KEYENCE

Vision Sensor
IV-H Series

PROFINET
EtherNet/IP
CE
c UL us LISTED

1 Minute SETUP

A VISION SENSOR THAT ANYONE CAN USE

NEW INSPECTION TOOLS FOR GREATER FLEXIBILITY

Intelligent sensor I-SERIES

NOT CHECKING POINTS, BUT THE ENTIRE SURFACE

Detects regardless of part position variations

With the position adjustment function, simply place the target anywhere within the field of view for detection with no errors in judgment.

Checking points

Entire surface

A single unit can be used for multiple inspections

Up to 16 tools can be utilised for each captured image.

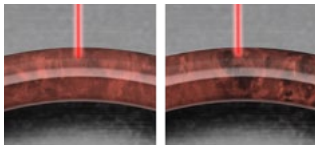
Checking points

Entire surface

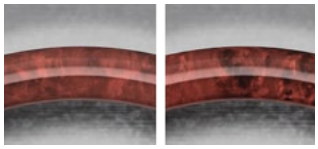
Can be used for difficult-to-detect targets

The vision sensor can detect parts for which detection was difficult with previous sensors, such as parts with irregular colour patterns.

Checking points



Entire surface



VISION SENSOR

FOR PRESENCE DETECTION

NEW IDEAS FOR HANDLING DIFFICULT DETECTION

EASY TO USE
1 MINUTE SETUP

Setup is completed in approximately 1 minute thanks to “Easy Navigation”.

STABLE DETECTION
OUTSTANDING IMAGING TECHNOLOGY

Clear images are captured with high-intensity illumination and a high-performance quad lens, which comes standard. In addition, the High Sensitivity - High Dynamic Range function and digital zoom provide even more stable detection.

ULTRA-COMPACT
INSTALL ANYWHERE DESPITE MOUNTING RESTRICTIONS

Featuring a lineup that offers the smallest ultra-compact model in its class.
This allows for the vision sensor to be installed anywhere, even in narrow spaces.

AFFORDABLY PRICED
REDUCE INTRODUCTION COSTS

Choose from 9 different sensor heads to suit your needs and reduce costs.

Intelligent sensor
I-SERIES

SIMPLY EASY

1 Minute SETUP

SIMPLE ONE-TOUCH SETUP

AUTOMATIC

BRIGHTNESS ADJUSTMENT

Brightness adjustment is completed with just the press of a button. Thanks to the built-in lighting, which is optimised for stable detection, there is no need to adjust settings such as the lighting type, colour, and installation distance. Additionally, fine adjustments requiring advanced imaging skills - such as adjustments to the gain and exposure time - are also automatically optimised.

AUTOMATIC

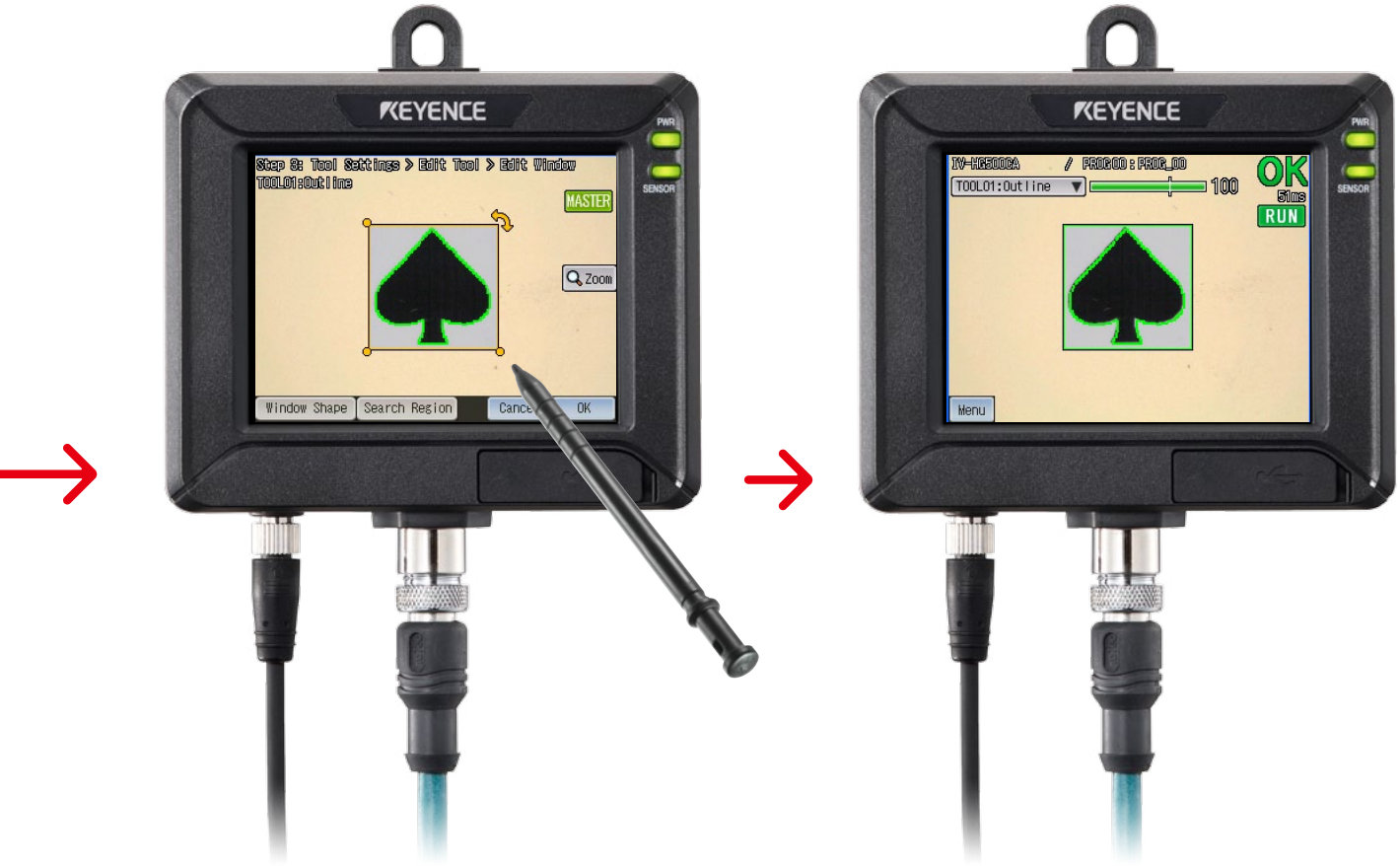
FOCUSING

Focusing is also completed with just one button press. The first-in-class automatic focus mechanism enables high-speed and highly accurate focusing, an operation that conventionally has been done manually while watching the screen.

START ..... **Approximately 15 seconds** .....

PC SOFTWARE IS AVAILABLE

The IV Series can be set up with an intelligent monitor (IV-M30) or a PC. As PCs can have a larger display, setup procedures are even easier to understand and can be quickly set up by first time users.



JUST OUTLINE

TOOL SETUP

The tool setup, which establishes the detection details, can also be completed intuitively. For shape judgements, the user only has to outline the target. For colour judgements, the user only has to touch the target. The IV Series then recognises and detects the target automatically.

COMPLETE IN 1 MINUTE

The brightness adjustment and focusing are set up automatically with one-touch control, and the detection tool is set when the user simply selects the target. Therefore, anyone can obtain stable detection without variations arising from differences in experience levels.

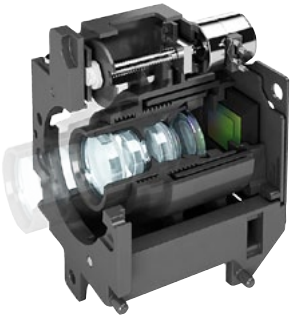
Approximately 45 seconds ► **1 minute**

STABLE DETECTION

OUTSTANDING OPTICAL TECHNOLOGY

FIRST-IN-CLASS AUTOMATIC FOCUS

Our first-in-class automatic focus mechanism has evolved even further. We have newly developed this mechanism to be more compact and to have higher accuracy. By combining the automatic focus drive unit with the lens case and then designing them in the optimal manner, our mechanism is 40% more compact than conventional ones. Also, by improving the durability of the drive unit, this compact automatic focus mechanism can operate over a wider range than conventional mechanisms.



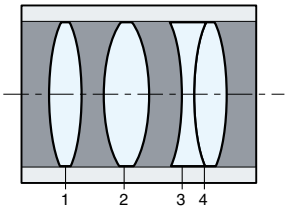
LOW DISTORTION

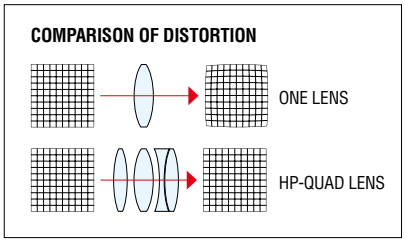
HP-QUAD* LENS

The newly developed lens contains 4 layers of glass that achieve low aberration with high light-gathering power. It captures bright, clear images with low distortion for stable detection.

*High Precision-Quad

The Quad lens captures an image of the entire field of view under uniform conditions.

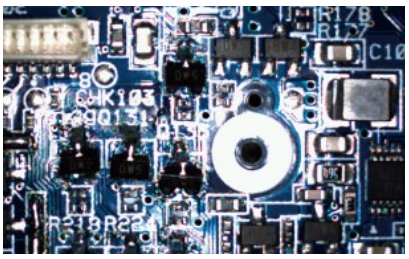




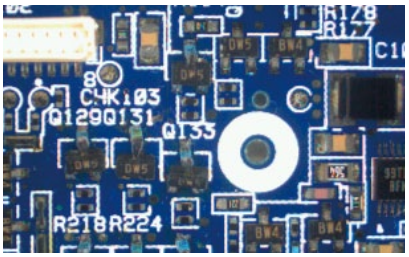
HS-HDR* FUNCTION

Detection is stabilised by widening the light-receiving sensitivity range when dispersion occurs in the reflection. High speeds are realised by adjusting within a single image capturing.

*High Speed HDR



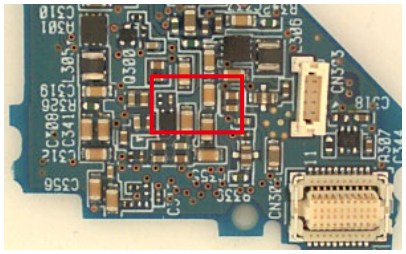
HS-HDR function OFF



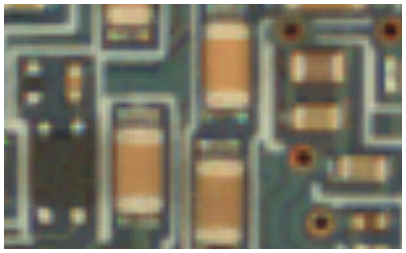
HS-HDR function ON

DIGITAL ZOOM FUNCTION

Use the digital zoom to show any area within the field of view at up to 4×. Whether looking to install further away or choosing to zoom in and capture only the required area for a small target, the digital zoom provides even more stable detection.



Without digital zoom



4× digital zoom [IV-HG Series only]

POLARISED FILTER

Glare from glossy surfaces is reduced because only one direction of the light wave components is transmitted. The compact size enables easy installation.

Without polarised filter

With polarised filter [OP-87436]

DOME LIGHT

Effective in reducing glare. Generating indirect light from various directions ensures the object is uniformly illuminated. No external power supply is necessary, which reduces introduction costs to 1/10th of conventional lights.

Without dome attachment

With dome attachment [IV-D10]

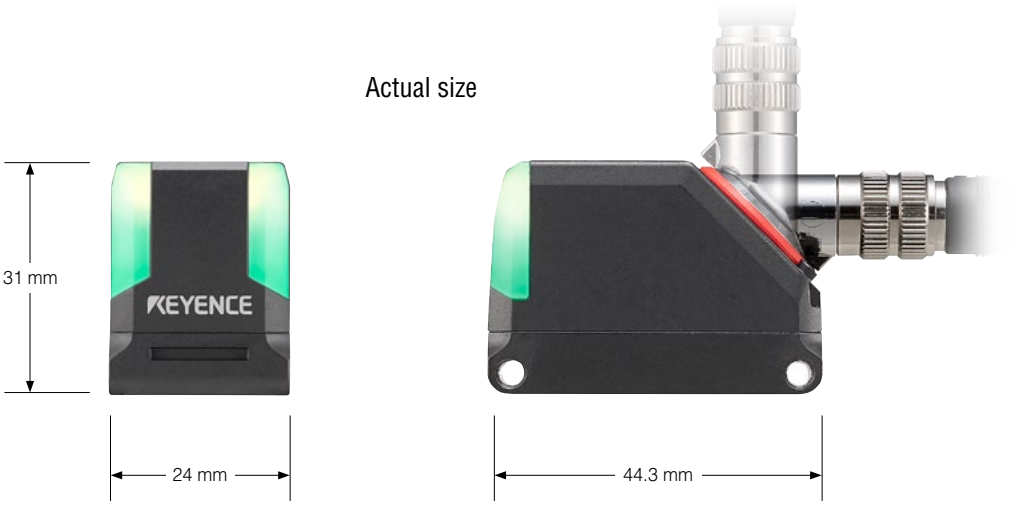
*This method is more effective than a polarisation filter at reducing glare.

INSTALL ANYWHERE

ULTRA-COMPACT MODEL THAT IS THE SMALLEST IN ITS CLASS

ULTRA-COMPACT MODEL

INSTALL ANYWHERE WITH MINIMAL SPACE RESTRICTIONS



FLEXIBLE LAYOUT
A CONNECTOR THAT CAN ROTATE 330°

The cable connector can be rotated by up to 330° to match the available space and installation conditions. Together with the smallest head size in its class, this ensures a high degree of freedom when it comes to installations.

ADJUSTABLE FIELD OF VIEW AND DISTANCE

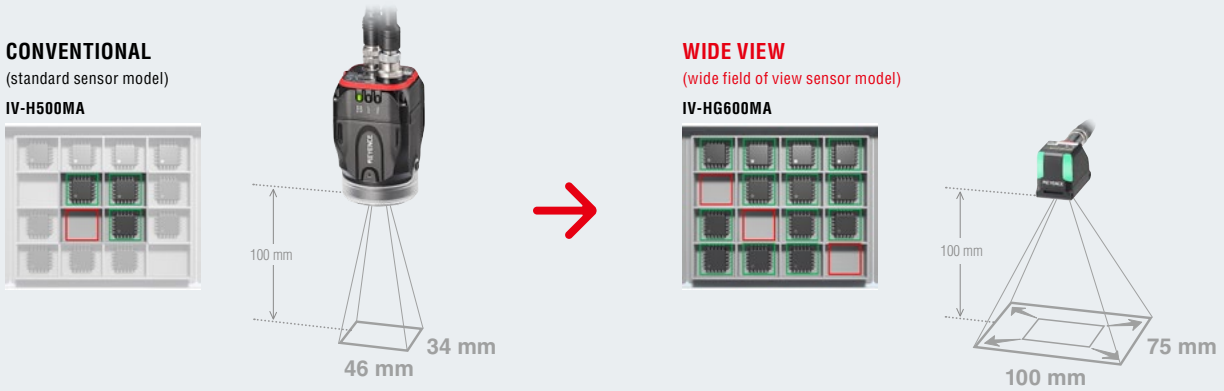
VAST LINEUP OF SENSOR HEADS

FIELD OF VIEW

WIDE 2.2 times more than conventional models (wide field of view model)

WIDE FIELD OF VIEW EVEN AT CLOSE RANGE

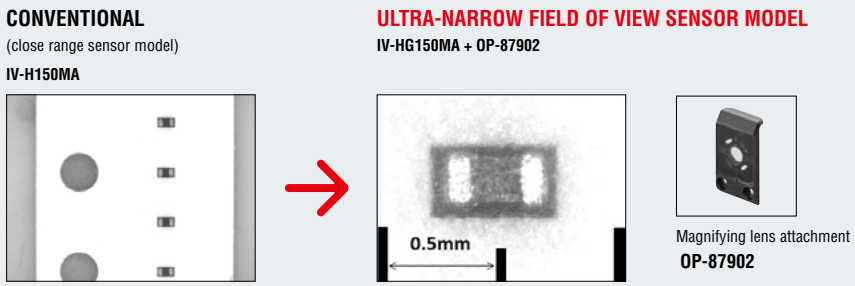
Installation distance: The field of view (the longer direction) makes use of a 1:1 wide-angle lens.
This expands the size of the field of view to 2.2 times that of the standard sensor model at the same installation distance.



ZOOM 3 times more than conventional models (ultra-narrow field of view model)

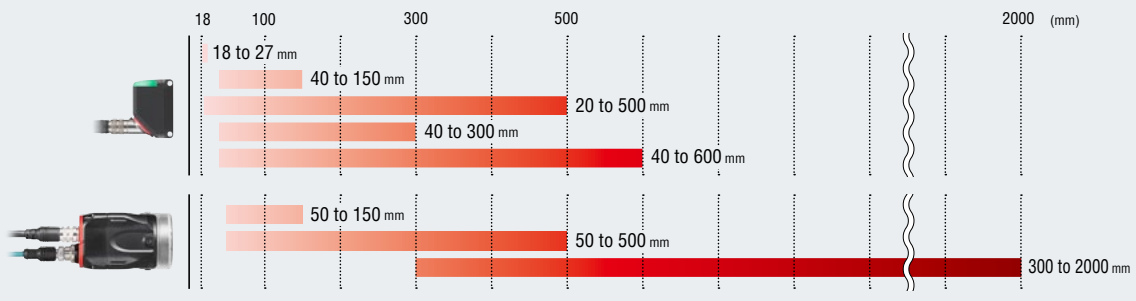
DETECTS EXTREMELY SMALL TARGETS

The sensor uses a magnifying lens with a minimum field of view of 4 × 3 mm (1 × 0.75 mm when using the digital zoom).
This enables imaging with a zoom that is 3 times the conventional model.



A LINEUP WITH SELECTABLE INSTALLATION DISTANCES

Covers a range up to 111×; from 18 mm for close range detection to 2000 mm for long distances.

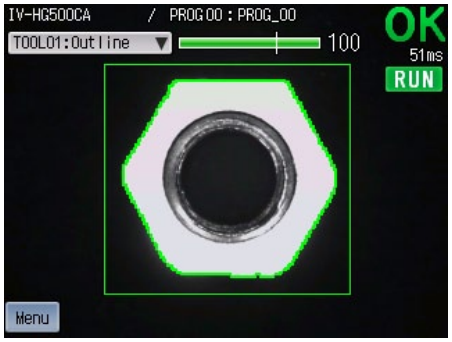


BASIC TOOLS

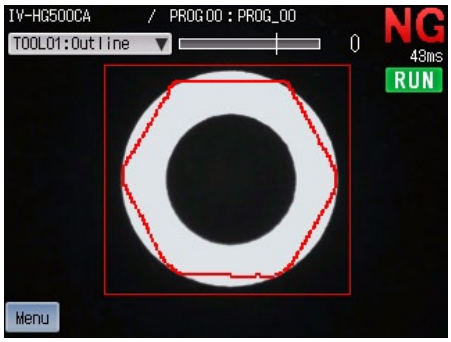
SHAPE DETECTION

The match percentage of the object is calculated based on the shape of the registered master image. Brightness differences or differences in individual surface conditions, which were previously difficult to handle with normalised correlation methods (pattern matching) can now be identified.

CONTOUR DIFFERENCES



PASS

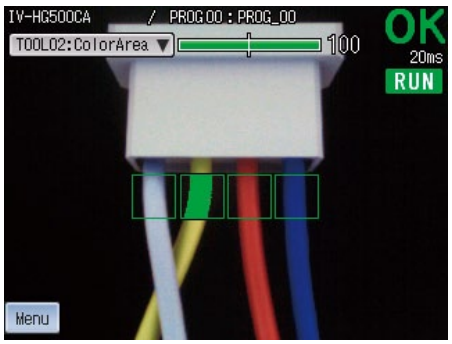


FAIL

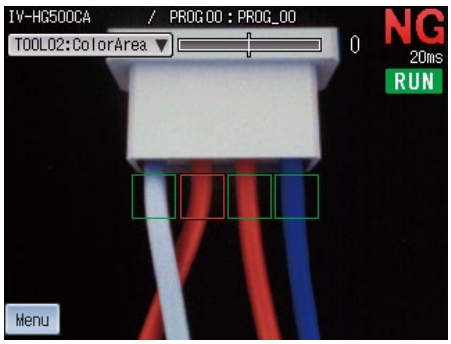
AREA

Using the registered master area (number of pixels) as reference, the difference in area from the inspection object is calculated. When using a colour model, judgement can be made based on the desired area of the specified colour. When using a monochrome model, brightness is judged by the area binarised in black and white.

COLOUR DIFFERENCES



PASS

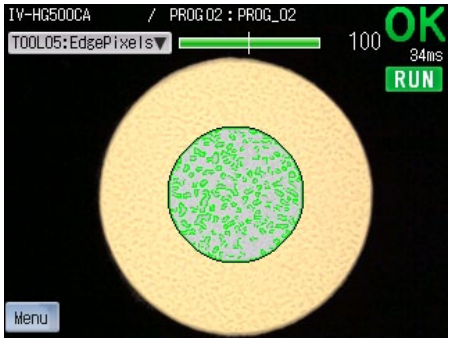


FAIL

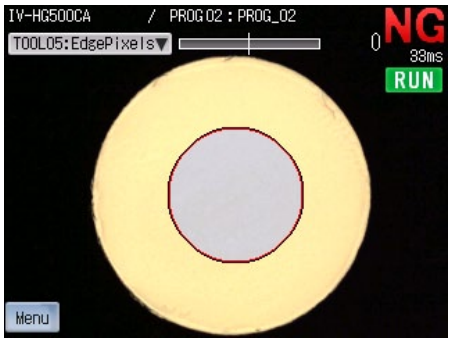
EDGE PIXELS

The match percentage of the object is calculated based on the number of pixels in the edge (outline) of a registered image. This makes it possible to maintain stable detection when the objects' colour is the same but their materials are differing, or when the brightness is changing.

DIFFERENCES IN THE NUMBER OF PIXELS IN AN EDGE



PASS



FAIL

POSITION ADJUSTMENT

If the object is misaligned, 100% inspection cannot be achieved because the object may be outside the inspection area. The position adjustment function calculates the amount of misalignment from the master image in order to correct the position, and enable correct judgement. In addition, 360° rotation is supported for high speed tracking. This means you don't need to worry about misalignment of the targets.

DETECTION OF STICKER PRESENCE/ABSENCE BY USING POSITION ADJUSTMENT

PASS

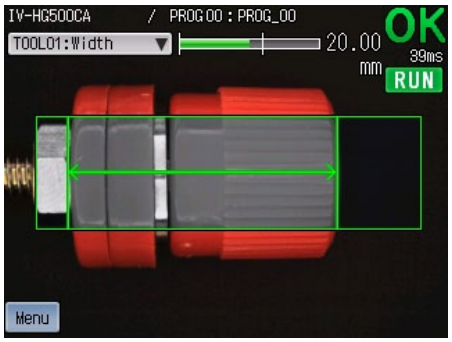
FAIL

EDGE TOOLS

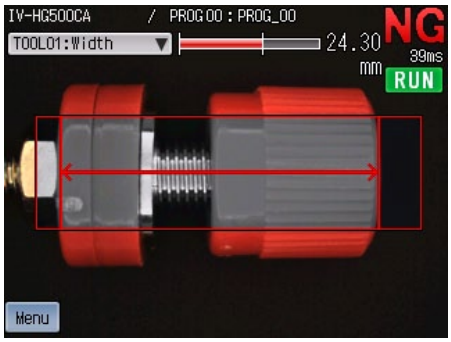
WIDTH/HEIGHT

Differentiate parts by comparing the width between edges on the target to the width of the registered master image. Using the scaling function to convert the actual values makes it possible to intuitively differentiate between products with different widths.

WIDTH DIFFERENCES



PASS

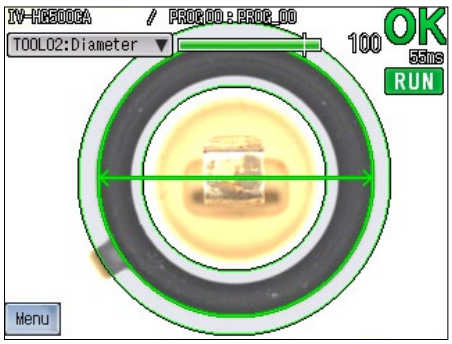


FAIL

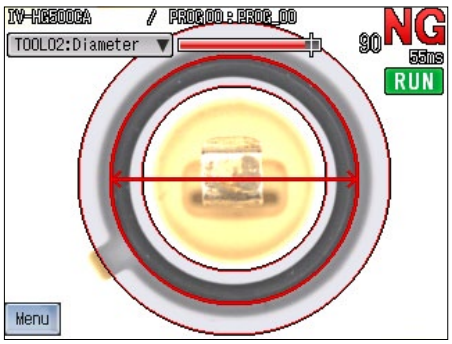
DIAMETER

Differentiate parts by comparing the diameter of the target to the diameter of the registered master image. Even if there is more than one diameter in the inspection area, selecting the diameter to be inspected is simple.

DIAMETER DIFFERENCES



PASS



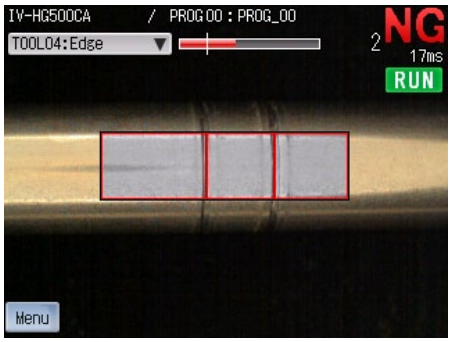
FAIL

EDGE PRESENCE

Differentiate parts by comparing the number of edges on the target to the number of edges in the registered master image. This allows for even faster and simpler edge count differentiation compared to using the outline tool.

EDGE COUNT DIFFERENCES

PASS

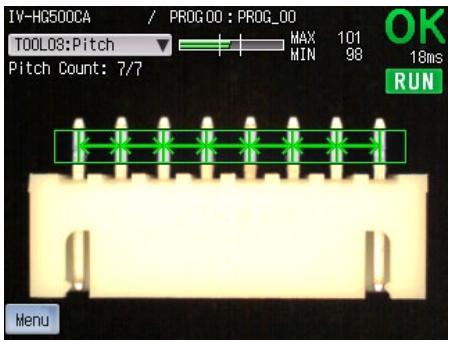


FAIL

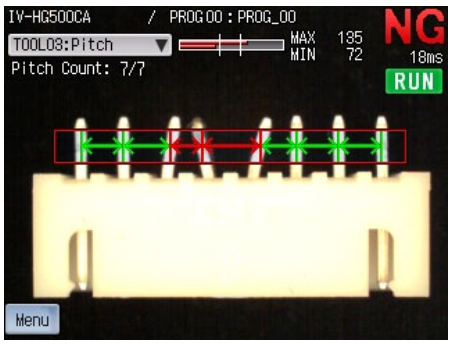
PITCH

Differentiate parts by comparing the pitch width of the target to that of the registered master image. In addition, checking the pitch count is possible, allowing for not only differentiation of product types but also simple inspections for missing or bent pins.

PITCH DIFFERENCES



PASS



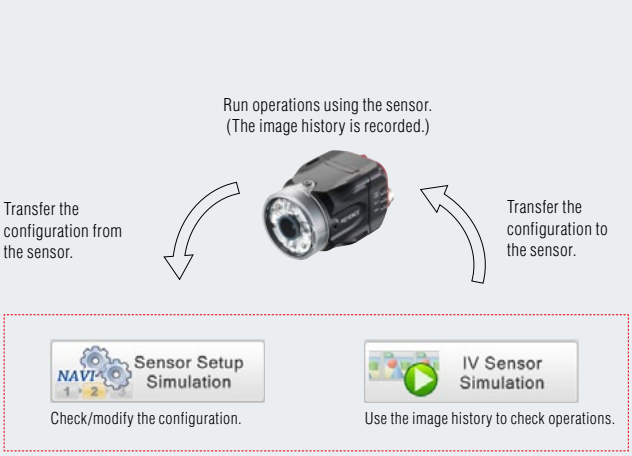
FAIL

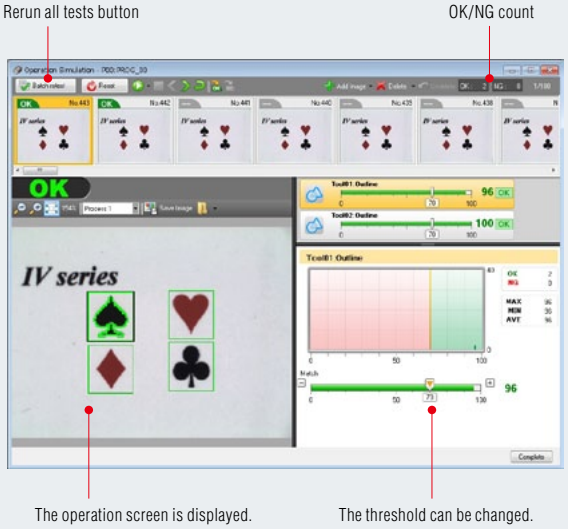
SOFTWARE FOR IV SERIES, “IV-Navigator” IV-H1

The IV Series can be set up with an intelligent monitor (IV-M30) or a PC. As PCs can have a larger display, setup procedures are even easier to understand and can be quickly set up by first time users.

SIMULATION FUNCTION

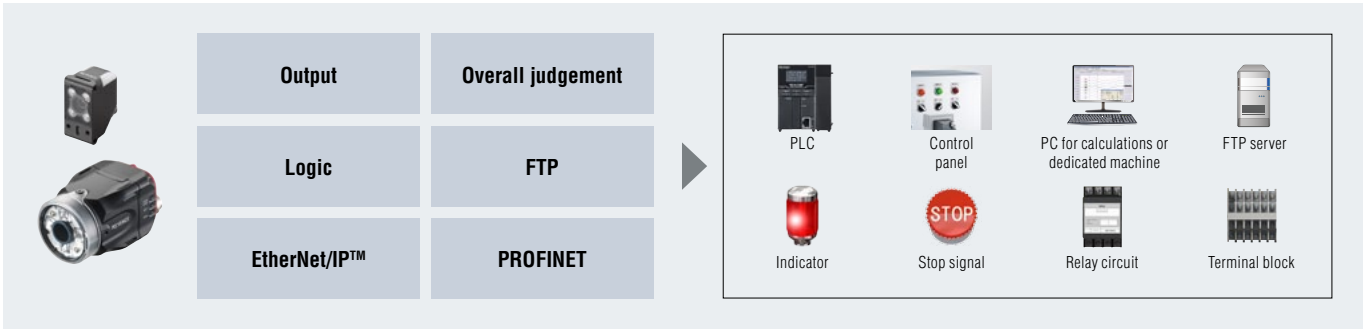
This function allows you to check and modify the programme configurations and perform operation simulations based on the image history without connecting the sensor. This enables easy computation of the optimal thresholds while looking at the detection result statistics and histogram, even when you are away from the actual worksite.





OUTPUT SPECIFICATIONS THAT SUPPORT ALL CONNECTED DEVICES

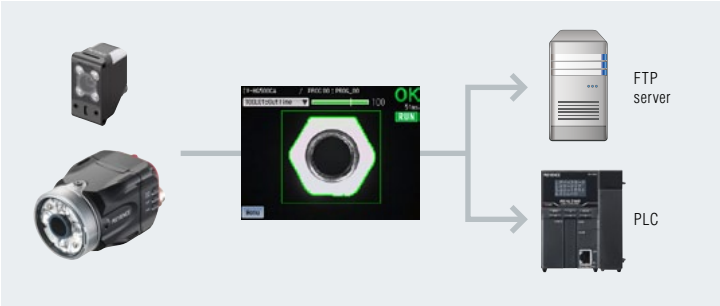
Up to 16 detection results can be freely combined to match the output destination and the usage conditions. The sensor can easily be attached to existing equipment and a PLC is not required. Also, the FTP client function supports image saving and global communication standards.



SIMPLE CONNECTION FUNCTION

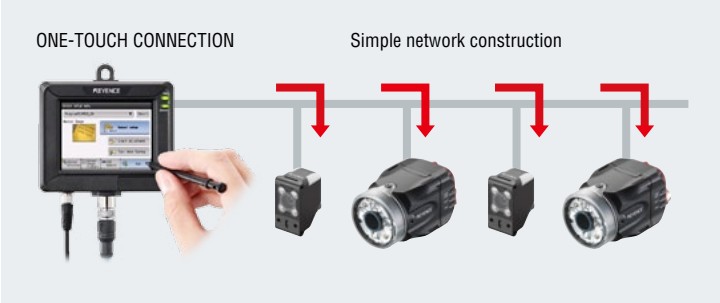
TRACEABILITY SUPPORT
FTP CLIENT AND DATE/TIME SYNCHRONISATION FUNCTIONS

Image files from the sensor can be automatically transferred to an FTP server or a PLC using the FTP client function. Additionally, the date/time synchronisation function offers verification of an image's capture date and time. To meet the increasing interest in traceability, these functions allow either all images or just images of unacceptable products to be saved for further analysis of these products.



REQUIRES NO INITIAL SETUP FOR REMOTE OPERATIONS AND NETWORKING:
SIMPLE CONNECTION & SWITCHING FUNCTION

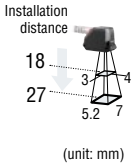
This function makes it easy to switch between sensors without troublesome initial setup such as assigning IP addresses and registering the devices to connect to. The result is major reductions in the initial setup, when operating remotely over Ethernet and when constructing a network with multiple units.



ULTRA-COMPACT MODELS

ULTRA-NARROW FIELD OF VIEW SENSOR MODEL (WITH ATTACHMENT)

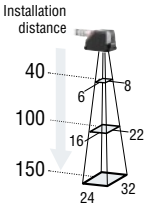
Monochrome AF type
IV-HG150MA
+
Magnifying lens attachment
OP-87902



(unit: mm)

NARROW FIELD OF VIEW SENSOR MODEL

Monochrome AF type
IV-HG150MA

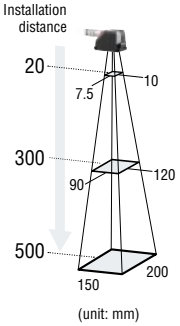


(unit: mm)

STANDARD SENSOR MODEL

Colour AF type
IV-HG500CA

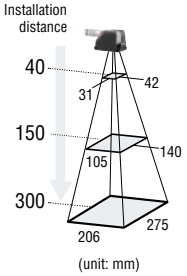
Monochrome AF type
IV-HG500MA



(unit: mm)

WIDE FIELD OF VIEW SENSOR MODEL (COLOUR)

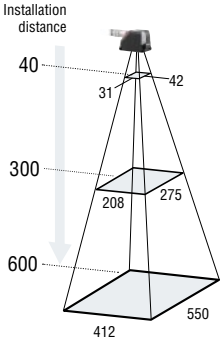
Colour AF type
IV-HG300CA



(unit: mm)

WIDE FIELD OF VIEW SENSOR MODEL (MONOCHROME)

Monochrome AF type
IV-HG600MA



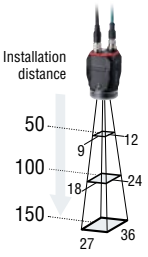
(unit: mm)

AF...Automatic focus model
*View and optical axis has individual differences.

AMPLIFIER-INTEGRATED MODELS

CLOSE RANGE SENSOR MODEL

Monochrome AF type
IV-H150MA

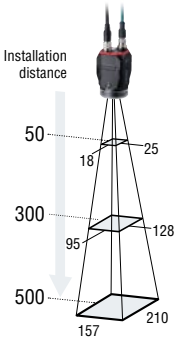


(unit: mm)

STANDARD SENSOR MODEL

Colour AF type
IV-H500CA

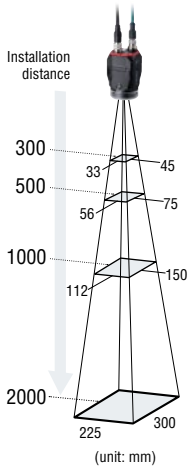
Monochrome AF type
IV-H500MA



(unit: mm)

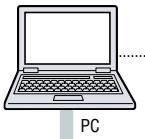
LONG RANGE SENSOR MODEL

Monochrome AF type
IV-H2000MA



(unit: mm)

ULTRA-COMPACT MODEL



PC

Software for the IV-H Series
IV-H1

Ultra-compact sensor head

IP67 environmental resistance

IV-HG sensor head to amplifier cable
OP-87903 (2 m)
OP-87904 (5 m)
OP-87905 (10 m)

Sensor amplifier main unit
IV-HG10

Sensor amplifier expansion unit
IV-HG15

LAN cable
(RJ-45 to RJ-45)
OP-87950 (1 m)
OP-87951 (3 m)
OP-87952 (5 m)
OP-87953 (10 m)

NFPA79 compliant Ethernet cable
(M12 4pin-RJ-45)
Straight cable
OP-87907 (1 m)
OP-87457 (2 m)
OP-87458 (5 m)
OP-87459 (10 m)

IV-HG I/O cable (3 m)
OP-87906

24 V | I/O | I/O

Accessories

IV-HG dome attachment (large)
IV-GD10

IV-HG dome attachment (small)
IV-GD05

Magnifying lens attachment
OP-87902

Narrow field of view & standard use polarised light filter attachment
OP-87899

IV-HG300CA polarised light filter attachment
OP-87900

IV-HG600MA polarised light filter attachment
OP-87901

IV-HG vertical mounting bracket
OP-87908

IV-HG rear mounting bracket
OP-87909

IV-HG adjustable bracket
OP-87910

MONITOR

Intelligent monitor
IV-M30

Drop impact resistance: **1.3 m**

Monitor power cable
(M8 4pin - strand wire)
OP-87443 (2 m)
OP-87444 (5 m)
OP-87445 (10 m)

24 V

Accessories

Wall mounting adapter
OP-87464
[Supplied with the IV-M30]

Panel mounting adapter
OP-87465

DIN mounting adapter
OP-87466

Touch panel protective sheet
OP-87463

Stylus
OP-87462
[Supplied with the IV-M30]

USB memory stick 1 GB
OP-87502

AMPLIFIER-INTEGRATED MODEL

NFPA79 compliant monitor cable for amplifier-integrated model
(M12 4pin-M12 4pin)

Straight cable	Right angle cable
OP-87450 (2 m)	**OP-88039** (2 m)
OP-87451 (5 m)	**OP-88040** (5 m)
OP-87452 (10 m)	**OP-88041** (10 m)
OP-87453 (20 m)	

Sensor head (amplifier-integrated type)

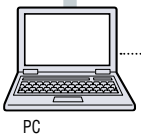
IP67 environmental resistance

Power I/O cable
(M12 12pin - strand wire)
Straight cable
OP-87440 (2 m)
OP-87441 (5 m)
OP-87442 (10 m)
Right angle cable
OP-88036 (2 m)
OP-88037 (5 m)
OP-88038 (10 m)

24 V | I/O

NFPA79 compliant Ethernet cable
(M12 4pin-RJ-45)

Straight cable	Right angle cable
OP-87907 (1 m)	**OP-88042** (1 m)
OP-87457 (2 m)	**OP-88043** (2 m)
OP-87458 (5 m)	**OP-88044** (5 m)
OP-87459 (10 m)	**OP-88045** (10 m)



PC

Software for the IV-H Series
IV-H1

Accessories

Dome attachment
IV-D10

Polarised visible light filter attachment
OP-87436

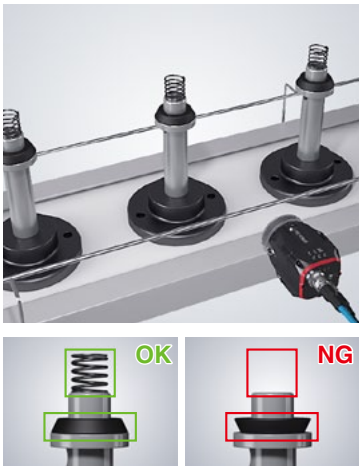
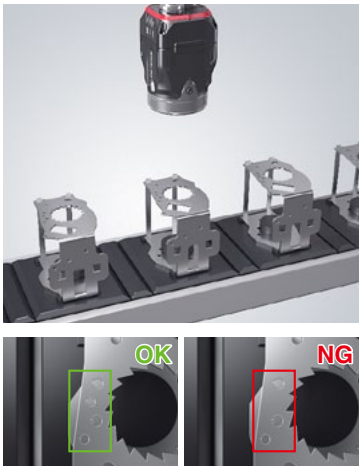
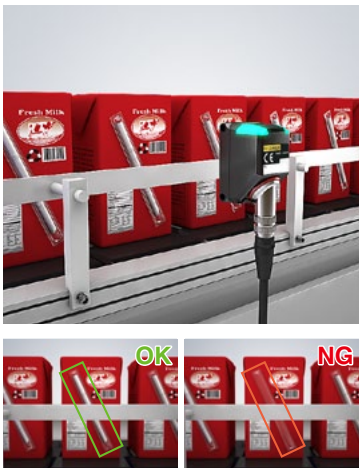
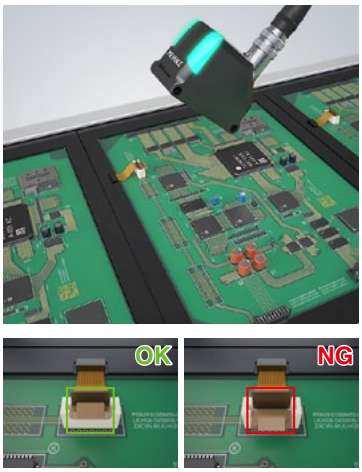
Infrared polarised filter attachment
OP-87437

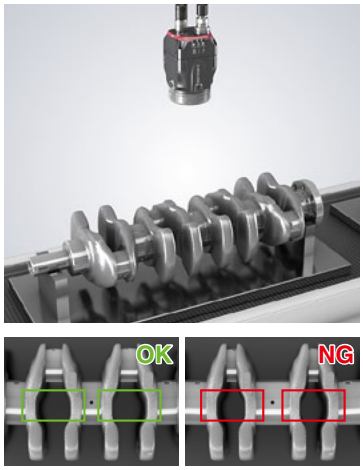
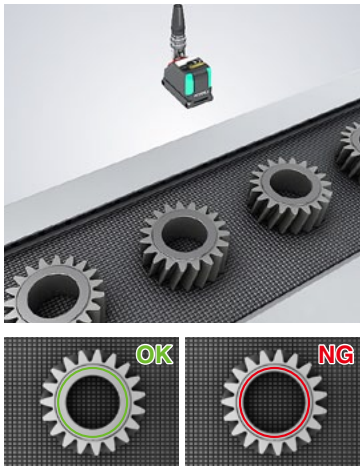
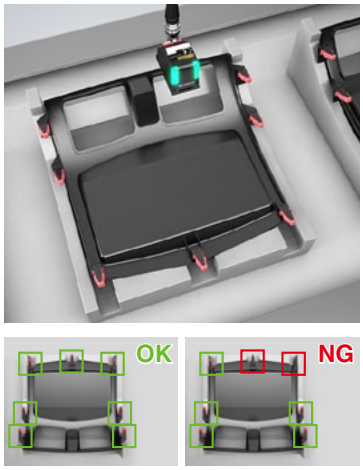
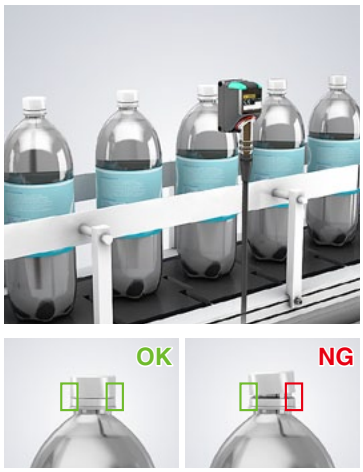
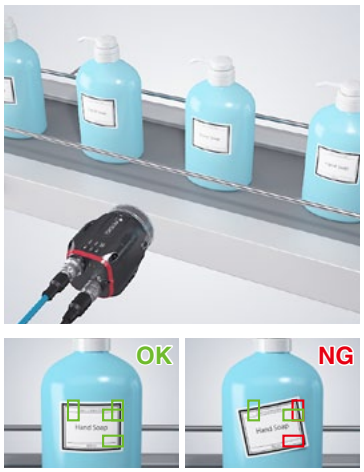
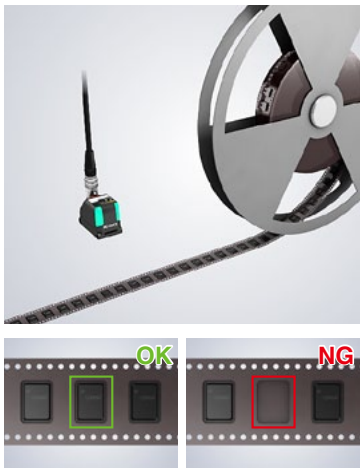
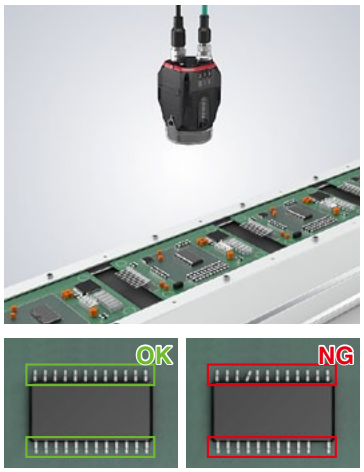
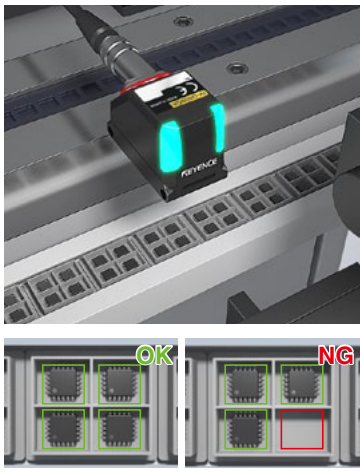
Mounting adapter
OP-87460
[Supplied with a sensor]

Front cover
OP-87461
[Supplied with the sensor]

Adjustable bracket
OP-87685

Appearance of mounted
OP-87685
[Support pole not included]

	PRESENCE DETECTION	COLOUR	SHAPE
AUTOMOTIVE & METAL			
FOOD & PHARMACEUTICAL			
ELECTRIC & ELECTRONIC			

WIDTH & HEIGHT	DIAMETER, PITCH & EDGE PRESENCE	WIDE FOV & SPACE-SAVING	
			AUTOMOTIVE & METAL
			FOOD & PHARMACEUTICAL
			ELECTRIC & ELECTRONIC

Sensor Head

Model		IV-HG500CA	IV-HG500MA	IV-HG150MA	IV-HG300CA	IV-HG600MA
Type		Standard sensor model		Narrow field of view sensor model	Wide field of view sensor model	
Installed distance		20 to 500 mm		40 to 150 mm	40 to 300 mm	40 to 600 mm
View		Installed distance 20 mm: 10 (H) × 7.5 (V) mm to Installed distance 500 mm: 200 (H) × 150 (V) mm		Installed distance 40 mm: 8 (H) × 6 (V) mm to Installed distance 150 mm: 32 (H) × 24 (V) mm*1	Installed distance 40 mm: 42 (H) × 31 (V) mm to installed distance 300 mm: 275 (H) × 206 (V) mm	Installed distance 40 mm: 42 (H) × 31 (V) mm to installed distance 600 mm: 550 (H) × 412 (V) mm
Image sensor		1/3 inch colour CMOS	1/3 inch monochrome CMOS	1/3 inch monochrome CMOS	1/3 inch colour CMOS	1/3 inch monochrome CMOS
	Pixel	752 (H) × 480 (V)				
Focus adjustment		Auto*2				
Exposure time		1/10 to 1/50000		1/20 to 1/50000	1/25 to 1/50000	1/50 to 1/50000
Lights	Illumination	White LED				Infrared LED
	Lighting method	Pulse lighting/DC lighting is switchable			Pulse lighting	
Indicators		2 (the same display details for both indicators)				
Environmental resistance	Ambient temperature	0 to +50°C (No freezing)				
	Relative humidity	35 to 85% RH (No condensation)				
	Vibration*3	10 to 55 Hz, 1.5 mm double amplitude, 2 hours each for X, Y, and Z axes				
	Shock resistance*3	500 m/s^2 6 different directions in 3 times				
	Enclosure rating*4	IP67				
Material		Main unit case: Zinc die-casting, Front cover: Acrylic (hard coat), Operation indicator cover: TPU				
Weight		Approx. 75 g				

*1. Installed distance 18 mm: 4 (H) × 3 (V) mm to installed distance 27 mm: 7 (H) × 5.2 (V) mm when the magnifying lens attachment (OP-87902) is used
*2. The focusing position can be automatically adjusted at the time of installation. Deactivated during the operation. Focusing position can be registered by programme
*3. Except when IV-HG dome attachment (IV-GD05/IV-GD10) is mounted
*4. Except when polarised filter attachment (OP-87899/OP-87900/OP-87901/OP-87902) is mounted

Sensor Amplifier

Model		IV-HG10 (main unit)	IV-HG15 (expansion unit)
Tools	Type	Shape Detection, Area*1, Colour Area*2, Edge Pixels, Width/Height, Diameter, Edge Presence, Pitch, Position Adjustment, High Speed Position Adjustment (1-Axis/2-Axis Adjustment)	
	Number*3	Detection tools: 16 tools, position adjustment tool: 1 tool	
Switch settings (programmes)		32 programmes	
Image history*4	Numbers	When using a colour type head: 100 images*5, when using a monochrome type head: 300 images*6	
	Condition	NG only/All is selectable	
Analysis information*7		OFF/Statistics/Histograms/Matching rate list is switchable Statistics: Processing time (latest value, MAX, MIN, AVE), number of OKs, number of NGs, trigger numbers, trigger errors, judgement results list by tools Histograms: Histogram, matching degree (latest value, MAX, MIN, AVE), numbers of OKs, numbers of NGs Matching rate list: Judgment results list by tools, matching rate list by tools, judgment bar list by tools	
Other functions		HDR, HighGain, Colour filters*2, Digital zoom (2×, 4×)*8, Brightness correction, Tilt correction, White balance*2, Mask function, Colour histogram, Test run, ToolAutoTune, Input monitor, Output test, Security settings, Simulator, Mutual interference prevention, Direct connection (2 units or more), Sensor date/time information addition, Scaling function, Failing sensor list, Failure hold	
Indicators		PWR/ERR, OUT, TRIG, STATUS, LINK/ACT	
Input		Non-voltage input/voltage input is switchable For non-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 0.2 mA or lower, ON current 2 mA (for 24 V)	
	Inputs	6 inputs (IN1 to IN6)	
	Function	IN1: External trigger, IN2 to IN6: Enable by assigning the optional functions Assignable functions: Programme switching, Clear error, External master image registration, Main unit/expansion unit simultaneous input	
Output		Open collector output NPN/PNP is switchable, N.O./N.C. is switchable For open collector NPN output: Maximum rating 26.4 V 50 mA (20 mA when linked to an expansion unit [IV-HG15]), remaining voltage 1.5 V or lower For open collector PNP output: Maximum rating 26.4 V 50 mA (20 mA when linked to an expansion unit [IV-HG15]), remaining voltage 2 V or lower	
	Outputs	8 outputs (OUT1 to OUT8)	
	Function	Enable by assigning the optional functions Assignable functions: Total judgement result, RUN, BUSY, Error, Position adjustment result, Judgement result of each tool, Result of the logical operation of each tool, Main unit/expansion unit logical output	
Ethernet*9	Standard	100BASE-TX/10BASE-T	
	Connector	RJ-45 8pin connector	
Network function		FTP client, EtherNet/IP™, PROFINET	
Rating	Power voltage	24 VDC ±10% (including ripple)	Supplied from main unit
	Current consumption	0.8 A or less. 1.5 A or less when also using an expansion unit (IV-HG15). (The output load is excluded.)	
Environmental resistance	Ambient temperature	0 to +50°C (No freezing)*10	
	Relative humidity	35 to 85% RH (No condensation)	
Material		Main unit case: Polycarbonate	
Weight		Approx. 150 g	

*1. Monochrome type only
*2. Colour type only
*3. Tools can be installed by programmes.
*4. Saves to the sensor amplifier's internal memory. The images saved to the sensor amplifier can be backed up to the USB memory device inserted into the intelligent monitor (IV-M30) or to the PC by the software for the IV-H/IV-HG Series (IV-H1).
*5. When using the FTP client function: 70 pictures
*6. When using the FTP client function: 210 pictures
*7. This can be displayed on the intelligent monitor (IV-M30) or by software for the IV-H/IV-HG Series (IV-H1).
*8. Possible with both the colour type and monochrome type
*9. This is for connection with the intelligent monitor (IV-M30) or software for the IV-H/IV-HG Series (IV-H1).
*10. When attaching the sensor amplifier to a DIN rail, attach the sensor amplifier to a metal plate.

Sensor

Model		IV-H500CA	IV-H500MA	IV-H150MA	IV-H2000MA
Type		Standard distance		Short range	Long range
Installed distance		50 to 500 mm		50 to 150 mm	300 to 2000 mm
View		Installed distance 50 mm: 25 (H) × 18 (V) mm to installed distance 500 mm: 210 (H) × 157 (V) mm		Installed distance 50 mm: 12 (H) × 9 (V) mm to installed distance 150 mm: 36 (H) × 27 (V) mm	Installed distance 300 mm: 45 (H) × 33 (V) mm to installed distance 2000 mm: 300 (H) × 225 (V) mm
Image sensor		1/3 inch colour CMOS	1/3 inch monochrome CMOS		
	Pixel	752 (H) × 480 (V)			
Focus adjustment		Auto*1	Auto*1	Auto*1	Auto*1
Exposure time		1/10 to 1/50000	1/10 to 1/25000	1/20 to 1/25000	1/10 to 1/25000
Lights	Illumination	White LED	Red LED		Infrared LED
	Lighting method	Pulse lighting/DC lighting is switchable			
Tools	Type	Shape Detection, Colour Area*7, Area*8, Edge Pixels, Width/Height, Diameter, Edge Presence, Pitch, Position Adjustment, High Speed Position Adjustment (1-Axis/2-Axis Adjustment)			
	Number*2	Detection tools: 16 tools, position adjustment tool: 1 tool			
Switch settings (programmes)		32 programmes			
Image history*3	Numbers	100 images*4	300 images*5		
	Condition	NG only/All is selectable			
Analysis information*6		OFF/Statistics/Histograms/Matching rate list is switchable Statistics: Processing time (latest value, MAX, MIN, AVE), number of OKs, number of NGs, trigger numbers, trigger errors, judgement results list by tools Histograms: Histogram, matching degree (latest value, MAX, MIN, AVE), numbers of OKs, numbers of NGs Matching rate list: Judgment results list by tools, matching rate list by tools, judgment bar list by tools			
Other functions		HDR, HighGain, Colour filters*7, Digital zoom*8, Brightness correction, Tilt correction, White balance*7, Mask function, Colour histogram, Test run, ToolAutoTune, Input monitor, Output test, Security settings, Simulator*9, Sensor date/time information addition, Scaling function, Failing sensor list, Failure hold			
Indicators		PWR/ERR, OUT, TRIG, STATUS, LINK/ACT			
Input		Non-voltage input/voltage input is switchable For non-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 0.2 mA or lower, ON current 2 mA (for 24 V)			
	Inputs	6 inputs (IN1 to IN6)			
	Function	IN1: External trigger, IN2 to IN6: Enable by assigning the optional functions Assignable functions: Programme switching, Clear error, External master image registration			
Output		Open collector output NPN/PNP is switchable, N.O./N.C. is switchable For open collector NPN output: Maximum rating 26.4 V 50 mA, remaining voltage 1.5 V or lower For open collector PNP output: Maximum rating 26.4 V 50 mA, remaining voltage 2 V or lower			
	Outputs	4 outputs (OUT1 to OUT4)			
	Function	Enable by assigning the optional functions Assignable functions: Total judge result, RUN, BUSY, Error, Position adjustment result, Judge result of each tool, Result of the logical operation of each tool			
Ethernet*10	Standard	100BASE-TX/10BASE-T			
	Connector	M12 4pin connector			
Network function		FTP client, EtherNet/IP™, PROFINET			
Rating	Power voltage	24 VDC ±10% (including ripple)			
	Current consumption	0.6 A or less			
Environmental resistance	Ambient temperature	0 to +50°C (No freezing)			
	Relative humidity	35 to 85% RH (No condensation)			
	Vibration*11	10 to 55 Hz, 1.5 mm double amplitude, 2 hours each for X, Y, and Z axes			
	Shock resistance*11	500 m/s² 6 different directions in 3 times			
	Enclosure rating*12	IP67			
Material		Main unit case: Aluminium die-casting, Packing: NBR, Front cover: Acrylic, Mounting adapter: POM			
Weight		Approx. 270 g			

*1. The focusing position can be automatically adjusted at the time of installation. Deactivated during the operation. Focusing position can be registered by programme.
*2. Tools can be installed by programmes.
*3. Saves to the memory in the sensor. The images saved in the sensor can be backed up to the USB memory installed to the intelligent monitor (IV-M30) or to the PC by the software for IV (IV-H1).
*4. When using the FTP client function: 70 pictures *5. When using the FTP client function: 210 pictures *6. This can be displayed on the intelligent monitor (IV-M30) or by software for IV (IV-H1). *7. Colour type only
*8. Possible with both the colour type and monochrome type *9. Simulator can be used with the IV software (IV-H1). *10. This is for connection with the intelligent monitor (IV-M30) or software for IV (IV-H1).
*11. Except when IV-H dome attachment (IV-D10) is mounted *12. Except when polarised filter attachment (OP-87436/OP-87437) is mounted

MONITOR

Model		IV-M30
Display		3.5" TFT colour LCD 320 × 240 dot (QVGA)
Backlight	Method	White LED
	Duration	Approx. 50000 hours (25°C)
Touch panel	Method	Analogue resistive
	Actuating force	0.8 N or less
Indicators		PWR, SENSOR
Ethernet*1	Standard	100BASE-TX/10BASE-T
	Connector	M12 4pin connector
Languages		Japanese/English/German/Simplified Chinese/Traditional Chinese/ Italian/French/Spanish/Portuguese/Korean
Expanded memory		USB memory*2
Rating	Power voltage	24 VDC ±10% (including ripple)
	Current consumption	0.2 A or lower
Environmental resistance	Ambient temperature	0 to +50°C (No freezing)
	Ambient humidity*3	35 to 80% RH (No condensation)
	Vibration	10 to 55 Hz, 0.7 mm double amplitude, 2 hours each for X, Y, and Z axes
	Drop impact resistance	1.3 m over the concrete (2 times each in the arbitrary direction)
	Enclosure rating	IP40
Material		Polycarbonate
Weight		Approx. 180 g

*1. This is dedicated for connection with IV Series sensor.
*2. Use the KEYENCE recommended product.
*3. If the ambient temperature is over 40°C, use it in the absolute humidity of 40°C 80% RH or lower.

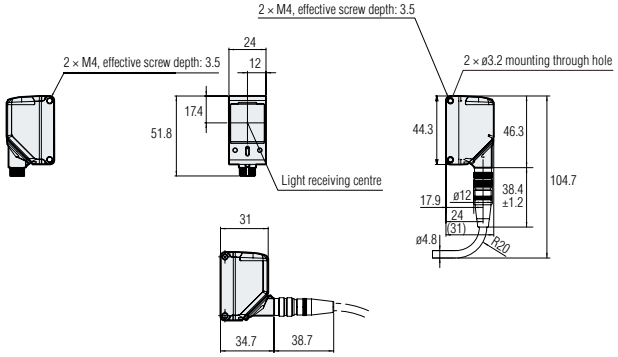
SOFTWARE

Model		IV-H1
System requirements	Interface	Equip the Ethernet (100BASE-TX) interface
	OS	Windows 7 Home Premium/Professional/Ultimate*1 Windows XP Professional/Home Edition; either of OS above needs to be pre-installed
	Languages	Japanese/English/German/Simplified Chinese/Traditional Chinese/ Italian/French/Spanish/Portuguese/Korean
	Processor	Windows 7: needs to be compliant with system requirements for OS Windows XP: Pentium III or better, Clock speed 1 GHz or faster
	Memory capacity	Windows 7: needs to be compliant with system requirements for OS Windows XP: 512 MB or more (1 GB or more is recommended)
	Required capacity for installation	1 GB or more
	Monitor	Resolution 1024 × 768 pixels or higher, Display colour High Colour (16 bit) or higher
	Operating conditions	.NET Framework 4.0 or 4.5 needs to be installed*2

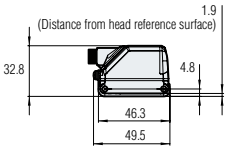
*1. Supported for 32 bit and 64 bit version.
*2. If .NET Framework 4.0 or 4.5 is not installed, this will be automatically installed at the time of IV-H1 installation.

ULTRA-COMPACT MODEL

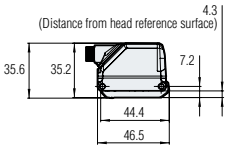
Sensor head
IV-HG500CA/IV-HG500MA/IV-HG150MA/IV-HG300CA/IV-HG600MA



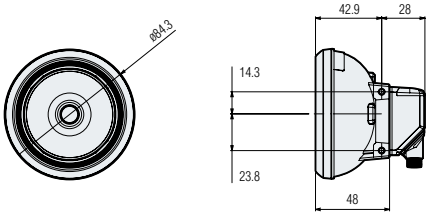
With polarised filter attachment
OP-87899 to OP-87901



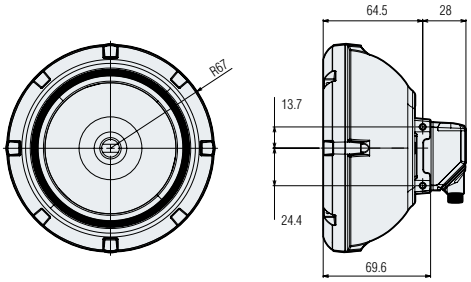
With magnifying lens attachment
OP-87902



With small dome attachment for the **IV-HG (IV-GD05)**

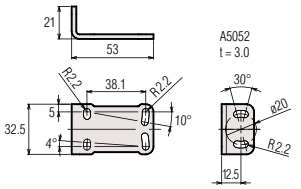


With large dome attachment for the **IV-HG (IV-GD10)**

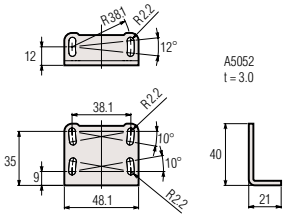


- When using an IV-HG dome attachment (small), please set the target within the range of 0 to 30 mm from the top.
- When using an IV-HG dome attachment (large), please set the target within the range of 0 to 50 mm from the top.

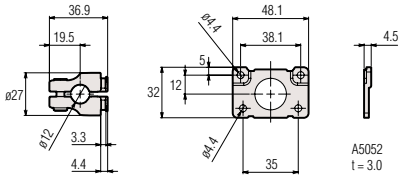
IV-HG vertical mounting bracket **OP-87908**



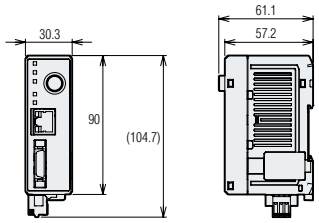
IV-HG rear mounting bracket **OP-87909**



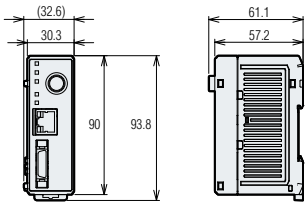
IV-HG adjustable bracket **OP-87910**



Sensor amplifier main unit
IV-HG10



Sensor amplifier expansion unit
IV-HG15



WIRING/CIRCUIT DIAGRAM

Terminal number and wiring colour of the I/O cable for IV-HG Series (OP-87906)

Terminal No.	Wiring colour	Name	Assigning default value	Description
A1	Brown	IN1	External trigger ↑	Set external trigger. Rising timing (↑) or falling timing (↓) can be set.
A2	Red	IN2	OFF	Input assignable function • Programme bit0 to bit4 • Clear Error • Ext. Master Save • OFF (not used)
A3	Orange	IN3	OFF	
A4	Yellow	IN4	OFF	
A5	Green	IN5	OFF	
A6	Blue	IN6	OFF	
A7	Purple	Unused	Unused	Unused
A8	Grey	Unused	Unused	
A9	White	Unused	Unused	
A10	Black	Unused	Unused	

Terminal No.	Wiring colour	Name	Assigning default value	Description
B1	Brown	OUT1	Total Status (N.O.)	Output assignable function • Total Status • Total Status NG • RUN • BUSY • Error • Position Adjustment • Status result of each tool (Tool 1 to 16) • Logical operation result of each tool (Logic 1 to 4) • OFF (not used)
B2	Red	OUT2	BUSY (N.O.)	
B3	Orange	OUT3	Error (N.C.)	
B4	Yellow	OUT4	OFF	
B5	Green	OUT5	OFF	
B6	Blue	OUT6	OFF	
B7	Purple	OUT7	OFF	
B8	Grey	OUT8	OFF	
B9	White	Unused	Unused	Unused
B10	Black	Unused	Unused	

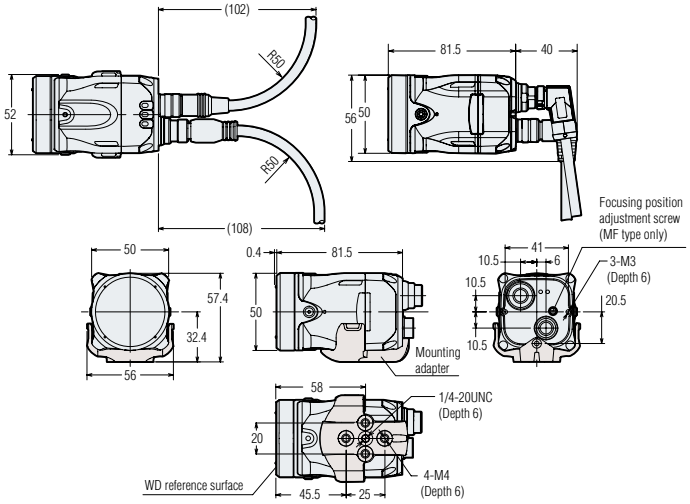
Cable specification : AWG28

Unit: mm

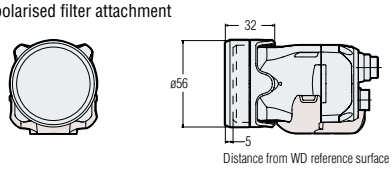
AMPLIFIER-INTEGRATED MODEL

Sensor

IV-H500C/IV-H150M/IV-H500M/IV-H2000M/IV-H500CA/IV-H150MA/IV-H500MA/IV-H2000MA

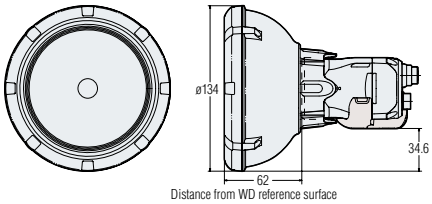


With polarised filter attachment



Distance from WD reference surface

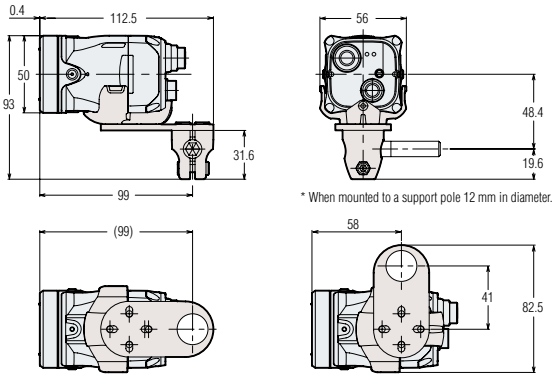
With dome attachment **(IV-D10)**



Distance from WD reference surface

- When using dome attachment, please set the target within the range of 0 to 50 mm from the top.
- Dome attachment can be used for standard distance and close range types.

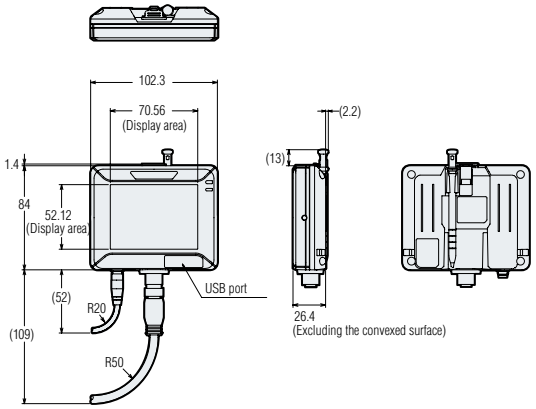
With adjustable bracket **(OP-87685)**



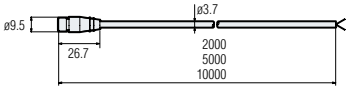
* When mounted to a support pole 12 mm in diameter.

INTELLIGENT MONITOR FOR AMPLIFIER-INTEGRATED AND ULTRA-COMPACT MODELS

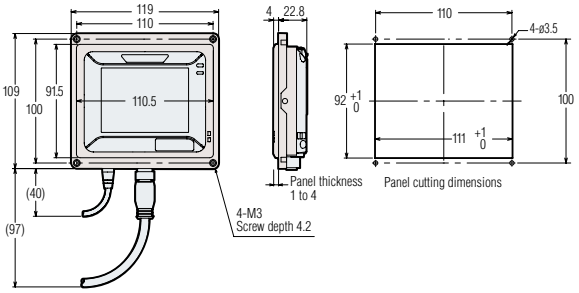
Intelligent monitor **IV-M30**



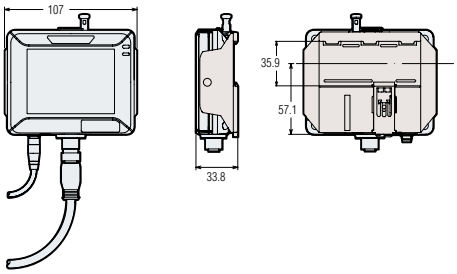
Monitor power cable
OP-87443 (2 m)/
OP-87444 (5 m)/
OP-87445 (10 m)



Using the panel mounting adapter



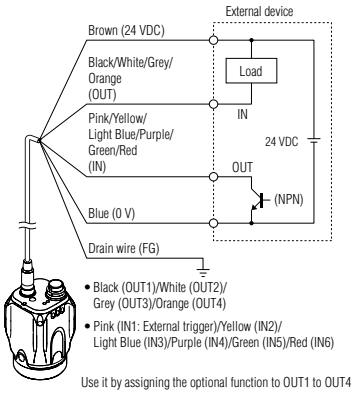
Using the DIN mounting adapter



WIRING/CIRCUIT DIAGRAM

SELECTING NPN OUTPUT

When NPN is selected in I/O format



- Black (OUT1)/White (OUT2)/ Grey (OUT3)/Orange (OUT4)
- Pink (IN1: External trigger)/Yellow (IN2)/ Light Blue (IN3)/Purple (IN4)/Green (IN5)/Red (IN6)

Use it by assigning the optional function to OUT1 to OUT4 and IN2 to IN6.

Terminal number and wiring colour of the I/O cable for IV-H Series (OP-87440/OP-87441/OP-87442)

Wiring colour	Name	Assigning default value	Description
Brown	24 VDC	-	+ side of power
Blue	0 V	-	- side of power GND of input-output cable
Black	OUT1	Total Status (N.O.)	Output assignable function • Total Status • Tot. StatusNG • RUN • BUSY • Error • Pos. Adj. • Judge result of each tool (Tool 1 to Tool 16) • Logical operation result of each tool (Tool 1 to Tool 4) • OFF (not used)
White	OUT2	BUSY (N.O.)	
Grey	OUT3	Error (N.C.)	
Orange	OUT4	OFF	
Pink	IN1	External trigger ↑	Set external trigger. Rising timing (↑) or falling timing (↓) can be set.

Wiring colour	Name	Assigning default value	Description
Yellow	IN2	OFF	Input assignable function • Programme bit0 to bit4 • Clear Error • Ext. Master Save • OFF (not used)
Light Blue	IN3	OFF	
Purple	IN4	OFF	
Green	IN5	OFF	
Red	IN6	OFF	
Drain	FG	-	Insulated frame

Cable specification

- Brown/Blue/Black/White/Grey/Orange : AWG25
- Pink/Yellow/Light Blue/Purple/Green/Red : AWG28
- With braided shield cable (with drain cable)

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