RICOH Extended Depth of Field Cameras

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

Ricoh is an expert in optical design technology and in the image-processing technology used in cameras, which is why we are able to create these new Extended Depth of Field Cameras.

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.
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.

With a RICOH Extended Depth of Field Camera:
Only one camera is required. It does not need repeated repositioning.

**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.

**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.

With a RICOH Extended Depth of Field Camera:
The camera focuses on objects of varying heights, without the need for focus adjustment.

---

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

| FP-CAG03 | GigE Vision Cable: 3m  
<table>
<thead>
<tr>
<th>Connector specification (camera end, board end)</th>
<th>Horizontal straight: Latch type</th>
</tr>
</thead>
</table>
| 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-RG25 | 0.5 |
| FP-RG01 | 1 |
| FP-RG05 | 5 |
| FP-RG10 | 10 |
| FP-RG20 | 20 |
| FP-RG40 | 40 |
**Principal camera specifications**

**EV-G200B1**
- Image sensor: 1/3" interline VGA monochrome progressive CCD (ICX244AL)
- Active picture elements: 752x480
- F number (f/number): f/1.7
- Vertical frequency (frame rate): 25.3166 Hz at full resolution
- Horizontal frequency: 38.818175 MHz
- Opt. Isolated

**EV-G200B1**
- Image sensor: 1/3" interline VGA monochrome progressive CCD (ICX244AL)
- Active picture elements: 752x480
- F number (f/number): f/1.7
- Vertical frequency (frame rate): 25.3166 Hz at full resolution
- Horizontal frequency: 38.818175 MHz
- Opt. Isolated

**EV-G200C1**
- Image sensor: 1/3" interline VGA monochrome progressive CCD (ICX244AL)
- Active picture elements: 752x480
- F number (f/number): f/1.8
- Vertical frequency (frame rate): 25.3166 Hz at full resolution
- Horizontal frequency: 38.818175 MHz
- Opt. Isolated

**EV-G200C1**
- Image sensor: 1/3" interline VGA monochrome progressive CCD (ICX244AL)
- Active picture elements: 752x480
- F number (f/number): f/1.8
- Vertical frequency (frame rate): 25.3166 Hz at full resolution
- Horizontal frequency: 38.818175 MHz
- Opt. Isolated

**Table showing lenses supported by Extended Depth of Field Cameras**

<table>
<thead>
<tr>
<th>Camera model name</th>
<th>EV-G200B1</th>
<th>EV-G200B1</th>
<th>EV-G200C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens model name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-COO17B-VG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-COO33B-VG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-COO866B-VG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-HC128B-2M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-HC125S-2M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-CCS212-BM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-CCS3532-2M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL-CCS3586-2M</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.
- Avoid overheating, as there is a danger of electric shock.

---

**RICOH Company, Ltd. Imaging Systems Business Group, Industrial Optical Systems Division**

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

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

For global environmental conservation, vegetable oil ink was used in this catalogue.

The information in this catalogue is correct as of July 2013.