Amplifier Separate Type Photoelectric Sensor
PS-N10 Series

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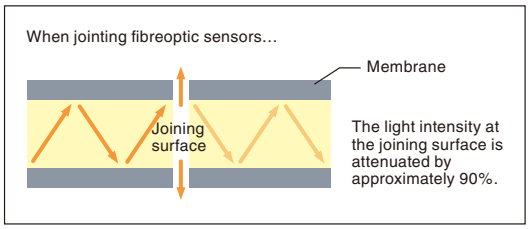
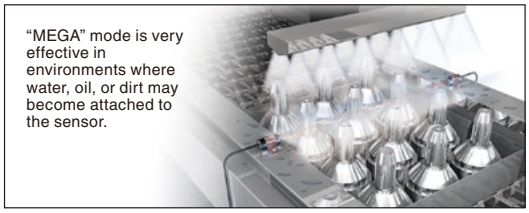
Extendable sensor head cable

Because the sensor head cable is a simple power cable, it can be extended to the desired length. By soldering or using a metal connector, it can be extended to a maximum of 10 m.



Small size yet high power

While the conventional PS Series had only “FINE” and “TURBO” modes, it is now equipped with additional power modes including “MEGA” mode, like the FS-N10 Series. This allows the PS Series to be used in applications where strong light intensity is required.



Wide range of sensor head options

The PS Series lineup includes a broad range of sensor heads that have a wide variety of special characteristics, such as the environmentally resistant models that are encased in PFA for protection, or the limited range reflective models that are able to avoid the effects of background light.

Communication unit support

Current values can be monitored and settings can be read and written over a network.

CC-Link
DeviceNet™
EtherNet/IP™
EtherCAT®

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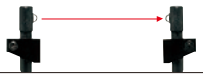
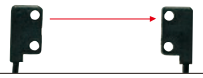
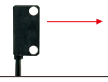
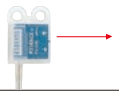
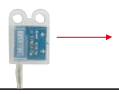
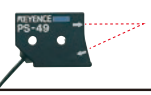
Sensor head lineup

Thrubeam type

Type		Appearance	Detecting distance (mm)*1	Features	Model (C means with connector)
Thrubeam type	General purpose		MEGA : 3600 (6000) ULTRA : 2800 (5000) SUPER : 2200 (4200) TURBO : 2000 (4000)	Compact body and long-detecting distance	**PS-55** (**PS-55C**)
			MEGA : 3600 (6000) ULTRA : 2800 (5000) SUPER : 2200 (4200) TURBO : 2000 (4000)	Compact body and long-detecting distance easy optical-axis alignment	**PS-05**
			MEGA : 1000 ULTRA : 900 SUPER : 750 TURBO : 700	Cylindrical, embedded type	**PS-58**
			MEGA : 1200 (1500) ULTRA : 800 (1000) SUPER : 400 (650) TURBO : 300 (600)	Side-to-side type, 3 mm thickness	**PS-52** (**PS-52C**)
			MEGA : 750 (900) ULTRA : 500 (600) SUPER : 400 (450) TURBO : 300 (400)	Flat-to-flat type 2.8 mm thickness	**PS-56**
	Environment-proof		MEGA : 3600 (6000) ULTRA : 2800 (5000) SUPER : 2200 (4200) TURBO : 2000 (4000)	PFA-sheath type, oil-proof, chemical proof	**PS-201** (**PS-201C**)
			MEGA : 900 (1000) ULTRA : 700 (900) SUPER : 600 (800) TURBO : 500 (750)	PFA-sheath type, Slit*2 built-in	**PS-202**

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode with a 5 m sensor head cable.
*2 5×1 mm slits for both transmitter/receiver.

Reflective model

Type		Appearance	Detecting distance (mm)*1	Features	Model (C means with connector)
Diffuse-reflective	General purpose		MEGA : 600 (900) ULTRA : 400 (600) SUPER : 250 (450) TURBO : 200 (400)	Compact body and long-detecting distance	**PS-45**
			MEGA : 200 (250) ULTRA : 150 (200) SUPER : 120 (160) TURBO : 100 (140)	Flat-to-flat type 2.8 mm thickness	**PS-46**
			MEGA : 75 ULTRA : 45 SUPER : 30 TURBO : 25	Cylindrical, embedded type	**PS-48**
	Environment-proof		MEGA : 600 (900) ULTRA : 400 (600) SUPER : 250 (450) TURBO : 200 (400)	PFA-sheath type, oil-proof, chemical proof	**PS-205**
			MEGA : 250 ULTRA : 180 SUPER : 100 TURBO : 70	PFA-sheath type, Focused beam small spot	**PS-206**
Definite-reflective	Small spot		10±4 * Common for all power modes	Small Spot ø0.8 mm almost unaffected by target background	**PS-47** (**PS-47C**)
	Long detecting		32 to 53 * Common for all power modes	Long distance small spot almost unaffected by target background	**PS-49** (**PS-49C**)

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode.

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Amplifier

Cable type

Type		Appearance	Model		Control outputs	External input
			NPN output	PNP output		
Standard	Main unit		PS-N11N	PS-N11P	1	1
	Expansion unit		PS-N12N	PS-N12P		0

M8 connector type

Type		Appearance	Model		Control outputs	External input
			NPN output	PNP output		
Standard	Main unit		PS-N11CN	PS-N11CP	1	1
	Expansion unit		PS-N12CN	PS-N12CP		

Zero line type

Type		Appearance	Model	Control outputs	External input
Standard	Expansion unit		PS-N10	None*1	0

*1 Counted as one output when added to an NU Series communication unit.

Sensor head specifications

Thrubeam sensor head

Type		Thrubeam type						
		General purpose					Environment-proof	
		Long-detecting distance	Free-positioning	Cylindrical	Thin		Long-detecting distance	Slit built-in
Model		PS-55 (C)	PS-05	PS-58	PS-52 (C)	PS-56	PS-201 (C)	PS-202
Detecting distance*1 (mm)	MEGA	3600 (6000)	3600 (6000)	1000	1200 (1500)	750 (900)	3600 (6000)	900 (1000)
	ULTRA	2800 (5000)	2800 (5000)	900	800 (1000)	500 (600)	2800 (5000)	700 (900)
	SUPER	2200 (4200)	2200 (4200)	750	400 (650)	400 (450)	2200 (4200)	600 (800)
	TURBO	2000 (4000)	2000 (4000)	700	300 (600)	300 (400)	2000 (4000)	500 (750)
Light source		Infrared LED						
Smallest detectable object*2		ø1.0 mm Opaque	ø1.0 mm Opaque	ø0.5 mm Opaque	ø0.3 mm Opaque	ø0.3 mm Opaque	ø0.8 mm Opaque	ø0.5 mm Opaque
Environmental resistance	Protective structure	IP64	IP64	IP67	—	—	IP67	
	Ambient light	Incandescent lamp: 4000 lux max., Sunlight: 12000 lux max.						
	Ambient temperature/ Relative humidity	-10 to +60°C (No freezing)/35 to 85% RH (No condensation)						

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode with a 5 m sensor head cable.
*2 With thrubeam sensors, the smallest detectable object indicates the size of a detectable object from the maximum detecting distance.

Reflective sensor head

Type		Diffuse-reflective					Definite-reflective	
		General purpose			Environment-proof		General purpose	
		Long-detecting distance	Thin	Cylindrical	Long-detecting distance	Narrow-beam	Small spot	Long-detecting distance
Model		PS-45	PS-46	PS-48	PS-205	PS-206	PS-47 (C)	PS-49 (C)
Detecting distance*1 (mm)	MEGA	600 (900)	200 (250)	75	600 (900)	250	10±4	32 to 53
	ULTRA	400 (600)	150 (200)	45	400 (600)	180		
	SUPER	250 (450)	120 (160)	30	250 (450)	100		
	TURBO	200 (400)	100 (140)	25	200 (400)	70		
Light source		Infrared LED					Red LED	
Detectable object		Transparent and opaque						
Smallest detectable object*2		—	—	—	—	—	ø0.03 mm Copper wire	ø0.1 mm Copper wire
Spot diameter		—	—	—	—	ø6 mm At detecting distance of 70 mm	ø0.8 mm At detecting distance of 10 mm	ø1.5 mm At detecting distance of 50 mm
Hysteresis (% of detecting distance)		15% max.	10% max.	20% max.	15% max.		3% max.	6% max.
Environmental resistance	Protective structure	IP64	—	IP67			—	
	Ambient light	Incandescent lamp: 4000 lux max., Sunlight: 12000 lux max.					Incandescent lamp: 4000 lux max., Sunlight: 5000 lux max.	
	Ambient temperature	-10 to +60°C (No freezing)						–10 to +50°C (No freezing)
	Relative humidity	35 to 85% RH (No condensation)						

*1 Depends on the mode, response time may be different even with the same detecting distance. Detecting distance in parentheses is a value when enabling the long distance detection mode.
*2 With reflective sensors, the smallest detectable object was determined at the optimal detecting distance and sensitivity setting.

Amplifier specifications

Specifications

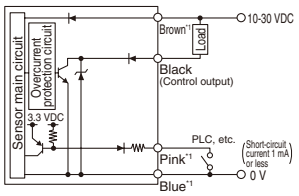
Type		Cable		M8 connector		Zero line
Main/Expansion unit		Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit
Model	NPN	**PS-N11N**	**PS-N12N**	**PS-N11CN**	**PS-N12CN**	**PS-N10**
	PNP	**PS-N11P**	**PS-N12P**	**PS-N11CP**	**PS-N12CP**	
I/O	Control outputs	1 output		1 output		None*1
	External input	1 input	None	1 input	1 input	None
Response time		500 µs (TURBO)/1 ms (SUPER)/4 ms (ULTRA)/16 ms (MEGA)				
Output selection		LIGHT-ON/DARK-ON (switch-selectable)				
Timer function		Timer OFF/OFF-delay timer/ON-delay timer/One-shot timer, Timer duration selectable: 1 ms to 9999 ms, Maximum error against the setting value: ±10% max.				
Control outputs	NPN output	NPN open collector 30 V, (without expansion) 100 mA max., (with expansion) 20 mA max., residual voltage 1 V max. (when the out current is 10 mA or less)/2 V max. (when the output current is 10 to 100 mA)				
	PNP output	PNP open collector 30 V, (without expansion) 100 mA max., (with expansion) 20 mA max., residual voltage 1.2 V max. (when the output current is 10 mA or less)/2.2 V max. (when the output current is 10 to 100 mA)				
External input		Input time 2 ms (ON)/20 ms (OFF) or more*2				
Expansion units		Up to 16 units (Up to 17 units including 1 main unit can be connected in total.)				
Protection circuit		Reverse polarity protection, Over-current protection, Surge absorber				
Number of interference prevention units		4 for TURBO/SUPER/ULTRA/MEGA (When set to DOUBLE, the number of interference-prevention units will be doubled)				
Power voltage		24 VDC (operating voltage 10-30 VDC (with ripple)), ripple (P-P) 10% or less, Class 2 or LPS				
Power consumption	NPN	Normal: 810 mW or less (at 30V. 28 mA max. at 24 V, 34 mA max. at 12 V) Eco on mode: 700 mW or less (at 30V. 24 mA max. at 24 V, 27 mA max. at 12 V) Eco Full mode: 490 mW or less (at 30V. 17 mA max. at 24 V, 20 mA max. at 12 V)				
	PNP	Normal: 860 mW or less (at 30V. 30 mA max. at 24 V, 35 mA max. at 12 V) Eco on mode (ALL): 750 mW or less (at 30V. 26 mA max. at 24 V, 28 mA max. at 12 V) Eco Full mode: 540 mW or less (at 30V. 19 mA max. at 24 V, 21 mA max. at 12 V)				—
Environmental resistance	Ambient temperature	-20°C to +55°C (No freezing)*3				
	Relative humidity	35 to 85% RH, (No condensation)				
	Vibration resistance	10 to 55 Hz, double amplitude: 1.5 mm , 2 hours each in the X, Y and Z axis				
	Shock resistance	500 m/s² 3 times for each of X,Y and Z axis				
Material	Case	Main unit and cover material: Polycarbonate				
	Cable	PVC				
Case size		H 32.6 mm × W 9.8 mm × L 78.7 mm				
Weight		Approx. 75 g	Approx. 65 g	Approx. 20 g	Approx. 20 g	Approx. 20 g

*1 Counted as one output when added to a NU Series communication unit.
*2 Input time is 25 ms (ON)/25 ms (OFF) when the external calibration time is selected.
*3 If more than one unit is used together, the ambient temperature varies with the conditions below. Mount the units on the DIN rail with mounting brackets and check that the output current is 20 mA or less for a unit.
One or two more units connected: -20°C to +55°C ; 3 to 10 more units connected: -20°C to +50°C ; 11 to 16 more units connected: -20°C to +45°C.

I/O Circuit Diagram

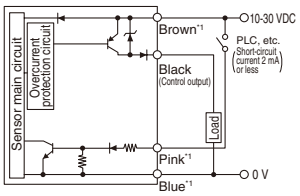
Cable type

PS-N11N/N12N



*1 **PS-N11N** only

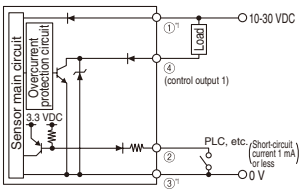
PS-N11P/N12P



*1 **PS-N11P** only

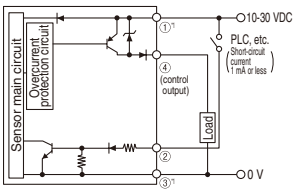
M8 connector type

PS-N11CN/N12CN



*1 **PS-N11CN** only

PS-N11CP/N12CP



*1 **PS-N11CP** only

Options

Model number	Applicable model	Type
OP-2555	**PS-55**	Slit (detecting distance: 700 mm) (transmitter/receiver set)
OP-93672	**PS-05**	
OP-0162	**PS-45** (accessory)	**PS-45** mounting bracket set
OP-0230	**PS-56 , 52** (accessory)	Mounting nut set for **PS-56**
OP-2812	**PS-55**	Mounting bracket set for **PS-55**
OP-6349	**PS-48** (accessory)	**PS-48** mounting bracket
OP-6350	**PS-58** (accessory)	**PS-58** mounting bracket
OP-6800	**PS2-61** (accessory)	**PS2** mounting bracket
OP-7080	**PS-201 , 202** (accessory)	**PS-201** mounting bracket (one side only)
OP-27934	Amplifier (accessory)	Connector for sensor head (2)
OP-42113	**PS-55, 05, 52, 56, 58**	Thrubeam transmitter side cable (20 m)
OP-42114	**PS-55, 05, 52, 56, 58**	Thrubeam receiver side cable (20 m)
OP-42115	**PS-45, 46, 47, 49**	Reflective (except **PS-48**) cable (20 m)
OP-42116	**PS-201, 202**	PFA thrubeam transmitter side cable (20 m)
OP-42117	**PS-201, 202**	PFA thrubeam receiver side cable (20 m)
OP-42118	**PS-205, 206**	PFA Reflective cable (20 m)

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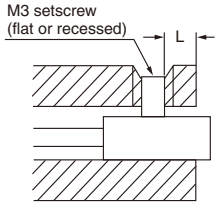
Hints on Correct Use

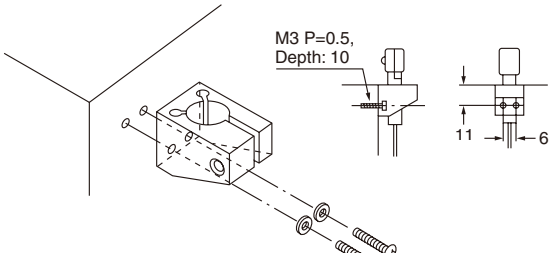
Mounting

- When mounting **PS-48**, ensure that the front face of the sensor head is forward of the mounting surface as shown in the drawing on the right.
- Tightening torque for mounting the **PS-58/48** with a set screw is shown below.

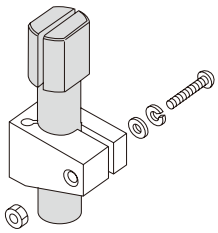


Model	L (mm)	Tightening torque
PS-58	7 mm or more	0.15 N·m (approx. 0.15 MPa) or less
PS-48	5 mm or more	0.15 N·m (approx. 0.15 MPa) or less

- The cable for the **PS-201**, **PS-202**, **PS-205**, and **PS-206** cannot be bent within 20 mm of the base of the sensor head. The minimum allowable bend radius is 25 mm.
- To mount the bracket for the **PS-05**, use M3 x 10 screws and spring washers from the supplied screw set as shown in the drawing below, and apply a maximum tightening torque of 0.5 N·m (approx. 0.49 MPa). When using screws other than those supplied, use M3 oval head machine screws (JIS B1111).



- To mount the **PS-05** sensor head, use an M3 x 14 screw (with washers) and a nut from the supplied screw set as shown in the drawing on the right, and employ a maximum tightening torque of 0.5 N·m (approx. 0.49 MPa). Always adjust the optical axis after loosening this screw.



- Use the tightening torque indicated below when mounting a sensor head with built-in mounting holes.

Model	Tightening torque	Mounting screw dimensions
PS-45	0.6 N·m (approx. 0.59 MPa) or less	M3
PS-46	0.3 N·m (approx. 0.29 MPa) or less	M2
PS-47	0.6 N·m (approx. 0.59 MPa) or less	M3
PS-49	0.6 N·m (approx. 0.59 MPa) or less	M3
PS-52	0.15 N·m (approx. 0.15 MPa) or less	M2
PS-55	0.6 N·m (approx. 0.59 MPa) or less	M3
PS-56	0.3 N·m (approx. 0.29 MPa) or less	M2
PS-205	0.5 N·m (approx. 0.49 MPa) or less	M4
PS-206	0.5 N·m (approx. 0.49 MPa) or less	M4

Connection

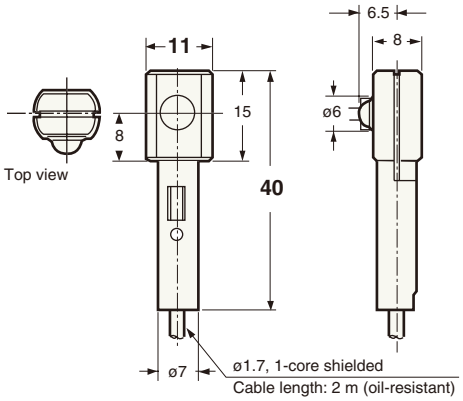
- When extending the amplifier cable, use a cable that has a nominal cross-sectional area of 0.3 mm^2 or greater and is 100 m or shorter.
- The stripped length must be 20 mm or shorter at the end of the sensor cable, and core wires must be kept as short as possible. Do not use a relay terminal.
- When extending the sensor cable, use a single-core shielded cable of 10 m or shorter.

Dimensions

Unit: mm

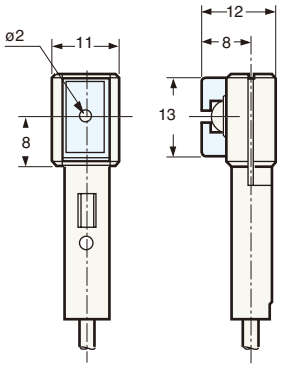
Sensor heads

PS-05

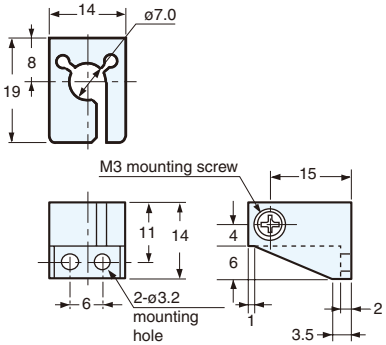


(For sensor head)
M3 x 14 screw: 1
Spring washer, Nut: 1 each
(For bracket)
M3 x 10: 2
Spring washer: 2 each

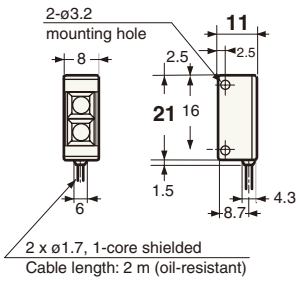
Slit plate for **PS-05**
OP-93672



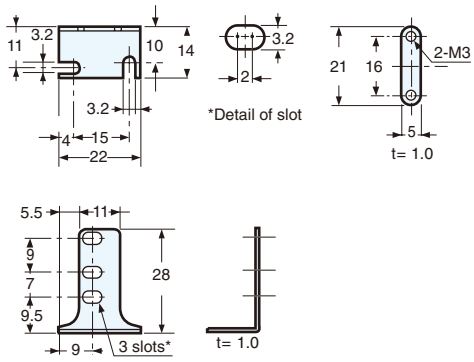
Bracket
(accessory for **PS-05**)



PS-45

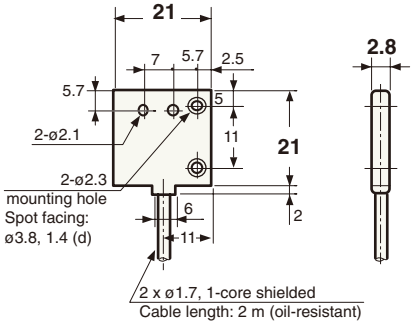


Mounting bracket
(accessory for **PS-45**)



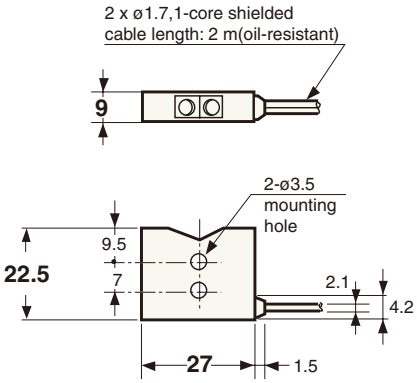
M3 x 12 screw: 2

PS-46

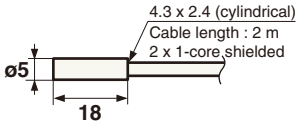


M2 x 10 screw : 2
Nut, spring washer,
flat washer : 2 each

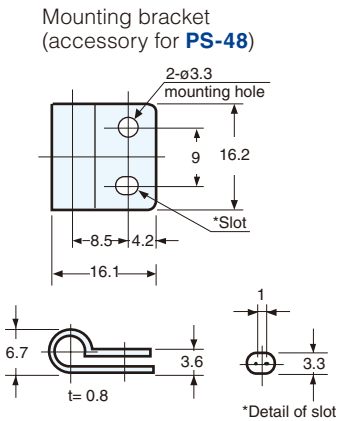
PS-47(C)



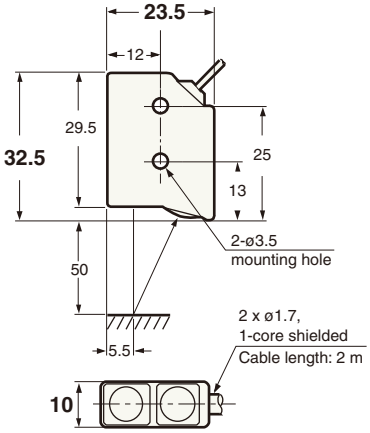
PS-48



Mounting bracket
(accessory for **PS-48**)

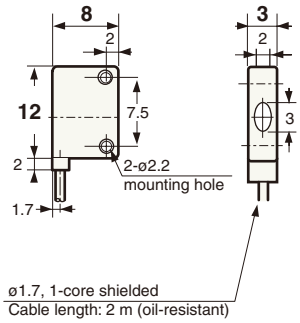


PS-49(C)



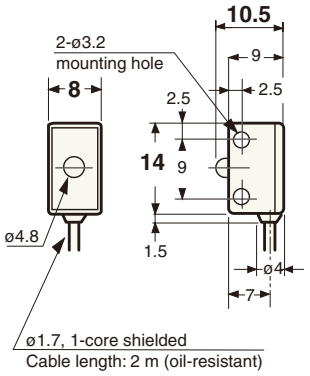
PS-N10 Amplifier Separate Type Photoelectric Sensor

PS-52 (C)

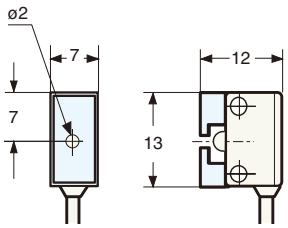


M2 x 10 screw : 4
Nut, spring washer, flat washer: 4 each

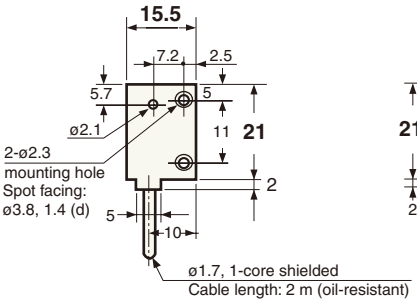
PS-55(C)



Slit plate for PS-55(C) OP-2555

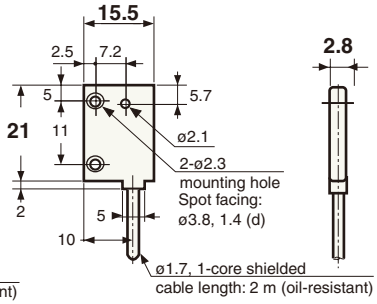


PS-56 (Receiver)

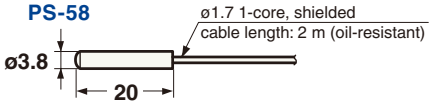


M2 x 10 screw : 4
Nut, spring washer, flat washer: 4 each

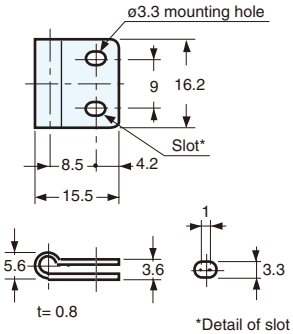
PS-56 (Transmitter)



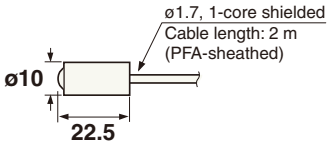
PS-58



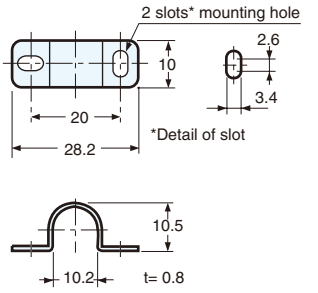
Mounting bracket (accessory for PS-58) (OP-6350)



PS-201(C), PS-202

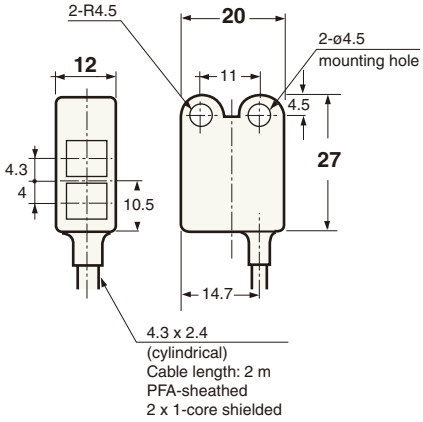


Mounting bracket (accessory for PS-201(C), PS-202) (OP-7080)

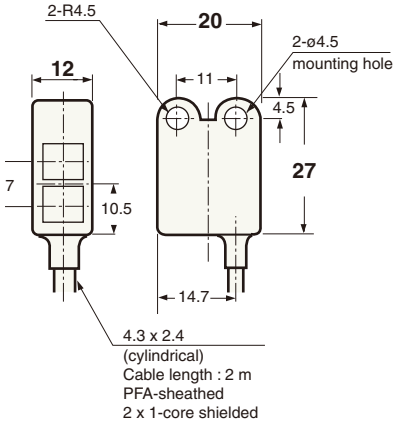


Material: Stainless steel

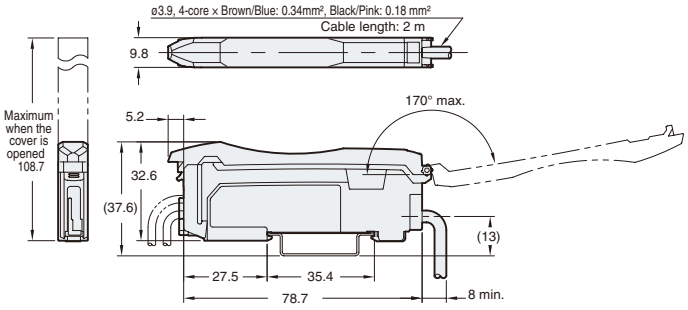
PS-205



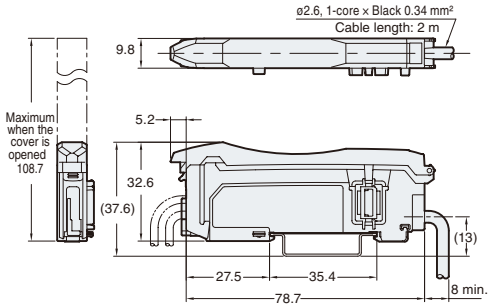
PS-206



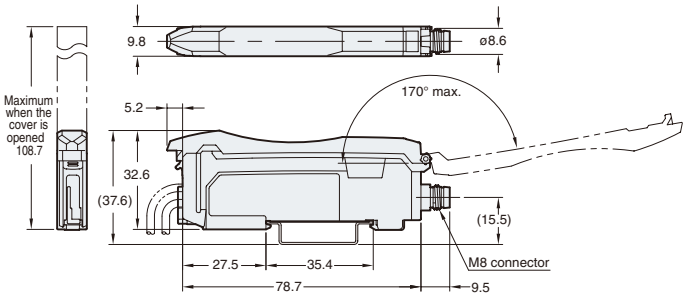
PS-N11N/N11P Cable type, Main unit



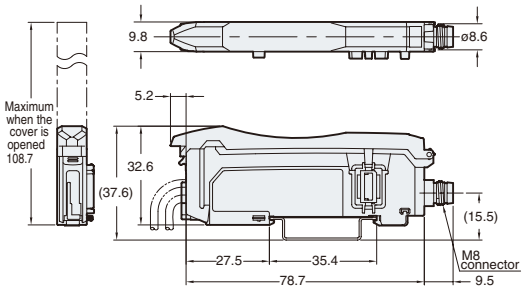
PS-N12N/N12P Cable type, Expansion unit



PS-N11CN/N11CP M8 connector type, Main unit

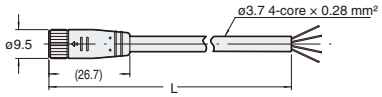


PS-N12CN/N12CP M8 connector type, Expansion unit

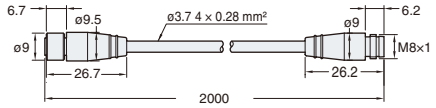


M8 connector cable (**OP-73864/73865** sold separately)

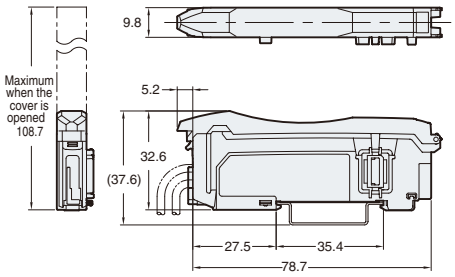
Cable length	L (m)
OP-73864	2
OP-73865	10



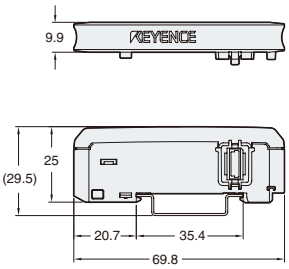
M8 connector junction cable (**OP-85498** sold separately)



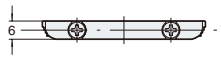
PS-N10 Zero line type, Expansion unit



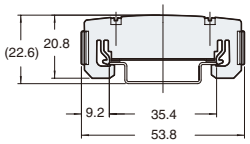
OP-87199 Conversion adaptor



End unit (**OP-26751** sold separately)



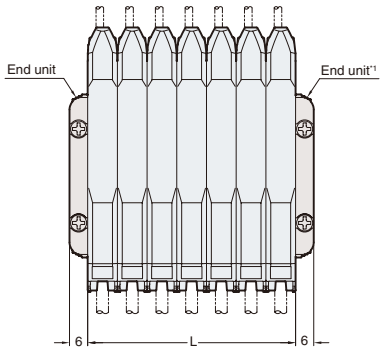
DIN-rail mounting



Material: Polycarbonate

Common for all types

When several units are connected:

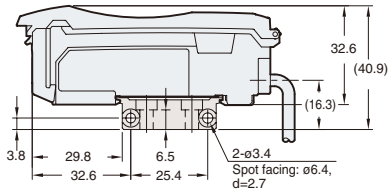


No. of units	L(mm)
1	9.8
2	19.6
3	29.4
4	39.2
5	49.0
6	58.8
7	68.6
8	78.4
9	88.2
10	98.0
11	107.8
12	117.6
13	127.4
14	137.2
15	147.0
16	156.8
17	166.6

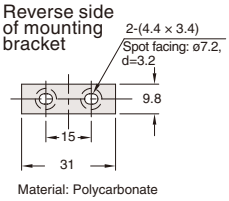
*1 End units must be used when several units are connected.(**OP-26751**)

When the mounting bracket is attached (**OP-73880** sold separately)

Cable type



Reverse side of mounting bracket



Material: Polycarbonate

M8 connector type