COGNEX

Machine Vision

Systems ▪ Sensors ▪ Software

Optimize Quality, Minimize Waste, Maximize Throughput

More than 1 billion products are made every day using Cognex machine vision solutions. These solutions perform highly detailed tasks on high-speed production lines to help companies around the world make their manufacturing and distribution faster, smarter, and more efficient.

Cognex sensors and 2D and 3D systems all use machine vision to perform inspections but are engineered for different tasks.

	Vision Sensors	2D Vision	3D Vision
Presence/Absence	✓	✓	
Defect Detection	✓	✓	✓
Assembly Verification	✓	✓	✓
Gauge/Measure	✓	✓	✓
Cosmetic Inspection		✓	✓
Guide/Align		✓	✓
OCR/OCV	✓	✓	✓
Code Reading		✓	

Industry-Leading Vision Technology

Cognex AI and rule-based technologies provide defect detection, feature location, optical character recognition (OCR), guidance, and measurement capabilities to solve the most challenging manufacturing applications.

AI-based technologies

Cognex AI-powered technologies learn to spot patterns and anomalies from example images to solve complicated tasks and provide consistency and speed that aren't possible with manual inspection.

Edge learning: For ease of use

Edge learning is a subset of AI in which processing takes place on-device, or "at the edge," using a pre-trained set of algorithms. The technology is simple to setup, requiring smaller image sets and shorter training and validation periods than traditional deep learning.
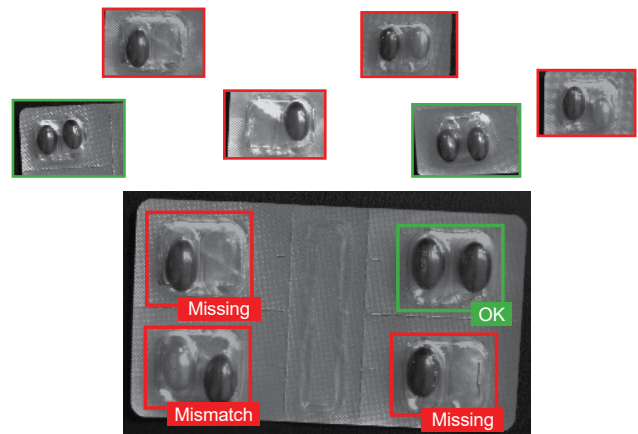
Deep learning: For complex tasks

Deep learning is a subset of AI designed to automate advanced or highly customized applications. The technology enables users to process large, detailed image sets quickly and efficiently and analyze fine details to differentiate between acceptable and unacceptable anomalies.
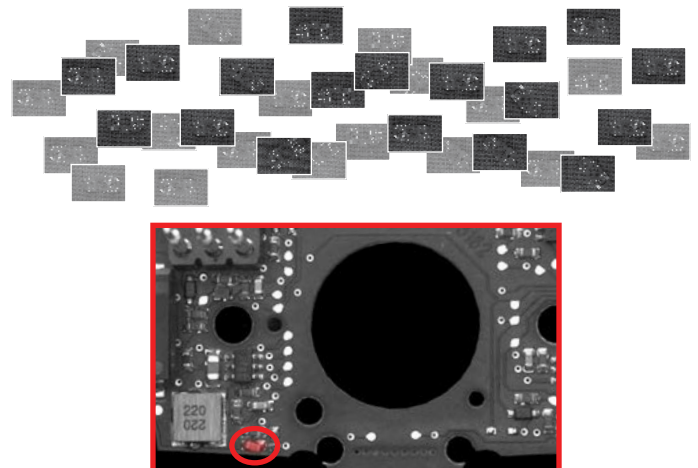
Rule-based technologies

Designed for specialized tasks with consistency and low variation, Cognex rule-based technologies improve production and distribution across all industries by automating a range of tasks and delivering highly reliable results.
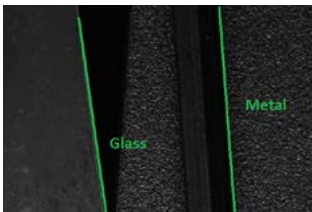
Object location

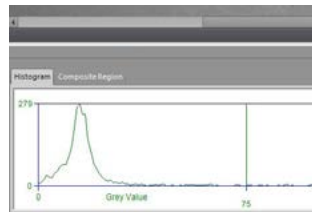Find geometric patterns on parts under inspection.

Bead inspection

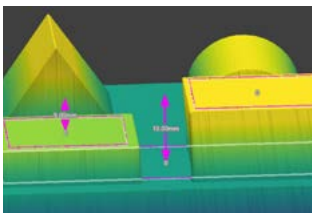Run high-precision inspections on beads and edges.

Edge inspection
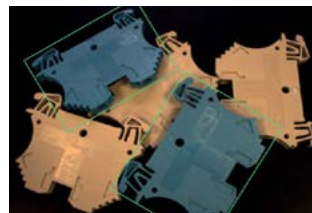
Locate edges, features, and measure width.

Histogram and image processing

Measure thresholds and prepare images for analysis.

Measurement tools

Establish reliable feature-based parameters and thresholds.

Color tools

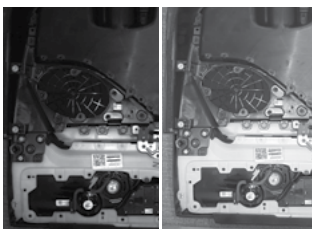Run color-based analysis for a range of applications.

Identification

Ensure high read rates for 1D and 2D barcodes.
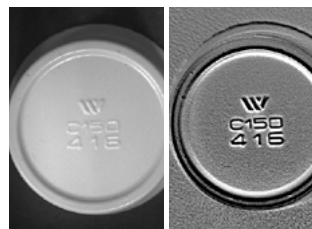
Optical character recognition

Automate character reading and decipher text.

Advanced imaging technologies

HDR+

Delivers high-contrast images for multi-point inspections and stabilizes light intensity to reveal subtle features.

SurfaceFX

Isolates features and defects that are recessed or embossed on parts such as chips, wrinkles, punctures, stamped text, and codes.
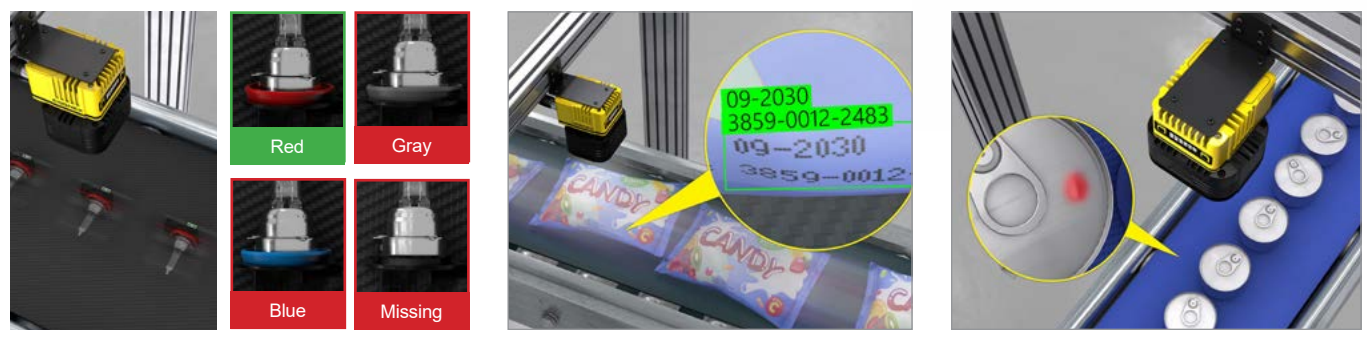
2D Vision Systems

In-Sight 3800 Series

Designed for high-speed applications, In-Sight 3800 delivers a fully integrated solution for manufacturing automation. Beyond speed, this powerful system is embedded with the latest vision technologies and offers high flexibility and high resolution, allowing users to maximize throughput, scale their solution, and run more accurate inspections.

TOOLSET	RESOLUTION	FEATURES			
ViDi EL	**Up to 16MP**	Monochrome/Color		Autofocus	IP67	HDR+

94 mm

93.3 mm

90.8 mm

Red   Gray

Blue   Missing

09-2030
3859-0012-2483
09-2030
3859-0012

CANDY

In-Sight 2800 Series

The In-Sight 2800 vision system combines edge learning technology with traditional rule-based vision to solve a range of error-proofing tasks. From presence/absence detection to sortation and character reading applications, this fully integrated vision system offers an easy-to-use solution for automating inspections.
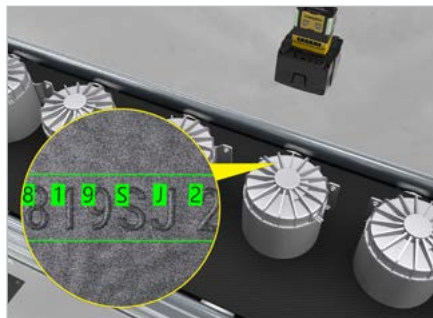
TOOLSET

ViDi EL

RESOLUTION

Up to 2MP

FEATURES

Monochrome/Color

Autofocus

IP67

Up to 104.4 mm

69 mm

Up to 109.7 mm

Up to 90.6 mm

42.4 mm

Up to 78.5 mm

COGNEX

OK

Torn

Skewed

In-Sight D900 Series

The In-Sight D900 vision system leverages advanced AI-based tools to solve challenging OCR, assembly verification, and defect detection tasks. Processing takes place on-device, which eliminates the need for a PC, simplifying application deployment.
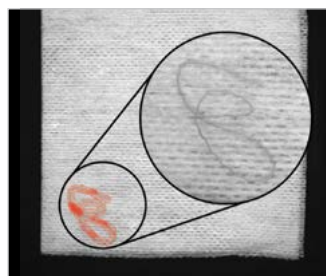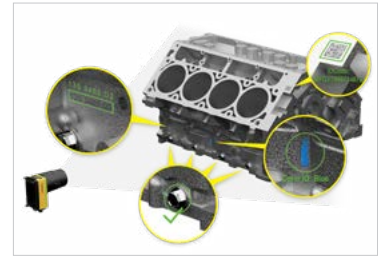
TOOLSET

DL

ViDi EL

RESOLUTION

Up to 5MP

FEATURES

Monochrome/Color

Autofocus

IP67

SD

95.1 mm

89.9 mm

121 mm

ChromeHandle

PassengerSideSwitches

G19500 3RD

#112-1 >PC<

In-Sight 9000 Series

Rugged, ultra-high-resolution standalone vision system solves high-accuracy part location, measurement, and inspection applications. Line scan and area scan image acquisition options are available for imaging large, continuously moving or stationary objects.
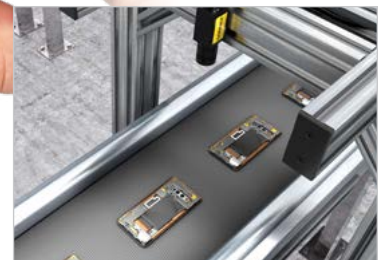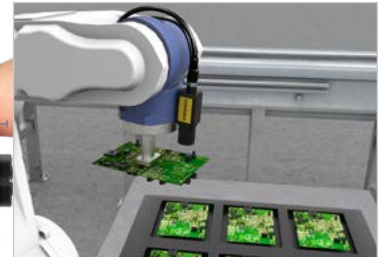
TOOLSET	RESOLUTION	FEATURES		
	Area Scan: Up to 12MP; **Line Scan: Up to 32MP**	Monochrome/Color	IP67	SD

In-Sight 8000 Series

Ultra-compact standalone vision system delivers industry-leading performance in the micro form factor of a typical GigE vision camera.

TOOLSET	RESOLUTION	FEATURES		
	Up to 5MP	Monochrome/Color	PoE	HDR+

In-Sight 7000 Series

Combines modular integrated lighting with powerful vision tools in a compact footprint to deliver fast, accurate inspections on space-constrained production lines.

| TOOLSET	RESOLUTION	FEATURES			
	Up to 5MP	Monochrome/Color	Autofocus	IP67	HDR+

Vision Sensors

In-Sight SnAPP Series

In-Sight SnAPP vision sensors offer the performance of multiple laser sensors in a single device. Using pre-trained AI and vision-based detection, these sensors exceed the capabilities of conventional sensors to deliver more accurate inspections and more reliable machine performance. Designed for high ease of use, they allow users to quickly solve common quality and process control tasks, with no experience needed.
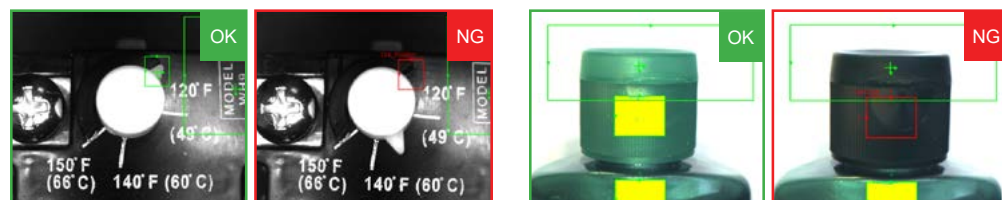
TOOLSET	RESOLUTION	FEATURES				
ViDi EL	Up to 1.6MP	Monochrome/Color		Autofocus	IP67	PoE
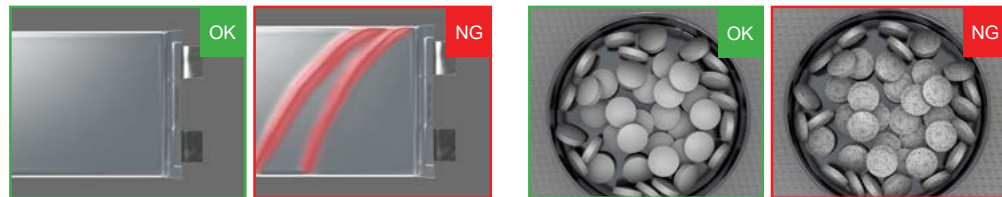
In-Sight 2000 Series

Leveraging rule-based vision tools, In-Sight 2000 vision sensors solve error-proofing tasks with consistent or predictable anomalies. They offer robust programming options, giving intermediate users more control in application development while providing the flexibility to adapt to any production line.

TOOLSET	RESOLUTION	FEATURES				
	Up to 1.2MP	Monochrome/Color		Autofocus	IP65	PoE

2D Vision Applications

Automotive

OK

NG

0085

Electronics

OK

NG

Li-ion

Food & Beverage

OK

NG

1 scoop

1 scoop

2 scoops

0 scoops

10-01-28

te 10-01-28
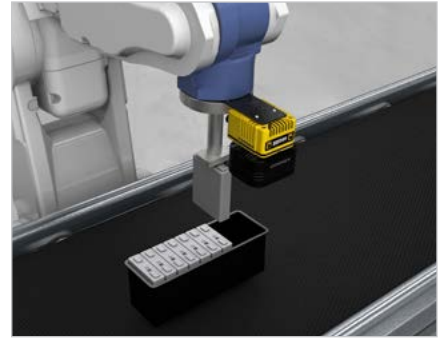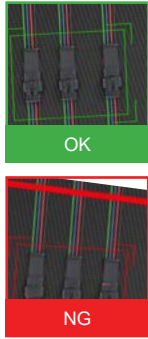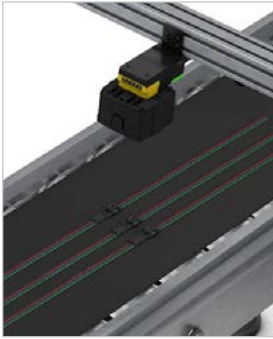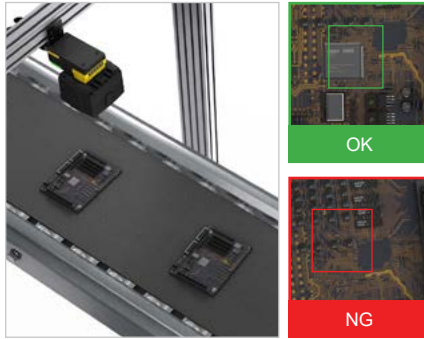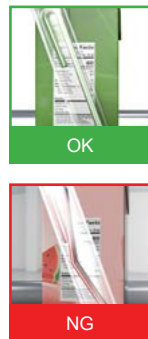
Pharmaceutical and Medical

OK

NG

QTY: Tablets

DAMAGED LABEL

(01)0062938548104

(18)2148383(10)204355
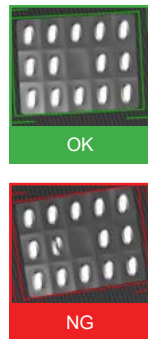
2D Vision Specifications

	SnAPP Series	2000 Series	2800 Series	3800 Series	7000 Series	8000 Series	9000 Series	D900 Series
Image								
Imager Type	Monochrome/ color area scan	Monochrome/ color area scan	Monochrome/ color area scan	Monochrome/ color area scan	Monochrome/ color area scan	Monochrome/ color area scan	Monochrome/ color area scan, Monochrome line scan	Monochrome/ color area scan
Resolution	Up to 1.6MP (1440 x 1080)	Up to 1.2MP (1280 x 960)	Up to 2MP (1920 x 1080)	Up to 16MP (5320 x 3032)	Up to 5MP (2448 x 2048)	Up to 5MP (2448 x 2048)	12MP (4096 x 3000), 32MP (2048 x up to 16,384 lines) for line scan	Up to 5MP (2592 x 1944)
Acquisition Speed (Max)	45 fps	75 fps	45 fps	Up to 200 fps	Up to 217 fps	Up to 217 fps	Up to 14 fps, 66K lines per second for line scan	Up to 51 fps
Options								
Lenses	S-mount, Auto-focus	S-Mount, Auto-focus	S-Mount, Auto-focus	C-Mount, Auto-focus	C-Mount, S-Mount, Auto-focus	C-Mount	C-Mount	C-Mount, S-Mount, Auto-focus
Lighting	Integrated	Integrated	Integrated	Integrated, External light via light control connector	Integrated, External light via light control connector	N/A	External light via light control connector (area scan only)	Integrated, External lights via light control connector
Networking								
Speed	Gigabit Ethernet (10/100/1000 Mbps)							
General Protocols	SFTP	TCP/IP, UDP, FTP, Telnet, RS-232C	TCP/IP, FTP	TCP/IP, FTP, SFTP	TCP/IP, UDP, FTP, SFTP, Telnet, SMTP			TCP/IP, FTP
Industrial Protocols	Ethernet/IP, PROFINET	OPC UA, Ether-Net/IP with AOP, PROFINET Class B, iQSS, Modbus TCP, SLMP/SLMP Scanner, CC-Link IE Field Basic	PROFINET, Eth-erNet/IP, SLMP, OPC/UA	PROFINET, EtherNet/IP, SLMP, OPC/UA, Modbus TCP	OPC UA, Ether-Net/IP with AOP, PROFINET Class B, iQSS, Modbus TCP, SLMP/SLMP Scanner, CC-Link IE Field Basic, IEEE 1588 (CIP Sync)	OPC UA, EtherNet/IP with AOP, PROFINET Class B, iQSS, Modbus TCP, SLMP/SLMP Scanner, CC-Link IE Field Basic	OPC UA, Ether-Net/IP with AOP, PROFINET Class B, iQSS, Modbus TCP, SLMP/SLMP Scanner, CC-Link IE Field Basic, IEEE 1588 (CIP Sync)	Ethernet/IP with AOP, Profinet Class A, Profinet Class B
I/O								
Trigger input	1	1	1	1	1	1	1	1
General purpose input	1	1	1	1	1		1	1
General purpose output	4	4	2	2	2	2	2	2
Bi-Directional			2	2	2		2 (area scan only)	2
Encoder							2 (line scan only)	
Expansion I/O		CIO-1400			CIO-1400, CIO-Micro	CIO-Micro	CIO-1400, CIO-Micro	
Serial		RS-232C		RS-232C	RS-232C	RS-232C	RS-232C	

	SnAPP Series	2000 Series	2800 Series	3800 Series	7000 Series	8000 Series	9000 Series	D900 Series
Mechanical								
Length	In-line: 90.6 mm (3.6 in), Right-angle: 78.5 mm (3.1 in)	In-line: 92 mm (3.61 in), Right-angle: 61 mm (2.42 in)	In-line: Up to 110 mm (4.3 in), Right-angle: Up to 68 mm (2.7 in)	Up to 117 mm (4.6 in)	90.1 mm (3.54 in)	75.5 mm (2.97 in)	121.0 mm (4.77 in)	121.0 mm (4.77 in)
Width	42.4 mm (1.7 in)	60 mm (2.38 in)	Up to 69 mm (2.7 in)	Up to 104 mm (4.1 in)	60.5 mm (2.38 in)	35 mm (1.38 in)	60.5 mm (2.38 in)	60.5 mm (2.38 in)
Depth	In-line: 23.6 (0.9 in), Right-angle: 37.8 mm (1.5 in)	52 mm (2.05 in)	Up to 104 mm (4.1 in)	Up to 181 mm (7.1 in)	Up to 2MP: 35.7 mm (1.41 in), 5MP: 49.4 mm (1.94 in)	32 mm (1.26 in)	53.4 mm (2.10 in)	53.4 mm (2.10 in)
Protection	IP67	IP65	IP67	IP67	IP67	IP40	IP67	IP67
Vision Tools								
Cognex AI	✓		✓	✓				✓
Pattern Matching		✓	✓	✓	✓ Available PatMax® and PatMax RedLine®			
Blob		✓	✓	✓	✓	✓	✓	✓
Edge		✓	✓	✓	✓	✓	✓	✓
Measurement		✓	✓	✓	✓	✓	✓	✓
1D/2D Code Reading			✓ IDMax®, PowerGrid®, Hotbars®	✓ IDMax, PowerGrid, Hotbars	✓ IDMax, PowerGrid, Hotbars	✓ IDMax, PowerGrid, Hotbars	✓ IDMax, PowerGrid, Hotbars	✓ IDMax
OCR		✓	✓	✓	✓	✓	✓	✓
Flaw Detection					✓	✓	✓	✓
Color Verification		✓			✓	✓	✓	✓
Color Identification					✓	✓	✓	✓
Histogram			✓	✓	✓	✓	✓	✓
Brightness		✓	✓	✓	✓	✓	✓	✓
Pixel Counting		✓	✓	✓	✓	✓	✓	✓
Contrast		✓	✓	✓	✓	✓	✓	✓
Image Filters		✓	✓	✓	✓	✓	✓	✓

3D Vision Systems

In-Sight L38 Series

Powered by AI, the In-Sight L38 is a next-generation 3D vision system that allows manufacturers to perform highly reliable inspections. Using a combination of embedded AI, powerful optics, and industry-proven vision technology, the system captures detailed 3D images to detect subtle features and measure them against pass/fail thresholds.
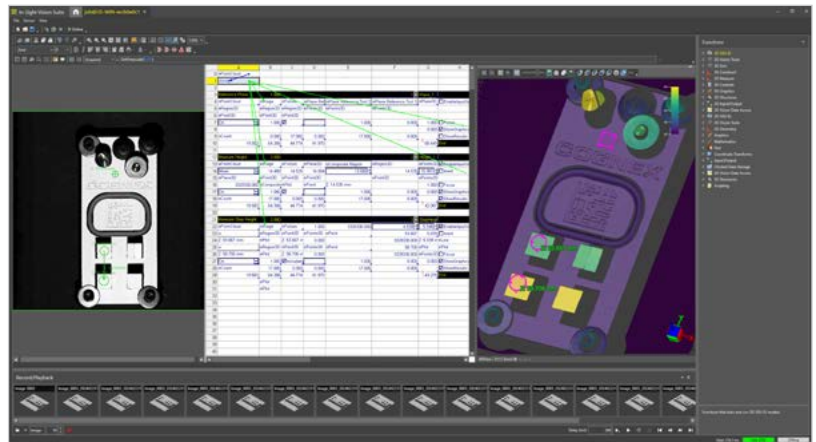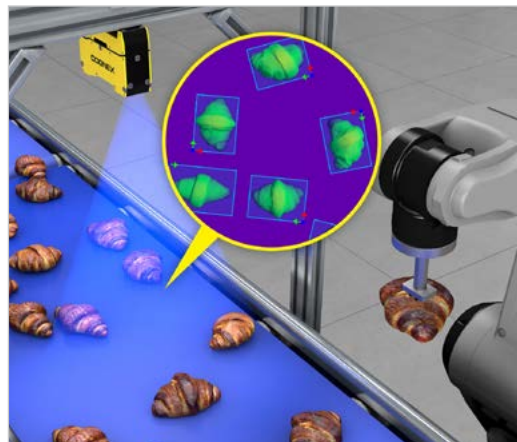

200.5 mm
101 mm
45 mm
45 mm
150.5 mm

| TOOLSET	RESOLUTION	FEATURES
ViDi EL	**1920 points**	3D · Factory Calibrated · IP65 · ESD-Safe

3D-A5000 Series

The 3D-A5000 is a state-of-art area scan camera that captures high-resolution 3D point cloud images in less time than alternative methods. Using unique 3D imaging technology, it solves challenging assembly verification, in-line metrology, and robotic guidance applications.

97 mm

323.9 mm

136.8 mm

| TOOLSET	RESOLUTION	FEATURES		
	1.5 million points	3D LightBurst	Factory Calibrated	IP65
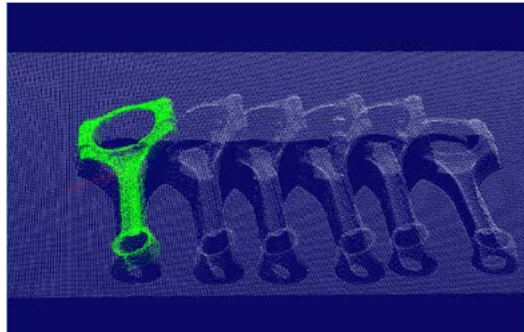
3D-L4000 with VisionPro

The 3D-L4000 with VisionPro is a powerful laser displacement sensor that performs fast, accurate 3D inspections, measurements, and optical character reading. Backed by powerful PC-based software, the solution provides ultimate programming control for solving highly customized tasks and those that require the fastest processing.

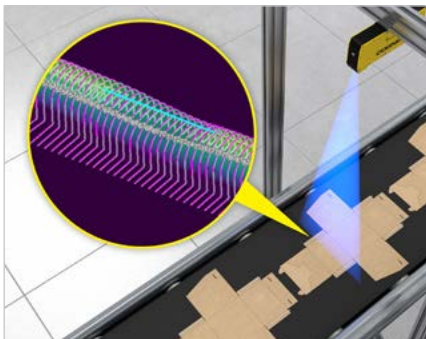| TOOLSET	RESOLUTION	FEATURES			
	960-1920 points	3D	Factory Calibrated	IP65	ESD-Safe
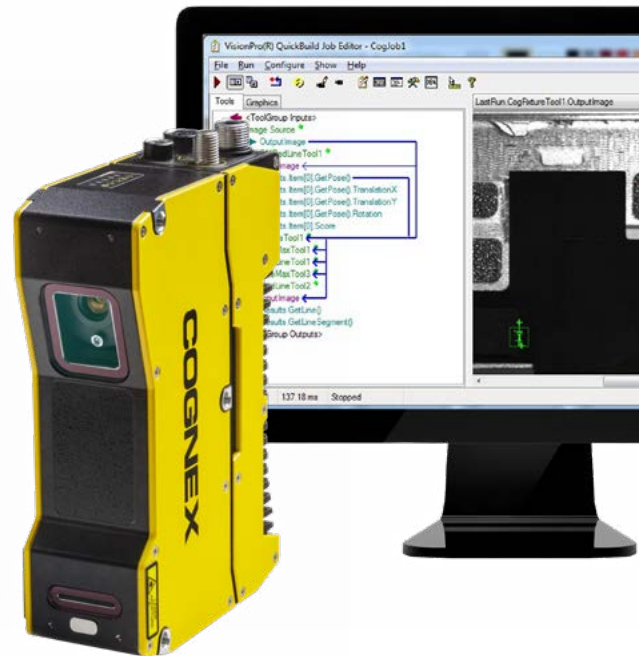
3D Vision Applications
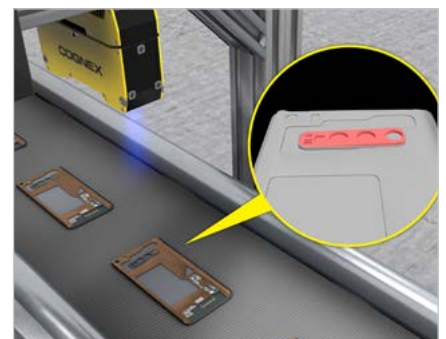
Automotive
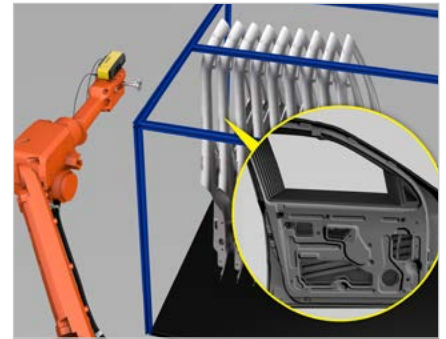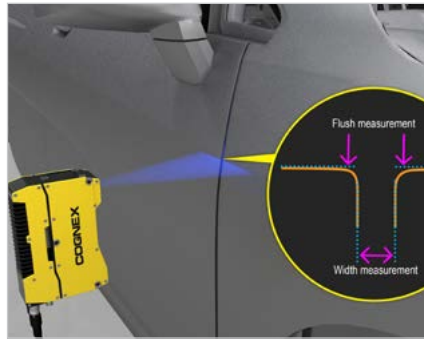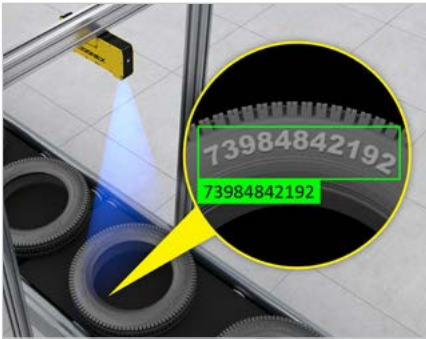
Consumer Packaged Goods
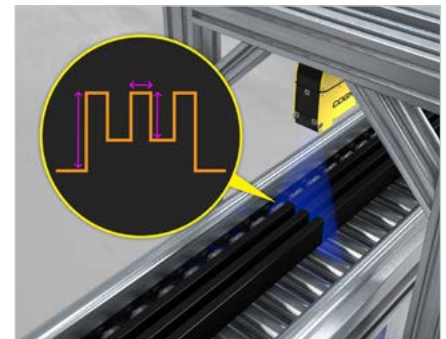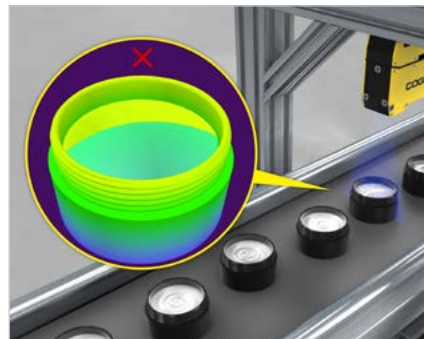
Electronics
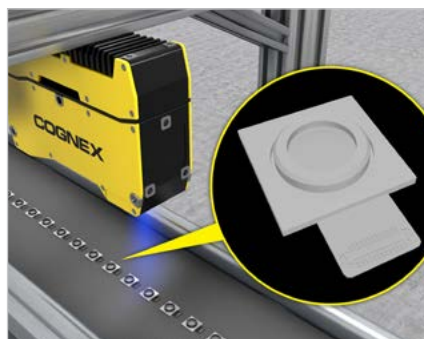
Food & Beverage

3D Vision Systems Specifications

In-Sight L38 Series

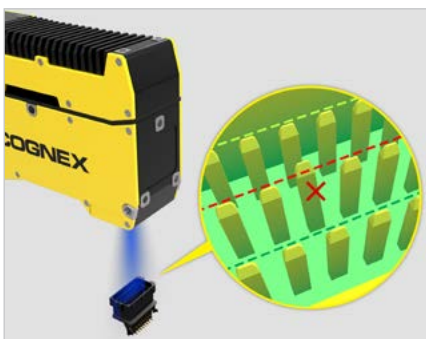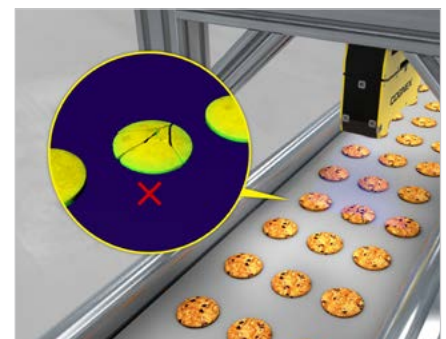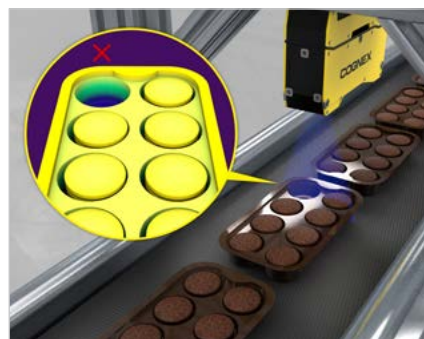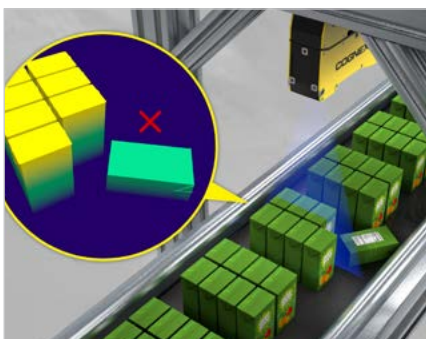|	ISL38-33	ISL38-50	ISL38-100	ISL38-300	ISL38-500
3D Technology	Displacement Sensor				
Clearance Distance (CD)	93 mm (3.7 in)	92 mm (3.6 in)	130 mm (5.1 in)	180 mm (7.1 in)	600 mm (23.6 in)
Measurement Range (MR)	44 mm (1.7 in)	106 mm (4.2 in)	235 mm (9.3 in)	745 mm (29.3 in)	1100 mm (43.3 in)
Near FOV	33 mm (1.3 in)	55 mm (2.2 in)	75 mm (3.0 in)	95 mm (3.7 in)	405 mm (15.9 in)
Far FOV	39 mm (1.5 in)	90 mm (3.5 in)	180 mm (7.1 in)	460 mm (18.1 in)	1082 mm (42.6 in)
Resolution X	17.2–20.3 μm	28.6–46.9 μm	39.1–93.8 μm	49.5–239.6 μm	213 –574 μm
Resolution Z	1.7–2.7 μm	2.5–6.9 μm	4.4–25.9 μm	6.9–147.5 μm	42–302 μm
Acquisition Rate	Up to 10 kHz[1]				
Protection	IP65				
Software	In-Sight Vision Suite				

[1]   When binning is enabled and measurement range is reduced.

3D-A5000 Series

	3D-A5120	3D-A5060	3D-A5030	3D-A5005
3D Technology	3D LightBurst Technology™ Area Scan			
Clearance Distance (CD)	1000.0 mm (39.4 in)	1400.0 mm (55.1 in)	1465.0 mm (57.7 in)	299.3 mm (11.8 in)
Measurement Range (MR)	1000.0 mm (39.4 in)	400.0 mm (15.7 in)	80.0 mm (3.1 in)	12.0 mm (0.5 in)
Near FOV	900 x 675 mm (35.4 x 26.6 in)	520 x 390 mm (20.1 x 15.4 in)	280 x 210 mm (11.0 x 8.3 in)	60 x 44 mm (2.4 x 1.7 in)
Far FOV	1760 x 1320 mm (69.3 x 52 in)	645 x 490 mm (25.4 x 19.3 in)	285 x 216 mm (11.2 x 8.5 in)	65 x 46 mm (2.6 x 1.8 in)
Resolution X	626–1223 μm	361–454 μm	195–200 μm	42–44 μm
Resolution Z	414–1656 μm	338–690 μm	178–213 μm	7–8 μm
Acquisition Time	200 msec			
Protection	IP65			
Software	VisionPro & Cognex Designer			

3D-L4000 with VisionPro

	VP 3D-L4033	VP 3D-L4050	VP 3D-L4100	VP 3D-L4300
3D Technology	Displacement Sensor			
Clearance Distance (CD)	93.00 mm (3.7 in)	92.00 mm (3.6 in)	130.00 mm (5.1 in)	180.00 mm (7.1 in)
Measurement Range (MR)	44.00 mm (1.7 in)	106.00 mm (4.2 in)	235.00 mm (9.3 in)	745.00 mm (29.3 in)
Near FOV	33.00 mm (1.3 in)	55.00 mm (2.2 in)	75.00 mm (3.0 in)	95.00 mm (3.7 in)
Far FOV	39.00 mm (1.5 in)	90.00 mm (3.5 in)	180.00 mm (7.1 in)	460.00 mm (18.1 in)
Resolution X	17.2–20.3 μm	28.6–46.9 μm	39.1–93.8 μm	49.5–239.6 μm
Resolution Z	1.7–2.7 μm	2.5–6.9 μm	4.4–25.9 μm	6.9–147.5 μm
Acquisition Rate	Up to 4 kHz (after windowing down the sensor) ([1]Up to 6 kHz)			
Protection	IP65			
Software	VisionPro & Cognex Designer™			

Vision Software

Cognex vision software provides the power and flexibility to solve your most challenging applications. Available in several formats, choose between programmatic or graphical user interfaces to match your development needs and gain access to the industry's most robust vision tool libraries.
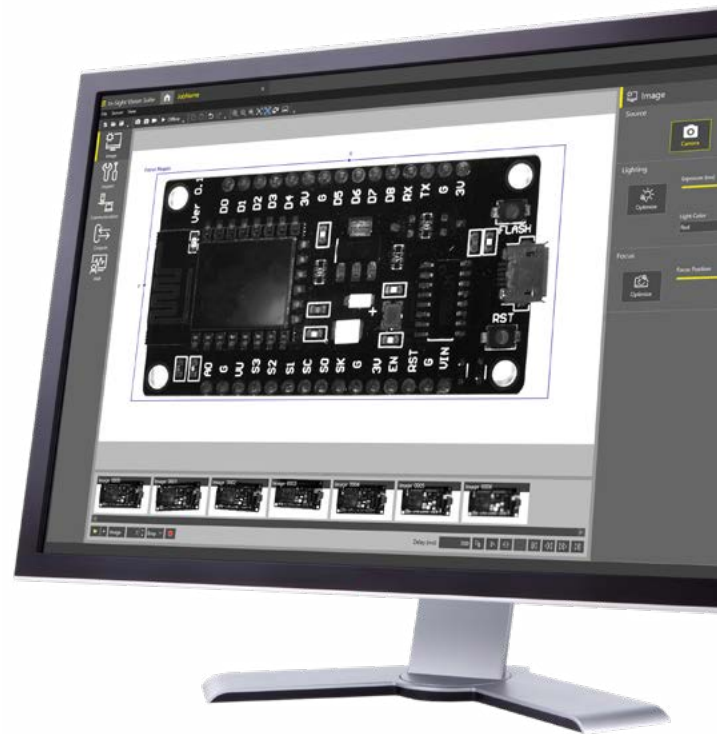
In-Sight Vision Suite

In-Sight Vision Suite software is common across all In-Sight products and offers flexible development options. It includes two programming environments — EasyBuilder® and spreadsheet — designed for different types of tasks, which allows you to seamlessly scale your solution as your application needs change.

EasyBuilder

With its point-and-click programming, the EasyBuilder interface is ideal for setting up simple or common jobs. The intuitive process guides developers step-by-step through setup — from image capture to the final result.

Spreadsheet

The spreadsheet interface is ideal for building advanced or customized applications. Robust in design, this development environment provides users with the ability to make critical adjustments to job parameters, without the need for programming.

Runtime visualization for real-time device management

VisionView Web is a web-based, human-machine interface (HMI) and display panel for monitoring and controlling In-Sight vision systems, directly on the factory floor. From the HMI, users can view inspection results, configure applications, and modify setup parameters.

VisionPro

VisionPro® is a PC-based software that combines best-in-class vision technologies in a graphical programming environment. Powerful enough to solve the most challenging vision tasks, it enables rapid deployment of highly-customizable applications, from geometric object location and inspection to identification, measurement, and alignment. With a future-oriented design that includes rule-based tools and AI capabilities, this flexible software supports both current and future vision needs.

TOOL SET

DL   ViDi EL
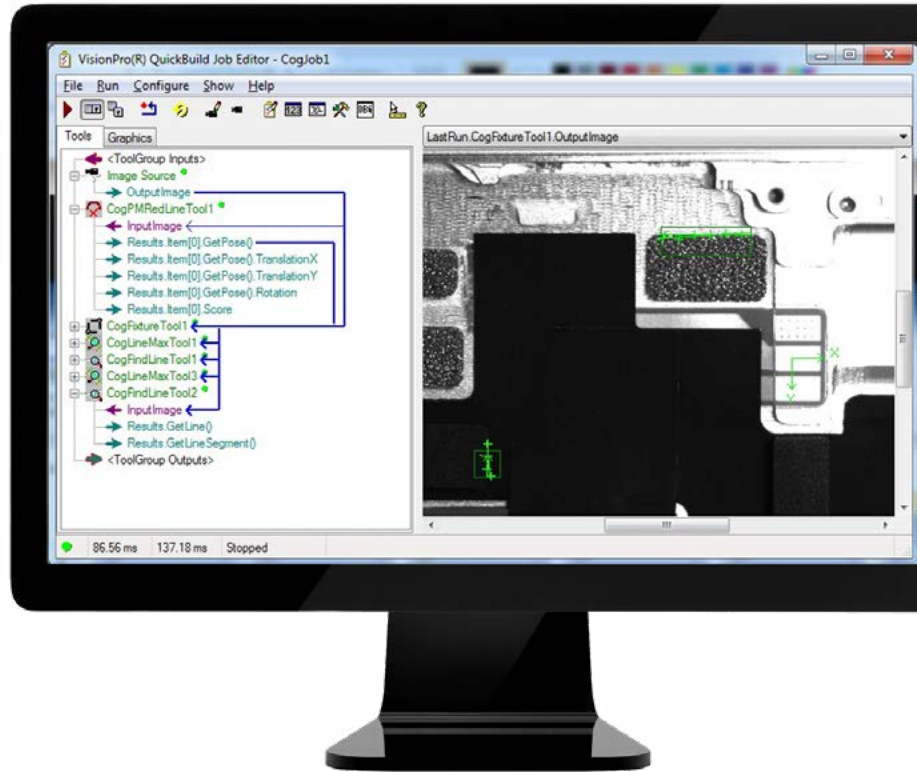
Extensive library of AI- and rule-based tools tackle your toughest vision challenges

OK   Scratch   Dent   Missing
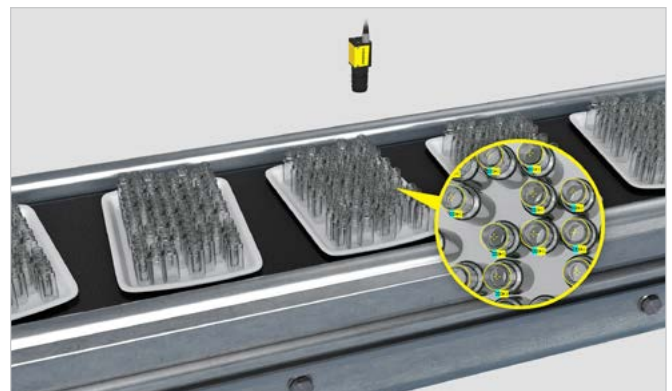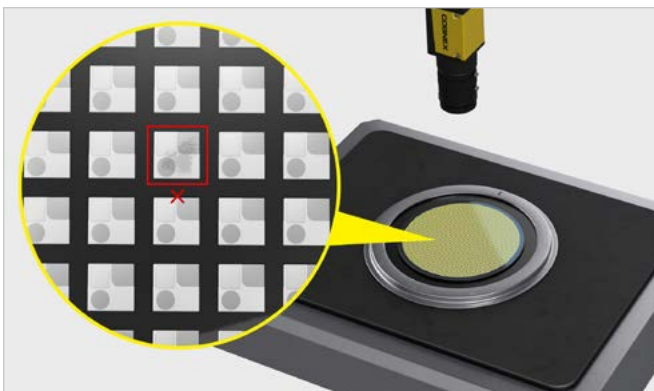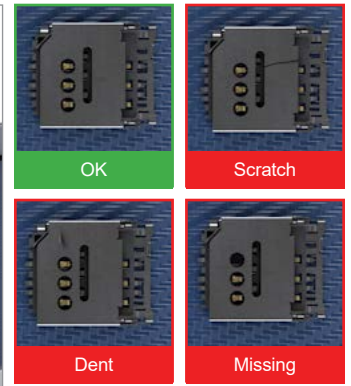
Vision Accessories

Cognex accessories optimize the performance of machine vision systems, so they can operate reliably and efficiently in a variety of manufacturing and logistics environments. These accessories include a range of lenses, lighting, and industrial cameras.

Lenses

The extensive portfolio of Cognex lenses includes standard and telecentric options compatible with a variety of sensor sizes and resolutions. All lenses offer industry-proven performance, a compact design for easy integration, and customizable settings to support a variety of cameras and technical specifications.

Lighting

Cognex lighting provides consistent, controllable illumination to ensure high-contrast, high-quality imaging essential for accurate measurement, alignment, and inspection. These lighting options offer the flexibility to meet a variety of application requirements.

Industrial Cameras

Available in both area scan and line scan formats, Cognex industrial cameras offer seamless integration with PC-based vision software to provide a complete solution for quality control. Rugged by design, these industrial cameras withstand the demanding conditions of manufacturing environments, including vibrations, extreme temperatures, and varying lighting conditions.

The Global Leader
in Machine Vision and Barcode Reading

For over 40 years, Cognex has helped the world's most innovative companies make their manufacturing and distribution faster, smarter, and more efficient.

Cognex machine vision solutions combine hardware and software to capture and analyze visual information. The company's wide range of solutions automates manufacturing and distribution tasks for customers worldwide, improving efficiency and quality in applications like inspecting, identifying, locating, and measuring components, products, and packaging. Cognex products incorporate advanced technologies including artificial intelligence to simplify implementation, increase accuracy, and deliver a faster ROI.

>40 years in business

$830M+ 2023 revenue

>60% revenue from EU & Asia

25K+ global customers

400+ channel partners

500+ global customer support resources

17% of revenue into R&D

>1,100 technology patents

>8 years developing AI for industrial machine vision

BUILD YOUR VISION

Vision Systems

Automate inspection tasks, from defect detection to assembly verification and text reading, with easy to deploy vision systems.

www.cognex.com/machine-vision

Barcode Readers

Track and trace, from the floor to dock door, with powerful readers and verifiers designed to handle any code type.

www.cognex.com/barcodereaders

Industry Solutions

Solve applications across a wide range of industries with flexible and reliable machine vision and barcode reading solutions.

www.cognex.com/solutions

COGNEX

Companies around the world rely on Cognex vision and barcode reading solutions to optimize quality, drive down costs and control traceability.

Corporate Headquarters   One Vision Drive Natick, MA 01760 USA

Regional Sales Offices

Americas
North America	+1 844 999 2469
Brazil	+55 11 4210 3919
Mexico	+800 733 4116

Europe
Austria	+43 800 28 16 32
Belgium	+32 289 370 75
Czechia	+420 800 023 519
France	+33 1 76 54 93 18
Germany	+49 721 958 8052
Hungary	+36 800 80291
Ireland	+353 21 421 7500
Italy	+39 02 3057 8196
Netherlands	+31 207 941 398
Poland	+48 717 121 086
Romania	+40 741 041 272
Spain	+34 93 299 28 14
Sweden	+46 21 14 55 88
Switzerland	+41 445 788 877
Turkey	+90 216 900 1696
United Kingdom	+44 121 29 65 163

Asia-Pacific
Australia	+61 2 7202 6910
China	+86 21 5875 1133
India	+91 7305 040397
Indonesia	+62 21 3076 1792
Japan	+81 3 5977 5400
Korea	+82 2 539 9047
Malaysia	+6019 916 5532
New Zealand	+64 9 802 0555
Phillipines	+63 2 8539 3990
Singapore	+65 3158 3322
Taiwan	+886 02 7703 2848
Thailand	+66 6 3230 9998
Vietnam	+84 98 2405167

www.cognex.com