

# COGNEX



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**MACHINE VISION**  
**2D & 3D VISION SYSTEMS**  
**VISION SENSORS**

# THE GLOBAL LEADER

## IN MACHINE VISION AND INDUSTRIAL BARCODE READING

**Cognex<sup>®</sup>, the world's most trusted machine vision and industrial barcode reading company.**

With over 1.5 million systems installed in facilities around the world and over thirty six years of experience, Cognex is solely focused on industrial machine vision and image-based barcode reading technology. Deployed by the world's top manufacturers, suppliers and machine builders, Cognex products ensure that manufactured items meet the stringent quality requirements of each industry.

Cognex solutions help customers improve manufacturing quality and performance by eliminating defects, verifying assembly and tracking information at every stage of the production process. Smarter automation using Cognex vision and barcode reading systems means fewer production errors, which equates to lower manufacturing costs and higher customer satisfaction. With the widest range of solutions and largest network of global vision experts, Cognex is the best choice to help you **Build Your Vision.<sup>™</sup>**

**\$748**  
**MILLION**  
**2017 REVENUE**

**OVER 36**  
**YEARS IN THE BUSINESS**

**500+**  
**CHANNEL PARTNERS**

**GLOBAL OFFICES IN**  
**20+ COUNTRIES**

**1,500,000+**  
**SYSTEMS SHIPPED**







# BUILD YOUR VISION

Tens of thousands of applications worldwide inspect billions of products each day, many products that simply could not be manufactured without machine vision technology. Whether verifying the fill levels of soda bottles traveling on a conveyor, reading oil-stained DPM codes on automotive parts or positioning touch screens on smartphones to micron-level accuracy, machine vision technology performs highly-detailed tasks on high-speed production lines.

Cognex machine vision products help companies:

- **Optimize quality** by inspecting products down to the smallest detail.
- **Minimize waste** by detecting errors early in the process before thousands of items need to be scrapped.
- **Maximize throughput** by identifying process inefficiencies so operations can reach their full potential.

Cognex comprehensive line of vision sensors, 2D vision systems and 3D laser profilers all use machine vision technology to perform inspections but are engineered for different tasks.









Vision Sensors



2D Vision Systems



3D Laser Profilers

 Presence/Absence	✓	✓	✓
 Inspection	✓	✓	✓
 Guide/Align		✓	✓
 OCR/OCV		✓	✓
 Code Reading		✓	
 Gauge/Measure		✓	✓

Cognex industry-leading solutions are supported by the largest international network of application and service engineers. This experienced team ensures Cognex technology is properly integrated, empowers your workforce and helps solve a wide range of applications.



# 2D VISION SYSTEMS

Cognex In-Sight® 2D vision systems are unmatched in their ability to inspect, identify and guide parts. These self-contained, industrial-grade vision systems combine a library of advanced vision tools with high-speed image acquisition and processing. A wide range of models, including line scan and color systems, meet most price and performance requirements.



## In-Sight 8000 Series Vision System

The In-Sight 8000 series ultra-compact, standalone vision systems deliver industry-leading vision tool performance at PC speeds, all in the micro form factor of a typical GigE Vision camera. Measuring just 31 mm x 31 mm x 64 mm, all In-Sight 8000 systems feature Power over Ethernet (PoE) and are the best option for space-constrained production lines.

- Compact footprint, with the ability to mount at angles up to 45-degrees, is ideal for integrating into tight spaces, on robots and on hard-to-reach machinery.
- Best-in-class vision tools (including pattern matching, filtering, defect detection, color, and barcode reading) solve a wide range of applications.
- In-Sight Explorer™ software with the intuitive EasyBuilder® interface guides users through step-by-step directions to set up simple to advanced applications.
- In-Sight spreadsheet provides greater control and ability to customize application data.

[www.cognex.com/InSight8000](http://www.cognex.com/InSight8000)

## Specifications

Models	8200	8400	8401	8402	8405
Relative Processing Speed	1X	2.3X			
Resolution	640 x 480		1280 x 1024	1600 x 1200	2592 x 1944
Frame Rate	217 fps (monochrome) 135 fps (color)		76 fps (monochrome) 45 fps (color)	53 fps (monochrome) 33 fps (color)	10 fps
Tools	Blob, Edge, Flaw Detection, Histogram, Barcode Reading, Filters, InspectEdge, OCR/OCV, Pattern, PatMax®, Geometry and Calibration.				
Tool Options	PatMax RedLine				
Software Interface	In-Sight Explorer Spreadsheet and EasyBuilder Interface				



## In-Sight 7000 Series Vision System

The In-Sight 7000 series vision system represents a breakthrough in flexibility, performance and ease of integration. This powerful vision system performs fast, accurate inspections while its compact footprint easily fits into space-constrained production lines. The unique, modular design is highly field-customizable to your application requirements.

- Field-changeable lighting and optics provide users with ultimate flexibility to customize the system for their application.
- Full suite of powerful Cognex algorithms and vision tools, including color, help you solve applications easily and reliably.
- Intuitive EasyBuilder interface allows both novice and experienced users to setup and monitor vision applications.
- In-Sight spreadsheet provides ultimate control through direct access to vision tools and communication options.



[www.cognex.com/InSight7000](http://www.cognex.com/InSight7000)



## Specifications

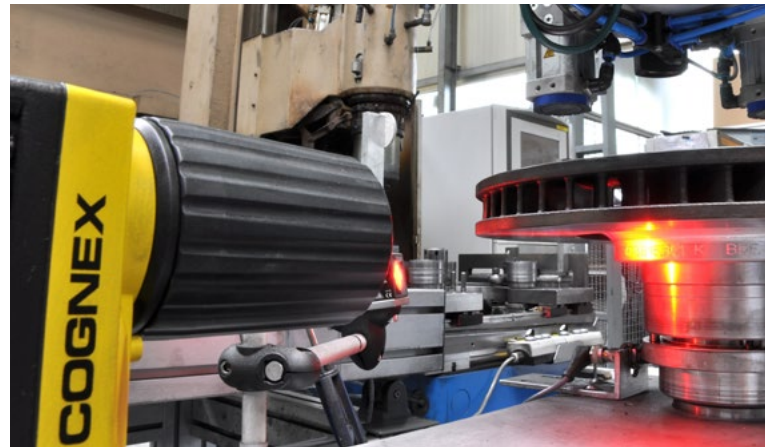
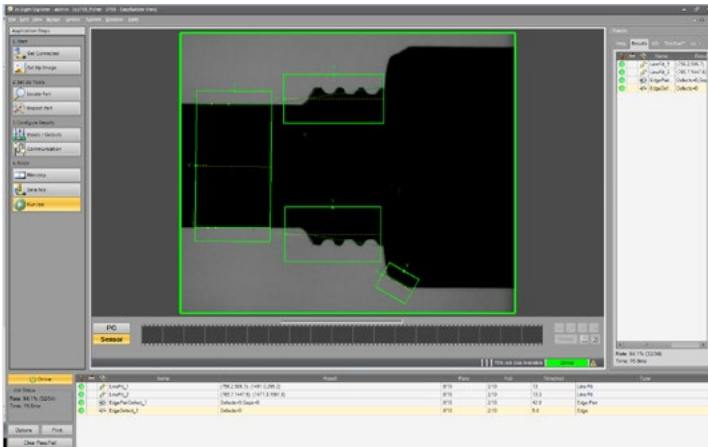
Models	7600	7800	7801	7802	7900	7902
Relative Processing Speed	1X		2.3X			2.5X
Resolution	800 x 600/640x480		1280 x 1024		1600 x 1200	
Frame Rate	217/165 (monochrome) 135/100 (color)		76 (monochrome) 45 (color)		217/165 (monochrome) 134/100 (color)	
Tools	Blob, Edge, Flaw Detection, Histogram, Barcode Reading, Filters, InspectEdge, OCR/OCV, Pattern, PatMax, Geometry and Calibration.					
Tool Options	PatMax RedLine					
Software Interface	In-Sight Explorer Spreadsheet and EasyBuilder Interface					

## In-Sight 5705 Series Vision System

The In-Sight 5705 series vision system significantly expand the range of applications that can be solved with a standalone vision system. Featuring optimized vision tools such as PatMax RedLine™ for high-speed pattern matching and Gigabit Ethernet communication, the In-Sight 5705 is the fastest self-contained 5 megapixel vision system capable of reliable color inspections.

- Full library of high-performance vision tools for inspection, defect detection, guidance, alignment and measurement applications.
- Intuitive EasyBuilder software interface makes it easy to set up and deploy even the most advanced jobs.
- In-Sight spreadsheet with scripting allows advanced users to modify application settings and custom-configure vision tools.
- True color filtering, color ID and color extraction tools for reliable color inspections.

[www.cognex.com/InSight5705](http://www.cognex.com/InSight5705)



## Specifications

Models	5705	5705C	5604	5603	5600
Resolution	2448 x 2048		1K line scan	1600 x 1200	640 x 480
Frame Rate	16 fps	14 fps	44K lines per sec	14 fps	60 fps
Tools	Blob, Edge, Flaw Detection, Histogram, Barcode Reading, Filters, InspectEdge, OCR/OCV, Pattern, PatMax, PatMax RedLine, Geometry, Calibration and Color (5705C only).		Blob, Edge, Flaw Detection, Histogram, Barcode Reading, Filters, InspectEdge, OCR/OCV, Pattern, PatMax, Geometry and Calibration.		
Software Interface	In-Sight Explorer Spreadsheet and EasyBuilder Interface				



# In-Sight VC200 Multi Smart Camera Vision System

The In-Sight VC200 multi smart camera vision system brings the proven reliability and flexibility of In-Sight vision systems to multi camera vision applications. You can easily connect up to four In-Sight smart cameras to a controller for multi-view inspections in your manufacturing environment. For the first time, you can leverage the power of distributed computing with multiple smart cameras for high-performance applications.

- Powerful processors run In-Sight vision tools independently on each camera with no reduction in speed regardless of how many cameras are attached.
- Intuitive and self-documenting block-diagrams and In-Sight spreadsheet eases application configuration and communication of results.
- Platform-independent HMI technology enables monitoring and control from any device with a supported web browser.



[www.cognex.com/InSightVC200](http://www.cognex.com/InSightVC200)



## Specifications

Model	In-Sight VC200
Supported Cognex Cameras	ISC8200, ISC8400, ISC8401, ISC8402, ISC8405, ISC7600, ISC7800, ISC7801, ISC7802, ISC7900, ISC7902
Dimensions	178.8 mm (7.04 in) x 142.1 mm (5.59 in) x 75.1 mm (2.96 in)
Job/Program Memory	8 GB non-volatile flash memory. Unlimited storage via remote network device
Image Processing Memory	2 GB SDRAM
Input/Output	8 discrete inputs and 16 discrete outputs; Optically isolated
Camera Ports	4 RJ-45 dedicated Ethernet ports for connecting directly to supported In-Sight cameras, additionally supplying PoE
LAN Port	1 RJ-45 Ethernet port, 10/100/1000 BaseT with auto MDIX. IEEE 802.3 TCP/IP Protocol
USB Ports	1 USB 3.0 (5 Gbps) and 2 host USB 2.0 ports (480 Gbps) ports for connecting mouse, keyboard or storage device
SD Card Slot	1 SD card (USH-I or II) slot for saving images, run times files and results
Video Out Port	1 locking HDMI port for connecting to a display device

# VISION SENSORS

Vision sensors perform simple pass/fail applications that help ensure products and packaging manufactured on an automated production line are error-free and meet stringent quality standards. Cognex vision sensors provide highly reliable inspections thanks to powerful vision tools, integrated, powerful lighting, modularity, and an easy-to-use setup environment.

## In-Sight 2000 Series Vision Sensors

In-Sight 2000 series vision sensors combine the power of an In-Sight vision system with the simplicity and affordability of a vision sensor. Ideal for solving error-proofing applications, these vision sensors set new standards for value, ease of use and flexibility thanks to a powerful combination of proven In-Sight vision tools, simple setup and a modular design.

- Intuitive In-Sight Explorer with EasyBuilder interface allows even novice users to achieve extremely reliable pass/fail inspections in nearly any production environment.
- Powerful In-Sight vision tools for reliable part location, inspection, measurement and counting.
- Integrated, high-performance image formation system produces even, diffuse illumination, eliminating the need for costly external lighting.
- Two form factors supporting in-line and right-angle configurations mount in tight spaces and simplifies wiring and optical paths.
- Monochrome and color sensor models solve presence/absence applications, including color verification.
- Fully compatible with Cognex VisionView® PC software and VisionView 900 HMI touchscreen panel.



[www.cognex.com/InSight2000](http://www.cognex.com/InSight2000)

## Specifications

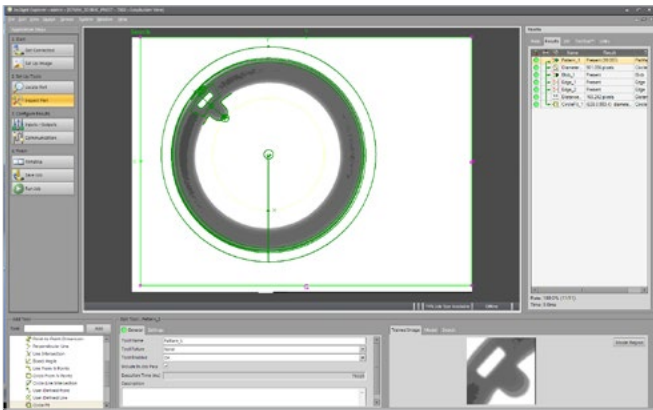
Models	2000-110	2000-120	2000-120C	2000-130	2000-130C
Color	Monochrome	Monochrome	Color	Monochrome	Color
Resolution	640 x 480 (standard)	640 x 480 (standard) 640 x 480 (2X magnification)		640 x 480 (standard) 640 x 480 (2X magnification) 800 x 600 (2X magnification)	
Relative Processing Speed	1X	2X			
Tools	Pattern	Pattern, Pixel Count, Contrast, Brightness		Pattern, Pixel Count, Contrast, Brightness, Edge, Circle Find, Measurement, Counting	
Connectivity	1 trigger, 1 general purpose input, 4 general purpose outputs				
Communications	Industrial M12 connectors (x-coded), power and I/O, EtherNet/IP, PROFINET, SLMP/SLMP scanner, Modbus TCP, TCP/IP, UDP, FTP, RS232				



# IN-SIGHT 2D VISION SOFTWARE

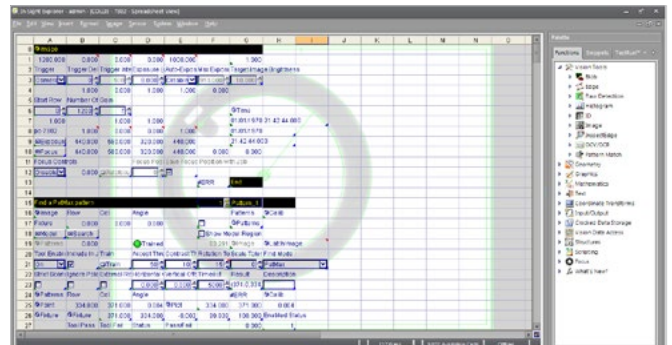
## In-Sight Explorer

All In-Sight products, from vision sensors to vision systems, are configured with the powerful, yet easy to use In-Sight Explorer software. The easy-to-use interface walks you step by step through the setup process and provides the power and flexibility of the vision spreadsheet for more difficult applications.



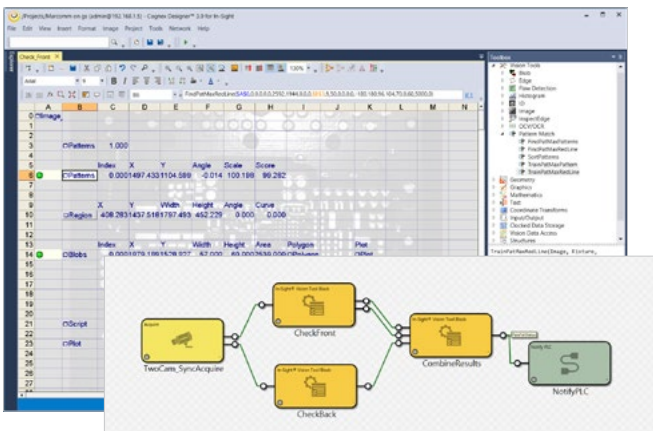
## EasyBuilder View

The EasyBuilder configuration environment guides users through a step-by-step setup process allowing both novice and experienced operators to configure vision applications quickly and easily on vision sensors and vision systems.



## Spreadsheet View

In-Sight spreadsheet provides ultimate control through direct access to the vision tools and communication options for more challenging applications. Access to the spreadsheet not only provides programming flexibility to make essential adjustments, it also offers assurance that you will be able to solve any of your vision applications.



## Multi Smart Camera Workflow View

The In-Sight VC200 multi smart camera combines the power and familiarity of the spreadsheet with a graphical workflow view to make multi-camera applications easy to set up for even the most challenging applications.

## Connectivity and Modular Communications

Connectivity to the factory network is essential to machine vision applications as a means to share data, support decision-making and enable high-efficient integrated processes. The Cognex Connect™ communications suite supports industrial protocols, including high-speed Ethernet for easy integration into the network.

- Ethernet/IP
- PROFINET
- Modbus/TCP
- SLMP (Seamless Message Protocol)
- FTP
- OPC
- TCP/IP
- RS-232

# 3D LASER PROFILERS

Whether performing a single profile measurement or scanning an entire surface in 3D, Cognex has the most powerful and robust 3D vision tools. Manufacturers in all industries trust Cognex technology to deliver high accuracy surface feature measurements that go beyond the capabilities of 2D vision technology.

## In-Sight Laser Profiler

The In-Sight laser profiler is a measurement system used to verify that a part's dimensions meet specifications. The In-Sight laser profiler is configured using the In-Sight EasyBuilder user interface. This intuitive, easy-to-use software makes it simple for manufacturing and quality engineers to develop, deploy and support high accuracy measurements on the factory floor.

- Profile optimization technology renders the most accurate outline of your part.
- Advanced object detection technology ensures measurements are performed in the correct location and provides consistent results.
- Intuitive EasyBuilder user interface provides access to the laser profiler toolset, making it simple for first time users to extract features and construct reference points.
- Mobile, platform-independent visualization provides access to HMIs from anywhere on the network.



[www.cognex.com/InSight-laser-profiler](http://www.cognex.com/InSight-laser-profiler)

## Specifications

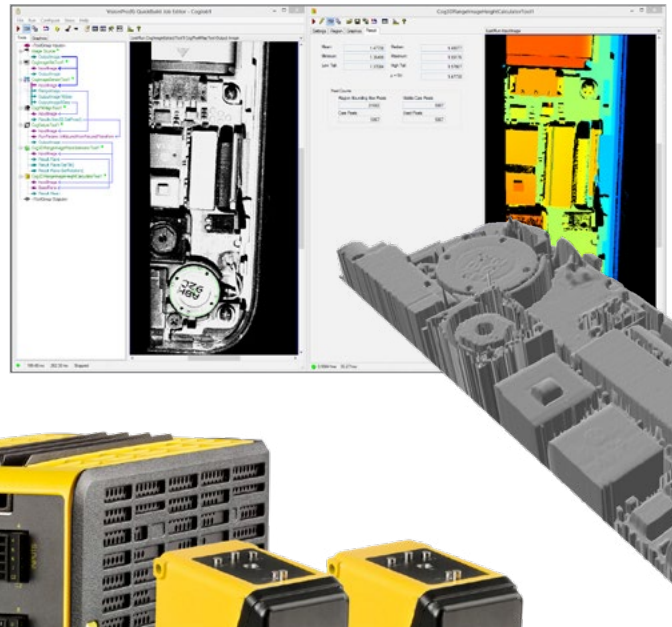
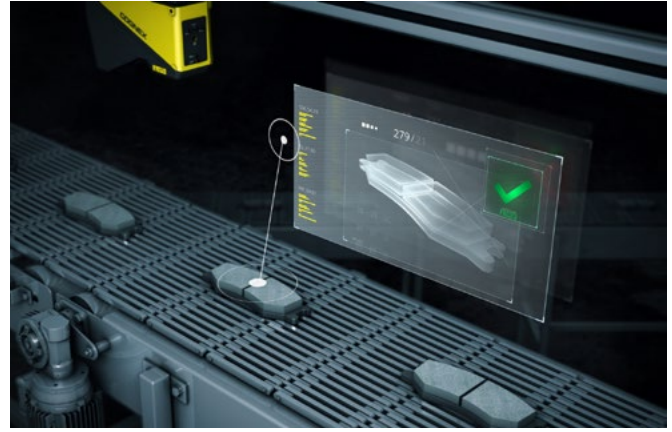
Models	DS1300	DS1101	DS1050	DS925B	DS910B
Resolution X (mm)	0.088–0.410	0.063–0.158	0.042–0.077	0.0183–0.0227	0.0073–0.0084
Resolution Z (mm)	0.016–0.265	0.010–0.052	0.004–0.014	0.002	0.001
Linearity	±0.23% FS	±0.08% FS	±0.06% FS	±0.17% FS	±0.10% FS
Measurements	Height, gap, angle, radius, position, area, roughness				
Communications	Ethernet/IP, ProfiNet, TCP/IP				
Controller	VC200 high-speed embedded processor, Precision I/O Real Time communications, 179 mm (H) x 142 mm (W) x 75 mm (L)				



# 3D Vision System

Cognex 3D vision system provides a topographical representation of the 3D features relative to any surface. The laser displacement sensors are factory calibrated to deliver results in real units of measurement with micron-level accuracy. Cognex field calibration techniques preserve accuracy despite mounting and motion errors. Multiple Cognex displacement sensors can be used in combination across wide production lines to generate single high resolution 3D images.

- Combines 3D sensors and 2D cameras with powerful vision tools including measurement, OCR, barcode reading and pattern matching tools.
- Powered by the factory-proven VisionPro® software with Cognex Designer™ development environment.
- Provides contrast independent inspection and concurrently acquires intensity data for aligned 2D and 3D inspection.
- Industrial IP65 housing with optional IP69K enclosure.



[www.cognex.com/3D-vision-system](http://www.cognex.com/3D-vision-system)



## Specifications

Models	DS1300	DS1101	DS1050	DS925B	DS910B
Resolution X (mm)	0.088–0.410	0.063–0.158	0.042–0.077	0.0183–0.0227	0.0073–0.0084
Resolution Z (mm)	0.016–0.265	0.010–0.052	0.004–0.014	0.002	0.001
Linearity	±0.16% FS				
Measurements	3D pattern, cross section, height, gap, angle, volume, OCR				
Communications	Ethernet/IP, ProfiNet, TCP/IP				
Controller	VC5 Intel i5 processor, Precision I/O Real Time Communication, 207 mm (H) 132.6 mm (W) x 229.5 (L)				

# VISION SOFTWARE

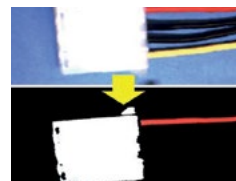
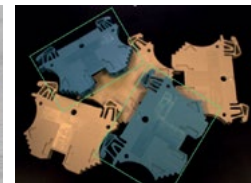
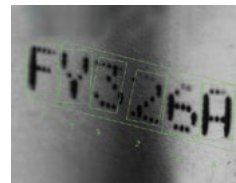
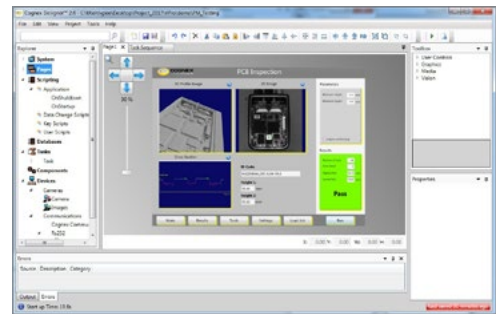
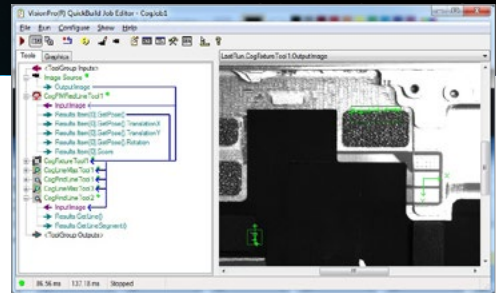


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## VisionPro Machine Vision Software

VisionPro is the leading PC-based vision software that empowers users to quickly set up and deploy even the most challenging 2D and 3D vision applications—no matter which camera or frame grabber they use. The Cognex Designer development environment provides access to a robust library of vision tools and the graphical, drag-and-drop interface simplifies complex applications into manageable tasks. Proven in more than 700,000 installations worldwide, the VisionPro tool library performs a wide range of functions from geometric object location and inspection to identification and measurement.

- Powerful vision tools (including PatMax, LineMax,™ OCRMax™ and IDMax®) perform accurate and repeatable inspections.
- With an extensive .NET class library and user controls, users can fully integrate VisionPro software into automation equipment.
- Cognex Designer and VisionPro QuickBuild™ let you configure acquisition, select and optimize vision tools and make pass/fail decision without programming.
- Fully compatible with latest Windows® environments and supports Microsoft 64-bit operating systems to meet the demands of larger cameras and greater pixel depth.
- Supports a broad range of Cognex Industrial Cameras and most 3rd party cameras through the Cognex Acquisition Alliance Program.



[www.cognex.com/VisionPro](http://www.cognex.com/VisionPro)

## Broad Camera Support



## Licensing Options



USB Dongle



8704E (GigE)



CIO-CC24  
(Real-Time I/O)



VC5



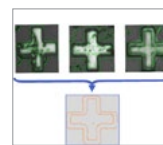
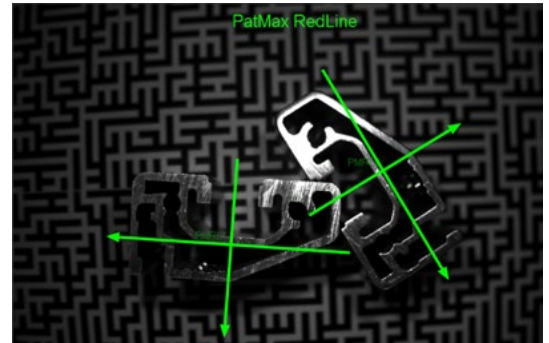
# INDUSTRY-LEADING VISION TECHNOLOGIES

## PatMax RedLine – Reliable part location

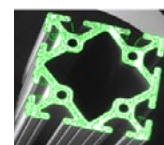
Finding a part in an image is an essential first step in most machine vision applications and is often the determining factor in the success of the application. Pattern matching is the most common method for finding a part in an image but can prove difficult in applications where the appearance of part features vary from one image to the next.

Cognex patented PatMax RedLine technology quickly and reliably locates parts regardless of size, position and orientation, surface reflectivity and shadows. PatMax RedLine is the newest addition to Cognex's suite of pattern matching technology based on the original PatMax algorithm, the foundation for other companion tools, including PatQuick®, PatMax AutoTune and Multi-model PatMax.

[www.cognex.com/PatMax](http://www.cognex.com/PatMax)



PatMax  
AutoTune



Perspective  
PatMax



Multi-model  
PatMax



## OCRMax – Highest character read rates

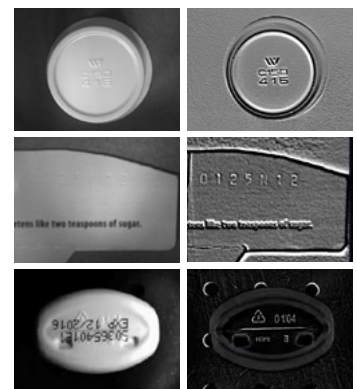
OCRMax technology delivers the power to achieve the highest character read rates while keeping misreads to a minimum. This powerful algorithm prevents misreads, handles process variations and provides easy font management. It is fast at decoding, easy to set up with a unique auto-tune feature and simple to use across all platforms with minimal training for the user.

[www.cognex.com/OCRMax](http://www.cognex.com/OCRMax)

## SurfaceFX – Accurate feature inspection

SurfaceFX™ feature extraction technology uses lighting and software algorithms to create high contrast images that enhances 3 dimensional features on a part. It removes noise and clutter from the surface background and isolates features and defects that are recessed or embossed on parts highlighting surface defects such as chips, dents, wrinkles, punctures and tears, as well as identifying stamped text and codes. Once a clear image is attained, Cognex other In-Sight vision tools such as OCRMax, PatMax RedLine, Blob and InspectEdge can perform their inspections.

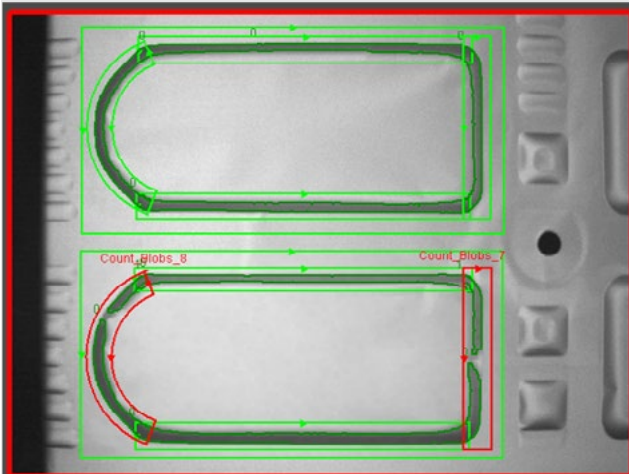
[www.cognex.com/SurfaceFX](http://www.cognex.com/SurfaceFX)





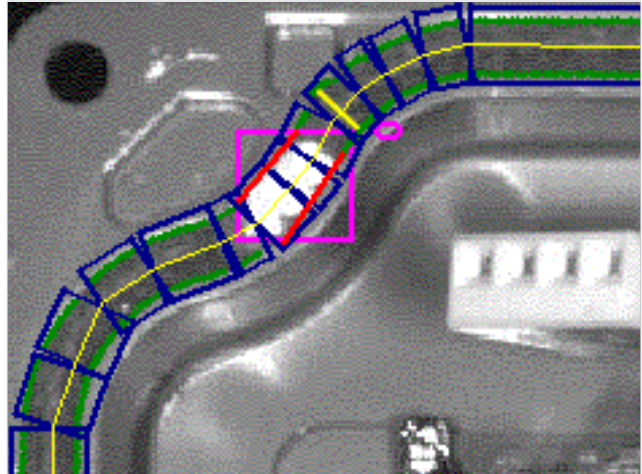
# IN-SIGHT VISION TOOLS

## Blob



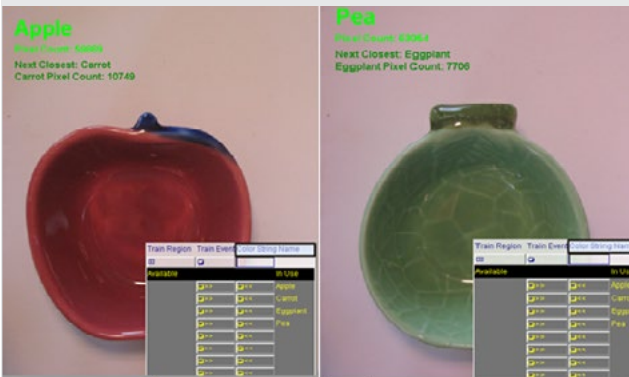
Blob tools are used to detect features that have similar shades of grey scale. Blob is very useful for quantifying defect sizes or for locating features that do not have a repeatable shape. Blob can be used for monochrome and color images to quantify the amount of a particular color present.

## Edge and InspectEdge



Edge tools detect dark and light transitions on a part. Edge tool results can be used to measure distances and can also be used to inspect by counting the number of edges found. Edge can also be used to detect and measure circles and arcs. The InspectEdge tool tracks an edge of a part to inspect for defects.

## Color



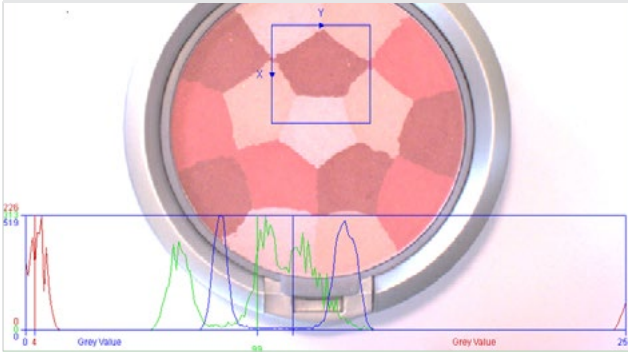
Color tools are used to identify and inspect objects based on color data. Color tools also measure by evaluating the amount of color pixels present or a color or group of colors. Advanced color vision technology maintains accuracy even with lighting variations that can cause problems for traditional color vision tools.

## Optical Character Recognition



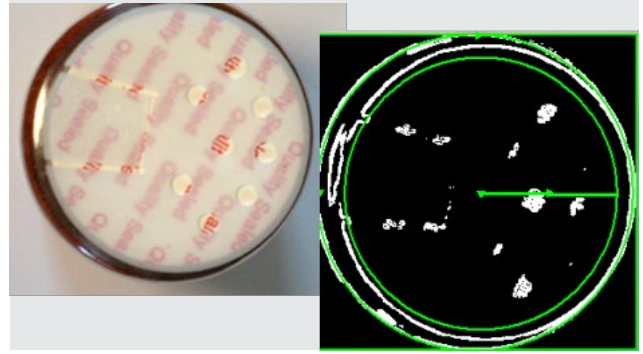
The OCV/OCR tool segments, extracts and trains fonts for optical character recognition (OCR) and optical character verification (OCV) of characters in an image. The font trainable tool accurately reads low-contrast or unevenly-spaced characters on confusing backgrounds.

## Histogram



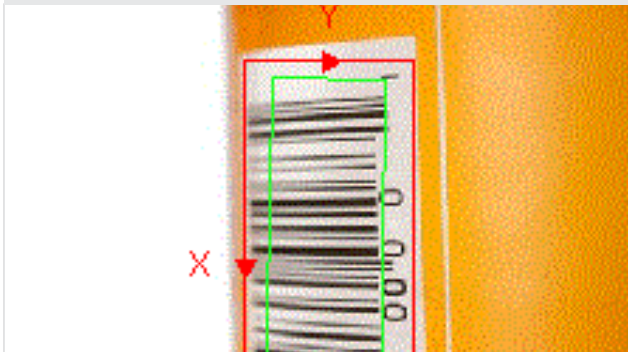
Histograms are used to inspect or monitor features of parts based on brightness.

## Image Filtering



Advanced image filtering is used to highlight features or remove features of parts before doing additional processing with other vision tools.

## ID



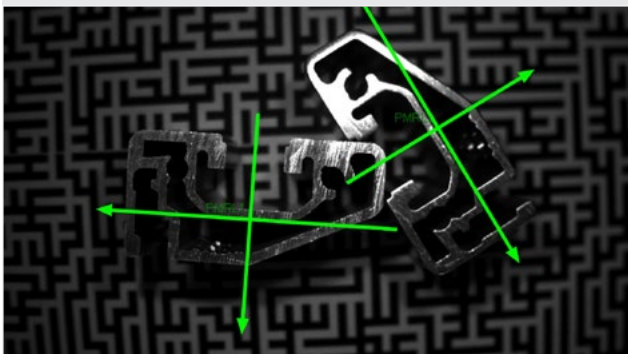
1DMax and 2DMax+™ barcode reading algorithms achieve the highest read rates for 1-D and 2-D barcodes, including decoding challenging 2-D direct part mark (DPM) codes.

## Flaw Detection



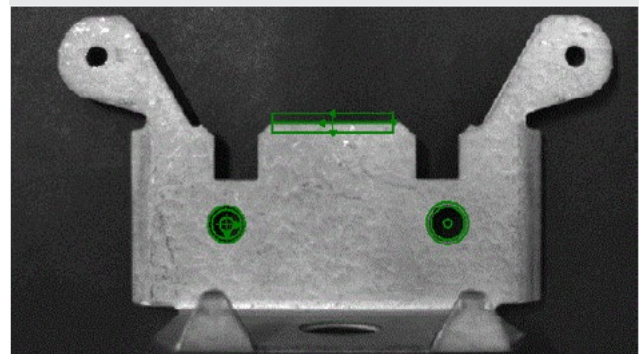
The Flaw Detection tools, including Flex Flaw and Surface Flaw, are used to inspect contours and the surface area of parts. These advanced technologies are able to adapt to variations in lighting and in part appearance.

## Pattern Matching



Locating a part accurately is the first step in most vision applications. Cognex's industry leading pattern matching technologies, such as PatMax RedLine, provide unmatched accuracy and robustness, even with rotation, scale and lighting variations.

## Geometry



Geometry tools are used to measure critical dimensions of a part with point-and-click simplicity. Angles, arcs, diameters and point-to-line distances use real world calibration to provide accurate and repeatable results.



# BUILD YOUR VISION

## 2D VISION SYSTEMS

Cognex machine vision systems are unmatched in their ability to inspect, identify and guide parts. They are easy to deploy and provide reliable, repeatable performance for the most challenging applications.

- Industrial grade with a library of advanced vision tools
- High speed image acquisition and processing
- Exceptional application and integration flexibility

[www.cognex.com/machine-vision](http://www.cognex.com/machine-vision)



## 3D LASER PROFILERS

Cognex In-Sight laser profilers and 3D vision systems provide ultimate ease of use, power and flexibility to achieve reliable and accurate measurement results for the most challenging 3D applications.

- Factory calibrated sensors deliver fast scan rates
- Industry-leading vision software with powerful 2D and 3D tool sets
- Compact, IP65-rated design withstands harsh factory environments

[www.cognex.com/3D-laser-profilers](http://www.cognex.com/3D-laser-profilers)

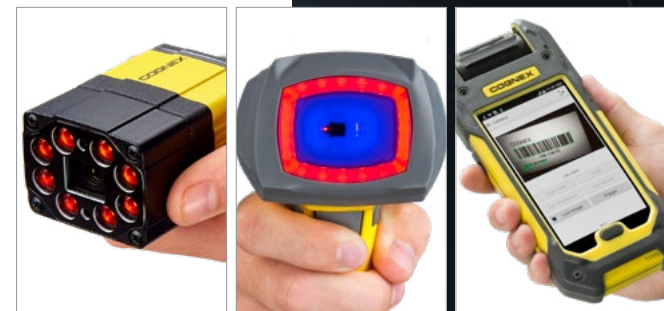


## IMAGE-BASED BARCODE READERS

Cognex industrial barcode readers and mobile terminals with patented algorithms provide the highest read rates for 1-D, 2-D and DPM codes regardless of the barcode symbology, size, quality, printing method or surface.

- Reduce costs
- Increase throughput
- Control traceability

[www.cognex.com/BarcodeReaders](http://www.cognex.com/BarcodeReaders)



# COGNEX

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

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