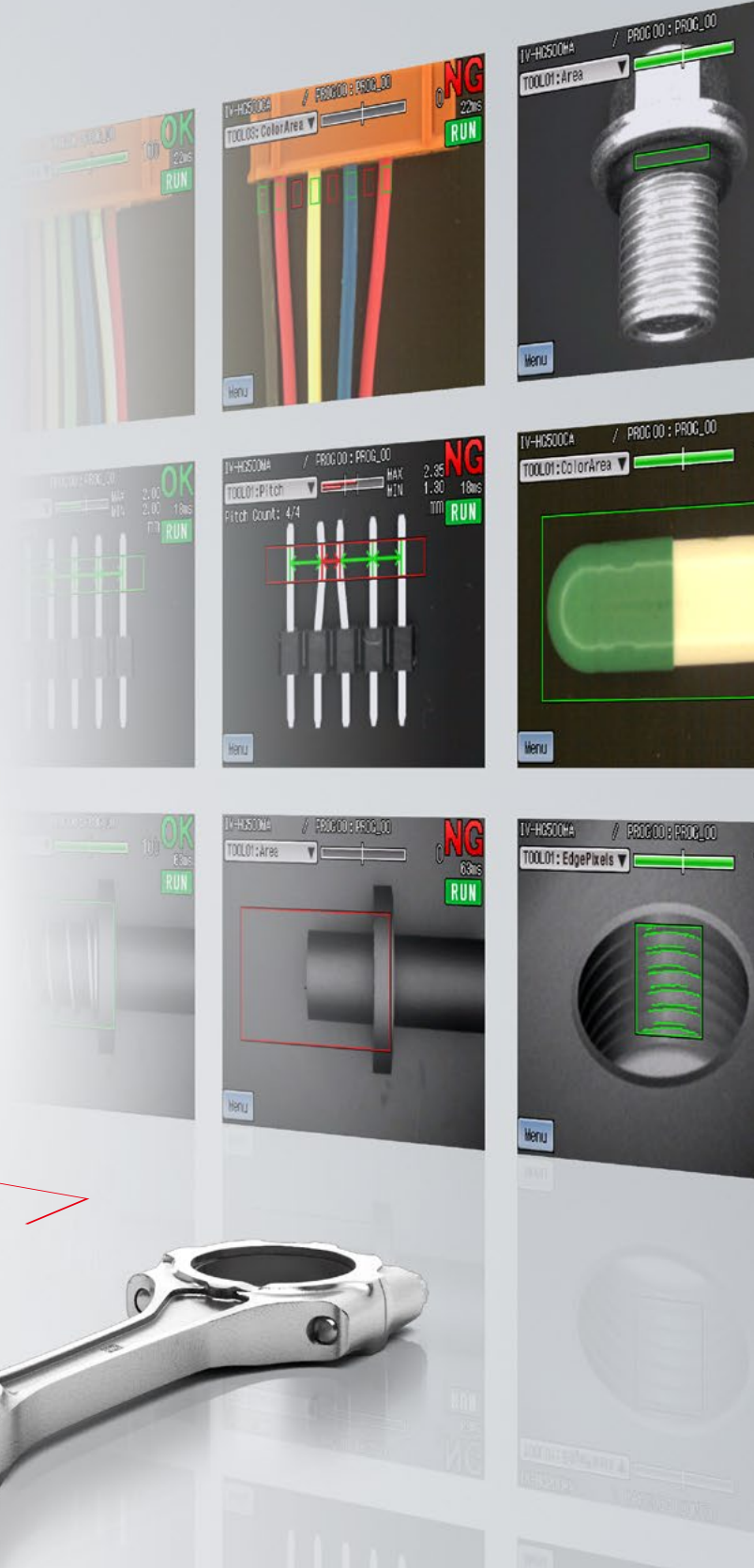


ULTRA-COMPACT, EASY CONFIGURATION



NEW Newly added
OCR function

DETECT VARIOUS PRODUCT FEATURES WITH KEYENCE VISION SENSORS



99 OK
18ms
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:Area
Menu




0 NG
18ms
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:OCR
Master text 15/12/2020
Character read 15/12/2020
Exp. Date
15/12/2020



100 OK
18ms
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:OCR
Master text 15/12/2020
Character read 14/12/2020
Exp. Date
14/12/2020



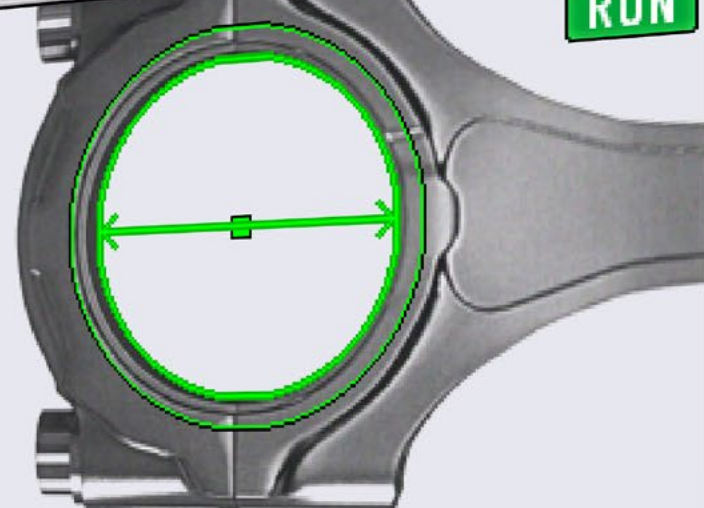
1 4 / 1 2 / 2 0 2 0

100 OK
26ms
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:ColorArea
Menu



IV-HG500CA / PROG_02 : PROG_02
TOOL01:Diameter
Menu



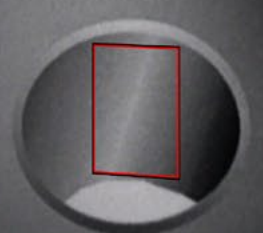
100 OK
24ms
RUN

IV-HG500CA / PROG_02 : PROG_02
TOOL01:Diameter
Menu

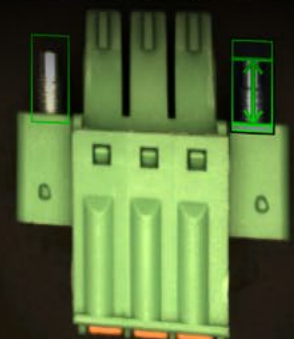


100 OK
13ms
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:EdgePixels
Menu

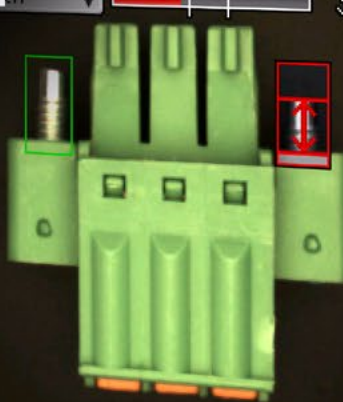


IV-HG500CA / PROG_00 : PROG_00
TOOL01:EdgePixels
Menu



mm
3.50
RUN

IV-HG500CA / PROG_00 : PROG_00
TOOL01:EdgePixels
Menu



mm
3.50
RUN

Conventional methods experience a variety of problems.

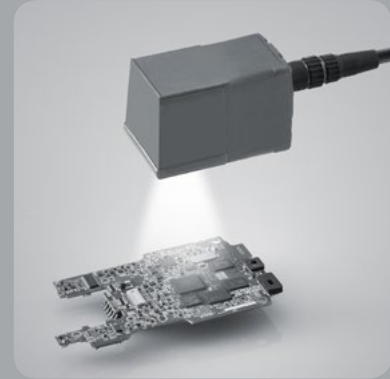
Visual



Sensor



Conventional vision sensor



Difficult

- It is difficult to perform complete inspections when checking items visually.
- Specialized knowledge is required in order to select, install, and set sensors.
- Conventional vision sensors require experience and take time to get used to.

Unstable

- The results in visual inspections vary from one person to another.
- Erroneous detections occur with sensors due to misalignment.
- Conventional vision sensors cannot capture clear images.

KEYENCE's IV Series Vision Sensor solves all these problems.

IV Series Vision Sensor



Easy to use

- 100% inspections are possible.
- A wide variety of detections can be supported.
- Anyone can operate the sensor easily.

Stable

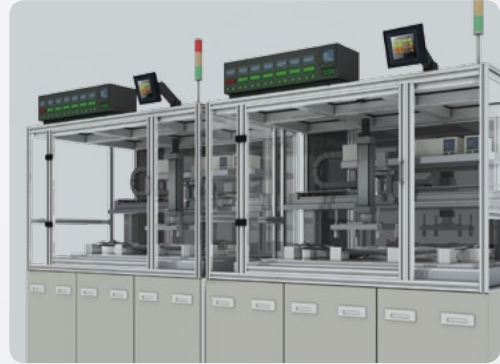
- Accurate detections without variations are possible.
- The entire surface is checked, providing high resistance to misaligned targets.
- Clear images with no distortion can be captured.

SIMPLE INSTALLATION

Install Anywhere Thanks to Smallest-In-Class Size



There is no space in which to install the sensor.



The device size needs to be reduced.

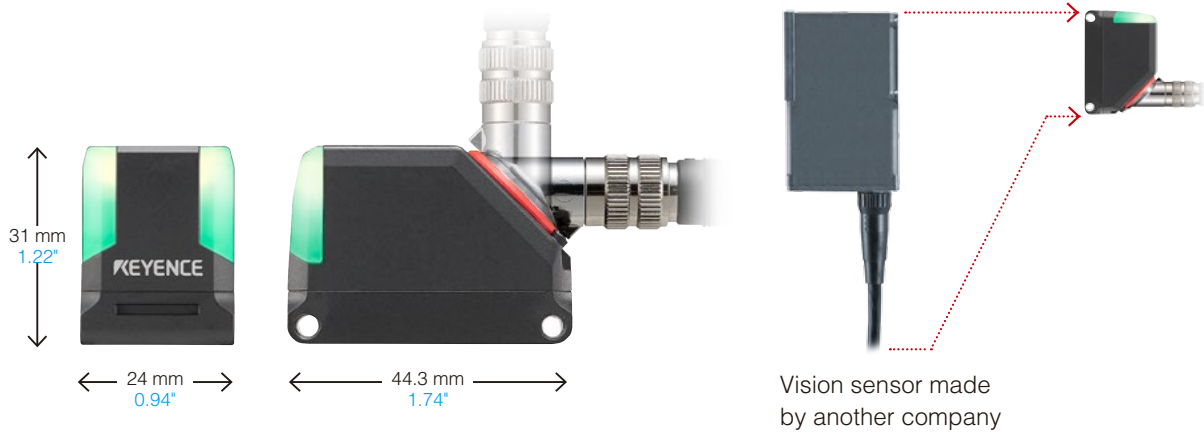


The IV Series solves these problems.



Flexible Installation Even in Narrow Locations

This sensor can be installed anywhere with minimal space restrictions. There is no need to worry about the installation location even when installing the sensor in existing devices or when designing a new installation.



Flexible Layout with Cable Routing 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. Together with the smallest head size in its class, this ensures a high degree of freedom when it comes to installations.



Connector can rotate 330°

EASY SETTINGS

1-MINUTE SETUP



START

After 15 seconds

Image capture setup



After 30 seconds

Tool setup



After 45 seconds

Output setup

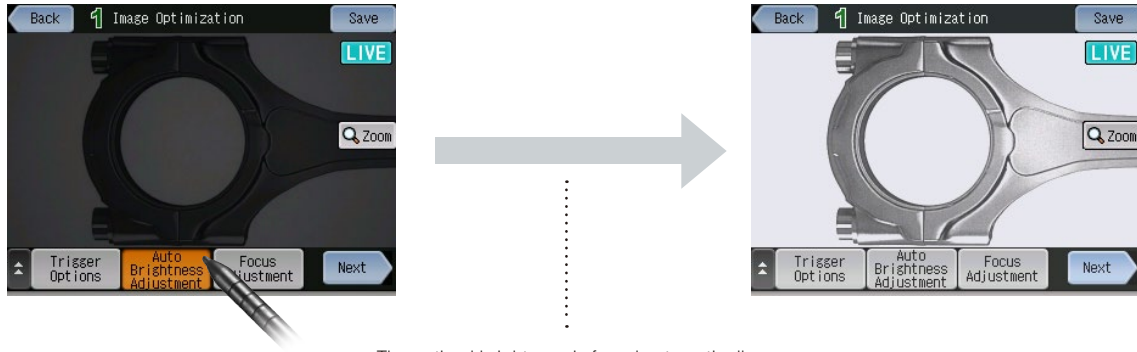
COMPLETE IN 1 MINUTE



Automatic Brightness Adjustment

Brightness adjustment is completed with just the press of a button.

Fine adjustments requiring advanced imaging skills—such as adjustments to the gain and exposure time—are also automatically optimized.



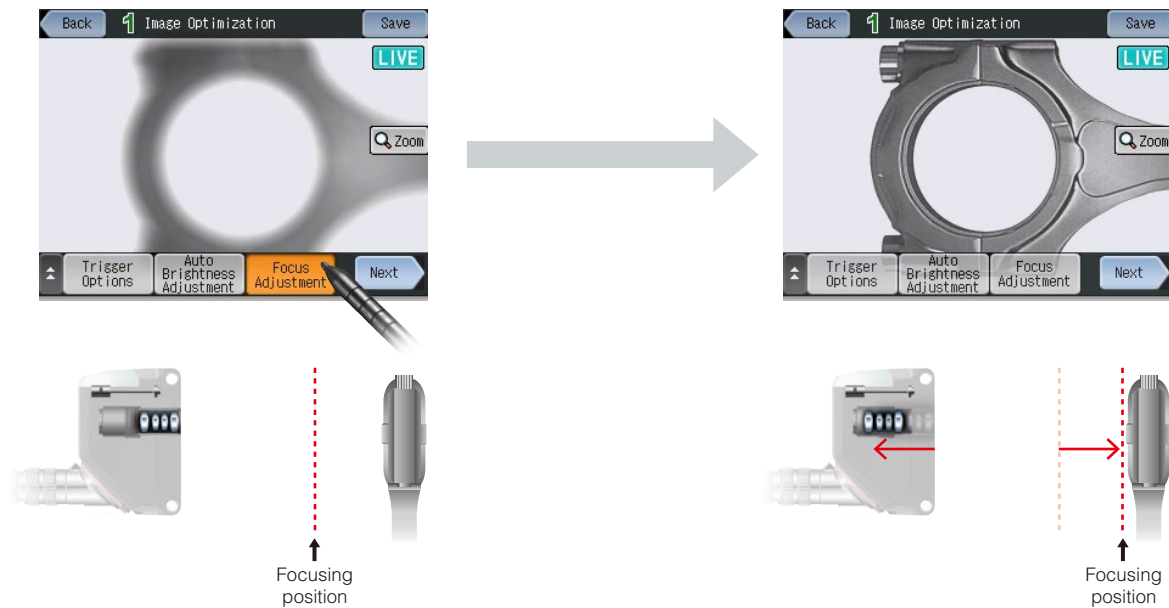
The optimal brightness is found automatically from multiple photographs taken under different image capture conditions.



First-In-Class, High-Speed, High-Accuracy Automatic Focus

Focusing is also completed with just one button press.

The specially developed automatic focus mechanism enables high-speed and high-accuracy focusing.



CLEAR IMAGE CAPTURING FOR GREATER STABILITY

High-Quality Image Capturing Unaffected by Ambient Environment

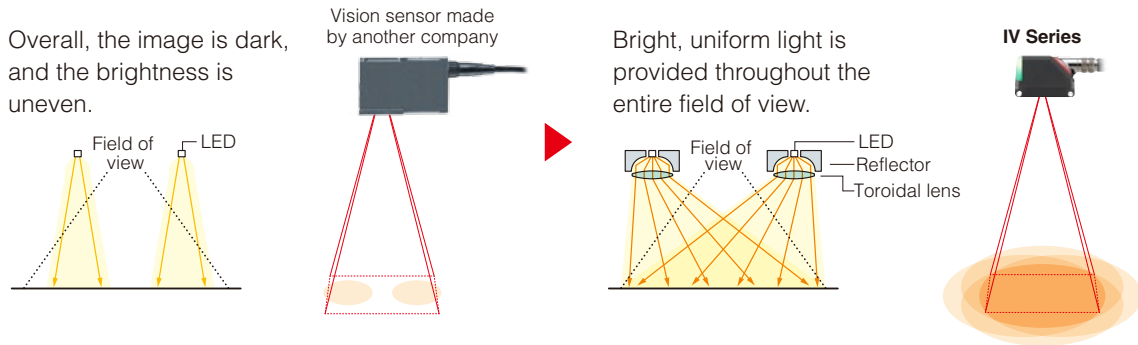
High-intensity
Hi-R
illumination



High-performance
HP-Quad lens

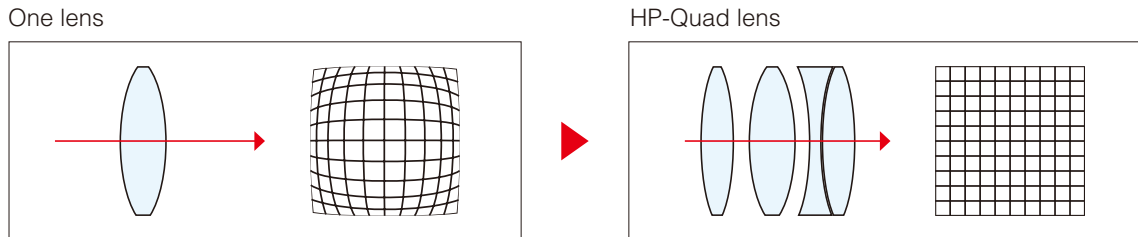
High-Intensity Hi-R Illumination Eliminates Light Intensity Loss

KEYENCE has investigated reflector shapes in an attempt to minimize the loss of light intensity from the LEDs. The result is that we have successfully made the lighting in the entire field of view uniform and overwhelmingly bright.



High-Performance HP-Quad Lens Minimizes Image Distortion

The newly developed lens contains 4 layers of glass. This minimizes the effect of lens distortion, making it possible to capture bright, clear images with low distortion.

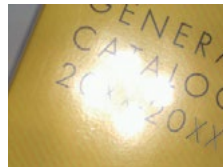


Polarized Light Filter Attachment

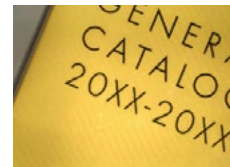


This filter reduces the effects of glare from glossy targets.

Not attached



Attached



Dome Attachment



This attachment generates indirect light from various directions to ensure the target is uniformly illuminated. This method is more effective than a polarized filter at reducing glare.

Not attached



Attached



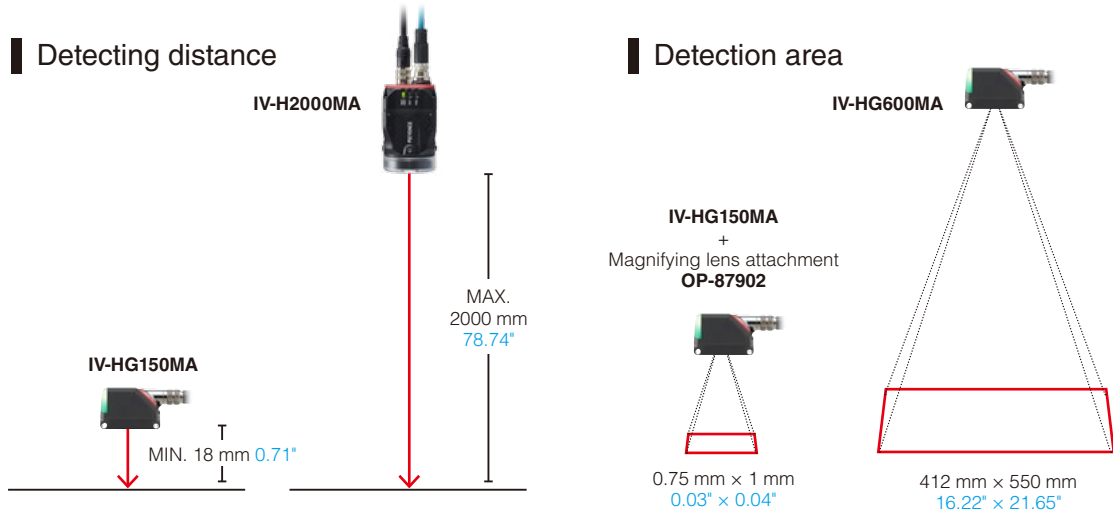
LARGER IMAGE CAPTURE FIELD FOR IMPROVED STABILITY

Detect Small Targets, Even at Long Distances



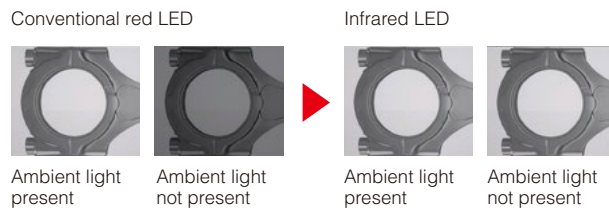
Using a Model That Matches the Application Eliminates Erroneous Detections

In order to stabilize detection, it is absolutely necessary to capture a large image of the target. The 10 different types of sensor heads make it possible to support a wide variety of target sizes and detecting distances.



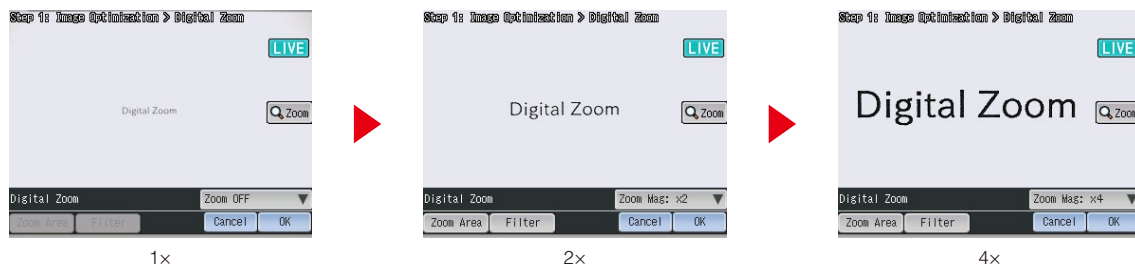
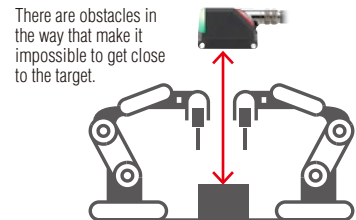
Infrared Model Is Unaffected by Ambient Light

The long range/wide field of view model is equipped with infrared LED illumination. This makes it possible to perform stable detections that are unaffected by ambient light (such as the light in a factory from the setting sun).



Digital Zoom Function for Stable Detection Even from Far Away

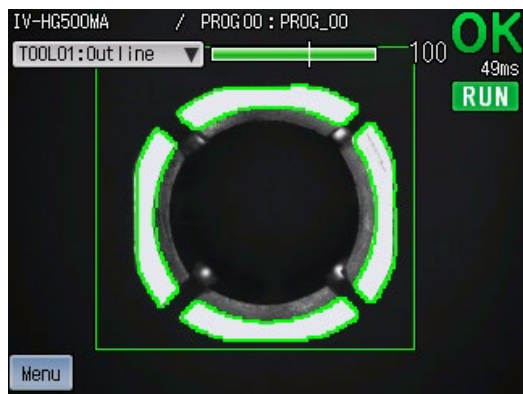
Even when it is not possible to bring the sensor close to the target due to the presence of obstacles or due to the design, this function can be used to capture a large image of the target.



Inspection Tools That Provide Stable Operation in Various Worksites and with Various Targets

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 normalized correlation methods (pattern matching) can now be identified.



PASS

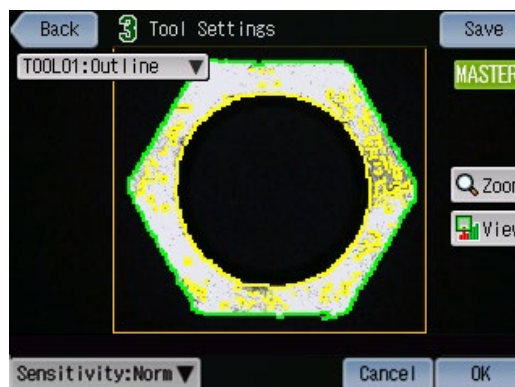
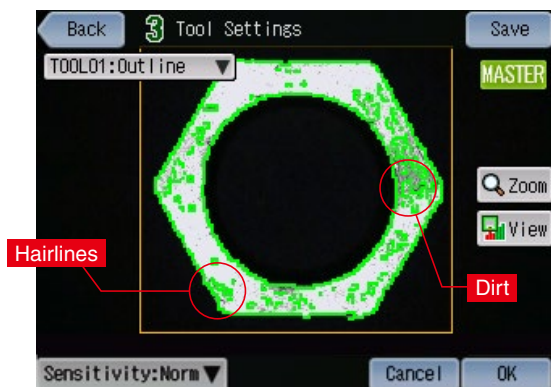


FAIL

Useful Functions That Provide Even Greater Stability

MASK OUTLINE

Outlines that are not relevant to the detection can be disabled. This makes it possible to perform stable detection even when hairlines or dirt are present on metal targets.



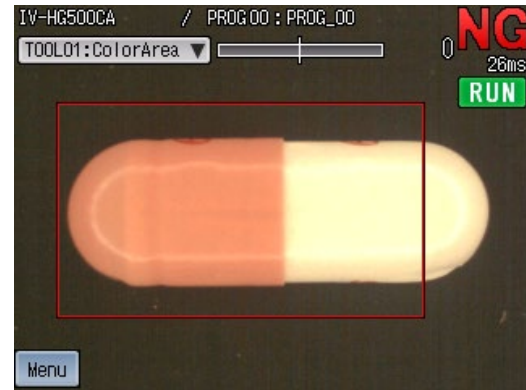
Everything other than the outline to be detected can be disabled.

AREA

Using the registered master area (number of pixels) as reference, the difference in area from the inspection object is calculated. When using a color model, judgment is made on the basis of the area of the specified color. When using a monochrome model, brightness is judged by the area binarized in black and white.



PASS



FAIL

Useful Functions That Provide Even Greater Stability

POSITION ADJUSTMENT

The position adjustment function calculates the amount of misalignment from the master image in order to correct the position and enable correct judgment. In addition, 360° rotation is supported, which means there is no need to worry about workpiece misalignment. Support for high-speed tracking is also possible.



PASS



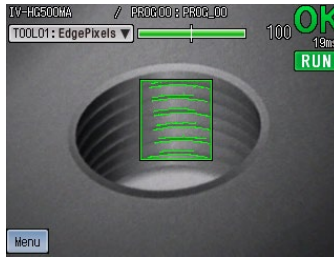
FAIL

Inspection Tools That Provide Stable Operation in Various Worksites and with Various Targets

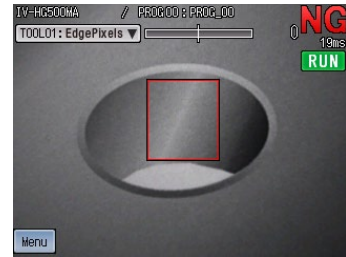
EDGES

This tool detects the boundary between the bright and dark parts in an image. KEYENCE's proprietary edge strength optimization algorithm can be used to stably detect targets that have variations in edge contrast.

EDGE PIXELS

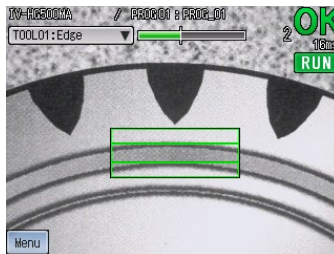


PASS

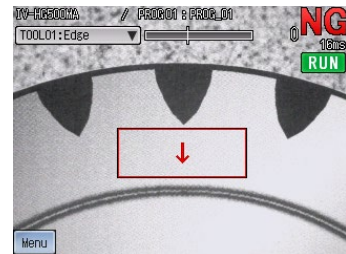


FAIL

EDGE PRESENCE

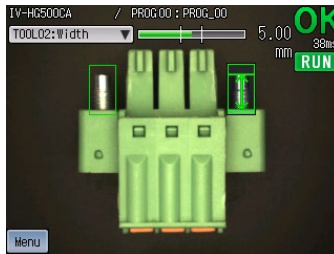


PASS

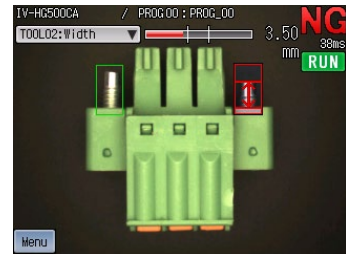


FAIL

WIDTH/HEIGHT

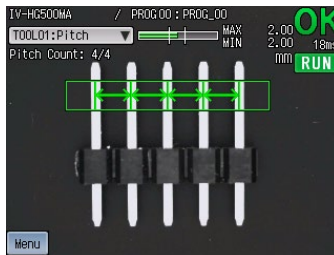


PASS

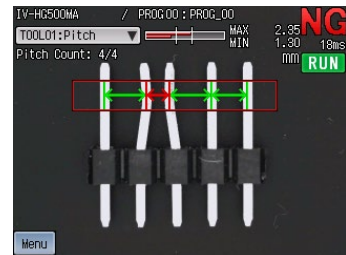


FAIL

PITCH

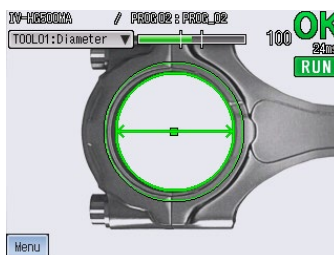


PASS

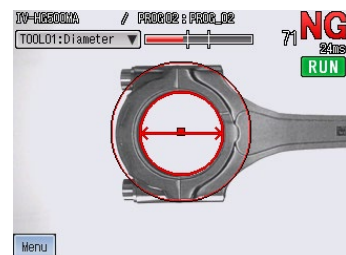


FAIL

DIAMETER

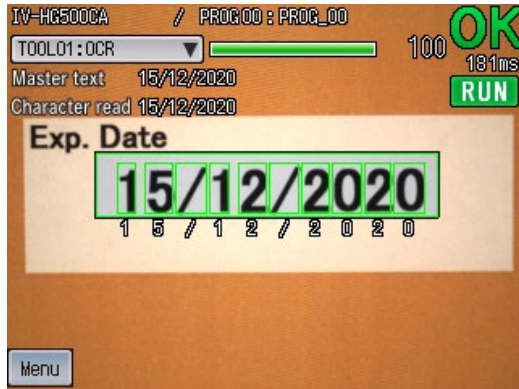


PASS

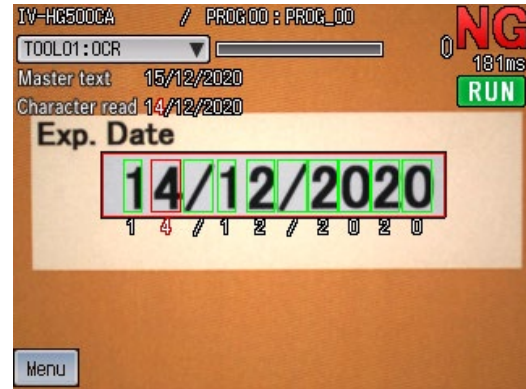


FAIL

This tool detects whether the text/date on the target being inspected matches the text/date information in the registered master image. The text/date is compared against the large number of internal character fonts that have been preregistered, and targets that match are identified as being text/dates.



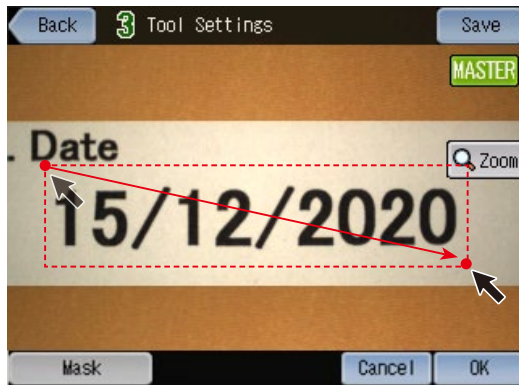
PASS



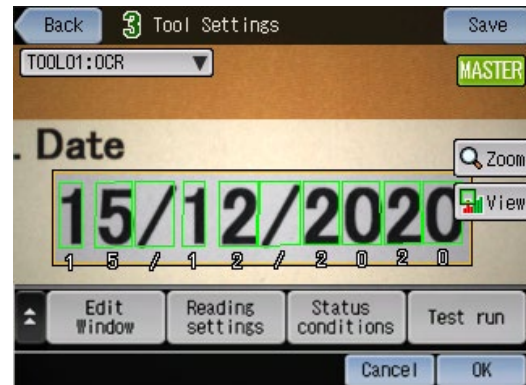
FAIL

Just Outline to Identify Text

There is no need to perform extraction (adjusting the character width and height), register a dictionary, or any other setting configurations required with conventional vision sensors. Just outline the text to identify it. Furthermore, stable reading is possible even if the conditions of the text's shading, thickness, and size change.



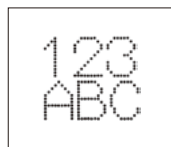
Draw the window...



to automatically identify the text.

Supports a Wide Variety of Marking Devices

Inkjet printer



Standard ink



White ink

Laser marker



In addition, various text formats such as those of thermal printers, hot printers, and dot characters are supported.

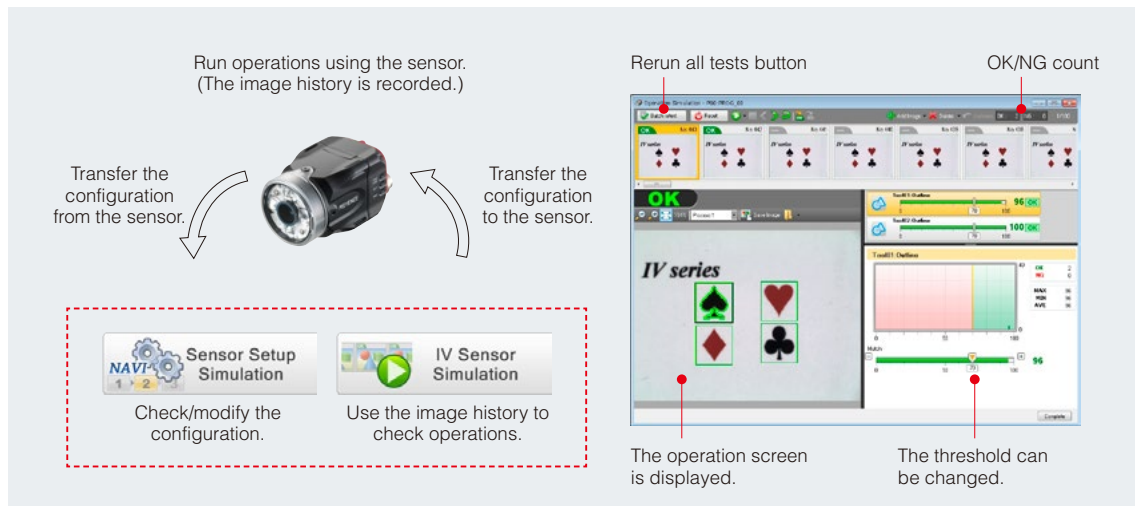
Software for IV Series, “IV-Navigator” IV-H1

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

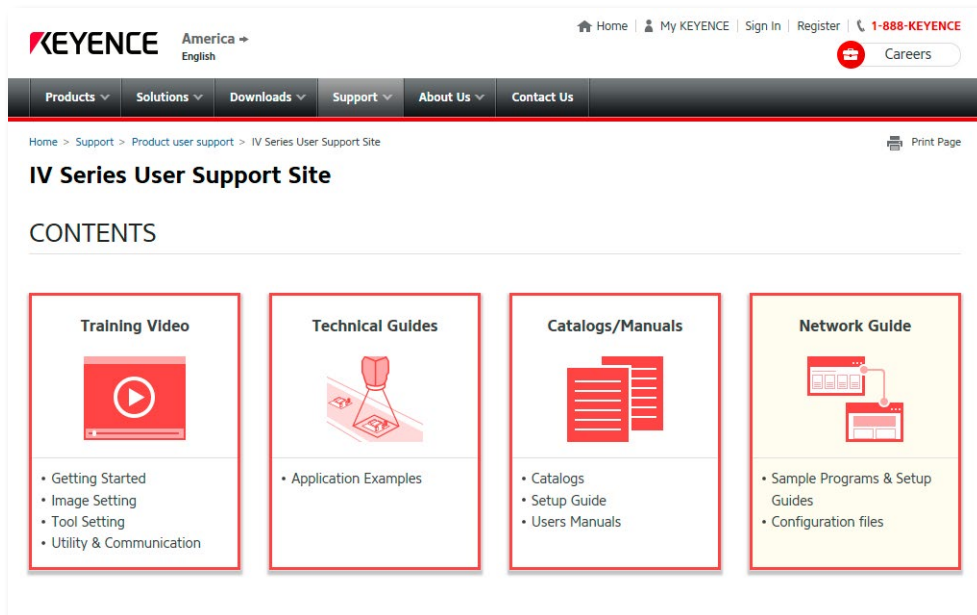
This function allows you to check and modify the program configurations and perform operation simulations based on the image history without connecting the sensor. This enables easy computation of the optimal thresholds while looking at the detection result statistics and histogram, even when you are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



Dedicated User Support Site

This is a dedicated informational site that contains answers to questions such as, “How can I use the IV Series?”, “What should I do when a problem occurs?”, and “What do people in other industries do?” This site is designed not only for people who are considering purchasing the IV but also for people who have already purchased it.

www.keyence.com/iv-support



Training Video

This section uses videos to provide easy-to-understand introductions to topics such as the know-how required for creating images and the mastering of tools. We recommend this section both to people who are just starting to use the IV and to people who want to expand their knowledge of the IV.

Technical Guides

A large number of examples of improvements obtained by customers using the IV in industries such as the automotive, electronics, and food industries are available. This section provides access to examples that are not readily available to the public.

Catalogs/Manuals

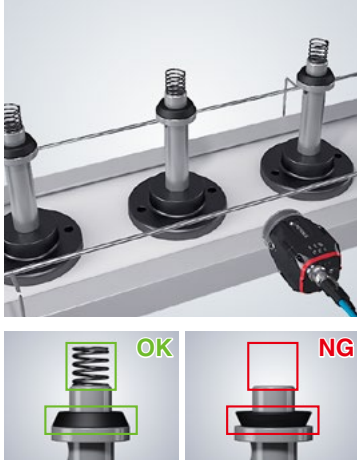
All the documents such as catalogs and manuals can be accessed from this site when necessary.

Network Guide

Sample programs for connecting the IV to PLCs and PCs are available free of charge. These can be used to connect the IV to a wide variety of devices, thereby leading to improved inspection quality.

PRESENCE DETECTION

Spring presence detection



AUTOMOTIVE & METAL

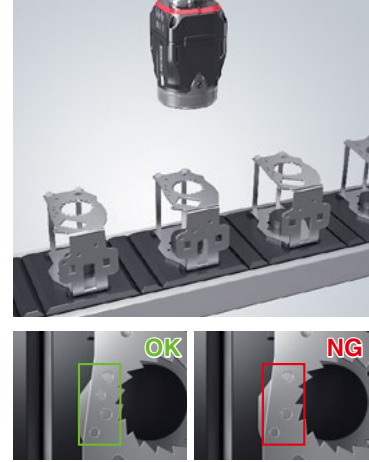
COLOR

Button assembly defect detection



SHAPE

Vehicle type detection according to stamping differences



Expiration date text presence



FOOD & PHARMACEUTICAL

Missing straw detection



Product type detection according to text differences



Capacitor marking presence

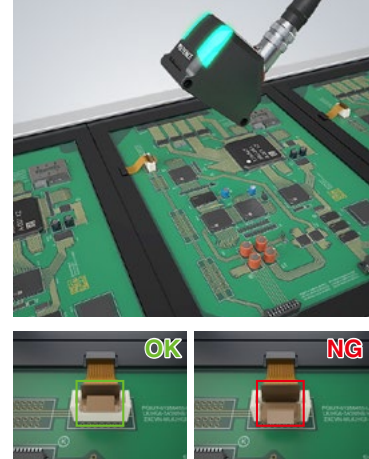


ELECTRIC & ELECTRONIC

Remote control lighting check

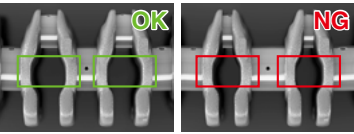


Connector locking check



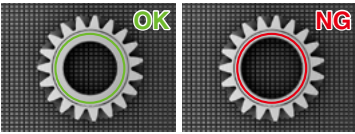
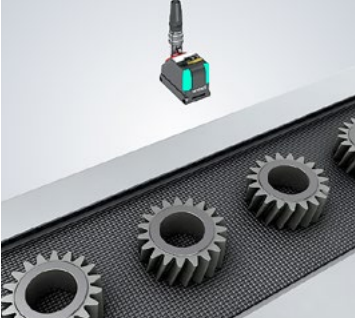
WIDTH & HEIGHT

Product type detection according to width differences



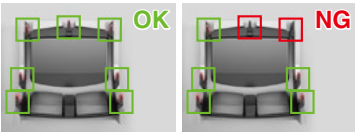
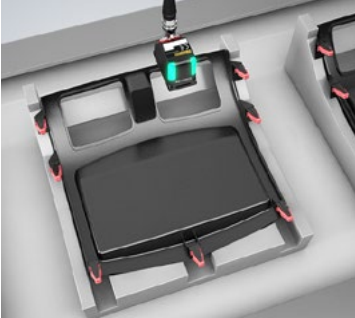
DIAMETER, PITCH & EDGE PRESENCE

Product type detection according to diameter differences



WIDE FOV & SPACE-SAVING

Instrument panel clip presence



AUTOMOTIVE & METAL

Cap tightening check



Label misalignment detection

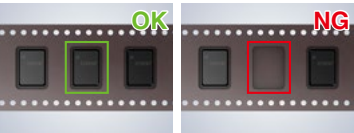
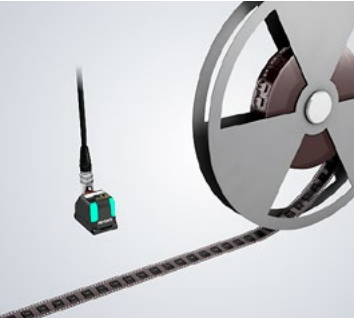


Expiration date OCR check

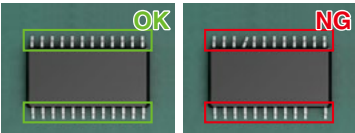


FOOD & PHARMACEUTICAL

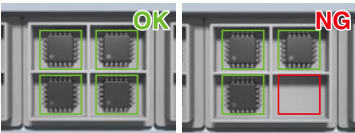
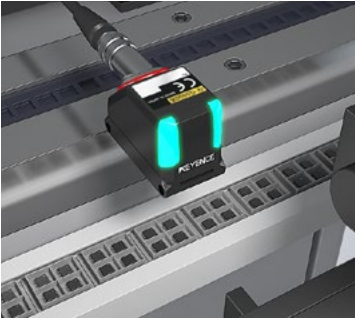
Electronic component presence/ orientation



Broken/bent lead detection








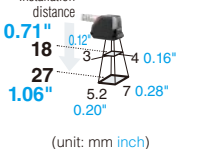
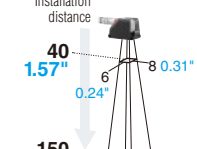
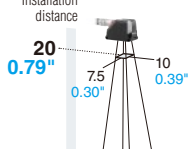
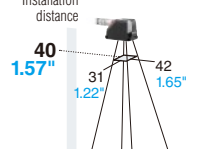
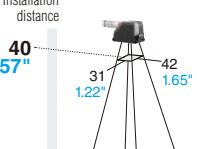
Tray component presence check



ELECTRIC & ELECTRONIC











COMPONENT LIST

Ultra-Compact Models










 <p>ULTRA-NARROW FIELD OF VIEW SENSOR MODEL (WITH ATTACHMENT)</p>	 <p>NARROW FIELD OF VIEW SENSOR MODEL</p>	 <p>STANDARD SENSOR MODEL</p>	 <p>WIDE FIELD OF VIEW SENSOR MODEL (COLOR)</p>	 <p>WIDE FIELD OF VIEW SENSOR MODEL (MONOCHROME)</p>
<p>Monochrome AF type IV-HG150MA + Magnifying lens attachment OP-87902</p>	<p>Monochrome AF type IV-HG150MA</p>	<p>Color AF type IV-HG500CA Monochrome AF type IV-HG500MA</p>	<p>Color AF type IV-HG300CA</p>	<p>Monochrome AF type IV-HG600MA</p>
 <p>Installation distance 0.71" 18 27 1.06" 0.12 3 4 0.16" 5.2 7 0.28" 0.20" (unit: mm inch)</p>	 <p>Installation distance 1.57" 40 6 8 0.31" 0.24" 150 5.91" 24 32 1.26" 0.94" (unit: mm inch)</p>	 <p>Installation distance 0.79" 20 7.5 10 0.39" 0.30" 500 19.69" 150 200 7.87" (unit: mm inch)</p>	 <p>Installation distance 1.57" 40 31 42 1.65" 1.22" 300 11.81" 206 275 10.83" (unit: mm inch)</p>	 <p>Installation distance 1.57" 40 31 42 1.65" 1.22" 600 23.62" 412 550 21.65" (unit: mm inch)</p>

AF...Automatic focus model
*View and optical axis has individual differences.
*If a wider field of view or longer range is required, please contact your nearest KEYENCE sales office.

System configuration

Sensor/Amplifier	Monitor
 <p>Ultra-compact sensor head</p>  <p>IV-HG sensor head to amplifier cable OP-87903 (2 m 6.6') OP-87904 (5 m 16.4') OP-87905 (10 m 32.8')</p>  <p>Sensor amplifier main unit IV-HG10</p>  <p>Sensor amplifier expansion unit (*When expanding the system) IV-HG15</p>	 <p>NFA79 compliant Ethernet cable (M12 4pin - RJ-45) Straight cable OP-87907 (1 m 3.3') OP-87457 (2 m 6.6') OP-87458 (5 m 16.4') OP-87459 (10 m 32.8')</p>  <p>Monitor power cable (M8 4pin - strand wire) OP-87443 (2 m 6.6') OP-87444 (5 m 16.4') OP-87445 (10 m 32.8')</p>  <p>Intelligent monitor IV-M30</p>
<p>Software for the IV Series IV-H1</p>  <p>IV-HG I/O cable (3 m 9.8') OP-87906</p>  <p>I/O</p> <p>24 V</p>	<p>*When connecting to a PC, the IV-H1 software and a LAN cable are also required.</p>  <p>LAN cable (RJ-45 - RJ-45) OP-87950 (1 m 3.3') OP-87951 (3 m 9.8') OP-87952 (5 m 16.4') OP-87953 (10 m 32.8')</p> <p>24 V</p>

Countermeasures against glare

 <p>IV-HG dome attachment (large) IV-GD10</p>	 <p>IV-HG dome attachment (small) IV-GD05</p>	 <p>Magnifying lens attachment OP-87902</p>	 <p>Narrow field of view & standard use polarized light filter attachment OP-87899</p>	 <p>IV-HG300CA polarized light filter attachment OP-87900</p>	 <p>IV-HG600MA polarized light filter attachment OP-87901</p>	 <p>IV-HG vertical mounting bracket OP-87908</p>	 <p>IV-HG rear mounting bracket OP-87909</p>	 <p>IV-HG adjustable bracket OP-87910</p>
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<p>Optional monitor accessories</p>	 <p>Wall mounting adapter OP-87464 (Included with IV-M30)</p>	 <p>Panel mounting adapter OP-87465</p>	 <p>DIN mounting adapter OP-87466</p>	 <p>Touch panel protective sheet OP-87463</p>	<p>Stylus OP-87462 (Included with IV-M30)</p>	<p>USB memory stick (1 GB) OP-87502</p>
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Amplifier-Integrated Models

CLOSE RANGE SENSOR MODEL



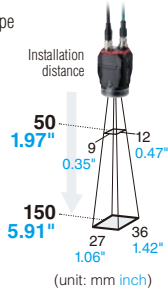
STANDARD SENSOR MODEL



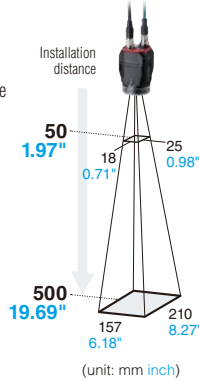
LONG RANGE SENSOR MODEL



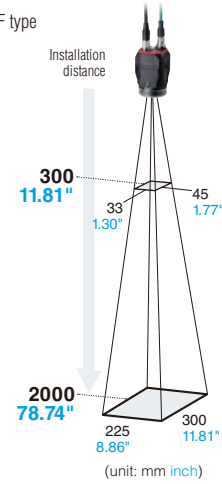
Monochrome AF type
IV-H150MA



Color AF type
IV-H500CA
Monochrome AF type
IV-H500MA



Monochrome AF type
IV-H2000MA



AF...Automatic focus model
*View and optical axis has individual differences.
*If a wider field of view or longer range is required,
please contact your nearest KEYENCE sales office.

System configuration

Sensor

Power I/O cable
(M12 12pin - strand wire)
Straight cable
OP-87440 (2 m 6.6')
OP-87441 (5 m 16.4')
OP-87442 (10 m 32.8')

Right angle cable
OP-88036 (2 m 6.6')
OP-88037 (5 m 16.4')
OP-88038 (10 m 32.8')

24 V

I/O

Software for the IV Series
IV-H1

Monitor

NFPA79 compliant monitor cable for amplifier-integrated model (M12 4pin - M12 4pin)
Straight cable
OP-87450 (2 m 6.6')
OP-87451 (5 m 16.4')
OP-87452 (10 m 32.8')
OP-87453 (20 m 65.6')

Right angle cable
OP-88039 (2 m 6.6')
OP-88040 (5 m 16.4')
OP-88041 (10 m 32.8')

Monitor power cable (M8 4pin - strand wire)
OP-87443 (2 m 6.6')
OP-87444 (5 m 16.4')
OP-87445 (10 m 32.8')

Intelligent monitor
IV-M30

NFPA79 compliant Ethernet cable (M12 4pin - RJ-45)
Straight cable
OP-87907 (1 m 3.3')
OP-87457 (2 m 6.6')
OP-87458 (5 m 16.4')
OP-87459 (10 m 32.8')

Right angle cable
OP-88042 (1 m 3.3')
OP-88043 (2 m 6.6')
OP-88044 (5 m 16.4')
OP-88045 (10 m 32.8')

24 V

*When connecting to a PC, the IV-H1 software and an Ethernet cable are also required.

Countermeasures against glare

Dome attachment
IV-D10

Polarized visible light filter attachment
OP-87436

Infrared polarized filter attachment
OP-87437

Mounting brackets

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]

Optional monitor accessories

Wall mounting adapter
OP-87464
(Included with IV-M30)

Panel mounting adapter
OP-87465

DIN mounting adapter
OP-87466

Touch panel protective sheet
OP-87463

Stylus
OP-87462
(Included with IV-M30)

USB memory stick (1 GB)
OP-87502

SPECIFICATIONS

Ultra-Compact Models



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 0.79" to 19.69"		40 to 150 mm 1.57" to 5.91"	40 to 300 mm 1.57" to 11.81"	40 to 600 mm 1.57" to 23.62"
View	Installed distance 20 mm 0.79": 10 (H) × 7.5 (V) mm 0.39" (H) × 0.30" (V) to Installed distance 500 mm 19.69": 200 (H) × 150 (V) mm 7.87" (H) × 5.91" (V)		Installed distance 40 mm 1.57": 8 (H) × 6 (V) mm 0.31" (H) × 0.24" (V) to Installed distance 150 mm 5.91": 32 (H) × 24 (V) mm 1.26" (H) × 0.94" (V)*1	Installed distance 40 mm 1.57": 42 (H) × 31 (V) mm 1.65" (H) × 1.22" (V) to installed distance 300 mm 11.81": 275 (H) × 206 (V) mm 10.83" (H) × 8.11" (V)	Installed distance 40 mm 1.57": 42 (H) × 31 (V) mm 1.65" (H) × 1.22" (V) to installed distance 600 mm 23.62": 550 (H) × 412 (V) mm 21.65" (H) × 16.22" (V)
Image sensor	1/3 inch color CMOS	1/3 inch monochrome CMOS	1/3 inch monochrome CMOS	1/3 inch color 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	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 32 to 122°F (No freezing)			
	Relative humidity	35 to 85% RH (No condensation)			
	Vibration*3	10 to 55 Hz, 1.5 mm 0.06" 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 0.71": 4 (H) × 3 (V) mm 0.16" (H) × 0.12" (V) to installed distance 27 mm 1.06": 7 (H) × 5.2 (V) mm 0.28" (H) × 0.20" (V) 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 program

*3 Except when IV-HG dome attachment (IV-GD05/IV-GD10) is mounted

*4 Except when polarized filter attachment (OP-87899/OP-87900/OP-87901/OP-87902) is mounted



Sensor Amplifier

Model	IV-HG10 (main unit)	IV-HG15 (expansion unit)
Tools	Shape Detection, Color Area*1, Area*2, Edge Pixels, Width/Height, Diameter, Edge Presence, Pitch, Position Adjustment, High Speed Position Adjustment (1-Axis/2-Axis Adjustment), OCR*11	
Type	Number*3	
Switch settings (programs)	32 programs	
Image history*4	When using a color 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, judgment 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, Color filters*1, Digital zoom (2x, 4x), Brightness correction, Tilt correction, White balance*1, Mask outline, Mask function, Color histogram*1, Monochrome histogram*2, Test run, ToolAutoTune*10, Input monitor, Output test, Security settings, Simulator, Mutual interference prevention, Direct connection (2 units or more), Failing sensor list, Failure hold, Sensor date/time information addition, Scaling function, Calendar synchronization	
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: Program 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 judgment result, RUN, BUSY, Error, Position adjustment result, Judgment result of each tool, Result of the logical operation of each tool, Main unit/expansion unit logical output	
Ethernet*8	Standard Connector 100BASE-TX/10BASE-T RJ-45 8pin connector	
Network function	FTP client, EtherNet/IP™, PROFINET	
Rating	Power voltage 24 VDC ±10% (including ripple)	
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 32 to 122°F (No freezing)*9	
Relative humidity	35 to 85% RH (No condensation)	
Material	Main unit case: Polycarbonate	
Weight	Approx. 150 g	

*1 Color type only

*2 Monochrome type only

*3 Tools can be installed by programs.

*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 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 IV (IV-H1).

*8 This is for connection with the intelligent monitor (IV-M30) or software for IV (IV-H1).

*9 When attaching the sensor amplifier to a DIN rail, attach the sensor amplifier to a metal plate.

*10 ToolAutoTune can be used with the Shape Detection, Color Area, and Area tools.

*11 Supported with Ver. R5.00.00 or later.

Amplifier-Integrated Models



Sensor

Model	IV-H500CA	IV-H500MA	IV-H150MA	IV-H2000MA
Type	Standard distance		Short range	
Installed distance	50 to 500 mm 1.97" to 19.69"		50 to 150 mm 1.97" to 5.91"	
View	Installed distance 50 mm 1.97": 25 (H) × 18 (V) mm 0.98" (H) × 0.71" (V) to installed distance 500 mm 19.69": 210 (H) × 157 (V) mm 8.27" (H) × 6.18" (V)		Installed distance 50 mm 1.97": 12 (H) × 9 (V) mm 0.47" (H) × 0.35" (V) to installed distance 150 mm 5.91": 36 (H) × 27 (V) mm 1.42" (H) × 1.06" (V)	
Image sensor	1/3 inch color CMOS		1/3 inch monochrome CMOS	
Pixel	752 (H) × 480 (V) 29.61" (H) × 18.90" (V)			
Focus adjustment	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	White LED	Red LED		Infrared LED
Lighting method	Pulse lighting/DC lighting is switchable			
Tools	Shape Detection, Color 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 (programs)	32 programs			
Image history*3	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, judgment 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, Color filters*7, Digital zoom, Brightness correction, Tilt correction, White balance*7, Mask outline, Mask function, Color histogram*7, Monochrome histogram*8, Test run, ToolAutoTune*13, Input monitor, Output test, Security settings, Simulator*9, Direct connection (2 units or more), Failing sensor list, Failure hold, Sensor date/time information addition, Scaling function			
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: Program 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 32 to 122°F (No freezing)		
	Relative humidity	35 to 85% RH (No condensation)		
	Vibration*11	10 to 55 Hz, 1.5 mm 0.06" double amplitude, 2 hours each for X, Y, and Z axes		
	Shock resistance*11	500 m/s ² 6 different directions in 3 times		
Enclosure rating*12	IP67			
Material	Main unit case: Aluminum 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 program. *2 Tools can be installed by programs.

*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 Color type only. *8 Monochrome type only. *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 polarized filter attachment (OP-87436/OP-87437) is mounted.

*13 ToolAutoTune can be used with the Shape Detection, Color Area, and Area tools.

Monitor



Model	IV-M30
Display	3.5" TFT color LCD 320 × 240 dot (QVGA)
Backlight	White LED
Method	Approx. 50000 hours (25°C 77°F)
Duration	Analog resistive
Touch panel	0.8 N or less
Actuating force	
Indicators	PWR, SENSOR
Ethernet*1	Standard
Connector	100BASE-TX/10BASE-T
	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
	Ambient humidity*3
	Vibration
	Drop impact resistance
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 104°F, use it in the absolute humidity of 40°C 104°F, 80% RH or lower.

Software

Model	IV-H1
Interface	Equip the Ethernet (100BASE-TX) interface
OS	Windows 10 Home/Pro/Enterprise*1 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 10/7: needs to be compliant with system requirements for OS Windows XP: Pentium III or better, Clock speed 1 GHz or faster
Memory capacity	Windows 10/7: 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 color High Color (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.

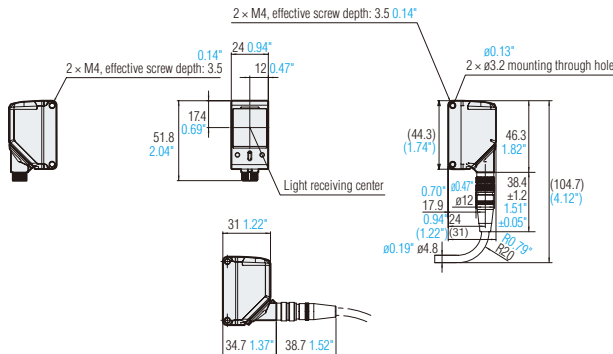
* Windows is either registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

DIMENSIONS

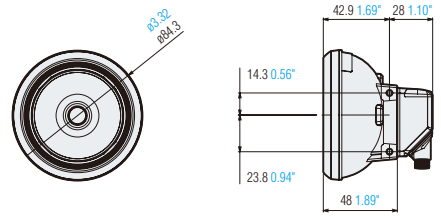
Ultra-Compact Models

Sensor head

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

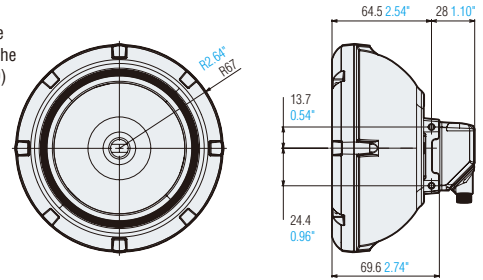


With small dome attachment for the IV-HG (IV-GD05)



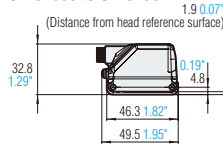
• When using an IV-HG dome attachment (small), please set the target within the range of 0 to 30 mm 0° to 1.18° from the top.

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

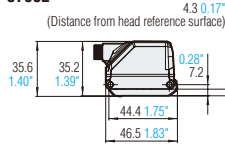


• When using an IV-HG dome attachment (large), please set the target within the range of 0 to 50 mm 0° to 1.97° from the top.

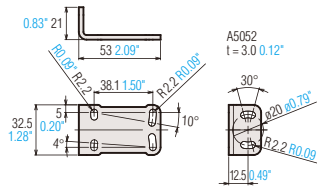
With polarized filter attachment OP-87899 to OP-87901



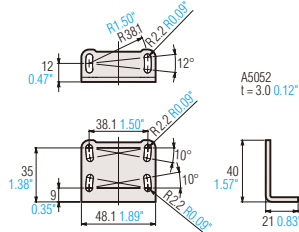
With magnifying lens attachment OP-87902



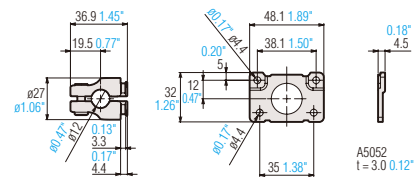
IV-HG vertical mounting bracket OP-87908



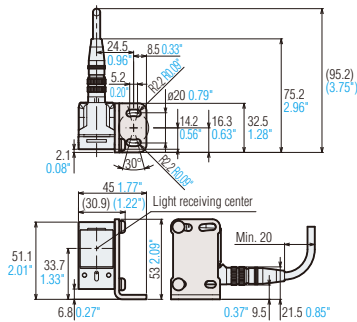
IV-HG rear mounting bracket OP-87909



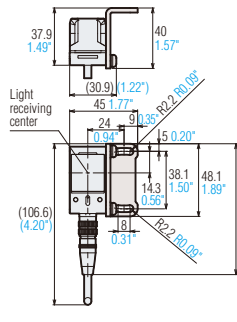
IV-HG adjustable bracket OP-87910



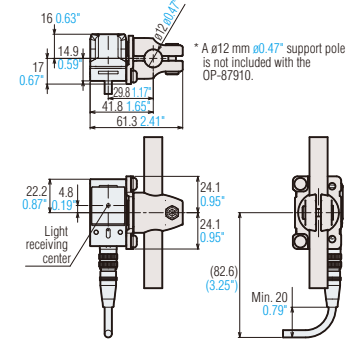
When the IV-HG vertical mounting bracket is attached



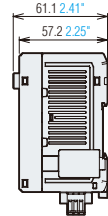
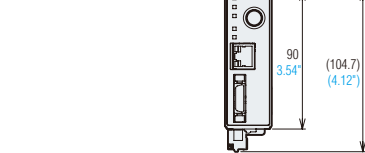
When the IV-HG rear mounting bracket is attached



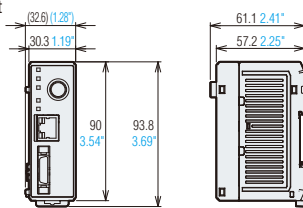
When the IV-HG adjustable bracket is attached



Sensor amplifier main unit IV-HG10



Sensor amplifier expansion unit IV-HG15



Wiring/Circuit Diagram

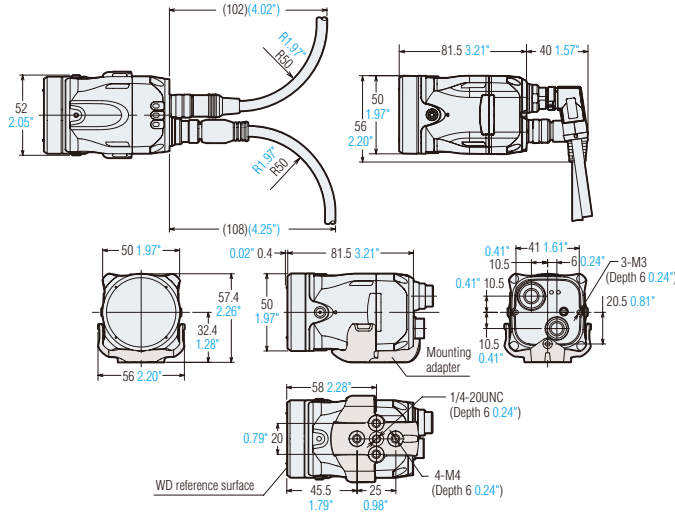
Terminal number and wiring color of the I/O cable for IV-HG Series (OP-87906)

Terminal No.	Wiring color	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 • Program 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	
A8	Gray	Unused	Unused	Unused
A9	White	Unused	Unused	
A10	Black	Unused	Unused	

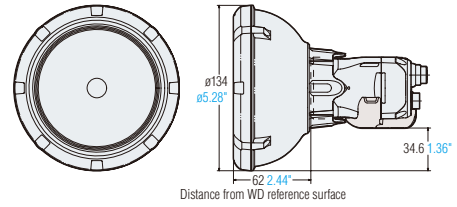
Terminal No.	Wiring color	Name	Assigning default value	Description
B1	Brown	OUT1	Total Status (N.O.)	Output assignable function • Total Status • Total Status NG • RUN • BUSY • Error • Position Adjustment • Status result of each tool (Tool 1 to 16) • Logical operation result of each tool (Logic 1 to 4) • 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	Gray	OUT8	OFF	
B9	White	Unused	Unused	
B10	Black	Unused	Unused	

Cable specification : AWG28

Sensor **IV-H500CA/IV-H150MA/IV-H500MA/IV-H2000MA**

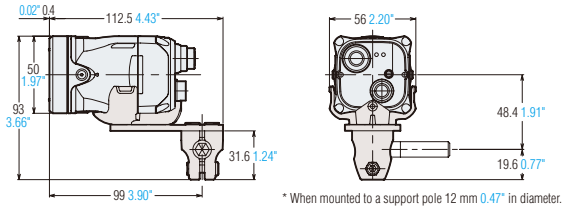


With dome attachment (IV-D10)

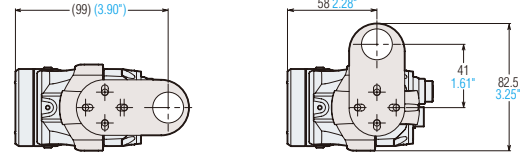
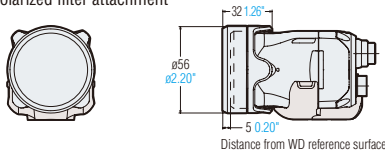


- When using dome attachment, please set the target within the range of 0 to 50 mm 0" to 1.97" from the top.
- Dome attachment can be used for standard distance and close range types.

With adjustable bracket (OP-87685)

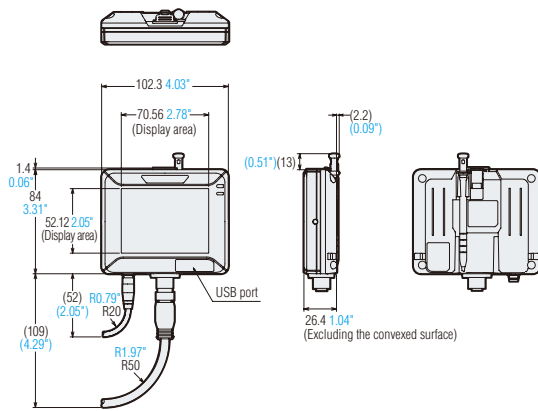


With polarized filter attachment

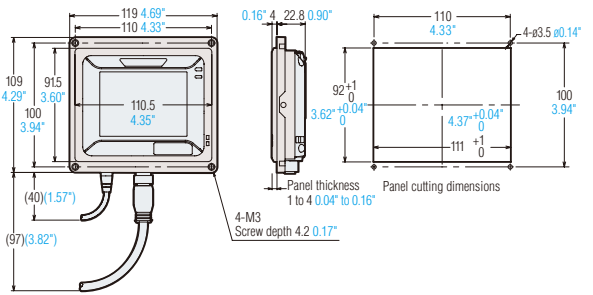


Intelligent Monitor For Amplifier-Integrated And Ultra-Compact Models

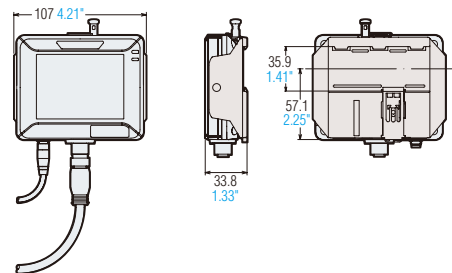
Intelligent monitor **IV-M30**



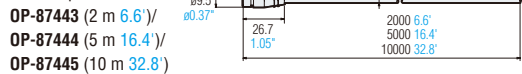
Using the panel mounting adapter



Using the DIN mounting adapter



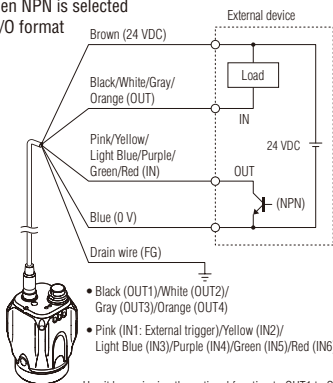
Monitor power cable



Wiring/Circuit Diagram

Selecting NPN output

When NPN is selected in I/O format



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

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

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

Cable specification

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

High

Optimal problem solving capability to meet a variety of needs

XG-X Series

The XG-X Series accurately meets all the needs of our customers with its rich lineup of cameras consisting of area cameras, line scan cameras, and 3D cameras; flexible inspection tools; and diverse operations.



The performance of a high-end machine, now easily accessible by anyone

CV-X Series

This standard model for worldwide use supports 13 languages and provides the user with both optimal problem solving capability and intuitive usability. As a next-generation image processing sensor, the CV-X Series was designed with the user in mind.



Advanced inspection capability and simple usability

CV-5000 Series

The rich variety of inspection tools (of which there are 19 types available) and the camera variations supporting up to 5 megapixels solve all of our customers' problems.



Affordable presence inspections

IV Series

Conventionally, presence inspections required multiple sensors and were difficult to set up, but the IV Series can complete these inspections in an easy and affordable manner with a single unit.



Full lineup of vision systems and image processing equipment to solve a variety of problems

Cost/functionality

Low



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SAFETY INFORMATION
Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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