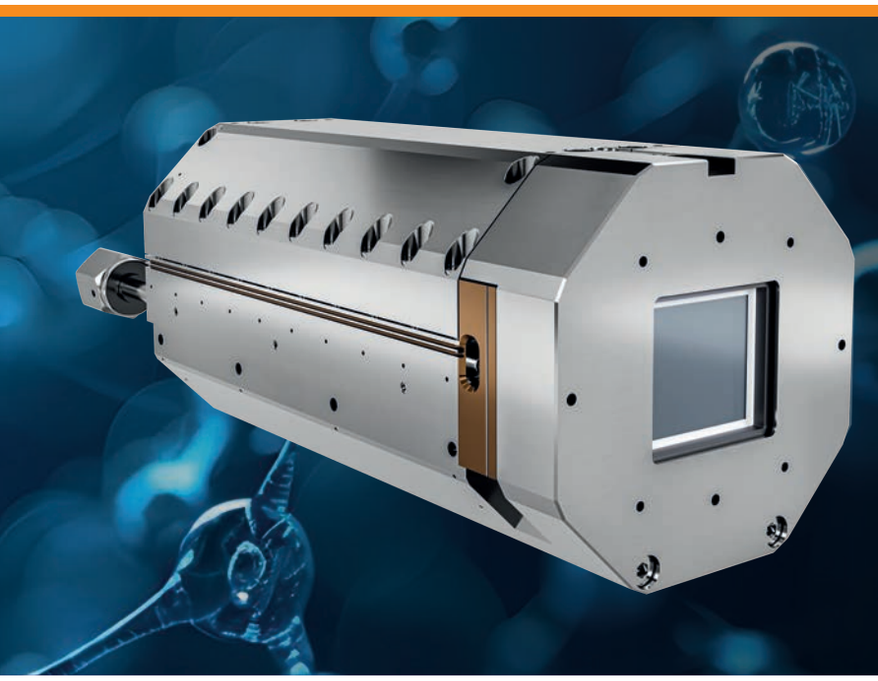
greateyes
EXPAND YOUR VISION

HIGH PERFORMANCE
IMAGING CAMERAS



LOTTEi

KEY SPECIFICATIONS

- UHV Compatibility through Compact Encapsulated Design
- High Quantum Efficiency
- Ultra Deep Cooling to -100°C
- 18-bit Dynamic Range
- Multi-MHz Readout

Full-Frame Deep Cooling In-vacuum CCD Camera for Imaging Applications

HIGH RESOLUTION
UP TO
16.8
MEGAPIXEL
HIGH RESOLUTION

VUV
EUV
SXR
HXR

LOTTE in-vacuum CCD camera is the latest innovation from greateyes. **LOTTE** can be submerged, operated and positioned freely inside a vacuum chamber.

Utilising scientific-grade back-illuminated CCD sensors for the detection of EUV, VUV, and X-ray signals, **LOTTE** is equipped with a novel and advanced cooling concept enabling detector temperatures as low as -100°C. It is furthermore driven by the most powerful and versatile true 18-bit electronic platform available for in-vacuum use. This guarantees ultra low noise performance.

One key feature that differentiates **LOTTE** from its nearest rivals is an innovative encapsulated stainless-steel housing, assuring extremely low outgassing at all times.

The special design and unprecedented performance make the **LOTTE** a unique companion for demanding low-light scientific research applications. Additional handy features are further improving the user experience and adding true value.

TYPICAL APPLICATIONS

- EUV Lithography
- X-ray Tomography / Fluoroscopy
- Fourier Transform Holography
- X-ray Diffraction
- X-ray Phase Contrast Imaging
- Ptychographic Spectromicroscopy
- Grazing-Incidence Small-Angle X-ray Scattering

www.greateyes.de

PRECISOMETER
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LOTTEi





Wearing the crown for lowest outgassing rate

Queen Sophia Charlotte - nicknamed 'LOTTE' - laid the foundation stone of Berlin's most famous palace 'Schloss Charlottenburg'

FEATURES & BENEFITS

Ultra deep TE cooling down to -100°C
lowest dark current for better detection limit

GigE data interface
local or remote network operation – your choice!

Fast readout speeds up to 5 MHz
fast frame rates paired with low-noise electronics

UHV Compatibility
encapsulated design delivers the lowest outgassing rate

High QE up to 98%
very sensitive sensors for low light applications

Flexible software options
camera software and SDKs available

COMMON SPECIFICATIONS

Pixel readout frequency	50/100/250/500 kHz, 1 MHz, 3 MHz (5 MHz for visualisation mode; up to 20 MHz by multi-output)
Readout modes	2 output nodes for 1k1k & 2k2k cameras, 4 output nodes for 2k2k plus & 4k4k cameras
AD converter resolution	18-bit
Linearity	Better than 99%
CCD epitaxial thickness	15 µm standard, 40 µm for deep depletion (DD) models
Feedthrough flange	CF DN100 flange with D-sub electrical feedthrough connectors and 6 mm liquid feedthrough tubes (airside: G 1/4 fitting female; vacuum side: VCR 1/4 fitting female)
Vacuum compatibility	10^{-9} mbar (UHV capability)
Bakeout temperature	Max. +80°C
Flange - focal place	1k1k camera: 6 mm; 2k2k, 2k2k plus & 4k4k cameras: 5mm (all distances can be customised)
Temperature monitoring	Two thermistors at CCD sensor and thermoelectric cooler (hot side)
Data link	Gigabit Ethernet
Software	greateyes Vision software for Windows 11
SDK and drivers	DLL for Windows; LabVIEW, EPICS, Linux, Python, Tango driver (optional)
TTL interface signals	1 Exposure out, 1 Trigger in
Power supply	1k1k & 2k2k: 80-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.1 A (230 V) / 1.9 A (115 V) 2k2k plus & 4k4k: 85-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.9 A (230 V) / 3.8 A (115 V)
Certification	CE
Dimensions (W x H x L)	rc version: 98 x 90 x 235 mm / 98 x 90 x 236 mm (4k4k cameras) sc version: 90 x 127 x 189 mm / 94 x 127 x 190 mm (4k4k cameras)
Weight	rc version: 4.4 kg / 5.2 kg (4k4k cameras); sc version: 4.6 kg / 5.3 kg (4k4k cameras)

Included with your camera

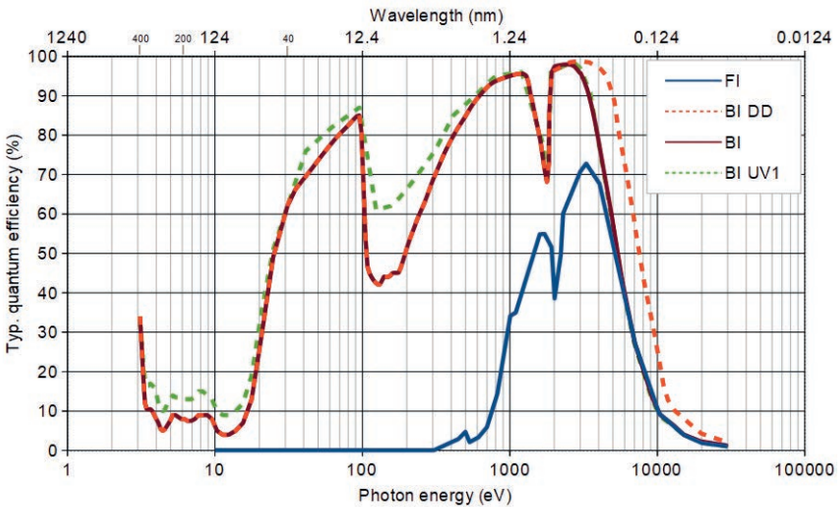
GE-InFI02	CF DN100 flange with electical and liquid feedthroughs		
GE-VacP01	2x in-vacuum hoses for cooling	GE-GigE10m	10 m Ethernet cable
GE-VacCab	2x in-vacuum PTFE D-sub cables	GE-StoB2m	2 m SMB to BNC connection cable x2
GE-VI01	greateyes Vision software suite for Windows	GE-POW01	Camera power supply with cabling
GE-SDK01	SDK for Windows (C/C++ based)	GE-ManCam	Camera instruction manual

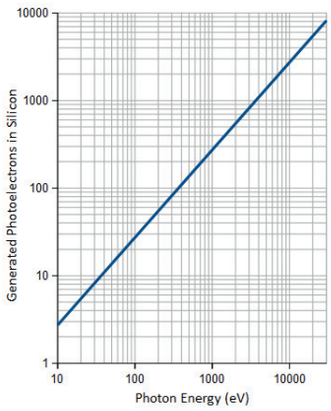
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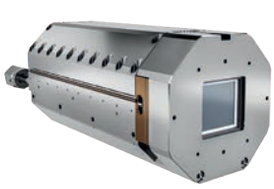
The mean energy of a photon to generate an electron-hole pair in silicon is 3.66 eV.

STEP 1: Choose your camera model

LOTTEi Series	LOTTEi 1k1k		LOTTEi 2k2k		LOTTEi 2k2k plus	LOTTEi 4k4k	
Sensor code	**FI BI BI UV1**	**BI DD**	**FI BI**	**BI DD BI UV1**	**BI**	**BI**	**BI DD BI UV1**
Usable pixels (columns x rows)	1024 x 1024 (FI) 1056 x 1027 (others)		2048 x 2052		2048 x 2064	4096 x 4112	
Active image area	13.3 mm x 13.3 mm		27.6 mm x 27.6 mm		30.7 mm x 30.7 mm	61.4 mm x 61.4 mm	
Pixel size	13 µm x 13 µm		13.5 µm x 13.5 µm		15 µm x 15 µm	15 µm x 15 µm	
CCD sensor cooling	-100°C to 20°C		-80°C to 20°C		-80°C to 20°C	-80°C to 20°C	
Full well capacity	100 ke⁻	120 ke⁻	100 ke⁻	150 ke⁻	150 ke⁻	150 ke⁻	350 ke⁻
Register well / Output node	400 ke⁻ / -		400 ke⁻ / -	600 ke⁻ / -	- / 900 ke⁻	- / 900 ke⁻	- / 600 ke⁻
Typical read noise (e⁻) @ 50 kHz @ 1 MHz @ 3 MHz	 2.8 6.4 10.9		 3.4 7.0 13.6		 4.6 8.5 17.0	 4.6 8.5 17.0	 2.8 5.8 10.4
Typical Dark Current (e⁻/pixels/s)	@ -80°C 0.0003	0.015	@ -80°C 0.0003	0.015	@ -80°C 0.0001	@ -80°C 0.0001	0.006
Gain (counts/e⁻): Standard Mode High Capacity Mode	 1 -		 1 0.34		 0.6 0.2	 0.6 0.2	 1 0.34
CCD sensor type	Front-illuminated (FI), Back-illuminated (BI), Deep depletion fringe suppression (DD), Enhanced back-illuminated (BI UV1)						
Blemish specifications	Grade 0 or Grade 1 (standard) as specified by sensor manufacturer. For more information please see: www.greateyes.de/en/glossar.html						

STEP 2: Choose your camera design

'rc' version



Compact in diameter, camera body fits into a 6 inch tube

Electrical and water connectors on the rear side

Order Code:
LOTTE-i 2k2k BI UV1 - rc

'sc' version



Camera length only 189 mm

Electrical and water connectors on the bottom side

Order Code:
LOTTE-i 1k1k BI DD - sc

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LOTTEi

Gigabit Ethernet spec · EPICS · Linux · python powered

STEP 3: Choose your accessories and software

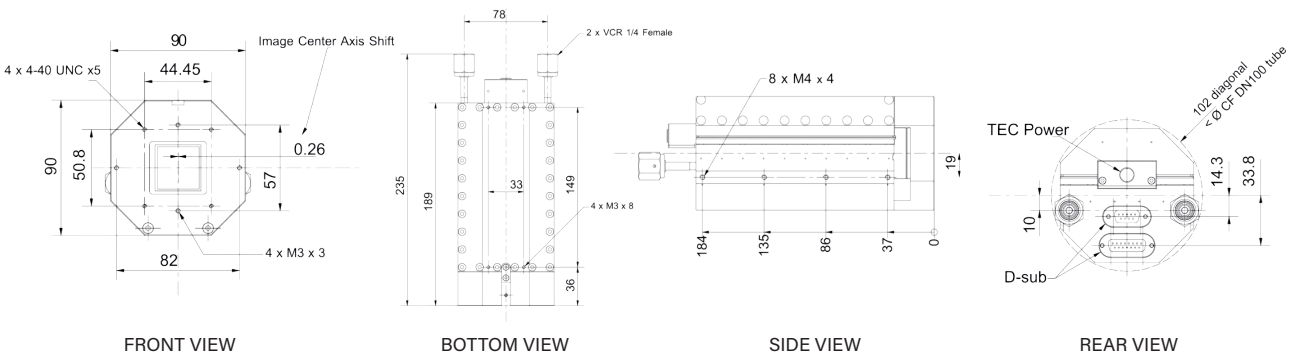
Order Code	Description
Accessories for Imaging Purposes	
LO-SR25	25 mm in-vacuum shutter for 1k1k camera, including shutter driver module
LO-SR45	45 mm in-vacuum shutter for 2k2k & 2k2k plus cameras, including shutter driver module
Accessories for Cooling Performance *(LOTTE series can only be cooled by liquid cooling)*	
GE-CR01	Compact liquid cooling, circulating the coolant at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, PID control with temp. from -5°C to 30°C for ultra-deep camera cooling
GE-VacP01	2x in-vacuum hoses, formed bellow 1/4", VCR male/female, 305 mm (standard accessory)
GE-VacP02	2x in-vacuum hoses, formed bellow 1/4", VCR male/female, 1200 mm (upon request)
Software Development Kit (SDK) and Drivers	
GE-LX01	SDK for Linux (C/C++ based)
GE-PYT01	Python driver
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-TAN	Tango driver

STEP 4: Flexible customisation service

With direct and fast response, we provide various customisations and OEM services. For example, other sensor types, the alteration of sensor position/tilt, the modification of camera housing or cooling system, etc. Let us know what **LOTTE** you require.

TECHNICAL DRAWINGS*

* Only valid for LOTTEi 1k1k, 2k2k & 2k2k plus cameras. For other drawings, please send us an enquiry.



FRONT VIEW · BOTTOM VIEW · SIDE VIEW · REAR VIEW

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DS-LOTTEi / Rev09 / Sep2026

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Explore products & discuss your experiment