KEYENCE

Online data sheet

Image-Based Laser Sensor

Online Data Sheet

IX Series

SYSTEM CONFIGURATION

Sensor/Amplifier

Sensor head
IX-055
IX-080
IX-150
IX-360

For IX
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
IX-1000

Sensor amplifier expansion unit
(* When expanding the system)
IX-1050

Software for the IX Series
IX-H1

For IX
I/O cable (3 m 9.8')
OP-87906

I/O output
Analog output

24 V

Control panel

Ethernet cable
(M12 4-pin/RJ-45)
NFPA79-compatible
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')

Panel/monitor power cable
(M8 4-pin/Strand wire)
OP-87443 (2 m 6.6')
OP-87444 (5 m 16.4')
OP-87445 (10 m 32.8')

IX Series control panel
IX-CP50

* When connecting to a PC, the IX-H1 software and a LAN cable are also required.

LAN cable (RJ45/RJ45)
OP-87950 (1 m 3.3')
OP-87951 (3 m 9.8')
OP-87952 (5 m 16.4')
OP-87953 (10 m 32.8')

24 V

Optional accessories

Optional sensor accessories

Vertical mounting bracket
OP-88343

Rear mounting bracket
OP-88344

Vertical diagonal mounting bracket
OP-88345

Rear diagonal mounting bracket
OP-88346

Adjustable bracket
OP-88347

OP-88347
when mounted
(Support pole not included)

Optional panel accessories

Wall mounting adapter
OP-88349
[Included with IX-CP50]

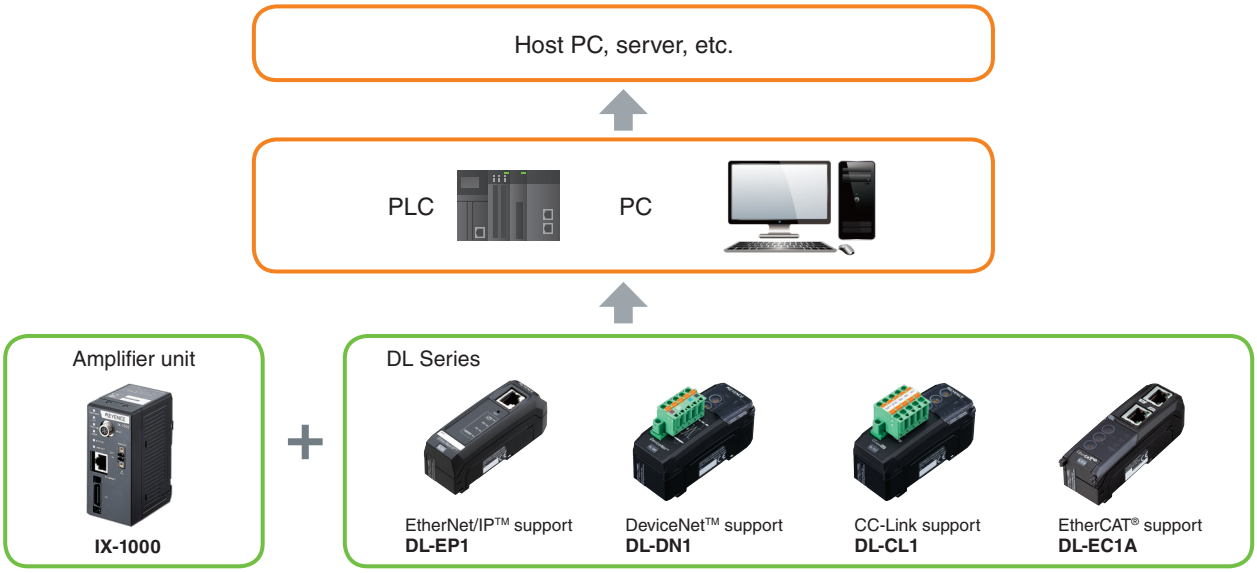
Control panel mounting adapter
OP-88350

Touch panel protective sheet
OP-88351

Stylus
OP-88352
[Included with IX-CP50]

USB memory stick (1 GB)
OP-87502

COMMUNICATION NETWORKS



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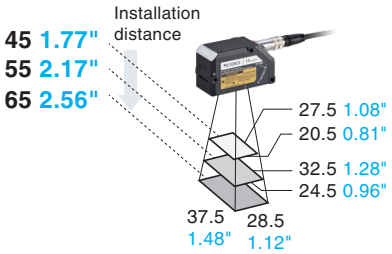
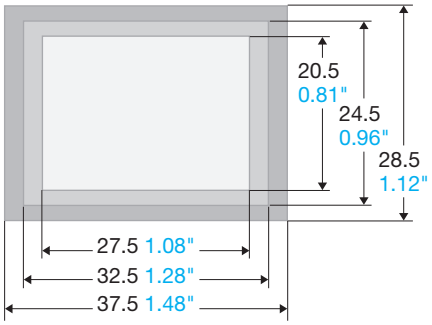
EtherNet/IP™ DeviceNet™ CC-Link V2
EtherCAT® RS-232C BCD

IX-055

Reference distance	Measurement range	Repeatability	Minimum step height
55 mm **2.17"**	**45** mm to **65** mm **1.77"** to **2.56"**	**10** µm	**0.1** mm **0.0039"**



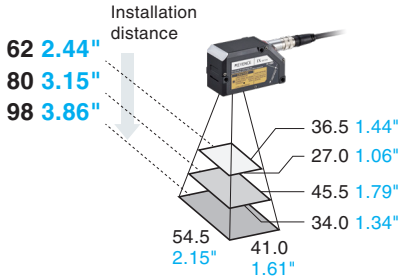
Field of view (actual size)



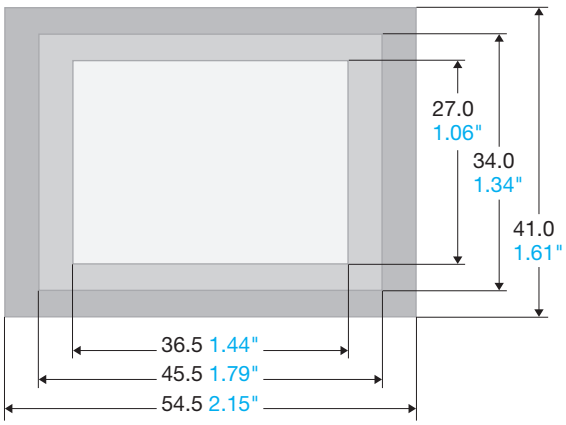
Installation distance: 45 mm 1.77" Installation distance: 55 mm 2.17" Installation distance: 65 mm 2.56"

IX-080

Reference distance	Measurement range	Repeatability	Minimum step height
80 mm **3.15"**	**62** mm to **98** mm **2.44"** to **3.86"**	**20** µm	**0.2** mm **0.0079"**



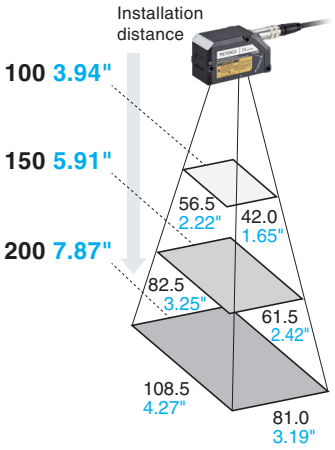
Field of view (actual size)



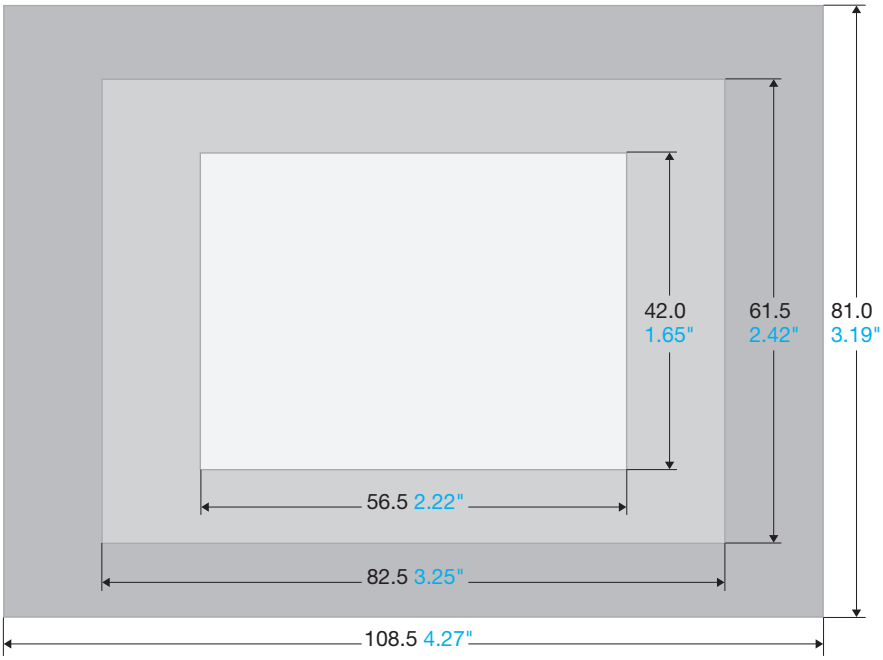
Installation distance: 62 mm 2.44" Installation distance: 80 mm 3.15" Installation distance: 98 mm 3.86"

IX-150

Reference distance	Measurement range	Repeatability	Minimum step height
150 mm 5.91"	100 mm to 200 mm 3.94" to 7.87"	50 µm	0.5 mm 0.0197"



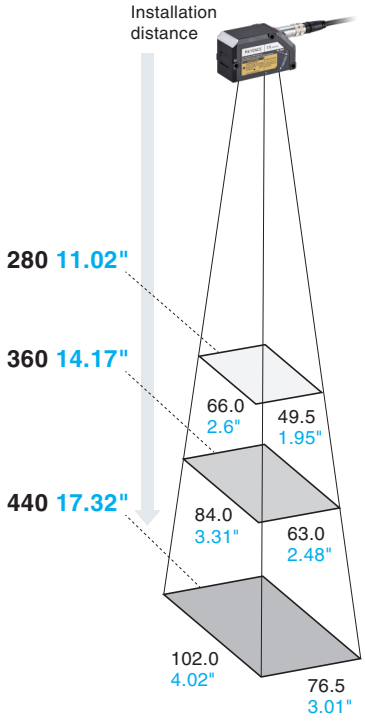
Field of view (actual size)



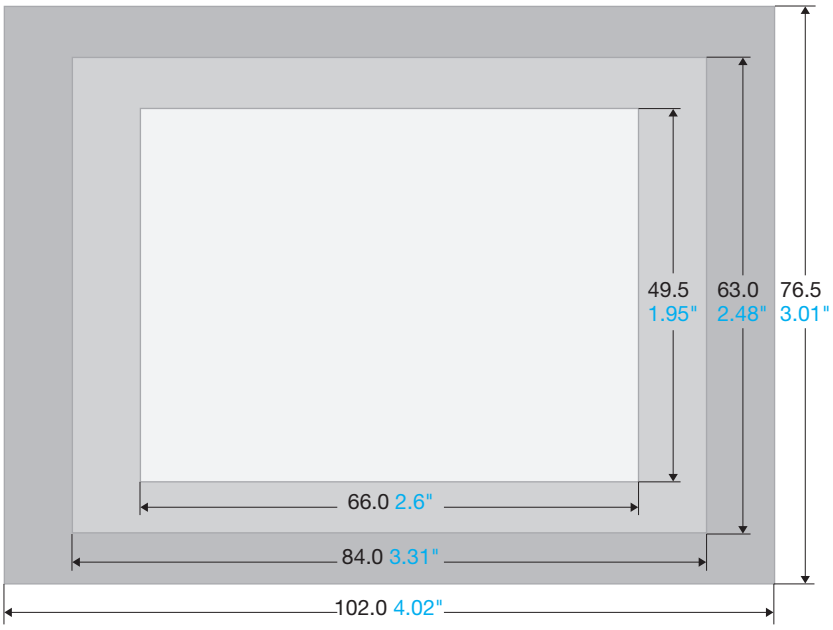
Installation distance: 100 mm 3.94" | Installation distance: 150 mm 5.91" | Installation distance: 200 mm 7.87"

IX-360

Reference distance	Measurement range	Repeatability	Minimum step height
360 mm 14.17"	280 mm to 440 mm 11.02" to 17.32"	150 µm	1.0 mm 0.04"



Field of view (actual size)



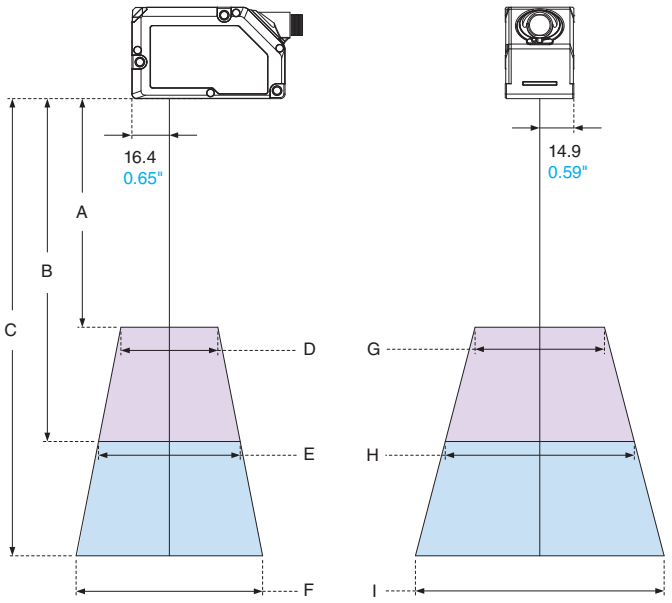
Installation distance: 280 mm 11.02" | Installation distance: 360 mm 14.17" | Installation distance: 440 mm 17.32"

Sensor Head

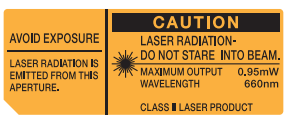
Model		IX-055	IX-080	IX-150	IX-360
Reference distance		55 mm 2.17"	80 mm 3.15"	150 mm 5.91"	360 mm 14.17"
Measuring distance		45 to 65 mm 1.77" to 2.56"	62 to 98 mm 2.44" to 3.86"	100 to 200 mm 3.94" to 7.87"	280 to 440 mm 11.02" to 17.32"
Detection area*1	Scan mode (X direction) × (Y direction)	Measuring distance of 45 mm 1.77": 27.5 × 20.5 mm 1.08" × 0.81" (min.) Measuring distance of 55 mm 2.17": 32.5 × 24.5 mm 1.28" × 0.96" (min.) Measuring distance of 65 mm 2.56": 37.5 × 28.5 mm 1.48" × 1.12"	Measuring distance of 62 mm 2.44": 36.5 × 27.0 mm 1.44" × 1.06" (min.) Measuring distance of 80 mm 3.15": 45.5 × 34.0 mm 1.79" × 1.34" (min.) Measuring distance of 98 mm 3.86": 54.5 × 41.0 mm 2.15" × 1.61"	Measuring distance of 100 mm 3.94": 56.5 × 42.0 mm 2.22" × 1.65" (min.) Measuring distance of 150 mm 5.91": 82.5 × 61.5 mm 3.25" × 2.42" (min.) Measuring distance of 200 mm 7.87": 108.5 × 81.0 mm 4.27" × 3.19"	Measuring distance of 280 mm 11.02": 66.0 × 49.5 mm 2.6" × 1.95" (min.) Measuring distance of 360 mm 14.17": 84.0 × 63.0 mm 3.31" × 2.48" (min.) Measuring distance of 440 mm 17.32": 102.0 × 76.5 mm 4.02" × 3.01"
	Line mode (X direction)	Measuring distance of 45 mm 1.77": 27.5 mm 1.08" (min.) Measuring distance of 55 mm 2.17": 32.5 mm 1.28" (min.) Measuring distance of 65 mm 2.56": 37.5 mm 1.48"	Measuring distance of 62 mm 2.44": 36.5 mm 1.44" (min.) Measuring distance of 80 mm 3.15": 45.5 mm 1.79" (min.) Measuring distance of 98 mm 3.86": 54.5 mm 2.15"	Measuring distance of 100 mm 3.94": 56.5 mm 2.22" (min.) Measuring distance of 150 mm 5.91": 82.5 mm 3.25" (min.) Measuring distance of 200 mm 7.87": 108.5 mm 4.27"	Measuring distance of 280 mm 11.02": 66.0 mm 2.6" (min.) Measuring distance of 360 mm 14.17": 84.0 mm 3.31" (min.) Measuring distance of 440 mm 17.32": 102.0 mm 4.02"
Laser light source	Light source	660 nm (visible light) wavelength red semiconductor laser			
	Laser class	Class II laser product (FDA [CDRH] part 1040.10), Class 2 laser product (IEC 60825-1: 2014)			
	Output	0.95 mW (FDA (CDRH) Part 1040.10), 1.6 mW (IEC 60825-1: 2014)			
Minimum detectable object size*2	Scan mode	ø0.7 mm ø0.03"	ø1.0 mm ø0.04"	ø1.7 mm ø0.07"	ø1.8 mm ø0.07"
	Line mode	0.7 mm × 0.7 mm 0.03" × 0.03"	1.0 mm × 1.0 mm 0.04" × 0.04"	1.7 mm × 1.7 mm 0.07" × 0.07"	1.8 mm × 1.8 mm 0.07" × 0.07"
Repeatability*3		10 µm	20 µm	50 µm	150 µm
		(Estimated detection: When measuring the height between two points, the minimum step difference is as follows. IX-055: 100 µm/IX-080: 200 µm/IX-150: 500 µm/IX-360: 1000 µm)			
Sampling cycle	Scan mode	120 ms (min.) (typical)			
	Line mode	6 ms/11 ms (selectable)			
Image receiving element		Monochrome CMOS image sensor			
Image capture lighting	Light source	Red LED			
	Lighting method	Pulse lighting			
Temperature characteristics*4		0.04% of F.S./°C	0.04% of F.S./°C	0.04% of F.S./°C	0.08% of F.S./°C
Environmental resistance	Enclosure rating	IP67			
	Operating ambient temperature*5	0 to +45°C 32 to 113°F (No freezing)			
	Operating ambient humidity	35 to 85% RH (No condensation)			
	Ambient light*6	Incandescent lamp, 5000 lux or less			
	Vibration resistance	10 to 55 Hz; double amplitude 1.5 mm 0.06"; 2 hours in each of the X, Y, and Z directions			
	Shock resistance	500 m/s², 3 times in each of the 3 directions			
Material		Main unit case: Zinc die-casting/Front cover: Glass, acrylic (hard coat)/ Operation indicator cover: TPU/Connector ring: PBT/Connector Zinc die-casting			
Weight		Approx. 190 g			

*1 X: Long-side direction of laser, Y: Short-side direction of laser
*2 With a correctly attached reference distance. When measuring using the height tool, measurement point min., and no position adjustment in scan mode. When measuring using the height tool, tool window size min., and no position adjustment in line mode.
*3 When measuring at the center of the field of view in scan mode using the "Max." measurement point of a KEYENCE reference target (white diffuser) at the reference distance.
*4 At the reference distance from the target. The F.S. for each model are as follows. IX-055: ±10 mm ±0.39", IX-080: ±18 mm ±0.71", IX-150: ±50 mm ±1.97", IX-360: ±80 mm ±3.15"
*5 With metal mounting.
*6 Using the default settings with a laser light source as the target.

[Measurement range]



(mm) (inch)	IX-055	IX-080	IX-150	IX-360
A	45 1.77"	65 2.56"	100 3.94"	280 11.02"
B	55 2.17"	80 3.15"	150 5.91"	360 14.17"
C	65 2.56"	98 3.86"	200 7.87"	440 17.32"
D	20.5 0.81"	27 1.06"	42 1.65"	49.5 1.95"
E	24.5 0.96"	34 1.34"	61.5 2.42"	63 2.48"
F	28.5 1.12"	41 1.61"	81 3.19"	76.5 3.01"
G	27.5 1.08"	36.5 1.44"	56.5 2.22"	66 2.6"
H	32.5 1.28"	45.5 1.79"	82.5 3.25"	84 3.31"
I	37.5 1.48"	54.5 2.15"	108.5 4.27"	102 4.02"



Sensor Amplifier

Model		IX-1000	IX-1050
Main unit/expansion unit		Main unit	Expansion unit
Display*1	Min. display unit	10 µm	
	Display range	±999.99 to ±999 mm (with 4 selectable steps)	
Tools*2	Scan mode	Height, Height difference, Max./Min., Height difference calculation, Thickness calculation, Height detection, Monochromatic detection, Position adjustment (Max. number of settings) Judgment: 16 tools, Position adjustment: 1 tool	
	Line mode	Height (Ave./Max./Min.), Height difference (Ave./Max./Min.), Height difference calculation, Thickness calculation, Position adjustment, Tilt correction (Max. number of settings) Judgment: 16 tools, Position adjustment: 1 tool, Alignment adjustment: 1 tool	
Other functions	Common	ZERO/offset, Operating threshold adjustment, 2-point calibration, Measurement direction, Position correction NG measurement, Zero/offset recording, Capture mode (HDR) Sensor date/time Information addition, N.O./N.C. switching, I/O monitor, Automatic brightness adjustment, Lighting (ON/OFF), Total judgment conditions, NPN/PNP switching, Simultaneous main unit/expansion unit input, Light interference prevention, Security	
	Scan mode	Measurement range, Measurement position (small/standard/large), Measurement mode, Measurement noise elimination, Imaging mode (high gain), Tilt correction (fixed or real-time correction), Glare removal, Trigger input (internal/external), Trigger interval, Trigger delay, Trigger error, Monochrome histogram, Fixed reference area, Mask outline, Rotation range	
	Line mode	Average count, Laser position adjustment, Timing input, Head tilt correction (fixed only), Ambient light removal for measurement, HOLD function, Alarm setting, Measurement method (Ave./Max./Min.)	
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)	
	Number of inputs	8 (IN1 to IN8)	
	Function	IN1: External trigger up/down timing, IN2 to IN8: Enable by assigning optional functions Assignable functions: Program switching, Laser emission stop, Zero/offset (batch), Reset (error only), Reset (judgment value only) Reset (judgment value and error)	
Output		Open collector output; NPN/PNP switchable, N.O./N.C. switchable For open collector NPN output: Maximum rating of 26.4 V, 50 mA (20 mA when linked to an expansion unit), residual voltage of 1.5 V or less For open collector PNP output: Maximum rating of 26.4 V, 50 mA (20 mA when linked to an expansion unit), residual voltage of 2 V or less	
	Number of outputs	10 (OUT1 to OUT10)	
	Function	Enable by assigning the optional functions Assignable functions: Total judgment result (All OK, Any OK/NG), run, busy, error, position adjustment result, tilt correction result, Monochromatic detection/Height detection tool result (OK/NG), Height/height difference/Max./Min./calculation tool result (OK/NG/HIGH/LO), Alarm	
Analog voltage output*3		±5 V, 1 to 5 V, 0 to 5 V, Output impedance: 100 Ω	Not available
Analog current output*3		4 to 20 mA, max. load resistance: 350 Ω	
Number of programs		32	
Statistical information*1		Scan mode: Measured value/Degree of similarity (Max., Min., Ave.), Processing time (Latest, Max., Min., Ave.), Count (Number of OKs/Number of NGs/Number of triggers) Line mode: Measured value/Degree of similarity (Max., Min., Ave.), Count (Number of OKs/Number of NGs/Number of triggers)*4	
Detection history*5	Saved history	100	
	Save conditions	Selectable from NG only/All	
Ethernet*6	Standard	100BASE-TX/10BASE-T	Not available
	Connector	RJ45 8-pin connector	
Interface compatibility*7		CC-Link / DeviceNet™ / EtherNet/IP™ / EtherCAT® / RS-232C / BCD / PROFINET / PROFIBUS / TCP/IP output	
Number of connectible units		Main units: 1, Expansion units: 1, Communication units (DL): 1	
Rating	Power voltage	24 VDC ±10% (including ripple)	Supplied from main unit
	Current consumption*8	Max. 1.9 A or less (With main unit only: 0.8 A or less, With unit expansion: 1.9 A or less) (Excluding output load)	
Environmental resistance	Operating ambient temperature	0 to +50°C 32 to 122°F (No freezing)	
	Operating ambient humidity	35 to 85% RH (No condensation)	
Material		Main unit case: PC / Power connector: PA, POM / Analog output connector: PA, POM / I/O connector: PA / Head connector: Zinc + Ni plating, PA/Ethernet connector: Copper alloy + Ni plating / Rear heat sink: Aluminum / Main unit rear DIN rail fixing tab: POM / Nameplate: PC	
Weight		Approx. 210 g	Approx. 190 g

*1 For displaying on an IX Series control panel or PC software. *2 Configurable for each program. *3 Select ±5 V, 1 to 5 V, 0 to 5 V, or 4 to 20 mA for use. *4 When sample hold (edge), peak/bottom/P-P hold (level/edge) is set.
*5 Saves to the sensor amplifier's internal memory. Detection history saved inside the sensor amplifier can be backed up to a PC using the USB memory stick connected to the IX Series control panel or PC software.
*6 For connection to an IX Series control panel or PC software. The RJ45 connector on the main unit is used for connecting to the expansion unit. *7 When a DL Series device is used. Contact KEYENCE for information on other interfaces.
*8 Includes a DL Series communication unit.

IX Series Control Panel

Model		IX-CP50
Display panel		5.7" TFT color LCD, 640 × 480 (VGA)
Backlight	Method	White LED
	Duration	Approx. 50,000 hours (25°C 77°F)
Touch panel	Method	Analog resistive
	Actuating force	0.8 N or less
Ethernet*1	Standard	100BASE-TX/10BASE-T
	Connector	M12 4-pin connector
Languages		English/Japanese/German/Simplified Chinese/Italian/French/Spanish
Expanded memory		USB memory*2
Rating	Power voltage	24 VDC ±10% (including ripple)
	Current consumption	0.3 A or less
Environmental resistance	Operating ambient temperature	0 to +50°C 32 to 122°F (No freezing)
	Operating ambient humidity*3	35 to 85% RH (No condensation)
	Vibration resistance	10 to 55 Hz; double amplitude 0.7 mm 0.03"; 2 hours in each of the X, Y, and Z directions
	Drop resistance	1.3 m 4.3' onto concrete (2 times in an arbitrary direction)
	Enclosure rating	IP40
Material		Main unit case: PC/Power connector: Brass + Ni plating/ Ethernet cable connector: Zinc + Ni plating, PA/USB connector cover: EDPM/ Pen holder: PC/Adapter fixing hook: POM/LED lamp cover: PC/ Mounting adapter: PC/Stylus: POM
Weight		Main unit: Approx. 450 g With wall mounting adapter and stylus attached: Approx. 485 g

*1 Dedicated for use in connecting to the IX-1000/1050. *2 Use only products recommended by KEYENCE.
*3 If the ambient operating temperature exceeds 40°C 104°F, use the product under conditions where the absolute humidity is 85% RH or less at 40°C 104°F.

PC Software

Model		IX-H1
System requirements	Interface	Equip the Ethernet (100BASE-TX) interface
	OS*1	Either Windows 7 (SP1 or later) Home Premium/ Professional/Ultimate or Windows 10 Home/Pro/Enterprise must be pre-installed
	Languages	English/Japanese/German/Simplified Chinese/ Italian/French/Spanish
	Processor	Compliant with OS system requirements
	Memory capacity	Compliant with OS system requirements
	Required capacity for installation	1 GB or more
	Monitor	Resolution: 1024 × 768 pixels or higher, Display color: High Color (16 bits) or higher
	Operating conditions	.NET Framework 4.5.2 or later installed.*2

*1 32-bit and 64-bit versions supported.
*2 If .NET Framework 4.5.2 or later is not installed, .NET Framework 4.5.2 will be automatically installed during IX-H1 installation.

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

Terminal No.	Wiring color	Name	Assigning default value	Description
A1	Brown	IN1	External trigger (↑)/timing input	In scan mode: External trigger (↑) or External trigger (↓) In line mode: Timing input
A2	Red	IN2	OFF	Input assignable function • Program bit0 to bit4 • Laser shutdown • ZERO/Offset • Reset (error only) • Reset (status only) • Reset (status & error) • OFF (not used)
A3	Orange	IN3	OFF	
A4	Yellow	IN4	OFF	
A5	Green	IN5	OFF	
A6	Blue	IN6	OFF	
A7	Purple	IN7	OFF	
A8	Gray	IN8	OFF	
A9	White	Unused	Unused	Unused
A10	Black	Unused	Unused	

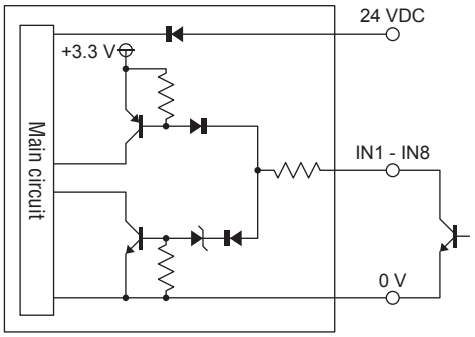
Terminal No.	Wiring color	Name	Assigning default value	Description
B1	Brown	OUT1	Total Status (N.O.)	Output assignable function • Total Status • Total Status NG • RUN • BUSY • Error • Position Adjustment • Tilt Adjustment • Status result of each tool (Tool 1 to 16) • Alert • OFF (not used)
B2	Red	OUT2	BUSY (N.O.)	
B3	Orange	OUT3	OFF	
B4	Yellow	OUT4	OFF	
B5	Green	OUT5	OFF	
B6	Blue	OUT6	OFF	
B7	Purple	OUT7	OFF	
B8	Gray	OUT8	OFF	
B9	White	OUT9	OFF	
B10	Black	OUT10	OFF	

Cable specification: AWG28
The output assignment, N.O./N.C., and input line assignment can be changed. For details, refer to user's manual of IX.

Input circuit

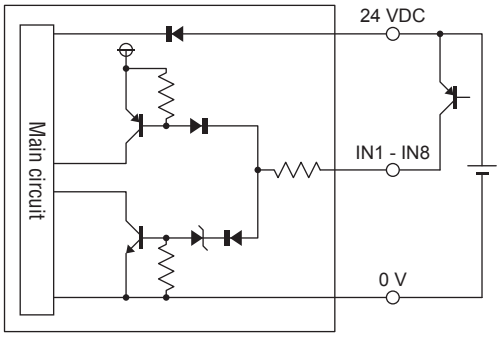
▮ No-voltage input (when NPN output is selected)

When NPN is selected in I/O format, the circuit becomes no-voltage input circuit.
External power supply is not necessary.
- ON voltage: 2 V or lower
- OFF current: 0.1 mA or lower
- ON current: 2 mA (short circuit)



▮ Voltage input (when PNP output is selected)

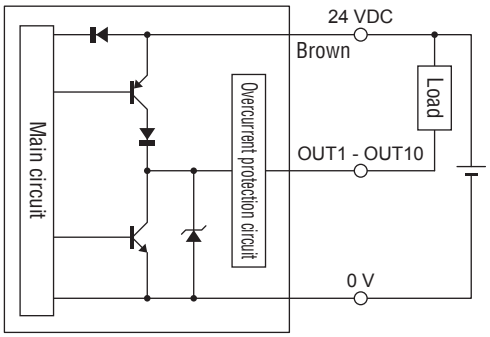
When PNP is selected in I/O format, the circuit becomes voltage input circuit.
- Input maximum rating: 26.4 V
- ON voltage: 18 V or higher
- ON current: 2 mA (for 24 V)
- OFF current: 0.2 mA or lower



Output circuit

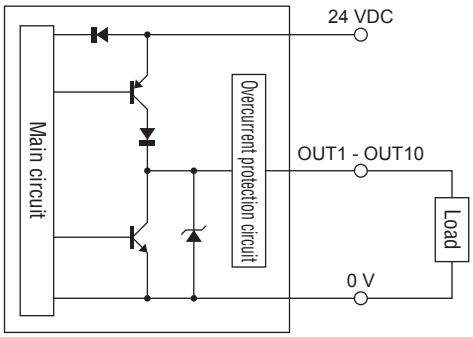
▮ Selecting NPN output

When NPN is selected in I/O format, the circuit becomes open collector NPN output circuit.
- Max. rating: 26.4 V, 50 mA
  (20 mA when the IX-1050 (Expansion) is connected)
- Remaining voltage: 1.5 V or lower



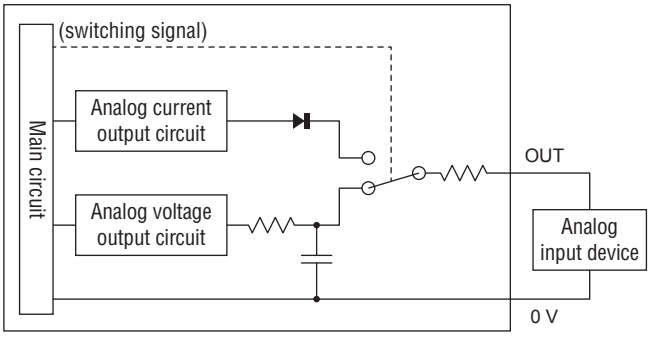
▮ Selecting PNP output

When PNP is selected in I/O format, the circuit becomes open collector PNP output circuit.
- Max. rating: 26.4 V, 50 mA
  (20 mA when the IX-1050 (Expansion) is connected)
- Remaining voltage: 2 V or lower

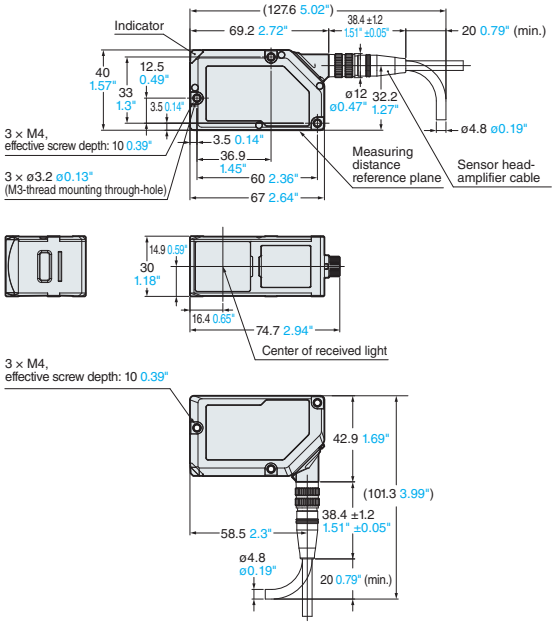


▮ Analog output

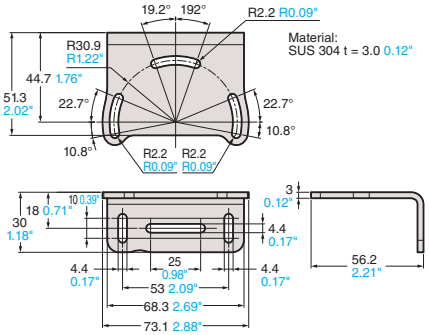
- Analog voltage output: 0 to 5 V, 1 to 5 V, -5 to 5 V
- Analog current output: 4 to 20 mA



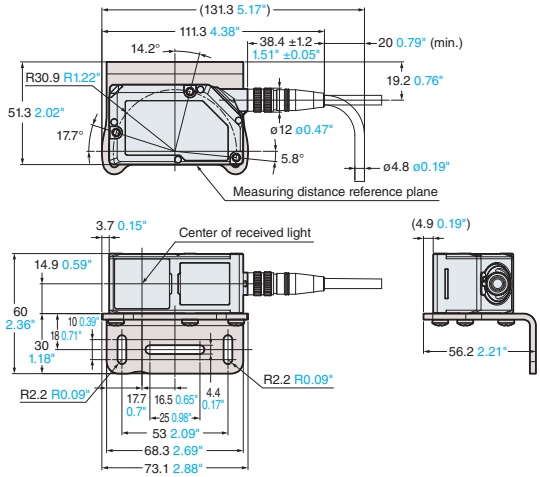
Sensor head
IX-055/IX-080/IX-150/IX-360



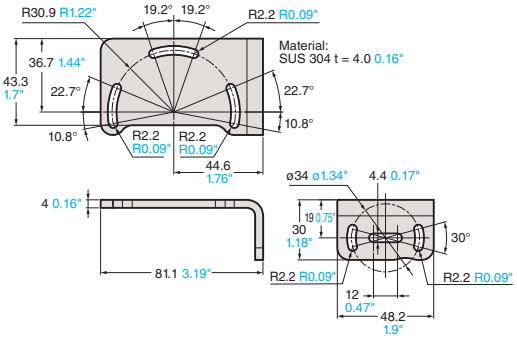
Rear mounting bracket
OP-88344



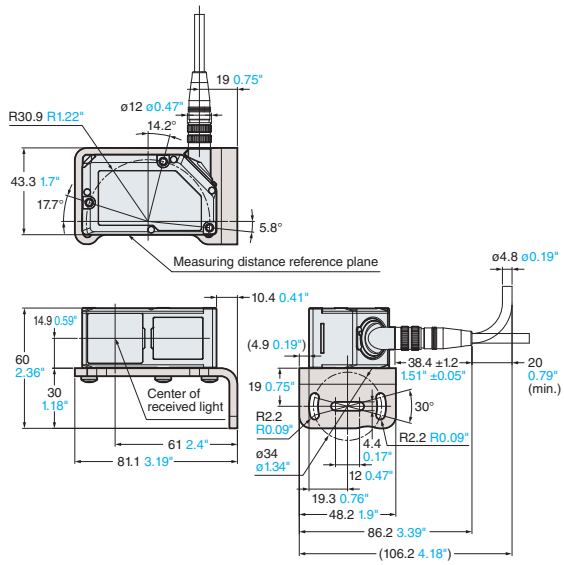
When the rear mounting bracket is attached



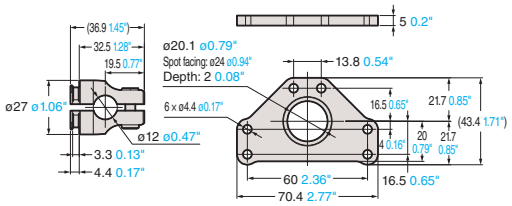
Vertical mounting bracket
OP-88343



When the vertical mounting bracket is attached



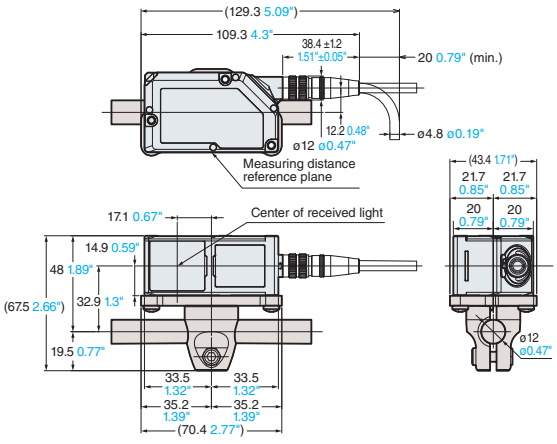
Adjustable bracket
OP-88347



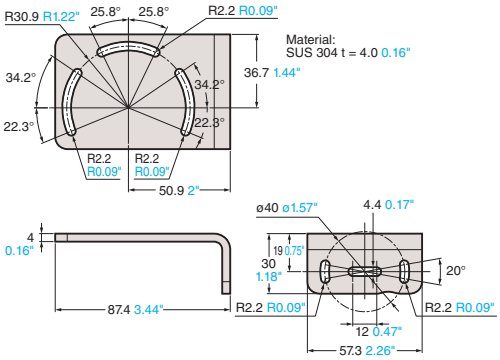
Material: Zinc die-casting
Material: SUS 304

When the adjustable bracket is attached

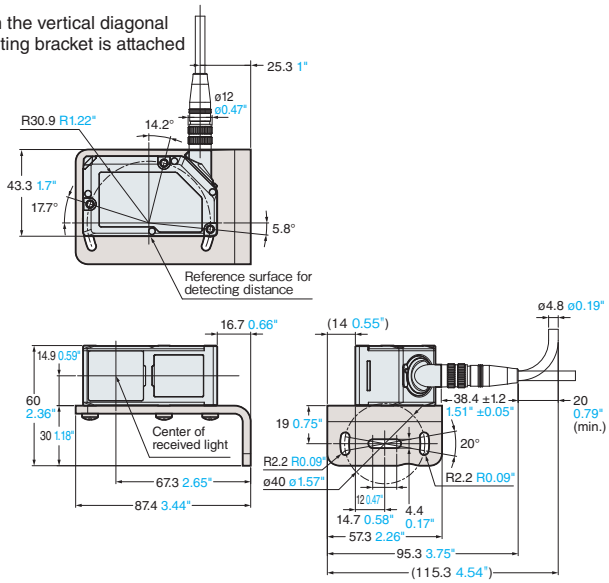
* No support pole (ø12 ø0.47") is included with this product.



Vertical diagonal mounting bracket
OP-88345

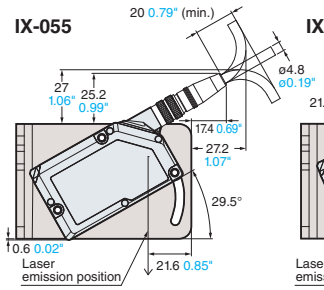


When the vertical diagonal mounting bracket is attached

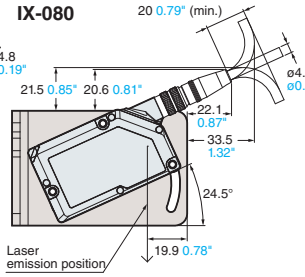


When the vertical diagonal mounting bracket is attached:
Line mode/laser vertical mounting

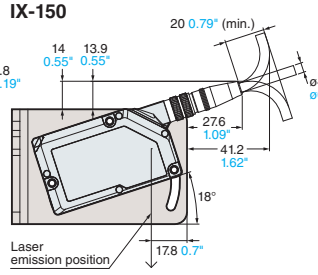
IX-055



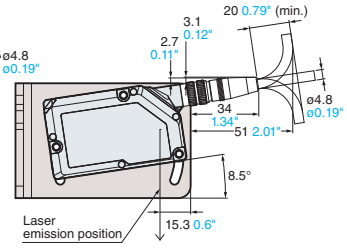
IX-080



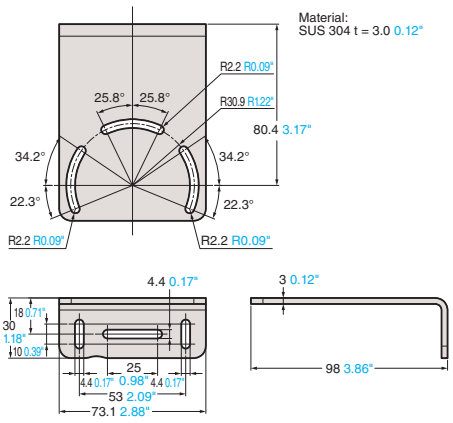
IX-150



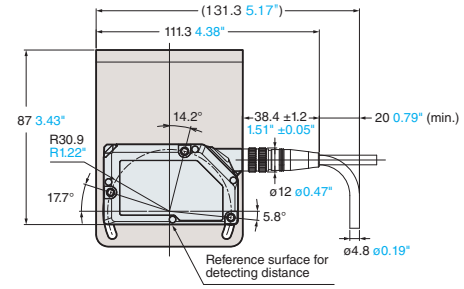
IX-360



Rear diagonal mounting bracket
OP-88346

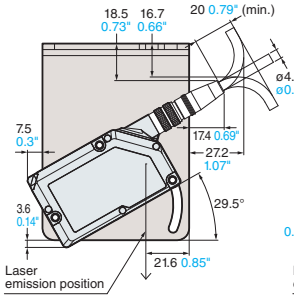


When the rear diagonal mounting bracket is attached

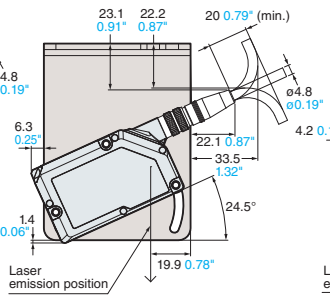


When the rear diagonal mounting bracket is attached:
Line mode/laser vertical mounting

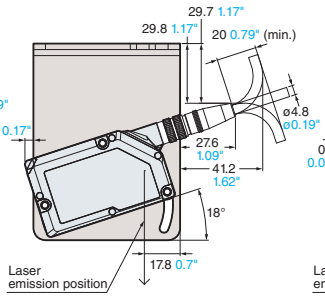
IX-055



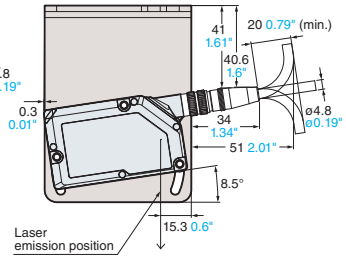
IX-080



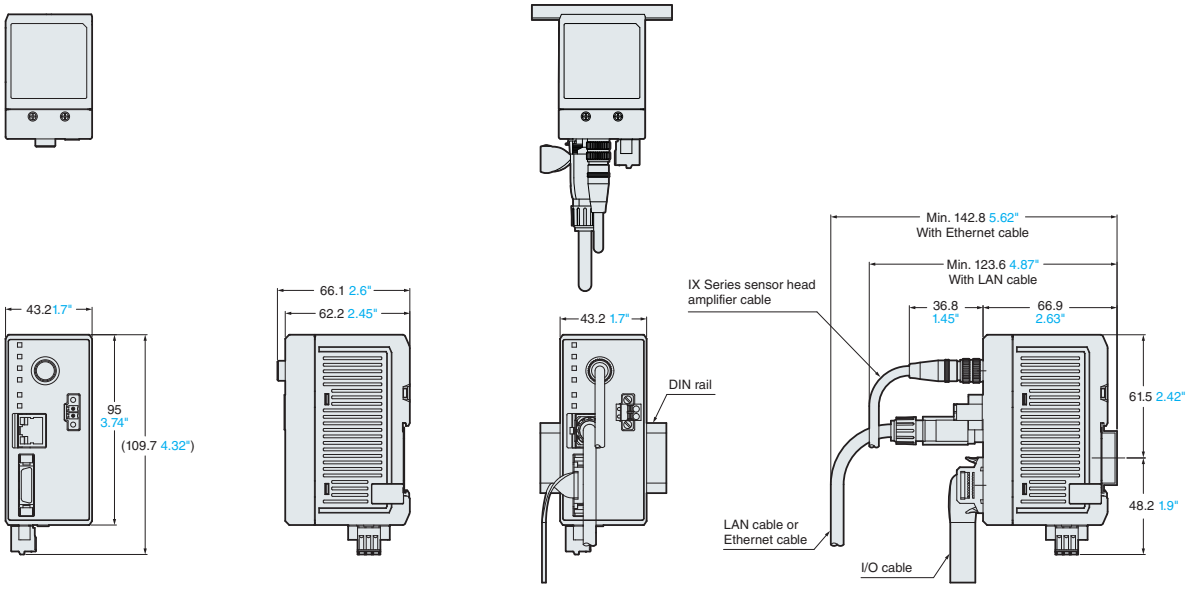
IX-150



IX-360

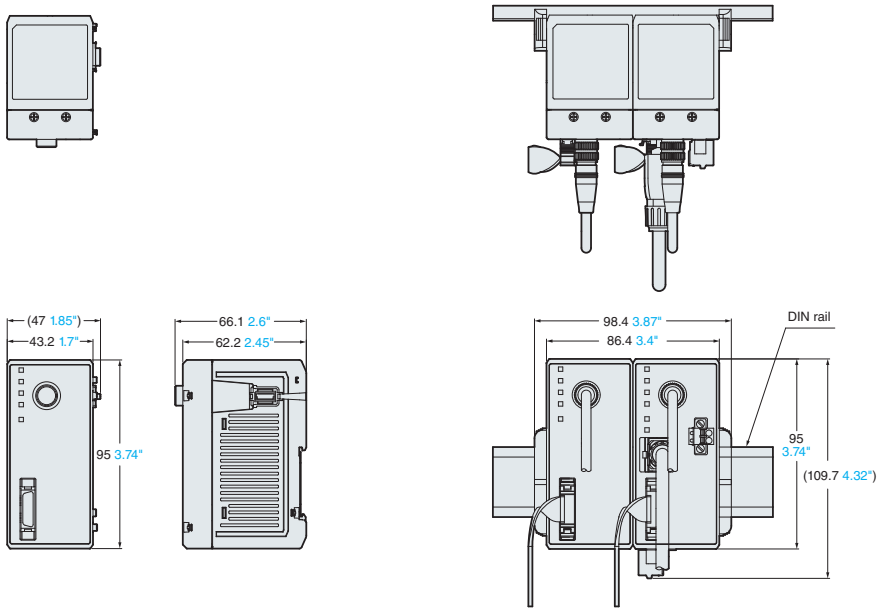


Sensor amplifier main unit
IX-1000

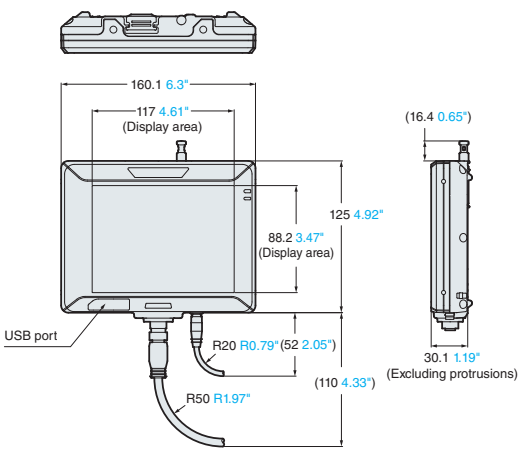


Sensor amplifier expansion unit
IX-1050

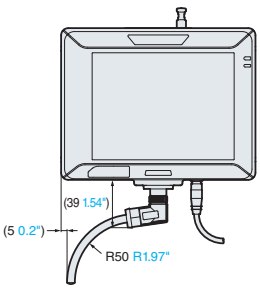
With **IX-1000/IX-1050** connected



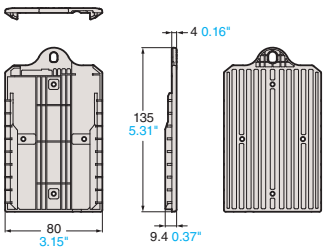
Control panel
IX-CP50



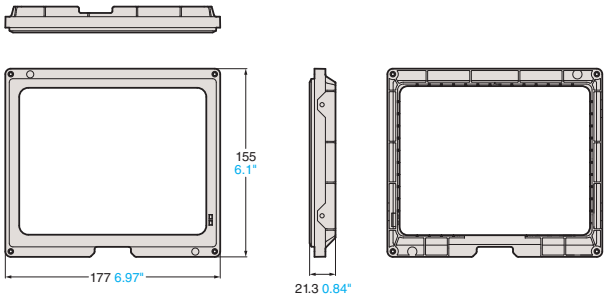
L-shaped Ethernet cable



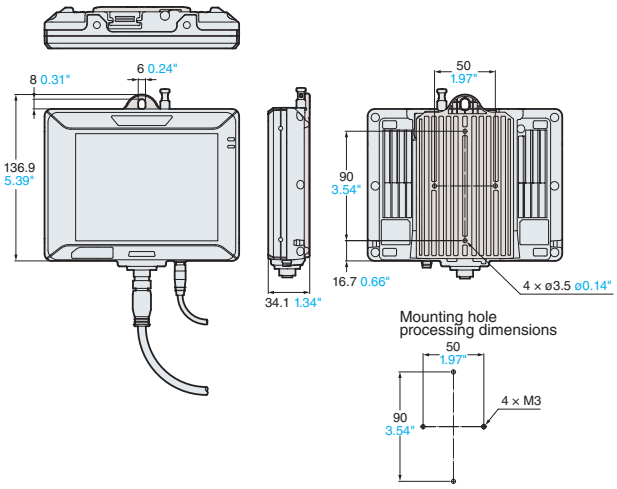
Wall mounting adapter
OP-88349



Control panel mounting adapter
OP-88350

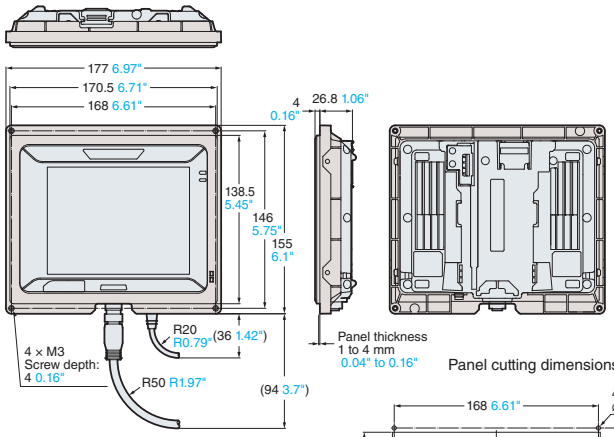


Using the wall mounting adapter

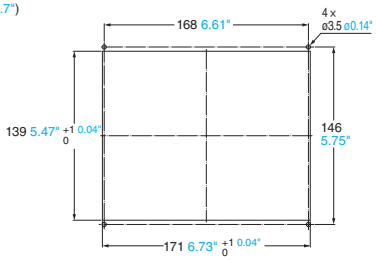


Mounting hole processing dimensions

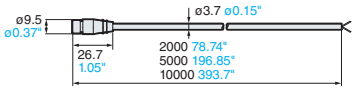
Using the control panel mounting adapter



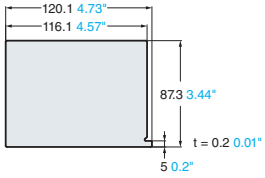
Panel cutting dimensions



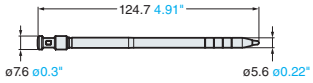
Panel/Monitor power cable
OP-87443 (2 m 6.6')
OP-87444 (5 m 16.4')
OP-87445 (10 m 32.8')



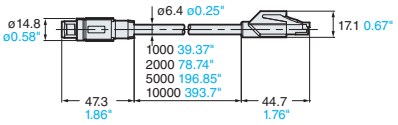
Touch panel protective sheet
OP-88351



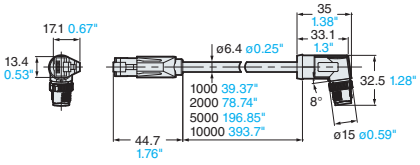
Stylus
OP-88352



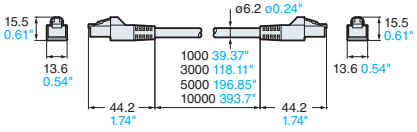
Ethernet cable
OP-87907 (1 m 3.3')**/ OP-87457** (2 m 6.6')**/**
OP-87458 (5 m 16.4')**/ OP-87459** (10 m 32.8')



L-shaped Ethernet 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')



LAN cable
OP-87950 (1 m 3.3')**/ OP-87951** (3 m 9.8')**/**
OP-87952 (5 m 16.4')**/ OP-87953** (10 m 32.8')



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SAFETY INFORMATION
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