The high resolution X-ray imaging system is designed for the application of X-ray beam alignment. Adopting unique mechanism, it enables to combine various type of cameras for real time X-ray beam alignment. Beryllium input window realized wide range of X-ray energy and coupled with L-shaped quartz optics makes high X-ray radiation tolerance. Suitable for high resolution X-ray beam alignment in large synchrotron radiation facilities.

**FEATURES**
- X-ray proof design (adopting a quartz glass plate and L-shaped optics)
- Easy to exchange scintillators
- Possible to detect low X-ray energy
- Small size and light weight
- Remote controllable focus adjustment
- One touch design for camera attachment
- High resolution

**APPLICATIONS**
- X-ray CT
- Phase contrast X-ray CT
- X-ray optics alignment
- X-ray topography
- X-ray microscope
- Angiography
- XAFS

The irradiated X-ray is converted to visible light and conducted to the lens bended 90 degrees by L-shaped mirror in order to reduce the X-ray damage onto the digital camera.
Imaging unit selection

**M11427-41, -42 (Standard type)**

**High resolution X-ray imaging system AA40**
- Resolution: 10 μm
- Scintillator diameter: 17 mm

**PRINCIPLE**
- Beryllium window
- P43 (Gd2O2S: Tb)
- Mirror Relay lens

- Option
  - Scintillator: CsI

**M11427-51, -52, -53 (Small area type)**

**High resolution X-ray imaging system AA50**
- Resolution: 2 μm
- Scintillator diameter: 10 mm

**PRINCIPLE**
- Beryllium window
- Microscope objective lens
- Mirror
- Amorphous carbon plate
- Single crystal scintillator (Lu2SiO5: Ce, thickness < 10 μm)

- Option
  - Scintillator: LuAG

**M11427-62 (Large area type)**

**High resolution X-ray imaging system AA60**
- Resolution: 10 μm or more
- Scintillator diameter: 35 mm

**PRINCIPLE**
- Glassy carbon window
- P43 (Gd2O2S: Tb)

- Option
  - Scintillator: CsI
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type number</th>
<th>M11427-41</th>
<th>M11427-42</th>
<th>M11427-51</th>
<th>M11427-52</th>
<th>M11427-53</th>
<th>M11427-62</th>
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</thead>
<tbody>
<tr>
<td>Imaging unit</td>
<td>AA40</td>
<td>AA50</td>
<td>AA60</td>
<td></td>
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<tr>
<td>Scintillator diameter</td>
<td>17 mm</td>
<td>10 mm</td>
<td>35 mm</td>
<td></td>
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<td></td>
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<tr>
<td>Input window material</td>
<td>Beryllium (0.5 mm)</td>
<td>Beryllium (0.5 mm) / Amorphous carbon (2 mm)</td>
<td>Glassy carbon (0.5 mm)</td>
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<tr>
<td>Sensitivity range</td>
<td>3 keV or more</td>
<td>3 keV or more</td>
<td>6 keV or more</td>
<td></td>
<td></td>
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<tr>
<td>Scintillator material</td>
<td>P43 (Gd2O2S: Tb)</td>
<td>LSO (Lu2SiO5: Ce)</td>
<td>P43 (Gd2O2S: Tb)</td>
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<td></td>
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<tr>
<td>Peak emission wavelength</td>
<td>540 nm</td>
<td>420 nm</td>
<td>540 nm</td>
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<tr>
<td>Minimum thickness of scintillator</td>
<td>10 μm</td>
<td>10 μm</td>
<td>10 μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substrate material of scintillator</td>
<td>Quart glass</td>
<td>Amorphous carbon plate</td>
<td>Quart glass</td>
<td></td>
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</tr>
<tr>
<td>Resolution *</td>
<td>10 μm</td>
<td>4 μm</td>
<td>2 μm</td>
<td>1 μm</td>
<td>10 μm or more</td>
<td></td>
</tr>
<tr>
<td>10 % Decay time</td>
<td>1 ms</td>
<td>40 ns</td>
<td></td>
<td>1 ms</td>
<td></td>
<td></td>
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<tr>
<td>First lens</td>
<td>24 mm</td>
<td>50 mm (F1.4)</td>
<td>10× (NA 0.3)</td>
<td>20× (NA 0.4)</td>
<td>50× (NA 0.55)</td>
<td>75 mm (F2.8)</td>
</tr>
<tr>
<td>Second lens</td>
<td>105 mm, 50 mm, 35 mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td></td>
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<tr>
<td>ND filter</td>
<td>ND10 / ND1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>ND10 / ND1</td>
<td></td>
</tr>
</tbody>
</table>

* Depending on the camera type

### DIMENSIONAL OUTLINES

(Unit: mm)

- **High resolution X-ray imaging system AA40**
  
  (Approx. 5.2 kg)

- **High resolution X-ray imaging system AA50**
  
  (Approx. 3.7 kg)

- **High resolution X-ray imaging system AA60**
  
  (Approx. 7.5 kg)
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Camera type number</th>
<th>ORCA-Flash4.0 V3 (C13440-20CU)</th>
<th>ImagEM X2-1K (C9100-24B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging device</td>
<td>Scientific CMOS image sensor</td>
<td>Electron multiplying back-thinned frame transfer</td>
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<tr>
<td>Effective number of pixels</td>
<td>2048 (H) × 2048 (V)</td>
<td>1024 (H) × 1024 (V)</td>
</tr>
<tr>
<td>Cell size</td>
<td>6.5 μm (H) × 6.5 μm (V)</td>
<td>13 μm (H) × 13 μm (V)</td>
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<tr>
<td>Effective area</td>
<td>13.3 mm (H) × 13.3 mm (V)</td>
<td>13.3 mm (H) × 13.3 mm (V)</td>
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<tr>
<td>Full well capacity</td>
<td>40 000 electrons (EM-CCD mode)</td>
<td>30 000 electrons (Camera Link)</td>
</tr>
<tr>
<td>Readout speed</td>
<td>100 frames/s (Camera Link), 40 frames/s (USB 3.0)</td>
<td>18.5 to 314 frames/s</td>
</tr>
<tr>
<td>Readout noise (rms)</td>
<td>EM 10x -</td>
<td>3 electrons (0.6875 MHz)</td>
</tr>
<tr>
<td></td>
<td>EM 1200x -</td>
<td>1 electron max. (0.6875 MHz)</td>
</tr>
<tr>
<td></td>
<td>Normal -</td>
<td>1.4 electrons (slowscan)</td>
</tr>
<tr>
<td></td>
<td>Air cooled -</td>
<td>0.06 electrons/pixel/s (-10 °C)</td>
</tr>
<tr>
<td></td>
<td>Water cooled -</td>
<td>0.006 electrons/pixel/s (-30 °C)</td>
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<tr>
<td>Cooling method</td>
<td>Forced air</td>
<td>Forced air</td>
</tr>
<tr>
<td>Cooling temperature</td>
<td>-10 °C (Ambient temperature: +20 °C)</td>
<td>-50 °C (Ambient temperature: 0 °C to +30 °C)</td>
</tr>
<tr>
<td>Digital output</td>
<td>16 bit</td>
<td>16 bit</td>
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<tr>
<td>Interface</td>
<td>Camera Link full configuration Deca mode / USB 3.0</td>
<td>IEEE1394b</td>
</tr>
</tbody>
</table>

*Refer to the camera catalog for detail information.

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