

RICOH Extended Depth of Field Cameras

Thanks to a new algorithm, you will never need to adjust the focus of your industrial cameras again.



EV-G030B1



EV-G200B1



EV-G200C1

Thanks to the synergy of Ricoh's optical design and image-processing technology, our new industrial cameras have roughly three times the depth of field of previous models.

Each RICOH Extended Depth of Field Camera comprises of a specialized lens and camera with a built-in image processor.

We married the unique optical technology of Ricoh lenses to Ricoh image-processing technology, applying a special optical system and new algorithm to triple the depth of field.



- Objects can be captured in sharp focus, regardless of distance from the camera. This eliminates the need to adjust the focus or the camera position.
- Each product in the new series comprises a special lens and a special GigE Vision™ camera.
- The product line up covers a range of focal lengths.
- VGA (90 fps) and 2M (15 fps) versions are available.
- Thanks to an integral FPGA processor, image processing is tailored to the image capturing task in hand.
- Area of Interest (AOI*) Scan Mode enables efficient scanning whilst enhancing inspection quality and speed.

* "Area of interest" is a user-defined portion of the full scanning range. When the scan is limited to the area of interest, fewer images are created, so the data can be read and transferred more rapidly.

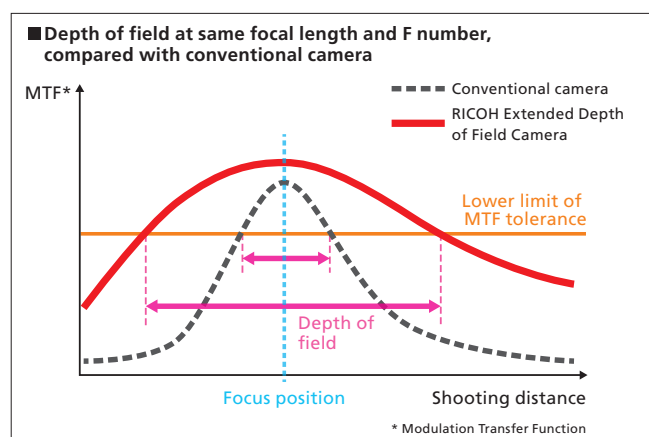


Image captured with conventional camera
QR code in foreground is unreadable.



Image captured with RICOH Extended Depth of Field Camera
QR codes in foreground and background are both readable.

With a RICOH Extended Depth of Field Camera, even complex scanning tasks can be handled with ease.

Usage scenario 1

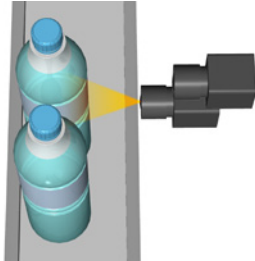
Thanks to a depth of field roughly three times that of conventional cameras, objects can be captured in sharp focus even when moving along a production line at varying distances from the camera.

With conventional cameras:

To shoot objects of different sizes as they move along a production line, multiple cameras are required. Alternatively, a single camera can be used, without the need to be repeatedly repositioned.



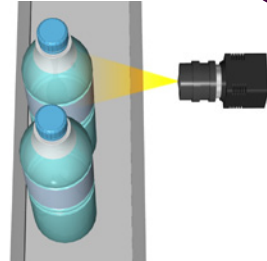
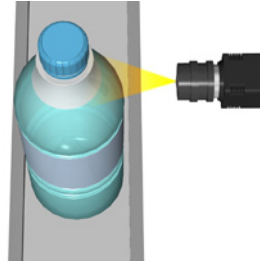
Camera position when a larger object comes down the production line.



Camera position when a smaller object comes down the production line.

With a RICOH Extended Depth of Field Camera:

Only one camera is required. It does not need repeated repositioning.



The camera stays in the same position regardless of the size of the current object.

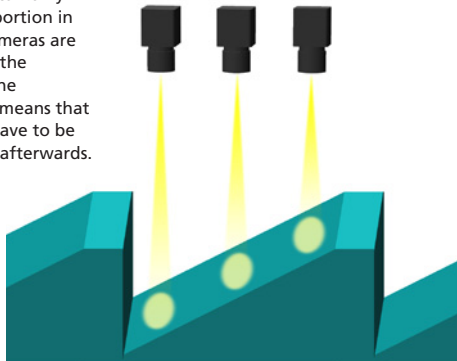
Fewer cameras required
No need to reposition cameras

Usage scenario 2

Even if it features oblique angles or uneven surfaces, as with printed circuit boards, the whole object stays in focus that's sharp enough for OCR.

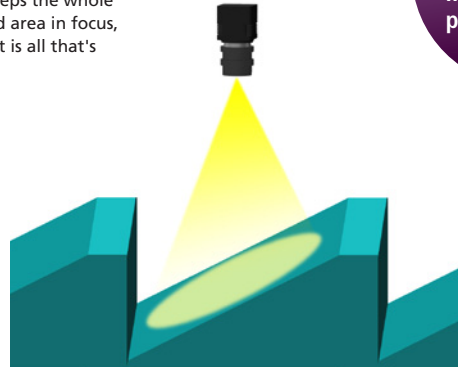
With conventional cameras:

Since the camera can only keep the central portion in focus, multiple cameras are required to cover the foreground and the background. This means that multiple images have to be stitched together afterwards.



With a RICOH Extended Depth of Field Camera:

The camera keeps the whole of the required area in focus, so a single shot is all that's required.



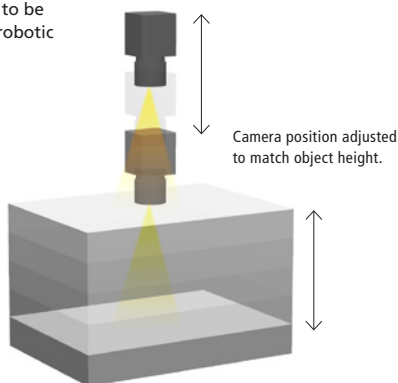
Fewer shots required
Images need no post-processing

Usage scenario 3

Even when objects are at different heights, as in processes involving stacks of printed paper, there's no need to adjust the focus or reposition the camera.

With conventional cameras:

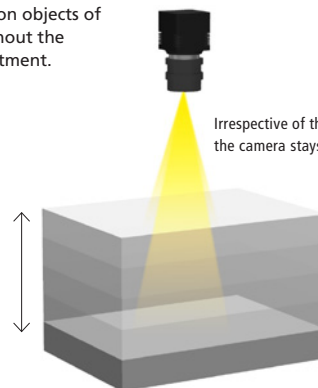
Camera height needs to be adjusted, either by a robotic arm or manually.



Camera position adjusted to match object height.

With a RICOH Extended Depth of Field Camera:

The camera focuses on objects of varying heights, without the need for focus adjustment.



Irrespective of the height of the object, the camera stays in the same position.

No need to reposition camera robotically or manually
Total cost reduced

[GigE Vision cables and extension tubes (macro rings) maximize the performance of Extended Depth of Field Cameras]



●FP-CAG03

GigE Vision Cable: 3m
Connector specification (camera end, board end)
Horizontal straight: Latch type

●FP-CAG05

GigE Vision Cable: 5m
Connector specification (camera end, board end)
Horizontal straight: Latch type



●FP-RGST 6-piece extension tube (macro ring) sets

Model name	Length (mm)	Maximum diameter (mm)
FP-RGZ5	0.5	31
FP-RG01	1	
FP-RG05	5	
FP-RG10	10	
FP-RG20	20	
FP-RG40	40	



Principal camera specifications

	EV-G030B1	EV-G200B1	EV-G200C1
Imager	1/3" interline VGA monochrome progressive CCD (ICX424AL)	1/1.8" interline UXGA monochrome progressive CCD (ICX274AL)	1/1.8" interline UXGA color progressive CCD (ICX274AQ)
Active picture elements	VGA: 648 (H) x 494 (V)	UXGA: 1624 (H) x 1236 (V)	
Cell size	7.4 (H) x 7.4 (V) μm	4.4 (H) x 4.4 (V) μm	
Vertical frequency (frame rate)	89.91172 Hz at full resolution 0.72028 to 360.33325 Hz adjustable via the communication (Frame rate depends on the AOI setting) Maximum frame rate (360.33325 Hz) is when vertical resolution AOI setting is 104.	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 230.	
Horizontal frequency	47.2028 kHz	19.176 kHz	
Pixel frequency		36.818175 MHz	
Minimum scene illumination	0.58 Lux at F1.2, 89.91172 Hz	0.16 Lux at F1.2, 15.31668 Hz	7.27 Lux at F1.2, 15.31668 Hz
Sync. system		Internal	
Video output format	Digital 8, 10 or 12 bit Raw data		Digital 8, 10 or 12 bit Raw data or RGB 8 bit
Exposure time	Preset continuous mode: 10 $\mu\text{seconds}$ to 16,777,216 $\mu\text{seconds}$ Preset trigger mode: 10 $\mu\text{seconds}$ to 16,777,216 $\mu\text{seconds}$ Pulse width mode: 10 $\mu\text{seconds}$ to unlimited		
Gain	0 to 20.4 dB		
Gamma	Gamma 1.0 (Factory default) or uploadable gamma table		
Power supply	+10.8 to +26.4 Vdc (power/signal connector or Power Over Ethernet connector) (power supply from power/signal connector automatically prioritized)		
Consumption	Less than 6.5 W		
Dimensions	50 (W) x 50 (H) x 53.5 (D) mm (NOT including the connector)		
Lens mount	C-mount		
Weight	Approximately 170 g		
Operational temperature	-5°C		
Maximum	Camera housing temperature (top plate) should not exceed 70°C.		
Storage temperature	Environmental temperature: -30 to 65°C		

Camera dimensions and rear connector specifications

Unit: mm

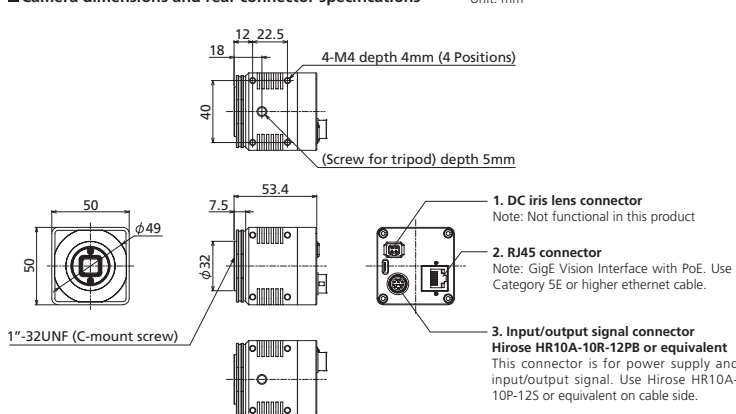


Table showing lenses supported by Extended Depth of Field Cameras

Lens model name	Camera model name		
	EV-G030B1	EV-G200B1	EV-G200C1
EL-CC0817B-VG	○	×	×
EL-CC0833B-VG	○	×	×
EL-CC0866B-VG	○	×	×
EL-HC1228-2M	○	○	○
EL-HC1255-2M	○	○	○
EL-CC3521-2M	○	○	○
EL-CC3543-2M	○	○	○
EL-CC3586-2M	○	○	○

Pin No.	Signal name	IN/OUT	Specification	Factory setting
1	GND	-	GND	-
2	Power input	-	+10.8 to +26.4Vdc	-
3	Output 1	OUT	Opt. Isolated	Trigger action status signal output
4	Output 2	OUT	Opt. Isolated	Exposure time 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 input for input/output signal	-	IO VCC +3 to +26.4Vdc	-
12	GND for input/output signal	-	IO GND	-

Principal specifications for lenses

	EL-CC0817B-VG	EL-CC0833B-VG	EL-CC0866B-VG	EL-HC1228-2M	EL-HC1255-2M	EL-CC3521-2M	EL-CC3543-2M	EL-CC3586-2M
Focal length		8.5 mm		12 mm			35 mm	
F number (fixed)	1.7	3.3	6.6	2.8	5.5	2.1	4.3	8.6
Minimum object distance		0.2 m		0.25 m			0.4 m	
Horizontal angle of view	When mounted on EV-G030B1	30.1°		21.6°			7.5°	
	When mounted on EV-G200B1	-		32.6°			11.4°	
	When mounted on EV-G200C1	-		32.4°			11.4°	
Dimensions	ϕ 42x40 mm			ϕ 29.5x28.5 mm		ϕ 29.5x35.4 mm		

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	For safe product use	•Carefully read user guide and use the product correctly. •Use correct power supply and voltage as indicated. •Do not install or use the products in locations with excessive water, humidity, steam, dust, smoke, etc. •Use a ground connection. In the event of a malfunction or short circuit, there is a danger of electric shock.
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RICOH Company, Ltd. Imaging Systems Business Group, Industrial Optical Systems Division

http://www.ricoh.com/fa_security/

For inquiries concerning the products in this catalog, please contact us as shown below.

For orders and inquiries: