isvi

Smart Sensor Solutions

PRODUCT

CATALOG

2019 VOL.1

PRODUCT OVERVIEW

isvi
Smart Sensor Solutions

ISVI is a forerunner in the design and construction of advanced high-speed, high-resolution camera technology

ISVI cameras deliver the resolution, accuracy, speed and return-on-investment required for advanced imaging system design in many demanding application areas ranging from flat panel display, semiconductor, solar wafer and secondary battery inspection, to 3D & 2D metrology, factory automation, bio-medical, aerospace, robotics, microscopy, sports & entertainment, film scanning and virtual reality content.

ISVI RAZOR models	IC-M12RZ-CX1 IC-C12RZ-CX1	IC-M16RZ-CX1 IC-C16RZ-CX1	IC-M25RZ-CX1 IC-C25RZ-CX1	IC-M26RZ-CX1 IC-N26RZ-CX1 IC-C26RZ-CX1
Resolution	4096(H) x 3072(V), 12.6Mpx	4096(H) x 4096(V), 16.8Mpx	5120(H) x 5120(V), 26.2Mpx	5120(H) x 5120(V), 26.2Mpx
Sensor	CMOSIS CMV12000	OnSemi Vita16K	OnSemi Vita25K	OnSemi Python25K
Active Area Dimensions (mm)	22.50 H / 16.90 V / 28.10 Ø	18.43 H / 18.43 V / 26.06 Ø	23.04 H / 23.04 V / 32.58 Ø	23.04 H / 23.04 V / 32.58 Ø
Pixel Size	5.5µm2	4.5µm2		
Chroma	Mono / Color			Mono / Ext. NIR / Color
Frame Rate in 8-bit output	181Hz	124Hz	72Hz	81Hz
Output Format	Mono8, BayerRG8	Mono8/10, BayerRG8/10		
CoaXPress Interface	CXP6: 4 Links	CXP6: 1, 2 and 4 Links, CXP3: 2 and 4 Links		
Dynamic Range @ Full Well	60dB @ >12K e⁻	53dB @ >19K e⁻	56dB @ >22K e⁻	59dB @ 12K e⁻
Exposure Mode	Continuous - Trigger Timed - Trigger Width			
Exposure Control	Programmable from 3 µsec to 10 sec in 1 µsec steps			
Trigger Control	Programmable Period in 1 µsec steps, External PWC			
Gain Control	Digital fine gain 1x - 10x in 0.001 steps			
Image Control	PRNU Correction, FFC Correction, Defect Pixel Correction			
Programmable Functions	Exposure Start Delay Strobe Pulse Start Delay & Width Region of Interest User Calibration Areas			
Lens Mount	F-Mount, M42, M72, Custom OEM			
Environmental Operating Conditions	0°C to +40°C, extended temp. possible with reduced performance 20% - 90% non-condensing 25G (Half sine 6-10ms XYZ) / 10G (5-150Hz, 1min, XYZ)			
Storage Temperature	-10°C to +70°C			
Power Requirements	24VDC Power over CXP (PoCXP) <13W			
Dimensions (H x W x L in mm)	80 x 80 x 46.2 without lens mount			
Weight	~506g (including F-Mount)			
Compliancy	CoaXPress 1.1/1.0, GenICam, RoHS, CE, FCC			

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RAZOR series Highlights

Resolution
The most popular resolutions for critical applications
Large field of views
High magnification without loss of measurement fidelity

Accuracy
Accurate, automatic image correction engine
Precise and stable multi-axis sensor alignment
More pixels for defect identification

Speed
Increased inspection throughput
Faster frame rate, transferring images in less time
Higher transfer speeds, more time for image processing

Return-on-investment
Industry-best price/performance
Affordable performance upgrades to existing CL systems
Throughput, Accuracy and Reliability

High-Resolution Sensors

12MP, 16MP, 25MP

Global Shutter CMOS

High-Speed Frame Rates

181fps, 124fps, 72fps, 81fps

CoaXPress CXP6

Monochrome, NIR* & Color

Automatic FFC & DPC correction

8/10*-bit Output Resolution

*not all models

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CXP Series Models	IC-M50S-CXP IC-C50S-CXP	IC-M50T-CXP IC-C50T-CXP	IC-C18N-CXP IC-C18R-CXP
Resolution	7920 H x 6004 V		4192 H x 3684 V
Sensor	CMOSIS CMV50000 Global Shutter		OnSemi AR1820HS, BSI
Active Area Dimensions (mm)	36.43 H / 27.62 V / 45.72 Ø		5.24 H / 4.60 V / 6.98 Ø
Pixel Size	4.6µm²		1.25µm²
Chroma	(M) Mono / (C) Color		Color
Frame Rate in 8/10/12-bit output	31Hz		24Hz
Output Format	Mono8/10/12, BayerRG8/10/12		BayerRG8
CoaXPress Interface	CXP6: 1, 2 and 4 Links		CXP6, 1 Link
Dynamic Range @ Full Well	64dB @ 14.5Ke⁻		65.8dB @ 12Ke⁻
Exposure Mode	Continuous - Trigger Timed - Trigger Width		
Exposure Control	Programmable from 3 µsec to 10 sec in 1 µsec steps		
Trigger Control	Programmable Period in 1 µsec steps, External PWC		
Gain Control	Digital fine gain 1x - 10x in 0.001 steps, Gamma		Analog Gain 0dB-21dB, 21 Steps
Image Control	PRNU Correction, FFC Correction, Defect Pixel Correction		Defect Pixel Correction, Auto- and Manual White Balance
Programmable Functions	Exposure Start Delay, Strobe Pulse Start Delay & Width Region of Interest, User Calibration Areas		Region of Interest User Calibration Areas Reverse X and Y
Special Feature	Compact Size	Dynamic Thermoelectric Cooling	18N with std. housing + I/O port 18R with 20cm Remote Head
Lens Mount	F-Mount, M72, Custom OEM		18N: C-mount, 18R : CS-Mount
Environmental Operating Conditions	0℃ to +40℃, extended temp. possible with reduced performance, 20% - 90% n on-condensing 25G (Half sine 6-10ms XYZ) / 10G (5-150Hz, 1min, XYZ)		
Storage Temperature	-10℃ to +70℃		
Power Requirements	24VDC Power over CXP (PoCXP) 2-Links, or regulated 2A external power supply	24VDC regulated 2A external power supply (no PoCXP)	24VDC regulated 2A "N" external and PoCXP "R" PoCXP only
Dimensions (H x W x L) in mm with lens mount and connectors	80 x 80 x 96	90 x 90 x 135	18N: 65 x 65 x 44.8 18R : 30 x 36 x 22.5 Head + 70.5 x 71 x 18.5 Base Unit
Weight including F-Mount	580g	1047 g	18N: 211g / 18R: 125g
Compliancy	CoaXPress 1.1/1.0, GenICam, RoHS, CE, FCC		

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IC-X50S/T-CXP Highlights

Performance
The highest output linearity of any 12-bit 50MP camera
Wide dynamic range and low noise for critical applications

Resolution
~50MP of resolution in a 35mm format (36 x 27mm)
Large field of views and superior accuracy

Speed
31fps means increased inspection throughput
Higher transfer speeds, more time for image processing

Award-Winning Camera with Thermoelectric Cooling (TEC)
IC-X50T-CXP
TEC dynamically controlled to maintain stable sensor temp.
Works in varying ambient temperatures
Creates reproducible measuring results
Long exposure times without induced thermal noise

IC-C18N/R-CXP Highlights

Performance
Fast, contrast-rich color images
Precise and stable multi-axis sensor alignment
Wide dynamic range and low noise for critical applications

Resolution
~18MP of resolution in a 1/2.5" optical format
Large field of views and superior accuracy
High magnification without loss of measurement fidelity

Speed
Reduced user-defined ROI for even faster frame rates
Fast rolling shutter CMOS sensor with 24fps
Single CXP connection for easy multi-camera systems

Remote Head version (IC-C18R-CXP)
Compact remote sensor head for restrictive spaces
True single-cable solution

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CL Series Cameras	IC-M29A-CL IC-M29T-CL	IC-M25B-CL IC-C25B-CL	IC-M25N-CL IC-C25N-CL	IC-M16A-CL IC-C16A-CL
Resolution	6576(H) x 4384(V), 28.8Mpx	5120(H) x 5120(V), 26.2Mpx	5056(H) x 5056(V), 25.5Mpx	4096(H) x 4096(V), 16.8Mpx
Sensor	OnSemi KAI-29050 Class1 CCD	OnSemi Vita25K global shutter CMOS	OnSemi Vita25K global shutter CMOS	OnSemi Vita16K global shutter CMOS
Active Area Dimensions (mm)	36.17 H / 24.11 V / 43.70 Ø	23.04 H / 23.04 V / 32.58 Ø	22.75 H / 22.75 V / 32.18 Ø	18.43 H / 18.43 V / 26.06 Ø
Pixel Size	5.5μm2	4.5μm2		
Chroma	Mono	Mono / Color		
Frame Rate	4.5Hz in all output formats	32Hz @ 8bit	29Hz @ 8bit	47Hz @ 8bit
Output Format	Mono8/10/12	Mono8 and BayerRG8	Mono8/10 and BayerRG8/10	Mono8 and BayerRG8
Camera Link Interface	2-Tap Base Configuration 80MHz	Full & Deca (80bit) Configuration 80MHz		
Dynamic Range	64dB @ 20K e⁻	56.2dB @ >22K e⁻		53dB @ >19K e⁻
Sensitivity (Sensor Mfr. Spec.)	34 uV/e- (550nm)	3.4 V/lux.s (550 nm)		3.1 V/lux.s (550 nm)
Exposure Mode	Continuous - Trigger Timed - Trigger Width			
Exposure Control	Programmable from 3 μsec to 10 sec in 1 μsec steps			
Trigger Control	Programmable Period in 1 μsec steps, External PWC			
Gain Control	Analog and Digital fine gain			
Image Control	FFC/PRNU Correction, Defect Pixel Correction			
Programmable Functions	Exposure Start Delay Strobe Pulse Start Delay & Width Region of Interest, User Calibration Saving Areas			
Lens Mounts	F-Mount, M72, M42, Custom OEM			
Environmental Operating Conditions	0℃ to +40℃, extended temp. possible with reduced performance 20% - 90% non-condensing 25G (Half sine 6-10ms XYZ) / 10G (5-150Hz, 1min, XYZ)			
Storage Temperature	-10℃ to +70℃			
Power Requirements	12VDC ± 10%, 14.4W, ≤ 50mV Ripple			
Dimensions (H x W x L mm) w/o lens mount and connectors	29S: 90 x 90 x 52 29T: 90 x 90 x 100	82 x 82 x 46		
Weight including F-Mount	29A: 957g 29T: 1148g	675g		
Compliancy	Camera Link, RoHS, CE, FCC			

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CL Series Highlights

Resolution
The most popular resolutions for critical applications
Large field of views
High magnification without loss of measurement fidelity

Accuracy
Accurate, automatic image correction engine
Precise and stable multi-axis sensor alignment
More pixels for defect identification

Speed
Increased inspection throughput
Faster frame rate, transferring images in less time
Higher transfer speeds, more time for image processing

High-Resolution Sensors

16MP, 25MP, 29MP

Global Shutter CMOS & CCD

High-Speed Frame Rates

47fps, 32fps, 29fps, 4.5fps

Camera Link®

Monochrome & Color*

FFC/PRNU & DPC correction

8/10*/12*-bit Output Resolution

*not all models

T C L s e r i e s l e n s e s

ISVI TCL Bi-Telecentric Lens

Product Name	Magnification	Lateral Resolution[1] (µm)	NA[2]	F-NO	WD (mm)	DOF[3] (± mm)	Sensor Size Ø (mm)	Mount	Pixel Resolution (µm)	Optical Distortion (%)	FOV (mm)
ISVI10-TCL-0.09-270-5P6	0.092	41	0.0082	5.6	270	3.3	8	C	13.6	<0.5	66.92 X 50.19
ISVI10-TCL-0.12-230-5P6	0.125	30.2	0.0111	5.6	230	1.8	8	C	10	<0.5	49.27 X 36.96
ISVI10-TCL-0.17-210-5P6	0.17	22.1	0.0152	5.6	210	1	8	C	7.3	<0.5	36.04 X 27.03
ISVI15-TCL-0.22-295-007	0.225	20.9	0.0161	7	295	2.5	25	M42	20	<0.11	78.08 X 78.08
ISVI15-TCL-0.22-295-008	0.225	23.9	0.0141	8	295	2.8	25	M42	20	<0.11	78.08 X 78.08
ISVI15-TCL-0.24-175-011	0.24	30.8	0.0109	11	175.1	3.4	25	F	18.8	<0.2	73.2 X 73.2
ISVI15-TCL-0.30-250-007	0.3	15.7	0.0214	7	250	1.4	25	M42	15	<0.1	58.56 X 58.56
ISVI15-TCL-0.30-250-008	0.3	17.9	0.0188	8	250	1.6	25	M42	15	<0.1	58.56 X 58.56
ISVI15-TCL-0.45-210-008	0.45	11.9	0.0281	8	210	0.7	25	M42	10	<0.1	39.04 X 39.04
ISVI15-TCL-0.45-210-009	0.45	13.4	0.025	9	210	0.8	25	M42	10	<0.1	39.04 X 39.04
ISVI15-TCL-0.75-174-012	0.75	10.7	0.0313	12	174.4	0.4	25	M42	6	<0.2	23.43 X 23.43
ISVI25-TCL-0.58-210-009	0.584	10.3	0.0325	9	210	0.5	33	M72	7.7	<0.05	39.43 X 39.43
ISVI25-TCL-0.58-210-010	0.584	11.5	0.0292	10	210	0.5	33	M72	7.7	<0.05	39.43 X 39.43
ISVI25-TCL-0.75-210-012	0.75	10.7	0.0313	12	210	0.4	33	M72	6	<0.1	30.72 X 30.72
ISVI25-TCL-1.13-210-012	1.125	7.2	0.0469	12	210	0.2	33	M72	4	<0.1	20.48 X 20.48

[1] Lateral Resolution @ 550nm Wavelength = 0.61 * 550 / NA

[2] NA = Magnification / (FN * 2)

[3] DOF = 2 * ((Pixel Size * 2 * FN) / Magnification^2)

Usable Wavelength: 450 – 650nm

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TCL Series Bi-Telecentric Lens Highlights

The perfect optical match to ISVI cameras

Designed for precise 2D & 3D measurement and metrology applications
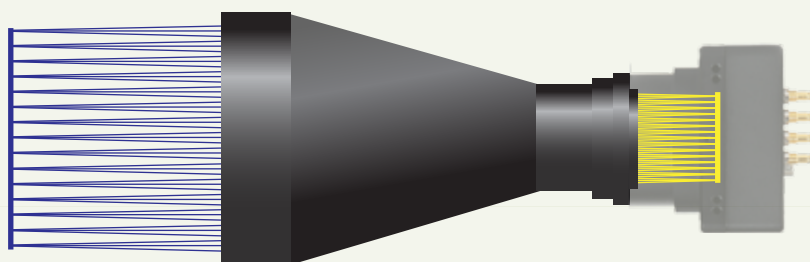
Designed for high-resolution, large format sensors

Precise, field-tested quality and reliability

Shock and vibration resistant

C-mount, F-mount, M42, M72

Best Price/Performance Ratio

Custom OEM optical & mechanical design available

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Application Area	Important Camera Attributes	RAZOR Series	CXP Series	CL Series	TCL Lenses
Flat Panel Display inspection	Ultra Hi-Res, Speed not important		✓	✓	✓
LED/OLED Package Inspection	Hi-Res and Speed	✓	✓	✓	✓
Semiconductor Wafer Inspection	Hi-Res and Speed	✓	✓	✓	✓
Solar Wafer Inspection	Hi-Res and Speed	✓	✓	✓	✓
Automated Optical Inspection	Hi-Res and Speed	✓			✓
Solder Past Inspection	Hi-Res and Speed	✓			✓
Semiconductor Package Inspection	Hi-Res and/or Speed	✓	✓	✓	✓
2D/3D Metrology Inspection	Hi-Res and/or Speed	✓	✓	✓	✓
General Factory Automation	Hi-Res and/or Speed	✓	✓	✓	✓
Automated Digital Pathology	Hi-Res and Speed, Great Color	✓	✓	✓	✓
Aerial Imaging	Ultra Hi-Res, Speed can be important	✓	✓	✓	
Augmented Reality Content	Hi-Res and Speed, Great Color	✓	✓	✓	
Film Scanning & Archiving	Ultra Hi-Res and Speed, Great Color	✓	✓		
Sports & Entertainment	Hi-Res and Speed, Great Color	✓	✓		
Microscopy	Hi-Res, Speed can be important	✓		✓	
Scientific Imaging	Ultra Hi-Res, Speed can be important	✓	✓	✓	✓

Attributes making ISVI cameras suitable for a wide range of demanding applications

Resolution

12MP, 16MP, 18MP, 25MP, 29MP, 50MP - the right resolution for every high-end application requirement.
Match the imaging requirements to the sensor resolution. Either a larger FOV with the same pixel/mm as a lower resolution camera, or the same FOV with a higher pixel/mm value for increased accuracy and smaller defect detection.

Accuracy

Accurate, automatic image correction engine providing dark and bright image uniformity under all conditions.
Best possible sensor output linearity equates to repeatable measurement results under a wide contrast range.
Precise and stable multi-axis sensor alignment for consistent inter-camera mechanical-optical alignment.

Throughput

Frame rates from 24fps to 181fps in full frame output to match application requirements.
User programmable Region of Interest (ROI) to further increase frame rates.
Faster frame rates equal less time for image acquisition and transfer, and more time for image processing

Ease-of-Use

Industry standard CoaXPress and Camera Link interfaces.
CoaXPress cameras offer the use of long cable lengths meeting most application requirements.
CoaXPress cameras are easy to integrate into multiple camera systems with deterministic synchronization.
CoaXPress frame grabbers available to match the required output number; 1, 2, 4, or 8-ports

Return-on-Investment

With an increase in resolution, accuracy, throughput, system flexibility for upgading and expansion, all in addition to the best price/performance ratio, ISVI cameras bring a very quick ROI to any imaging system designed for today and the future.

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