



DATA SHEET:

GE 2048 2048 series

SPECTRAL RANGES:

Vacuum-ultraviolet (VUV)

Extreme-ultraviolet (EUV)

Soft X-ray

Hard X-ray

Near-infrared (NIR)

Visible (VIS)

Ultra-violet (UV)

GE 2048 2048 series

2048 × 2048 pixels, 27.6 mm × 27.6 mm image area, 13.5 μm × 13.5 μm pixel size

Vacuum flange interface

Based on a unique platform concept, greateyes offers a portfolio of large format scientific cameras with vacuum interface for imaging and spectroscopy in the VUV, EUV, soft- and hard X-ray range. Incoming photons are directly detected by the CCD sensor. Besides the precise measurement of high energy radiation, the cameras exhibit a high sensitivity in the ranges NIR, VIS and UV as well.

All greateyes cameras combine scientific CCD sensors with ultra low noise electronics for optimal detection of weak signals. Select among different spectral sensitivities and flange types to find the best solution for your imaging or spectroscopic application.

Deep cooling of the sensor is achieved by means of multi-stage thermoelectric coolers. The cameras provide a rich set of functionalities including flexible binning operation, various trigger and synchronisation modes, software adjustable base line as well as temperature monitoring of the sensor and the heat radiation system.

Key features

Scientific low noise CCD sensors	Flexible binning modes	Quantum efficiency up to 98%
Full well capacity up to 150 ke ⁻	Software adjustable gain setting	Deep cooling to min. -80°C
Read noise: min. 2.4 e ⁻	Temperature monitoring	16 bit dynamic range
Wide spectral sensitivity	CF or ISO-F interface flanges	greateyes Vision software included
SDK & Labview and EPICS drivers	Ext. trigger, shutter, sync signals	Water and forced air cooling

SPECIFICATIONS

Model specifications

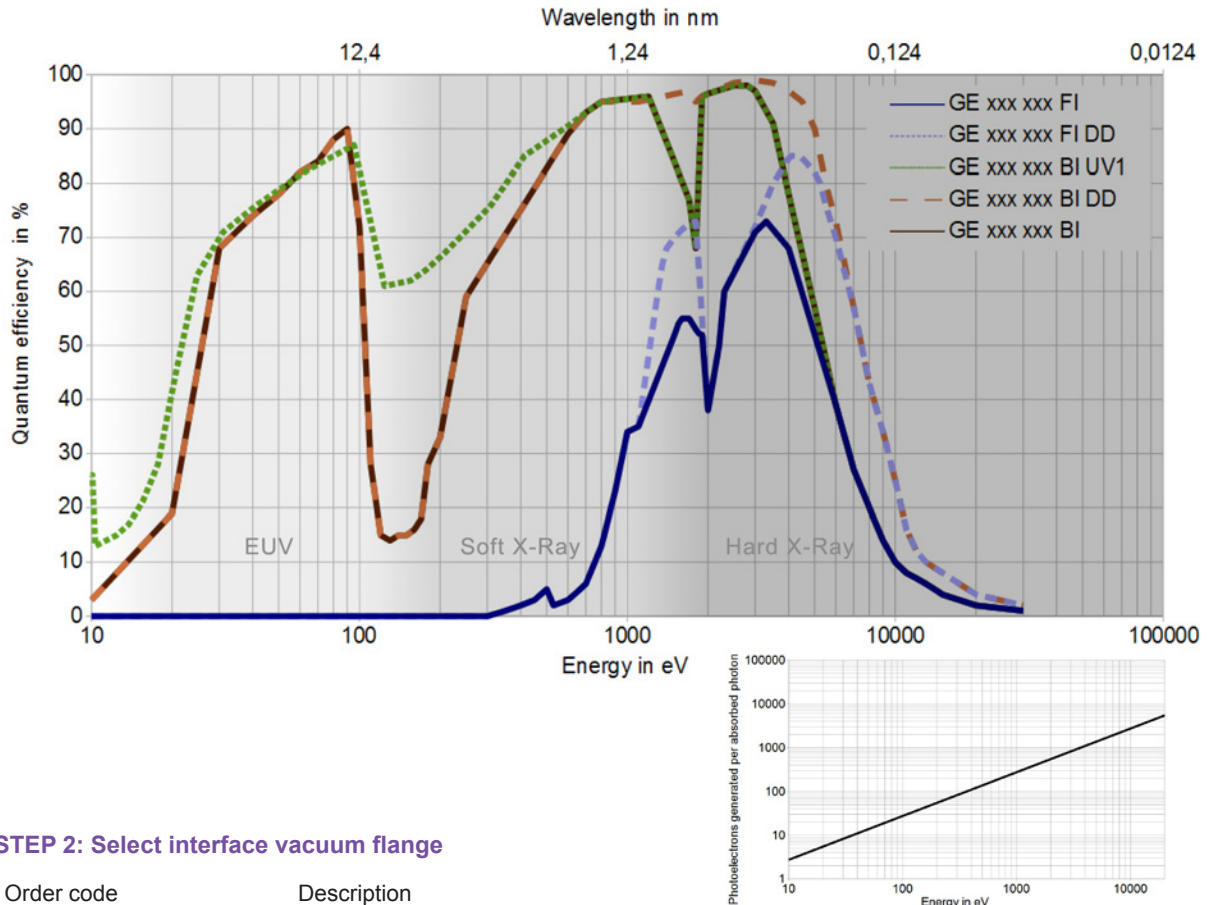
	GE 2048 2048 FI GE 2048 2048 BI	GE 2048 2048 BI DD	GE 2048 2048 BI UV1
Pixel format	2048 × 2048	2048 × 2048	2048 × 2048
Image area	27.6 mm × 27.6 mm	27.6 mm × 27.6 mm	27.6 mm × 27.6 mm
Pixel size	13.5 μm × 13.5 μm	13.5 μm × 13.5 μm	13.5 μm × 13.5 μm
Full well capacity	100 ke ⁻	150 ke ⁻	150 ke ⁻
Register well capacity	1 000 ke ⁻	1 000 ke ⁻	1 000 ke ⁻
Dark current @ -80°C	0.0003 e ⁻ /pixel/sec	0.05 e ⁻ /pixel/sec	0.05 e ⁻ /pixel/sec
Gain	1 counts/e ⁻ (high) 0.4 counts/e ⁻ (low)	1 counts/e ⁻ (high) 0.4 counts/e ⁻ (low)	1 counts/e ⁻ (high) 0.4 counts/e ⁻ (low)
CCD epitaxial thickness	15 μm	40 μm	15 μm
Max. dynamic range	33 333:1	50 000:1	50 000:1
CCD sensor type	front-illuminated (FI), back-illuminated (BI), deep depletion fringe suppression (DD), enhanced back-illuminated (UV1)		
Blemish specifications	Grade 0 or grade 1 (standard) as specified by sensor manufacturer		

Common specifications

Pixel readout frequency	500 kHz - 3 MHz
AD converter resolution	16 bit
Read noise at 500kHz	min.: 2.4 e ⁻ rms, typical: 4 e ⁻ rms
Linearity	better than 99%
Vertical shift speed	software selectable from min. 30 μs
Flange types	knife edged sealed CF DN100 or CF DN160
Vacuum compatibility	with CF DN100: 10 ⁻⁸ mbar, with CF DN160: <10 ⁻⁹ mbar (UHV capability)
Bakeout temperature	max. +80°C
Distance flange - CCD focal plane	7.5 mm for CF DN100
CCD sensor cooling	min. -80°C to 20°C, forced air or water cooling
Temperature monitoring	CCD sensor and thermoelectric cooler (hot side)
Data link	USB, Gigabit-Ethernet
Software	greateyes Vision software for Windows XP / Vista / 7 / 10
SDK and drivers	DLL for Windows XP / Vista / 7 / 10; LabVIEW, EPICS, Linux driver
TTL interface signals	Sync out, shutter out, external trigger in
Operating conditions	temperature: 0°C to 30°C ambient, relative humidity <70% (non condensing)
Power supply	110-240 VAC, 50 Hz-60 Hz, max. 1A
Certification	CE
Dimensions	9.7cm (3.82") x 9.1cm (3.58") x 13.5cm (5.31") (W x H x L) camera body
Weight	3 500g (camera with CF DN100 flange)

STEP 1: Choose camera model by order code

Order code	Description
GE 2048 2048 FI	Front-illuminated CCD sensor
GE 2048 2048 BI	Back-illuminated CCD sensor
GE 2048 2048 BI DD	Back-illuminated deep depletion fringe suppression CCD sensor
GE 2048 2048 BI UV1	Enhanced back-illuminated CCD sensor



STEP 2: Select interface vacuum flange

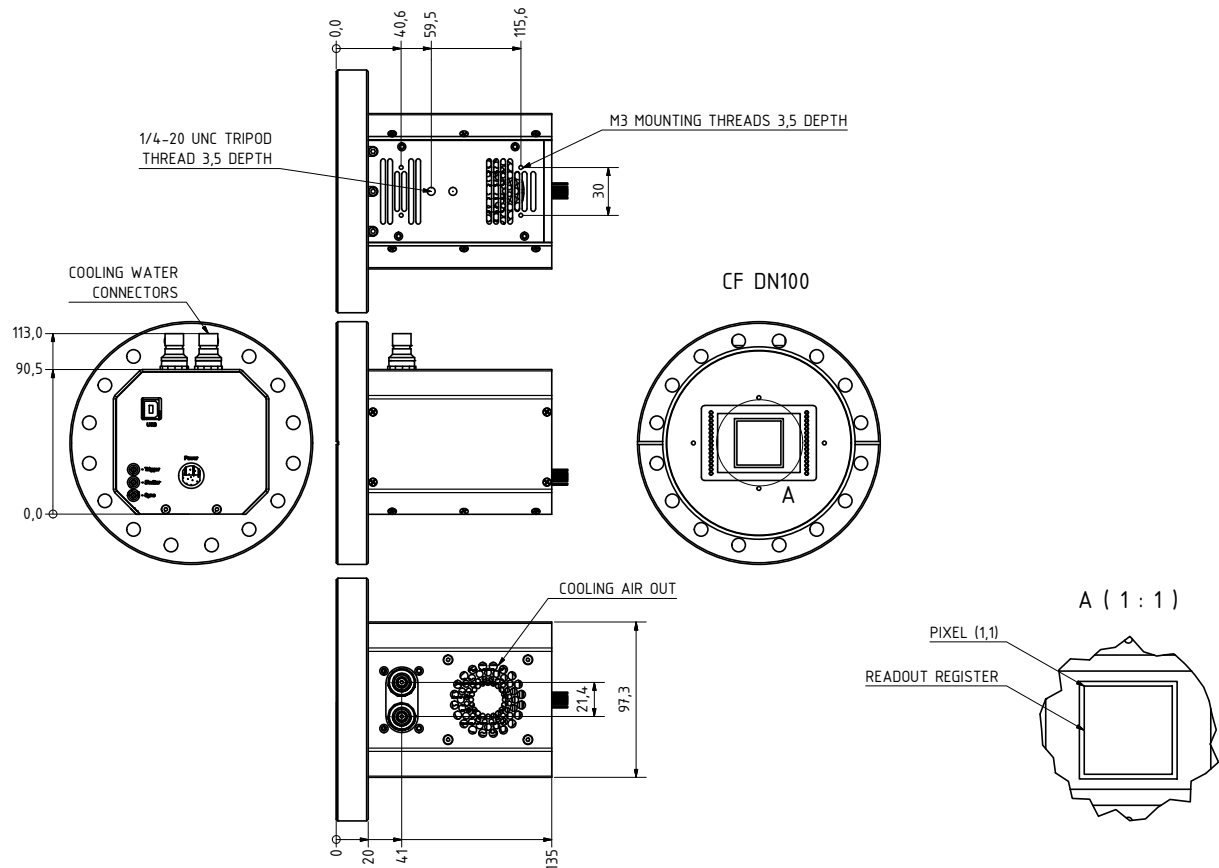
Order code	Description
camera order code + CF1	Front side knife edge sealed CF DN100 flange with through holes
camera order code + CF3	Knife edge sealed CF DN160 flange. An integrated pumping pipe with CF DN40 flange allows differential pumping of sensor area, therefore UHV conditions can be achieved.

STEP 3: Choose accessories and software

Order code	Description
A) Subpixel resolution enhancement	
New GE-S xxx xxx series	Increased spatial resolution (See scientific superresolution camera data sheet for details)
B) Accessories for enhanced cooling performance	
GE-CR01	Compact recirculator operating at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, temperature range -5°C to 30°C for ultra deep camera cooling
C) Software development kit (SDK) and drivers	
GE-SDK01	SDK for Windows and Linux compatible with C/C++, Delphi, Labview
GE-LAB01	Labview driver
GE-EP	EPICS driver
GE-LX01	Linux driver

STEP 4: For customisation of the camera detector please tell us about your requirements.

TECHNICAL DRAWINGS



GE 2048 2048 xxx with CF DN100 vacuum interface flange.

Items delivered together with each camera

GE-VI01	greateyes Vision software suite for Windows
GE-StoB2m	2m SMB to BNC connection cable
GE-USB5m	5m USB 2.0 cable type A to type B
GE-POW01	camera power supply with cabling
GE-ManCam	camera instruction manual on CD

CONTACT INFORMATION

greateyes GmbH
Rudower Chaussee 29
12489 Berlin
Germany

Web: www.greateyes.de
E-mail: info@greateyes.de
Phone: +49 30 6392 6237
Fax: +49 30 6392 6238

For a list of representatives and distributors please visit our website.