KEYENCE

Cat No PJV-KA-C

Expandable Safety Light Curtain

PJ-V Series

Safety Light Curtain

Modular Plug-n-Play

OSHA | c UL us | ANSI | CE CATEGORY 4

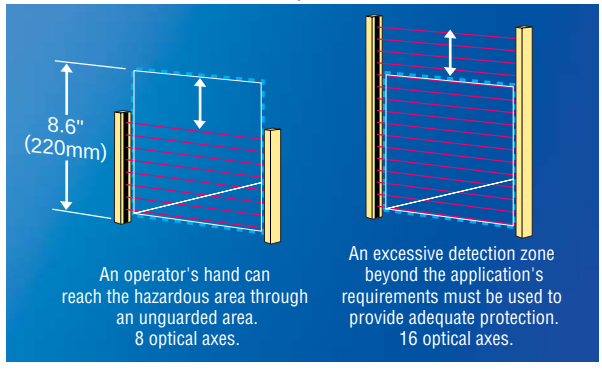
In-house System Configuration

Keyence's revolutionary modular system permits in-house custom configurations.This unique feature enables your safety detection system to adapt to your changing safety needs.

Optimal Detection Zone

The optimal detection zone can be configured in increments of 3.14"(80mm) to create a 15 level system as shown below. The expansion system consists of only three different components, which allows inventory to be kept to a minimum.

Conventional Models
Provide either insufficient or excessive protection



PJ-V Design

Highest Safety Rating

The PJ-V series meets the following international standards and is accepted worldwide.

OSHA | c UL us | ANSI | CE

Category 4 rated in accordance with the EN standards.

Complies to the Latest Standards

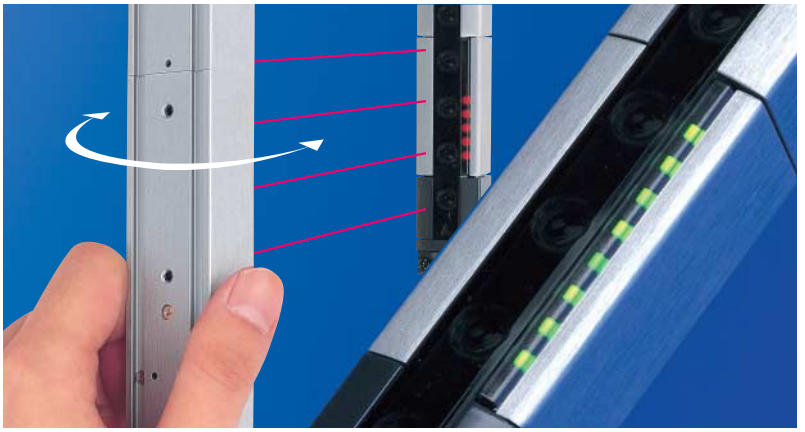
Old Numbers		New Numbers
pr.EN50100-1, 2	→	EN61496-1, 2
pr.EN954-1	→	EN954-1
pr.IEC61496-1, 2	→	IEC61916-1, 2

Noise Resistance.

The PJ-V complies with the noise resistance standards specified by the EMC directive.

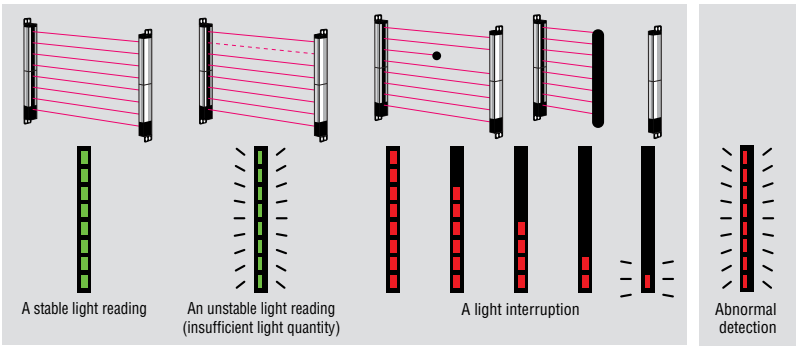
Country/Area	Standards	Qualifying Organization	Marking
Europe	EN 61496-1, 2*4 EN 954-1H EN 60204-1	DEMKO	CE *2
U.S.A./ Canada	IEC 61496-1, 2*4 UL491	UL	c UL us *3
	OSHA 1910.212 OSHA 1910.217 (C) ANSI B11.1 to B11.19 ANSI R15.06	*1	——

*1 ANSI and OSHA do not qualify products for compliance. It is the responsibility of the machine manufacturer to conform to the standards.
*2 The mark, when affixed to a product indicates that the product complies with the requirements stipulated by EMC directive.
*3 The mark, when affixed to a product indicates that the product is UL or CSA listed when applicable.
*4 These standards were still being discussed and modified untill finalized at the end of 1997. Since the PJ-V qualifies for the latest stringent standards, it can be used without worry for an extended period.



Easy Optical Alignment

The LED bar indicator guides a fast and easy alignment. The number of illuminated LEDs confirms the signal strength and a color change from red to green indicates an optimal alignment. In case of a detection, the indicators inform the operator of the detection status in real time.



Slim, Compact, and Sturdy Construction

This space saving compact design is first in its safety class. Although slim in design the sensor head is extremely durable and can withstand harsh environments. The metallic construction of the outer housing, inner housing and locking mechanism ensure the durability of the sensor head and its ability to withstand vibration and impact.

- **Long operating range up to 22.9'(7m)**
- **Water-resistant IP-65 rated enclosure**

Space-Saving Design

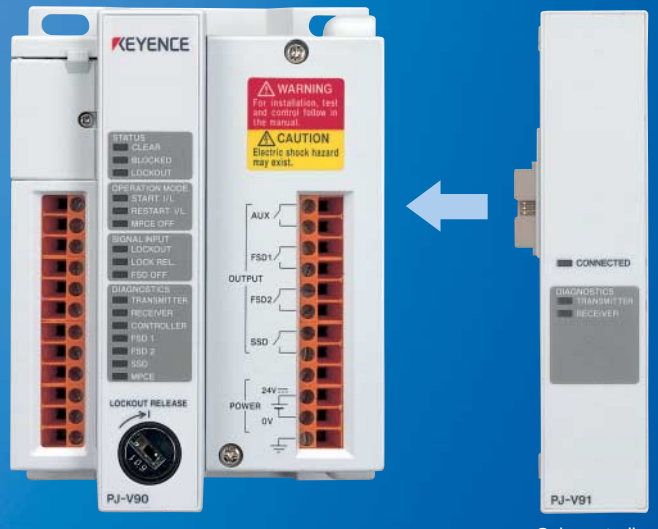
This ultimate space saving design is first in its safety class. The ultra-slim sensor head and ultra-compact controller create a new image in safety light curtain design.

Controller Expansion

An inexpensive sub-controller is available for use with a second sensor head. A simple connector eliminates any wiring requirement.

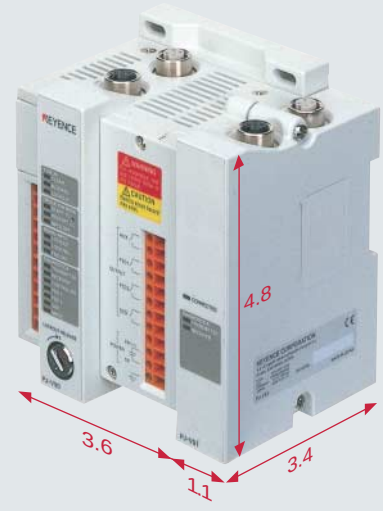
Smallest in its class

An impressive compact size for a full scale safety system.



Main controller **PJ-V90**

Sub-controller **PJ-V91**



unit:inch

Reduced Set-up Time

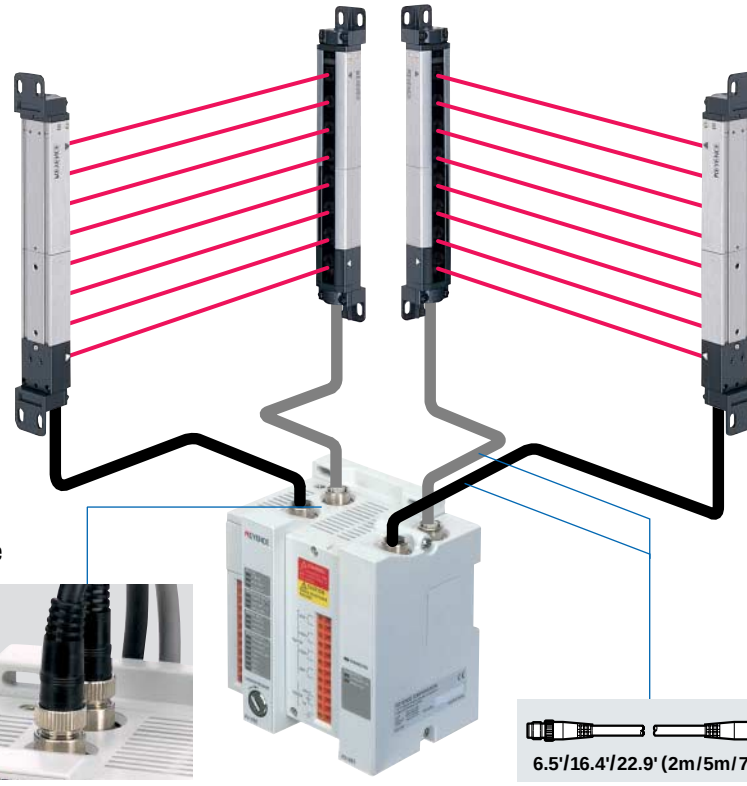
The sub-controller is easily connected to the main control unit using a connector. There is no need for any wiring to a power supply or output lines.
The sub-controller not only reduces set up time but also provides a substantial cost savings.

Mutual Interference Suppression

When the sub-controller is connected to the main unit the suppression function is automatically activated. There is no need for any specialized wiring as the two sensor heads will not interfere with each other.

Cost effective

Using one main controller and a sub-controller is more cost effective than using two main controllers.



6.5'/16.4'/22.9' (2m/5m/7m)

Selections

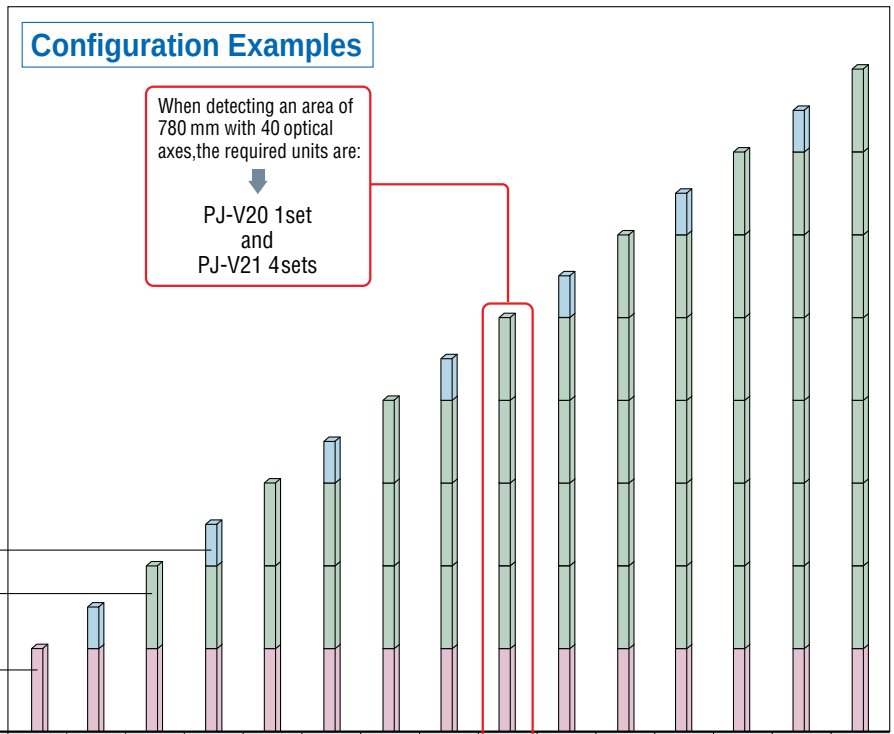
Expandable Sensor Head

- Each unit consists of a transmitter and receiver.
- The end caps are included with the base unit.
- The expansion unit B does not require end cap.

Configuration Examples

When detecting an area of 780 mm with 40 optical axes,the required units are:

PJ-V20 1set
and
PJ-V21 4sets



Sensor

20 mm pitch Detection Capability: 28 mm in diameter

Model	Unit	Number of Optical Axes	Detection zone: inch (mm)	5.5 (140)	8.6 (220)	11.8 (300)	14.9 (380)	18.1 (460)	21.2 (540)	24.4 (620)	27.5 (700)	30.7 (780)	33.8 (860)	37.0 (940)	40.1 (1020)	43.3 (1100)	46.4 (1180)	49.6 (1260)
				8	12	16	20	24	28	32	36	40	44	48	52	56	60	64
PJ-V22	Expansion unit B	4		0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
PJ-V21	Expansion unit A	8		0	0	1	1	2	2	3	3	4	4	5	5	6	6	7
PJ-V20	Base unit	8		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Number of units required

Controller

Model	Description	Application
PJ-V90	Main controller	When using a single sensor head
PJ-V91	Sub-controller	When using two sensor heads

*PJ-V91 cannot be used independently.

Connector Cable

Length	Transmitter	Receiver
	Model	Model
6.5'(2m)	PJ-VC2T	PJ-VC2R
16.4'(5m)	PJ-VC5T	PJ-VC5R
22.9'(7m)	PJ-VC7T	PJ-VC7R

* Transmitter and receiver cable lengths can be expanded separately.
The transmitter and receiver cable lengths can each be expanded up to 21 m (excluding the length of the 50-cm cable extruding from the base unit.)

Replacement Parts

All of these parts are supplied with the product, and are also available separately.


Test piece OP-31608


Release tool OP-31609


Mounting brackets OP-31784


Support brackets OP-31785


End cap OP-31786

Model	Description
OP-31608	Test piece(ø28mm)
OP-31609	Release tool
OP-31784	Mounting brackets
OP-31785	Support brackets
OP-31786	End cap
OP-31787	LOCKOUT release key
OP-31788	Relay board unit

Specifications

Sensor Head

Model		PJ-V20, 21, 22
Controller to be combined		PJ-V90, PJ-V91*1
Detection zone		140 to 1260 mm 5.51" to 49.6"
Number of optical axes		8 to 64 axes
Optical axis pitch		20 mm 0.79"
Operating range		7 m 23.0'
Detection capability		Opaque materials (28 mm 1.10" dia. min.)
Light source		Infrared LED (880 nm)
Operating form		LIGHT-ON
Indicator		Bar of 8 two-color (red and green) LEDs both on transmitter and receiver
Effective aperture angle*2		±2.5˚ max. (When operating range is 3 m 9.8' or more)
Enclosure rating		IP-65
Ambient light		Incandescent lamp: 5,000 lux max, Sunlight: 20,000 lux max
Ambient temperature		-10 to +55˚C
Relative humidity		35 to 95%
Vibration		10 to 55 Hz, 0.7 mm double amplitude in X, Y, and Z directions, 20 times each axis.
Shock		100 m/s^2 328.1'/s^2 (approx. 10 G), 16 ms pulses in X, Y, and Z directions, 1000 times each axis.
Material		Housing: Aluminum, Lens cover: Polyarylate
Weight		PJ-V20: 570 g (including End cap: 140 g), PJ-V21: 320 g, PJ-V22: 290 g
Cable	Transmitter	500 mm 19.69" 4-core cable with connector (0.5 mm^2, AWG20)
	Receiver	500 mm 19.69" 5-core cable with connector (0.5 mm^2, AWG20)
	Extension	Transmitter and receiver cable lengths can each be extended up to 21 m 68.9' (excluding 500-mm 19.69" length of cable extruded from base unit).

*1 The PJ-V91 cannot operate independently. It is a sub-controller connected to the PJ-V90.
*2 In accordance with IEC61496 (EN61496).

Connector Cable

Weight	PJ-VC2T: Approx. 150 g, PJ-VC5T: Approx. 340 g, PJ-VC7T: Approx. 460 g, PJ-VC2R: Approx. 160 g, PJ-VC5R: Approx. 360 g, PJ-VC7R: Approx. 490 g,

Controller

Model		PJ-V90
Sensor head to be combined		PJ-V2x
Power supply		24 V DC ±10%, Ripple (p-p): 5% max.
Power consumption		20 W max. (Including consumption by sensor head)
Current consumption		PJ-V90+PJ-V20: 350mA PJ-V21: 25mA PJ-V91+PJ-V20: 110mA PJ-V22: 15mA
Output	FSD1, FSD2, SSD	4 A at 230 VAC, 2 A at 30 VDC (resistive load), 2 A at 230 VAC (COS ø = 0.3) (inductive load), 1 A at 30 VDC (COS ø = 0.3) (inductive load)
	AUX	0.5 A at 125 VAC, 2 A at 30 VDC (resistive load), 0.25 A at 125 VAC (COS ø = 0.3) (inductive load), 1 A at 30 VDC (COS ø = 0.3) (inductive load)
	Service life	Mechanical: 10 million operations or more, Electrical: 100,000 operations or more (Use of an RC snubber is recommended for inductive loads.)
Response time	FSD1, FSD2, SSD, AUX	15 ms max. (ON to OFF) (Including sensor head response time)
Signal input	Input method	Non-voltage input
Enclosure rating		IP-20 (Mount controller inside control panel with IP-54 or higher level enclosure rating.)
Protection circuit		Power supply section: Reversed polarity protection, surge absorber
Ambient temperature		-10 to +55˚C
Relative humidity		35 to 95%
Vibration		10 to 55 Hz, 0.7 mm double amplitude in X, Y, and Z directions, 20 times each axis.
Shock		100m/s^2 328.1'/s^2 (approx. 10 G), 16 ms pulses in X, Y, and Z directions, 1000 times each axis.
Material		Polycarbonate
Weight		PJ-V90: 520 g, PJ-V91: 150 g
Compliance with international standards		Can be used in U.S.A., Canada, and European countries.
Category		Category 4 ESPE according to EN954-1 (type 4 AOPD according to IEC61496)

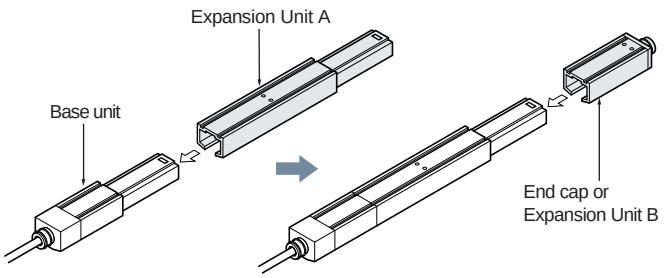
For detailed instructions please refer to the instruction manual included with the PJ-V.

Type of Equipment / Machinery

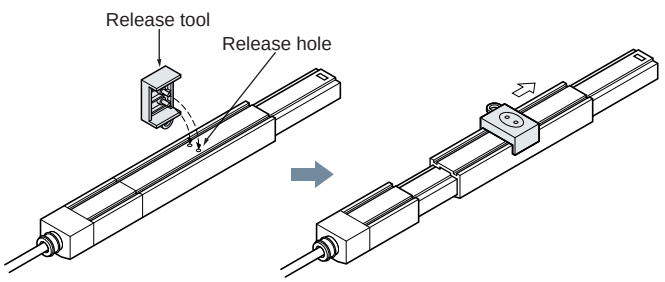
The PJ-V can be used as a safety sensor on almost all equipment in the U.S.A., Canada, and Europe.

Sensor Head Expansion Unit

- Be sure to turn off the power supply before connecting the units.
- If the end cap (top cover) or expansion unit B is not attached, the PJ-V will not operate.
- Do not confuse the transmitter with the receiver when connecting the units. Insert the unit until it is secured and check that it is not disconnected.



- Up to 64 optical axes can be used with the PJ-V20 Series. Increasing the number of optical axes to more than the specified number will cause a failure.
- To increase the number of optical axes to 36 or more with the PJ-V20 Series, use the support brackets included with the base unit. (See page 9.)
- When disconnecting the unit, insert the release tool (included with each unit) into the release hole, and slide the unit with the tool inserted, as shown below.



- The release tool has a hook through which a string can be passed.

Additional Points

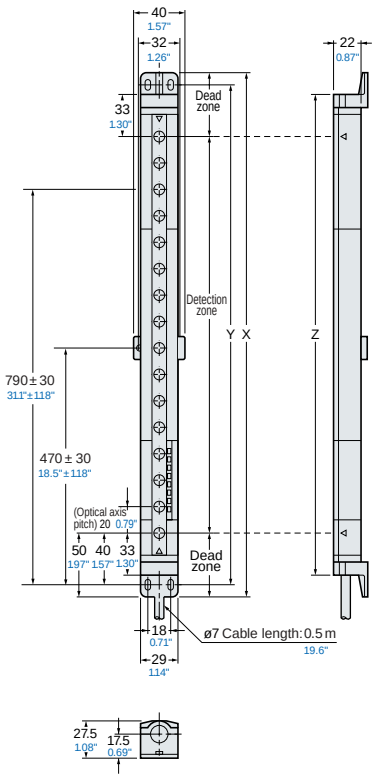
- Never disassemble the sensor head or controller.
- Do not install the power supply or signal lines in the same conduit as high voltage or power lines.
- Be sure to turn off the power supply before starting any wiring. Make all electrical connections in accordance with local electrical codes and laws.
- The LOCKOUT input terminals are shipped short-circuited with a shorting bar. When using the LOCKOUT input, remove the shortihg bar.
- The transmitter and receiver cable lengths can each be expanded up to 21 m, excluding the length of the 50-cm cable extruding from the base unit. Combine the 2-m, 5-m, and 7-m special connector cables as required. The number of core wires for the transmitter cable is different from that for the receiver cable. Check the cable color so that the transmitter cable is not combined with the receiver cable. (Transmitter cable: Gray, Receiver cable: Black)
- The output relays in the controller can be easily changed by replacing the relay board unit with a new one. Use the relay board unit (model: OP-31788), which is sold separately. Also, be sure to turn off the power supply before replacing the relay board unit.

Dimensions

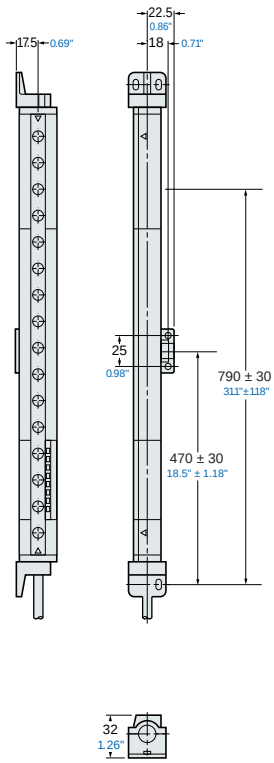
Unit: mm Inch

Sensor Unit PJ-V20/21/22

Rear mounting

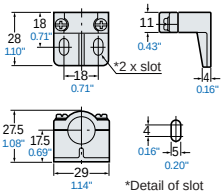


Side mounting



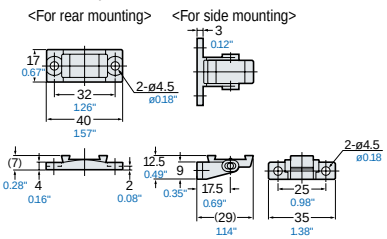
Number of optical axes	Detection zone		X		Y		Z	
8	140	5.51"	240	9.45"	220	8.66"	206	8.11"
12	220	8.66"	320	12.60"	300	11.81"	286	11.26"
16	300	11.81"	400	15.75"	380	14.96"	366	14.41"
20	380	14.96"	480	18.90"	460	18.11"	446	17.56"
24	460	18.11"	560	22.05"	540	21.26"	526	20.71"
28	540	21.26"	640	25.20"	620	24.41"	606	23.86"
32	620	24.41"	720	28.36"	700	27.56"	686	27.01"
36	700	27.56"	800	31.50"	780	30.71"	766	30.16"
40	780	30.71"	880	34.65"	860	33.86"	846	33.31"
44	860	33.86"	960	37.80"	940	37.01"	926	36.46"
48	940	37.01"	1040	40.94"	1020	40.16"	1006	39.61"
52	1020	40.16"	1120	44.09"	1100	43.31"	1086	42.76"
56	1100	43.31"	1200	47.24"	1180	46.46"	1166	45.91"
60	1180	46.46"	1280	50.39"	1260	49.61"	1246	49.06"
64	1260	49.61"	1360	53.54"	1340	52.80"	1326	52.20"

Mounting bracket

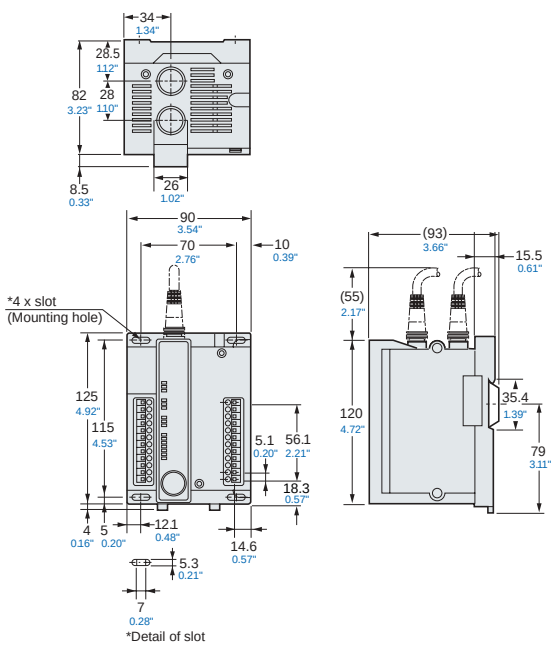


Intermediate support

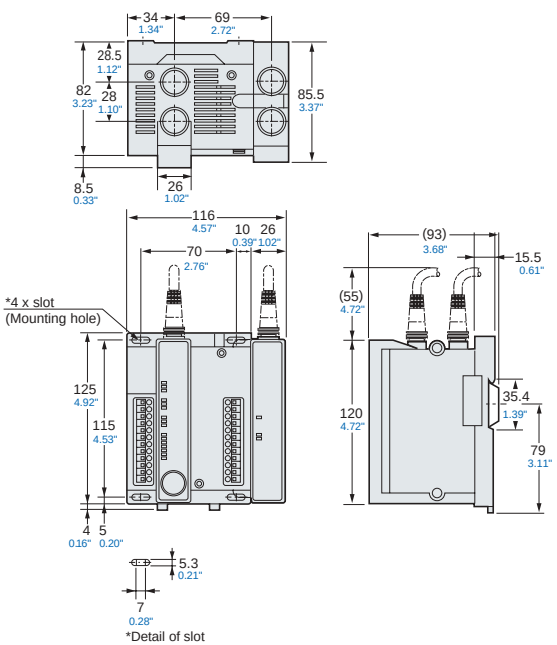
(Accessory for PJ-V20)



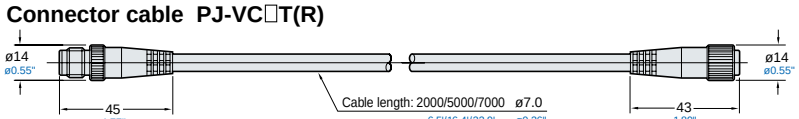
Controller PJ-V90



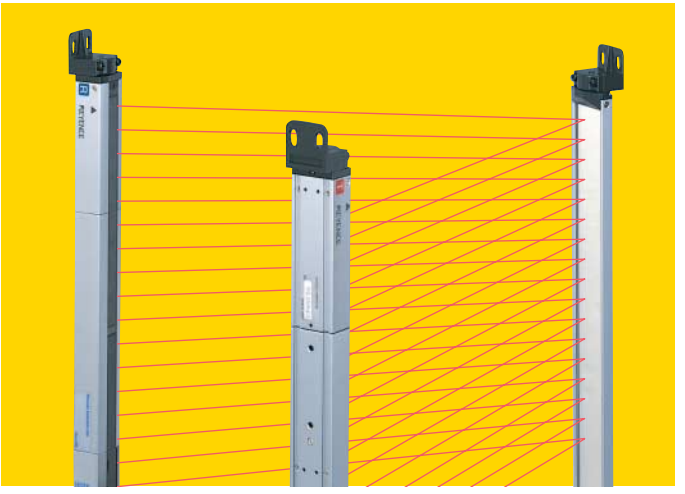
Controller PJ-V90+PJ-V91



Connector cable PJ-VC□T(R)



NEW Optional Corner Mirror



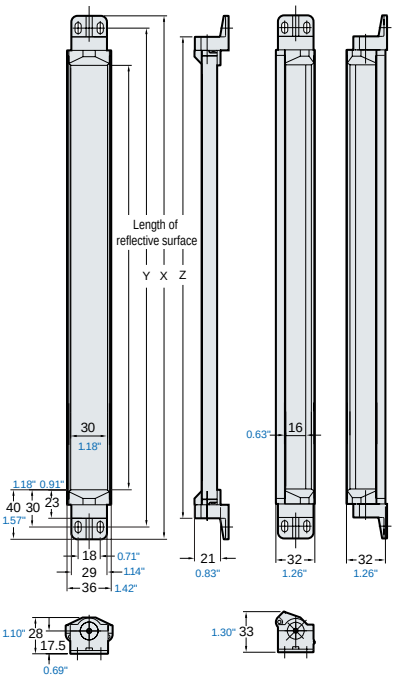
Specifications

Product name		Corner mirror		
Model		OP-35334	OP-35335	OP-35336
Applicable No. of optical axes	Optical axis pitch: 20 mm	8 to 16	20 to 24	28 to 32
	Optical axis pitch: 40 mm	4 to 8	10 to 12	14 to 16
Length of reflective surface		370 mm 14.57"	530 mm 20.87"	690 mm 27.17"
Applicable sensor combination		PJ-V20/V40		
Detecting distance [1]	One mirror	6 m 19.7'		
	Two mirrors	5.5 m 18.0'		
	Three mirrors	5 m 16.4'		
Detection capability		Opaque materials (28 mm 1.10" dia. min.)		
Ambient temperature		-10 to +55℃		
Relative humidity		35 to 95%		
Material		Mirror: Back surface mirror, Housing: Aluminum, Mounting bracket: Zinc die-cast		
Weight		Approx. 410 g	Approx. 510 g	Approx. 610 g
Accessory		Mounting bracket (2 pcs.: OP-31784)		

1. Detecting distance is the total distance between the transmitter and receiver by way of the corner mirrors.

Dimensions

When rotated 45°



Model	Length of reflective surface	X	Y	Z
OP-35334	370 14.57"	450 17.72"	430 16.93"	416 16.38"
OP-35335	530 20.87"	610 24.02"	590 23.23"	576 22.68"
OP-35336	690 27.17"	770 30.31"	750 29.53"	736 28.98"

KEYENCE

KEYENCE CORPORATION OF AMERICA
Corporate Office
50 Tice Blvd., Woodcliff Lake, NJ 07675, U.S.A.

Boston Office
Phone:781-453-2244 Fax:781-453-2255
New Jersey Office
Phone:201-291-4000 Fax:201-291-8860
Pennsylvania Office
Phone:610-768-8993 Fax:610-337-1067
Charlotte Office
Phone:704-423-0070 Fax:704-423-0066
Atlanta Office
Phone:770-951-1222 Fax:770-951-1958
Tampa Office
Phone:813-998-9886 Fax:813-998-9887
Cleveland Office
Phone:216-464-7530 Fax:216-464-7540
Columbus Office
Phone:614-799-3400 Fax:614-799-3401
Cincinnati Office
Phone:513-554-1227 Fax:513-554-1229
Michigan Office
Phone:734-591-9922 Fax:734-591-1722
Indianapolis Office
Phone:317-843-2616 Fax:317-843-2647
Chicago Office
Phone:847-969-0001 Fax:847-969-0453
Minneapolis Office
Phone:952-924-9779 Fax:952-249-9143
St. Louis Office
Phone:314-275-9174 Fax:314-275-9175
Texas Office
Phone:972-733-6790 Fax:972-733-6791
Denver Office
Phone:303-756-5242 Fax:303-756-8301
Phoenix Office
Phone:602-225-2400 Fax:602-225-2425
Portland Office
Phone:503-699-0500 Fax:503-699-8400
Northern California Office
Phone:925-225-1550 Fax:925-225-1440
Los Angeles Office
Phone:310-851-8635 Fax:310-851-8681

PJV-KA-C-3-1099 Printed in Japan