B/W model XCG-C130 XCG-C32 XCG-C30

Color model XCG-C130C XCG-C32C XCG-C30C

GigE Vision | Progressive Scan | Square Pixels | *1 1/3 Type CCD | *2 1/2 Type CCD | C Lens Mount | *3 SXGA Output | *4 VGA Output

Long Exposure | Normal Shutter | External Trigger Shutter | Auto Shutter | Bulk Trigger | Sequential Trigger | Trigger range | Partial Scan

Temperature Readout | One-Push White Balance | Manual White Balance | LUT | *5 B/W | *6 RGB RAW | *7 Near-IR Sensitivity | Lower Power Consumption mode

*1 : XCG-C130/XCG-C130C/XCG-C30/XCG-C30C
*2 : XCG-C32/XCG-C32C
*3 : XCG-C130/XCG-C130C
*4 :XCG-C32/XCG-C32C/XCG-C30/XCG-C30C
*5 : XCG-C130/XCG-C32/XCG-C30
*6 : XCG-C130C/XCG-C32C/XCG-C30C
*7 : XCG-C130

Connection Diagram P59

Outline

The XCG-C series using GigE Vision interface and supporting PoE and 12 VDC inputs are a new series of cameras that incorporate Sony's unique functions and a wide variety of functions in a compact cubic case.

Features

■ High speed image output

XCG-C30 (B/W), XCG-C30C (Color) :
1/3-type CCD VGA Frame rate : 130 fps
XCG-C32 (B/W), XCG-C32C (Coler) :
1/2-type CCD VGA Frame rate : 104 fps
XCG-C130 (B/W), XCG-C130C (Coler) :
1/3-type CCD SXGA Frame rate : 31 fps

■ Low speed mode

This is a function that reduces power consumption by decreasing a CCD driving clock.
Operation in the low speed mode can reduce power consumption of maximum approx 20%.

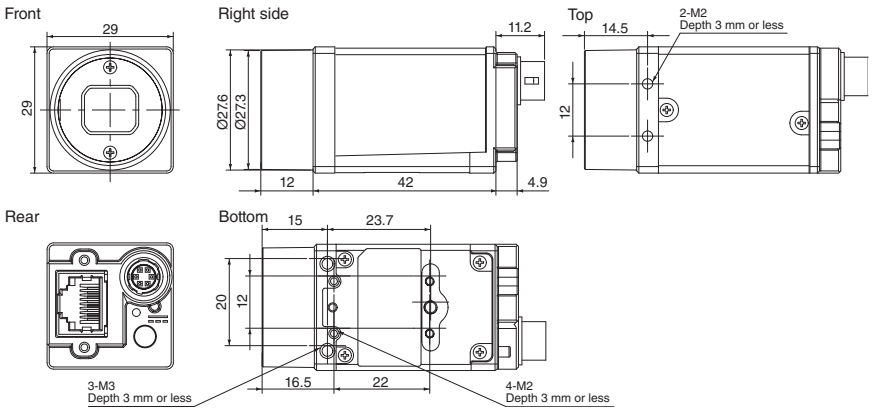
Model	Normal mode	Low speed mode
XCG-C30/C30C	130 fps	31 fps
XCG-C32/C32C	104 fps	26 fps
XCG-C130/C130C	31 fps	7.4 fps

■ Hardware trigger, software trigger
■ Shorter trigger latency
Example) XCG-C30/C30C: 0.7µs.
(from trigger input to exposure start)
■ Trigger range (noise filter)
■ Special trigger mode
(bulk trigger/sequential trigger)
■ 3 × 3 Filter
■ Temperature read out
■ LUT (look up table)
■ Near-infrared sensitibity: XCG-C130
■ GigE Vision® Version 2.0/1.2 Compliant
■ PoE* (IEEE802.3af) /DC +12 V
*PoE (power over ethernet)
■ Highshok and vibration resistance
■ Dimentions:
29 (W) × 29 (H) × 42 (D) mm (excluding pro trusion)

Accessories

■ Compact camera adaptor : DC-700/700CE
■ Tripod adaptor : VCT-333I

Dimensions



Unit : mm

Specifications

		XCG-C130	XCG-C130C	XCG-C32	XCG-C32C	XCG-C30	XCG-C30C
Camera							
B/W or Clor		B/W	Color	B/W	Color	B/W	Color
Image size		SXGA		VGA			
Image sensor		1/3-type PS IT CCD (Exview HAD CCD®)		1/2-type PS IT CCD		1/3-type PS IT CCD	
Number of effective pixels (H × V)		1,296 × 966		658 x 494			
Cell size (H × V)		3.75 µm × 3.75 µm		9.9 µm × 9.9 µm		7.4 µm × 7.4 µm	
Standard output pixels (H × V)		1,280 × 960		640 x 480		640 x 480	
Color filter		—	RGB Color mosaic filter	—	RGB Color mosaic filter	—	RGB Color mosaic filter
Frame rate		31 fps		104 fps		130 fps	
Minimum illumination		0.5 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/30 s)	12 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/30 s)	1.0 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/60 s)	12 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/60 s)	1.5 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/90 s)	15 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/90 s)
Sensitivity		F5.6 (400 lx, Gain: 0 dB)	F5.6 (2000 lx, Gain: 0 dB)	F5.6 (400 lx, Gain: 0 dB)	F5.6 (2000 lx, Gain: 0 dB)	F5.6 (400 lx, Gain: 0 dB)	F5.6 (2000 lx, Gain: 0 dB)
SNR		More than 50dB (Lens close, Gain: 0 dB, 8 bits)					
Gain		Auto, Manual: 0 dB to 18 dB					
Shutter speed		Auto, Manual: 60 to 1/100,000 s					
White balance		—	One push, Manual	—	One push, Manual	—	One push, Manual
Camera Features							
Readout modes	DC+12V	Normal, Binning (2 × 1, 1 × 2, 2 × 2), Partial scan	Normal, Partial scan	Normal, Binning (2 × 1, 1 × 2, 2 × 2), Partial scan	Normal, Partial scan	Normal, Binning (2 × 1, 1 × 2, 2 × 2), Partial scan	Normal, Partial scan
	PoE	Normal	Normal	Normal	Normal	Normal	Normal
Readout features		LUT (Binarization, Gamma (arbitrary setting)), Test pattern					
Synchronization		Internal/External (Hardware trigger, Software trigger)					
Trigger modes		OFF (Free run), On (trigger edge detection, trigger width detection), special trigger (bulk/sequential)					
User Set/Memory channel		16 channels					
User memory		64 bytes × 16 ch					
Image buffer		8					
Frame rate at low power consumption *1		7.4 fps		26 fps		31 fps	
Other features		3 × 3 Filter, Temperature readout, Trigger range		3 × 3 Filter, Temperature readout, Trigger range, Sensitivity control			
Interface							
Video data output		digital Mono 8, 10, 12 bit (default setting 8 bit)	digital Raw 8, 10, 12 bit (default settingRaw 8 bit) RGB, YUV422, YUV444	digital Mono 8, 10, 12 bit (default setting 8 bit)	digital Raw 8, 10, 12 bit (default settingRaw 8 bit) RGB, YUV422, YUV444	digital Mono 8, 10, 12 bit (default setting 8 bit)	digital Raw 8, 10, 12 bit (default settingRaw 8 bit) RGB, YUV422, YUV444
Digital interface		Gigabit Ethernet (1000BASE-T) /100BASE-TX					
Camera specification		GigE Vision® Version 2.0, 1.2					
Digital I/O		ISO IN (x1), GP IN/OUT (x2, selectable)					
General							
Lens mount		C-mount					
Flange focal length		17.526 mm					
Power requirements		DC +12 V (10.5 V to 15.0 V)					
Power over Ethernet (PoE)		IEEE802.3af					
Power consumption	DC+12V	3.2 W (max)					
	PoE	3.8 W (max)					
Operating temperature		-5°C to +45°C					
Performance guarantee temperature		0°C to 40°C					
Storage temperature		-30°C to +60°C					
Operating humidity		20 to 80% (no condensation)					
Storage humidity		20 to 95% (no condensation)					
Vibration resistance		10 G (20 Hz to 200 Hz, 20 minutes for each direction - x, y, z)					
Shock resistance		70 G					
Dimensions (W × H × D)		29 × 29 × 42 mm (excluding protrusions)					
Mass		Apporox. 66 g					
MTBF		53,268 hours (Approx. 6 years)					
Regulations		UL60950-1, FCC Class A, CSA C22.2-No.1, IC Class A Digital Device, CE : EN61326 (Class A), AS EMC: EN61326-1, VCCI Class A, KCC,CISPR22/24+IEC61000-3-2/-3					
Supplied accessories		Lens mount cap (1), Operating Instructions (1)					

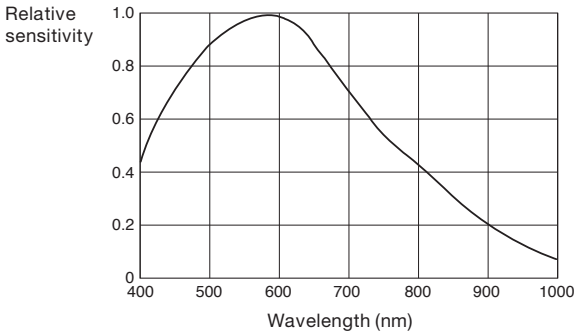
*1 It can reduce power consumption of maximam approx 20%.

Spectral Sensitivity Characteristics

B/W model

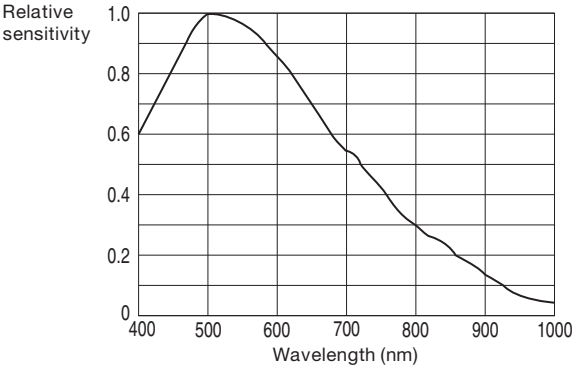
• XCG-C130

(Lens characteristics and light source characteristics excluded.)



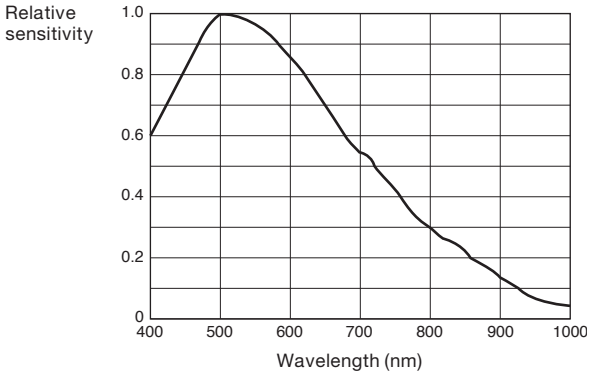
• XCG-C32

(Lens characteristics and light source characteristics excluded.)



• XCG-C30

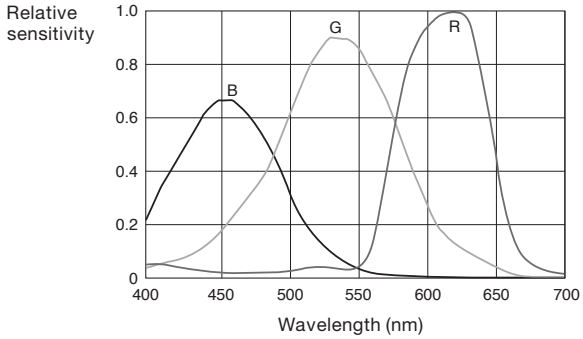
(Lens characteristics and light source characteristics excluded.)



Color model

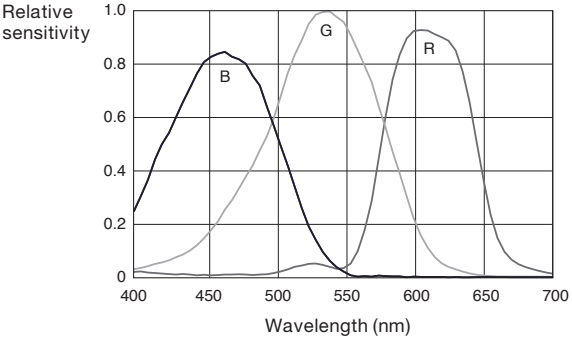
• XCG-C130C

(Lens characteristics and light source characteristics excluded.)



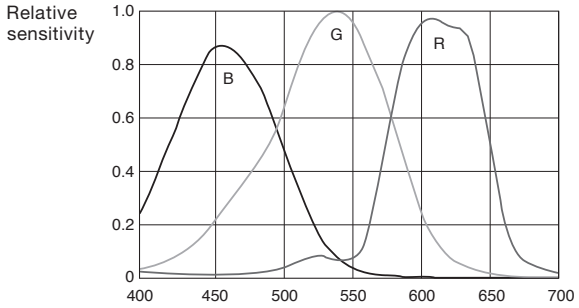
• XCG-C32C

(Lens characteristics and light source characteristics excluded.)

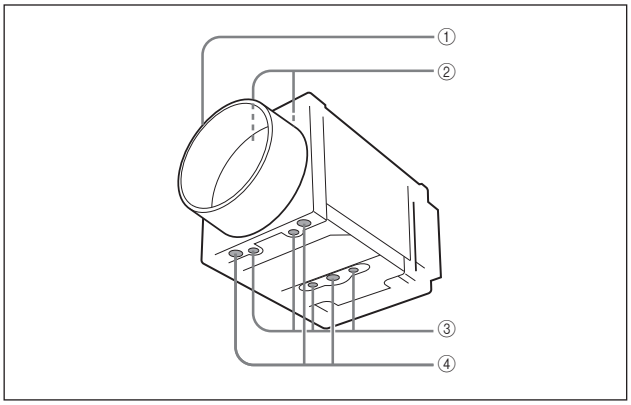


• XCG-C30C

(Lens characteristics and light source characteristics excluded.)



Location and Function of Parts and Controls



① **Lens mount (C-mount)**
Attach any C-mount lens or other optical equipment.

Note

The lens must not project more than 10 mm (13/32 inch) from the lens mount.When you use the camera with the lens attached, the resolution of the image output from the camera may differ according to the performance of the lens. Note it when you select a lens.The performance of a lens may change according to the aperture level.If the resolution is not enough, adjust the aperture level.

② **Guide screw holes (Top)**

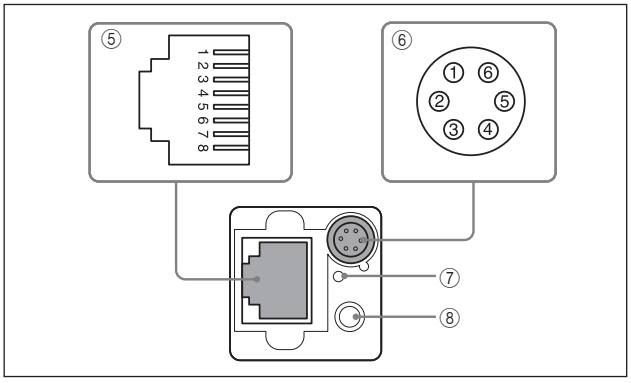
③ **Guide screw holes/Tripod screw holes (bottom)**

When using a tripod, use these four screw holes to attach a VCT-333I tripod adaptor.

④ **Reference screw holes (bottom)**

These precision screw holes are for locking the camera module. Locking the camera module into these holes secures the optical axis alignment.

Rear Panel/Pin Assignments



⑤ **RJ45 connector**

You can connect a LAN cable to this connector to control the camera module from a host device to output image to a host device. By using a PoE-compatible LAN cable and camera module interface board or hub, you can supply power using the LAN cable.

(Refer to Fig. ⑤ above for the pin assignment of the connector.)

Pin No.	Signal	Pin No.	Signal
1	TP3 +	5	TP1 -
2	TP3 -	6	TP2 -
3	TP2 +	7	TP4 +
4	TP1 +	8	TP4 -

Note

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port. Follow the instructions for this port.

⑥ **DC IN (DC power input) connector (6-pin)**

You can connect a camera cable to input the +12 V DC power supply. The pin configuration of this connector is as follows.

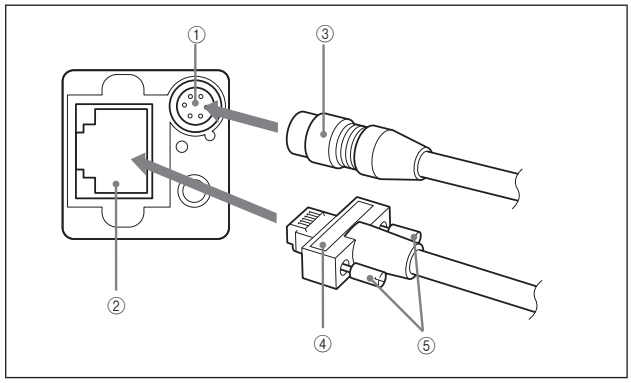
(Refer to Fig. ⑥ above for the pin assignment of the connector.)

Pin No.	Signal	Pin No.	Signal
1	DC input (10.5 V to 15 V)	14	GPI3/GPO3
2	GPI1 (ISO +)	15	GPI1 (ISO -)
3	GPI2/GPO2	16	Ground

⑦ **Reset switch**
This reformats the network settings.

⑧ **Status LED (Green)**
When power is on, this LED lights up.

Connecting the Cables



Connect the camera cable to the DC IN connector and connect the LAN cable to the RJ45 connector respectively. If you use a camera module interface board or a hub with support for PoE, you can operate the camera even if you do not connect the camera cable to the DC IN connector. When you connect the LAN cable with fastening screws, turn the two screws on the connector to secure the cable tightly.

① DC IN connector ② RJ45 connector ③ Camera cable
④ LAN cable ⑤ Fastening screws

Connect the other end of the camera cable to the DC-700/700CE and the other end of the LAN cable to the camera module interface board or a hub.

Note

Do not supply power to the camera cable and LAN cable at the same time.

Controlling the Camera From the Host Device

You can control the camera from host devices such as a computer. The following table shows the major control functions.

Control functions	Description	
Operating mode	Free run/Trigger	
Shutter speed*	Free run	1/100,000 sec to 2 sec
	Trigger edge detection	1/100,000 sec to 2 sec
	Trigger pulse width detection	Setting by trigger pulse width
Gain	0 dB to +18 dB	
Partial Scan (during DC IN power supply only)	Variable, 2-line increments (the number of settable lines is 32 or more/the recommended setting is 120 lines or more)	
LUT (Look Up Table)	OFF/ON (Mode: 5 types)	
External trigger input	DC IN connector	
Video output switch	Monochrome model: Mono 8/10/12-bit Color model: Raw 8/10/12-bit, RGB 24-bit, YUV 24-bit, YUV 16-bit	
Binning (during DC IN power supply only)	2×1, 1×2, 2×2	

* If you do not prioritize the image quality, you can set the shutter speed up to 60 sec during operation.

Note

Make sure to supply power to the camera module and confirm that the camera module is operating before inputting a trigger signal. If you input trigger signal to a camera module without the power supplied, this may cause a malfunction of the camera module. Do not exit the application software of the host device before completing the image transmission from the camera. This may cause a malfunction on the camera.

Trigger Signal Input

Trigger signals can be input via the 2nd, 3rd, 4th pins of the DC IN connector, or the software command. Switchover of the trigger signal can be changed via the TriggerSource register.

Register	Parameter	Setting
TriggerSource	Line1 (0)	DC IN connector 2nd pin (GPI1)
	Line2 (1)	DC IN connector 3rd pin (GPI2) *
	Line3 (2)	DC IN connector 4th pin (GPI3) *
	Software (4)	Software (TriggerSoftware register)

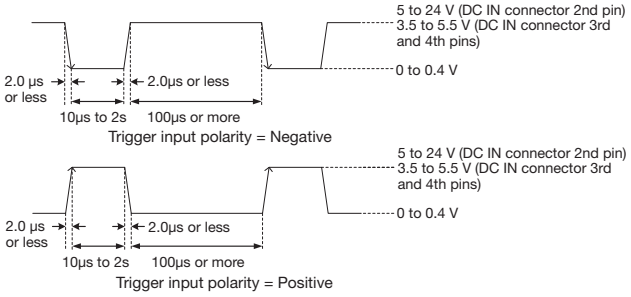
* The 3rd and 4th pins of DC IN connector are available only when the input/output switching setting is set to input.

Trigger signal polarity

Positive refers to a trigger signal polarity activated while rising from Low to Hi, or during the Hi interval. Negative refers to a trigger signal polarity activated while falling from Hi to Low, or during the Low interval.

Register	Parameter	Setting
TriggerActivation	FallingEdge (0)	Negative
	RisingEdge (1)	Positive

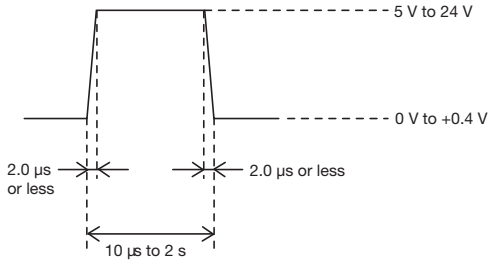
DC IN connector specifications



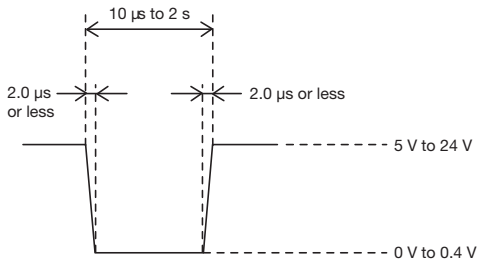
When inputting a trigger signal to the camera using the DC-700/CE, use DC 5 V or less at the logical high level.

Trigger Signal Specifications

Trigger input polarity = Positive



Trigger input polarity = Negative



Voltage reading shows figure by terminal with 10 kΩ or more.

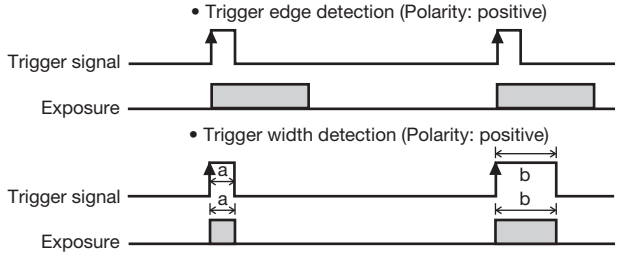
When inputting a trigger signal to the camera using the DC-700/DC-700CE, use DC 5 V or less at the logical high level.

Trigger Modes

There are three modes, Free run, Special trigger (Bulk Trigger/ Sequential Trigger).

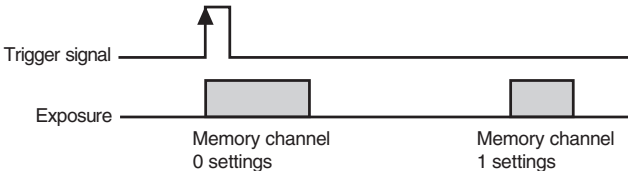
Free Run

The camera operates without a trigger signal and performs the video output operation continuously after the shutter (exposure) is finished when operating in Free run mode.



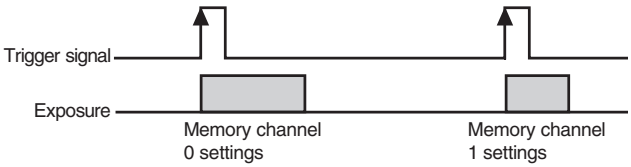
Bulk Trigger

Different camera setting configurations are stored in memory channels beforehand, with the different settings applied to acquire multiple video images at each trigger event. In the following diagram, two images are acquired in one cycle.



Sequential Trigger

Different camera setting configurations are stored in memory channels beforehand, with the different settings applied in sequence to acquire a different image with each trigger event. In the following diagram, two images with different exposure settings are acquired in one cycle.



External Trigger Signals and Timing of Shooting

In Trigger Edge mode, the time from when detecting a trigger signal to when starting exposure is 1.5 µsec.Shooting is performed according to the “Exposure Time” specified in advance.

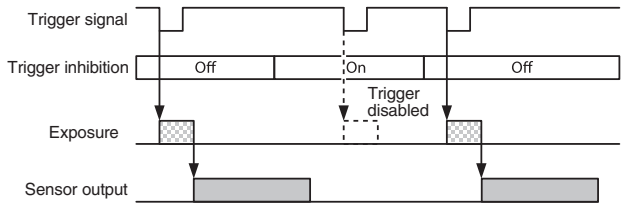
In Trigger Edge mode, the time from when detecting a trigger signal to when starting exposure is 1.5 µsec.

Shooting is performed according to the “Exposure Time” specified in advance.

Trigger Inhibition

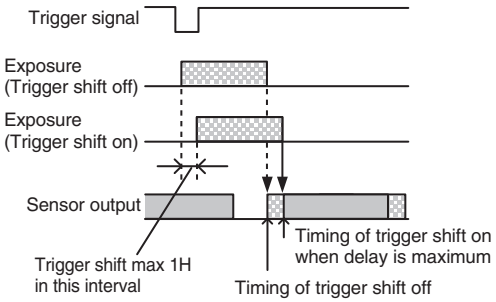
Trigger input can be disabled. This function is effective when disabling the trigger signal to a specific camera in the environment where multiple cameras are connected by the same trigger signal and when preventing false operations caused by noise contamination to the trigger signal line (due to the installed environment).

•Exposure condition (detecting the drop edge):



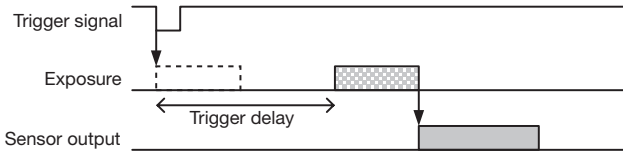
Trigger Shift

This device can accept exposure by the next trigger even while a video is output (except for the special trigger operation). In this case, the trigger signal can become a noise source. When trigger shift is enabled, adjustment is made automatically for operations from trigger input to exposure to prevent noise contamination. (The time from trigger input to exposure start will be delayed up to 1 line.)



Trigger Delay

The camera can delay the trigger signal.



Trigger Range Limit

Only signals in the set trigger width can be accepted as the trigger signal. This functions as a noise filter, which removes chattering or disturbance noise in the trigger signal line. This also functions as a trigger selector, whereby only a specific camera can be operated by the trigger when multiple cameras share one trigger signal line.

User Set

Main set values can be saved to the channels 1 to 16 of USERSET. Refer to “Command List” (page37) for items to be saved. The factory setting is saved to channel 0, which cannot be overwritten.

Gain

The camera provides both manual and automatic gain control.

Manual gain control

The analog gain can be finely set in 0.0359 dB units or bit levels. Although the settable lower/upper limit values of the gain are slightly different in each camera, the gain parameter value can be set from –1 dB or less to 27 dB or more. Same as the gain, the parameter value of the Gain Analog Raw can be set from –27 or less to 752 or more. The setting rage of the gain.

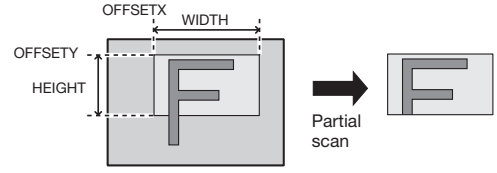
Auto gain control

The camera provides the auto gain control function to automatically control image brightness according to a user-specified detection frame and image average level (variable from 0 to 16383 in 14 bit). The variable range is the same as for manual gain control.

Also, the auto gain control detection frame showing each area’s image average level can be displayed and adjusted. The detection frame is defined by Offset X and Y, Width and Height percentage values (relative to the [100%] width and height of the output video image).

Partial Scan

The partial scan function outputs a user-defined region (Area Of Interest) within the overall image area. The cut-out region for partial scan is defined by Offset X and Offset Y (which indicate the start point for cutting), and Width and Height (which indicate the area). Contiguous blocks of minimum areas can be selected to define regions. However, the defined region must be a square or right rectangle. T- and L-shaped regions are invalid.



Note

Be aware that the frame rate increases for vertical cut-outs, while the frame rate remains unchanged for horizontal cut-outs.

Frame Rate Control

The camera provides the following two methods for frame rate control during internal continuous drive operation.

Auto Frame Rate setting

The fastest frame rate is configured automatically based on the current shutter setting and partial scan setting. This is the default frame rate control setting for the camera.

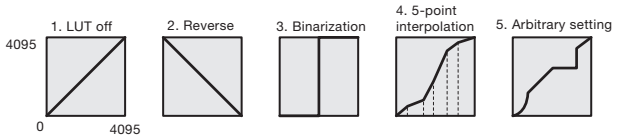
Frame Rate setting

Configure the frame rate manually. However, you cannot increase the frame rate beyond the fastest setting. In addition, if the exposure time is longer than the configured frame period, the frame rate will be reduced in proportion to the exposure time.

When you want to minimize network traffic, use this setting to lower the frame rate while maintaining the same shutter setting

Look-Up Table (LUT)

The camera’s look-up table consists of 4,096 values, with 12-bit input and output. The look-up table allows setting an arbitrary gamma curve or binarization. Also, a gamma curve coefficient can be specified for the standard black level. For levels below the standard black level, set the gamma value to 1 to prevent burnt-out highlights in the black level.



White Balance (XCG-C130C/C32C/C30C)

The camera provides a white balance function.

One-Push White Balance

This mode adjusts the R- and B-level corresponding to the G-level for a user-specified detection frame once upon executing the command. The variable range is the same as for pixel gain.

Also, the white balance detection frame showing each area's image average level can be displayed and adjusted. The detection frame is defined by Offset X and Y, Width and Height percentage values (relative to the [100%] width and height of the output video image).

GPIO

GPI

The signal level which is input in the 2nd, 3rd, and 4th DC IN connector can be detected. After selecting a connector by LineSelector register, the signal level is acquired from LineStatus register.

GPO

Various signals can be output from the 3rd and 4th DC IN connector. After selecting a connector by LineSelector register and setting LineMode to Output, LineSource is set. The output polarity is set by LineInverter register.

Register	Parameter	Setting
LineSelector	Line1 (0)	DC IN connector 2nd pin
	Line2 (1)	DC IN connector 3rd pin
	Line3 (2)	DC IN connector 4th pi
LineMode	Input (0)	Set to output
	Output (1)	Input setting
LineInverter	Off (0)	Without output inversion
	On (1)	With output inversion
LineStatus		Input signal level
LineSource	TriggerThrough (0)	Trigger through signal
	ExposureActive (2)	Exposure signal
	StrobeActive (3)	Strobe control signal
	SensorReadout (4)	Sensor readout signal
	UserOutput1 (5)	User definition 1
	UserOutput2 (6)	User definition 2
	UserOutput3 (7)	User definition 3
	SignalTrue (8)	Level H
	SignalFalse (9)	Level L
	PWM (10)	Pulse generation signal

Setting example:

LineSelector = 1 LineMode = 1
LineInverter = 0 LineSource = 3