



Vision Sensor with Built-in AI

NEW IV3 Series



All-in-one presence
detection solution



IV3 Series

Ultimate Flexibility for Mistake and Error proofing in manufacturing



AI

**AI-based imaging and
detection for easy usability**



Smart camera and compact model for use anywhere

IV3 Series Vision Sensor with Built-in AI



AI-based imaging

The AI generates the optimum detection image with no glare or crushed blacks.

All settings—including illumination intensity, flash method, and exposure time—are automatically configured by the AI. The ideal imaging conditions can be derived for any environment or target conditions to ensure stable detection.

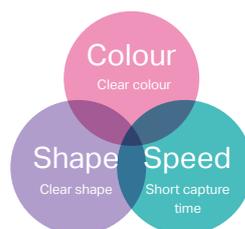


Algorithm

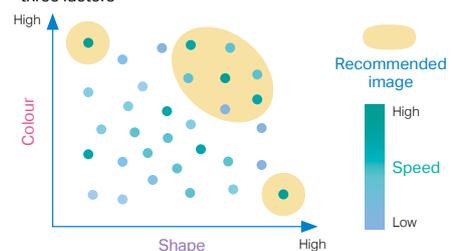
Imaging mechanism

The AI automatically extracts the recommended image from over 1000 imaging conditions. The system scores the acquired images according to three factors—colour, shape, and speed—for automatic extraction of the recommended image.

Three factors for AI-based image extraction



Recommended image extraction based on scoring of three factors



AI-based detection

Simply register OK and NG products to automatically configure the optimal settings for AI-based presence detection.

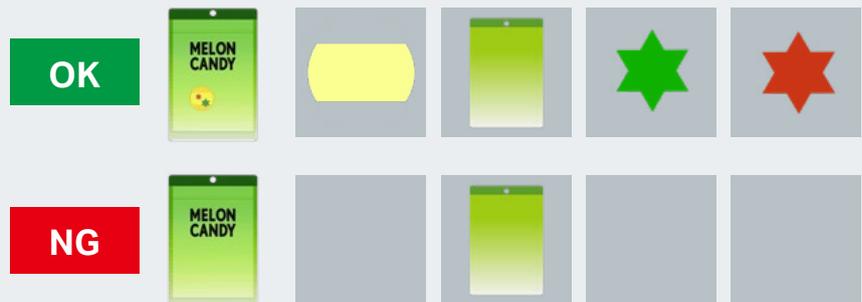
The built-in AI detects even slight differences to automatically configure the optimal detection settings. Because detection is based on target characteristics, stability can be ensured with no adverse effects from ambient light, individual product variations, or surface conditions.



Algorithm

Detection mechanism

The AI determines the characteristics of registered OK and NG products to enable comprehensive judgement. Accurate judgement is possible even if part of the image is not visible or if the shape changes by extracting the colours, shapes, edges, or other pattern characteristics.

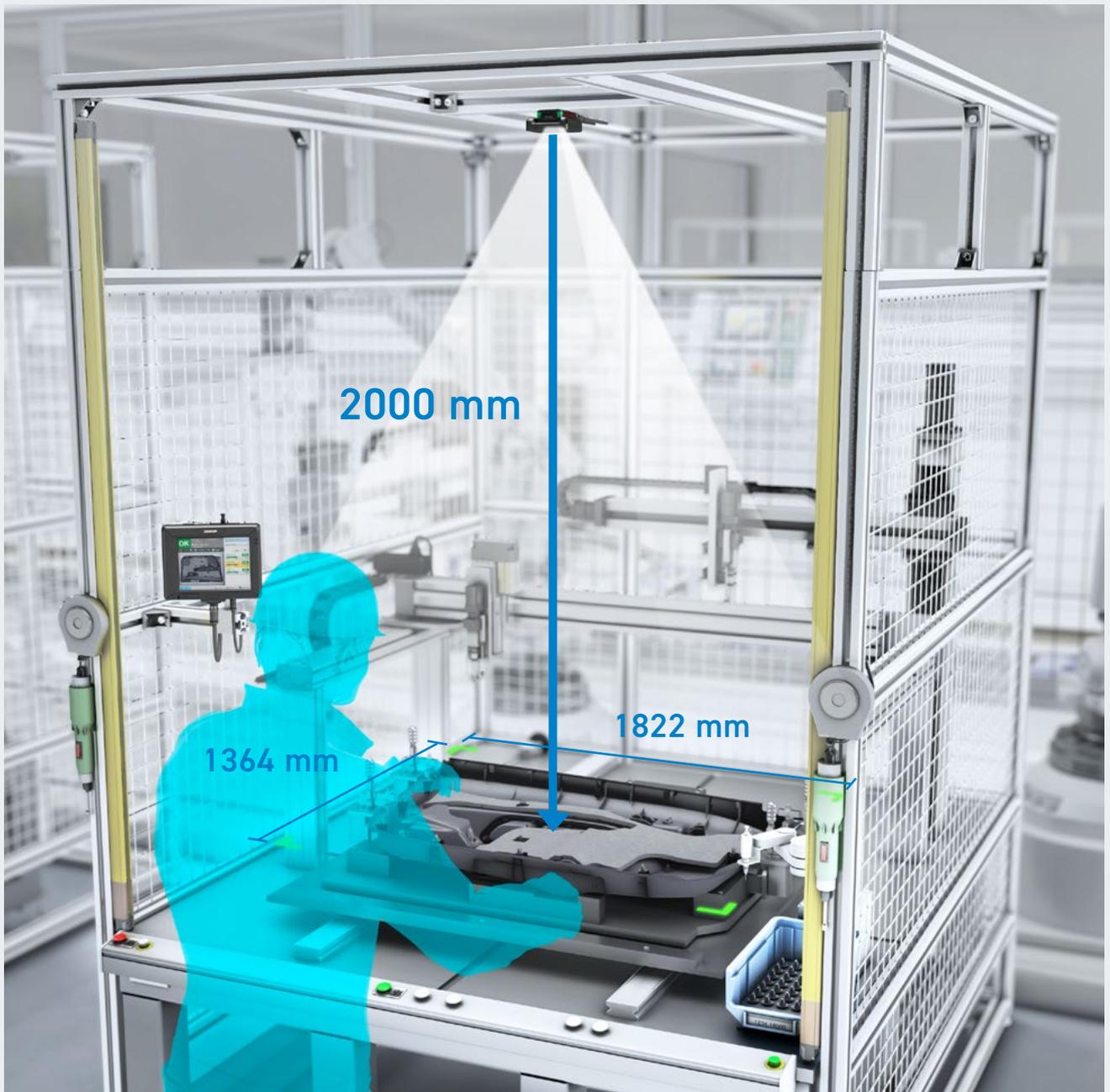


Detection of colours, shapes, edges, and other pattern characteristics



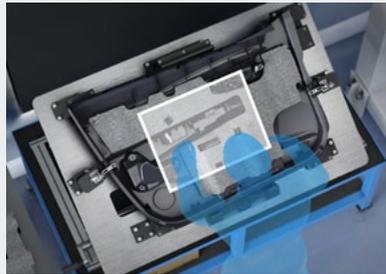
Smart camera and compact model for use anywhere

Semi-automatic
assembly processes

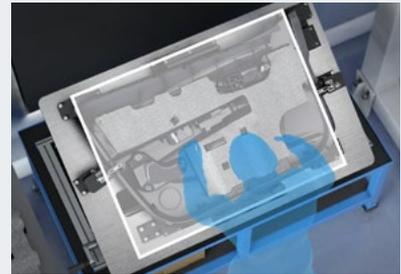


Megapixel camera for long-range detection over a wide field of view

Perform differentiation inspections in up to 65 locations with just one device. When using infrared lighting, operators are not distracted even if the sensor head is installed 2000 mm above the workspace.



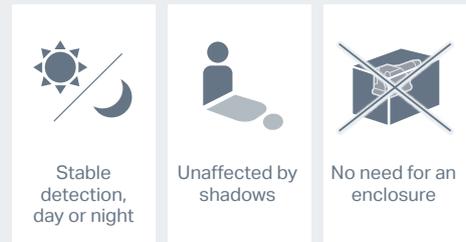
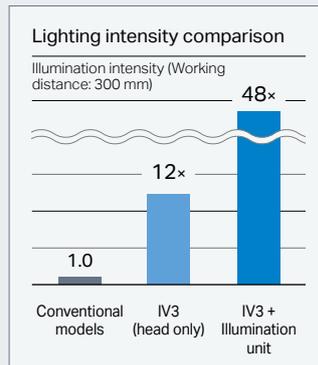
Conventional models



IV3 Series

High-intensity lighting and AI tools for preventing adverse effects from ambient light

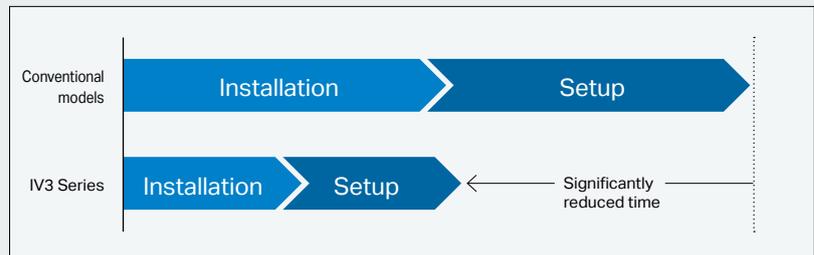
The sensor heads offer 12 times more light intensity than conventional models when used alone or 48 times more powerful when used with an illumination unit. This impressive light intensity enables stable detection with no fluctuations due to ambient light.



No adverse effects from ambient light or imaging environment changes

Significantly reduced time spent from installation to setup with PoE and dual AI

With PoE support, installation is easy even in locations with no power supply or where installing a power supply is difficult. In addition, AI imaging and learning tools can significantly reduce the time spent from image capturing to settings configuration.





Smart camera and compact model for use anywhere

Automatic assembly processes



Compact design for easy retrofitting or equipment improvement

The small sensor size (24 × 31 × 44.3 mm) allows for flexible, stress-free installation. This opens the door to a wide range of improvements.



Flexible layout with a connector that can be rotated up to 330°

The cable connector can be rotated by up to 330° to match the available space and installation conditions for greater installability.



Robot assembly processes



Robust, integrated design with IP67 enclosure

The smart camera is PoE-compatible, allowing for installation with even minimal wiring. The IP67-rated enclosure also ensures safe use even in environments with exposure to water.



Conversion connectors with support for common cables

The conversion connectors make it possible to use any available standard cable.



Power supply cable

M12 A-coded 12-pin (included as standard)

M12 A-coded 4-pin **OP-88631**

M12 L-coded 5-pin **OP-88632**

Ethernet cable

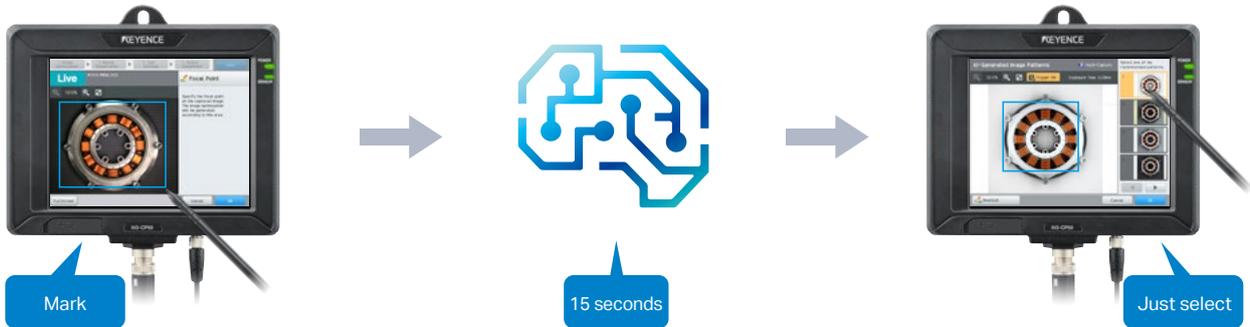
M12 X-coded 8-pin (included as standard)

M12 D-coded 4-pin **OP-88633**

AI-based imaging

Easy extraction of optimal judgement image for anyone

Flow



Mark the detection area.

The AI automatically extracts the recommended images from over 1000 imaging conditions in about 15 seconds.

Choose from 4 to 12 images extracted automatically by the AI.

Point 1 Automatic recommended image extraction from over 1000 imaging conditions

The lighting method, intensity, and other conditions are automatically controlled, and the acquired images are scored according to three factors—colour, shape, and speed—to extract between 4 and 12 recommended images. Users need only to mark the inspection area, and the AI will provide images captured under various conditions.



Automatic extraction of recommended images



Point 2 Automatic configuration of conditions for the target area

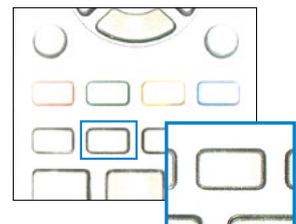
The optimal imaging conditions for the inspection area are configured automatically. Any user can obtain the best imaging conditions simply by marking the area to be inspected.



Marking the entire area ensures a balanced detection of colour and shape.



Marking only the red button emphasises colour.



Marking only a black button emphasises shape.

AI-based detection

Easy configuration of the most stable settings for anyone

Flow



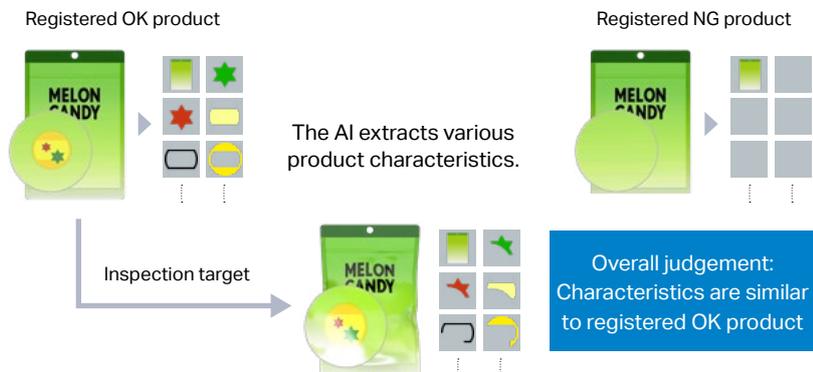
Mark the detection area.

Register OK products and NG products.

The AI identifies the characteristics of OK and NG products for automatic generation of the best settings in about 3 seconds.

Point 1 Stable detection even if the imaging environment changes

The AI determines the characteristics of registered OK and NG products for accurate judgement even if part of the image is not visible or if the shape changes, ensuring stable detection.



Point 2 One-touch handling of condition changes and product type additions

Product inspection criteria can be easily added with a single touch through additional learning even if various conditions have already been set. Even beginners can use the AI to easily redetermine the optimum settings. This enables inspection under any situation, including if the imaging environment changes or if more product types are added.



Standard mode

A wide range of detection tools for various targets and applications



New built-in tools



NEW
Learning



NEW
Blob count

Tools



Outline



Colour area



Area



Colour average



Brightness average



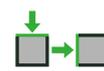
Edge pixels



Width



Diameter



Edge presence



Pitch



OCR



Colour/
brightness
prohibit

Position adjustment tools



Position adjustment



High-speed position adjustment



NEW Multi-position adjustment



Automatic AI-based differentiation

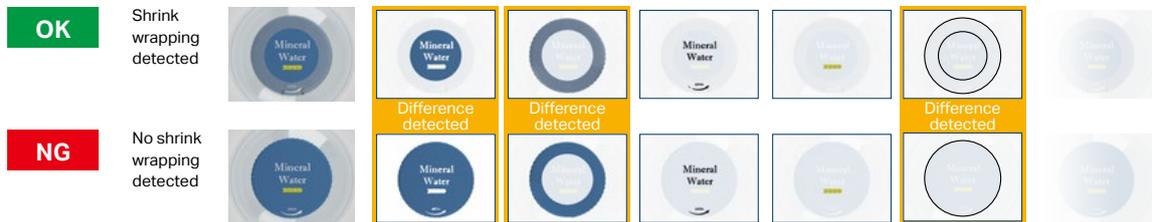
The built-in AI can detect even slight differences to automatically configure the optimal detection settings simply by registering OK and NG products.



NEW Flexible combination with other detection tools

The learning mode is a new tool that uses registered OK and NG products for differentiation. The learning tool can also be used together with various other tools for even more advanced detection.

Extraction of colours, shapes, edges, and other pattern characteristics



(Appearance-based difference check of metal components)



(Connector wiring difference check)



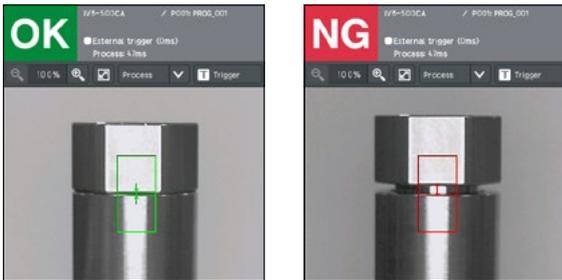
(Colour-based cap difference check)



(Type-based difference check of metal components)

Built-in tools

Width



(Component assembly misalignment check)

Diameter



(Diameter-based difference check of metal components)

Edge presence



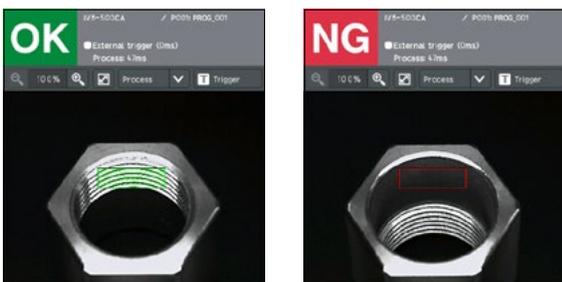
(Type-based difference check of metal components)

Pitch



(Pin pitch check)

Edge pixels



(Tap processing presence detection)

Colour/brightness prohibit



(Wire protrusion detection)

Position adjustment



(Mark presence detection with rotational correction)

Multi-position adjustment

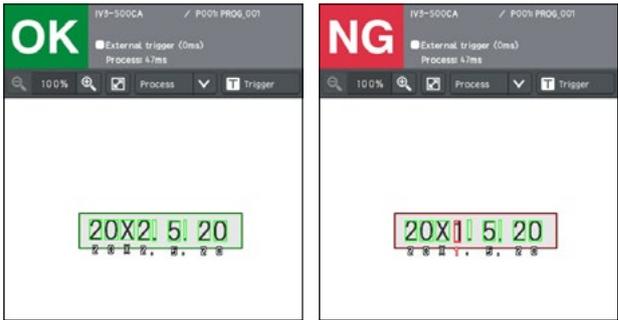


(Label and Expiration date detection)

123 OCR

Inspection based on text, numbers, or dates

Automatic character recognition can be performed simply by enclosing the characters to be detected. There is no need to register a dictionary or configure any other settings required with conventional vision sensors.



(Expiration date-based inspection)

NEW Newly developed OCR algorithm

Characters can be read even if not perfectly aligned. Reading accuracy has been further improved for stable recognition even with misaligned text and text on irregularly shaped surfaces. Reading of lowercase characters and the "+" symbol has also been added for increased capability.



Stable detection even with misaligned text

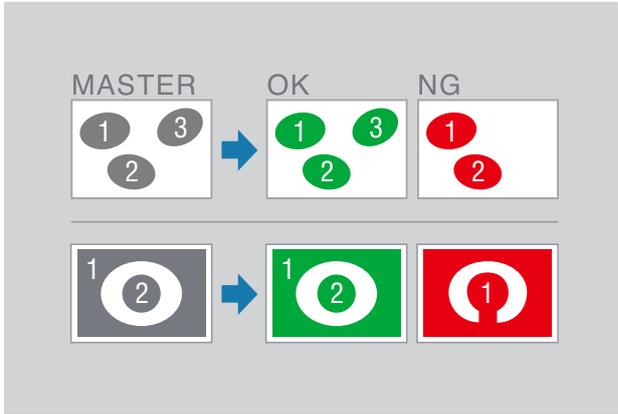


Support for lowercase characters and "+" symbol

NEW Blob count

Differentiation according to the number of similarly coloured clumps

Specify the detection area to include or exclude certain blobs from detection. In addition to counting, this function can also be used for detecting incomplete areas.



(Beverage bottle count)



(Sealant interruption inspection)

Various detection tools

Sorting mode

Sort and identify product types while also improving productivity by addressing root causes and shortening processing time

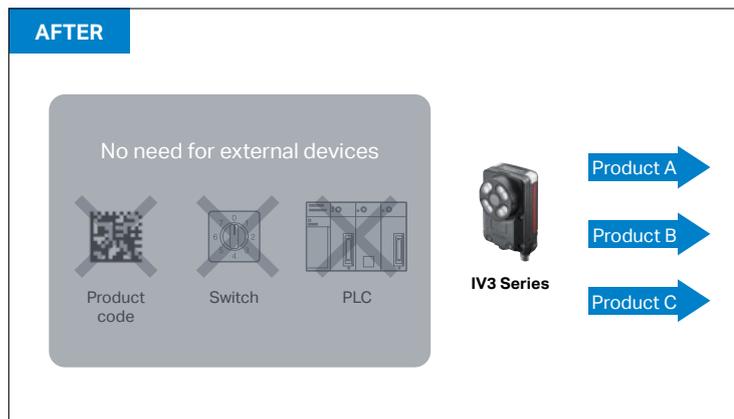
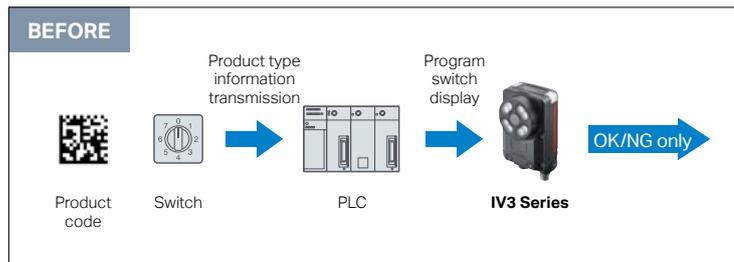
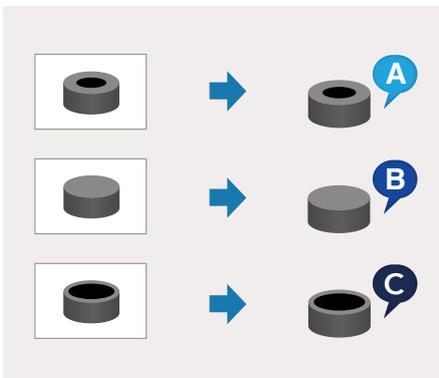


Up to 8 patterns can be registered for product sorting. Registering patterns beforehand can help improve productivity in various ways, including through product type differentiation and sorting, feedback to the next process, and countermeasures against defect factors at the source.

Registration of up to 8 different patterns

Sorting Output differentiation and sorting for up to 8 different product types

Register products in advance to output up to 8 product differentiation and sorting patterns, eliminating the need for complicated PLC control and external devices.

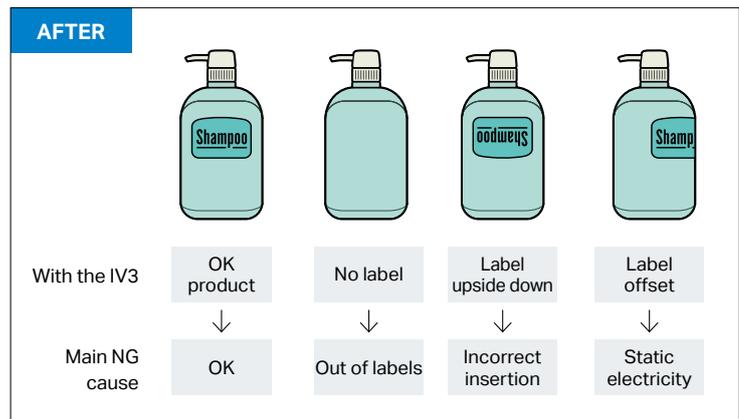
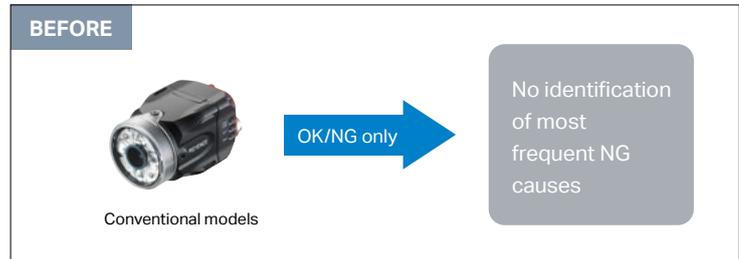


CASE 1 Identifying root causes

Identify the cause of defects to enforce countermeasures at the source

Registering possible NG patterns in advance makes it possible to determine and categorise the types of NGs, enabling countermeasures at the source.

Example: Determining and identifying root causes of NG label application

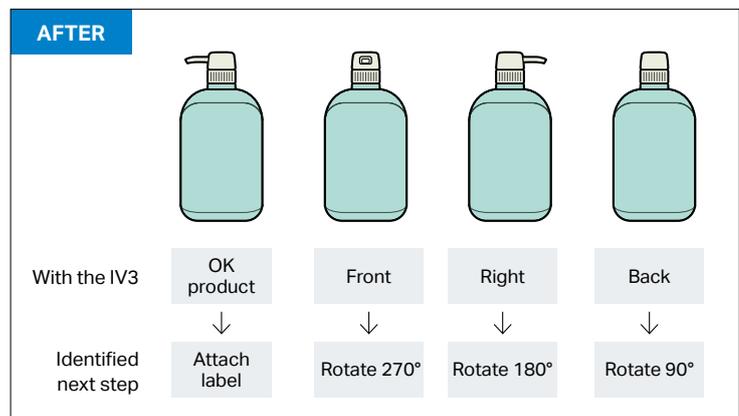
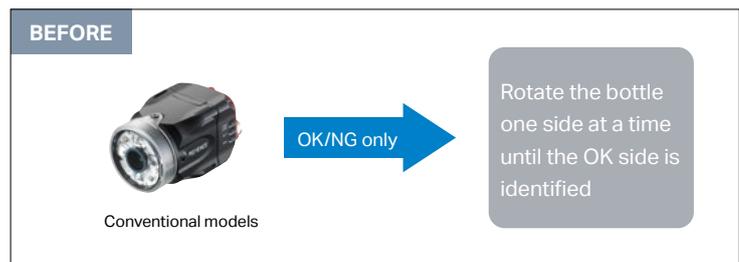


CASE 2 Improving processing time

Decide the next steps more easily

Using pre-registered patterns makes it possible to identify the product conditions. This can help improve equipment processing time by identifying the necessary operations in the next step.

Example: Determining bottle direction to identify next steps



Extensive network compatibility for various equipment types



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 * DeviceNet® and EtherNet/IP® are registered trademarks or trademarks of ODVA.
 * CC-Link is a registered trademark or a trademark of Mitsubishi Electric Corporation.

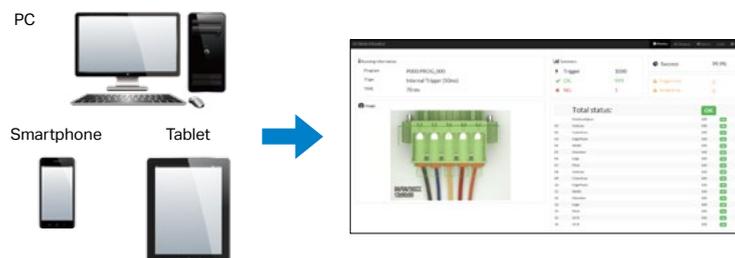
SFTP support for reliable security

The SFTP client function makes it possible to transfer image data to an SFTP server (PC, NAS, PLC). This enables status confirmation and cause analysis support in the event of a problem.



Remote sensor status checking

The Web Monitor function makes it easy for users to check the operation screen, judgement result, and sensor status from a PC, smartphone, or tablet.



SD card compatibility for reliable line operation even if a problem occurs

Support for up to 128 programs and multi-product production lines

Using an SD card enables up to 128 programs for use in multi-product production lines.

SDHC UHS1 compatibility, high-speed image data storage

Applicable models	SD card	Number of programs	Image data transfer capacity (typical example)
Compact model	16 GB	128 (32 + 96)	Approx. 156,000 images*
Compact model	4 GB	128 (32 + 96)	Approx. 37,000 images*
Smart camera	8 GB	128 (32 + 96)	Approx. 75,000 images*
Compact model + Smart camera	None	32	—

* Extended programs: Not used
File size varies depending on the image when using JPEG format.

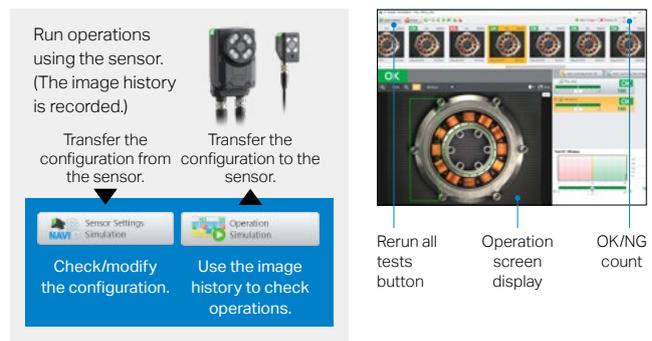


Data management and cause analysis support

IV3-Navigator (IV3 software)



Simulation function

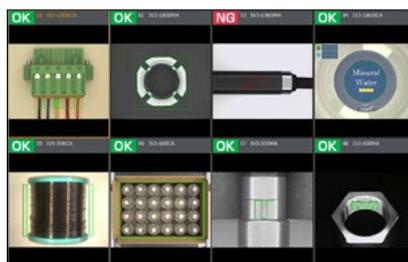


At-a-glance status checking of multiple sensors



Connected sensor list **NEW**

A list of network-connected sensors can be displayed for easy configuration of settings and display switching.



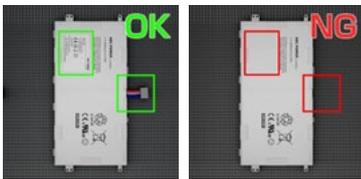
Simultaneous multi-sensor display screen **NEW**

Display up to sixteen operation screens at once.

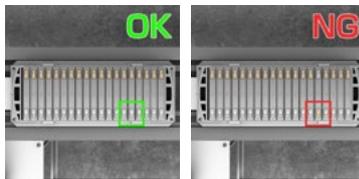
Automotive & metal

Electronics

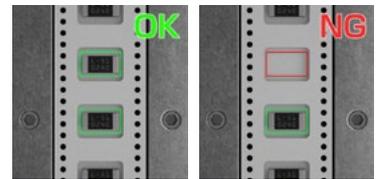
Lithium-ion battery presence check



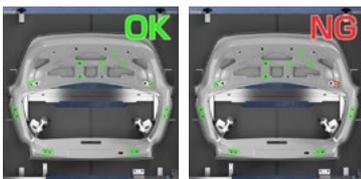
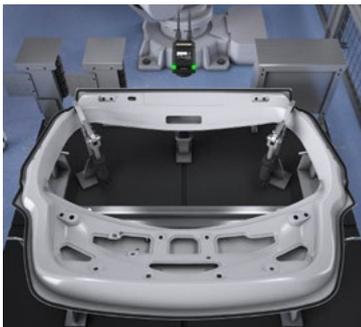
Lithium-ion battery orientation check



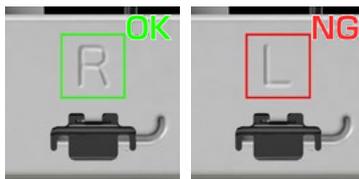
IC presence check



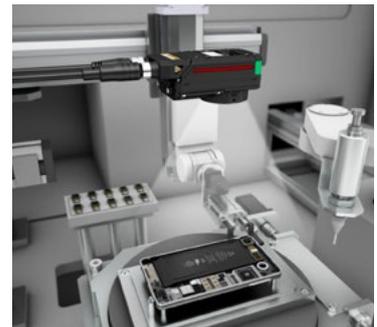
Bumper bolt check



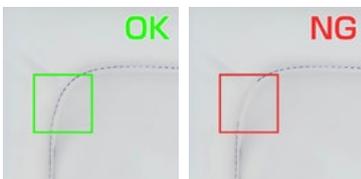
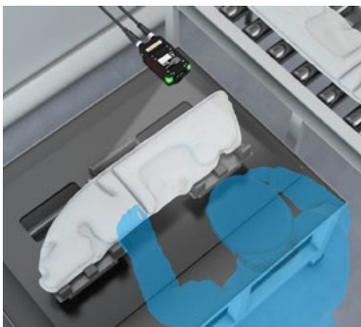
Sheet right/left check



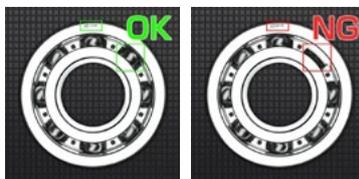
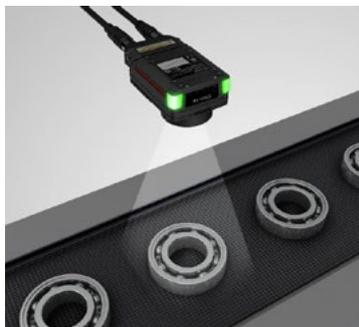
Smartphone component check



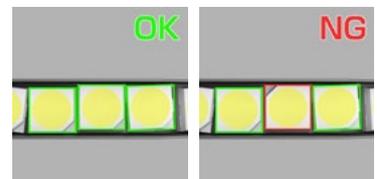
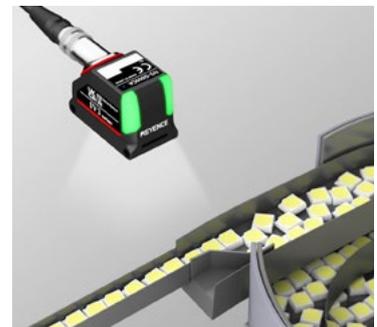
Air bag stitching check



Bearing roller check

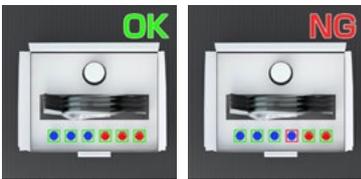


LED direction check



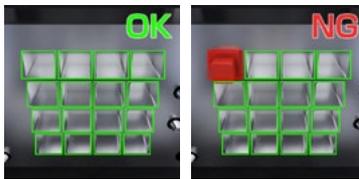
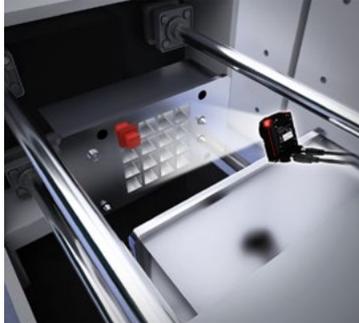
Food & pharmaceutical

Test kit product check



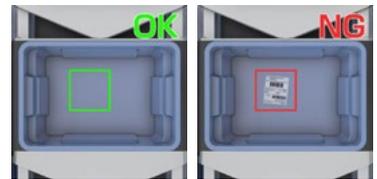
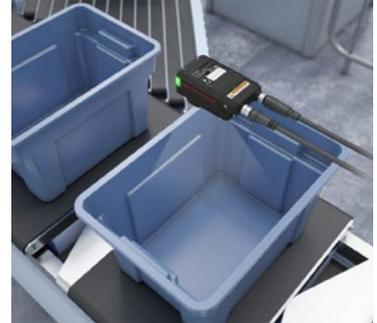
Resin & rubber

Resin part mould check



Logistics & robotics

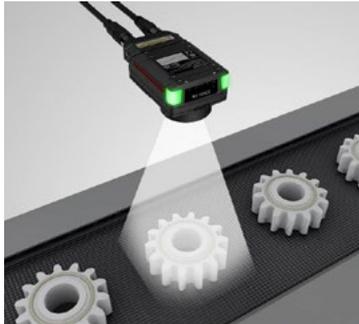
Shipping box stock check



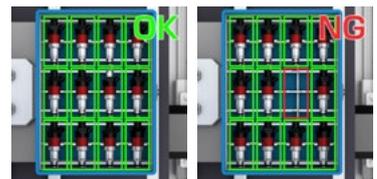
Diaper type check



Gear grease check



Injector quantity check



Chocolate quantity check



Bad mark check on tyres



Photocopying machine screw check



Specifications

Smart camera

Model	IV3-500CA	IV3-500MA	IV3-600CA	IV3-600MA
Type	Standard type		Wide view type	
Installed distance	50 to 2000 mm			
Field of view	Installed distance 50 mm : 22 (H) × 16 (V) mm to Installed distance 2000 mm : 789 (H) × 592 (V) mm		Installed distance 50 mm : 51 (H) × 38 (V) mm to Installed distance 2000 mm : 1822 (H) × 1364 (V) mm	
Image receiving element	1/2.9 inch colour CMOS		1/2.9 inch monochrome CMOS	
	Number of pixels		1280 (H) × 960 (V)	
Focus adjustment	Auto*1			
Exposure time	12 μs to 10 ms			
Light	illumination	White LED	Infrared LED	White LED
	Lighting method	Pulse lighting/ continuously lighting is switchable.	Pulse lighting	Pulse lighting/ continuously lighting is switchable.
Tool	Available modes	Standard mode / Sorting mode		
	Available Tool	Learning, Outline, Colour area*2, Area*3, Edge pixels, Colour average*2, Brightness average*3, Width, Diameter, Edge presence, Pitch, OCR, Colour prohibit *1, Brightness prohibit, Position adjustment, High-speed position adjustment (1-axis edge/2-axis edge), Blob count		
	Number of tools *4	Total: 65 tools		
Switch settings (programs)	128 programs (when using SD card) / 32 programs (when not using SD card)			
Image history*5	Number of storable images	100 images		
	Condition	Selectable between NG only, NG and OK near threshold*6, and All		
Image data transfer	Transfer destination	Selectable between SD card, FTP server and SFTP server		
	Transfer format	Selectable between bmp, jpeg, iv3p, and txt, and file names can be modified		
	Transfer conditions	Selectable between NG only, NG and OK near threshold*7, and All		
Analysis information*7	RUN display	Tools list (Judgement results, degree of similarity, or degree of similarity bar display)		
	RUN information	Switchable between OFF, histogram, processing time, count, and output monitor Histogram: Histogram, degree of similarity (Max., Min., Ave.), Number of OKs, Number of NGs Processing time: Processing time (latest, Max., Min., Ave.) Count: Trigger numbers, Number of OKs, Number of NGs, Trigger errors, Strobe errors Output monitor: ON/OFF status by output		
Other functions	Image capture function	Digital zoom (2x, 4x), HDR, High gain, Colour filter*2, White balance*2, Brightness correction, AI capture		
	Tool functions	Additional learning, Mask outline, Masking function, Colour extraction/exclusion*2, Colour histogram function*2, Monochrome histogram function*3, Scaling function		
	Utilities	Failing sensor list, Failure hold, Test run, I/O monitor, Security settings (Two-factor password), Simulator*8, Additional FTP/SFTP Image Information, Multi-position adjustment, Multi-master image registration, High-speed program switching, Auto program switching, Auto setting backup/restore, Threshold changing in RUN		
Indicators	OUT, TRIG, STATUS, LINK/ACT, SD			
Input		Switchable between non-voltage input and voltage input For no-voltage input: ON voltage 2 V or lower, OFF current 0.1 mA or lower, ON current 2 mA (short circuit) For voltage input: Maximum input rating 30 V, ON voltage 18 V or higher, OFF current 0.15 mA or lower, ON current 2 mA (for 24 V)		
	Number of inputs	6 ports, 3 ports are selectable as IN/OUT		
	Function	IN1: External trigger, IN2, IN3, I/O1 to I/O3: Enable by assigning optional functions Assignable functions: Program switching, Clear error, External master image registration, SD card save cancel		
Output	Number of outputs	6 ports, 3 ports are selectable as IN/OUT		
	Function	Photo MOS relay output, NO/NC, Switchable Maximum rating 30 V 50 mA, residual voltage 1.5 V or less *9 Enable by assigning the optional functions Assignable functions: Total judgement (OK/NG), Run, Busy, Position adjustment result, Judgement result of each tool, Result of the logical operation of each tool, Error, SD card error, Variety discrimination result, Master judgement result		
Power/I/O	Connector	M12 12 pin A code Male connector		
Ethernet	PoE	PoE power Class 3/4/6 *10		
	Standard	1000BASE-T/100BASE-TX		
	Connector	M12 8 pin X code Female connector		
Network function		FTP client, SFTP client		
Interface compatibility	Built-in Ethernet	EtherNet/IP®, PROFINET*11, TCP/IP non-procedure communication		
Expanded memory		microSD card (microSD/microSDHC)*12		
Rating	Power voltage	24 VDC ±25%/-20% (including ripple)*13		
	Consumption current	3.3 A or less (without the AI Lighting unit, and including the output load) 1.8 A or less (AI Lighting unit, and including the output load)*14		
Environmental resistance	Operating ambient temperature	0 to +40°C (No freezing)		
	Operating ambient humidity	35 to 85% RH (No condensation)		
	Vibration resistance *15	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
	Shock resistance *15	500 m/s ² , 3 times in each of the 6 directions		
	Enclosure rating *16	IP67		
Material	Main unit case: Aluminium die-casting/PBT/TPU Indicator light cover: TPU Ethernet connector: Aluminium die-casting/LCP Front cover: Acrylic (hard coating)	Power connector: Aluminium die-casting/LCP Nameplate: PET Water proof cap for the Power connector: PC+ABS alloy Water proof cap for the Ethernet connector: PC		
Weight	Approx. 300 g (without the AI Lighting unit) Approx. 495 g (with the AI Lighting unit)			

*1 The focusing position can be automatically adjusted at the time of installation. Disabled during operation. The focusing position can be registered by programs. *2 Colour type only. *3 Monochrome type only. *4 Tools can be installed by programs. This is the number of detection tools and position adjustment tools. Up to 64 detection tools can be set. The number of detection tools in Sorting mode are eight tools. *5 Saves to the sensor's internal memory. The images saved to the sensor can be backed up to a USB memory stick inserted into the control panel (IV3-CP50) or to the PC where the software for the IV3 Series (IV3-H1) is being used. *6 Learning tool only. *7 Can also be displayed on the control panel (IV3-CP50) or the software for the IV3 Series (IV3-H1). *8 Usable on the software for the IV3 Series (IV3-H1). *9 Make sure to keep a total of each output with 120 mA or less. *10 For a PoE power supply device, IEEE802.3at power class 4 or higher is recommended when using the AI Lighting unit, and IEEE802.3bt power class 6 or higher is recommended when the AI Lighting unit is not used. When using PoE operation may be restricted due to power limitation. *11 Conformance Class B, applicable protocol: LLDP, SNMP. *12 Use only products recommended by KEYENCE. *13 When using the OP-88656 (10 m), the power voltage is 24 V DC ±25%/-10% (including ripple). *14 The peak current is designed to be smaller if the AI Lighting unit is mounted. The peak current is greater if the AI Lighting unit is not mounted. *15 Except when the dome attachment (IV3-D10) is mounted. *16 Except when the polarising filter (OP-88640/OP-88641/OP-88644/OP-88645) is mounted.

PC software

Model	IV3-H1	
Supported sensor	IV3 Series, IV2 Series, IV Series	
Recording software	For IV3 Series: IV3-Navigator, For IV2 Series: IV2-Navigator, For IV Series: IV-Navigator	
Interface	Equipped with the Ethernet (1000BASE-T) interface	
	OS*1	Windows 10 Home/Pro/Enterprise Windows 7 (SP1 or higher) Home Premium/Professional/Ultimate; either OS above needs to be pre-installed
Languages*2	English / Japanese / German / Chinese (Simplified) / Chinese (Traditional) / Korean / Italian / French / Spanish / Portuguese / Czech / Hungarian / Polish / Thai	
System requirements	Processor	Needs to be compliant with system requirements for OS.
	Memory capacity	4 GB or more
Required capacity for installation	4 GB or more	
Monitor	Resolution: 1024 × 768 pixel or higher, Display: High Colour (16 bit) or higher	
Operating conditions	.NET Framework 4.5.2 must be installed*3 Microsoft Visual C++ 2017 Redistributable Package must be installed.*3	

*1 Supports 32-bit and 64-bit versions. *2 When connected to the IV3 Series. When connected to the IV2 Series, the supported languages are the same as the IV2-H1. *3 If this software is not installed, it will be automatically installed when IV3-H1 is installed.

Control panel

Model	IV3-CP50	
Supported sensor	IV3 Series, IV2 Series, IV Series	
Display	5.7" TFT colour LCD 640 × 480 dot (VGA)	
Backlight	Method	White LED
	Duration	Approx. 50000 hours (25°C)
Touch panel	Method	Analogue resistive
	Actuating force	0.8 N or lower
Indicators	PWR, SENSOR	
Ethernet*1	Standard	100BASE-TX
	Connector	M12 4 pin connector
Languages*2	English / Japanese / German / Chinese (Simplified) / Chinese (Traditional) / Korean / Italian / French / Spanish / Portuguese / Czech / Hungarian / Polish / Thai	
Expanded memory	USB flash memory*3	
Ratings	Power voltage	24 VDC ±10% (including ripple)
	Current consumption	0.3 A or less
Environmental resistance	Operating ambient temperature	0 to +50°C (No freezing)
	Operating ambient humidity *4	35 to 85%RH (No condensation)
	Vibration resistance	10 to 55 Hz, 0.7 mm double amplitude, 2 hours each for X, Y, and Z axes
	Drop resistance	1.3 m over the concrete (2 times each in the arbitrary direction)
	Enclosure rating	IP40
Material	Main unit case: PC Power connector: brass + Ni coat Ethernet connector: Zinc + Ni coat, PA USB connector cover: EPDM Pen holder: PC	Hook for adapter: POM LED lamp cover: PC Mounting adapter: PC Stylus: POM
Weight	Control panel: Approx. 450 g A mounted with the wall mounting adapter and the stylus: Approx. 485 g	

*1 Especially for connecting to the IV3 Series, IV2 Series, and IV Series. *2 When connected to the IV3 Series. When connected to the IV2 Series, the supported languages are the same as the IV2-CP50. *3 Use a product recommended by KEYENCE. *4 If the ambient temperature exceeds 40°C, use the sensor head in the absolute humidity of 40°C 85% RH or lower.

Compact model sensor amplifier

Model		IV3-G120
Available modes		Standard mode / Sorting mode
Tool	Tool with standard mode	Learning, Outline, Colour area*1, Area*2, Edge pixels, Colour average*1, Brightness average*2, Width, Diameter, Edge presence, Pitch, OCR, Colour prohibit *1, Brightness prohibit, Position adjustment, High-speed position adjustment (1-axis edge/2-axis edge), Blob count
	Number of tools *3	Total: 65 tools
Switch settings (programs)		128 programs (when using SD card) / 32 programs (when not using SD card)
Image history*4	Number of storable images	100 images
	Save conditions	Selectable between NG only, NG and OK near threshold*5, and All
	Transfer destination	Selectable between SD card, FTP server, and SFTP server
Image data transfer	Transfer format	Selectable between bmp, jpeg, iv3p, and txt, and file names can be modified
	Transfer conditions	Selectable between NG only, NG and OK near threshold*5, and All
Analysis information*6	RUN display	Tools list (Judgement results, degree of similarity, or degree of similarity bar display)
	RUN information	Switchable between OFF, histogram, processing time, count, and output monitor Histogram: Histogram, degree of similarity (Max., Min., Ave.), Number of OKs, Number of NGs Processing time: Processing time (latest, Max., Min., Ave.) Count: Trigger numbers, Number of OKs, Number of NGs, Trigger errors Output monitor: ON/OFF status by output
Other functions	Image capture function	Digital zoom (2x, 4x), HDR, High gain, Colour filter*1, White balance*1, Brightness correction, AI capture
	Tool functions	Additional learning, Mask outline, Masking function, Colour extraction/exclusion*1, Colour histogram function*1, Monochrome histogram function*2, Scaling function
	Utilities	Falling sensor list, Failure hold, Test run, I/O monitor, Security settings (Two-factor password), Simulator*7, Additional FTP/SFTP Image Information, Multi-position adjustment, Multi-master image registration, High-speed program switching, Auto program switching, Auto setting backup/restore, Threshold changing in RUN
Indicators		PWR/ERR, OUT, TRIG, STATUS, LINK/ACT, SD
Input	Switchable between non-voltage input and voltage input For no-voltage input: ON voltage 2 V or lower, OFF current 0.1 mA or lower, ON current 2 mA (short circuit) For voltage input: Maximum input rating 26.4 V, ON voltage 18 V or higher, OFF current 0.15 mA or lower, ON current 2 mA (for 24 V)	
	Number of inputs	8 (IN1 to IN8)
Output	Function	IN1: External trigger, IN2 to IN8: Enable by assigning optional functions Assignable functions: Program switching, Clear error, External master image registration, SD card save cancel
	Number of outputs	8 (OUT1 to OUT8) Photo MOS relay output, N.O./N.C. Switchable Maximum rating 26.4 V 50 mA, residual voltage 1.5 V or less*8
Ethernet	Standard	1000BASE-T/100BASE-TX
	Connector	RJ-45 8pin connector
Network function		FTP client, SFTP client
Interface compatibility	Built-in Ethernet	EtherNet/IP®, PROFINET*9, TCP/IP non-procedure communication
	Communication unit*10	EtherCAT®, CC-Link, DeviceNet®, RS-232C, PROFIBUS
Expanded memory		SD card (SD/SDHC)*11
Rating	Power voltage	24 VDC ±10% (including ripple)
	Consumption current	2.2 A or less (including a communication unit, without the AI Lighting unit, and including the output load) 3.4 A or less (including a communication unit, with the AI Lighting unit, and including the output load)
Environmental resistance	Ambient temperature	0 to +40°C (No freezing)*7
	Relative humidity	35 to 85%RH (No condensation)
Material	Main unit case: PC I/O terminal block: PA Ethernet connector: Copper alloy + Ni plating Main unit rear DIN rail fixing tab: POM Power connector: PA/POM Sensor head connector: Zinc + Ni plating/PA Main unit rear heat sink: Aluminium Nameplate: PC	
Weight	Approx. 300 g	

*1 Colour type only. *2 Monochrome type only. *3 Tools can be installed by programs. This is the number of detection tools and position adjustment tools. Up to 64 detection tools can be set. The number of detection tools in Sorting mode are eight tools. *4 Saves to the sensor amplifier's internal memory. The images saved to the sensor amplifier can be backed up to a USB memory stick inserted into the control panel (IV3-CP50) or to the PC where the software for the IV3 Series (IV3-H1) is being used. *5 Learning tool only. *6 Can also be displayed on the control panel (IV3-CP50) or the software for the IV3 Series (IV3-H1). *7 Usable on the software for the IV3 Series (IV3-H1). *8 Make sure to keep a total of each output with 160 mA or less. *9 Conformance Class B, Applicable protocol: LLDP, SNMP. *10 When a communication unit (DL Series) is connected. *11 Use only products recommended by KEYENCE.

Compact model sensor head

Model	IV3-G500CA	IV3-G500MA	IV3-G600CA	IV3-G600MA
Type	Standard type		Wide view type	
Installed distance	50 to 2000 mm		50 to 2000 mm	
Field of view (typical example)	Installed distance 50 mm: 22 (H) × 16 (V) mm Installed distance 2000 mm: 789 (H) × 592 (V) mm		Installed distance 50 mm: 51 (H) × 38 (V) mm Installed distance 2000 mm: 1822 (H) × 1364 (V) mm	
Image receiving element	1/2.9 inch colour CMOS		1/2.9 inch colour CMOS	
	Number of pixels	1/2.9 inch monochrome CMOS		
Focus adjustment	1280 (H) × 960 (V) Auto*1			
Exposure time	12 µs to 9 ms	12 µs to 9 ms*2	12 µs to 9 ms	12 µs to 9 ms*2
Light	Illumination	White LED	Infrared LED	Infrared LED
	Lighting method	Pulse /continuous lighting is switchable.	Pulse lighting	Pulse /continuous lighting is switchable.
Indicators	2 (the same display details for both indicators)			
Environmental resistance	Operating ambient temperature	0 to +40°C (No freezing)		
	Operating ambient humidity	35 to 85% RH (No condensation)		
	Vibration resistance *3	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
	Shock resistance *3	500 m/s ² , 3 times in each of the 6 directions		
Material	IP67			
Weight	Main unit case: Zinc die-casting, Front cover: Acrylic, Operation indicator cover: TPU			
	Approx. 75 g (without the AI Lighting unit) Approx. 225 g (with the AI Lighting unit)			

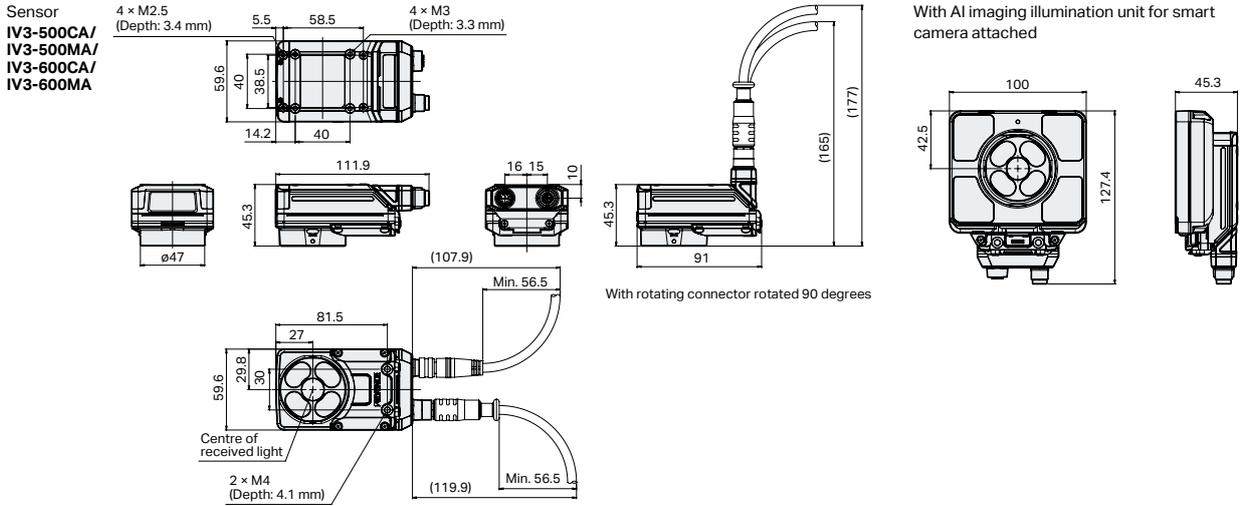
*1 The focus position can be automatically adjusted at the time of installation. This function is deactivated during operation. A different focus position can be registered for each program. *2 When the AI Lighting unit is mounted, the maximum exposure time is 6.25 ms. *3 Except when the dome attachment (IV2-GD05/IV2-GD10) is mounted. *4 Except when the polarising filter (OP-88644/OP-88645/OP-88646/OP-88647) is mounted.

AI imaging illumination unit

Model	IV3-L5C	IV3-L5M	IV3-L6C	IV3-L6M	IV3-LG5C	IV3-LG5M	IV3-LG6C	IV3-LG6M
Compatible sensor	IV3-500CA	IV3-500MA	IV3-600CA	IV3-600MA	IV3-G500CA	IV3-G500MA	IV3-G600CA	IV3-G600MA
Light source	White LED	Infrared LED	White LED	Infrared LED	White LED	Infrared LED	White LED	Infrared LED
Power supply	Power is supplied by the connected sensor							
Environmental resistance	Ambient temperature	0 to +40°C (No freezing)						
	Relative humidity	35 to 85%RH (No condensation)						
	Enclosure rating	IP67*1						
Material	Case: Aluminium die-casting Front cover: Acrylic				Unit case: Aluminium die-casting/PBT Sensor head connector: Zinc + Ni plating/PA Front cover: Acrylic Cable: PVC, Ni plating, TPEE			
Weight	Approx. 195 g				Approx. 150 g			

*1 Applicable only when mounted to a compatible sensor. Except when the polarising filter (OP-88644/OP-88645/OP-88646/OP-88647) is mounted.

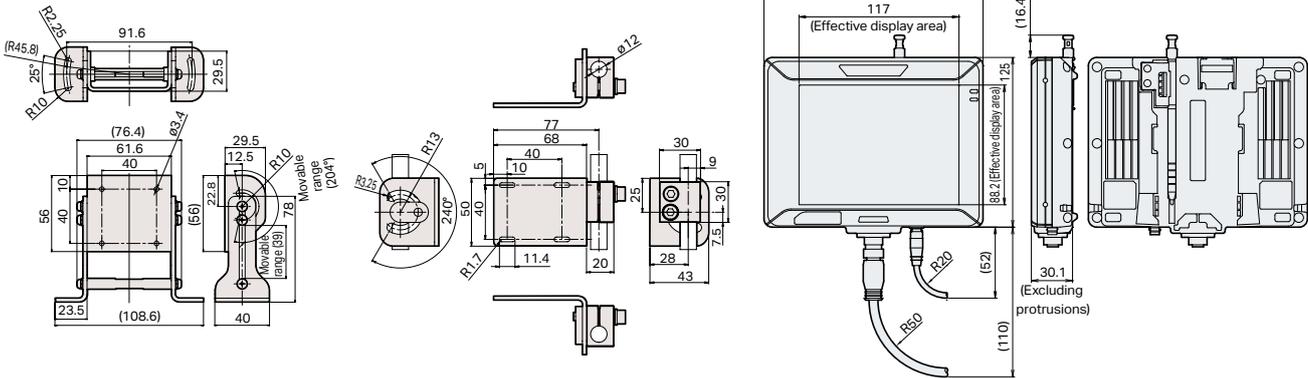
Smart camera



2-axis adjustment mounting bracket **OP-88635**

Adjustable bracket **OP-88636**

Control panel **IV3-CP50**



Wiring colour

Wiring colour	Pin No.	Name	Assigning default value	Description
Brown	1	DC24	-	+ side of power
Blue	2	0V	-	- side of power
Pink	6	IN1	Ext. Trigger ↑	Set external trigger. Rising timing (↑) or falling timing (↓) can be set.
Yellow	4	IN2	OFF	Input assignable function • Program bit0 to bit6 • Clear Error
Light blue	5	IN3	OFF	• Ext. Master Save • SD Card Save Stop • OFF (not used)
Black	9	OUT1	Total Status OK	Output assignable function • Total Status OK • Total Status NG
White	10	OUT2	BUSY	• RUN • BUSY • Error
Grey	11	OUT3	Error	• SD card error • Position adjustment
Purple	3	I/O1*	OFF	• Status result of each tool (Tool 01 to 64) • Logical operation result of each tool (Logic 1 to 4)
Green	7	I/O2*	OFF	• Type discrimination result (Type 0 to Type 7) • Master judgement result (Master 00 to Master 07)
Red	8	I/O3*	OFF	• OFF (not used)
Orange	12	OUTCOM	-	Output Common

* The I/O1 to I/O3 can be used by individually selecting IN/OUT.

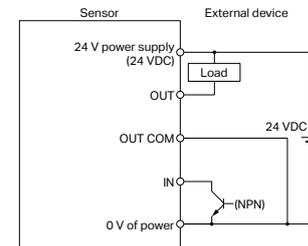
Cable specification

- Brown / Blue: AWG22
- Black / White / Grey / Orange: AWG25
- Pink / Yellow / Light blue / Purple / Green / Red: AWG28 (without shield)

Connection diagram

Selecting NPN output

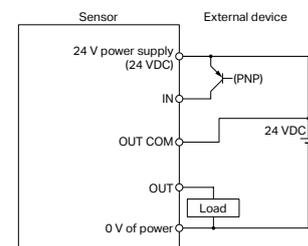
When NPN is selected as the Polarity



OUT COM is a common terminal for OUT.
Be sure to connect it to 0 V of the power supply.

Selecting PNP output

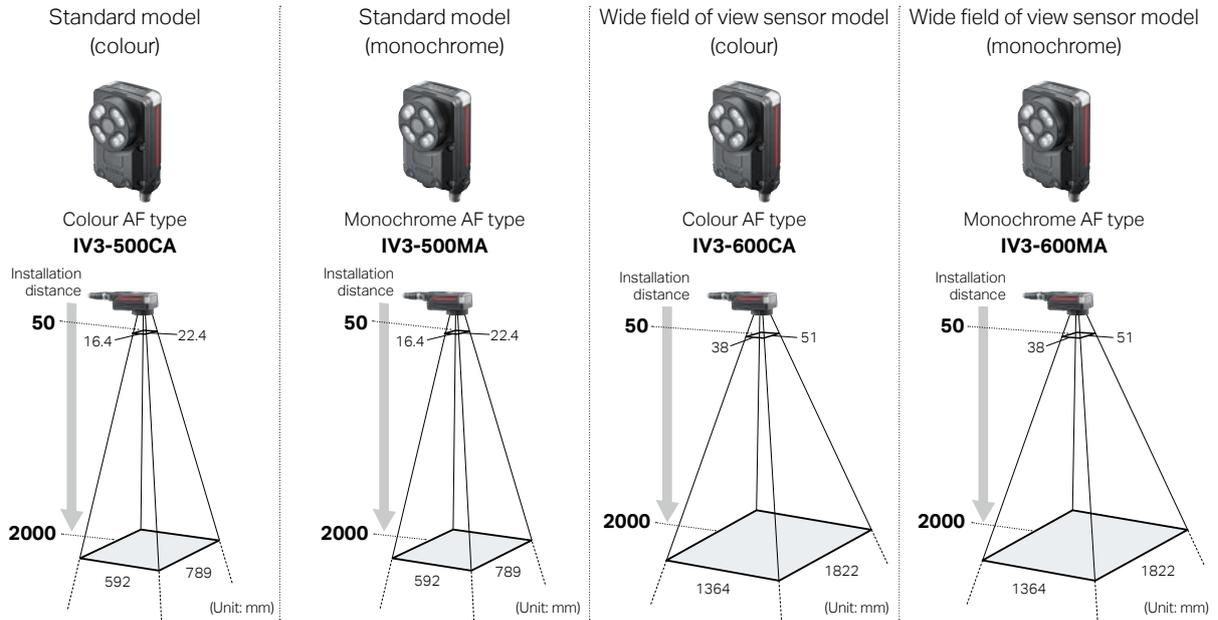
When PNP is selected as the Polarity



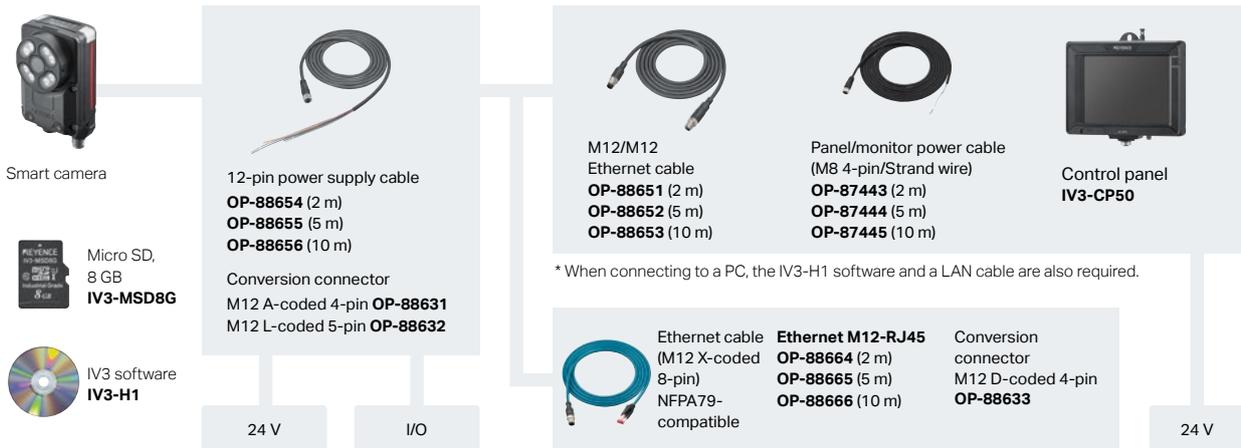
OUT COM is a common terminal for OUT.
Be sure to connect it to 24 V of the power supply.

Component list

Smart camera



* The field of view and optical axis have individual differences.



Attachment

AI imaging illumination unit for smart camera

Illumination model	Head model	Type
IV3-L5C	IV3-500CA	Standard (colour)
IV3-L6C	IV3-600CA	Wide field of view (colour)
IV3-L5M	IV3-500MA	Standard (monochrome)
IV3-L6M	IV3-600MA	Wide field of view (monochrome)

Polarising filter
OP-88640 (Colour)
OP-88641 (Monochrome)

Polarising filter for AI imaging illumination unit
OP-88644 (Colour)
OP-88645 (Monochrome)

IV3 dome attachment
IV3-D10

Mounting bracket

Common mounting bracket
OP-88634

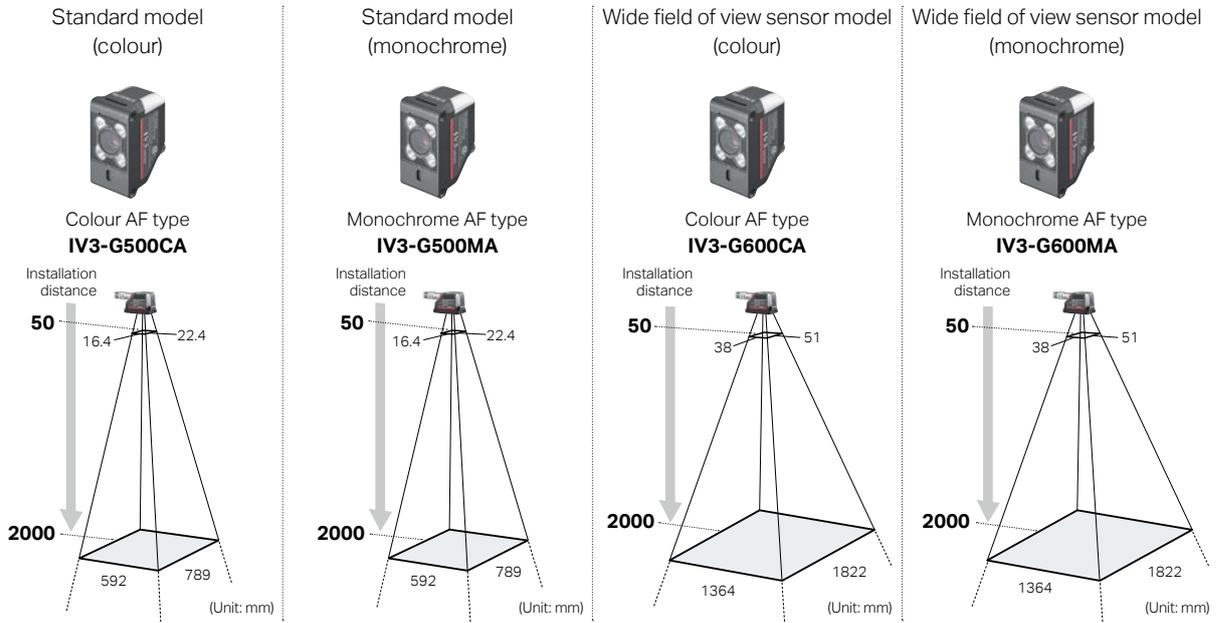
2-axis adjustment mounting bracket
OP-88635

Adjustable bracket
OP-88636

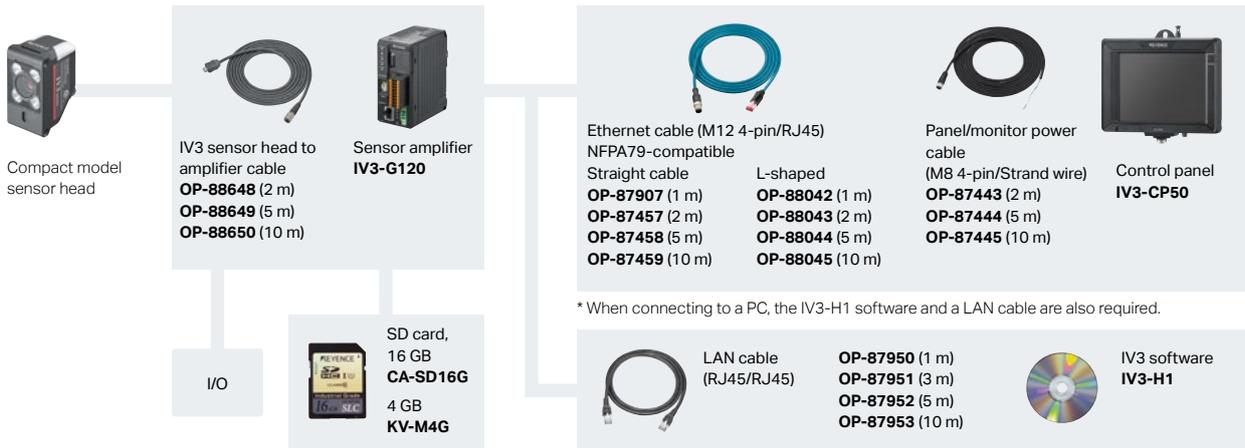
Optional panel accessories

- Wall mounting adapter **OP-88349** (Included with IV3-CP50)
- Control panel mounting adapter **OP-88350**
- Touch panel protective sheet **OP-88351**
- Stylus **OP-88352** (Included with IV3-CP50)
- USB memory device, 1 GB **OP-87502**

Compact model



* The field of view and optical axis have individual differences.



Communication network devices



Attachment

AI imaging illumination unit for compact models

Illumination model	Head model	Type
IV3-LG5C	IV3-G500CA	Standard (colour)
IV3-LG6C	IV3-G600CA	Wide field of view (colour)
IV3-LG5M	IV3-G500MA	Standard (monochrome)
IV3-LG6M	IV3-G600MA	Wide field of view (monochrome)

Dome attachment (large) IV2-GD10

Dome attachment (small) IV2-GD05

Polarising filter OP-88642 (colour) OP-88643 (monochrome)

Polarising filter for AI imaging illumination unit OP-88646 (colour) OP-88647 (monochrome)

Mounting bracket (head only)



Mounting bracket (when illumination unit is used)



Full lineup of vision systems to solve a variety of problems

High

Optimal problem-solving capability to meet a variety of needs **XG-X Series**

With a rich lineup of cameras, the XG-X Series meets all the needs of customers. Models include area cameras, line scan cameras, and 3D cameras, all featuring flexible inspection tools and supporting diverse operation.



Cost/performance

High-end machine performance, easily accessible for all **CV-X Series**

This standard model for worldwide use supports 16 languages and provides the user with both optimal problem-solving capability and intuitive usability. As a next-generation vision system, the CV-X Series was designed with the user in mind.



Low

All-in-one presence detection solution **IV3 Series**

Artificial intelligence specialising in go vs. no go detection allows for automatic setup and stable performance. Past inspections that require multiple sensors with conventional models can be easily performed with a single unit.



Related Product

Height-based difference detection

IX Series

- Height measurement possible anywhere within the area
- Position adjustment function
- Simple setup by selecting detection points

Height

Height difference

Tilt

Incorrect seating



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