LASER SENSORS

MICRO PHOTOELECTRIC **SENSORS** AREA SENSORS LIGHT CURTAINS / SAFETY COMPONENTS PRESSURE / FLOW SENSORS INDUCTIVE PROXIMITY **SENSORS** PARTICULAR USE SENSORS SENSOR OPTIONS SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS MEASUREMENT SENSORS

Adjustable Range Reflective Photoelectric Sensor Amplifier Built-in

FIBER SENSORS Related Information General terms and conditions...... F-7

■ Glossary of terms......P.1455~

■ Sensor selection guide...... P.271~ ■ General precautions P.1458~







Unaffected by color or material, 2 m (6.562 ft) distance adjustable range reflective sensing

Hardly affected by object color or background

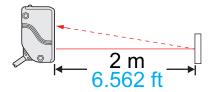
As the **EQ-30** series is incorporated with a 2-segment photodiode as the receiving element with a unique circuitry, it detects an object at the same distance regardless of its color or the background beyond the adjusted sensing range.

However, when the background is specular, it may be necessary to change the angle of the sensor.

Long sensing range 2 m 6.562 ft

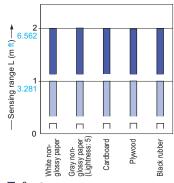
The EQ-30 series can detect an object 2 m 6.562 ft

It is suitable for various applications, such as, sensing objects or positioning objects traveling on a wide assembly line, etc.



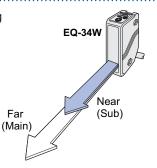
Two distances (far and near) can be set EQ-34W

EQ-34: Correlation between material (200 × 200 mm 7.874 × 7.874 in) and sensing range (typical)



These bars indicate the sensing range with the respective objects when the distance adjuster is set at the sensing range of 2 m 6.562 ft, 1 m 3.281 ft and 0.2 m 0.656 ft long, each, with white ...0.2 m non-glossy paper.

With EQ-34W, two sensing distances, Far (Main) and Near (Sub), can be set. Hence, one sensor can suffice where, earlier, two were required.



Power Supply Built-in

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

HUMAN MACHINE

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

INTERFACES ENERGY CONSUMPTION VISUALIZATION COMPONENTS

PLC

Amplifier-separated

CY-100 EX-10 EX-20

CX-400

EX-30 EX-40

CX-440

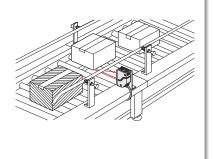
EQ-30

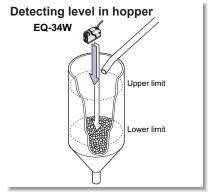
EQ-500 MQ-W

RX-LS200

RX

Detecting a passage of cardboard box

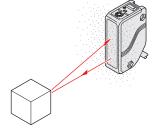




ENVIRONMENTAL RESISTANCE

Insusceptible to contamination on lens

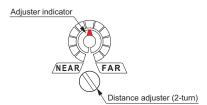
The fixed-focus sensing keeps the detectability better than diffuse reflective type sensors even if the lens is contaminated by dirt, dust, mist, or smoke under an unclean environment.



OPERABILITY

Mechanical 2-turn adjuster with indicator

It features a mechanical 2-turn distance adjuster with an indicator that shows the set distance at a glance.



Waterproof

It has IP67 protection. It can be used in places splashed with water.

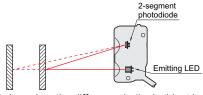


Note: However, take care that if it is exposed to water splashes during operation, it may detect a water drop itself.

Principle of adjustable range reflective sensing with 2-segment photodiode

Normal reflective type sensors operate by sensing the variation in the amount of incident beam.

However, the adjustable range reflective sensing type sensor incorporating the 2-segment photodiode operates by sensing the variation in the incident beam angle. Thus, the output is activated according to the distance of the object from the sensor. This system helps the **EQ-30** series in being unaffected by object color or a background, enabling stable sensing.



Sensing is based on the difference in the incident beam angle of the dotted line and the solid line in the above figure.

MOUNTING / SIZE

Compact

It saves space, since a miniaturized housing of W20 × H68 × D40 mm W0.787 × H2.677 × D1.575 in has been designed for the adjustable range reflective sensing sensor even though the adjustable sensing range is 2 m 6.562 ft long.



VARIETIES

Plug-in connector type is available

Plug-in connector type, which can be easily disconnected for replacement is available. In case a problem occurs, anyone can replace the sensor in a minute. (Excluding **EQ-34W**)



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AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS PRESSURE /

FLOW SENSORS INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide Amplifier Built-in

Power Supply Built-in Amplifierseparated

CX-400

CY-100

EX-10

EX-30

EX-40

CX-440

EQ-30

EQ-500

MQ-W

RX-LS200

FIBER SENSORS

LASER

AREA SENSORS

COMPONENTS PRESSURE / SENSORS

INDUCTIVE PROXIMITY SENSORS PARTICULAR SENSORS SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS MEASURE-MENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES LASER MARKERS

PLC HUMAN

COMPONENTS MACHINE

CURING SYSTEMS

VISION SYSTEMS

Power Supply Built-in

CX-400 CY-100 EX-10 EX-20 EX-30 EX-40 CX-440 EQ-30 EQ-500

MQ-W

RX-LS200 RX RT-610 **ORDER GUIDE**

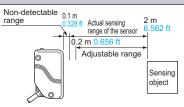
Туре	Appearance	Adjustable range (Note)	Model No.	Output
NPN output		0.2 to 2 m 0.656 to 6.562 ft	EQ-34	NPN open-collector transistor
PNP output			EQ-34-PN	PNP open-collector transistor
Two outputs			EQ-34W	Two NPN open-collector transistor outputs

NOTE: Mounting bracket is not supplied with the sensor. Please select from the range of optional sensor mounting brackets (two types).

Note: The adjustable range stands for the maximum sensing range which can be set with the adjuster.

The sensor can detect an object 0.1 m 0.328 ft, or more, away.

However, the detectable range of Near (Sub) type of EQ-34W begins at 0.2 m 0.656 ft.



Plug-in connector type (Not available for EQ-34W)

Plug-in connector type (standard: cable type) is also available. (excluding EQ-34W) When ordering this type, suffix "-J" to the model No. Please order the suitable mating cable separately.

Model No.: EQ-34-J, EQ-34-PN-J

· Mating cable

Туре	Model No.	Description		
Q	CN-24-C2	Length: 2 m 6.562 ft	0.34 mm ² 4-core cabtyre cable with connector on one end Cable outer diameter: ø5 mm ø0.197 in	
Straight	CN-24-C5	Length: 5 m 16.404 ft		
Elbow	CN-24L-C2	Length: 2 m 6.562 ft		
	CN-24L-C5	Length: 5 m 16.404 ft		

5 m 16.404 ft cable length type

 $5\ m$ $16.404\ ft$ cable length type (standard : $2\ m$ $6.562\ ft$) is also available for NPN output type and two outputs type.

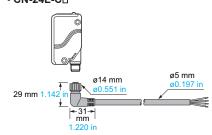
When ordering this type, suffix "-C5" to the model No.

Model No.: EQ-34-C5, EQ-34W-C5

• CN-24-C□



• CN-24L-C□



OPTIONS

Designation	Model No.	Description	
Sensor	MS-EQ3-1	Back angled mounting bracket	
mounting bracket	MS-EQ3-2	Foot angled mounting bracket	

Note: The plug-in connector type does not allow use of some sensor mounting brackets because of the protrusion of the connector.

Sensor mounting bracket

• MS-EQ3-1

Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.





Two M4 (length 25 mm 0.984 in) screws with washers and two M4 nuts are attached.

SPECIFICATIONS

		Туре	NPN output	PNP output	Two outputs		
Item		Model No.	EQ-34	EQ-34-PN	EQ-34W		
Adjustable range (Note 2)		(Note 2)	0.2 to 2 m 0.656 to 6.562 ft		Far (Main): 0.2 to 2 m 0.656 to 6.562 ft Near (Sub): Refer to diagram in (Note 3)		
Sensing range (with white non-glossy paper (at setting distance 2 m 6.562 ft)			0.1 to 2 m 0.328 to 6.562 ft		Far (Main): 0.1 to 2 m 0.328 to 6.562 ft Near (Sub): 0.2 to 2 m 0.656 to 6.562 ft [with Near (Sub) distance for adjuster at max.]		
Hyst	eresis		10 % or le:	10 % or less of operation distance (With white non-glossy paper)			
Repeatability			Along sensing axis: 10 mm 0.394 in or less, Perpendicular to sensing axis: 1 mm 0.039 in or less (with white non-glossy paper)				
Supply voltage							
Curr	ent consump	otion	50 mA or less	55 mA or less	90 mA or less		
Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)	PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)	<far (main)="" (sub)="" near="" output="" output,=""> NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)</far>		
	Utilization of	category		DC-12 or DC-13			
	Output ope	ration	Sw	ritchable either Detection-ON or Detection-C	DFF		
Short-circuit protection		it protection	Incorporated				
Response time			2 ms or less				
Operation indicator		tor	Red LED (lights up when the output is ON)		Far (Main) output: Red LED [lights up when the Far (Main) output is ON Near (Sub) output: Red LED [lights up when the Near (Sub) output is ON]		
Stab	ility indicator	r	Green LED (lights up ur	nder stable light received condition or stable	dark condition) (Note 4)		
Distance adjuster		r	2-turn mechanical adjuster with pointer		Far (Main): 2-turn mechanical adjuster with pointer Near (Sub): Variable adjuster		
Autom	atic interference	prevention function	Incorporated (Note 5)				
	Pollution de	egree	3 (Industrial environment)				
oc	Protection		IP67 (IEC)				
star	Ambient ter	•	-20 to +55 °C −4 to +131 °F (No dew condensation or icing allowed), Storage: -25 to +70 °C −13 to +158 °F				
resi	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH				
Ambient illuminance		ıminance	Incandescent light: 3,000 (x at the light-receiving face				
mer	EMC	EN 60947-5-2					
iron	Ambient temperature Ambient humidity Ambient illuminance EMC Voltage withstandability Insulation resistance		1,000 V AC for one min. between all supply terminals connected together and enclosure				
2							
To to 33 112 frequency, 1.3 fill 0.003 in amplitude (10 G max.) in X, 1 a							
			500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each				
Emitting element Material			Infrared LED (Peak emission wavelength: 880 nm 0.035 mil, modulated) Enclosure: Polyalylate and Polyethylene terephthalate, Lens: Polyalylate				
Cable			0.3 mm ² 3-core (EQ-34W : 4-core) cabtyre cable, 2 m 6.562 ft long				
Cable extension			Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable.				
Weight			Net weight: 150 g approx., Gross weight: 200 g approx.				
Accessory			Adjusting screwdriver: 1 pc.				
Accessory			Aujusting screwanver: 1 pc.				

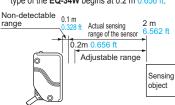
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) The adjustable range stands for the maximum sensing range which can be set with the adjuster. The sensor can detect an object 0.1 m 0.328 ft, or more, away.

**Reverse the detectable area of the Near (Sub)

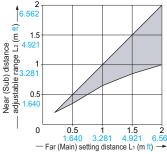
**Reverse the detectab

However, the detectable area of the Near (Sub) type of the EQ-34W begins at 0.2 m 0.656 ft.



4) Refer to "Stability indicator (p.361)" of "PRECAUTIONS FOR PROPER USE" for details of the stability indicator. 3) The Near (Sub) distance adjustable range, L2, changes with the setting of the Far (Main) distance, L1, as shown in the table below.

EQ-34W Near (Sub) distance adjustable range



EQ-34W		
Far (Main) setting distance L1	Near (Sub) distance adjustable range L2	
2 m 6.562 ft	1 to 2 m 3.281 to 6.562 ft	
1.5 m 4.921 ft	0.85 to 1.5 m 2.789 to 4.921 ft	
1 m 3.281 ft	0.65 to 1 m 2.133 to 3.281 ft	
0.5 m 1.640 ft	0.35 to 0.5 m 1.148 to 1.640 ft	
0.2 m 0.656 ft	0.2 m 0.656 ft	

__ _

5) Detection may become unstable depending on the setting conditions or the sensing objects. After setting up this product, make sure to check operations using actual sensing objects.

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INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS SIMPLE

UNITS

WIDE CAVING

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

ELECTRICITY PREVENTION DEVICES LASER MARKERS

PLC

HUMAN MACHINE INTERFACES ENERGY CONSUMPTION

FA COMPONENTS

> MACHINE VISION SYSTEMS

IV CURING CYSTEMS

Selection Guide Amplifier Built-in Power Supply Built-in

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CX-400 CY-100

EX-10 EX-20

EX-30 EX-40

CX-440

EQ-30 EQ-500

MQ-W RX-LS200

RX

FIBER SENSORS

LASER SENSORS PHOTO-ELECTRIC

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS LIGHT CURTAINS/ SAFETY COMPONENTS PRESSURE/ FLOW SENSORS













CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

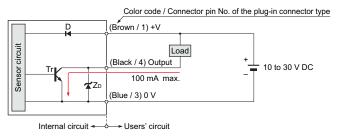


CURING SYSTEMS

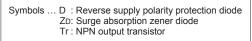
SENSO

I/O circuit diagram

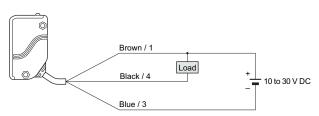
EQ-34



■ I/O CIRCUIT AND WIRING DIAGRAMS

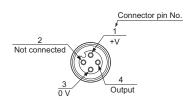


Wiring diagram



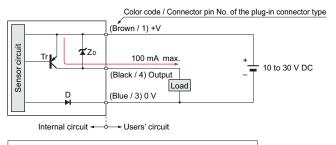
NPN output type

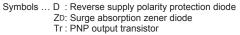
Connector pin position (Plug-in connector type)



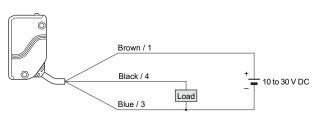
EQ-34-PN PNP output type

I/O circuit diagram

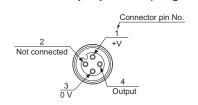




Wiring diagram

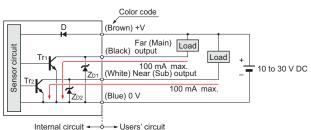


Connector pin position (Plug-in connector type)



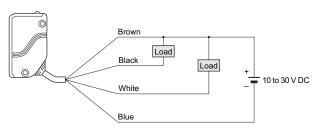
EQ-34W Two outputs type

I/O circuit diagram



Symbols ... D: Reverse supply polarity protection diode ZD1, ZD2: Surge absorption zener diode Tr1, Tr2 : NPN output transistor

Wiring diagram



Selection Guide Amplifier Built-in Power Supply Built-in Amplifierseparated

CX-400 CY-100 EX-10 EX-20 EX-30 EX-40

CX-440 EQ-30 EQ-500

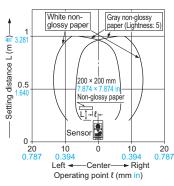
MQ-W RX-LS200

SENSING CHARACTERISTICS (TYPICAL)

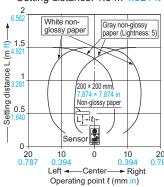
EQ-34 EQ-34-PN

Sensing fields

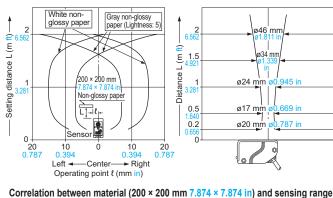
• Setting distance: 1 m 3.281 ft



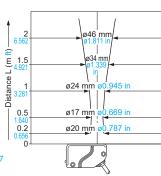
• Setting distance: 1.5 m 4.921 ft



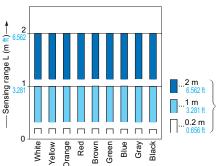
• Setting distance: 2 m 6.562 ft



Emitted beam

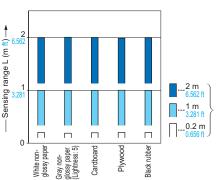


Correlation between color (200 × 200 mm 7.874 × 7.874 in non-glossy paper) and sensing range



These bars indicate the sensing range with the respective colors when the distance adjuster is set at the sensing range of 2 m 6.562 ft, 1 m 3.281 ft and 0.2 m 0.656 ft long, each, with white color.

The sensing distance varies depending also on material.

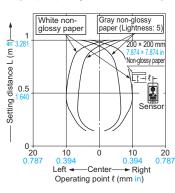


These bars indicate the sensing range with respective objects when the distance adjuster is set at the sensing range of 2 m 6.562 ft, 1 m 3.281 ft and 0.2 m 0.656 ft long, each, with white non-glossy paper.

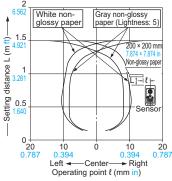
EQ-34W

Sensing fields

• Far (Main) [Far (Main) setting distance: 1 m 3.281 ft]

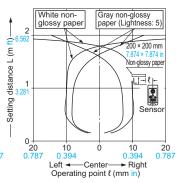


 Far (Main) [Far (Main) setting distance: 1.5 m 4.921 ft]

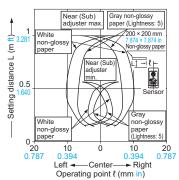


• Far (Main) [Far (Main) setting distance: 2 m 6.562 ft]

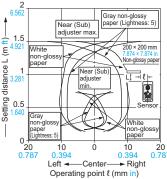
Gray



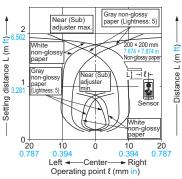
 Near (Sub) [Far (Main) setting distance: 1 m 3.281 ft]



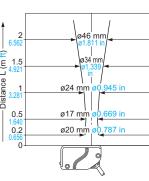
 Near (Sub) [Far (Main) setting distance: 1.5 m 4.921 ft]



 Near (Sub) [Far (Main) setting distance: 2 m 6.562 ft]



Emitted beam



FIBER SENSORS

COMPONENTS PRESSURE FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

LASER MARKERS

PLC

MACHINE INTERFACES

FA COMPONENTS

MACHINE

VISION SYSTEMS

Power Supply Built-in

CX-400

CY-100 EX-10

EX-20 EX-30

EX-40 CX-440

EQ-30 EQ-500

RX-LS200

RX RT-610

LASER SENSORS

AREA SENSORS COMPONENTS PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS PARTICULAR SENSORS SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS FA COMPONENTS

MACHINE VISION

CURING

CX-400 CY-100 EX-10 EX-20

EX-30 EX-40 CX-440 EQ-30

EQ-500 MQ-W

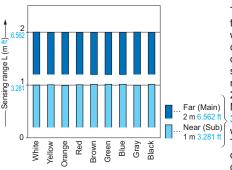
RX-LS200 RX

RT-610

SENSING CHARACTERISTICS (TYPICAL)

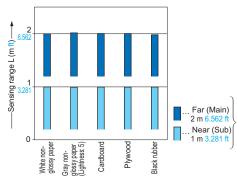
EQ-34W

Correlation between color (200 × 200 mm 7.874 × 7.874 in non-glossy paper) and sensing range



These bars indicate the sensing range with respective colors when the distance adjuster is set at the sensing range of Far (Main) 2 m 6.562 ft and Near (Sub) 1 m 3.281 ft long, each, with white color. The sensing distance varies depending also on material.

Correlation between material (200 × 200 mm 7.874 × 7.874 in) and sensing range



These bars indicate the sensing range with re-spective objects when the distance adjuster is set at the sensing range of Far (Main) 2 m 6.562 ft and Near (Sub) 1 m 3.281 ft long, each, with white non-alossy paper.

Refer to p.1458~ for general precautions.

PRECAUTIONS FOR PROPER USE

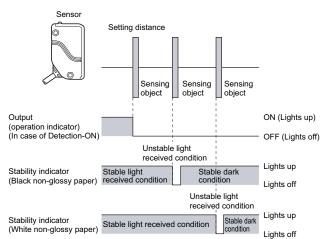
 Never use this product as a sensing device for personnel protection.



 In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Stability indicator

• Since the EQ-30 series uses a 2-segment photodiode as its receiving element, and sensing is done based on the difference in the incident beam angle of the reflected beam from the sensing object, the output and the operation indicator operate according to the object distance. Further, the stability indicator shows the margin of the incident light intensity and not that of the object distance. Hence, the distance at which it lights up/off depends on the object reflectivity and is not at all related to the output operation. Do not use the sensor when the stability indicator is off (unstable light received condition), since the sensing will be unstable.

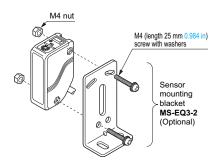


Others

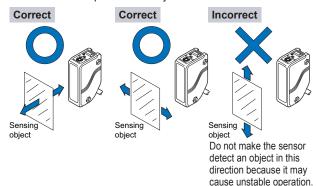
- · Do not use during the initial transient time (50 ms) after the power supply is switched on.
- · When connecting the mating cable to the plug-in connector type, the tightening torque should be 0.4 N·m or less.

Mounting

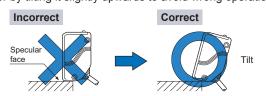
· The tightening torque should be 0.8 N·m or less.



 Care must be taken regarding the sensor mounting direction with respect to the object's direction of movement.



- When detecting a specular object (aluminum or copper foil) or an object having a glossy surface or coating, please take care that there are cases when the object may not be detected due to a small change in angle, wrinkles on the obiect surface, etc.
- · When a specular body is present below the sensor, use the sensor by tilting it slightly upwards to avoid wrong operation.



- · If a specular body is present in the background, wrong operation may be caused due to a small change in the angle of the background body. In that case, install the sensor at an inclination and confirm the operation with the actual sensing object.
- Take care that some objects may produce a dead zone right (less than 0.1 m 0.328 ft) in front of the sensor.

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FA COMPONENTS

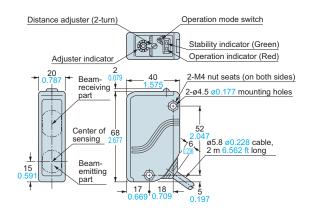
MACHINE

VISION SYSTEMS

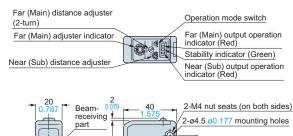
DIMENSIONS (Unit: mm in)

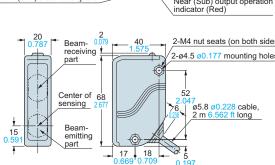
The CAD data in the dimensions can be downloaded from our website.

EQ-34 EQ-34-PN



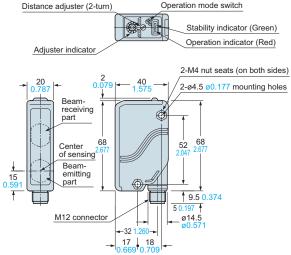
EQ-34W

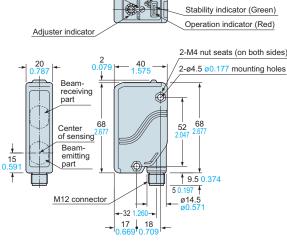




EQ-34-J EQ-34-PN-J

MS-EQ3-1





Sensor mounting bracket (Optional)

54 2.126 27

0.906

10°

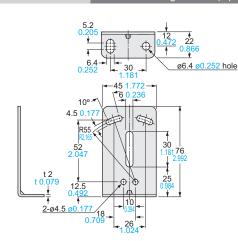
R55

t 2 t 0.079

30 46 58 69

MS-EQ3-2

Sensor mounting bracket (Optional)



Material: Cold rolled carbon steel (SPCC)

Two M4 (length 25 mm 0.984 in) screws with washers

and two M4 nuts are attached.

Power Supply Built-in

CX-400 CY-100 EX-10

EX-20 EX-30

EX-40

CX-440

EQ-30 EQ-500

MQ-W

RX-LS200 RX RT-610

Material: Cold rolled carbon steel (SPCC) Two M4 (length 25 mm 0.984 in) screws with washers

and two M4 nuts are attached.

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