

# HAMAMATSU

DATA SHEET

## Electron Bombardment CCD Cameras C7190-11W, -12W, -13W



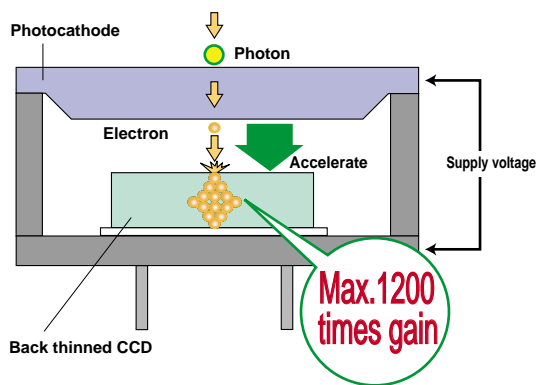
C7190-11W, -12W, -13W

Hamamatsu EB-CCD cameras use an innovative high gain sensor that puts advanced technology to work to obtain high gain images in very low light. This technology involves a special vacuum chamber in which electrons generated at the photocathode are accelerated by a high potential into a newly developed, back thinned, back illuminated CCD. This direct bombardment of the CCD by accelerated electrons provides high gain, high resolution images, with none of the problems associated with Micro Channel Plates which are used in other devices. The sensor in the EB-CCD is driven by low noise circuits and features MPP (Multi Pin Phase) technology to achieve good S/N ratios at high gain conditions and a long service life.

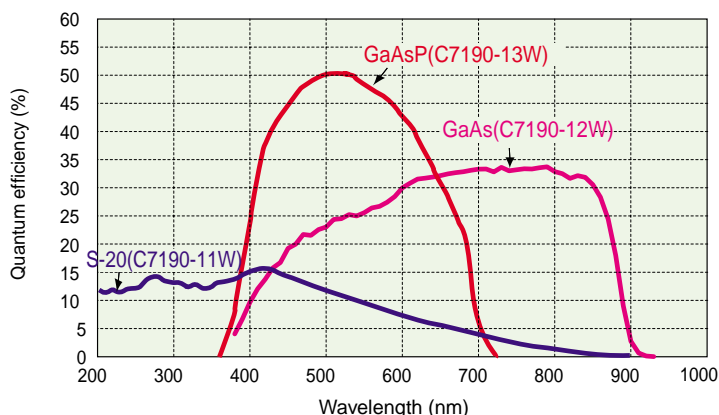
Two different implementations of this technology are available. A selection of photocathode materials is available for tailoring these cameras to almost any application.

This new technology is ideal for demanding applications such as genetic and bioscience research, materials research, laminar flow applications, and many physical sciences requiring the rapid acquisition of images at low light levels.

### SENSOR STRUCTURE



### SPECTRAL RESPONSE CHARACTERISTICS



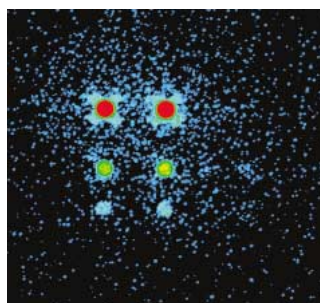
\* This is typical, not guaranteed.

### FEATURES

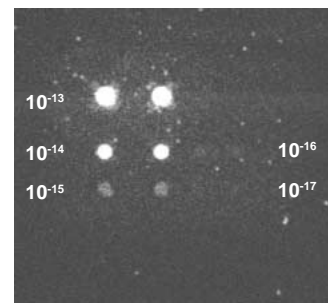
- Amplification gain of up to 1200 times
- High S/N Ratio
- Ultra-high sensitivity
- Dual scan digital type

### IMAGING EXAMPLE

Photon counting camera  
(With 2 MCPs: 5-minute exposure)



EB-CCD Camera  
(3-minute exposure)



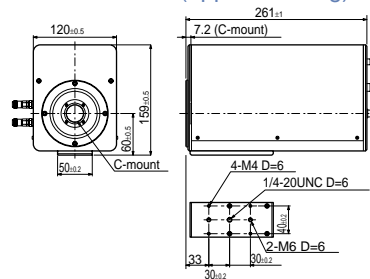
**Sample:** ATP luciferin-luciferase generated luminescence. 96 microplates have been diluted with 100ml of ATP solution mixed with 10 ml of L/L solution. (10E-13, 10E-14, 10E-15, 10E-16, 10E-17 mole/well.)

## SPECIFICATIONS

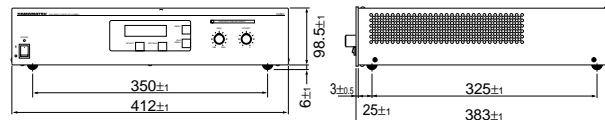
Type. Number	C7190-11W	C7190-12W	C7190-13W
CCD Structure	Back thinned full frame transfer CCD		
Total no. of pixels	512(H) × 512(V)		
Effective no. of pixels	512(H) × 512(V)		
Cell size	24 μm × 24 μm		
Effective area	12.3 mm × 12.3 mm / 1-inch format		
Readout noise	15 electrons r.m.s. (slow scan)		
Full well capacity	150,000 electrons (typ.)		
CCD dark current	8 electrons/pixel/s at -25 °C		
Frame rate	Slow scan: 3 Hz High scan: 5 Hz		
A/D converter	Slow scan: 12 bit High scan: 12 bit		
Gate function	10 μsec		
Gain	to 1200 times		
Sensitivity control	Possible		
System gain	Low: 36 electrons/count High: 15 electrons/count Super High: 4 electrons/count		
Cooling temperature	-25 °C		
Photocathode	S-20	GaAs	GaAsP
Sensor structure	Proximity focused type		
Data output	RS-422 digital out		
Camera controller	RS-232C		
Functions	Dual mode readout / Contrast enhancement		

## DIMENSIONAL OUTLINES (Unit: mm)

- Camera head (approx. 4.5 Kg)



- Camera controller (approx. 10 Kg)



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Specifications and external appearance are subject to change without notice.

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