INSNEX

DEFECT IMAGING EXPERT

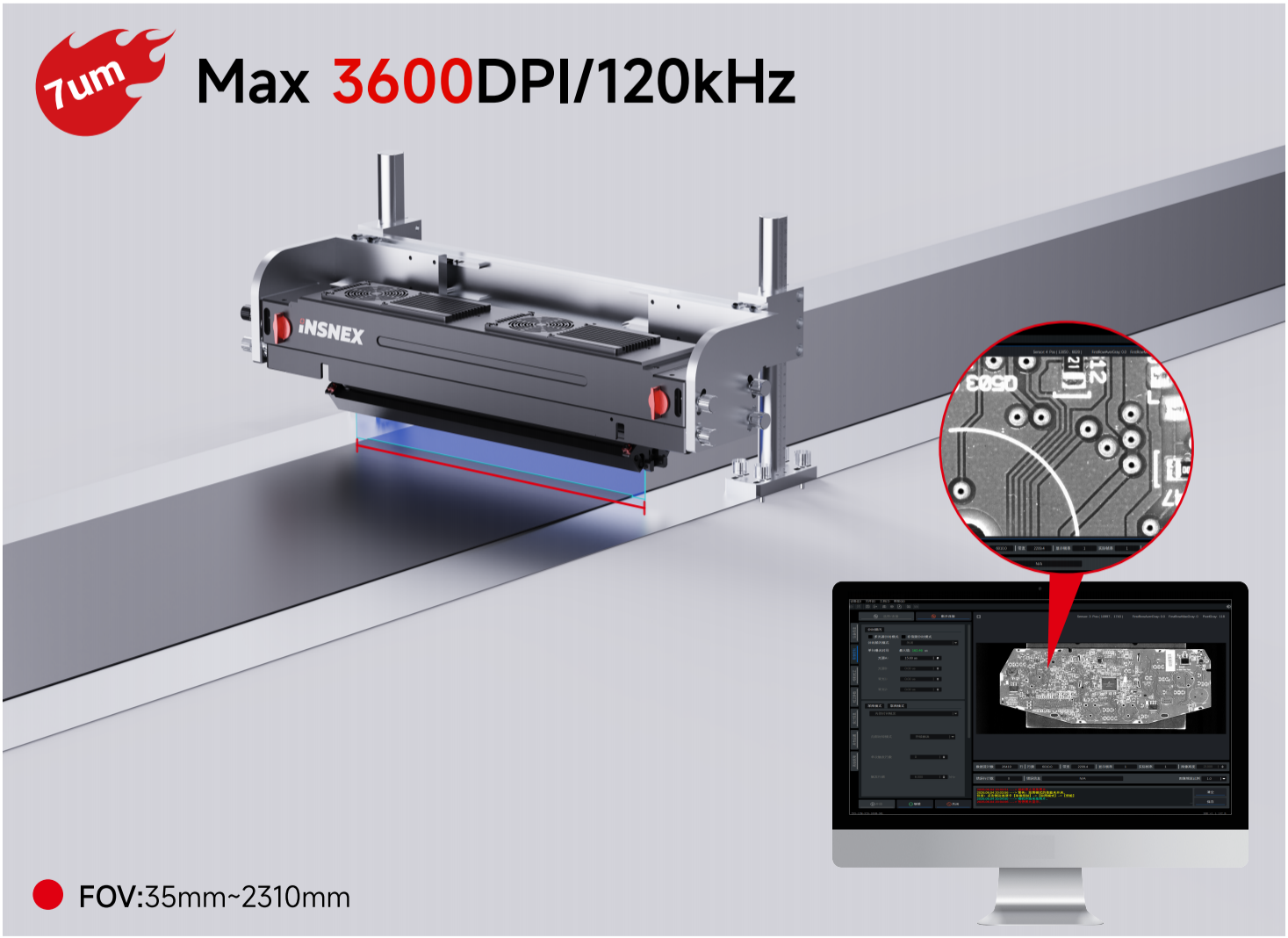
LineX Series NFL

Make Space Smaller



High Speed
Compact Space
No-Distortion Imaging

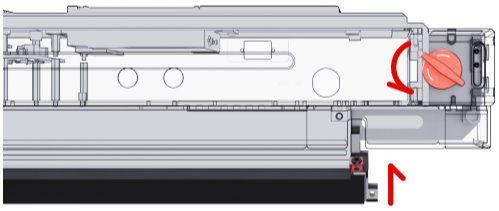
LineX Introduction

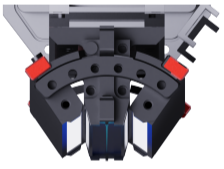




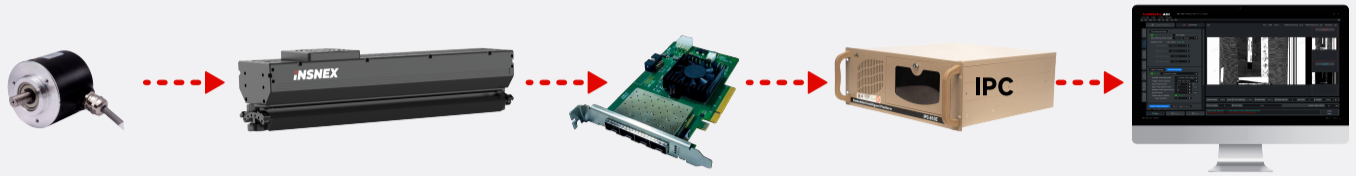
← Patented built-in dual-side precision focusing design

Compact design with integrated dual-strip front lighting ↓



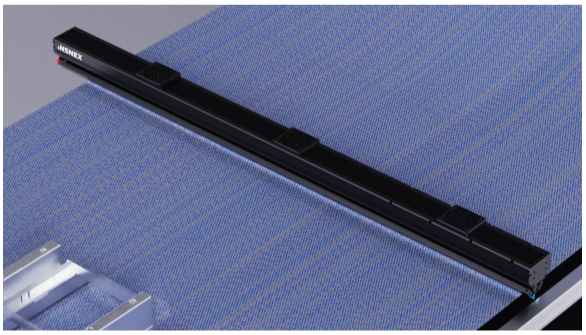


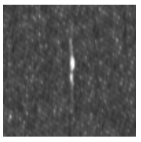
Typical System Configuration of LineX

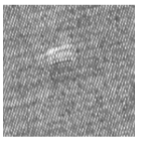


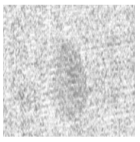
Application Cases

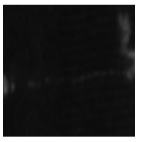
Fabric Inspection

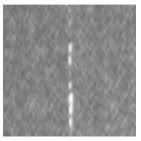


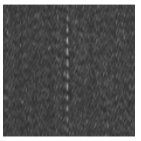

Weave Structure

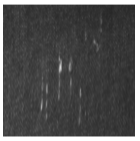

Block Defect

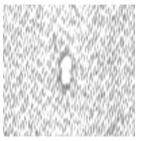

Oil Stains


Shrinkage

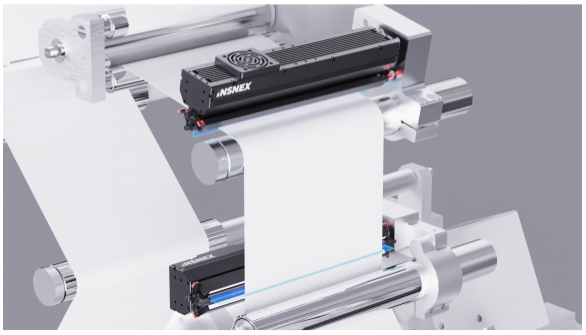

Foreign Fibers


Rough Warp


Warp and Weft Structure


Sizing

Surface Inspection of Battery Separator

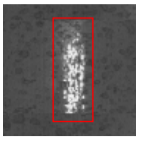


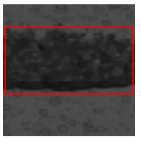

White Spots


Fracture

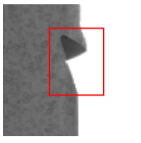

Folding


Dripping Adhesive

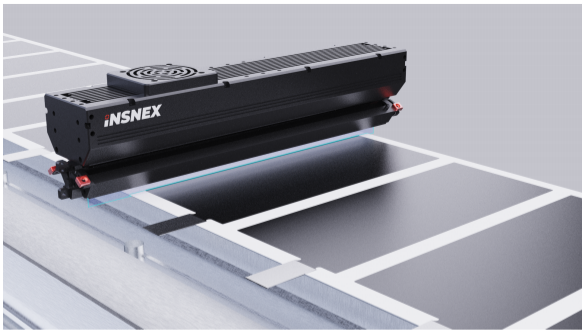

Missing Coating

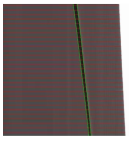

Offset Printing

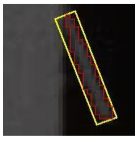

Black Spots

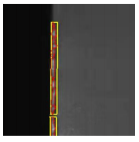

Edge Damage

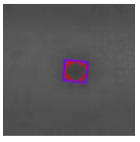
Surface Inspection of Electrode Sheets

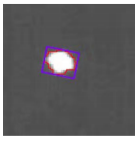



Wrinkles

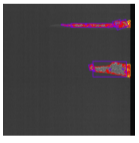

Burrs

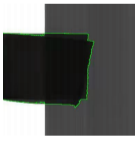

Edge Coating Peeling

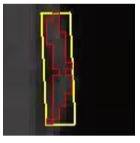

Dents


Adhesive Peeling

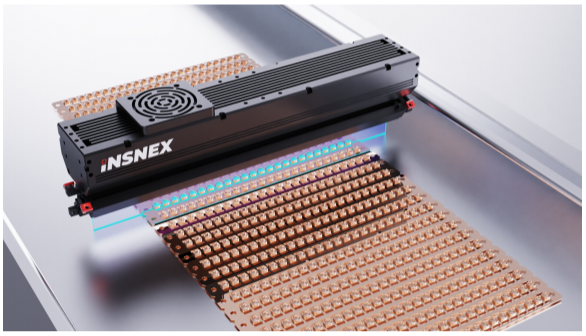

Adhesive Peeling

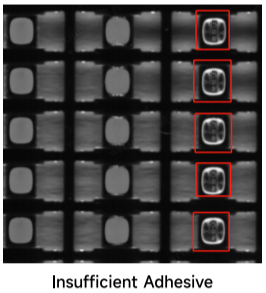

Output Hole

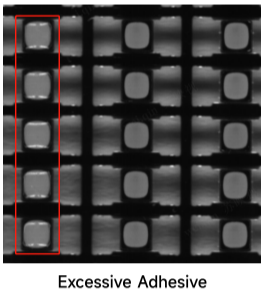

Foreign Object

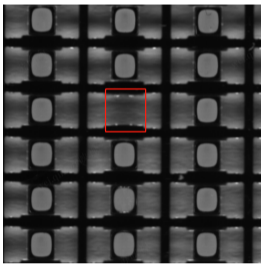

Edge Fracture

Electronic Components Inspection



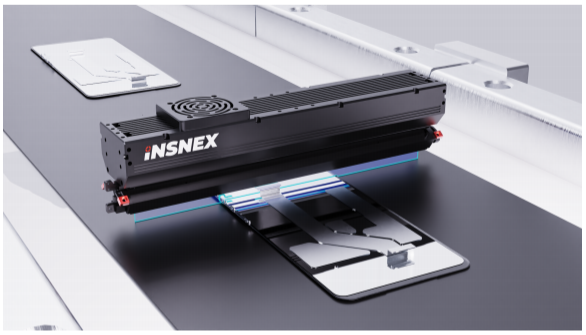

Insufficient Adhesive


Excessive Adhesive


Damage

Application Cases

Screen Surface Inspection

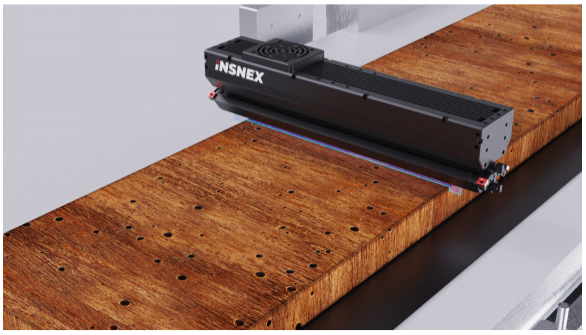


During the production of mobile phone displays, it's important to detect surface defects like bubbles and scratches. Bubbles with low contrast are hard to detect using regular imaging, but LineX can clearly show them.

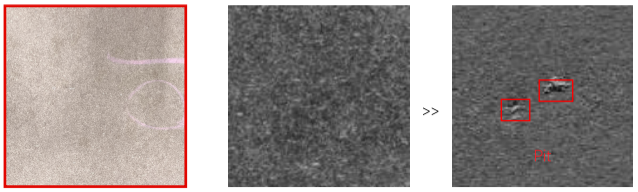


Test object | Traditional camera | LineX

Wood Surface Inspection

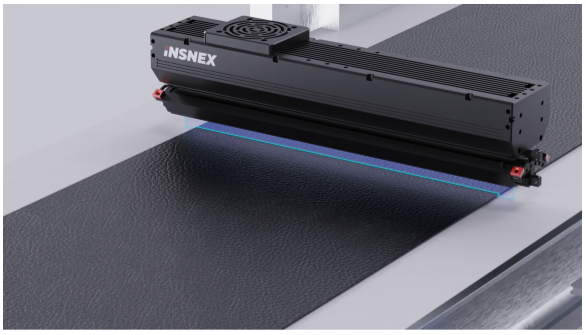


The original color of wood can mask defect features, making them hard to distinguish with the naked eye. LineX can filter out unnecessary patterns and clearly display defects.



Test object | Traditional camera | LineX

Leather Surface Inspection



Common defects found on leather include loose stitches, improper fitting, insect eggs, pinholes, and blemishes. LineX can capture invisible texture details.



Test object | Traditional camera | LineX

Keyboard Frame Inspection



The creases on the keyboard frame are shallow, making it difficult for traditional 2D imaging techniques to identify the defect. LineX clearly displays the defect features for inspection.



Test object | Traditional camera | LineX

Application Cases

Printing Industry | Offset Printing and Color Management





LineX Serise COLOR NFL excels in high-precision color recognition and clear imaging, accurately reproducing the subtle color differences and complex pattern structures of banknotes. Through advanced imaging technology and pre e color correction, the texture, pattern and anti-counterfeiting mark of each banknote can be clearly captured.

Printing Industry | Packaging Material Appearance Inspection



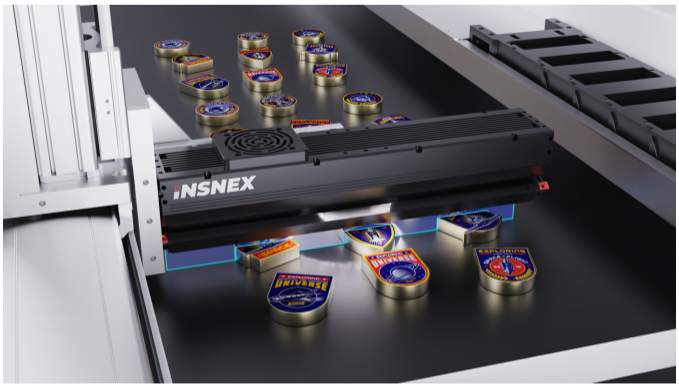


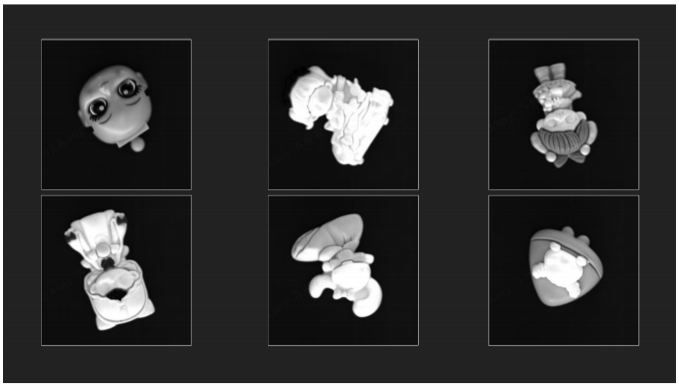


Relying on the 600dpi/900dpi trilinear true-color high-speed NFL, the multi-light source 2.5D fusion imaging technology and advanced AI algorithm are integrated to accurately identify dozens of defects such as surface dirt, scratches, printing defects, foreign objects and flaws in the sealed area of packaging materials. The system has strong anti-interference ability, effectively overcoming the misjudgment caused by material shake and wrinkle, ensuring the full-scale quality check under the high-speed production line, and significantly enhancing customer value.

Application Cases

Digital Printing Industry | UV Printer Guiding



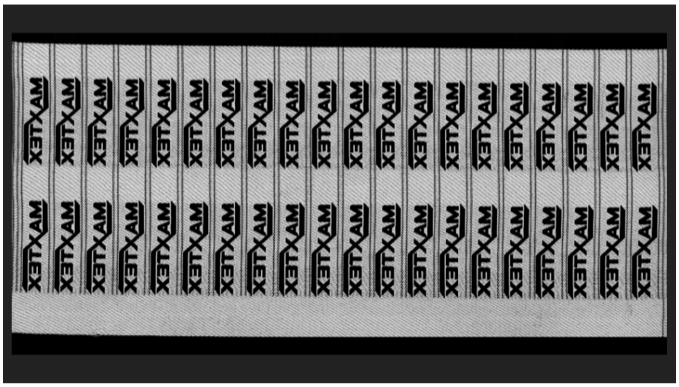




Using a 600 dpi NFL instead of the traditional setup enables 1:1 distortion-free imaging. The system captures fabric edge features in real time, processes the images to automatically identify cutting lines or reference points, tracks fabric deformation, and corrects the path through software to ensure cutting accuracy.

Machinery Industry | Cloth Cutting Guiding



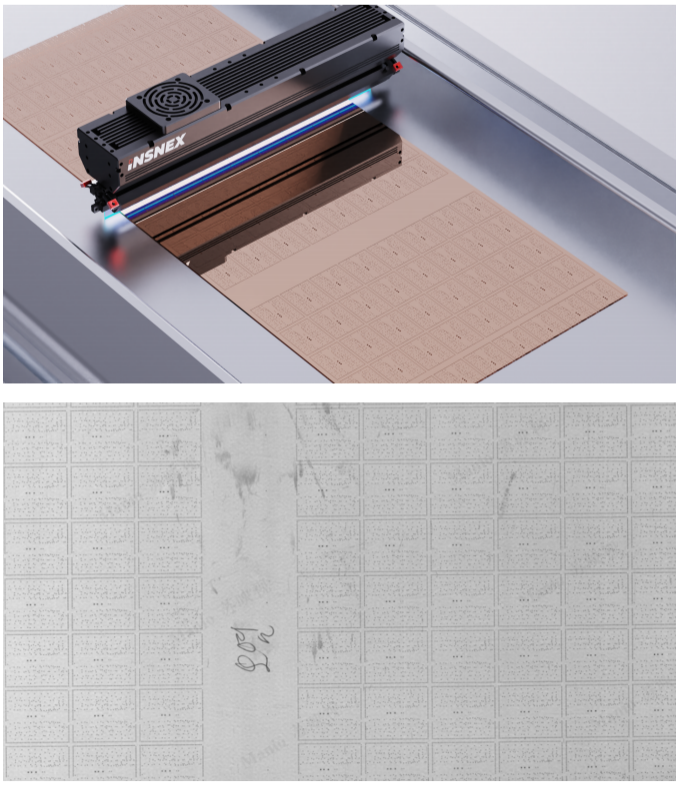




A high-resolution 600dpi NFL is used to replace the traditional line scan camera and telecentric lens to achieve 1:1 distortion-free imaging. The customer collects the edge features of the cloth in real time, and combines digital signal processing technology to process the image data to automatically identify the cutting line or locate the feature point. The system can automatically track the tensile deformation of the fabric and correct the path through computer software to ensure cutting accuracy.

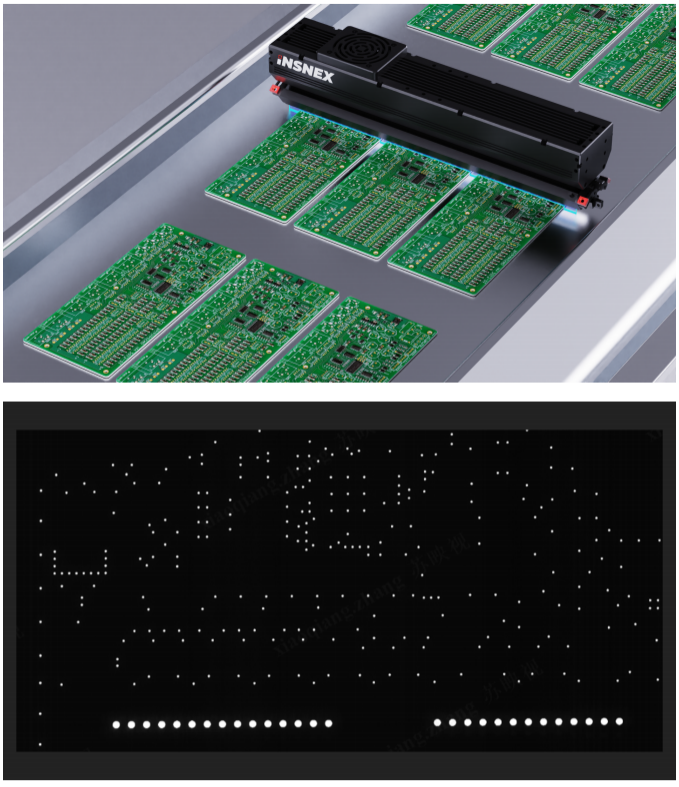
Application Cases

Semiconductor Industry | Lead Frame Inspection



A semiconductor lead frame manufacturer integrated an 1800 dpi / 14 μm color NFL into its production line. With distortion-free imaging and AI algorithms, the system enables real-time defect detection. Using defect traceability for process improvements, the end user increased yield by over 1% and significantly boosted production efficiency.

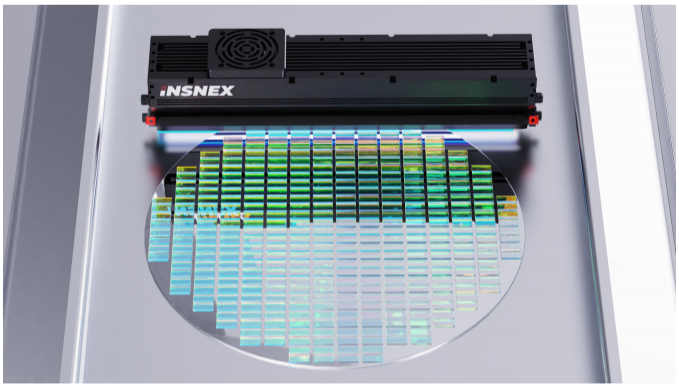
PCB industry | PCB hole inspection machine application

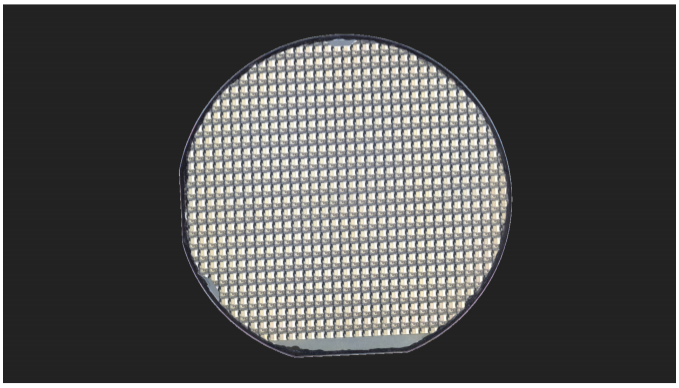


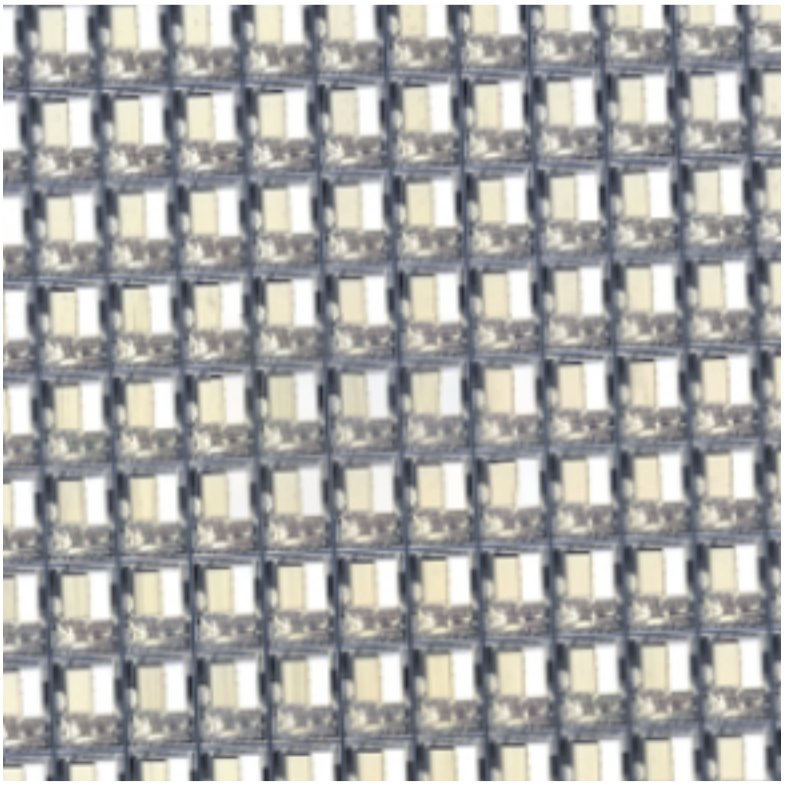
The vision system of the PCB hole inspector uses the 1800dpi/14um NFL with multi-angle and multi-light source collaborative imaging technology to clearly capture the inner wall details of the through hole and blind hole. The system feeds the detection data back to the drilling machine in real time, providing a solid data foundation for the PCB board factory to achieve drilling process optimization and comprehensive quality traceability.

Application Cases

Semiconductor Industry | Wafer Macro Defect Detection

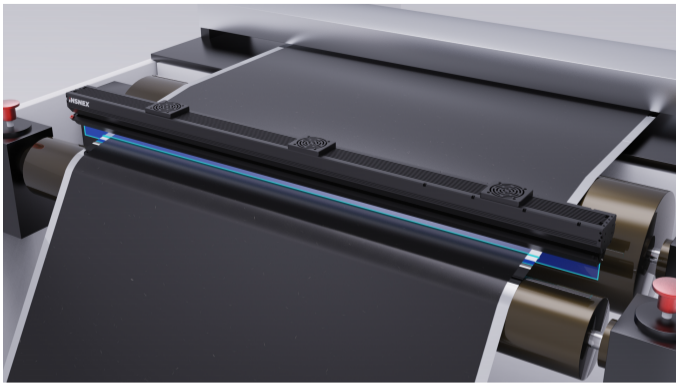


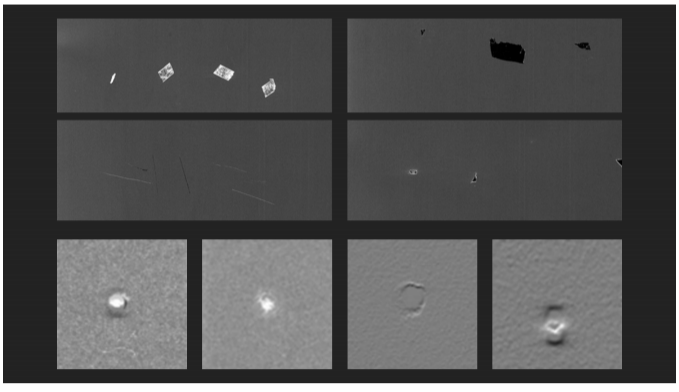


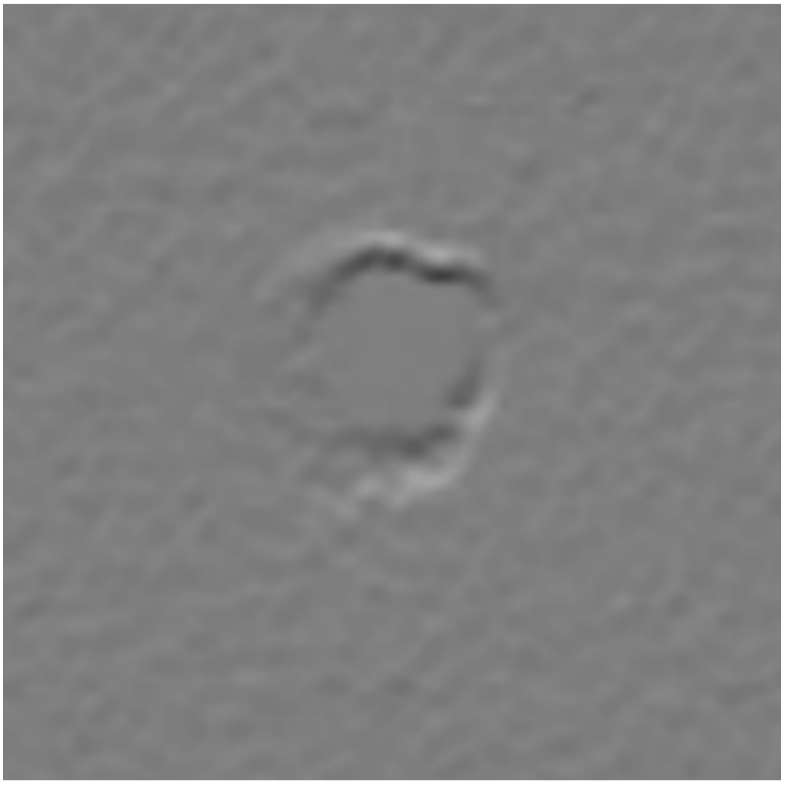


The newly released 3600 dpi / 7 μm NFL, combined with time-division strobe and uniform illumination, enables fast and non-destructive wafer macro defect inspection. Since most micro-defects appear as macro defects, integrating NFL monitoring across 500+ processes from wafer to packaging provides 100% early-warning coverage and real-time feedback for process optimization and yield improvement.

Lithium battery industry | Gravure coating machine electrode defect detection







INSNEX's NFL solution empowers leading battery manufacturers to upgrade gravure coating inspection. With a single 1550 mm wide, zero-stitching camera and 600 dpi high-precision imaging, it eliminates stitching errors, reliably detects micron-level defects, raises yield to 99.8%, and significantly reduces maintenance costs.

SPECIFICATIONS

LineX 2 Series, High Performance Model

Model	FOV (mm)	Image Mode	Resolution (dpi)	Resolution (μm/Pxl)	Pixel Count (K)	DOF (mm)	WD (mm)	LR (kHz)	Comm. Interface	Built-in Focus Mod.	Built-in Light (Dual White Bar)	Cooling Method	Net Weight (kg)	Dim. (Lmm×Wmm×Hmm)
LX2-160-10GM-18D80K-WD15-01	165	Mono	1800	14	11.7	±1.3	15	80	10GigE *1	×	INS-LGT2-165-W *2pcs	Air Cooling (Fan)	2.6	342*72*101.3
LX2-160-10GM-9D80K-WD15-01			900	28	5.8			80					2.6	342*72*101.3
LX2-320-10GM-18D40K-WD15-01	328		1800	14	23.4			40			INS-LGT2-328-W *2pcs		3.2	420*72*101.3
LX2-320-10GM-9D80K-WD15-01			900	28	11.7			80					3.2	420*72*101.3
LX2-490-10GM-18D30K-WD15-01	490		1800	14	35			30			INS-LGT2-490-W *2pcs		4.4	584*72*101.3
LX2-490-10GM-9D60K-WD15-01			900	28	17.5			60					4.4	584*72*101.3
LX2-650-10GM-18D20K-WD15-01	656		1800	14	46.8			20			INS-LGT2-656-W *2pcs		5.5	748*72*101.3
LX2-650-10GM-9D40K-WD15-01			900	28	23.4			40					5.5	748*72*101.3
LX2-820-10GM-18D30K-WD15-01	815		1800	14	58.2			30	10GigE *2		INS-LGT2-820-W *2pcs		6.9	912*72*101.3
LX2-820-10GM-9D60K-WD15-01			900	28	29.1			60					6.9	912*72*101.3

LXM Series, High Performance Model

Model	FOV (mm)	Image Mode	Resolution (dpi)	Resolution (μm/Pxl)	Pixel Count (K)	DOF (mm)	WD (mm)	LR (kHz)	Comm. Interface	Built-in Focus Mod.	Built-in Light (Dual White Bar)	Cooling Method	Net Weight (kg)	Dim. (Lmm×Wmm×Hmm)
INS-LXM-135-10GC-36L	135	Color	3600	7	19.29	±0.7	15	19	10GigE *1	✓	INS-LGT1-165-W *2pcs	Air Cooling (Fan)	3.0	310*90*118.5
INS-LXM-165-10GM-18L	165	Mono	1800	14	11.79	±1.3		40					3.0	310*90*116
INS-LXM-165-10GM-18M			1800	14	11.79			80					3.0	310*90*116
INS-LXM-165-10GC-18L		Color	1800	14	11.79			19					3.0	310*90*116
INS-LXM-165-10GC-9L			900	28	5.89			27					3.0	310*90*116
INS-LXM-165-10GM-9M		Mono	900	28	5.89			80					3.0	310*90*116
INS-LXM-165-10GM-36L			3600	7	23.57	±0.7		40					3.0	310*90*118.5
INS-LXM-165-10GM-9F			900	28	5.89	±1.3		120					3.0	310*90*118.5
INS-LXM-270-10GC-18L	270	Color	1800	14	19.29			19			INS-LGT1-328-W *2pcs		4.1	412*90*108
INS-LXM-270-10GC-9L			900	28	9.64			27					4.1	412*90*108
INS-LXM-270-10GC-36L			3600	7	38.57	±0.7		19	10GigE *2				4.4	529*90*118.1
INS-LXM-328-10GM-18L	328	Mono	1800	14	23.43	±1.3		40	10GigE *1				4.1	412*90*108
INS-LXM-328-10GM-9M			900	28	11.71			80					4.1	412*90*108
INS-LXM-328-10GM-36L			3600	7	46.86	±0.7		40	10GigE *2				4.4	529*90*118.1
INS-LXM-490-10GM-18L	490		1800	14	35	±1.3		40			INS-LGT1-490-W *2pcs		5.2	610*90*106
INS-LXM-490-10GM-9M			900	28	17.5			80					5.2	610*90*106
INS-LXM-490-10GM-36L			3600	7	70	±0.7		40	10GigE *3				5.7	577*108*155.7
INS-LXM-656-10GM-18L	656		1800	14	46.86	±1.3		40	10GigE *2		INS-LGT1-656-W *2pcs		6.0	740*90*106.2
INS-LXM-656-10GM-9M			900	28	23.43			80					6.0	740*90*106.2
INS-LXM-656-10GM-36L			3600	7	93.71	±0.7		40	10GigE *4				9.3	737*108*157.9
INS-LXM-820-10GM-18L	820		1800	14	58.57	±1.3		40	10GigE *3		INS-LGT1-820-W *2pcs		9.0	954*90*122
INS-LXM-820-10GM-9M			900	28	29.29			80					9.0	954*90*122

SPECIFICATIONS

CHVS-Base Series

Model	FOV (mm)	Image Mode	Resolution (dpi)	Resolution (μm/Pxl)	Pixel Count (K)	DOF (mm)	WD (mm)	LR (kHz)	Comm. Interface	Built-in Focus Mod.	Built-in Light (Dual White Bar)	Cooling Method	Net Weight (kg)	Dim. (Lmm×Wmm×Hmm)
INS-CHVS-242-10GM-BB	242	Mono	600	42	5.72	±1.3	15	66	10GigE *1	√	INS-LGT1-242-W *2pcs	Air Cooling (Fan)	2.8	330*70*104.5
INS-CHVS-363-10GM-BB	363		600	42	8.59			66			INS-LGT1-363-W *2pcs		3.9	450*90*106.2
INS-CHVS-363-10GC-AA	363	Color	300	84	4.28			66					3.9	450*90*106.2
INS-CHVS-363-10GC-BB	363		600	42	8.57			33					3.9	450*90*106.2
INS-CHVS-550-10GM-BB	550	Mono	600	42	13.09			66			INS-LGT1-550-W *2pcs		5.2	630*90*106.2
INS-CHVS-550-10GC-AA	550	Color	300	84	6.55			66	10GigE *2				5.7	630*90*106.2
INS-CHVS-550-10GC-BB	550		600	42	13.09			33					5.7	630*90*106.2
INS-CHVS-813-10GM-AA	813	Mono	300	84	9.63			110			INS-LGT1-813-W *2pcs		7.1	896*90*106.2
INS-CHVS-813-10GM-BB	813		600	42	19.22			66					7.1	896*90*106.2
INS-CHVS-934-10GM-AA	934		300	84	11.07			110			INS-LGT1-934-W *2pcs		8.1	1041*90*106.2
INS-CHVS-934-10GM-BB	934		600	42	22.09			66					8.1	1041*90*106.2
INS-CHVS-934-10GC-AA	934	Color	300	84	11.04			66	10GigE *3				8.6	1041*90*106.2
INS-CHVS-934-10GC-BB	934		600	42	22.09			33					8.6	1041*90*106.2
INS-CHVS-1550-10GM-AA	1539	Mono	300	84	18.24			110			INS-LGT1-1550-W *2pcs		15.7	1628*116*117.5
INS-CHVS-1550-10GM-BB	1539		600	42	36.4			66					15.7	1628*116*117.5

CHVS-Eco Series

Model	FOV (mm)	Image Mode	Resolution (dpi)	Resolution (μm/Pxl)	Pixel Count (K)	DOF (mm)	WD (mm)	LR (kHz)	Comm. Interface	Built-in Focus Mod.	Built-in Light (Dual White Bar)	Cooling Method	Net Weight (kg)	Dim. (Lmm×Wmm×Hmm)
INS-CHVS-164-GM-CC-WD8	164	Mono	1200	21	7.79	±0.9	8	10	GigE *1	×	Built-in White Light	Passive Cooling (Forced Cooling)	1.4	218*63*60.4
INS-CHVS-310-GM-BC-WD5	310		600	42	7.36	±1.3	5						0.8	360*64*48.9
INS-CHVS-242-10GM-AA	242		300	84	2.87		15	110	10GigE *1	√	INS-LGT1-242-W *2pcs	Air Cooling (Fan)	2.8	330*70*104.5
INS-CHVS-363-10GM-AA	363				4.3						INS-LGT1-363-W *2pcs		3.9	450*90*106.2
INS-CHVS-550-10GM-AA	550				6.56						INS-LGT1-550-W *2pcs		5.2	630*90*106.2

LineX Image Frame Grabber

Model		
	INS-FG-EXGV2-S-2	INS-FG-EXGV2-S-4
Pixel Depth	8/10/12/14/16bit	
Pixel Format	Mono/Bayer/YUV422/RGB/RGBC/BGR/BGRC	
Interface Type	Electric 10GigE Vision	
Data Interface	XGV interface, providing 4-channel of three color LED status indicator lights	
Link Speed	10G	
Acquisition Speed	20Gbps (MAX)	40Gbps (MAX)
Protocol Support	GigE Vision V2.0,Gen<i>Cam	
Host Interface	PCIe Gen3 x 4	PCIe Gen3 x 8
Payload	128/256/512/1024 bytes	
Bus Bandwidth	> 2500 MB/s	> 5000 MB/s
Maximum Number of Supported Cameras	2	4
Power Supply	<11.8W	<16.5W
Scanning Type	Directly DMA fill the camera data stream into the system memory	
Memory Management	Support firmware online upgrade	
Firmware Update	0~55°C	
Working Temperature	Cooling of heat sink	
Cooling Method	Windows 10/7-64bit/32bit, Linux-64bit	
Operating System	Support SDK development libraries for C, C++, and C #	
Secondary Development	Provide GUI configuration tool	

SPECIFICATIONS

LineX Cable

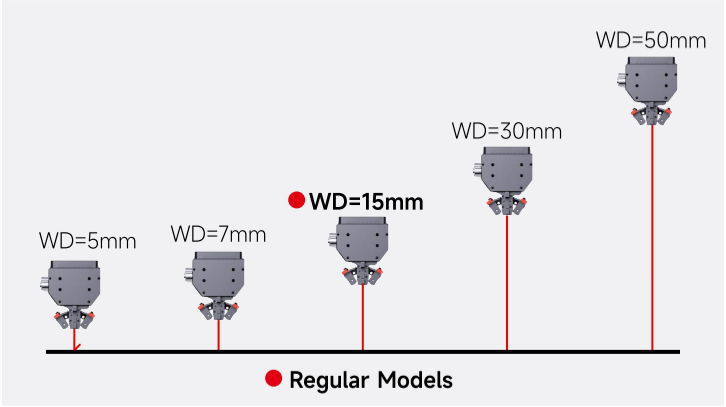
	No.	Cable Classification	INS Model	Optional Specifications	Remarks
Network Cable	1	10GigE Cab. – Straight	INS-WIRE-LKK-10GE-S-RJ45-RJ45-H-XX	5m, 8m, 10m, 15m, 20m	
	2	10GigE Cab. – Angled	INS-WIRE-LKK-10GE-S-RJ45-U-RJ45-H-XX		

	No.	Cable Classification	INS Model	Optional Specifications	Remarks
Power Cable	1	Pwr. Cab. – Straight	INS-WIRE-M16-A-S4-XX	5m, 8m, 10m, 15m, 20m	Models with Scan Width ≤1m
	2	Pwr. Cab. – Angled	INS-WIRE-M16-D-S4-XX		
	3	Pwr. Cab. – Straight	INS-WIRE-7/8-A-S4-XX		Models with Scan Width > 1m
	4	Pwr. Cab. – Angled	IINS-WIRE-7/8-D-S4-XX		

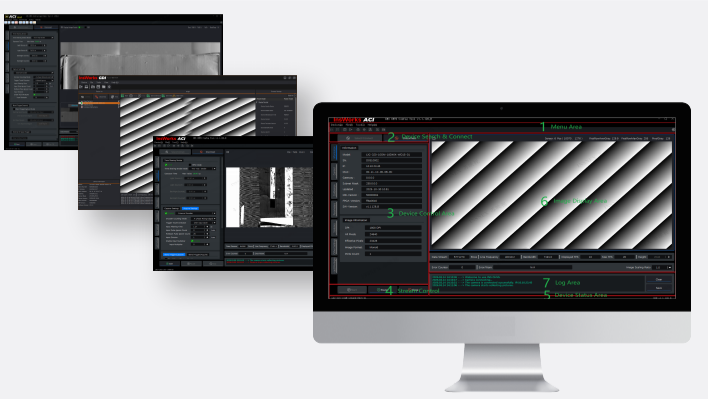
	No.	Cable Classification	INS Model	Optional Specifications	Remarks
Trigger Input Cable	1	Trig. In Cab. – Straight	INS-WIRE-M12-A1-S8-XX-PUR	5m, 8m, 10m, 15m, 20m	
	2	Trig. In Cab. – Angled	IINS-WIRE-M12-S8A-MWD-XPU-S-CZ29		

	No.	Cable Classification	INS Model	Optional Specifications	Remarks
Trigger Output Cable	1	Trig. Out Cab. – Straight	INS-WIRE-M12-A1-P8-XX-PUR	5m, 8m, 10m, 15m, 20m	
	2	Trig. Out Cab. – Angled	INS-WIRE-M12-P8A-MWD-XPU-S-CZ29		

LineX 2 WD



LineX SoftWare - InsWorks ACI



LineX Standard Accessories

Frame Grabber



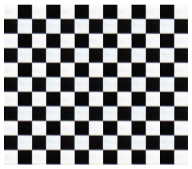
Dual Ports/Quard Ports
10GigE FrameGraber

Light Source



Standard: 2pcs Light Source
*Optional extra: Backlight, Dome Diffused Light and other various lights.

Calibration Plate



Custom high-precision calibration target.

Power Cable



Power cables comply with international standards to ensure safe and stable power supply for equipment.

Trigger Cable



High-flex industrial trigger cables with strong anti-interference performance.

Network Cable



High-standard Cat6A 10-Gigabit Ethernet cable.

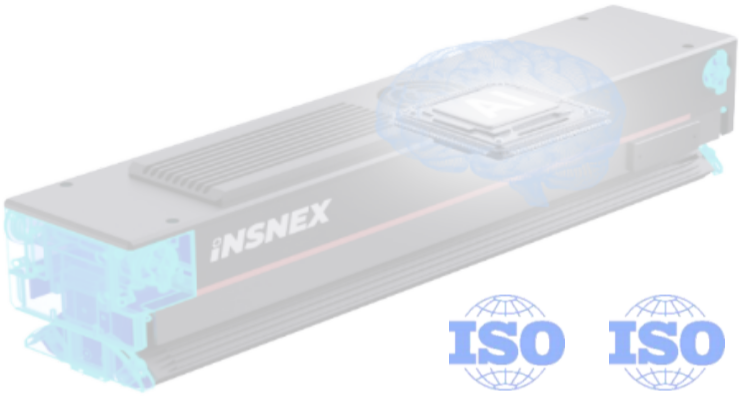
INSNEX , founded in 2017, has been dedicated to industrial vision inspection for many years. Built on extensive industry experience and application expertise, INSNEX continuously explores and develops advanced imaging products centered around the vision of “Making Defects Clearer”, together with its “Vision+AI” platform software, delivering innovative technologies and products for more accurate, reliable, and user-friendly defect inspection.

The LineX Series Near-Field Line Scan Camera (NFL) is an all-in-one imaging solution developed by INSNEX for applications where installation space is limited. With its high level of integration, compact form factor, and exceptionally low distortion, LineX effectively addresses the challenges of multi-camera stitching and makes high-quality imaging easier to achieve. Combined with INSWORKS, INSNEX’s “Vision+AI” platform software, LineX enables efficient development and deployment of complex inspection systems, significantly enhancing the accuracy and stability of defect detection.

Today, INSNEX products are widely deployed across a range of industrial applications, including li-ion battery, printing, PCB, semiconductor, and 3D printing. With distributors and technical partners covering multiple regions worldwide, INSNEX provides localized service and support to customers around the globe—making advanced line-scan imaging and defect inspection solutions more accessible than ever.

LineX Series NFL

Make Space Smaller



ISO9001 ISO14001

COMPANY: Insnex Technologies Co.,Ltd
TEL: +86 0512-67159489
FAX: +86 0512-67159489
EMAIL: services@insnex.com
MOBILE: +86 18151073327
WHATSAPP: +86 18151073327
WEB: https://www.insnex.com/

SUZHOU HEADQUARTERS: No.218 Xingming Street, Suzhou Industrial Park, Jiangsu Province