Intelligent
Digital Interface IEEE1394b Camera Link
Non-TV Format
TV Format B/W Model
Color Model
Accessories
Color Camera Block
Color PTZ Model

CCD DIGITAL CAMERA MODULE

XCL-5000 (B/W) *NEW*
XCL-5005 (B/W) *NEW*
XCL-5005CR (Color) *NEW*

CL Output	2/3 Type CCD	Progressive Scan	Square Pixels	C Lens Mount	5 MEGA Output	Partial Scan	Long Exposure

Normal Shutter	Mode 2 (Reset Mode) External Trigger Shutter	One-Push White Balance *1	Fixed White Balance *1	Manual White Balance *1	RS232C Control	B/W *2	RGB/RAW *1
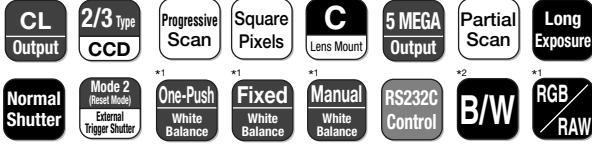
*1: XCL-5005CR
*2: XCL-5005, XCL-5000

Connection Diagram **P34**

Outline

The XCL-5000 is monochrome camera module with a 2/3 type 5-megapixel CCD and a compact Camera Link connector. The new XCL-5005 series of cameras are based on the XCL-5000 concept. Like the XCL-5000, XCL-5005 series cameras incorporate a 5-megapixel 2/3 type CCD that produces detailed images. The XCL-5005 is a monochrome camera, while the XCL-5005CR outputs 24-bit RGB or RAW color data that enables true color reproduction. Both models are compatible with the compact Camera Link standard (non-PoCL)/PoCL*, are equipped with EIAJ 12-pin connectors, and feature a selectable power supply (12-pin power supply has priority). The cameras are equipped with new functions such as selectable image output for various bit lengths, as well as hardware-based pre-processing functions and partial scan function, which are found only on digital cameras. High resistance to shock and vibration makes these camera modules ideal for machine vision and other applications that require high-definition image reproduction.
*PoCL (Power over Camera Link)

Dimensions

4-M3 depth 4
26
13   50

44
44

Ø28.7
5Mega CCD
XCL-5000
8   57.5

4-M3 depth 4
26
13   50
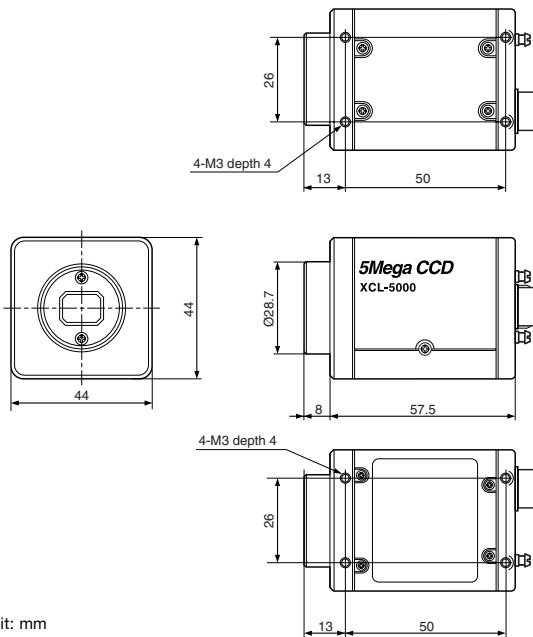
Unit: mm

Features

XCL-5000series
- 2/3-type 5 Mega pixel CCD
- Effective picture elements: 2456 (H) X 2058 (V)
- Frame rate: 15fps
- Partial scan function (Vertical random read scan)
- Normal /External trigger shutter
- C mount
- High Shock and Vibration Resistance
- RS-232C Control

XCL-5000/5005
- Read mode: Normal/Binning
- Outline detection, Outline Emphasis
- Binarization
- 3X3 pixel matrix operation
- Flip-Flop (XCL-5005 only)

XCL-5005CR
- One-push white balance function
- Switching color output (RAW color or RGB)
- Color Bar Chart

XCL-5005seires
- CameraLink: Standard (non-PoCL) /PoCL
- Switching an Output tap (1TAP/2TAP)
- Various mode setting
  • Shutter speed
  • Gamma
  • Partial scan

Digital output CameraLink Base Configuration

XCL-5000	1TAP 8/10/12bit 80MHz
XCL-5005	1TAP 8/10/12bit 80MHz
XCL-5005CR	2TAP 8/10/12bit 40MHz
XCL-5005CR	1TAP 24bitRGB 80MHz

* PoCL : (Power Over Camera Link)

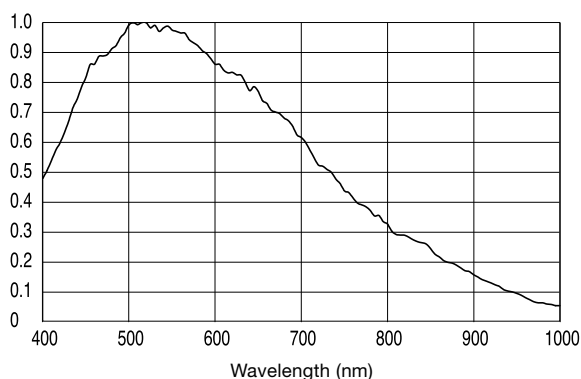## Accessories

- Compact camera adaptor
  ● DC-700/700CE
- 12-pin camera cable (CE standard)
  ● CCXC-12P02N (2 m)
  ● CCXC-12P05N (5 m)
  ● CCXC-12P10N (10 m)
  ● CCXC-12P25N (25 m)
- Tripod adaptor
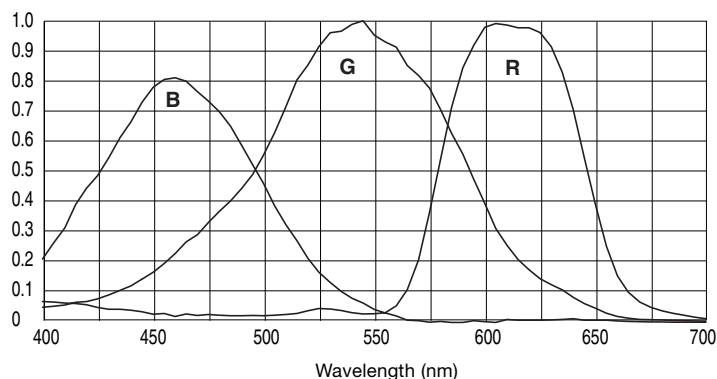 ● VCT-ST70I

Spectral Sensitivity Characteristics

●XCL-5000/XCL-5005

Relative sensitivity
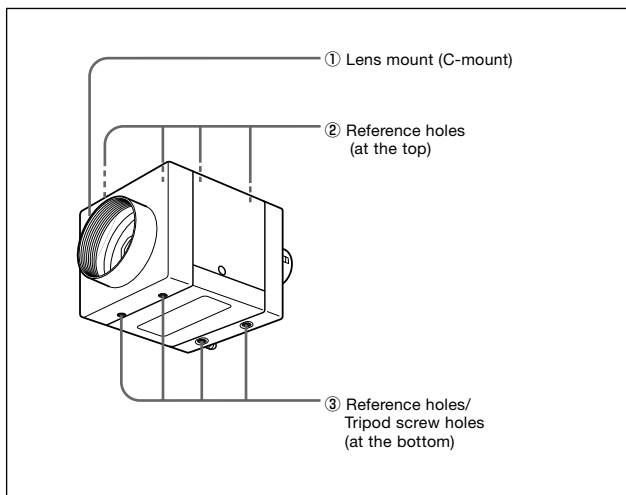

●XCL-5005CR

Relative sensitivity

Specifications

	XCL-5000	XCL-5005	XCL-5005CR
Type	B/W	B/W	Color
Image device	2/3 type Progressive Scan IT transfer CCD		
Effective picture elements (H x V)	2456 (H) x 2058 (V)		
Effective lines (H x V)	2448 (H) x 2050 (V)		
Cell size	3.45 (H) μm x 3.45 (H) μm		
Lens mount	C mount		
Sync system	Internal		
Video output	Digital output		
	LVDS 12 bits/10 bits/8 bits switching		RAW data/RGB data switching, RAW data: LVDS 12 bits /10 bits/8 bits switching, RGB data:LVDS R/G/B 8 bits
Reference video output level	3760 steps (12bits)		
Reference pedestal level	240 steps (12bits)		
Output data clock	15 Hz		
Sensitivity	400 lx F5.6 (0 dB)		2000 lx F5.6 (0 dB)
Minimum illumination	1 lx (GAIN +18dB, F1.4)		8 lx (GAIN +18dB, F1.4)
Gain	0 to +18 dB		
Gamma	OFF/ON (Mode 0 to 5)	OFF/ON (Mode 0 to 7)	
Read mode	Normal/Bining/Partial scan		Normal/Partial scan
Frame rate	15 fps		
Output data clock	1Tap: 80 MHz	1Tap: 80 MHz/2Tap: 40 MHz 1Tap/ 2Tap switching (However, only 1TAP when RGB data output of XCL-5005CR)	
Shutter mode	Normal/External trigger shutter		
Normal shutter speed	2 to 1/10,000s		
External trigger shutter	2 to 1/10,000s		
Partial Scanning	ON/OFF (Vertical 16 Zone)	ON/OFF (Starting Position: per 5 lines, Area: per line)	ON/OFF (Starting Position: per 10 lines, Area: per 2 lines)
Bining	Vertical (1 x 2)		—
White balance	—		PRESET/MANUAL/ONE PUSH (AUTO)
Signal output	DVAL/EXPOSURE/GND output (selectable)		
Edge detection, Edge emphasis	yes		—
Binarize	yes		—
Matrix	yes		—
Power requirements	12V DC (Range: +10.5 to 15V with DC IN connector)	12V DC (Range: +10.5 to 15V with DC IN connector/digital interface connector)	
Power consumption	3.6 W	3.8 W	
Dimensions (W x H x D)	44 (W) x 44 (H) x 57.5 (D) mm		
Mass	Approx 135g	Approx 130g	
Operating temperature	-5 to +45 ˚C		
Storage temperature	-30 to +60 ˚C		
Performance guarantee temperature	0 to +40 ˚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		
MTBF	67,900Hrs (approx. 7.75years)	75,300Hrs (approx. 8.6 years)	
Regulatory compliance	UL60950-1+CSA C22.2 No.60950.1, FCC/ICES-003 : Class A, CE : EN61326, AS/NZ : EN61326, VCCI : Class A, MIC		
Supplied accessories	Lens mout cap(1) Operationg Instructions(1)		

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Location and Function of Parts and Controls

① Lens mount (C-mount)

② Reference holes (at the top)

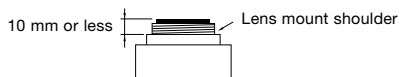③ Reference holes/ Tripod screw holes (at the bottom)

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

Note
The lens must not project more than 10 mm from the lens mount.

10 mm or less   Lens mount shoulder

② Reference holes (at the top)

③ Reference holes/Tripod screw holes (at the bottom)
These precision screw holes are for locking the camera module. Locking the camera module into these holes secures the optical axis alignment. You can install the camera on a tripod. To install on a tripod, you will need to install a tripod adaptor VCT-ST70I to the camera on the reference holes. 10 mm or less Lens mount shoulder.

Rear Panel

① DC IN (DC power input) connector (12-pin)

② DIGITAL IF (Interface) connector (26-pin)
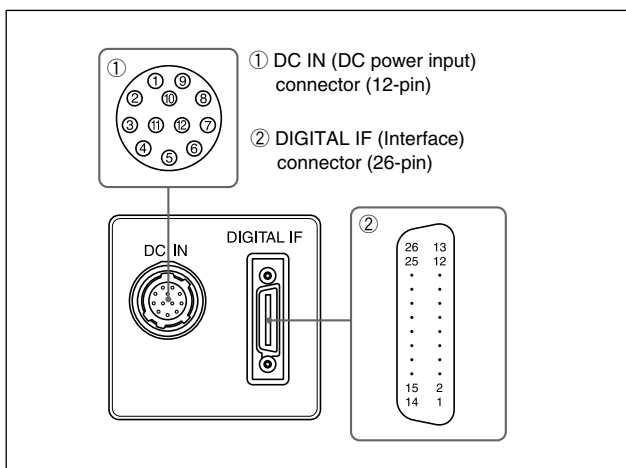
① DC IN (DC power input) connector (12-pin)
You can connect a CCXC-12P05N camera cable to input the +12 V DC power supply. If you use a camera module interface board with support for PoCL, you can operate the camera without using this connector. The pin configuration of this connector is as follows.

② DIGITAL IF (Interface) connector (26-pin)
You can connect a CameraLink cable to this connector to control a camera module from a host device utilizing the serial communication protocol while outputting a video signal from the camera module. If you use a camera module interface board with support for PoCL, you can also supply power from this connector. You can input the external trigger signal via the 26-pin connector and operate a camera module in the external trigger mode. The pin configuration of this connector is as follows.

Note
When you operating a camera module by inputting an external trigger signal via the 26-pin connector, make sure to input external trigger signal that meet the following specifications to both the two pins.

Connector Pin Assignments

DC IN (DC Power input) 12-pin connector

Pin No.	Signal	Pin No.	Signal
1	Ground	7	NC
2	+12 V DC	8	Ground
3	Ground	9	NC
4	NC	10	Signal* output
5	Ground	11	Trigger pulse input
6	NC	12	Ground

* Signal output from the Tenth pin of *12 pins connector.
You can select one of the following signals according to the setting. Ground/DVAL output/Exposure pules output The default setting in the factory is Ground.

DIGITAL IF (Interface) connector (26-pin)
Camera Link Base Configuration: 1tap

Pin No.	Digital signal	Pin No.	Digital signal
1	Power supply or Ground*	14	INNER_SHIELD (Ground)
2	X0– output (Signal)	15	X0+ output (Signal)
3	X1– output (Signal)	16	X1+ output (Signal)
4	X2– output (Signal)	17	X2+ output (Signal)
5	XCLK– output (Signal)	18	XCLK+ output (Signal)
6	X3– output (Signal)	19	X3+ output (Signal)
7	Ser TC+ (Signal)	20	Ser TC– (Signal)
8	Ser TFG– (Signal)	21	Ser TFG+ (Signal)
9	TRIG– input (Signal)	22	TRIG+ input (Signal)
10	NC	23	NC
11	NC	24	NC
12	NC	25	NC
13	INNER_SHIELD (Ground)	26	Power supply or Ground*

* The connection differs depending on the type of camera module interface board you use.
In the case of PoCL support: Both the 1 st pin and 26 th pin are POWER (Power supply)
In the case of non PoCL support: Both the 1 st pin and 26 th pin are INNER_SHELD (Ground)

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Controlling the camera from the host device

You can control the camera from host device such as a PC.
The following table shows the control functions.

Control functions		XCL-5000	XCL-5005	XCL-5005CR
Operating mode		Normal/Trigger		
Shutter speed	Normal	2 to 1/10000s		
	Trigger	Trigger edge: 2 to 1/10000s		
		Trigger puls width: Setting by trigger pulse widht		
Gain		0 to +18 dB		
Binning		OFF/ON		—
Partial Scan		OFF/ON		
Edge detection, Edge emphasis		OFF/ON		—
Binarization		OFF/ON		—
Gamma control		OFF/ON (mode1 to mode 7)		
3x3 Image filtering		OFF/ON		—
Video output switch		12 bits/10 bits/ 8 bits		
External trigger input		26 pin connector/ 12 pin connector		
Switch output tap		1 Tap	1 Tap/ 2Tap	
White balance		—		RESET/MANUAL/ ONE PUSH(AUTO)
Switch color output		—		RAW data/ RGB data

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 external signals to a camera module without the power supplied, this may cause a malfunction of the camera module.

Trigger signal specifications

DC IN terminal
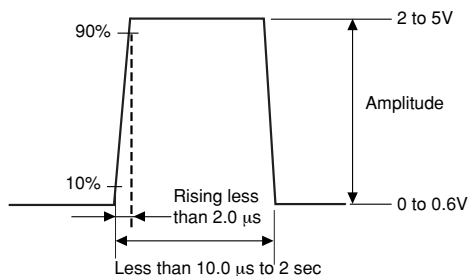
Input Impedance: Stated in the voltage determined at more than 10k ohms.

DIGITAL IF terminal
Convert the signal which meets the specifications above into LVDS format (3.3V power drive IC output), and inputs the converted signal.

Specification for the External Trigger Signal
Amplitude   : LVDS using 3.3 volt IC
Connections : Input a TRIG (-) signal to the 9th pin
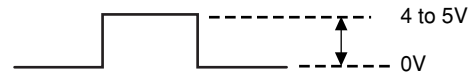   : Input a TRIG (+) signal to the 22nd pin

Note that the signal level cannot be recognized correctly by the camera if it does not meet the following conditions.

Polarity: positive

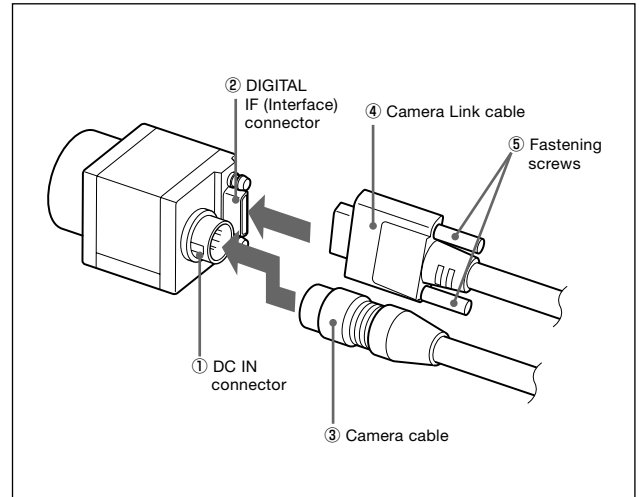H level: 1.5 V to 1.7V
L level: 0.8 V to 1.0V

DVAL/Exposure output specific (only DC IN terminal)

4 to 5V

0V

Stated in the voltage of when terminating at more than 10k ohms.

Connecting the cables

① DC IN Connector
② DIGITAL IF (Interface) Connector
③ Camera Cable
④ Camera Link Cable
⑤ Fastening Screws

Connect the Camera cable to the DC IN connector and the Camera Link cable to the digital Interface cable respectively. If you use a camera module interface broad with support for PoCL, you can operate the camera even it connect the Camera Link cable, turn the two fastening screws on the connector to secure the cable tightly.
Connect the other end of the Camera cable to the DC-700/700CE and the other end of the Camera Link cable to the camera module interface board.