

No focus readjustment required. Industrial camera with a newly developed algorithm.

RICOH extended depth of field camera

《 Camera Link™ 》 5 Mega-Pixel Camera & Lens

Detailed flaw inspection

Substrate inspection

《 GigE Vision™ 》 2 Mega-Pixel / VGA Camera & Lens

DPM*
identification

Distribution line inspection

*Direct Part Marking

■ EV-L500C1 **NEW**



■ EV-G200C1



■ EV-G200B1



■ EV-G030B1



A fusion of RICOH optical design and image processing technology has realized a depth of field 3 to 5 times* better than conventional cameras (compared to RICOH products).

Consisting of a dedicated camera equipped with a newly developed special algorithm and a specific range of lenses, RICOH's extended depth of field camera system requires no focus readjustment or no repositioning of the camera or subject. A new 5MP high resolution camera with 3 dedicated lenses have been added to the EDoF lineup to support a wider range of applications.

*When compared to cameras at the same working distance. The extended depth of field effect varies depending on the subject matter.

5 Mega-Pixel Camera & Lens

- PCB substrate inspection (AOI)
- Detailed flaw inspection

- 5MP high resolution quality in a compact design
- High frame rate (up to 53 fps) capture is possible
- Newly developed image processing (adaptive reconstruction filter) suppresses noise and reproduces fine patterns
- High-speed transfer using CameraLink™ (PoCL™ model)

EV-L500C1

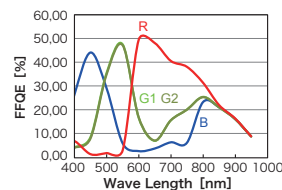
Color CMOS model

NEW

5 mega-pixel
Camera Link

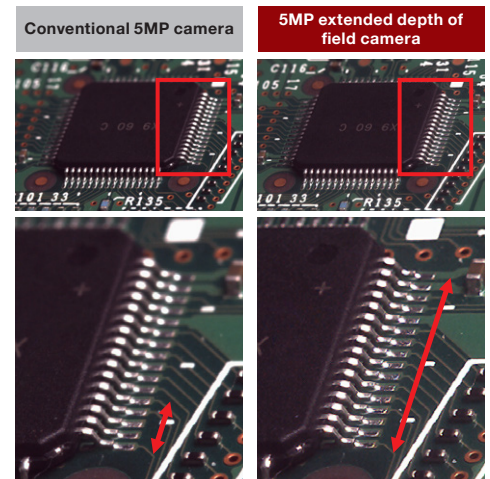


Spectral sensitivity properties



Substrate visual inspection

With an extended depth of field camera, the entire depth of field is in focus, from the front of the foot of the substrate (indicated by the red arrow) to the back, even in substrate inspections using a high condenser.



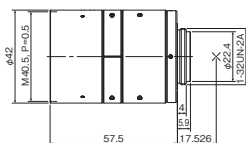
EL-BC2550-5M

NEW



Scale 40:100

External dimensions



Unit: mm

EL-BC2550-5M Product specifications

Focal length	25 mm
F number (fixed)	5.0
Minimum object distance	0.1 m
Horizontal angle of view	With EV-L500C1 connected 28.8°
External dimensions	$\phi 42$ mm \times 57.5 mm
Weight	149 g

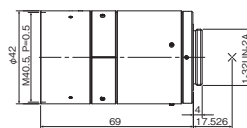
EL-BC5090-5M

NEW



Scale 40:100

External dimensions



Unit: mm

EL-BC5090-5M Product specifications

Focal length	50 mm
F number (fixed)	9.0
Minimum object distance	0.2 m
Horizontal angle of view	With EV-L500C1 connected 14.6°
External dimensions	$\phi 42$ mm \times 69 mm
Weight	166 g

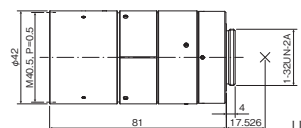
EL-BC751L-5M

NEW



Scale 40:100

External dimensions



Unit: mm

EL-BC751L-5M Product specifications

Focal length	75 mm
F number (fixed)	10.9
Minimum object distance	0.25 m
Horizontal angle of view	With EV-L500C1 connected 9.8°
External dimensions	$\phi 42$ mm \times 81 mm
Weight	189 g

What is RICOH extended depth of field camera?

- The combination of a dedicated camera utilizing a newly developed special algorithm and a dedicated lens.
- Available camera resolutions include 5MP (up to 53 fps), 2MP (15 fps) and VGA (90 fps).
- Uses FPGA (Field Programmable Gate Array) to achieve near real time image data processing.
- Equipped with an effective [AOI]* scan mode to improve the quality and speed of inspection.

*Area of Interest: Only the part of the image required for scanning is scanned and transferred, reducing the time required to read and transfer data.

Foreground and background subjects are in focus, so there is no need to readjust the focus or the subject and camera positions.

Conventional camera imaging result



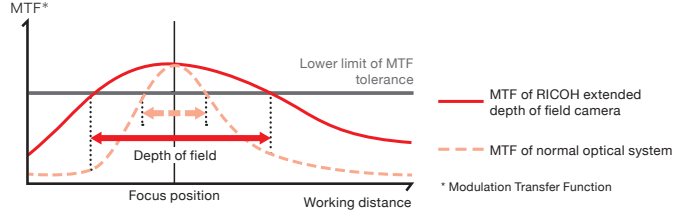
The foreground QR code cannot be recognized.

RICOH extended depth of field camera (example)



Both foreground and background QR codes can be recognized.

Comparison of the depth of field at the same focal length and F number



2 Mega-Pixel
Camera & Lens

VGA
Camera & Lens

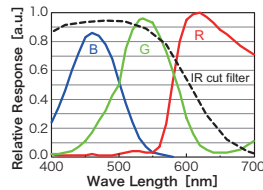
- Bar code and character recognition in distribution, pharmaceutical, food, and steel industries
- Direct Part Marking (DPM) identification

EV-G200C1 Color CCD model

2 mega-pixel
GigE Vision



Spectral sensitivity properties

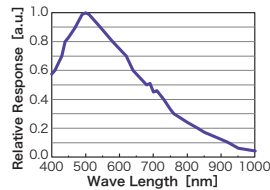


EV-G200B1

2 mega-pixel
GigE Vision



Spectral sensitivity properties

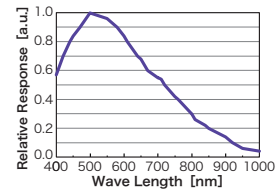


EV-G030B1

300,000 pixels
GigE Vision



Spectral sensitivity properties

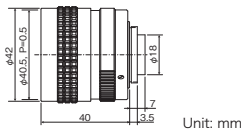


EL-CC0817B-VG
EL-CC0833B-VG
EL-CC0866B-VG



Scale 65:100

External dimensions



EL-CC0817B-VG/EL-CC0833B-VG
EL-CC0866B-VG Product specifications

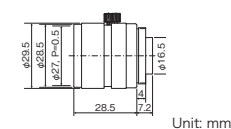
Focal length	8.5 mm
F number (fixed)	1.7 (EL-CC0817B-VG) 3.3 (EL-CC0833B-VG) 6.6 (EL-CC0866B-VG)
Minimum object distance	0.2 m
Horizontal angle of view	With EV-G030B1 connected: 30.1° With EV-G200B1 connected: — With EV-G200C1 connected: —
External dimensions	φ42×40 mm
Weight	120 g

EL-HC1228-2M
EL-HC1255-2M



Scale 65:100

External dimensions



EL-HC1228-2M/
EL-HC1255-2M Product specifications

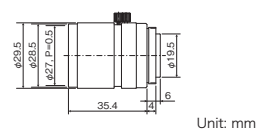
Focal length	12 mm
F number (fixed)	2.8 (EL-HC1228-2M) 5.5 (EL-HC1255-2M)
Minimum object distance	0.25 m
Horizontal angle of view	With EV-G030B1 connected: 21.6° With EV-G200B1 connected: 32.6° With EV-G200C1 connected: 32.4°
External dimensions	φ29.5×28.5 mm
Weight	55 g

EL-CC3521-2M
EL-CC3543-2M
EL-CC3586-2M



Scale 65:100

External dimensions



EL-CC3521-2M/EL-CC3543-2M
EL-CC3586-2M Product specifications

Focal length	35 mm
F number (fixed)	2.1 (EL-CC3521-2M) 4.3 (EL-CC3543-2M) 8.6 (EL-CC3586-2M)
Minimum object distance	0.4 m
Horizontal angle of view	With EV-G030B1 connected: 7.5° With EV-G200B1 connected: 11.4° With EV-G200C1 connected: 11.4°
External dimensions	φ29.5×35.4 mm
Weight	63 g

Camera Specifications

		EV-L500C1	EV-G200C1	EV-G200B1	EV-G030B1
Image sensor		1" interline 5.2M color global shutter CMOS	1/1.8" Square pixel format UXGA progressive color CCD	1/1.8" Square pixel format UXGA progressive monochrome CCD	1/3" Square pixel format VGA progressive monochrome CCD
Effective number of image output pixels (H × V)		2560 × 2048	UXGA class: 1624 × 1236		VGA class: 648 × 494
Cell size (H × V)		5.0 × 5.0 μm	4.4 × 4.4 μm		7.4 × 7.4 μm
Vertical frequency (frame rate)		Up to 53 fps (at 8 bit 8 TAP)	15.31668 Hz (at full resolution) Adjustable by communication 0.29261 to 61.26674 Hz (Max. frame rate varies according to AOI setting) Max. camera frame rate (61.26674 Hz) is when the vertical resolution is set to 230.		89.91172 Hz (at full resolution) Adjustable by communication 0.72028 to 360.33325 Hz (Max. frame rate varies according to AOI setting) Max. camera frame rate (360.33325 Hz) is when the vertical resolution is set to 104.
Horizontal frequency		109 kHz (at 8 bit 8 TAP)	19.176 kHz		47.2028 kHz
Pixel frequency		40 MHz (at 8 bit 8 TAP)	36.818175 MHz		
Sync system			Internal		
Movie output format		RAW 8 bit / 10 bit / 12 bit	Digital 8, 10 or 12 bit RAW data or RGB 8 bit	Digital 8, 10 or 12 bit RAW data	
Exposure time		4 to 16,777,215 μseconds	Preset continuous mode: 10 to 16,777,216 μs, / Preset trigger mode: 10 to 16,777,216 μs, / Pulse width trigger mode: 10 μs to infinite		
Gain		0 to 24 dB	0 to 20.4 dB		
Gamma		Programmable (Factory default OFF Gamma 1.0)	Gamma = 1.0, uploadable gamma table (selectable using communication)		
Power supply	Input voltage	12 Vdc ± 10%	DC 10.8 to 26.4 V (power/signal connector or Power Over Ethernet) (power supply from power/signal connector is automatically prioritized)		
	Power consumption	Less than 3.8 W	Less than 6.8 W		Less than 6.5 W
External dimensions (W × H × D)		50 mm × 50 mm × 39.6 mm*	50mm × 50mm × 53.5 mm*		
Lens mount			C mount		
Weight		Approximately 140 g	Approx. 170 g		
Operating temperature	Minimum/Maximum	0 to 45°C	-5 to 40°C		
Storage temperature (Environmental temperature)		-20 to 65°C	-30 to 65°C		

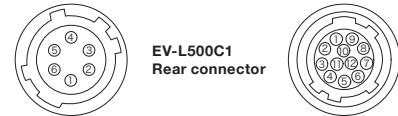
*Excluding connector

RICOH extended depth of field camera and supported lenses

		Camera model			
		EV-L500C1	EV-G200C1	EV-G200B1	EV-G030B1
Lens model	EL-BC2550-5M	○	×	×	×
	EL-BC5090-5M	○	×	×	×
	EL-BC751L-5M	○	×	×	×
	EL-HC1228-2M	×	○	○	○
	EL-HC1255-2M	×	○	○	○
	EL-CC3521-2M	×	○	○	○
	EL-CC3543-2M	×	○	○	○
	EL-CC3586-2M	×	○	○	○
	EL-CC0817B-VG	×	×	×	○
	EL-CC0833B-VG	×	×	×	○
	EL-CC0866B-VG	×	×	×	○

Note The special algorithm of the camera varies depending on each of the 11 lenses. You will be provided a set configured to the algorithm according to the ordered lens, so make sure to use with the fixed set.

EV-L500C1/EV-G200C1/EV-G200B1/EV-G030B1 Rear connector specifications



	Pin number	Signal name	IN/OUT	Voltage		
				Low Voltage	High Voltage	
EV-L500C1	1	GND	IN	0V		
	2	SP-4	IN/OUT	Input 0 to +0.99 V	+2.3 to +5.0 V	
				Output 0V	+3.3 V	
	3	SP-3	IN/OUT	Input 0 to +0.99 V	+2.3 to +5.0 V	
				Output 0V	+3.3 V	
	4	SP-2	IN/OUT	Input 0 to +0.99 V	+2.3 to +5.0 V	
EV-G200C1 EV-G200B1 EV-G030B1	5	SP-1	IN/OUT	Input 0 to +0.99 V	+2.3 to +5.0 V	
				Output 0V	+3.3 V	
	6	+12 Vdc	IN	+12 Vdc		

Trigger input signal can be assigned either on Camera Link connector (CC1) or on the No. 2 pin of the power/I/O connector through the camera setting communication.

	Pin number	Signal name	IN/OUT	Specification	Default setting
EV-G200C1 EV-G200B1 EV-G030B1	1	Power supply GND	—	GND	—
	2	Power supply input	—	+10.8 to +26.4 Vdc	—
	3	Output 1	OUT	Opt. Isolated	Trigger operating status signal output
	4	Output 2	OUT	Opt. Isolated	Exposure period signal output
	5	Output 3	OUT	Opt. Isolated	Open
	6	Output 4	OUT	Opt. Isolated	Open
	7	Output 5	OUT	Opt. Isolated	Open
	8	Input 1	IN	Opt. Isolated	TRG input
	9	Input 2	IN	Opt. Isolated	Open
	10	Input 3	IN	Opt. Isolated	Open
	11	Power supply input for I/O signal	—	IO VCC +3 to +26.4 Vdc	—
	12	GND for I/O signal	—	IO GND	—

*The information contained herein is subject to change without notice. *The actual color of the product may slightly vary from the pictures. *Camera Link, GigE Vision, and PoCL are trademarks of Automated Imaging Association (AIA). *QR Code is a registered trademark of Denso Wave Incorporated. *Other company names and product names in this manual are trademarks or registered trademarks of their respective owners. *For details and constraint conditions, contact your dealer.

For your safety

*Read all safety precautions thoroughly before using the product. *Use the correct power supply and voltage listed. *Avoid using or installing in locations subject to large amounts of water, moisture, steam, dust, or oil smoke. *Be sure to ground the product. Malfunction or electric leakage can cause an electric shock.

RICOH INDUSTRIAL SOLUTIONS INC. Industrial Partner Business Division, Industrial Module Business Center

http://industry.ricoh.com/en/fa_camera_lens/

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For orders and inquiries: