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Ver1.06

Camera Link UV CMOS Camera  
ARTCAM-2020UV-CL  
INSTRUCTION BOOKLET

4.00 M Pixels

ARTCAM-2020UV-CL

ARTRAY CO., LTD.

**ARTRAY**

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# 1. Attention

## ■About this manual

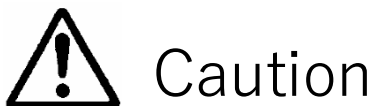
1. Before using the camera, please read this manual thoroughly.
2. Please keep this manual reachable and always refer to the contents when needed.
3. Please contact us if the manual is lost or damaged. We will provide a replacement.
4. We cannot guarantee the safety of improper uses of the camera.
5. For your safety, please follow the directions of this manual.
6. All contents are subject to change.
7. Images in this manual may have been simplified to be easier comprehended.
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. We are not responsible for any lost or damages on your profits due to the use of our products.
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.



If the user fails to follow the instruction, serious injury or death may occur.



If the user fails to follow the instruction, physical injury on human or damages on hardware may occur.

#### ■For Safe Use



## Warning

●In following circumstances, please stop using the product and turn off the power immediately to prevent the risks of fires and electric shocks. If the product is defective, please contact us for repair or exchange. For your safety, please do not disassemble, modify or repair the camera on your own.

Please stop using the product and turn off the power immediately when:

- The product becomes smoky or gets extremely hot on the surface, or makes unusual smells or sounds.
- Foreign material or water gets into the product.
- The product falls and becomes damaged.

●Do not place the product on unstable surfaces. The product may be fallen and people may get hurt.



## 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 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 the dirt on surface with soft cloth or tissue paper. Do not use alcohol, thinner or benzene to avoid damaging the surface paints.

#### ■Electro Magnetic Interference

●The camera may interference with electronic devices such as TV and radio. Please do not place the camera next to such equipment.

#### ■Export Control

This product is a Catch-all Control item subject to the Foreign Exchange and Foreign Trade Act and its relevant legislations. Except for exporting to the 27 white countries designated in the Cabinet Order, export licenses are required if the products are going to be used for military use or if the end user of the product is related to all kinds of military activities. If your circumstances cause the need to apply export licenses, please notify us before you place orders. Also, please notify us in advance if the end users or purposes of use change after the purchase and thus cause the need to apply export licenses.

About the Japanese Security Export Controls, please refer to the webpage for Security Export Control Policy, the Ministry of Economy, Trade and Industry:

[www.meti.go.jp/policy/anpo/englishpage.html](http://www.meti.go.jp/policy/anpo/englishpage.html)

The above is based on the enforcement laws and regulations at the time of issuance of this document. Please be sure to check the latest laws and regulations before actually exporting this product.

#### ■Guarantee

To save the environment, we do not issue warranty in printed format. Instead, all records of the warranty periods, delivery dates and the customer information are well kept in our system.

For more details, please refer to the following link:

Hardware Warranty: [http://www.artray.us/download/artray\\_warranty.pdf](http://www.artray.us/download/artray_warranty.pdf)

●We do not guarantee the functions of this product or the descriptions on this manual to be completely adapted to the users' end applications or marketing purposes. We are also not held responsibility for any direct or indirect damages caused by our products under any circumstances.

●Please do not use this product for a task that require high reliability. This product is not manufactured to be used as medical, nuclear, aerospace, transportation equipment or equipment or that is highly related to human safety. We are not held responsibility for any damages on the users' property, equipment or personal safety caused by this product.

#### ■Disposal

●To dispose this product, please return the camera to us. If you decide to dispose the camera without returning it to us, please follow related regulations and have the camera disposed as an industrial waste. Please always keep track of the disposal, and make sure the disposed camera cannot be accessed or used by any third party.

## 2. Introduction

ARTCAM-2020UV-CL is a series of ultraviolet cameras with high sensitivity to the wavelength band of 200 nm to 1100 nm.

## 3. Main Features

- UV Detection with High Sensitivity

The CMOS sensor can detect radiation invisible to human eyes and CMOS cameras in the wavelength range between 200 nm to 1100 nm band.

- CameraLink interface

We adopt high reliability CameraLink interface as industrial application.

## 4. The Product

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

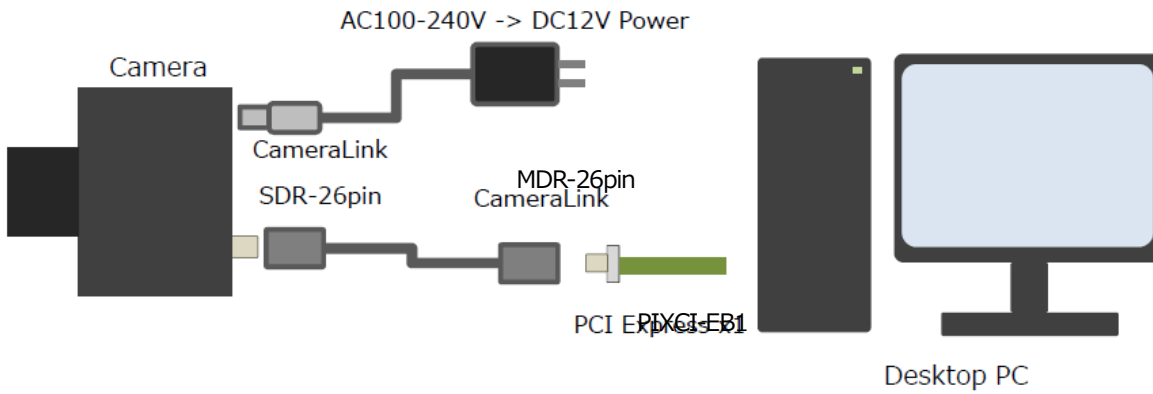
<Options>

- 1) Grabber board (PIXCI-EB1, manufactured by EPIX, Inc., is recommended.)
- 2) CameraLink Cable (Standard 5m, Exchangeable to 1m or 3m)
- 3) CameraLink SDK (XCLIB manufactured by EPIX, etc.)

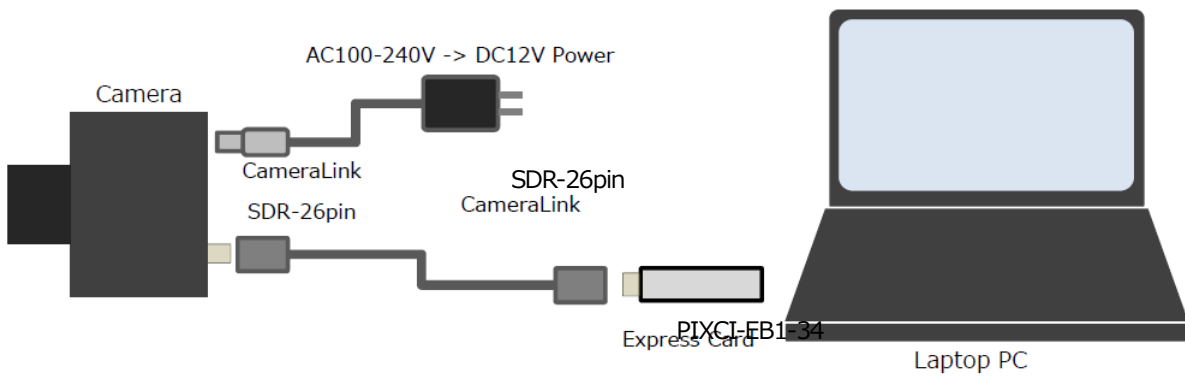
## 5. Setup

### 5.1. Connecting Method (an example)

#### 5.1.1. When using on a desktop PC



#### 5.1.2. When using on a notebook PC



\*There is a unique port of CameraLink channel used since this camera operates with CameraLink - Base Configuration.

For the connector of this camera is SDR-26pin, please use the supported cable.

## 6. Specifications

### 6.1. Camera Specification

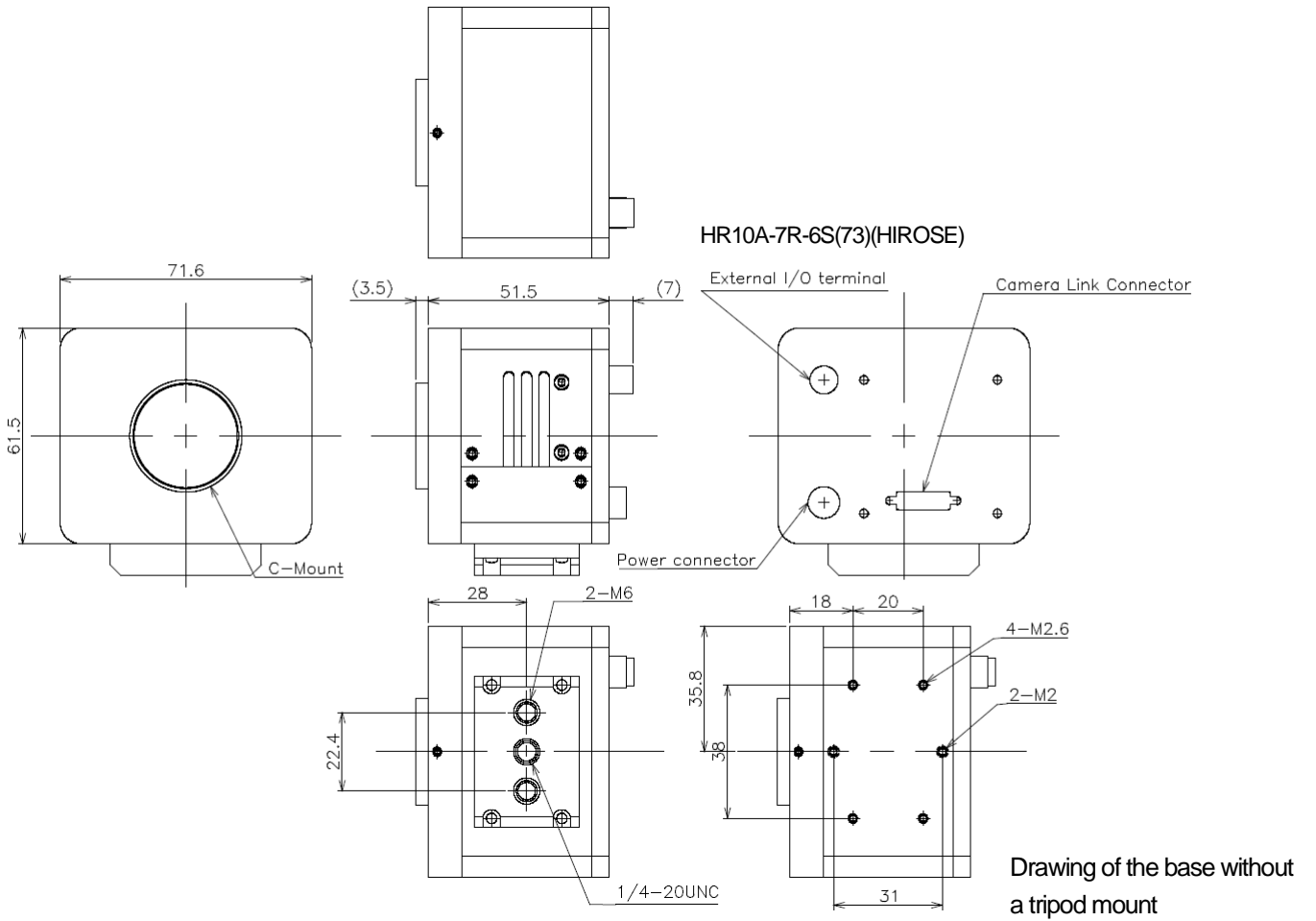
#### 6.1.1. Camera specification list

Items	
Image pickup device	Gpixel 4.0M pixels CMOS Sensor GSENSE2020BSI
Number of total pixels	2056(W) x 2058(H)
Number of effective pixels	2048(W) x 2048(H)
Pixel Size	6.5(H) [ $\mu\text{m}$ ] $\times$ 6.5(V) [ $\mu\text{m}$ ]
Imaging area	13.3(H) $\times$ 13.3(V)[mm] (Diagonal 18.809[mm], Approx.1.2 inch)
Detection frequency band	200~1100nm
Shutter Type	Rolling Shutter (Global reset possible)
Saturation capacity / readout noise	54ke- 1.6e- @12/11bits
A/D Resolution	11/12bits
Interface	Camera Link (Base Configuration)
Number of output bits	12 bits
Frame Rate	11.5 fps
Shutter Speed	42.32 $\mu$ sec ~ 2 sec
ROI	Vertical only (Horizontal only available on software)
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	Approx.6W (During normal operation)
Ambient Conditions	Operating Temperature/Humidity : 0~35° C/10~80%(Non condensing) Storage Temperature/Humidity : 0~60° C /10~95%(Non condensing)
External Dimensions	71.6(W) $\times$ 61.5(H) $\times$ 51.5(D) mm ※Exclude lens, tripod mount and projections
Weight	Approx. 240g ※Exclude lens, tripod mount and projections

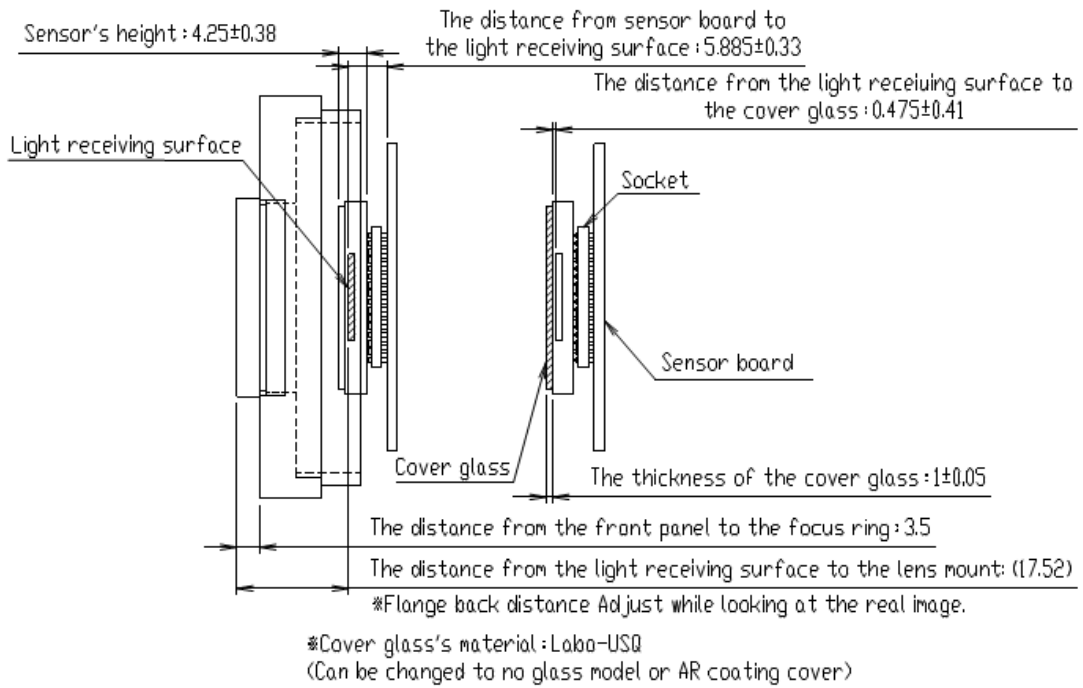
※All by nominal value



6.1.2. Dimensional Outline



6.1.3. Schematic Diagram of the Sensor



## 6.2. Camera's Functions

### 6.2.1. Shutter Speed

The exposure time (electronic shutter speed) of the camera can be set.

The exposure time can be calculated by the following formula:

Exposure time = the setting value of the shutter speed \* 1 H period

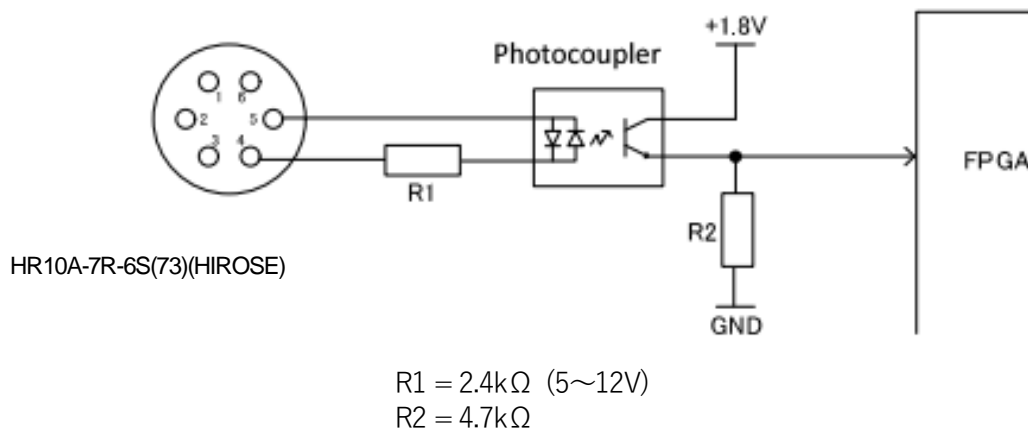
※1 H period = 1058(Minimum) \* 1PCLK = 42.32 μsec.

※1PCLK = 1/25,000,000sec. = 0.040 μsec.

### 6.2.2. 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.

### Trigger input circuit diagram

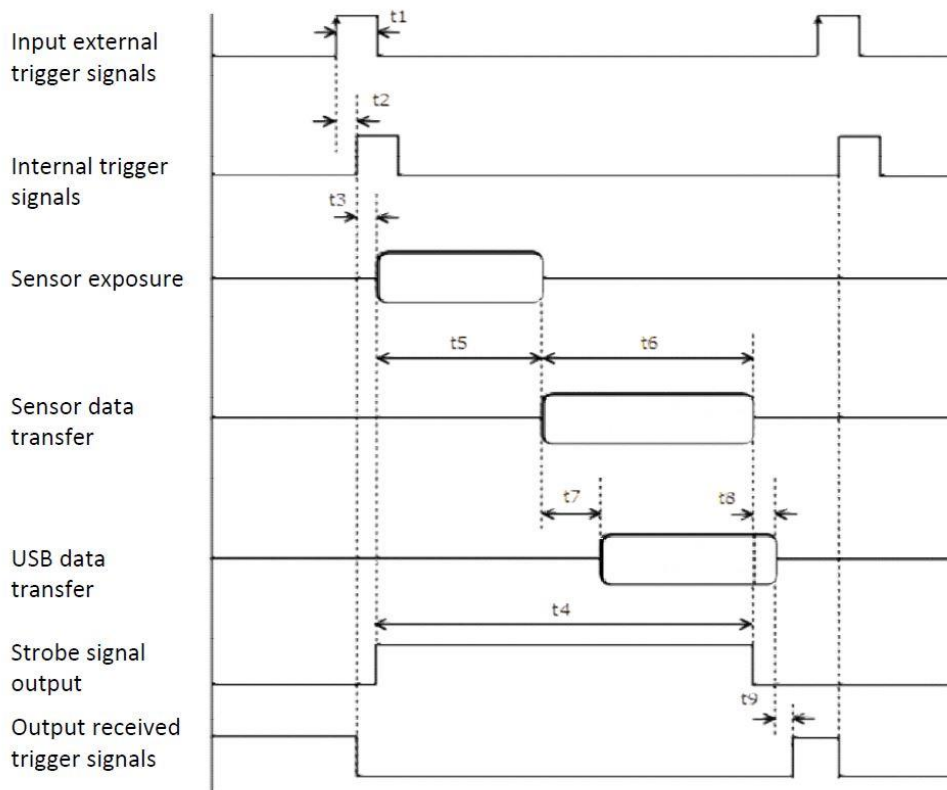


The Pin Assignment of the External I/O Terminal

Pin Number	Function
1	GND
2	External output 1 (Vertical Synchronization) ※
3	External output 2 (Strobe) ※
4	External Input (-) (Trigger Reception -)
5	External Input (+) (Trigger Reception +)
6	+12V

※When outputting, please use open drain (6.5V, 50mA)

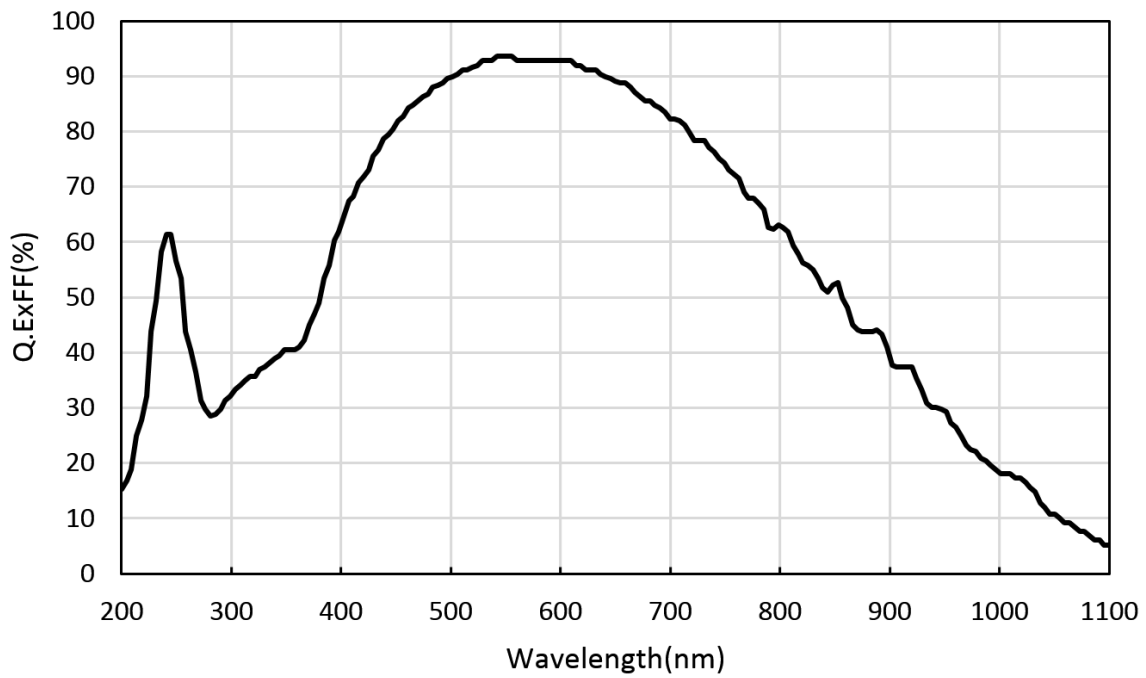
Details of trigger timing



Item Numbers	Items	Required Time
t1	Effective Trigger Input Pulse	>10 $\mu$ sec.
t2	Time required from the starting of the External Trigger to the starting of the Internal Trigger Signals (may delay caused by the photocoupler)	<1 $\mu$ sec.
t3	Time required from the starting of the Internal Trigger Input to the Exposure Time	<1 $\mu$ sec.
t4	Strobe Time	t5 + t6
t5	Exposure Time	Exposure Time = the setting value of the Shutter Speed * 1 H period ※1 H period = 1058(Minimum) * 1PCLK = 42.32 $\mu$ sec. ※1PCLK = 1/25,000,000sec. = 0.040 $\mu$ sec.
t6	Time required for data transfer (from the sensor to the FPGA)	(Effective Vertical Pixels + 2) * 1 H period
t7	Time required for the transfer (from the FPGA to USB)	>3 H period
t8	Time required from the completion of the sensor data transfer to the completion of the USB data transfer	>3 H period
t9	Time required from the completion of the internal data transfer until the next trigger input becomes available	Approx. 1 H period

## 7. Spectral Sensitivity Characteristics

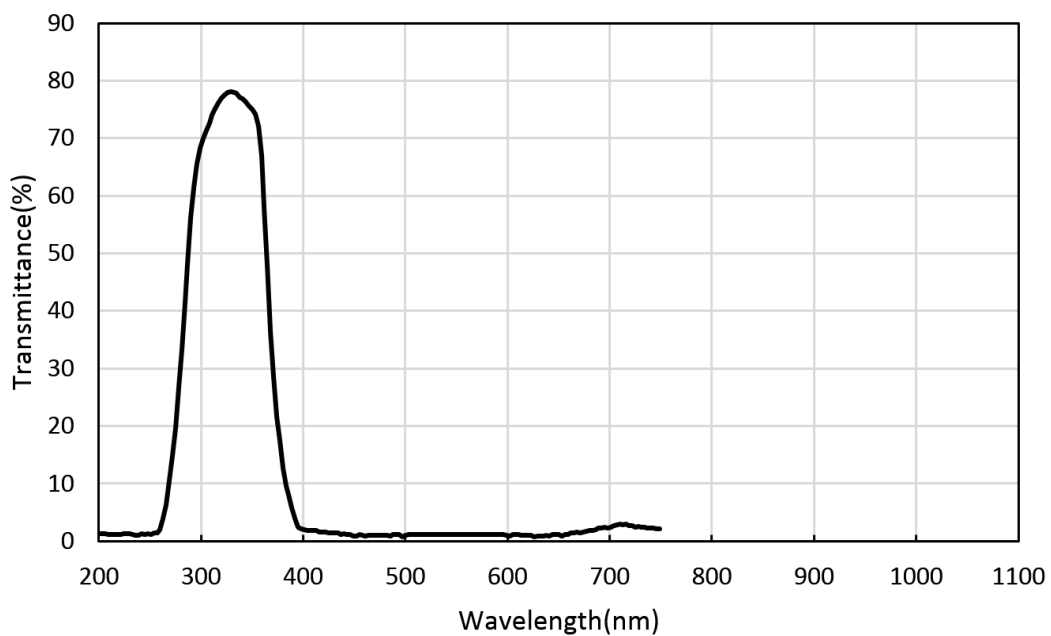
### 7.1. ARTCAM-2020UV-CL



### 7.2. UV Bandpass Filter (U340) (Optional)

ARTCAM-2020UV-CL is possible to choose to install an additional filter U340, which can absorb visible wavelengths and only allow ultraviolet wavelengths to pass.

Please refer to the following Spectral sensitivity line chart for detail.



## 8. Recommended System Requirements

- Camera Link Frame Grabber

PIXCI-EB1 manufactured by EPIX, Inc. is recommended.

Please confirm with us if you are using different grabber.

- PC

Please confirm the recommended requirement of the Camera Link frame grabber you are using.

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The logo for ARTRAY, featuring the word "ARTRAY" in a bold, orange, sans-serif font.