

# XCU-CG Series

## USB3 Vision

Sony is adding a new series of the USB3 Vision interface digital cameras equipped with a global shutter CMOS sensor to the Machine Vision product line.

Exmor

Pregius

USB  
VISION



### Functions

#### Cubic Size

- Dimensions : 29 (W) × 29 (H) × 30 (D) mm  
\*excluding protrusions
- Identical dimensions and attachment method as cubic series analog cameras

#### Feature-rich

- Area gain
- Defect correction
- Shading correction
- Temperature readout
- Look Up Table (LUT)
- Multi ROI
- 3 x 3 filter
- Binning \*

\*Only XCU-CG160

#### Easy connection

- Plug and Play

#### Easy analog cameras Migration

- **SXGA and VGA output are available**  
Through the use of binning, VGA output is also available with same angle of view.  
Sensitivity is also increased.
- **Easy expansion from VGA to SXGA**  
In consideration of future changes to SXGA cameras, replacement is easy allowing you to reduce development time.

**XCU-CG160 (B/W)**

**XCU-CG160C (Colour)**

1/2.9-type 1.6MP 100 fps



These cameras achieve 1.6MP, 100fps in a compact 29(W) x 29(H) x 30(D)mm size.

This series is ideal for replacing older analog camera models. Both cameras inherit analog camera size and reliability and combine excellent system construction with feature rich, cost-effective performance.

Easy plug and play use through a PC connection.

**USB3 Vision Features**

The USB 3.0 (also known as USB3.1 Gen1) has transmission speeds of up to 5 Gbps which allows real-time delivery of uncompressed image data. Known for plug and play, ease of use USB3 Vision cabling is optimized for machine vision use by adopting a secure cable that can withstand high vibration environments.

**Stability**

- Maximum 350MB/sec data transfer speed
- Real-time bulk transfers

**Expandability**

- Ensured future expansion

**Robustness**

- Secure connectivity for demanding environments

USB3 Vision uses the GenICam API device description for camera control which is the same as GigE Vision and CameraLink 2.0. This allows an easy switch of assets created for other standards.

**Others**

- Cable length: 3m\* (standard passive copper wire)
- Power supply: Standard passive cable, Maximum 4.5W
- Easy application switch with other I/F cameras such as GigE Vision

\*Contact your Sony representative for details on cable length.

**Features**

**High Frame Rate**

Select either "Frame rate priority" or "Full feature available" mode.

Model name	Frame rate priority Fast		Full feature available Normal	
	XCG-CG510 XCG-CG510C	Raw 8 bit	100 fps	Raw 8/12 bit
			YCbCr422	49 fps
			RGB YCbCr444	32 fps

**Burst Trigger**

This is a feature capable of continuous shooting at the trigger timing and specifying the number of exposures, exposure interval, and exposure time. Select between the mode that repeats one exposure time or the mode that switches between 2 exposure times repeatedly. Furthermore, there is another mode that repeats only while the trigger signal is on.

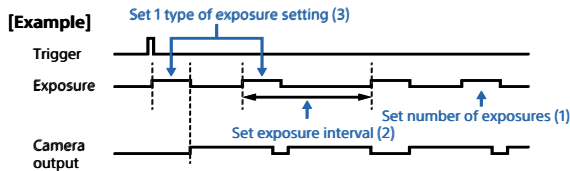
**Merits**

- Optimal for capturing synchronized images with several cameras
- Optimal when 2 exposures are necessary due to the difference in brightness of the subject

**(A) When 1 pattern of exposure time is set**

Set the number of exposures (1), exposure interval (2), and exposure time (3)

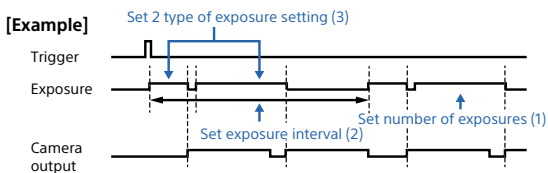
Continuous shooting at the trigger timing



**(B) When 2 patterns of exposure times are set**

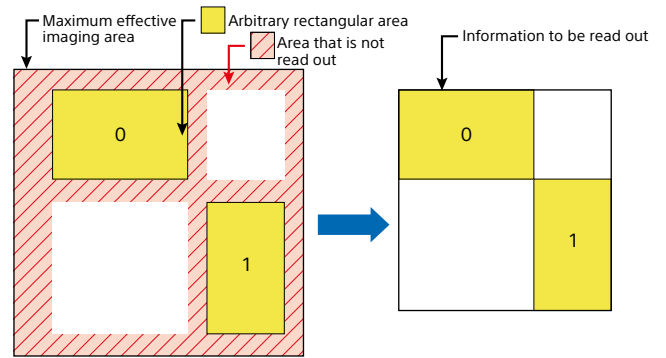
Set the number of exposures (1), exposure interval (2), and exposure time (3)

Continuous shooting at the trigger timing



**Multi ROI**

Arbitrarily read out images including any 2 (max.) rectangular area from the maximum effective imaging area. Due to this, you will be capable of limiting read out information, thus accelerating the frame rate.

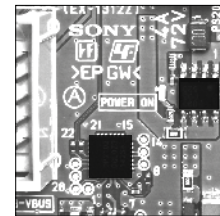


**Area Gain**

Individually set digital gain (0 to 32 times) to any of the 16 rectangular areas.

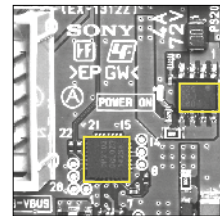
If several rectangular areas overlap, the gain value of the rectangular area with a smaller area number is prioritized. Optimization of images for parts is available during parts inspection, etc.

When area gain is OFF



\*Sample image

When area gain is ON

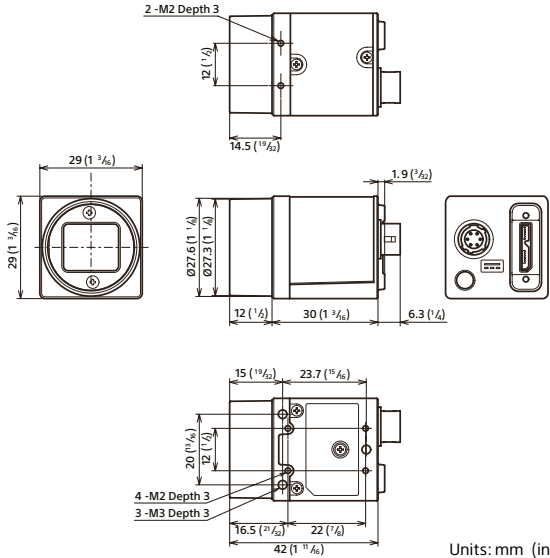
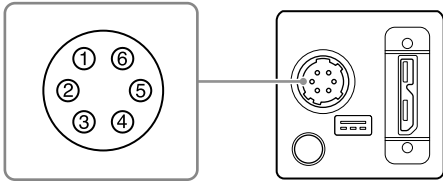


\*Sample image

In case setting Gain=2 at Area 0 and Area 1

Pin No.	Signal	Pin No.	Signal
1	DC input (10.5 V to 15 V)	4	GPO3 (ISO +)
2	GPI1 (ISO +)	5	ISO -
3	GPI2/GPO2	6	GND

Connector Pin assignments

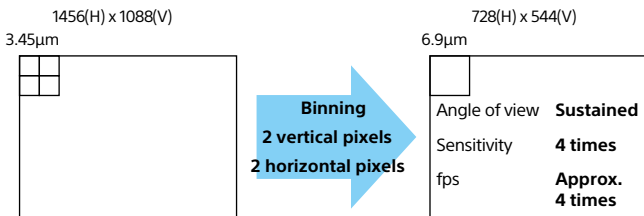
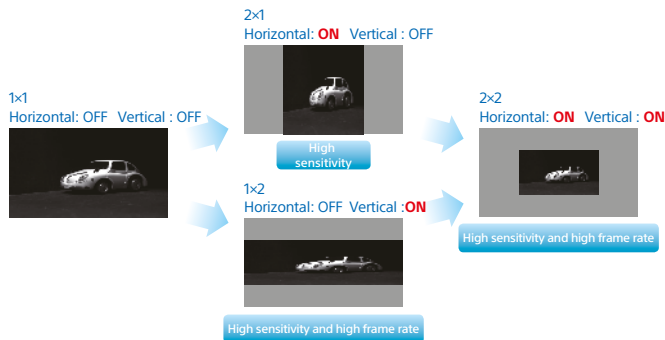


Units: mm (inches)

### Binning

\*only XCU-CG160

Supports binning in vertical and horizontal 2 pixel units and increases frame rate without changing the angle of view as well as enhances the sensitivity.



### Pregius

Pregius is a trademark of Sony Corporation. The Pregius is global shutter pixel technology for active pixel-type CMOS image sensors that use Sony's low-noise CCD structure, and realizes high picture quality.

### Trigger Range Limitation

You can choose to receive only the signal of the set trigger width as a trigger signal.

It functions as a noise filter that eliminates chattering and disturbance noise of the trigger signal line.

Furthermore, exposure start can be delayed following the set value of the trigger range if a trigger signal is input.

### Defect Correction

Corrects white defect points and black defect points of the image sensor.

Corrections start from the periphery of the pixel coordinates where defects were detected.

Select between factory default settings and user settings.

### 3 x 3 Filter

Apply various processing to the image through matrix operating in 3 x 3 pixels.

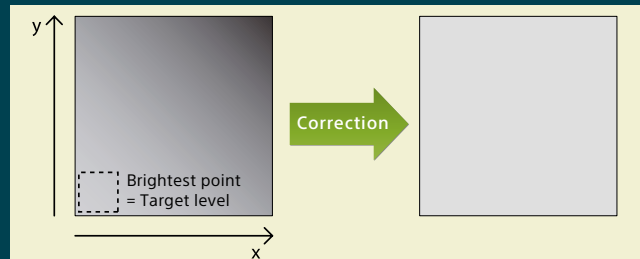
Perform processing including noise reduction, edge emphasizing, and contour extraction with 9 filter factor patterns.

### Shading Correction

Corrects shading that occurs due to peripheral light falloff, light source irregularity, etc. that are characteristics of the lens.

A number of user data can be saved as user settings.

XCU-CG160/CG160C : 31 patterns



### Image Flip

Images can be flipped vertically, horizontally, or 180°.

		ReverseX	
		0 (False)	1 (True)
ReverseY	0 (False)	Normal	Horizontal flip
	1 (True)	Vertical flip	180° rotation

# XCU-CG160 - Specifications

Basic Specifications		XCU-CG160	XCU-CG160C
B/W / Colour		B/W	Colour
Image Size		1.6Mega	
Image Sensor		1/2.9-type CMOS Image sensors with global shutter function (Pregius)	
Number of Effective Pixels (H x V)		1,456 x 1,088	
Cell Size (H x V)		3.45 μm x 3.45 μm	
Standard Output Pixels (H x V)		1,440 x 1,080	
Colour Filter		-	RGB colour mosaic filter
Frame Rate		100 fps (8 bit, Mono/Raw)	
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)
Sensitivity		F5.6 (400 lx, Gain: 0 dB, Shutter: 1/30 s)	F5.6 (2000 lx, Gain: 0 dB, Shutter: 1/30 s)
SNR		More than 50 dB (Lens close, Gain: 0 dB, 8bit)	
Gain		Auto, Manual: 0 to 18 dB	
Shutter Speed		Auto, Manual: 60 to 1/100,000 s	
White Balance		-	Manual, One push, Auto
<b>Camera features</b>			
Readout Modes		Normal, Binning (1 x 2, 2 x 1, 2 x 2), Partial scan (Multi ROI)	Normal, Partial scan (Multi ROI)
Readout Features		LUT (Binarization, Gamma (Arbitrary value settable)), Test pattern	
Synchronization		Hardware trigger, Software trigger	
Trigger Modes		OFF (Free run), ON (Edge detection, Trigger width detection), Burst trigger	
User set		16	
User Memory		64 bytes x 16 ch	
Partial Scan	W (Pixel)	16 to 1,456	
	H (Line)	16 to 1,088	
GPO		EXPOSURE / Strobe / Sensor readout / Trigger through / Pulse generation signal / User defined 1, 2, 3 (Output switching)	
Other Features		Area gain, Shading correction, Defect correction, Temperature readout, LUT, 3 x 3 filter	
<b>Interface</b>			
Video Data Output		digital Mono 8, 12 bit (at the time of shipment : 8 bit)	digital Raw 8, 12 bit (at the time of shipment: Raw 8 bit) RGB, YCbCr422, YCbCr444
Digital Interface		USB3.0 (super speed only)	
Camera Specification		USB3 Vision® Ver.1.0.1 compliant	
Digital I/O		ISO IN (x1), ISO OUT (x1), TTL IN/OUT (x1, selectable)	
<b>General</b>			
Lens Mount		C mount	
Flange Back		17.526 mm	
Power Requirements		DC +12V (10.5V to 15.0V), USB bus power (DC +5V ± 5%)	
Power Consumption		DC +12 V 3.5W USB bus power 3.0W	
Operating Temperature		-5°C to +45°C (23 °F to 113 °F)	
Performance Guarantee Temperature		0°C to 40°C (32 °F to 104 °F)	
Storage Temperature		-30°C to +60°C (-22 °F to +140 °F)	
Operating Humidity		20% to 80% (no condensed)	
Storage Humidity		20% to 80% (no condensed)	
Vibration Resistance		10 G (20 Hz to 200 Hz, 20 minutes for each direction -x, y, z)	
Shock Resistance		70 G	
Dimensions (W x H x D)		29 x 29 x 30 mm (excluding protrusions) 1 <sup>3</sup> / <sub>16</sub> x 1 <sup>3</sup> / <sub>16</sub> x 1 <sup>3</sup> / <sub>16</sub> inches (excluding protrusions)	
Mass		Approx. 50 g (Approx. 1.8 oz)	
MTBF		67,447 hours (Approx. 7.7 years)	
Regulations		UL60950-1, FCC Class A, CSA C22.2-No.60950-1, IC Class A Digital Device, CE: EN61326-1 (Class A), AS EMC: EN61326-1, VCCI Class A, KCC, CU-TR EAC: EN61326-1 compliant	
Supplied Accessories		Lens mount cap (1), Operating instructions (1)	

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