KEYENCE

NEW **Vision Sensor with Built-in Lighting**

IV Series

CE c UL us LISTED

EtherNet/IP™

PROFINET®

Standard models

Smallest in its class
ultra-compact models

NEW

RAPID SET-UP

A VISION SENSOR THAT ANYONE CAN USE

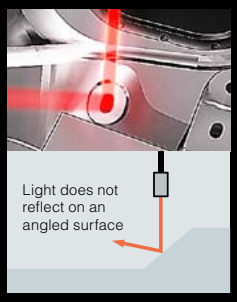
Intelligent sensor I-SERIES

Example of Conventional Presence Detection

BENEFITS OF USING A VISION SENSOR FOR PRESENCE DETECTION

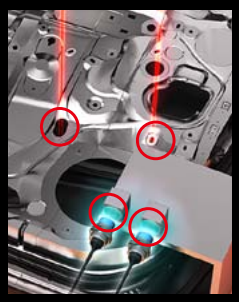
Can be used for difficult to detect targets.

The vision sensor detects parts in environments which were previously unstable with a photoelectric sensor, such as angled surfaces where light does not reflect well.



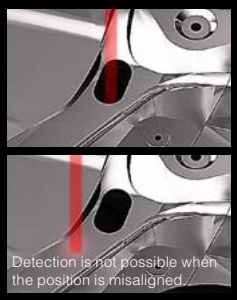
A single unit can be used for multiple part presence inspections.

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



Can also detect regardless of part position variations.

With the position adjustment function, simply place the target anywhere within the field of view for stable detection.



Easy, stable detection with a single vision sensor unit

Vision Sensor

FOR PRESENCE DETECTION

NEW IDEAS FOR HANDLING DIFFICULT DETECTION

Difficult applications that formerly required multiple conventional photoelectric or proximity sensors can now be tackled easily and at low cost with one "IV Series vision sensor". Our unbeatable vision and presence sensor know-how positions KEYENCE to introduce a new style of presence detection.

EASY-TO-USE

RAPID SET-UP

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

STABLE DETECTION

OUTSTANDING IMAGING CAPABILITY

Clear images are captured with high-intensity illumination and high-performance lenses, which are standard equipment.

AFFORDABLY PRICED

REDUCE INTRODUCTION COSTS

Choose from 8 different sensor heads to suit your needs.

Intelligent sensor
I-SERIES

STABLE DETECTION

OUTSTANDING OPTICAL TECHNOLOGY

FIRST-IN-CLASS AUTOMATIC FOCUS

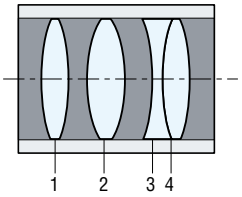
Our first-in-class automatic focus mechanism has evolved even further. We have newly developed this mechanism to be more compact and to have higher accuracy. By combining the automatic focus drive unit with the lens case and then designing them in the optimal manner, our mechanism is 40% more compact 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

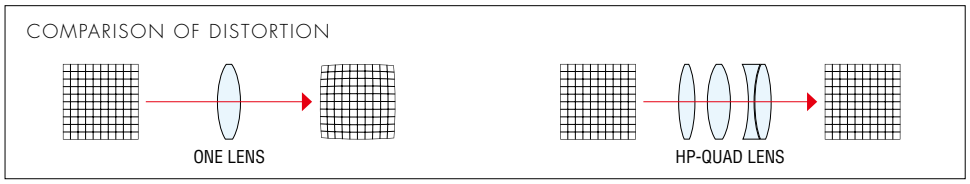
HP-QUAD* LENS

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.



LIGHTING ATTACHMENTS

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.

POLARIZED 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 dome attachment

With dome attachment [IV-D10]

Without polarized filter

With polarized filter [OP-87436]

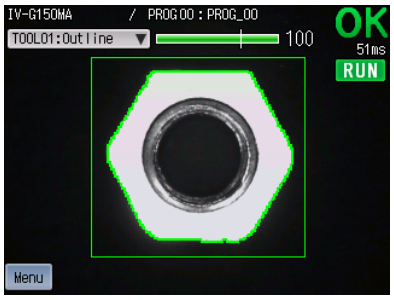
*This method is more effective than a polarization filter at reducing glare.

NEWLY DEVELOPED PATTERN TOOL FOR STABLE DETECTION

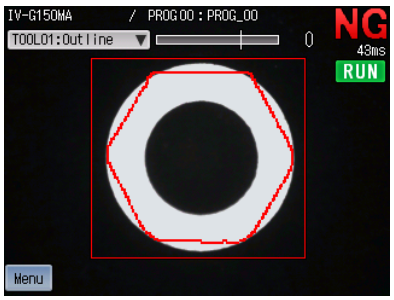
SHAPE DETECTION

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.

Detection of contour difference



PASS

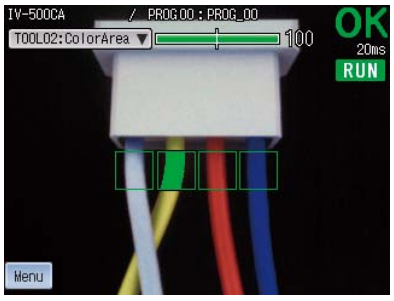


FAIL

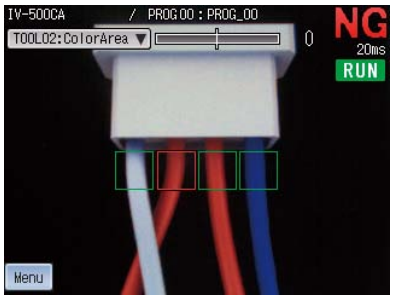
AREA

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

Detection by cable color difference



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 judgment. 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

SIMPLY EASY

RAPID SET-UP

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 optimized for stable detection, there is no need to adjust settings such as the lighting type, color, and installation distance. Additionally, fine adjustments requiring advanced imaging skills - such as adjustments to the gain and exposure time - are also automatically optimized.

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 judgments, the user only has to outline the target. For color judgments, the user only has to touch the target. The IV Series then recognizes 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**

ULTRA-COMPACT MODEL NEW

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

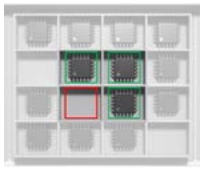
FIELD OF VIEW

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

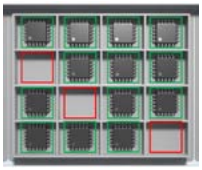
WIDE FIELD OF VIEW EVEN AT CLOSE RANGE

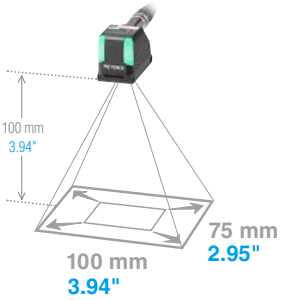
Installation distance: The field of view (the longer direction) makes use of a 1:1 wide-angle lens.
This expands the size of the field of view to 2.2 times that of the standard sensor model at the same installation distance.

CONVENTIONAL
(standard sensor model)
IV-500MA



WIDE VIEW
(wide field of view sensor model)
IV-G600MA



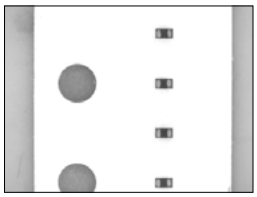


ZOOM 3 times more than conventional models (ultra-narrow field of view model) NEW

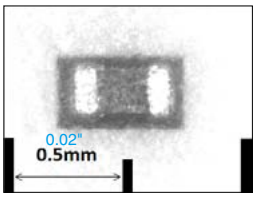
DETECTS EXTREMELY SMALL TARGETS

The sensor uses a magnifying lens with a minimum field of view of 4 × 3 mm 0.16" × 0.12" (1 × 0.75 mm 0.04" × 0.03" when using the digital zoom).
This enables imaging with a zoom that is 3 times the conventional model.

CONVENTIONAL
(close range sensor model)
IV-150MA



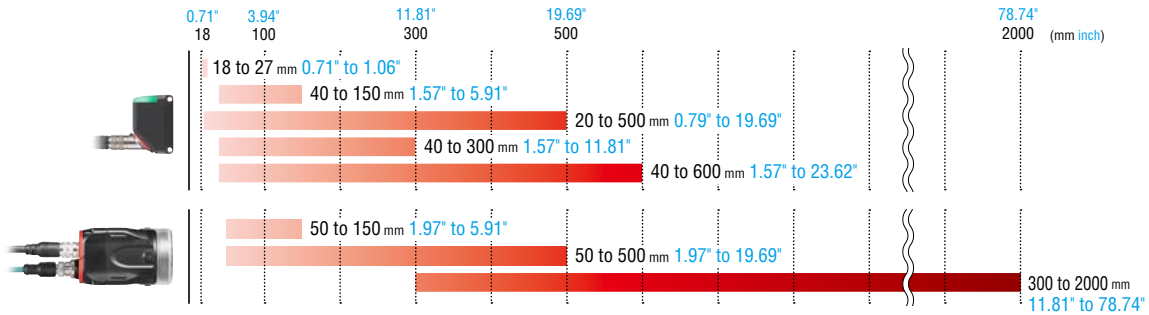
ULTRA-NARROW FIELD OF VIEW SENSOR MODEL
IV-G150MA + OP-87902



Magnifying lens attachment
OP-87902

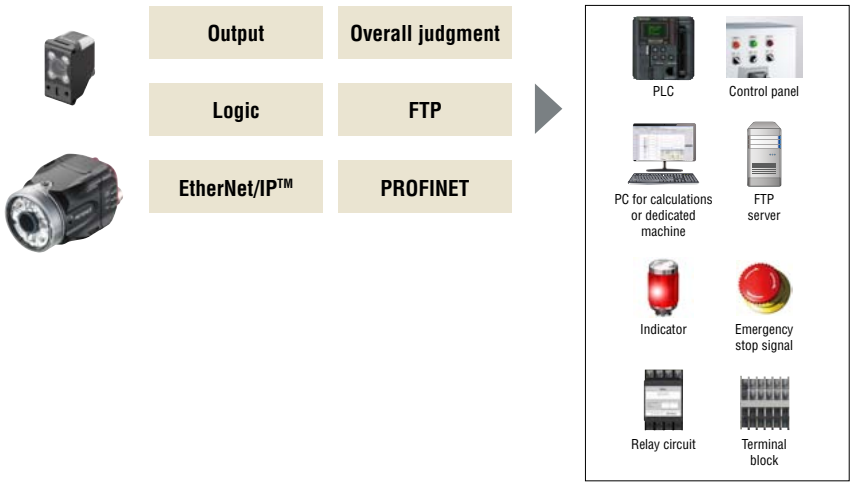
A LINEUP WITH SELECTABLE INSTALLATION DISTANCES

Covers a range up to 111×; from 18 mm 0.71" for close range detection to 2000 mm 78.74" for long distances.



OUTPUT SPECIFICATIONS THAT SUPPORT ALL CONNECTED DEVICES

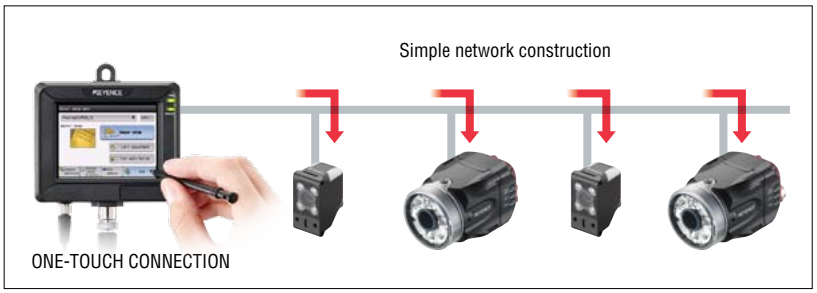
Up to 16 detection results can be freely combined to match the output destination and the usage conditions. The sensor can easily be attached to existing equipment and a PLC is not required. Also, the FTP client function supports image saving and global communication standards.



SIMPLE CONNECTION FUNCTION

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

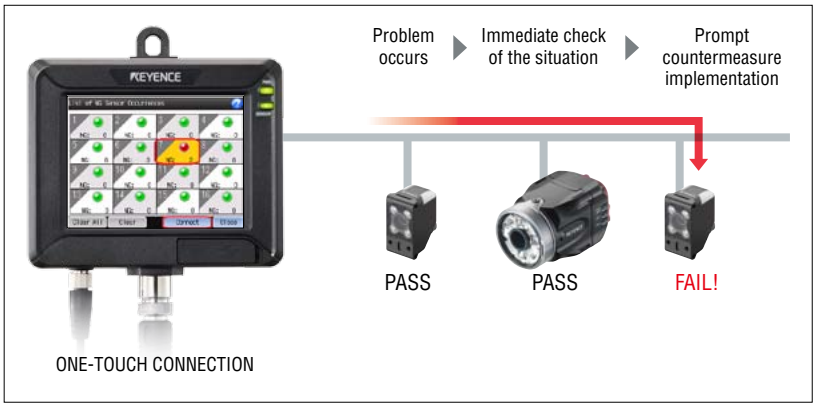
This function makes it easy to switch between sensors without troublesome initial setup such as assigning IP addresses and registering the devices to connect to. The result is major reductions in the initial setup, when operating remotely over Ethernet and when constructing a network with multiple units.



DETERMINE THE CAUSE OF PROBLEMS IMMEDIATELY: [FAILING SENSOR LIST & SWITCH FUNCTION]

With this function, when multiple sensors are connected, it is possible to use one-touch control to switch to the sensor that made a failing judgment. This makes it possible to immediately check the situation when a problem occurs, which reduces the time spent tracking down the source of and resolving the problem.

*This function is provided with only IV-M30.



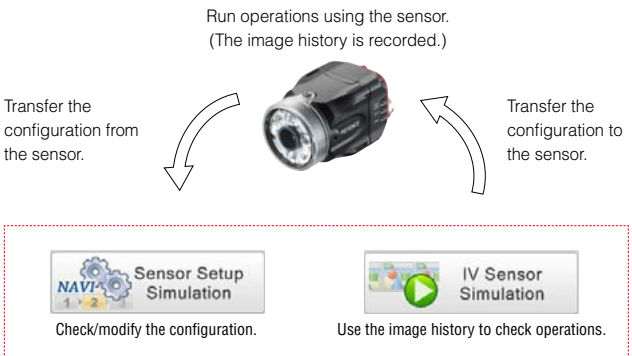
SOFTWARE FOR IV SERIES, IV-NAVIGATOR

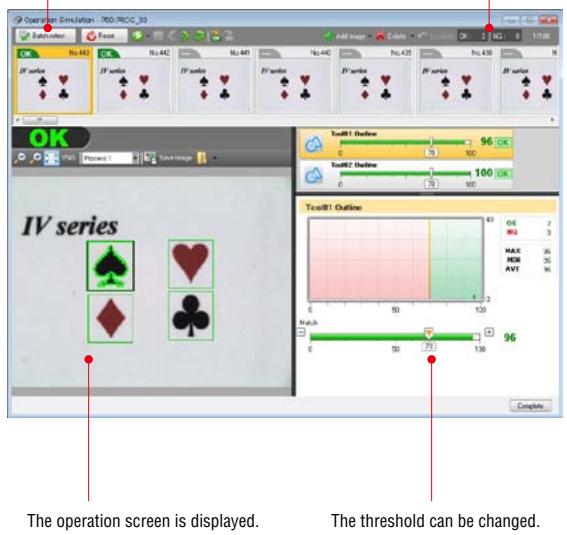
IV-H1

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.





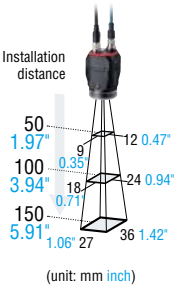
LINEUP CONTAINING 13 MODELS FOR A VARIETY OF SITUATIONS

STANDARD MODELS

CLOSE RANGE SENSOR MODEL

Monochrome AF type
IV-150MA

Monochrome MF type
IV-150M



(unit: mm inch)

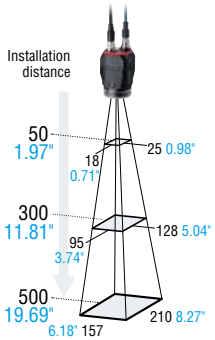
STANDARD SENSOR MODEL

Color AF type
IV-500CA

Color MF type
IV-500C

Monochrome AF type
IV-500MA

Monochrome MF type
IV-500M

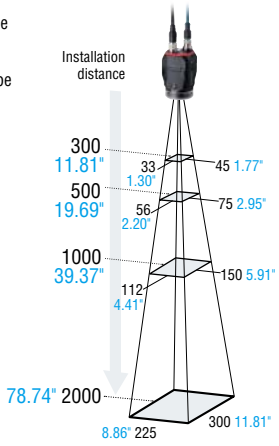


(unit: mm inch)

LONG RANGE SENSOR MODEL

Monochrome AF type
IV-2000MA

Monochrome MF type
IV-2000M



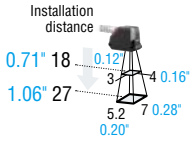
(unit: mm inch)

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

ULTRA-COMPACT MODELS NEW

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

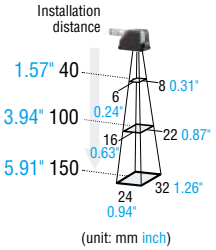
Monochrome AF type
IV-G150MA
+
Magnifying lens attachment
OP-87902



(unit: mm inch)

NARROW FIELD OF VIEW SENSOR MODEL

Monochrome AF type
IV-G150MA

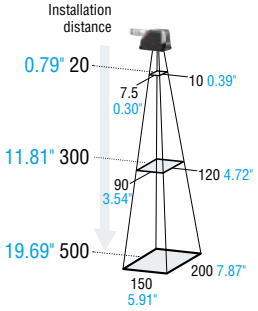


(unit: mm inch)

STANDARD SENSOR MODEL

Color AF type
IV-G500CA

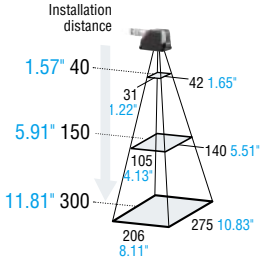
Monochrome AF type
IV-G500MA



(unit: mm inch)

WIDE FIELD OF VIEW SENSOR MODEL (COLOR)

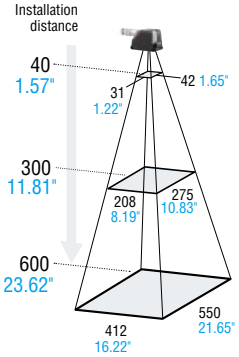
Color AF type
IV-G300CA



(unit: mm inch)

WIDE FIELD OF VIEW SENSOR MODEL (MONOCHROME)

Monochrome AF type
IV-G600MA

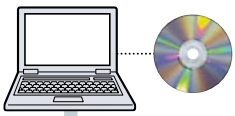


(unit: mm inch)

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

SYSTEM CONFIGURATION OF A STANDARD OR ULTRA-COMPACT HEAD MODEL

STANDARD MODEL



PC

Software for IV
IV-H1

Sensor head
(standard type)

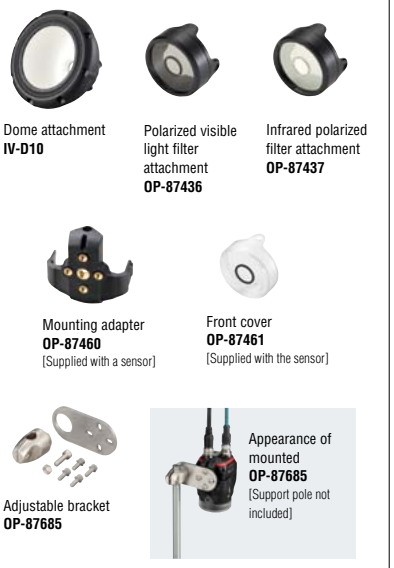
IP67 environmental resistance

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

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

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

24 V | I/O



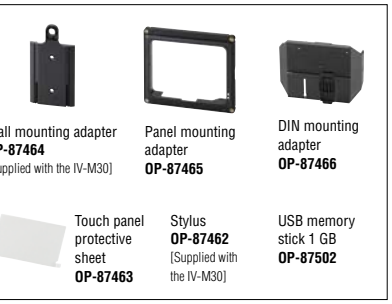
MONITOR

Intelligent monitor
IV-M30

Drop impact resistance: **1.3 m 4.3'**

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')

24 V



ULTRA-COMPACT MODEL NEW

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

Ultra-compact sensor head

IP67 environmental resistance

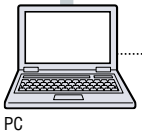
IV-G sensor head to amplifier cable
OP-87903 (2 m 6.6')
OP-87904 (5 m 16.4')
OP-87905 (10 m 32.8')

Sensor amplifier main unit
IV-G10

Sensor amplifier expansion unit
IV-G15

LAN cable
(RJ-45 to 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')

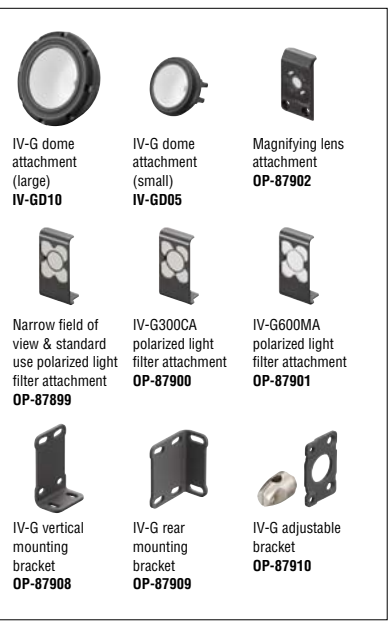
IV-G I/O cable (3 m 9.8')
OP-87906

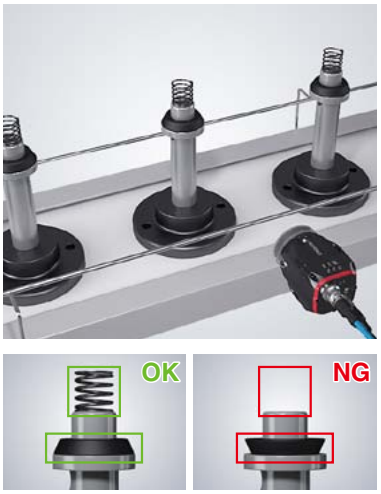
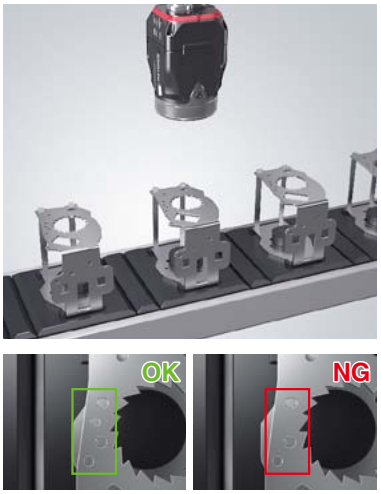
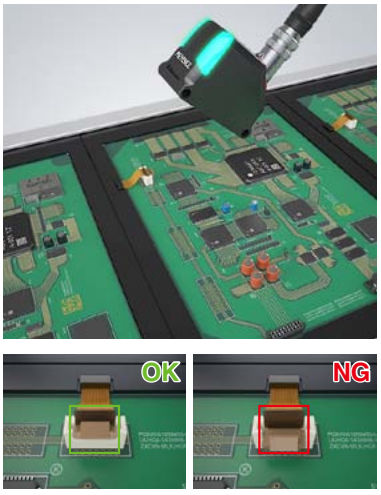


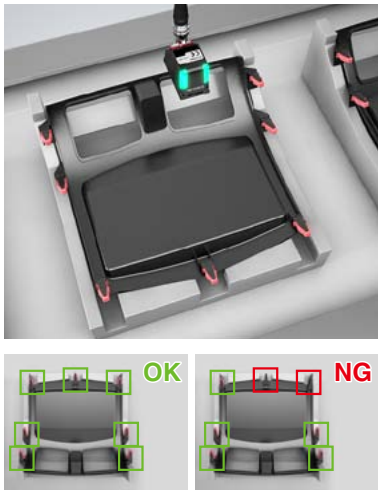
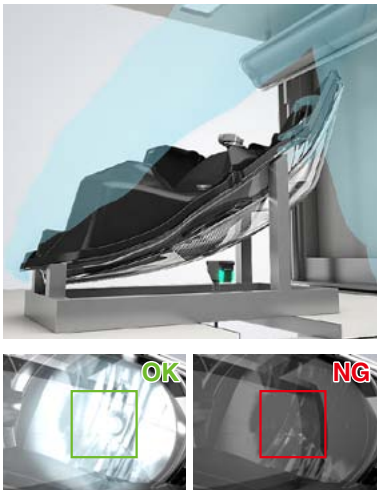
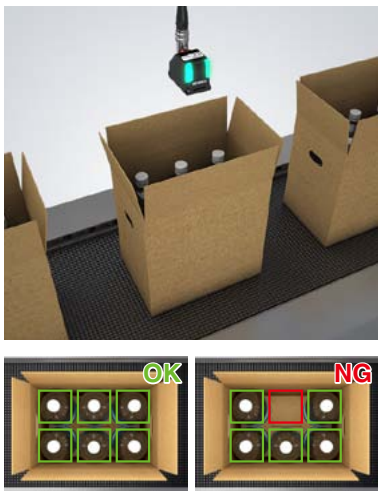
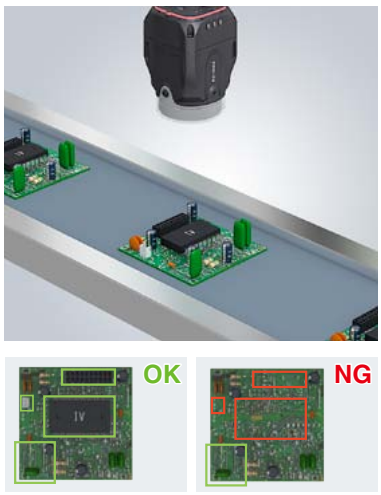
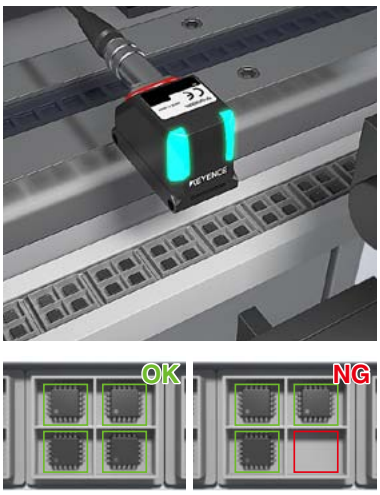
Software for the IV Series
IV-H1

PC

24 V | I/O | I/O



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

ORIENTATION/ MISALIGNMENT	WIDE FOV	SPACE-SAVING	
			AUTOMOTIVE & METAL
			FOOD & PHARMACEUTICAL
			ELECTRIC & ELECTRONIC

Sensor

Model		IV-500CA	IV-500C	IV-500MA	IV-500M	IV-150MA	IV-150M	IV-2000MA	IV-2000M
Type		Standard distance				Short range		Long range	
Installed distance		50 to 500 mm 1.97" to 19.69"				50 to 150 mm 1.97" to 5.91"		300 to 2000 mm 11.81" to 78.74"	
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)		Installed distance 300 mm 11.81": 45 (H) × 33 (V) mm 1.77" (H) × 1.30" (V) to installed distance 2000 mm 78.74": 300 (H) × 225 (V) mm 11.81" (H) × 8.86" (V)	
Image sensor		1/3 inch color CMOS		1/3 inch monochrome CMOS					
	Pixel	752 (H) × 480 (V) 29.61"(H) x 18.90"(V)							
Focus adjustment		Auto*1	Manual	Auto*1	Manual	Auto*1	Manual	Auto*1	Manual
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, color area*7, area*8, position adjustment							
	Number*2	Detection tools: 16 tools, position adjustment tool: 1 tool							
Switch settings (programs)		32 programs							
Image history*3	Numbers	100 images*4		300 images*5					
	Condition	NG only/All is selectable							
Analysis information*6		OFF/Statistics/Histograms 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							
Other functions		HDR, HighGain, Color filters*7, Digital zoom*8, Brightness correction, Tilt correction, White balance*7, Mask outline, Mask area, Test run, ToolAutoTune, Input monitor, Output test, Security settings, Simulator*9							
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/s² 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. Possible with both the color 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-G dome attachment (IV-D10) is mounted
*12. Except when polarized filter attachment (OP-87436/OP-87437) is mounted

MONITOR

Model		IV-M30
Display		3.5" TFT color LCD 320 × 240 dot (QVGA)
Backlight	Method	White LED
	Duration	Approx. 50000 hours (25°C 77°F)
Touch panel	Method	Analog 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 32 to 122°F (No freezing)
	Ambient humidity*3	35 to 80% RH (No condensation)
	Vibration	10 to 55 Hz, 0.7 mm 0.03" double amplitude, 2 hours each for X, Y, and Z axes
	Drop impact resistance	1.3 m 4.3' 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 104°F, use it in the absolute humidity of 40°C 104°F 80% RH or lower.

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

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 pixel 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.

Sensor Head

Model		IV-G500CA	IV-G500MA	IV-G150MA	IV-G300CA	IV-G600MA
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 0.32" (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) 29.61"(H) x 18.90"(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 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-G 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

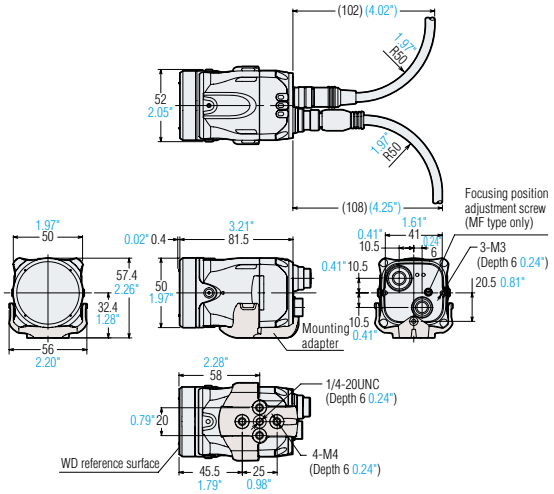
Model		IV-G10 (main unit)	IV-G15 (expansion unit)
Tools	Type	Shape detection, area*1, color area*2, position adjustment	
	Number*3	Detection tools: 16 tools, position adjustment tool: 1 tool	
Switch settings (programs)		32 programs	
Image history*4	Numbers	When using a color type head: 100 images*5, when using a monochrome type head: 300 images*6	
	Condition	NG only/All is selectable	
Analysis information*7		OFF/Statistics/Histograms 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	
Other functions		HDR, HighGain, Color filters*2, Digital zoom (2×, 4×)*8, Brightness correction, Tilt correction, White balance*2, Mask outline, Mask area, Test run, ToolAutoTune, Input monitor, Output test, Security settings, Simulator, Mutual interference prevention, Total judgment result output, Direct connection (2 units or more), 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: 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-G15]), 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-G15]), 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*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-G15). (The output load is excluded.)	
Environmental resistance	Ambient temperature	0 to +50°C 32 to 122°F (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. Color 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/IV-G 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/IV-G Series (IV-H1).
*8. Possible with both the color type and monochrome type
*9. This is for connection with the intelligent monitor (IV-M30) or software for the IV/IV-G Series (IV-H1).
*10. When attaching the sensor amplifier to a DIN rail, attach the sensor amplifier to a metal plate.

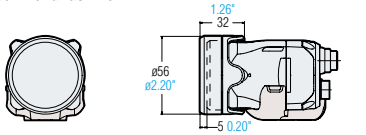
DIMENSIONS

STANDARD MODEL

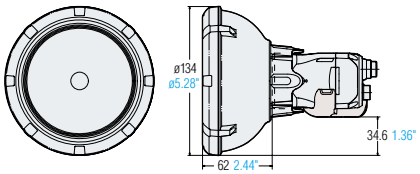
Sensor
IV-500C/
IV-150M/
IV-500M/
IV-2000M/
IV-500CA/
IV-150MA/
IV-500MA/
IV-2000MA



With polarized filter attachment

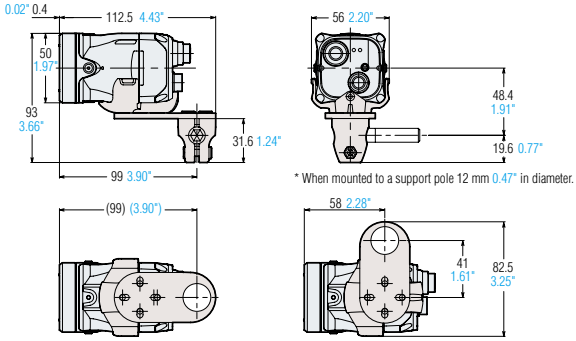


With dome attachment **(IV-D10)**



- 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.

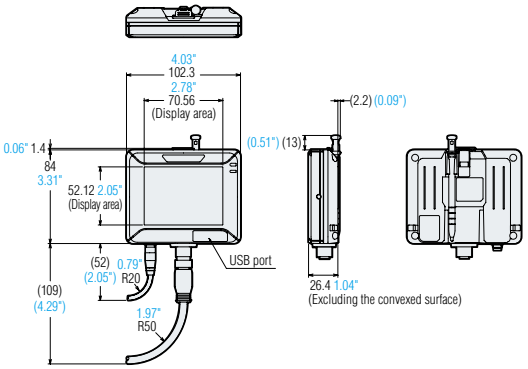
With adjustable bracket **(OP-87685)**



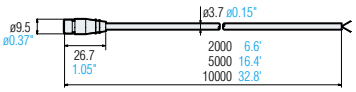
* When mounted to a support pole 12 mm 0.47" in diameter.

INTELLIGENT MONITOR FOR STANDARD AND ULTRA-COMPACT MODELS

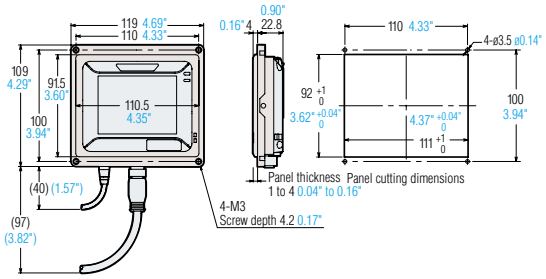
Intelligent monitor **IV-M30**



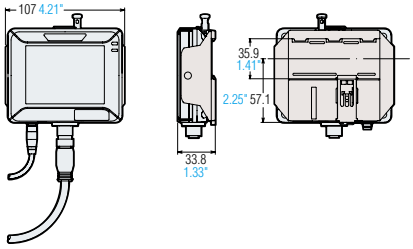
Monitor power cable
OP-87443 (2 m 6.6')/
OP-87444 (5 m 16.4')/
OP-87445 (10 m 32.8')



Using the panel mounting adapter

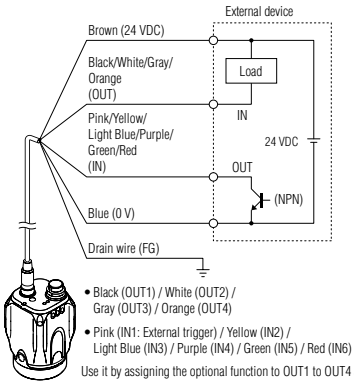


Using the DIN mounting adapter



WIRING/CIRCUIT DIAGRAM

SELECTING NPN OUTPUT
When NPN is selected in I/O format



- Black (OUT1) / White (OUT2) / Gray (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.

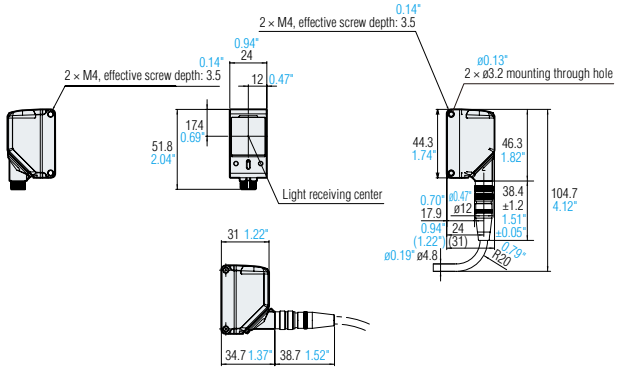
Terminal number and wiring color of the I/O cable for IV series (OP-87440/OP-87441/OP-87442)

Wiring color	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.)	
Gray	OUT3	Error (N.C.)	
Orange	OUT4	OFF	
Pink	IN1	External trigger ↑	Set external trigger. Rising timing (↑) or falling timing (↓) can be set.

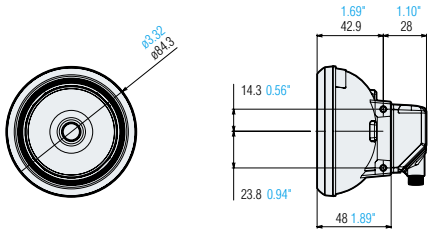
Wiring color	Name	Assigning default value	Description
Yellow	IN2	OFF	Input assignable function • Program bit0 to bit4 • Clear Error • Ext. Master Save • OFF (not used)
Light Blue	IN3	OFF	
Purple	IN4	OFF	
Green	IN5	OFF	
Red	IN6	OFF	
Drain	FG	-	Insulated frame

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

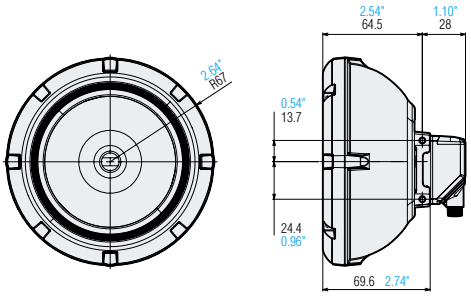
Sensor head
IV-G500CA/IV-G500MA/IV-G150MA/IV-G300CA/IV-G600MA



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

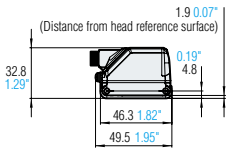


With large dome attachment for the **IV-G (IV-GD10)**

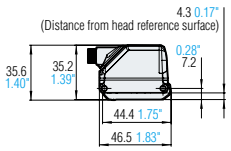


- When using an IV-G dome attachment (small), please set the target within the range of 0 to 30 mm 0" to 1.18" from the top.
- When using an IV-G dome attachment (large), please set the target within the range of 0 to 50 mm 0" to 1.97" from the top.

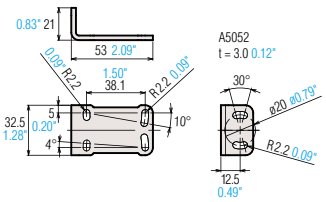
With polarized filter attachment
OP-87899 to OP-87901



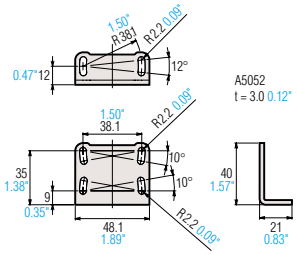
With magnifying lens attachment
OP-87902



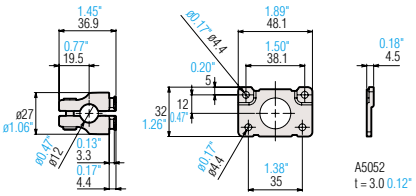
IV-G vertical mounting bracket **OP-87908**



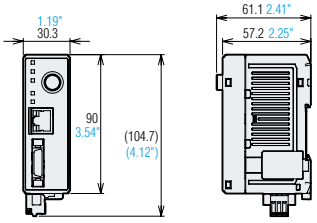
IV-G rear mounting bracket **OP-87909**



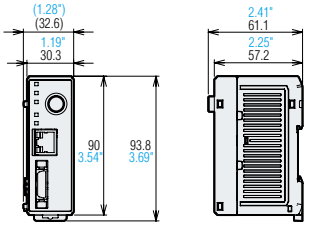
IV-G adjustable bracket **OP-87910**



Sensor amplifier main unit
IV-G10



Sensor amplifier expansion unit
IV-G15



WIRING/CIRCUIT DIAGRAM

Terminal number and wiring color of the I/O cable for IV-G 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	Unused
A8	Gray	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	Unused
B10	Black	Unused	Unused	

Cable specification : AWG28

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

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KA1-1125

IV-KA-C3_2-US 1016-4 611970 Printed in Japan