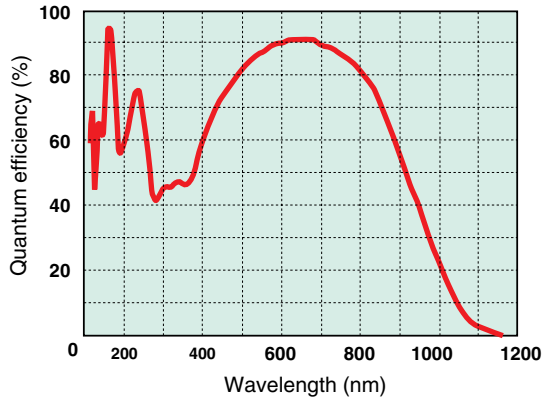
BT-CCD Camera
C8000-30

Back-Thinned CCD Camera

▲C8000-30

The C8000-30 employs an ultrahigh-sensitivity back-thinned CCD sensor made by Hamamatsu, which offers extremely high quantum efficiency in a wide range of UV, VIS and NIR wavelengths. The high UV sensitivity from 120 nm is useful for semiconductor mask inspection and measurement applications. Also, the high NIR sensitivity is useful for fluorescence measurement, NIR LD measurement and so on.

SPECTRAL RESPONSE



* Without sapphire window. With the sapphire window, the spectral response is decreased due to the transmittance characteristics of the window.

FEATURES

High-sensitivity imaging from UV to near-infrared wavelengths

- UV: Quantum efficiency over 60 % (at 200 nm)
- Near-infrared: Quantum efficiency over 90 % (at 650 nm)

◆ **Quantum efficiency in UV source (reference data)**

(This is typical, not guaranteed.)

Light source	F_2	ArF	KrF	Fourth harmonic generation of a YAG laser	i line
Wavelength (nm)	157	193	248	266	365
Quantum efficiency (%) (typ.)	84	57	69	50	47

* UV light irradiation may cause a drop in sensitivity and increase the dark current of the CCD sensor.

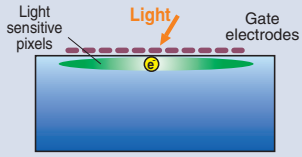
Real time background subtraction

Recursive filter (2, 4, 8, 16, 32 and 64 frames selectable)

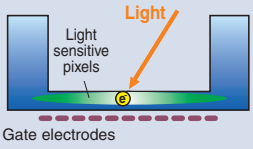
PRINCIPLE

In a normal CCD with front-illuminated CCD structure, the light sensitive pixels have a charge transfer function as well, and this function requires the front surface of light sensitive pixels to be covered by a semi-transparent Poly-Si electrode for the charge transfer function. The Poly-Si electrode absorbs some percentage of incoming photons depending on their wavelength. Especially of of the UV light is not able to reach the light sensitive pixels.
To overcome this disadvantage, in a back-thinned CCD, the CCD is turned upside down and this back side of the CCD is thinned to 10-15 µm in thickness. Incident photons now enter the CCD from the back-thinned side, without the Poly-Si electrode in the light path. Then QE values of greater than 90 % can be achieved.

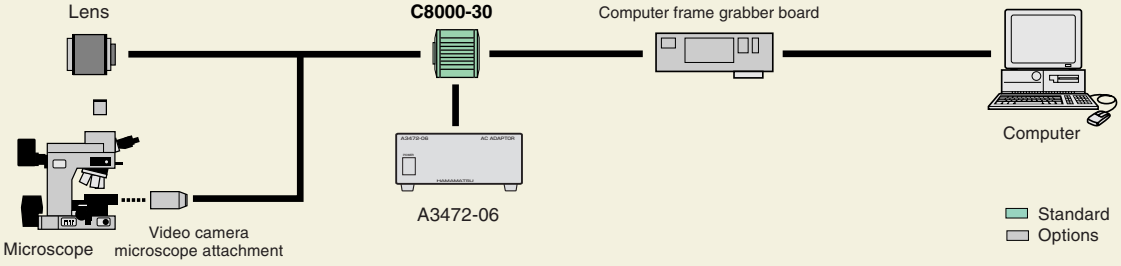
● **Normal CCD**
(Front-Illuminated CCD)



● **Back-Thinned CCD**



SYSTEM CONFIGURATION



HAMAMATSU

SYSTEM SPECIFICATIONS

Type number			C8000-30
Imaging device			Back-thinned frame transfer CCD
Effective number of pixels			640 (H) × 480 (V)
Cell size			14 µm (H) × 14 µm (V)
Effective area			8.96 mm (H) × 6.72 mm (V)
Frame rate	1×1		31.4 frames/s
	binning	2×2	58.3 frames/s
		4×4	101.8 frames/s
Readout noise (r.m.s.) (typ.)			Approx. 100 electrons
Full well capacity (typ.)			30 000 electrons
Cooling method			Passive air-cooled
Cooling temperature			+ 5 ˚C (room temperature + 20 ˚C)
A/D converter			12 bit
Exposure time			30.8 ms to 1 s
Analog gain			Approx. 1 to 5 times (16 steps)
Sub-array			8 pixels increments (V)
External trigger mode			Edge trigger, Level trigger, Start trigger, Synchronous readout trigger
Image processing functions			Background subtraction, Recursive filter
Lens mount			C-mount
Interface			Camera Link Base Configuration
External control			Camera Link
Power requirements			DC +12 V
Power consumption			Approx. 10 V·A
Ambient storage temperature			- 10 ˚C to + 50 ˚C
Ambient operating temperature			0 ˚C to + 40 ˚C
Ambient storage/operating humidity			70 % max. (with no condensation)

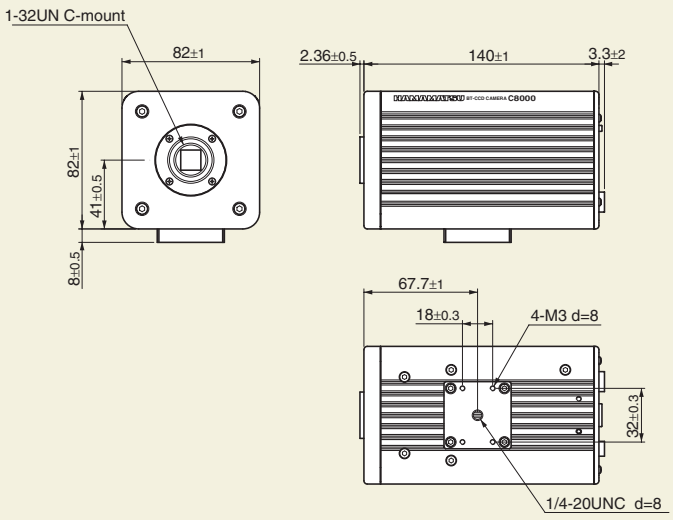
*Calculated from the ratio of the full well capacity and the average readout noise.

OPTIONS

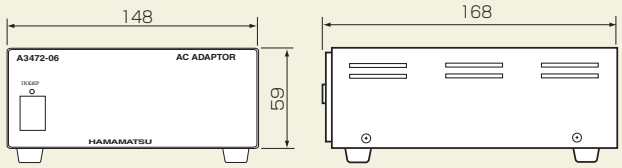
- **AC adaptor: A3472-06**
- **Power cable (5 m): A9071-05**

DIMENSIONAL OUTLINES (Unit: mm)

● Camera head (approx. 1.3 kg)



● AC adaptor A3472-06 (approx. 0.8 kg) (option)



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Cat. No. SCAS0009E01
JUN/2010 HPK
Created in Japan