Vision Sensors VG Series

The Perfect Solution for Accurate Inspection

www.autonics.com

Autonics

Vision Sensors

Competitive manufacturing is achieved through the pursuit of uncompromising quality. Across various industries, manufacturers are relentlessly striving to enhance product quality. Quality is the most important criteria that determines the reliability of a product and the company. Many products are available for quality inspection, but vision sensors have come into the spotlight recently due to their high efficiency.

Vision sensors can utilize images captured by the industrial camera lenses to determine the target object's presence, color, size, shape, orientation, patterns and recognize defects during manufacturing process. Vision sensors can inspect thousands of parts per minute and inspect details of objects that human eyes can't inspect.

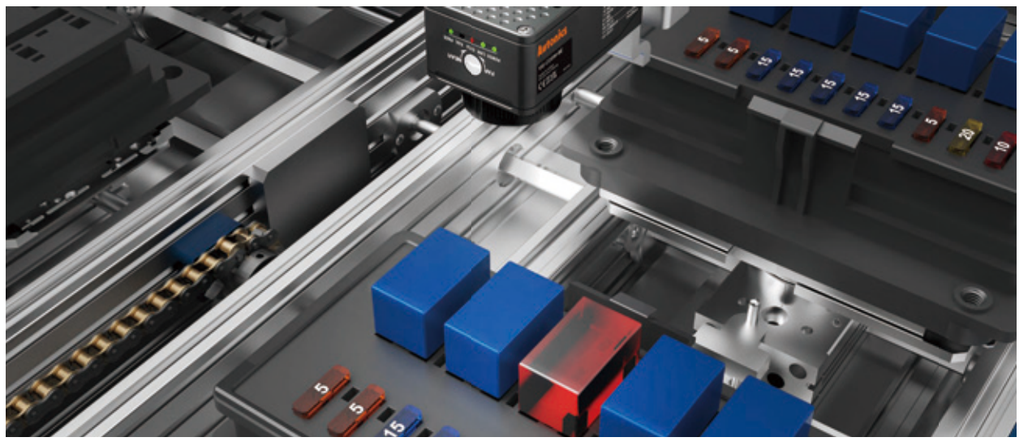
Autonics VG series vision sensors offer highly efficient vision inspection for manufacturing. The integrated design featuring LED lighting, camera and lens allows users to set up and manage the units more easily compared to vision systems. The camera also utilizes global shutter method to capture accurate images, and the sensors feature 13 essential inspection functions for diverse applications. The captured images can also be saved directly to FTP servers, so that users can manage and analyze the inspection data separately.

Vision Sensors **VG Series**

· 0.4M Color Vision Sensors
· 0.4M Monochrome Vision Sensors

1. Vision Sensors with Integrated LED Lighting

Vision sensors VG series utilize images captured by the industrial camera lenses to determine the target object's presence, color, size, shape, orientation, patterns and more. The integrated design featuring LED lighting, camera and lens allows users to set up and manage the units more easily compared to vision systems.

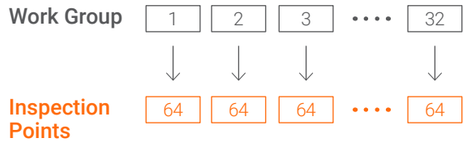


2. Global Shutter Method Reduces Motion Blur

The global shutter method allows the camera to capture images of fast moving targets with minimal distortion and motion blur.

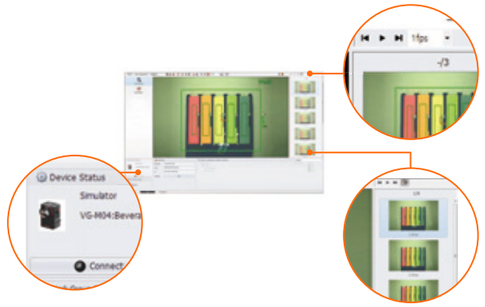
3. Set Up to 32 Workgroups

Users can set up to 32 different workgroups and up to 64 inspection points can be set up per each workgroup.



4. Inspection Simulator Function

With the simulator function, users can check and edit program settings or simulate inspections with saved images even when the VG series sensor is not connected.



5. Save Data to FTP Servers

The image data captured by the VG series can be transferred and stored to FTP servers. Depending on the configuration, users can choose to save all images, pass images only, or fail images only, making it easy to view, manage and analyze the stored data.

6. Various Filters Available for Accurate Inspection

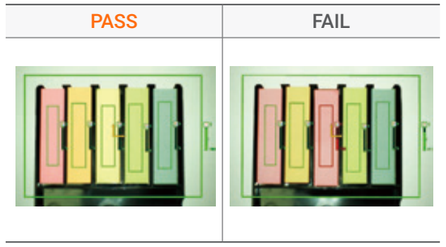
With 4 different color filters and 5 different polarizing filters available, the sensors offer precise and accurate inspection in various environments. The filters can be replaced easily.

7. 13 Types of Inspection Functions

The sensors feature 13 different essential inspection functions including color identification, alignment, brightness, contrast, area, edge, length, shape, angle, diameter, object counting.

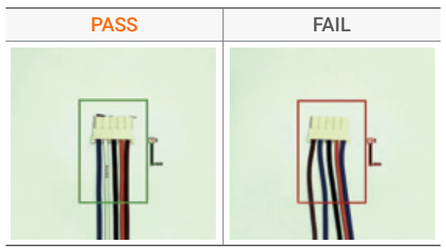
7-1. Color Identification

Inspects the color of the captured image's ROI (region of interest) in reference to the color of the registered image's ROI.



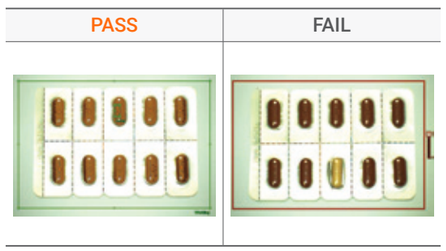
7-2. Color Area

Inspects the color area of the captured image's ROI (region of interest) in reference to the color area of the registered image's ROI.



7-3. Color Object Counting

Inspects the number of specific colored objects in the captured image's ROI (region of interest) in reference to the registered number of colored objects in the registered image's ROI.



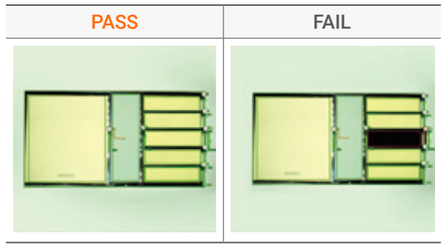
7-4. Alignment

Inspects the characteristics of the captured image in reference to the registered image, comparing the location and angle of similar patterns.

7-5. Brightness

Inspects the brightness of the captured image's ROI (region of interest) in reference to the average brightness of the registered image's ROI.

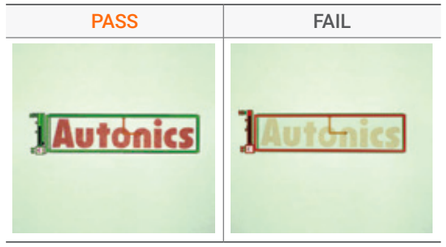
※ Brightness is identified after the color images are converted to monochrome images.



7-6. Contrast

Inspects the contrast of the captured image's ROI (region of interest) in reference to the contrast of the registered image's ROI.

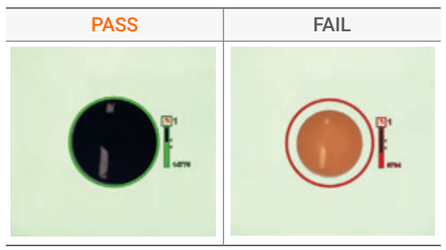
※ Contrast is identified after the color images are converted to monochrome images.



7-7. Area

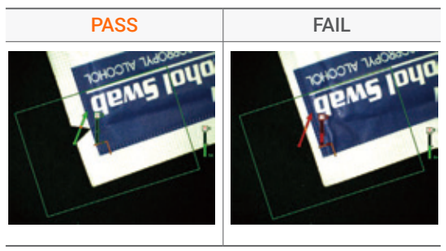
Inspects the area of the captured image's ROI (region of interest) in reference to the area of the registered image's ROI.

※ Area is identified after the color images are converted to monochrome images.



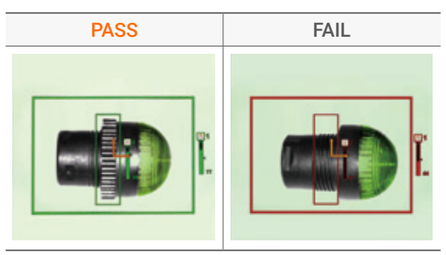
7-8. Edge

Inspects the direction of the edge of the captured image in reference to the edge location of the registered image.



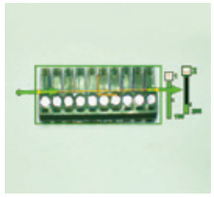
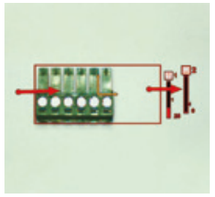
7-9. Shape

Inspects the shape of the captured image in reference to the shape of the registered image.



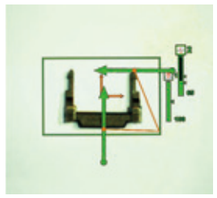
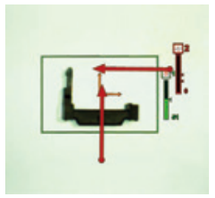
7-10. Length

Inspects the captured image in reference to the length set by the user between two edges of the registered image.

PASS	FAIL
	

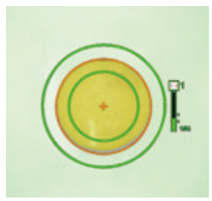
7-11. Angle

Inspects the captured image in reference to the angle set by the user between two edges of the registered image.

PASS	FAIL
	

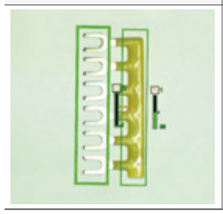
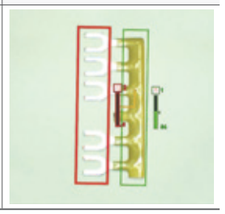
7-12. Diameter

Inspects the captured image in reference to the two diameters set by the user for the registered image.

PASS	FAIL
	

7-13. Object Counting

Inspects the number of objects in the captured image's ROI (region of interest) in reference to the registered number of objects in the registered image's ROI.

PASS	FAIL
	

8. IP67 Protection Structure (IEC Standard)

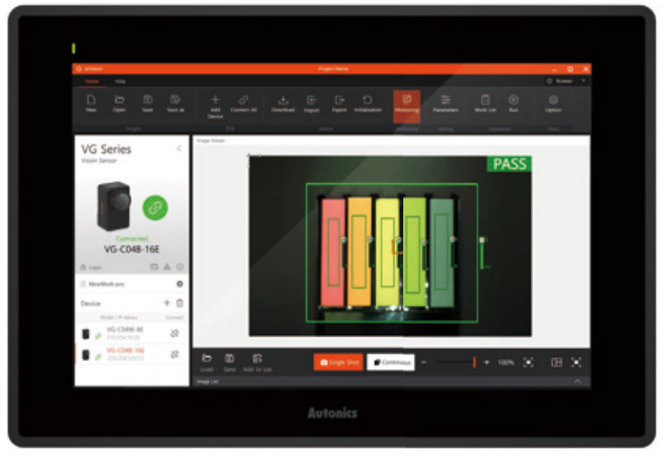
IP67 protection structure allows stable and error-free operation even in wet or dusty environments.

9. Free Vision Sensor Software (Vision Master) Provided

The Vision Master software allow users to directly set parameters, monitor inspection data and more with an easy-to-use, intuitive graphic UI design.

10. Easy Vision System Setup with 10.1-Inch Color LCD Panel PC

APC-1021 (sold separately) is a color LCD industrial panel PC which can be connected to VG series vision sensors to set up vision systems. The touchscreen display panels have integrated processors, allowing simple vision system setup without requiring separate PCs. The panels also support various connection interfaces including HDMI, USB, VGA, Ethernet, and more.



0.4M Monochrome/Color Vision Sensor (Internal illumination)

VG Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

VG - ❶ ❷ ❸ - ❹ ❺

❶ Image element
M: Mono CMOS
C: Color CMOS

❷ Resolution
04: 752 × 480 pixel

❸ Color of light
W: White
R: Red
G: Green
B: Blue

❹ Effective focal length
Number: Effective focal length (unit: mm)

❺ Communication
E: Ethernet (TCP/IP)

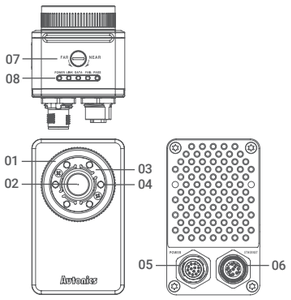
Specifications

Model	VG-M04□-□E			VG-C04□-□E		
Effective focal length	8 mm	16 mm	25 mm	8 mm	16 mm	25 mm
Min. working distance	50 mm	100 mm	200 mm	50 mm	100 mm	200 mm
Image filter	Preprocessing, external filter (color filter, polarizing filter)					
Image element	1/3 inch mono CMOS			1/3 inch color CMOS		
Resolution	752 × 480 pixel					
Image snap camera frame per second	≤ 60 fps					
Shutter	Global shutter					
Exposure time	20 to 50,000 μs					
Inspection work group	32 (simultaneous inspection: 64)					
Inspection camera frame per second	≤ 60 fps					
Dedicated software	Vision Master					
Light ON/OFF method	Pulse					
Light color	White / Red / Green / Blue model					
Trigger mode	External - Internal - Free run setting (software)					
Communication	Ethernet(TCP/IP), 100BASE-TX/10BASE-T					
FTP trans. output	YES					
Indicators	POWER (green), LINK (green), PASS (green), DATA (orange), FAIL (red)					
Approval	CE UK EAC					
Unit weight (package)	≈ 273 g (≈ 415 g)	≈ 274 g (≈ 416 g)	≈ 274 g (≈ 416 g)	≈ 273 g (≈ 415 g)	≈ 274 g (≈ 416 g)	≈ 274 g (≈ 416 g)

01) The number of camera frames per second can be different by image setting or inspection item.
02) Available to buy separately and replace

Power supply	24 VDC⎓ ±10%
Current consumption	1 A
Rated input signal	24 VDC⎓ ±10%
Output signal	NPN-PNP open collector output setting (software)
Load voltage	24 VDC⎓
Load current	≤ 50 mA
Residual voltage	≤ 1.5 VDC⎓
Protection circuit	Output short over current protection circuit
Insulation resistance	≥ 20MΩ (500 VDC⎓ megger)
Dielectric strength	500 VAC~ 50/60 Hz for 1 min.
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	300 m/s^2 (≈ 30 G) in each X, Y, Z direction for 3 times
Ambient temperature	0 to 45 °C, storage: -20 to 70 °C (non-freezing or non-condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (non-freezing or non-condensation)
Protection structure	IP67 (IEC standards)
Connection	Connector type
Connector	Power I/O: M12 12-pin, Ethernet: M12 8-pin-RJ45
Material	Case: AL, lens cover: PC, focus adjuster: SUS, cable: PUR

Parts Descriptions



01. Lens cover
02. Lens
03. Light cover
04. LED light
05. Power I/O connector
06. Ethernet connector
07. Focus adjuster
08. Indicators

■ Indicators

Mark	Name	Function
POWER	Power indicator (green)	Turns ON when power is supplied.
LINK	Ethernet connection indicator (green)	Turns ON when vision sensor is connected with PC (Ethernet communication).
DATA	Data transmission indicator (orange)	Flashes when data is transmitted from vision sensor to PC.
FAIL	Failure indicator (red)	Flashes when detects failure during work group inspection.
PASS	Pass indicator (green)	Flashes when passed inspection during work group inspection.

Software

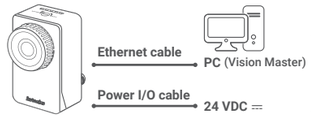
• Download the installation file and the manuals from the Autonics website.

■ Vision Master

Vision Master is the vision sensor program that allows setting of vision sensor parameters and management of monitoring data such as inspection status and status information.

Network Setting

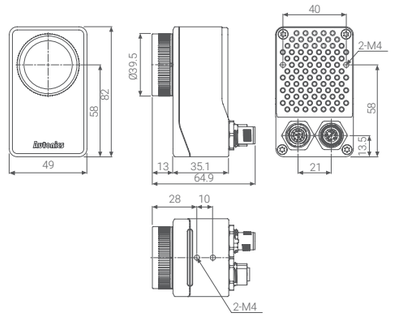
• Configure the network settings of vision sensor via Vision Master.



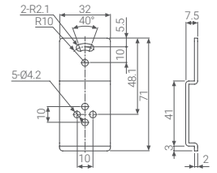
IP address	192.168.0.2
Subnet mask	255.255.255.0
Gateway	192.168.0.1

Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics web site.



■ Bracket A (BK-VG-A)

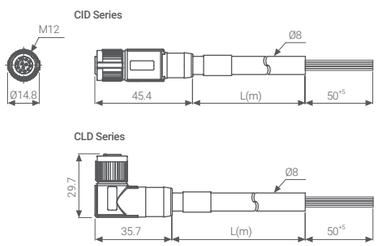


Separately

* For detailed information, please refer to the instruction manual on the Autonics website.

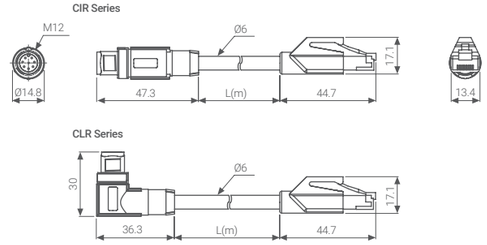
[Power I/O cable]
CID-□-VG, CLD-□-VG

• Cable length L (m): 2 m, 5 m, 10 m



[Ethernet cable]
CIR-□-VG, CLR-□-VG

• Cable length L (m): 2 m, 5 m, 10 m



[Light]
LR-□-06-VG

Model	Appearance	Color
LR-W-06-VG		White
LR-R-06-VG		Red
LR-G-06-VG		Green
LR-B-06-VG		Blue

• The built-in light is available to be replaced with the assembly tool. Refer to the Replacement of Light.

[Color filter]
FL-□-VG

Model	Appearance	Color	Model	Appearance	Color
FL-R-VG		Red	FL-B-VG		Blue
FL-G-VG		Green	FL-IC-VG		Infrared blocking

• The filter is available to be replaced with the assembly tool. Refer to the Replacement of Filter.

[Polarizing filter]
FL-□-VG

Model	Appearance	Color	Model	Appearance	Color
FL-P-VG		Window	FL-BP-VG		Blue
FL-RP-VG		Red	FL-ICP-VG		Infrared blocking
FL-GP-VG		Green			

• The filter is available to be replaced with the assembly tool. Refer to the Replacement of Filter.

[Connector protection cover]
P96-M12-1

[Bracket B]
BK-VG-B

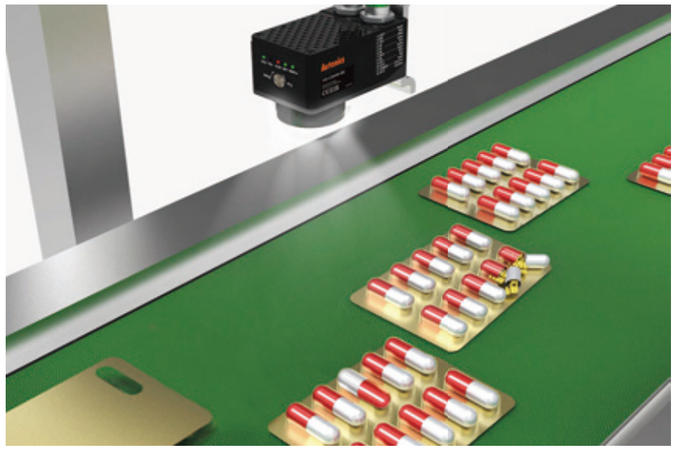
Vision Sensor Applications

Applications of Autonics vision sensors are becoming more diversified with the growth of smart factories and advanced automation processes.

Vision sensors can identify defects in the early stages of production, decrease defect rates, monitor production lines, and precisely track and categorize components. Vision sensors are used across various industries, including food and beverage packaging, automotive manufacturing, press processes, and part transfer lines, ensuring product quality.

Autonics is dedicated to delivering optimal inspection solutions that enhance manufacturing quality through meticulous inspection and user-friendly operation.

1. Medical/Pharmaceutical Industry



1-1. Pharmaceutical Drugs Production Line

Vision sensors are used to identify the number of pills, presence or absence of pills, or defects in packaging of medical suppliles.

1-2. Pharmaceutical Drugs Transfer Line

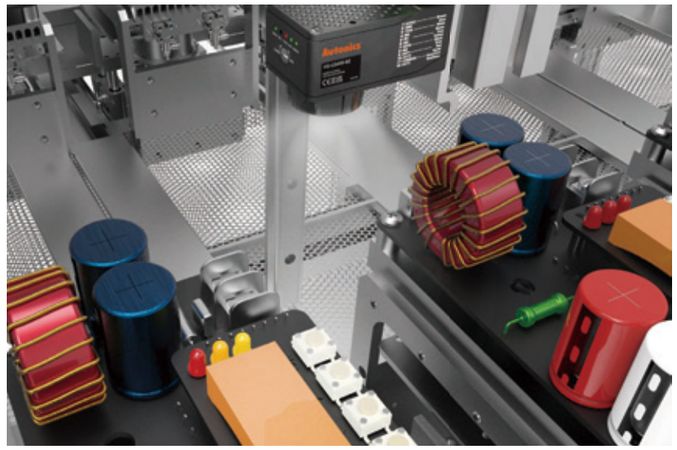
Color type vision sensors are used to identify different color pills within packages.

2. Medical Equipment Industry

2-1. Syringes Assembly Line

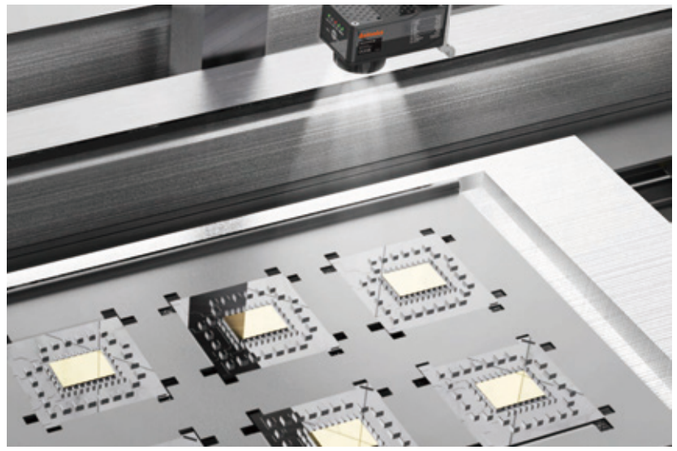
Visions sensors are used to identify presence, absence, or defects of rubber packing in syringes during manufacturing.

3. Semiconductor Industry



3-1. PCB Transfer Line

Color type vision sensors are used to identify colors of diodes and capacitors on PCB boards during manufacturing process.



3-2. Semiconductor Parts Transfer Line

Vision sensors are used to identify the presence or absence of parts for defects during semiconductor transfer lines.

4. Printing Industry

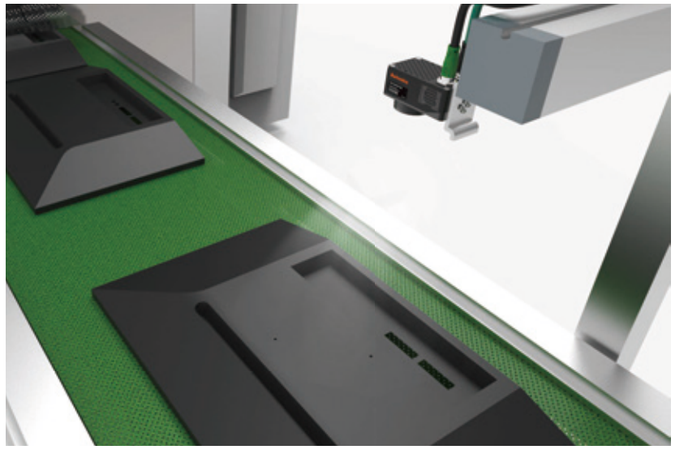
4-1. Printing Paper Transfer Line

Color type vision sensors are used to identify the color of printing paper during manufacturing and packaging processes.

5. Injection Molding Industry

5-1. Plastic Container Manufacturing Line

Visions sensors are used to identify errors in the shape of screw threads during injection molding process.



5-2. Monitor Assembly Transfer Line

Visions sensors are used to identify the molding status of monitors in manufacturing lines, including the number of holes, size, etc.

6. Logistics Industry

6-1. Shipping Transfer Line

Visions sensors are used to identify box sizes on shipping conveyor belts.

7. Food Industry

7-1. Containers Transfer Line

Visions sensors are used to identify sealing status of food containers on conveyor belts.

7-2. Beverage Containers Packaging Line

Visions sensors are used to identify the presence of expiration date printing on packages.

8. Cosmetics Industry

8-1. Cosmetics Containers Transfer Line

Visions sensors are used to identify the printing status on cosmetics containers.

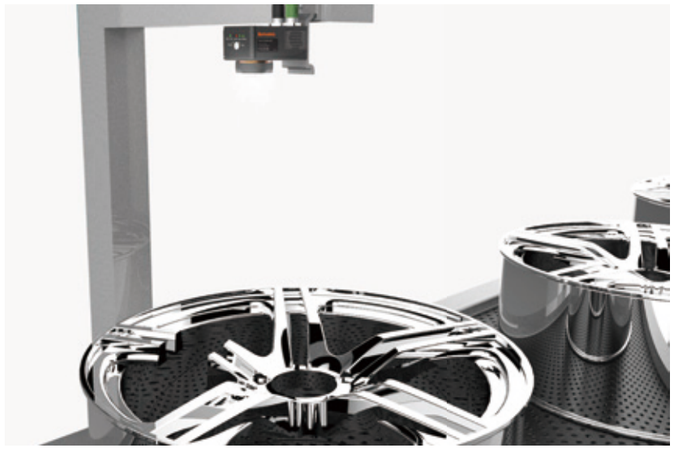
9. Automotive Industry

9-1. Automobile Parts Manufacturing Line

Visions sensors are used to identify the shape of car spark plugs in manufacturing lines.

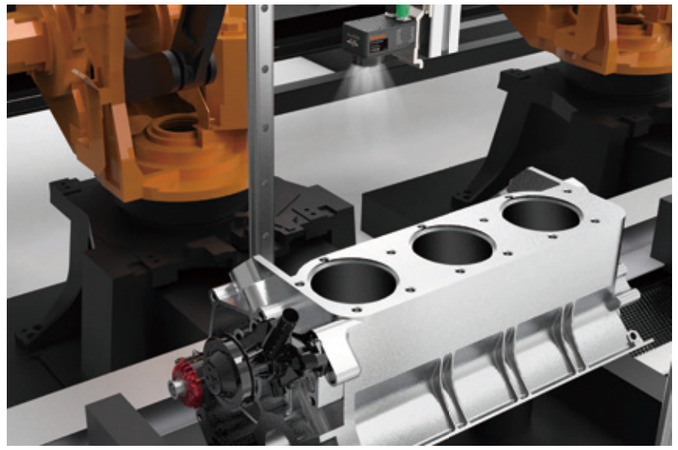
9-2. Automobile Parts Manufacturing Line

Color type vision sensors are used to identify colors of relays in car fuse box manufacturing lines.



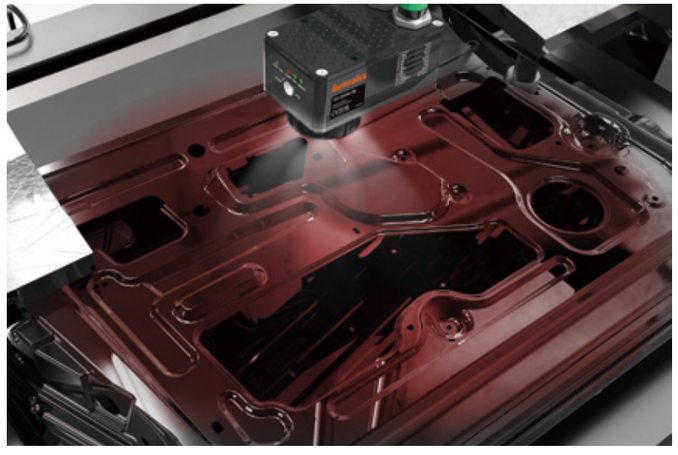
9-3. Automobile Parts Manufacturing Line

Visions sensors are used to identify the shape of car wheels in manufacturing lines.



9-4. Automobile Parts Manufacturing Line

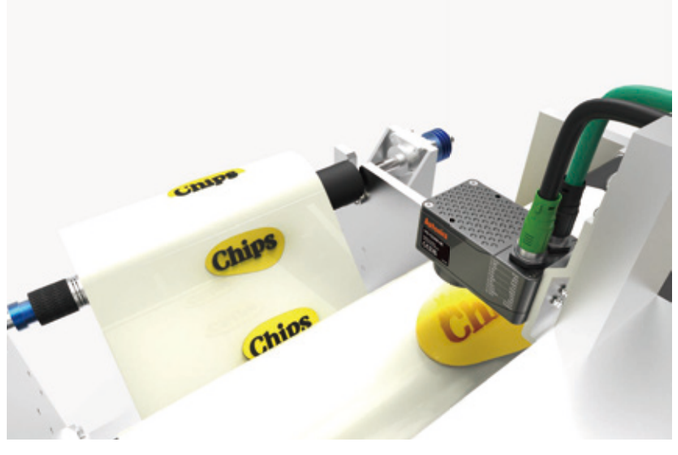
Visions sensors are used to identify the diameter of holes in car engine blocks during manufacturing.



9-5. Press Process

Vision sensors are used to inspect the shape of automobile doors during manufacturing process.

10. Packaging Industry



10-1. Inkjet Markers

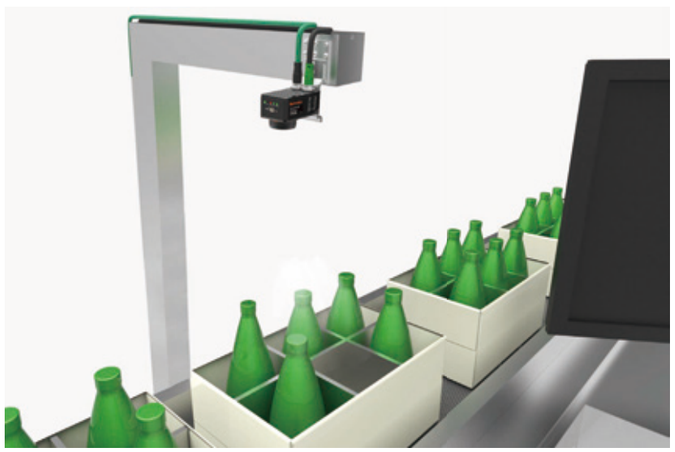
Visions sensors are used to identify the printing status of marks on packaging paper from inkjet markers.

10-2. Pen Transfer Line

Color type vision sensors are used to identify the color of pens during manufacturing and packaging processes.

10-3. Engine Oil Containers Transfer Line

Color type vision sensors are used to identify the colors of engine oil containers on transport conveyor belts.



10-4. Beverage Containers Transfer Line

Visions sensors are used to identify the number of items in containers in packaging lines.

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