![RICOH]

GigE Vision

UXGA Monochrome CCD Camera

FV-G200B1

Product Specifications

RICOH COMPANY, LTD.

Copyright & Disclaimer

Sensor Technology Co., Ltd. (DBA Sentech) believes the contents and specifications of its website, catalog, documentation and ads are correct; however, Sentech provides no representation or warranty regarding such information or product(s) contained therein. It is requested that Sentech be given appropriate acknowledgement in any subsequent use of such work by a third party.
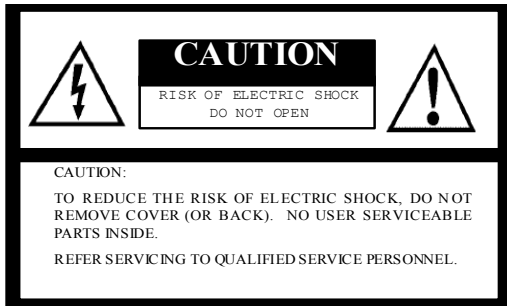
While every effort has been made to ensure that the details contained in Sentech's website and all documentation are correct and up-to-date, Sentech assumes no liability, legal or otherwise for any errors in listings, specifications, part numbers, process, software or model applications. Sentech reserves the right to change specifications, product descriptions, product quality, pricing and application at any time without prior written or oral notice. Any party using such information assumes all risk for any and all damaged caused to themselves, a third party and/or property by virtue of incorrect information and/or failure of these products. By installing and/or using a Sentech software development kit or other similar product and/or information obtained from Sentech's website, catalog, documentation or ads, you hereby accept and understand these stated terms and conditions.

RICOH

Table of Contents

RICOH

1 Safety / Product Precautions

Safety Precautions

<table>
<tr><td>

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION:

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

</td><td>

For U.S.A.

Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, I.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

</td></tr>
</table>

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

For Canada

Warning:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Product Precautions

➢ Handle the camera with care. Do not abuse the camera. Avoid striking or shaking it. Improper handling or storage could damage the camera.
➢ Do not pull or damage the camera cable.
➢ During camera use, do not wrap the unit in any material. This will cause the internal temperature of the unit to increase.
➢ Do not expose the camera to moisture, or do not try to operate it in wet areas.
➢ Do not operate the camera beyond its temperature, humidity and power source ratings.
➢ While the camera is not being used, keep the lens or lens cap on the camera to prevent dust or contamination from getting in the CCD or filter area and scratching or damaging this area.
➢ Do not keep the camera under the following conditions:
   In wet, moist, and high humidity areas
   - Under hot direct sunlight
   - In high temperature areas
   - Near an object that releases a strong magnetic or electric field
   - Areas with strong vibrations
➢ Apply the power that satisfies the requirements specified in this document to the camera.
➢ Use a soft cloth to clean the camera. Use pressured air spray to clean the surface of the glass. DO not scratch the surface of the glass.

RICOH

➢ The camera is a general-purpose electronic device; using the camera for the equipment that may threaten human life or cause dangers to human bodies directly in case of failure or malfunction of the camera is not guaranteed. Use the camera for special purposes at your own risk.

FV-G200B1
Product Specifications Rev. 1.03

RICOH

2 Electronic / Mechanical / Environmental Specifications

Product		FV-G200B1
Electronic Specifications	Imager	1/1.8" Interline UXGA monochrome progressive CCD: ICX274AL
	Total Picture Elements	1688 (H) x 1246 (V)
	Active Picture Elements	UXGA: 1624 (H) x 1236 (V)
	Cell Size	4.4 (H) x 4.4 (V) μm
	Scanning System	Progressive
	Vertical Frequency (Frame Rate)	15.31668 Hz at full resolution 0.29261 to 61.26674 Hz adjustable via the communication (Frame rate depends on the AOI setting) Maximum frame rate (61.26674 Hz) is when vertical resolution AOI setting is 232.
	Horizontal Frequency	19.1761 kHz
	Pixel Frequency	36.8181 MHz
	Noise Level @ 8bit output	≤ 3 Digit (Gain 0 dB)
	@ 10bit output	≤ 12 Digit (Gain 0 dB)
	@ 12bit output	≤ 48 Digit (Gain 0 dB)
	Minimum Scene Illumination	0.16 Lux at F1.2, 15.31668 Hz
	Sync. System	Internal
	Video Output Format	Digital 8, 10 or 12 bit Raw Data or RGB 8 bit
	Interface	IEEE802.3 (1000BASE-T)
	Protocol	GigE Vision® 1.2 and GenICam™ 2.0 compliant
	Exposure Time	Preset continuous mode: 1 useconds to 16,777,215 useconds Preset trigger mode: 1 useconds to 16,777,215 useconds Pulse width mode: 1 useconds to Unlimited
	ALC	Auto iris lens, electronic iris and AGC (ON/OFF)
	Gain	0 to 20.4 dB
	Gamma	Gamma 1.0 (Factory default) or uploadable gamma table
	AOI Function	Programmable AOI setting via the communication
	Smear Reduction	Selectable ON/OFF via the communication
	Operational Mode	Free-run, Edge preset trigger, Pulse width trigger (unlimited long exposure)
	Communication	UART Communication through Ethernet port
	I/O	One opt-isolated input and two open-collector outputs
	Auto IRIS Lens Control	DC IRIS control input with video level target, peak/average and zone weight settings via the communication
	Power Input Voltage	+10.8 to +26.4 Vdc
	Consumption	Less than 5.00 W
Mechanical Specifications	Dimensions	35 (W) x 35 (H) x 50.8(D) mm excluding connectors
	Optical Filter	No Filter
	Optical Center Accuracy	Positional accuracy in H and V directions: +/- 0.3 mm Rotational accuracy of H and V: +/- 1.5 deg.
	Material	Aluminum (AC)
	Lens Mount	C mount
	Connectors	RJ45 connector Power-I/O connector: HR10A-7R-6PB (Hirose) or equivalent DC IRIS lens connector: M1951 (EMUDEN) or equivalent
	Camera Mount Screws	Two 1/4" Tripod screw holes: (One on each top and bottom plate), Twelve M4 screws holes: (Four on each top and bottom plate, two on each side plate)

Weight	Approximately 120 g

Product			FV-G200B1
Environmental Specifications	Operational Temperature	Minimum	Environmental Temperature -5^{0}C
		Maximum	Camera housing temperature (top plate) shall not exceed 65^{0}C (This corresponds to an environmental temperature of approximately 35^{0}C)
	Storage temperature		Environmental Temperature: -30^{0}C to 65^{0}C
	Vibration		20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, 3 directions 30 min. each
	Shock		Acceleration 38G, half amplitude 6ms, 3 directions 3 times each
	Standard Compliancy		EMS: EN61000-6-2, EMI: EN55011, FCC PART15 subpart B classA
	RoHS		RoHS Compliant

Note: Please use this camera in surrounding temperature conditions that are less than 35^{0}C or in conditions where the
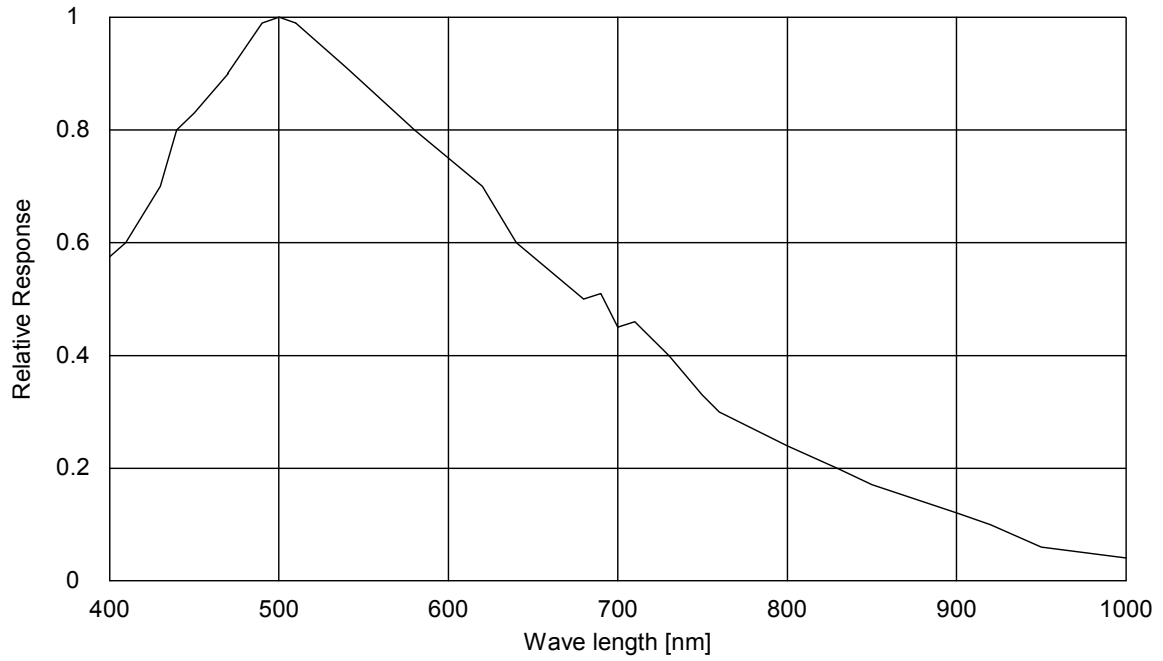
camera's top case plate is less than 65^{0}C.

When the camera is used in surrounding temperatures that exceed 35^{0}C, please make sure that the camera is set up
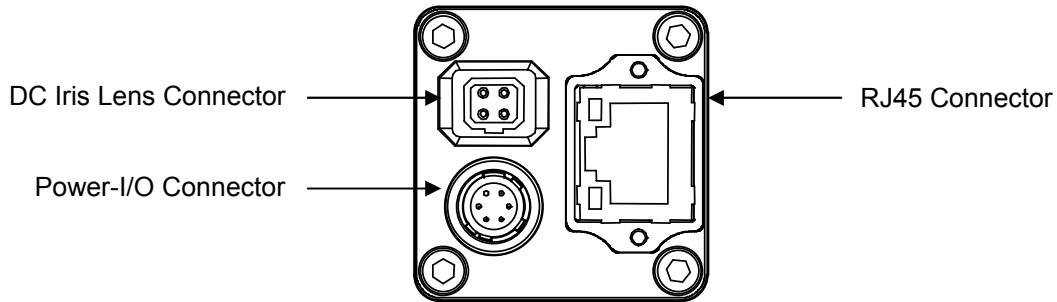
to properly radiate heat (maintaining the camera's top case plate's temperature to be less than 65^{0}C).

Taking these steps will maintain the heat rating of the electronic components of the camera.

2.1 Spectral Sensitivity Characteristics

3   Connector Specifications

DC Iris Lens Connector →

RJ45 Connector ←

Power-I/O Connector →

3.1   RJ45 Connector

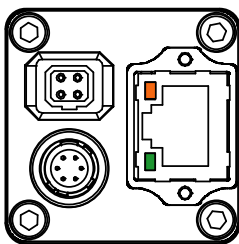**This product is NOT a PoE type. Apply power (+10.8 to +26.4Vdc) ONLY through the I/O connector.**

Pin Assignment:

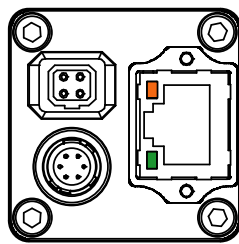| Pin No.	Signal Name
1	TA+
2	TA-
3	TB+
4	TC+
5	TC-
6	TB-
7	TD+
8	TD-

LED Information:

Green LED	Yellow LED	Status
Green Light ON	Orange Light ON	Power ON
Green Light ON	Orange Light Blinking	1Gb Transferring
Light OFF	Orange Light Blinking	100 Mb Transferring

The camera is powered-on

Green light: ON
Yellow light: Blinking
1 Gb Transferring

Green light: OFF
Yellow light: Blinking
100 Mb Transferring

Please use a 1Gb supported NIC, HUB and LAN cable. Check that the NIC and HUB being used is "1Gb transferring".
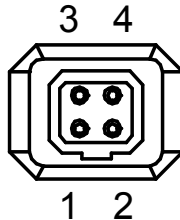**Damaging or mishandling the CAT5e cable may cause the transferring speed to change from 1Gb to 100Mb. If this happens, please replace the CAT5e cable.**

RICOH

3.2 DC Iris Lens Connector

> M1951 (EMUDEN) or equivalent.

Pin Assignment

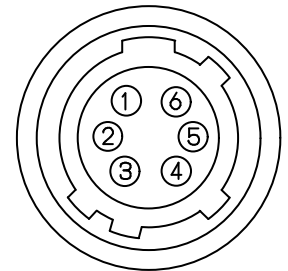| Pin No.	Signal Name
1	DAMP-
2	DAMP+
3	DRIVE+
4	DRIVE-

3.3 Power-I/O connector

> HR10A-7R-6PB（Hirose）or equivalent
> This connector is for the power supply (12Vdc) and input /output signals.
> Use HR10A-7P-6S (Hirose) or equivalent for the cable side.

Pin Assignment

Pin No.	Signal Name	IN / OUT	Voltage
1	GND	IN	0V
2	I/O-1	OUT	+3.3V LVTTL
3	I/O-2	OUT	+3.3V LVTTL
4	TRG_In-	IN	Low: Smaller than +1.0V (Opt. Isolated -) High: +3.0 to +26.4V (Opt. Isolated +)
5	TRG_In+	IN	*potential difference between TRG_In- and TRG_In+
6	POWER IN	IN	+10.8 to +26.4 Vdc

> Output signals can be assigned through the camera setting communication.
> (Device Code = 00H, Command = F0H and F1H)

IO Signal Patterns for Pin No.2 (I/O-1) and Pin No.3 (I/O-2)

Command No.				HR10A-7R-6PB (Hirose)
F0H[3..0]	F1[3]	F0H[7..4]	F1[4]	I/O-1 (Pin No.2) / I/O-2 (Pin No.3)
For I/O-1 (Pin No. 2)		For I/O-2 (Pin No.3)		
0H (initial setting)	-	0H	-	FrameTriggerWait (initial setting for I/O-1)
1H	Set Value	1H	Set Value	UserOutput
2H	-	2H (initial setting)		ExposureActive (initial setting for I/O-2)
3H	-	3H	-	TriggerAuxiliary
4H	-	4H		TriggerInternal
5H	-	5H		SensorReadOut
6H	-	6H		StrobeSignal
7H-FH	-	7H-FH	-	For Test Use Only

Note: I/O-1 can be assigned only by F0H[3..0] and F1[3], and I/O-2 can be assigned only by F0H[7..4] and F1[4].

1) FrameTriggerWait

The user can check the camera condition (camera exposure and image output processing by the trigger signal with this FrameTriggerWait signal).
This signal is LOW for the period from the trigger input signal to the image output.

a) High status (3.3V): No processing by the trigger signal. The camera accepts the trigger signal.
b) Low status (0V): The camera is exposed and the image output processes by the trigger signal.

The camera default setting is the input trigger signal is INVALID while at the low status of this signal. When the exposure starts while the image output by the next trigger signal, please change the camera setting (Device code: 00H, Command No. :13H) to accept the trigger signal while the image outputs.
The noise appears on the image when the exposure begins while the image is output. The noise appears on the image when the start exposure while the image is output. In this case, please change the "H reset" for the exposure start mode (Device code: 00H, Command No. : 12H) to change the exposure start point to the next HD timing.

2) UserOutput

The status of the UserOutput signal can change with the "UserOutputValue".

a) High status (3.3V)
b) Low status (0V).

3) ExposureActive

The user can check the exposure time with the ExposureActive signal.

a) High status (3.3V): The camera is exposing
b) Low status (0V): The camera is not exposed

4) TriggerAuxiliary

The TriggerAuxiliary signal is the input trigger signal.

5) TriggerInternal

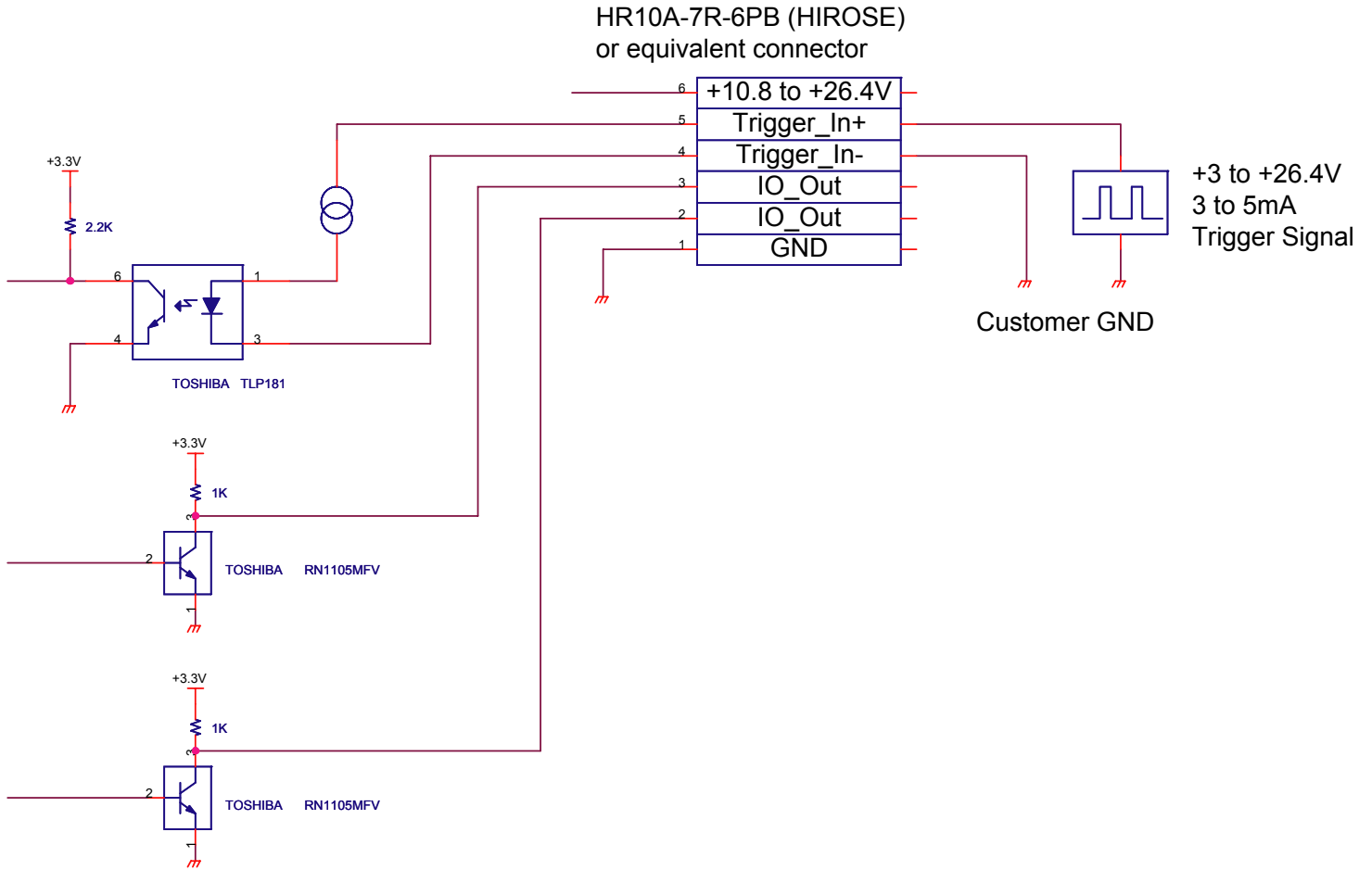The TriggerInternal signal is the input trigger signal with the trigger delay time.

6) SensorReadOut

The SensorReadOut signal is the FVAL signal, which is the image output period of the time.
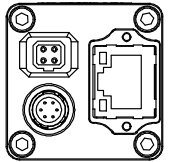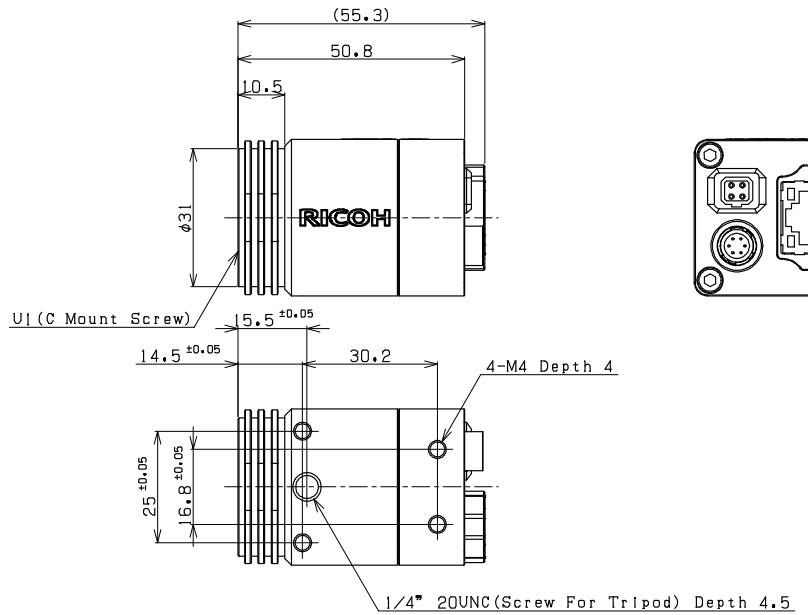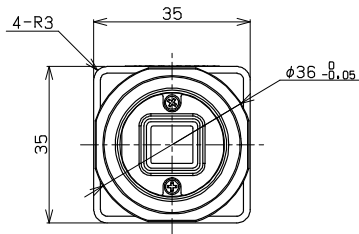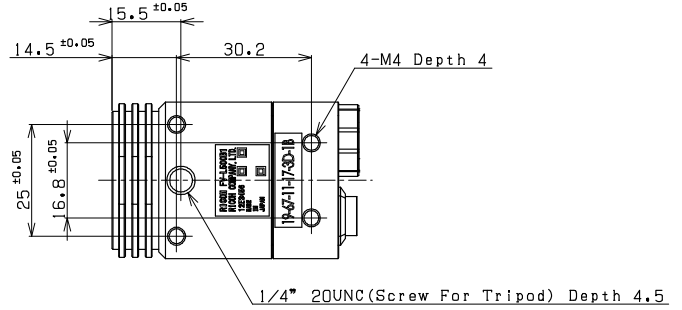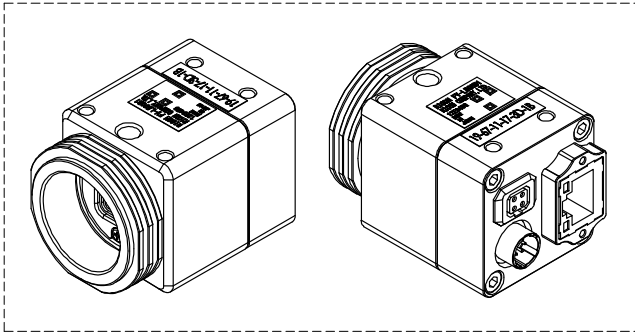
7) StrobeSignal

The StrobeSignal signal is the strobe control signal.

3.3.1 Equivalent Circuit for the Input Pin of the I/O Connector

HR10A-7R-6PB (HIROSE)
or equivalent connector

6	+10.8 to +26.4V
5	Trigger_In+
4	Trigger_In-
3	IO_Out
2	IO_Out
1	GND

+3 to +26.4V
3 to 5mA
Trigger Signal

Customer GND

+3.3V
2.2K

TOSHIBA TLP181

+3.3V
1K

TOSHIBA   RN1105MFV

+3.3V
1K

TOSHIBA   RN1105MFV

4　Dimensions

Unit: mm

Revision History

Rev	Date	Changes	Note
1.00	2012/06/17	● Initial Release	
1.01	2012/06/18	● Updated The output Signal "StrobeOut" is corrected to "StrobeSignal"	
1.02	2012/07/03	● Updated Document title Electronic Specifications Shutter Speed → Exposure Time The maximum value for the Exposure Time is corrected to 16,777,215 Equivalent Circuit for the Input Pin of the I/O Connector	
1.03	2012/08/25	● Updated Pin Assignment of Power-I/O Connector	

RICOH COMPANY, LTD.