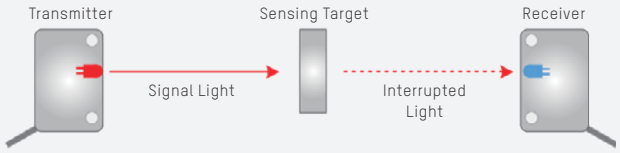
Vision for Imagination

MACHINE VISION
PHOTOELECTRIC SENSOR CATALOG

Hikrobotics.com

HIKROBOT

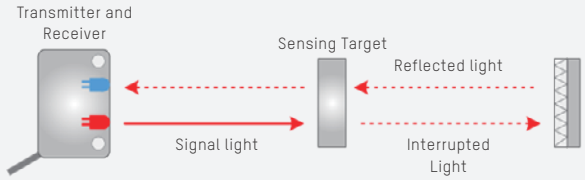
Through-beam sensor



MV-PE5101/-P
Large spot
Detection distance: 15m

MV-PE5112/-P
Large spot
Detection distance: 30m

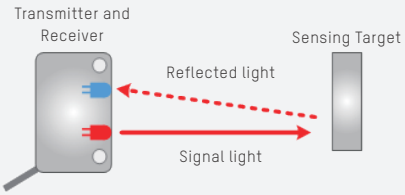
Retro-reflective sensor (with polarizing filter)
Retro-reflective sensor (transparent object detection)



MV-PE5301/-P
Spot
Detection distance: 4m

MV-PE5313/-P
Spot
Detection distance: 1m

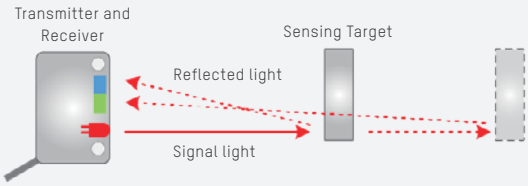
Diffuse reflective sensor



MV-PE5602/-P
Large spot
Detection distance: 300mm

MV-PE5603/-P
Large spot
Detection distance: 1000mm

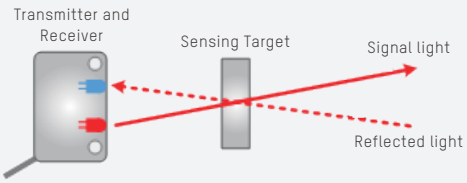
Diffuse reflective sensor (with distance-settable)



MV-PE5501/-P
Spot
Detection distance: 100mm

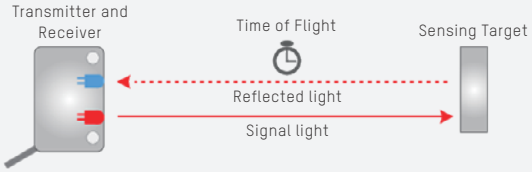
MV-PE5502/-P
Large Spot
Detection distance: 350mm

Definite reflective sensor (definite-reflective)



MV-PE5801/-P
Spot
Detection distance: 5-50mm

Time-of-flight senor



MV-PE5715
Laser spot
Detection distance: 5m

CONTENTS

Hikrobot

Hikrobot is a global product and solution supplier specializing in machine vision and mobile robots. Focused on IIoT, smart logistics, and smart manufacturing, we build open cooperation ecosystems, provide services to industry and logistics customers, and are committed to continuously promoting intelligentization and leading the intelligent manufacturing process

Machine Vision

With efforts in industrial vision sensing application and hardware technology, the company provides customers with leading machine vision products. The products cover industrial camera, lens, vision box, industrial smart camera and related accessory. Through rigorous EMC, safety and reliability tests, Hikrobot guarantees the high precision, high efficiency and high environmental performance of each product. The machine vision products are widely used in industrial automation sectors such as consumer electronics, semiconductors and logistics, as a part of the vision applications like positioning guidance, measurement, quality inspection, code reading, OCR, etc. They help users to greatly improve productivity, accuracy and stability

Overview

Introduction

A photoelectric sensor primarily consists of a transmitter and a receiver. The former transmits visible light and infrared light, and the latter detects and converts changes of light amount reflected or interrupted by the sensing object to an electrical output. Since detection can be performed without touching the sensing object, the risk for scratching or damaging detected object or sensor is low, therefore extending their service life and lowering maintenance cost. Compared with traditional sensors, it supports more stable and long-range detection in complex electromagnetic environment.

Key Features

Excellent Protection

IP67, uaffected if exposed to direct sunlight, high-frequency LED light, or strong electro-magnetic wave

Wide-Range Detected Objects

Provides long-range detection of materials in various scenarios by using spots and lasers

Standard Structure

Provides standard hole spacing of 25.4 mm and metal holes for M3 screws to ensure stable installation in industrial scenarios

Application Scenarios

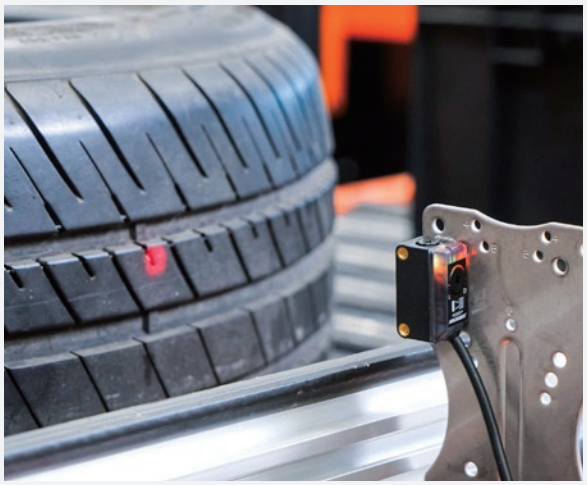
Long-range detection

Accurate distance detection

Highly reflective object detection

Transparent object detection

Dark object detection



Super small workpiece detection

Speed gate and turnstile detection

Model selection

Quick model selection

Detection Type	Detection distance		Light source	Model		Key Features	Output	Connecting method
				NPN output	PNP output			
Through-beam sensor		15m	Red LED	MV-PE5101	MV-PE5101-P	/	Light-on (LO) or dark-on (DO) switch via trimmer	Cable lead-out
		30m	Infrared LED	MV-PE5112	MV-PE5112-P	/		
Retro-reflective sensor		0.1-3m	Red LED	MV-PE5301	MV-PE5301-P	Polarizing filter		
		0.1-1m	Infrared LED	MV-PE5313	MV-PE5313-P	Transparent detection		
Diffuse-reflective sensor		300mm	Red LED	MV-PE5602	MV-PE5602-P	/		
		1000mm	Red LED	MV-PE5603	MV-PE5603-P	/		
Diffuse-reflective sensor (with settable distance)		5-100mm	Red LED	MV-PE5501	MV-PE5501-P	Spot		
		10-350mm	Red LED	MV-PE5502	MV-PE5502-P	Long-distance detection		
Diffuse-reflective sensor (definite-reflective)		5-50mm	Red LED	MV-PE5801	MV-PE5801-P	/		
Time-of-flight sensor		50-5000mm	Infrared laser	MV-PE5715	/	TOF principle	Light-on (LO) or dark-on (DO) switch via teach-in button	

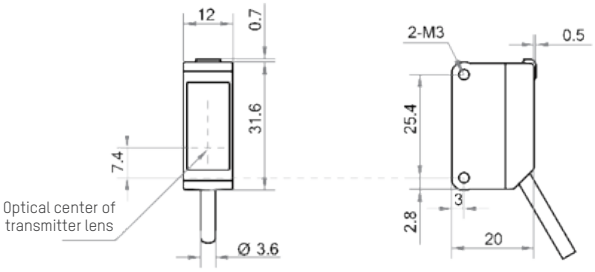
Through-beam sensor

Specification

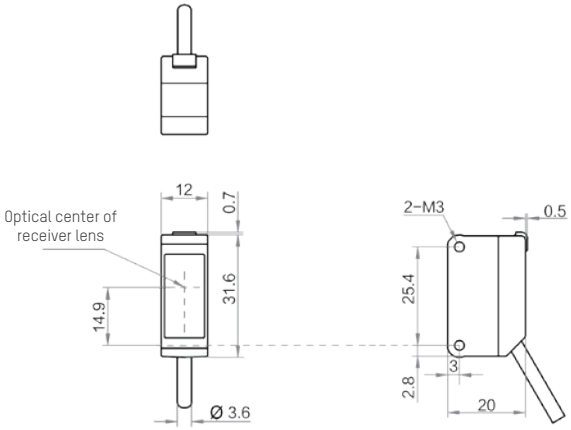
Model	MV-PE5101/-P	MV-PE5112/-P
Detection distance	15 m	30 m
Sensing target	Opaque objects above Φ15mm	
Output	NO/NC (supports light-on/dark-on switch)	
Light source	Red light 660 nm	Infrared light 850 nm
Response time	≤ 500 us	
Sensitivity adjustment	/	Trimmer (200°)
Repeatability (perpendicular to sensing axis)	≤ 0.5 mm	
Supply voltage	12 VDC to 24 VDC (tolerance ± 10%), including Ripple (P-P) 10% or less	
Residual voltage	≤ 2 V.	
Operating current	≤ 20 mA	
Max. sink/source current	≤ 100 mA	
Circuit protection	Reverse polarity protection, overcurrent protection, overvoltage protection	
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)	
Withstand voltage	1000 VAC, 1 min (between the terminal block for power supply and the housing)	
Weight	Transmitter: Approx. 45g (including wire) Receiver: Approx. 45g (including wire)	
Temperature	Working temperature: −25 °C to 55 °C (−13 °F to 131 °F) Storage temperature: −30 °C to 70 °C (−22 °F to 158 °F)	
Humidity	35 to 85% RH	
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux	
Ingress protection	IP67	
Material	Housing: polycarbonate Lens: acrylic	
Indicator	Operation indicator: orange (receiver) Stability indicator: green (receiver) Power indicator: orange (transmitter)	
Connecting method	Wire lead-out (2 m standard)	
Vibration resistance	10 to 500 Hz, double amplitude 1.5 mm, 2 hours in each direction of X,Y,Z.	
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions	
Certification	CE, RoHS	
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")	

Dimension

Structure Dimensions

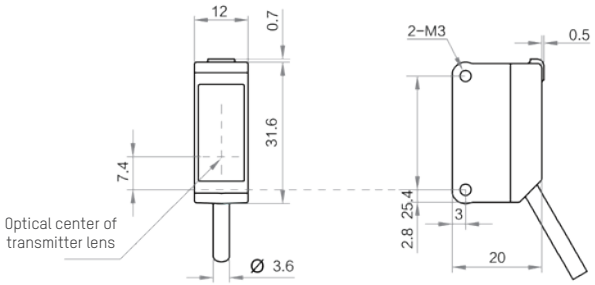


Transmitter

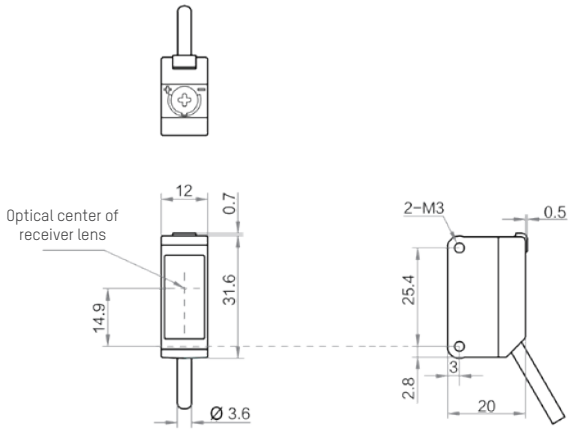


Receiver

MV-PE5101/-P



Transmitter

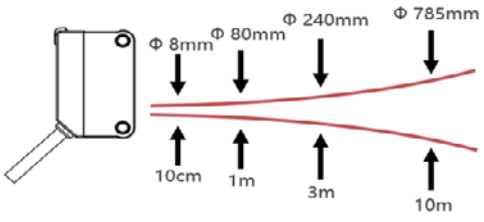


Receiver

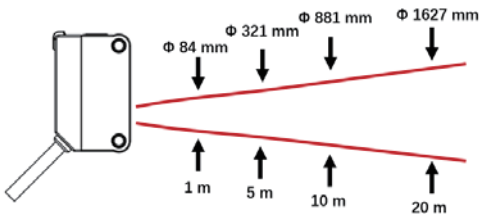
MV-PE5112/-P

Unit: mm

Spot Diameter



MV-PE5101/-P



MV-PE5112/-P

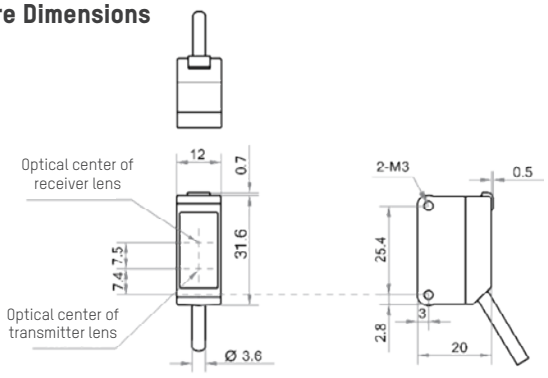
Retro-reflective sensor

Specification

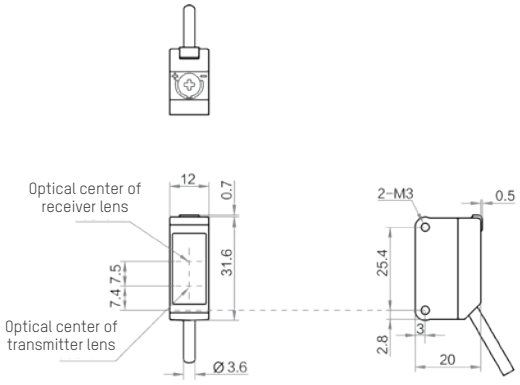
Model	MV-PE5301/-P	MV-PE5313/-P
Detection distance	0.1-4 m	0.1-1m
Sensing target	opaque objects, semi-transparent objects, mirrors above Φ50 mm	Opaque object, semi-transparent object, and transparent object above Φ75 mm
Output	NO/NC (supports light-on/dark-on switch)	
Light source	Red LED 650 nm	Infrared LED 850 nm
Response time	≤ 500 us	
Sensitivity adjustment	/	Trimmer (200°)
Repeatability (perpendicular to sensing axis)	≤ 0.5 mm	
Supply voltage	12 VDC to 24 VDC ±10%, including Ripple (P-P) 10% or less	
Residual voltage	≤ 2 V	
Operating current	≤ 20 mA	
Max. sink/source current	≤ 100 mA	
Circuit protection	Reverse polarity protection, overcurrent protection, overvoltage protection	
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)	
Withstand voltage	1000V AC, 1 minute (between terminal block for power supply and housing)	
Weight	Approx. 45 g (0.1 lb.) (including cable)	
Temperature	Working temperature: –25 °C to 55 °C (–13 °F to 131 °F) Storage temperature: –30 °C to 70 °C (–22 °F to 158 °F)	
Humidity	35% RH to 85% RH	
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux	
Ingress protection	IP67	
Material	Housing: polycarbonate Lens: acrylic	
Indicator	Operation indicator: orange Stability indicator: green	
Connecting method	Cable lead-out (standard length: 2 m)	
Vibration resistance	10 Hz to 500 Hz, double amplitude 1.5 mm, 2 hours in each of the X, Y, and Z directions	
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions	
Certification	CE, RoHS	
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")	

Dimension

Structure Dimensions



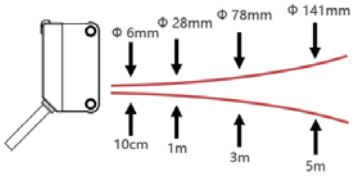
MV-PE5301/-P



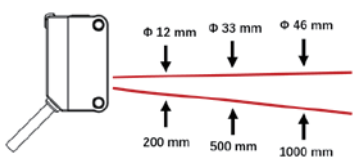
MV-PE5313/-P

Unit: mm

Spot Diameter



MV-PE5301/-P



MV-PE5313/-P

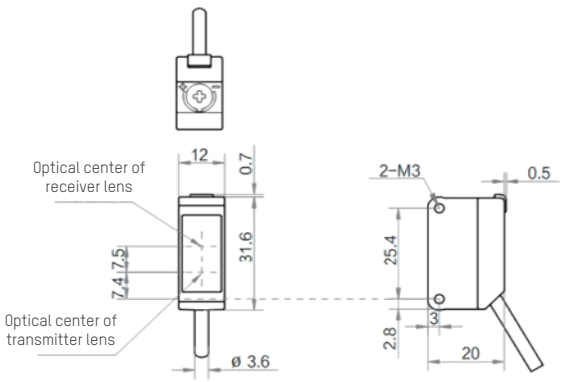
Diffuse-reflective sensor

Specification

Model	MV-PE5602/-P	MV-PE5603/-P
Detection distance	300 mm	1000 mm
Sensing target	White paper (100 mm × 100 mm)	White paper (300 mm × 300 mm)
Output	NO/NC (supports light-on/dark-on switch)	
Light source	Red LED 660 nm	
Response time	≤ 500 μs	
Hysteresis	< 10% of set distance	
Distance setting adjustment	Trimmer (200°)	
Supply voltage	12 VDC to 24 VDC ±10%, including Ripple (P-P) 10% or less	
Residual voltage	≤ 2 V.	
Operating current	≤ 20 mA	
Max. sink/source current	≤ 100 mA	
Circuit protection	Reverse polarity protection, overcurrent protection, and overvoltage protection	
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)	
Withstand voltage	1000 VAC, 1 min (between the terminal block for power supply and the housing)	
Weight	Approx. 45 g (0.1 lb.) (including cable)	
Temperature	Working temperature: –25 °C to 55 °C (–13 °F to 131 °F) Storage temperature: –30 °C to 70 °C (–22 °F to 158 °F)	
Humidity	35% RH to 85% RH	
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux	
Ingress protection	IP67	
Material	Housing: polycarbonate Lens: acrylic	
Indicator	Operational status indicator: Orange Stability indicator: Green	
Connecting method	Cable lead-out (standard length: 2 m)	
Vibration resistance	10 Hz to 500 Hz, double amplitude 1.5 mm, 2 hours in each of the X, Y, and Z directions	
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions	
Certification	CE, RoHS	
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")	

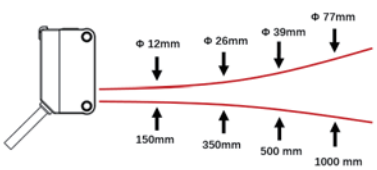
Dimension

Structure Dimensions



MV-PE5602/-P and MV-PE5603/-P Unit: mm

Spot Diameter



MV-PE5602/-P and MV-PE5603/-P

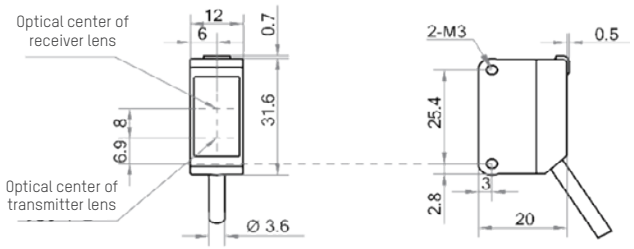
Diffuse-reflective sensor (with settable distance)

Specification

Model	MV-PE5501/-P	MV-PE5502/-P
Detection distance	5-100 mm	10-350 mm
Sensing target	Standard reflector (100 mm × 100 mm) with reflectivity of 5%	
Output	NO/NC (supports light-on/dark-on switch)	
Light source	Red LED 650 nm	Red LED 660 nm
Response time	≤ 500 μs	
Hysteresis	< 10% of set distance	
Distance setting adjustment	Multi-turn trimmer	
Supply voltage	12 VDC to 24 VDC ±10%, including Ripple (P-P) 10% or less	
Residual voltage	≤ 2 V.	
Operating current	≤ 20 mA	
Max. sink/source current	≤ 100 mA	
Circuit protection	Reverse polarity protection, overcurrent protection, and overvoltage protection	
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)	
Withstand voltage	1000 VAC, 1 min (between the terminal block for power supply and the housing)	
Weight	Approx. 45 g (0.1 lb.) (including cable)	
Temperature	Working temperature: −25 °C to 55 °C (−13 °F to 131 °F) Storage temperature: −30 °C to 70 °C (−22 °F to 158 °F)	
Humidity	35% RH to 85% RH	
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux	
Ingress protection	IP67	
Material	Housing: polycarbonate Lens: acrylic	
Indicator	Operation indicator: orange Stability indicator: green	
Connecting method	Cable lead-out (standard length: 2 m)	
Vibration resistance	10 Hz to 500 Hz, double amplitude 1.5 mm, 2 hours in each of the X, Y, and Z directions	
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions	
Certification	CE, RoHS	
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")	

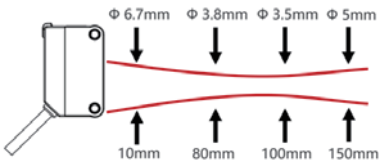
Dimension

Structure Dimensions

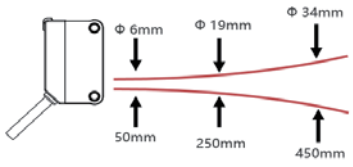


MV−PE5501/−P and MV−PE5502/−P Unit: mm

Spot Diameter



MV−PE5501/−P



MV−PE5502/−P

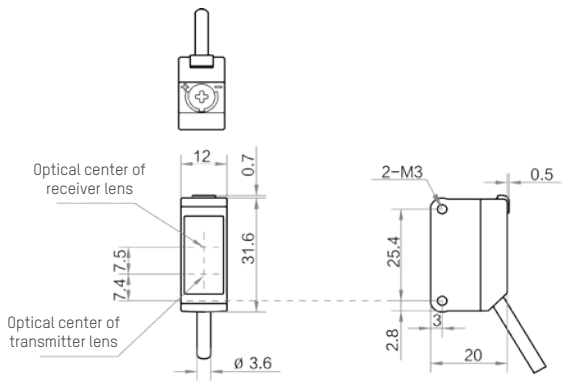
Diffuse-reflective sensor (definite-reflective)

Specification

Model	MV-PE5801/-P
Detection distance	5-50 mm
Sensing target	White paper (100 mm × 100 mm)
Output	NO/NC (supports light-on/dark-on switch)
Light source	Red LED 650 nm
Response time	≤ 500 μs
Hysteresis	< 10% of set distance
Distance setting adjustment	Trimmer (200°)
Supply voltage	12 VDC to 24 VDC (tolerance: ± 10%)
Residual voltage	≤ 2 V.
Operating current	≤ 20 mA
Max. sink/source current	≤ 100 mA
Circuit protection	Reverse polarity protection, overcurrent protection, and overvoltage protection
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)
Withstand voltage	1000 VAC, 1 min (between the terminal block for power supply and the housing)
Weight	Approx. 45 g (0.1 lb.) (including cable)
Temperature	Working temperature: –25 °C to 55 °C (–13 °F to 131 °F) Storage temperature: –30 °C to 70 °C (–22 °F to 158 °F)
Humidity	35% RH to 85% RH
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux
Ingress protection	IP67
Material	Housing: polycarbonate Lens: acrylic
Indicator	Operation indicator: orange Stability indicator: green
Connecting method	Cable lead-out (standard length: 2 m)
Vibration resistance	10 Hz to 500 Hz, double amplitude 1.5 mm, 2 hours in each of the X, Y, and Z directions
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions
Certification	CE, RoHS
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")

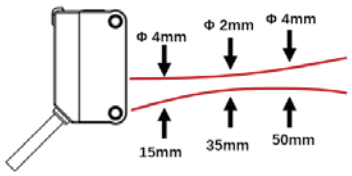
Dimension

Structure Dimensions



MV-PE5801/-P Unit: mm

Spot Diameter



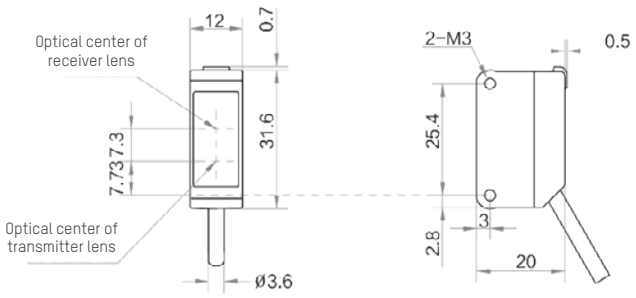
Time-of-flight sensor

Specification

Model	MV-PE5715
Detection distance	50-5000 mm
Sensing target	Standard reflector (100 mm × 100 mm) with reflectivity of 90%
Output	NPN/PNP switch and light-on/dark-on switch
Light source	Infrared laser 905 nm
Response time	500 µs/10 ms switch
Laser safety class	Class 1
Method of setting up	Single teach-in button
Supply voltage	12 VDC to 24 VDC ±10%, including Ripple (P-P) 10% or less
Residual voltage	≤ 2 V.
Operating current	≤ 35 mA @ 12V, ≤ 20 mA @ 24V
Max. sink/source current	≤ 100 mA
Circuit protection	Reverse polarity protection, overcurrent protection, and overvoltage protection
Insulation resistance	20 MΩ or more (between the terminal block for power supply and the housing)
Withstand voltage	1000 VAC, 1 min (between the terminal block for power supply and the housing)
Weight	Approx. 45 g (0.1 lb.) (including cable)
Temperature	Working temperature: –25 °C to 55 °C (–13 °F to 131 °F) Storage temperature: –30 °C to 70 °C (–22 °F to 158 °F)
Humidity	35% RH to 85% RH
Ambient illumination	Sunlight: < 10000 lux Incandescent lamp: < 3000 lux
Ingress protection	IP67
Material	Housing: polycarbonate Lens: acrylic
Indicator	Operation indicator: orange Stability indicator: green
Connecting method	Cable lead-out (standard length: 2 m)
Vibration resistance	10 Hz to 500 Hz, double amplitude 1.5 mm, 2 hours in each of the X, Y, and Z directions
Shock resistance	500 m/s², 3 times in each of the X, Y, and Z directions
Certification	CE, RoHS
Dimension	20 mm × 12 mm × 31.6 mm (0.8" × 0.5" × 1.2")

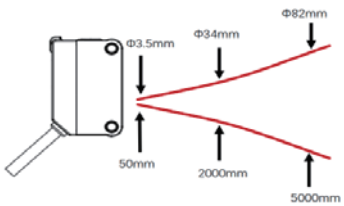
Dimension

Structure Dimensions



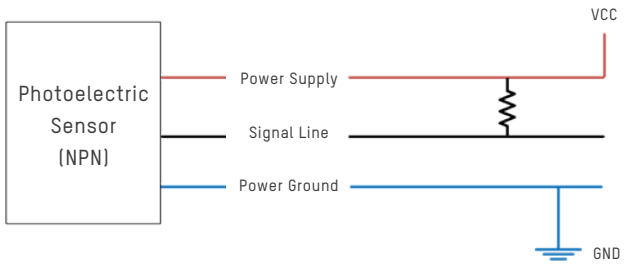
MV–PE5715 Unit: mm

Spot Diameter

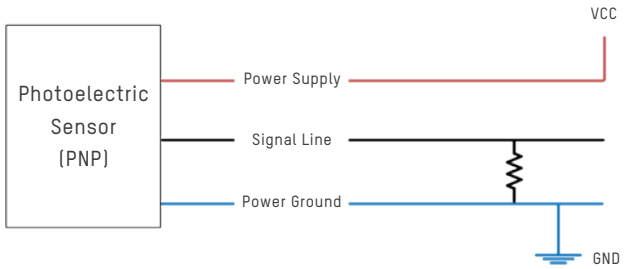


Wiring Guide

Photoelectric sensor with NPN output



Photoelectric sensor with PNP output



Appendix

Glossary

Polarizing filter

Retro-reflective sensors with polarizing filters provide overall detection of highly reflective objects

LO/DO

LO (Light-on): The output is on when incident light is detected

DO (Dark-on): The output is on when no incident light is detected

Spot

Spots, with clear shapes and without surrounding halos, help provide high-precision and high-accuracy detection for sensors

Sensing target

Through-beam sensors: The min. sensing target dimension is generally more than 15 mm (the lens diameter)

Retro-reflective sensors: The min. sensing target dimension is generally more than 50 mm (the retroreflector dimension)

Hysteresis

Based on actual detection plans, hysteresis refers to the range, rather than an exact threshold, for light to be detected.

Practically, it is the difference between the working distance for detecting the incident light and the reset distance for not detecting the incident light

Ambient illumination

Sunlight: < 10000 Lux
Incandescent lamp: < 3000 lux

Generally, illumination for incandescent lamp of 3000 lux equals to that for sunlight of 10000 Lux. The higher the value is, the stronger the anti-interference capability of ambient illumination will be

Residual voltage

Due to circuit conditions, there is no absolute high level and low level of IO output

For NPN type: Residual voltage is the one measured on the interface when IO is on

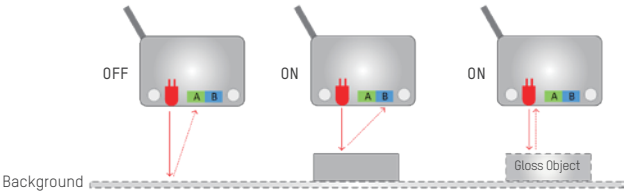
For PNP type: Residual voltage is the one toward the power supply measured on the interface when IO is on

Spot diameter

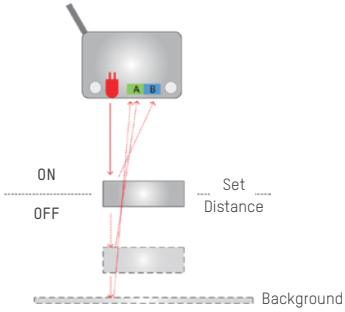
Spot diameter is selected based on actual needs. Generally, small spot is used for high-precision scenes and large spot for scenes requiring ease of alignment

FGS/BGS

FGS (Foreground suppression): Photoelectrical sensors with FGS function support easy detection of glossy workpieces or workpieces which are closely connected to the background

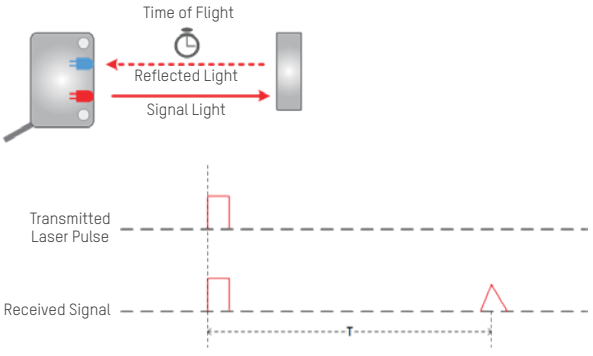


BGS (Background suppression): Photoelectrical sensors with BGS function support easy detection of workpieces which are separated from the background



Time of flight (TOF)

It refers to the time duration that the light is sent (via sensor) to and returned from the detected object under laser irradiation, which is used to measure the distance between the sensor and the detected object. Since time of flight is not affected by the surface condition of workpieces, sensors designed on time-of-flight principle support stable and long-range detection



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