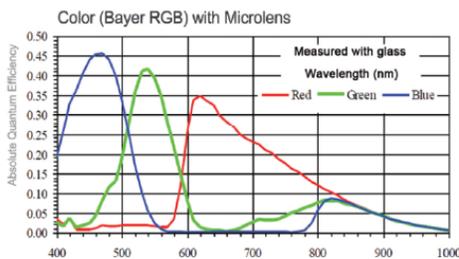


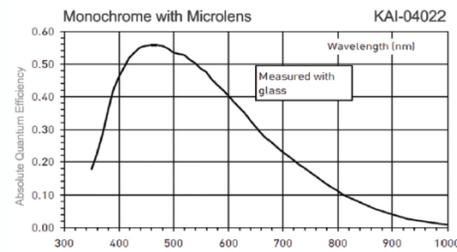
# Pressure Sensitive Paint Camera

(Product ID: PSP-CCD-C-4, PSP-CCD-M-4)

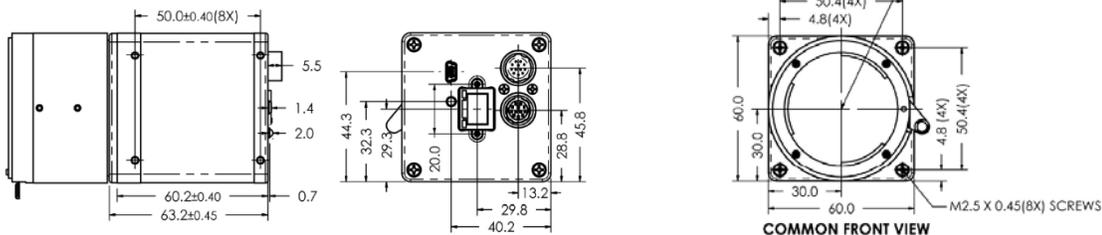
The PSP-CCD-C/M-4 is a 4-megapixel CCD camera designed to operate within a PSP system. The camera is small and lightweight, allowing for an array of cameras to be mounted in a tight place for larger scale models and applications. The camera is available with a color sensor or a monochrome sensor. The color camera is used in Binary PSP and particle shadow velocimetry applications (PSV) whereas the monochrome version is used in monochrome PSP or S3F applications. The binary pressure sensitive paint (PSP) system incorporates the color camera. Rather than use optical filters in front of the camera lens to separate the two binary PSP signals, the filtering is applied on the sensor using a standard Bayer filter. In the case of Binary FIB, the signal channel is acquired on the red pixels and the reference channel is acquired on the green pixels. All images are acquired through a single camera and lens and this process minimizes image alignment errors. This single sensor system also accomplishes a second goal, all data is acquired simultaneously, and thus the stability of the illumination source is a less significant issue. The major drawback of this approach is the loss of spatial resolution. In a color sensor, only 1/4 of the pixels are sensitive to the signal channel (red pixels) on the standard Bayer filter. Despite the loss of spatial resolution, the color camera approach produces excellent results at low speeds. The normal frame rate is 16 fps but can operate at 20 fps in overclock mode. The camera features a software trigger and external TTL trigger over BNC. The camera is compatible with Windows 7, Vista and XP both 32- and 64-bit. The PSP-CCD is packaged with ProAcquire data acquisition software.



Quantum Efficiency of Color Sensor



Quantum Efficiency of Monochrome Sensor



Innovative Scientific Solutions, Inc.  
7610 McEwen Road, Dayton, OH 45459  
Phone (937) 630-3012 Fax (937) 630-3015

email: [issi-sales@innssi.com](mailto:issi-sales@innssi.com)  
web: [www.psp-tsp.com](http://www.psp-tsp.com)

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## SPECIFICATIONS

### Sensor

Resolution	2048 x 2048 (active)
Type	KAI-04022 CCD
Format	15.21 mm (H) x 15.24 mm (V), 21.3 mm diagonal (4/3" optical format)
Pixel Size	7.4 $\mu\text{m}$
Frame Rate	16 fps (40 MHz) Standard clock 20 fps (50 MHz) Overclocked
Electron Full Well Capacity	40,000 $e^-$
Readout Noise (f = 10 MHz)	9 $e^-$ rms
Dynamic Range	72dB
Output Format(s)	8, 12, 14-bit (single AD only)
Binning H/L	1x, 2x, 3x, 4x, 8x
Interframe Transfer Time	200 ns
Maximum Exposure	16 seconds

### Trigger

Inputs	External (TTL via IN1/IN2), software, computer
Options	Level, edge, pulse width, internal exposure
Modes	Free-run, standard, double, frame accumulation
Strobe Output	Programmable position and duration

### Communication

Interface	GigE
On Board Memory	None
Software Interface	ProAcquire
Lens Control	Available in ProAcquire (LC-2 integration)

### Environmental

Vibration/Shock	100g
Operating Temperature Range	-40°C to 85°C
Humidity	10% to 90% non-condensing

### Size & Weight

Size	60 mm (L) x 60 mm (H), 63.2 mm (L)
Operating Temperature Range	-40°C to 85°C
Humidity	10% to 90% non-condensing
Weight	377 grams
Lens Mount	F-mount, c-mount, M42-mount

### Power Requirements

External Power Input	12V $\overline{\text{---}}$ 2A
Power Consumption	5.7 W

### Export

ECCN	EAR99
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