- 1) NIR Lenses (C Mount Lens)
- 2) 10GbE network card (10GigE Vision compatible)
- 3) LAN Cable (Ethernet cable rated Cat 6A)

5. Connect the Camera

5.1. How to Connect a Camera

5.1.1. When connecting to a PC



6. Specifications

6.1. Specification

MODEL	ARTCAM-992SWIR-TEC-10GigE
Sensor Model	SONY InGaAs sensor IMX992-AABA-C
Image Sensor Cooling Method	Thermoelectric Cooling ($\leq 15^{\circ}\text{C}$)
Effective Pixels	2592(W) $\times$ 2056(H)
Output Pixels	2560(W) $\times$ 2048(H)
Pixel Pitch	3.45[μm] $\times$ 3.45[μm]
Image Size	8.8[mm] $\times$ 7.1[mm]
Spectral Range	400nm~1700nm
Shutter type	Global Shutter
S/N Ratio	48dB (for reference only)
Interface	10GigE VISION
Output connector	RJ-45 Ethernet connector
Ethernet Standard	10GBASE-T
A/D Resolution	12bit
Frame Rate	71fps
Exposure time	27.84 μs ~2s
Gain (Analog/Digital)	0~420 ※Default value : 0 (0~42[dB] ※Default value : 0[dB])
ROI	Available
Trigger	ON/OFF ※Default value : OFF
Mirroring	ON/OFF ※Default value : OFF Vertical and Horizontal
Synchronization System	Internal Synchronization/External Trigger Synchronization
Lens Mount	C Mount
External I/O terminal	HR10A-7R-6S (73) (HIROSE)
Power	DC12V External Input
Power Consumption	Under Approx.15W
Ambient Conditions	Operating Temperature/Humidity: 10~40 $^{\circ}\text{C}$ / 10~80% (Non-condensing) Storage Temperature/Humidity: 0~60 $^{\circ}\text{C}$ / 10~95% (Non-condensing)
External Dimensions	71.6(W) $\times$ 61.5(H) $\times$ 112.5 (D)mm ※Lens, Tripod mount and cables not included
Weight	About 580g

6.1.1. Analog / Digital Gain Settings

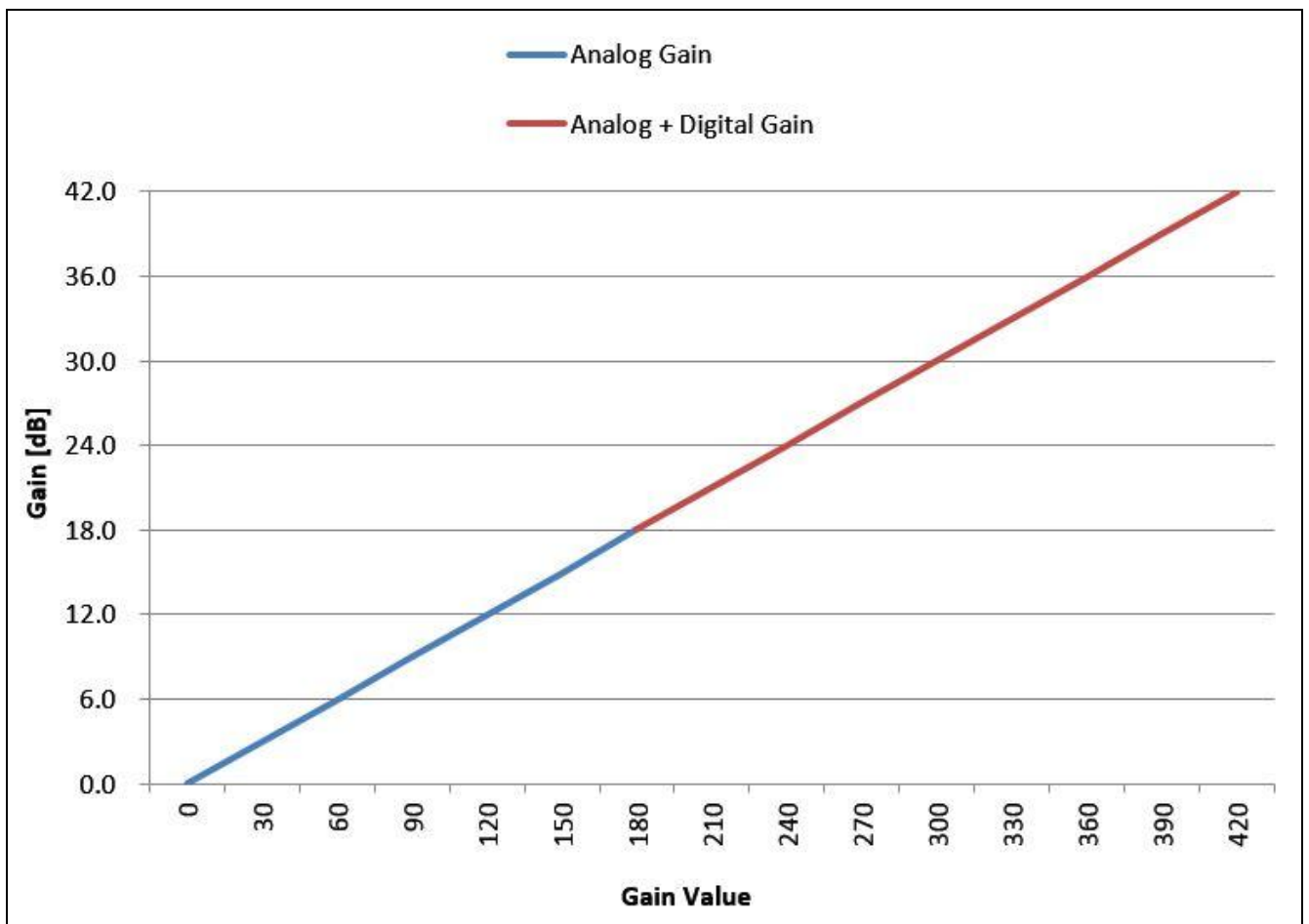
ARTCAM-992SWIR-TEC-10GigE is compatible with analog and digital gain.

Setting value of gain on software can be set from 0 ~ 420, and the gain will change from 0.0dB ~ 42.0dB accordingly. Gain can be calculated by the following formula:

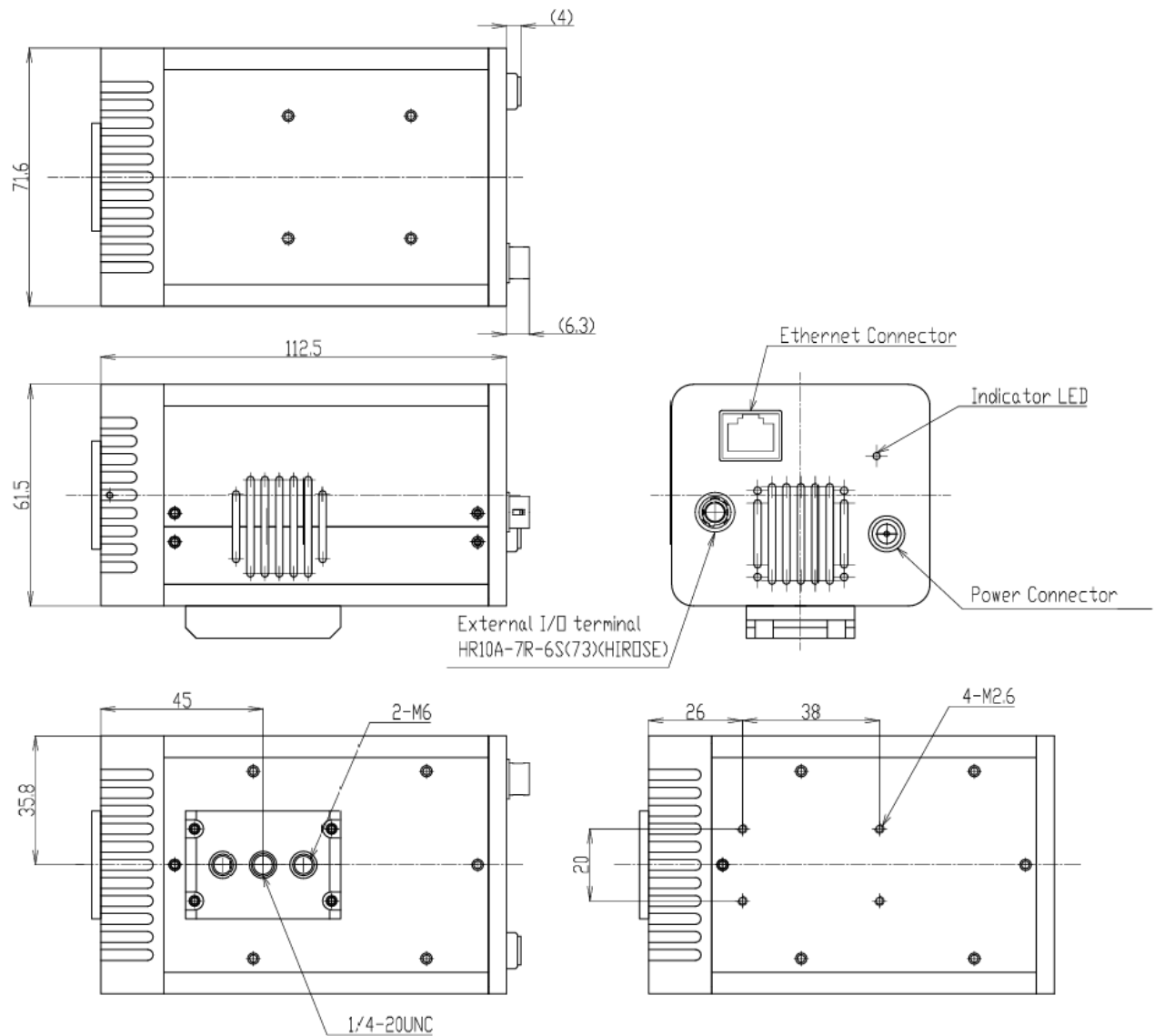
$$\text{Gain [dB]} = \text{value} / 10.0[\text{dB}]$$

Digital gain will activate when setting value of gain > 180.

The graph below shows the relationship between setting value of gain and its magnification[dB].



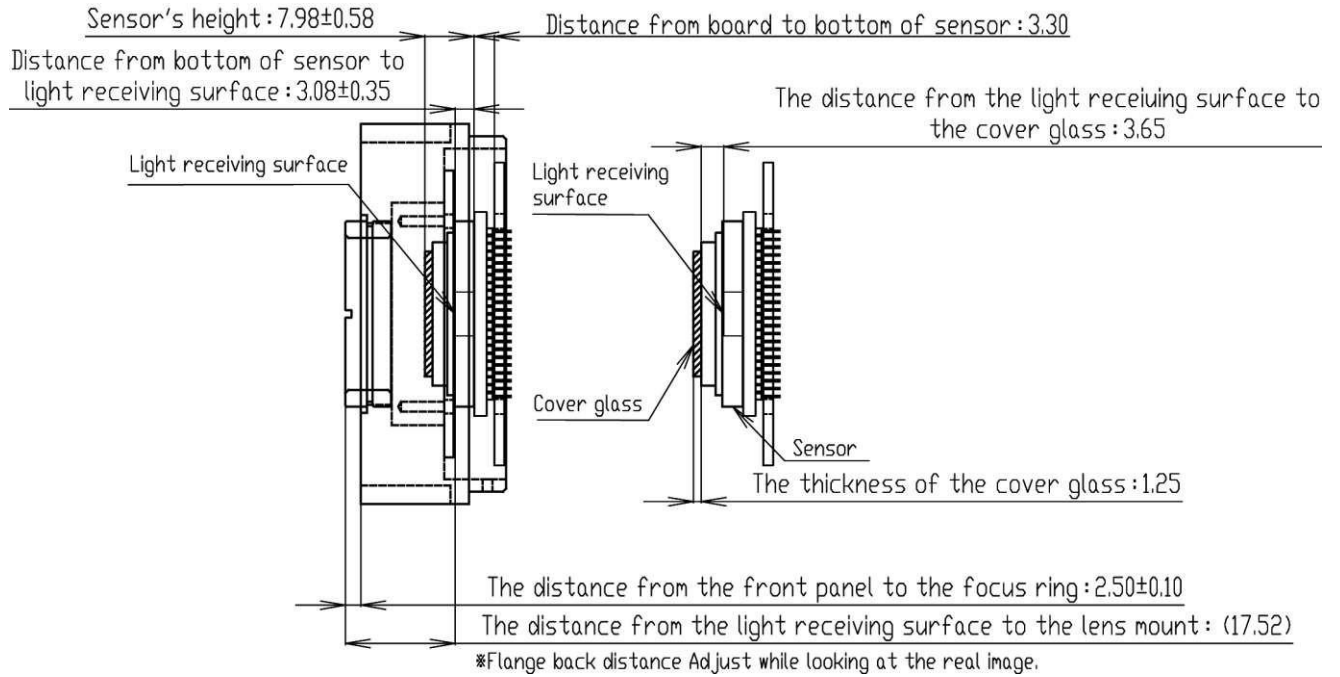
6.1.2. Dimensional Outline



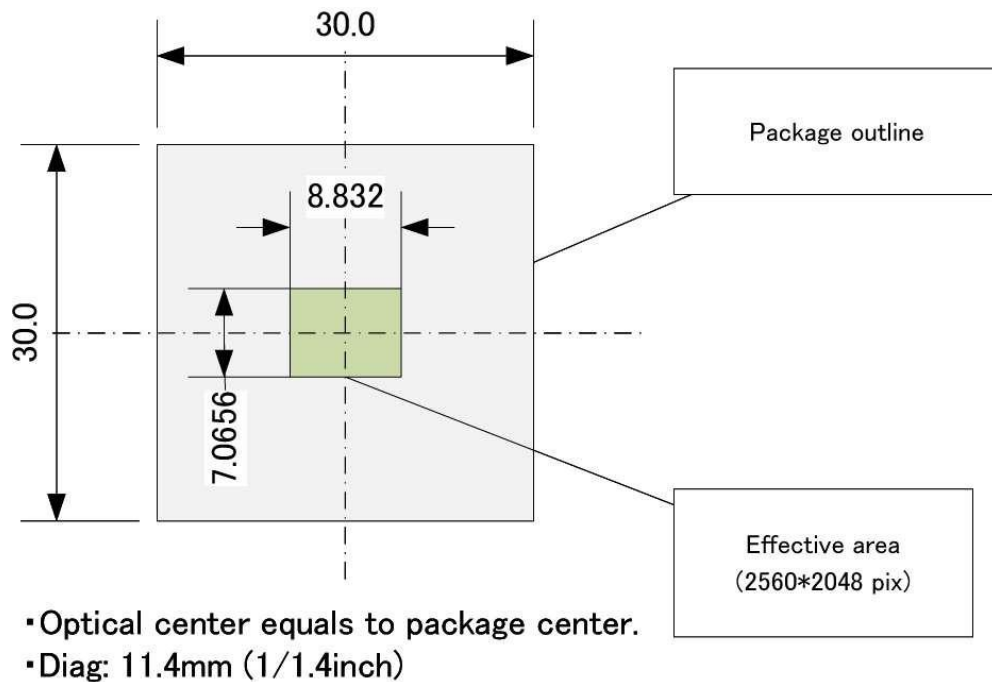
Base drawing without tripod mount

Please note that specifications may be updated.

6.1.3. Sensor Package Information



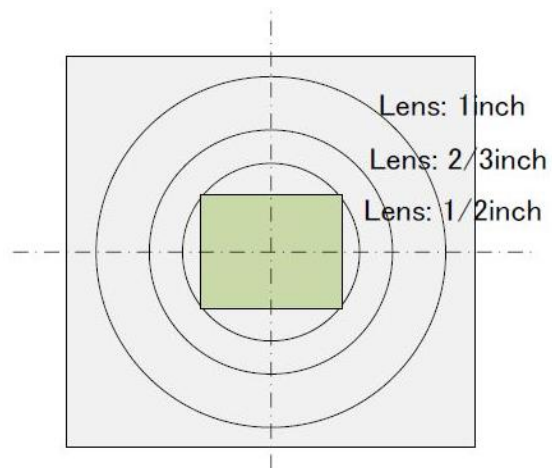
6.1.4. Sensor Position and the Light Receiving Surface



$$H = 3.45[\mu\text{m}] * 2560 = 8832 [\mu\text{m}]$$

$$V = 3.45[\mu\text{m}] * 2048 = 7065.6 [\mu\text{m}]$$

6.1.5. Field of Vision: Lens versus Sensor (For Reference Only)

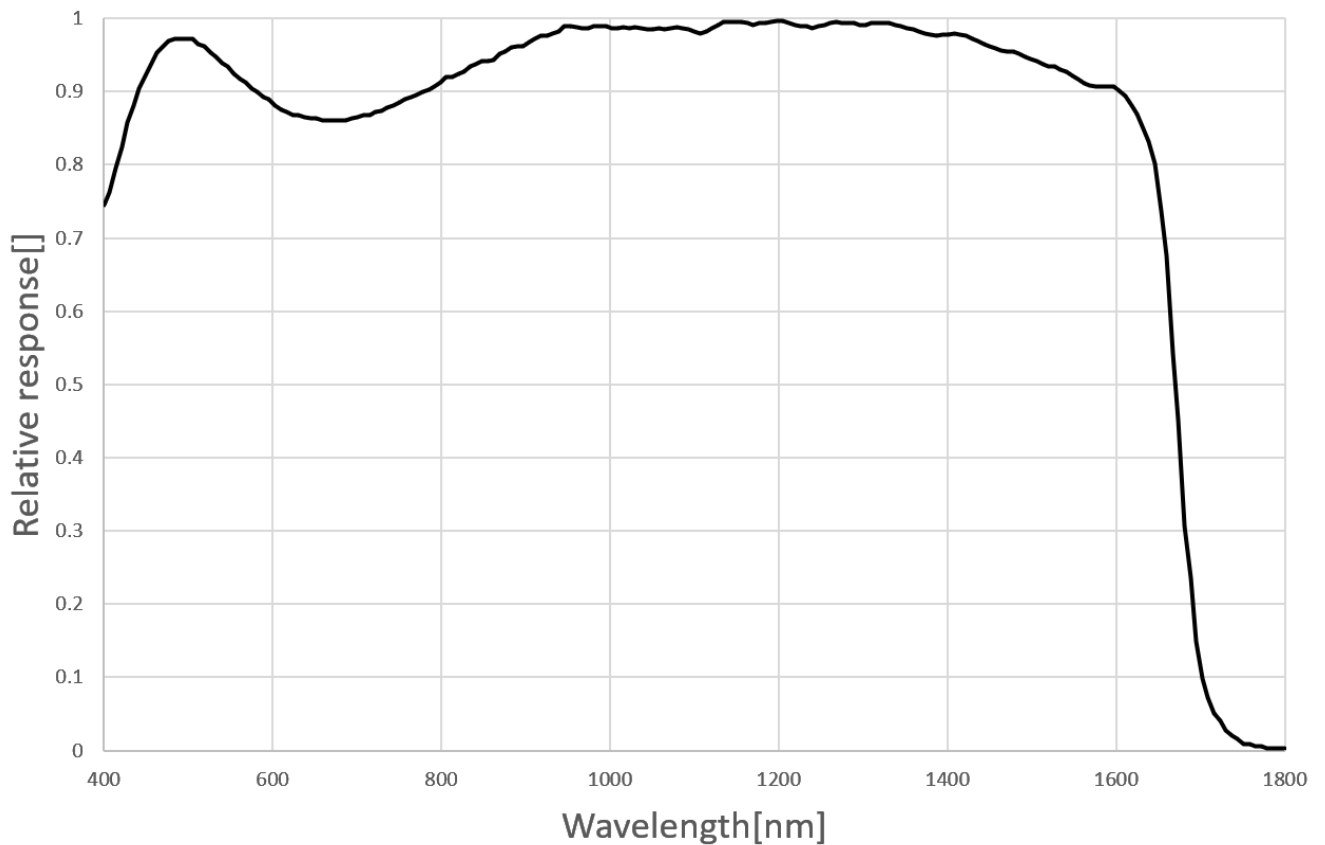


※The ratios of sensor size (diagonal) to lens size in the above illustrations are as follows:

1/2 inch = ϕ 8mm, 2/3 inch = ϕ 11mm, 1 inch = ϕ 15.8mm.

Please note that the actual field of view varies depending on different lens.

6.2. Quantum Efficiency

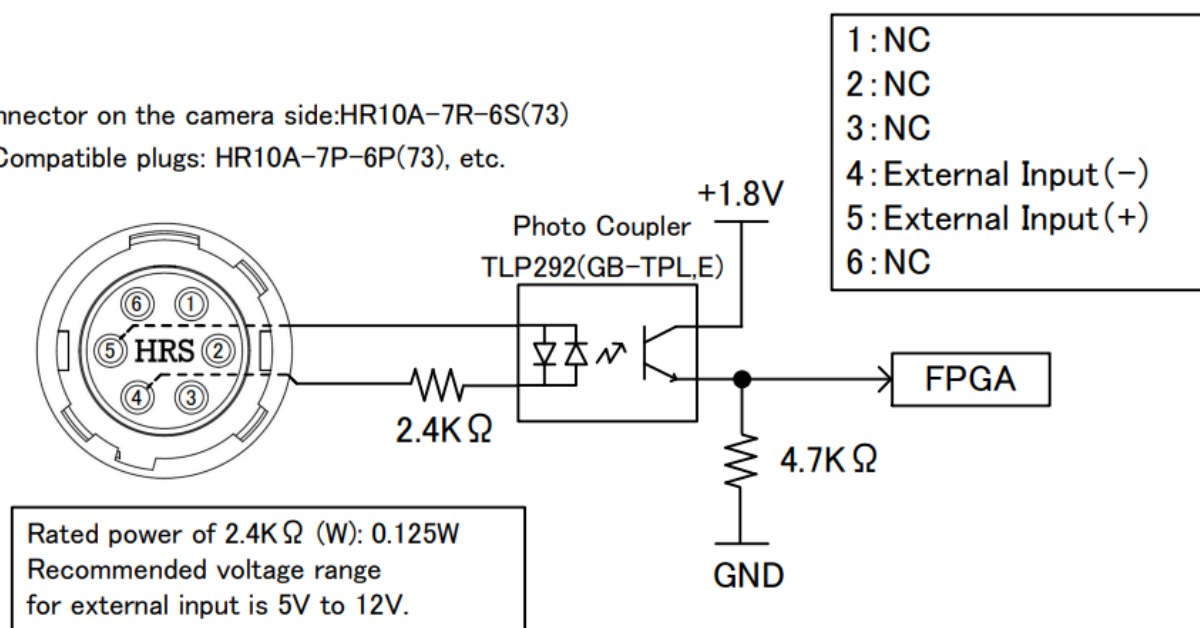


6.3. External Trigger Function

This camera has an external trigger electronic circuit, which is insulated by a photocoupler, and thus enables synchronized shooting by the input signal received from the external circuit.

Connector on the camera side: HR10A-7R-6S(73)

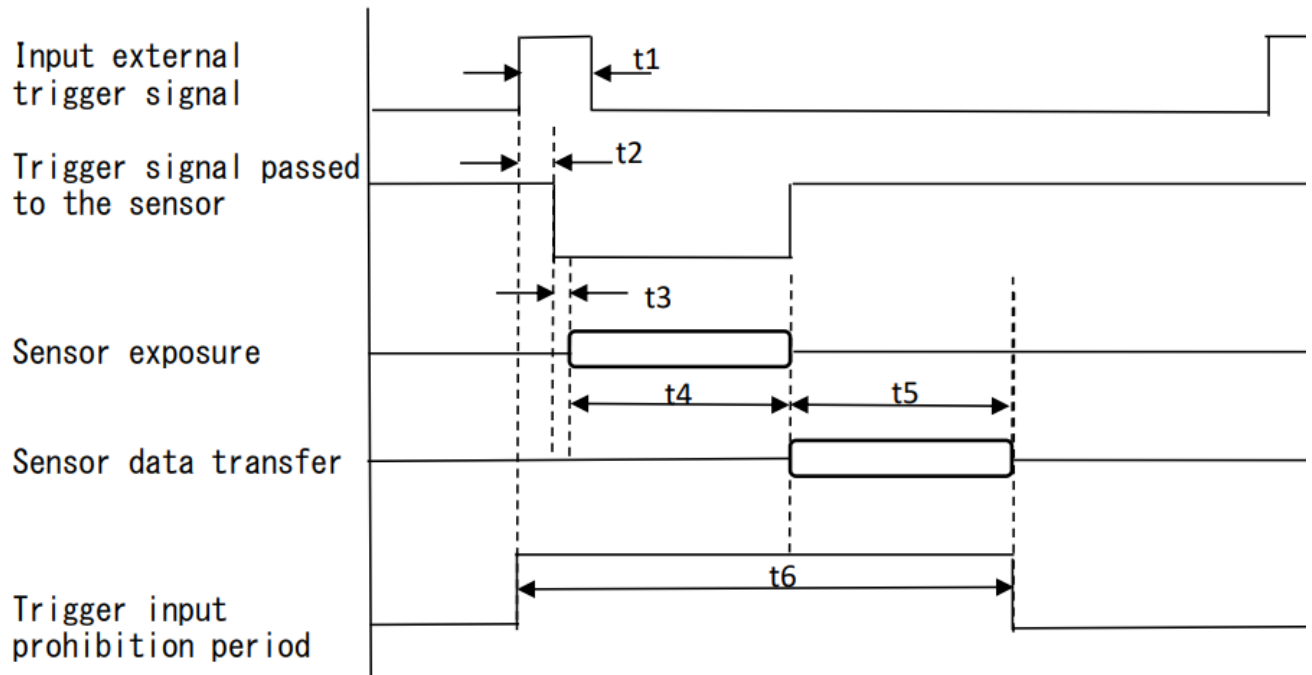
*Compatible plugs: HR10A-7P-6P(73), etc.



6.4. Trigger Timing

※For command settings, please refer to the ARTCAM-992SWIR-TEC-10GigE Setting Manual.

Details of Trigger Timing



	items	Required time
t1	Effective trigger input pulse	$>10 \mu \text{ sec.}$
t2	From the rise of the external trigger input to the fall of the trigger signal passed to the sensor (Delay due to the photocoupler)	$<1 \mu \text{ sec.}$
t3	From the fall of the trigger signal passed to the sensor to the start of exposure	Max $0.13 \mu \text{ s}$
t4	Exposure time	t sec.
t5	Time required for data transfer (from the sensor to the FPGA)	$(43 + \text{Effective Vertical pixels}) * 1H$
t6	Trigger input prohibition period	$t_2 + t_3 + t_4 + t_5 + 600 \mu \text{ s}$

※ $1H = 6.52 \mu \text{ sec.}$

※When input triggers continuously, please ensure that the trigger interval is more than t_6 .

7. Recommended System Requirements

- PC Specification

Please use a PC equipped with a 10GbE network card.

- LAN Cable

An Ethernet cable rated Cat 6A or above is recommended.

ARTRAY Co., LTD. Obtained ISO 9001: 2015 2018/9/17
1-17-5 Kouenjikita, Suginami-ku, Tokyo 166-0002 Japan
TEL: +81-3-3389-5488 FAX: +81-3-3389-5486
Email: sales@artray.us URL: www.artray.us

ARTRAY