

POWERVIEW™ CCD CAMERAS FOR PIV AND PLIF MEASUREMENTS

The latest PowerView™ CCD camera series from TSI is built to meet the most challenging applications for Particle Image Velocimetry (PIV) and Particle Laser Induced Fluorescence (PLIF). The series offers a wide variety of pixel resolutions from 4 million to 29 million and with frame rates up to 32 fps at full resolution. All the cameras provide short frame straddling time, high quantum efficiency and low background noise for excellent PIV and PLIF image captures. The frame rate of the camera can be increased by using the Region of Interest selection or hardware binning function in the camera. The increase in frame rate allows the camera to be used in some time-resolved measurements with higher sensitivity. All the cameras come standard with a Nikon® 50-mm lens, frame grabber, all interface cables, and power supply unit.



Unique for PLIF

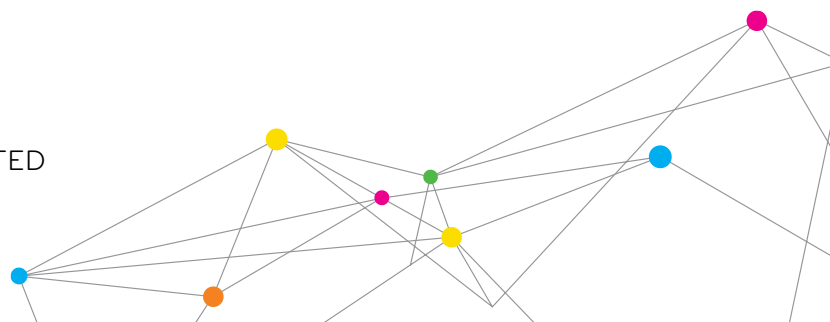
The hardware binning function is particularly important in PLIF applications for high resolution and quantitative intensity measurements. Many of the cameras also offer selectable 12-bit or 14-bit dynamic range which increases the intensity dynamic range for better detection of seed particles and dye concentration resulting in more accurate velocity and scalar quantity measurements respectively.

Upgradability to Volumetric PIV

Adding cameras to perform stereo or volumetric PIV (V3V™ System) measurements is simple and straightforward. Upgrading to TSI's V3V System, requires the V3V Precision Mounting Plate as well as additional cameras. TSI offers affordable upgrade packages to upgrade old cameras for current generation models to maximize your system capability.



UNDERSTANDING, ACCELERATED



COMPACT AND
RUGGED DESIGN
WITH STABLE
TEMPERATURE
CONTROL FOR
ENVIRONMENTS
WITH LARGE
TEMPERATURE
AND HUMIDITY
RANGES



Camera	Characteristics and functions
Model 630090 4MP-LS	For PIV image capture with increased frame rate using Region of Interest – with pixel resolution of 2360 x 946 (2.2 MP), frame rate increases to 30 fps
Model 630091 4MP-HS	For PIV and V3V flow measurements at 32 fps, providing the optimal frame rate with many high energy 15 Hz Nd:YAG lasers – high resolution and time resolved capture capability
Model 630092 8MP	For PIV and V3V image capture with high spatial resolution and increased field of view for turbulent flows – with pixel resolution of 3320 x 1560 (5.2 MP), frame rate increases to 16 fps
Model 630093 16MP	For large field of view measurements high spatial resolution – with pixel resolution of 4920 x 2260 (11.1 MP), frame rate increases to 6.1 fps
Model 630094 29MP	For large format Field of View with unsurpassed resolution – resolving the smallest turbulent structure or the finest concentration profile

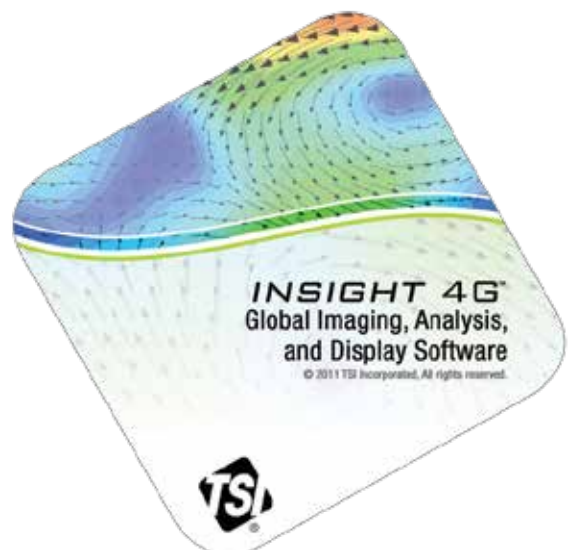
FROM PIV TO V3V
CAMERAS IN PIV SYSTEMS ARE
THE SAME AS THOSE FOR V3V!





CAMERA DRIVEN BY INSIGHT 4G™ GLOBAL IMAGE ACQUISITION, ANALYSIS AND DISPLAY SOFTWARE

The Insight 4G software package is the driver for all the new Powerview cameras. Faster, more robust, and with added capabilities, Insight 4G™ Software provides the complete PIV and PLIF software platform operating on Windows® 7 64-bit operating systems capable of controlling a wide range of hardware and quickly analyzing results. Insight 4G Software contains full control of the new Powerview cameras from the user interface, meaning that once the camera is turned on, image capture synchronization is controlled completely through the software. In addition to hardware control, Insight 4G Software performs all types of velocity analysis with the latest state-of-the-art algorithms for 2D PIV, PTV, Stereo PIV, TSI-patented MicroPIV, as well as size shape analysis (SSA) and Global Sizing Velocimetry (GSV). In PLIF applications, the software provides measurement of scalar quantities such as temperature, concentration, and even spray pattern assessment.



SPECIFICATIONS

CAMERA MODELS; 630090, 630091, 630092, 630093 AND 630094

Features	630090	630091	630092	630093	630094
Description	4MP-LS	4MP-HS	8MP	16MP	29MP
Sensor Device	Progressive Scan Interline CCD with Microlens				
Pixel Resolution	2352 x 1768 Pixels	2048 x 2048 Pixels	3320 x 2496 Pixels	4920 x 3288 Pixels	6600 x 4400 Pixels
Pixel Size	5.5 μm x 5.5 μm	7.4 μm x 7.4 μm	5.5 μm x 5.5 μm		
Sensor Size	12.9 mm x 9.7 mm	15.2 mm x 15.2 mm	18.3 mm x 13.7 mm	26.9 mm x 17.9 mm	36.3 mm x 24.2 mm
Intensity Dynamic Range	12-bit or 14-bit selectable	12-bit	12-bit or 14-bit selectable	12-bit or 14-bit selectable	12-bit
Frame Rate	16 fps	32 fps	8.5 fps	3.1 fps	3.6 fps
Max frame rate	126 fps	256 fps	72 fps	21 fps	26 fps
Binning H & V	2x, 4x, 8x				
Shutter speed	2 μs to 0.125 s			4 μs to 0.33 s	8 μs to 0.285 s
Integration time	Up to 16 s				
Region of Interest	Selectable from 16 x 2 to 2352 x 1768	Selectable from 16 x 2 to 2048 x 2048	Selectable from 16 x 2 to 3320 x 2496	Selectable from 16 x 2 to 4920 x 3288	Selectable from 16 x 2 to 6600 x 4400
Trigger modes	Single; Frame straddling				
Video output	CameraLink with Mini CL interface	Dual CameraLink with Mini CL interface	CameraLink with Mini CL interface	CameraLink with Mini CL interface	Dual CameraLink with Mini CL interface
Quantum Efficiency	46% (480 nm)	52% (500 nm)	46% (480 nm)	47% (515 nm)	47% (515 nm)
Read Noise	8 electron RMS				
Frame Straddle Time	195 ns				990 ns
Lens Mount	C-Mount or F-Mount with adaptor	F-Mount			
Camera Interface	64-Bit Camera Link	64-Bit Camera Link-dual	64-Bit Camera Link	64-Bit Camera Link	64-Bit Camera Link-dual
Standard Camera lens	Nikon 50 mm F1.8 Lens				
Operating Temperature	-40° to 85° C				
Humidity	10% to 90% non-condensing				
Size (W x H x L)	76 x 76 x 54.6 mm	76 x 76 x 50 mm	76 x 76 x 43 mm	76 x 76 x 50 mm	76 x 76 x 50 mm
Regulatory compliance	FCC 15 part A, CE, RoHS				
Voltage	12 VDC				

Specifications are subject to change without notice.

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