

Ultra-small Separate Amplifier Photoelectric Sensors

PS-N Series



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The PS-N Series is part of the NEO family of sensors

The NEO family contains many common features, including those listed below.

PS-NEO FUNCTION

- NEO Preset
- NEO MEGA
- Built-in application modes
- DATUM function
- Open field network compatibility
- Reduced wiring
- Interference prevention function
- Pause function
- Sleep function

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, or the limited range reflective models that are able to avoid the effects of background light.

Small size heads with high power

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

"MEGA" mode is very effective in environments where water, oil, or dirt may become attached to the sensor.



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

PHOTOELECTRIC SENSORS

PR
PZ
PQ
PW
PX
PS
LR
GV
LV
LR
CZ
PG
MU

Thru-beam type

Type	Appearance	Detecting distance (mm inch)*1	Features	Model (C means with connector)
Thru-beam type		MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	Compact body and long-detecting distance	PS-55 (PS-55C)
		MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	Compact body and long-detecting distance easy optical-axis alignment	PS-05
		MEGA : 1000 39.37" ULTRA : 900 35.43" SUPER : 750 29.53" TURBO : 700 27.56"	Cylindrical, embedded type	PS-58
		MEGA : 1200 (1500) 47.24" (59.06") ULTRA : 800 (1000) 31.50" (39.37") SUPER : 400 (650) 15.75" (25.59") TURBO : 300 (600) 11.81" (23.62")	Side-to-side type, 3 mm 0.12" thickness	PS-52 (PS-52C)
		MEGA : 750 (900) 29.53" (35.43") ULTRA : 500 (600) 19.69" (23.62") SUPER : 400 (450) 15.75" (17.72") TURBO : 300 (400) 11.81" (15.75")	Flat type 2.8 mm 0.11" thickness	PS-56
		MEGA : 3600 (6000) 141.73" (236.22") ULTRA : 2800 (5000) 110.24" (196.85") SUPER : 2200 (4200) 86.61" (165.35") TURBO : 2000 (4000) 78.74" (157.48")	PFA-sheath type, oil-proof, chemical proof	PS-201 (PS-201C)
		MEGA : 900 (1000) 35.43" (39.37") ULTRA : 700 (900) 27.56" (35.43") SUPER : 600 (800) 23.62" (31.50") TURBO : 500 (750) 19.69" (29.53")	PFA-sheath type, Slit ² built-in	PS-202

*1 Depending on the mode, the response time may be different even at the same detecting distance. The detecting distance in parentheses is the value when enabling the long distance detection mode and using a 5 m sensor head cable.

*2 5×1 mm 0.2"×0.04" slits for both transmitter/receiver.

Reflective model

Type	Appearance	Detecting distance (mm inch)*1	Features	Model (C means with connector)
Diffuse-reflective		MEGA : 600 (900) 23.62" (35.43") ULTRA : 400 (600) 15.75" (23.62") SUPER : 250 (450) 9.84" (17.72") TURBO : 200 (400) 7.87" (15.75")	Compact body and long-detecting distance	PS-45
		MEGA : 200 (250) 7.87" (9.84") ULTRA : 150 (200) 5.91" (7.87") SUPER : 120 (160) 4.72" (6.30") TURBO : 100 (140) 3.94" (5.51")	Flat type 2.8 mm 0.11" thickness	PS-46
		MEGA : 75 2.95" ULTRA : 45 1.77" SUPER : 30 1.18" TURBO : 25 0.98"	Cylindrical, embedded type	PS-48
		MEGA : 600 (900) 23.62" (35.43") ULTRA : 400 (600) 15.75" (23.62") SUPER : 250 (450) 9.84" (17.72") TURBO : 200 (400) 7.87" (15.75")	PFA-sheath type, oil-proof, chemical proof	PS-205
		MEGA : 250 9.84" ULTRA : 180 7.09" SUPER : 100 3.94" TURBO : 70 2.76"	PFA-sheath type, Focused beam small spot	PS-206
		10±4 0.39"±0.16" * Common for all power modes	Small Spot ø0.8 mm ø0.03" nearly unaffected by target background	PS-47 (PS-47C)
Definite-reflective		32 to 53 1.26" to 2.09" * Common for all power modes	Long distance small spot nearly unaffected by target background	PS-49 (PS-49C)

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



Amplifier

Cable type

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

M8 connector type

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

^{*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 inch)	MEGA	3600 (6000) 141.73" (236.22")	3600 (6000) 141.73" (236.22")	1000 39.37"	1200 (1500) 47.24" (59.06")	750 (900) 29.53" (35.43")	3600 (6000) 141.73" (236.22")	900 (1000) 35.43" (39.37")
	ULTRA	2800 (5000) 110.24" (196.85")	2800 (5000) 110.24" (196.85")	900 35.45"	800 (1000) 31.50" (39.37")	500 (600) 19.69" (23.62")	2800 (5000) 110.24" (196.85")	700 (900) 27.56" (35.43")
	SUPER	2200 (4200) 86.61" (165.35")	2200 (4200) 86.61" (165.35")	750 29.53"	400 (650) 15.75" (25.59")	400 (450) 15.75" (17.72")	2200 (4200) 86.61" (165.35")	600 (800) 23.62" (31.50")
	TURBO	2000 (4000) 78.74" (157.48")	2000 (4000) 78.74" (157.48")	700 27.56"	300 (600) 11.81" (23.62")	300 (400) 11.81" (15.75")	2000 (4000) 78.74" (157.48")	500 (750) 19.69" (29.53")
Light source		Infrared LED						
Smallest detectable object*2		ø1.0 mm ø0.04" Opaque	ø1.0 mm ø0.04" Opaque	ø0.5 mm ø0.02" Opaque	ø0.3 mm ø0.01" Opaque	ø0.3 mm ø0.01" Opaque	ø0.8 mm ø0.03" Opaque	ø0.5 mm ø0.02" 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 (14 to +140°F) (No freezing)/35 to 85% RH (No condensation)						

^{*1} Depending on the mode, the response time may be different even with the same detecting distance. The detecting distance in parentheses is the value when enabling the long distance detection mode and using 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/small spot
Model		PS-45	PS-46	PS-48	PS-205	PS-206	PS-47 (C)	PS-49 (C)
Detecting distance*1 (mm inch)	MEGA	600 (900) 23.62" (35.43")	200 (250) 7.87" (9.84")	75 2.95"	600 (900) 23.62" (35.43")	250 9.84"	10±4 0.39"±0.16"	32 to 53 1.26" to 2.09"
	ULTRA	400 (600) 15.75" (23.62")	150 (200) 5.91" (7.87")	45 1.77"	400 (600) 15.75" (23.62")	180 7.09"		
	SUPER	250 (450) 9.84" (17.72")	120 (160) 4.72" (6.30")	30 1.18"	250 (450) 9.84" (17.72")	100 3.94"		
	TURBO	200 (400) 7.87" (15.75")	100 (140) 3.94" (5.51")	25 0.98"	200 (400) 7.87" (15.75")	70 2.76"		
Light source		Infrared LED					Red LED	
Detectable object		Transparent and opaque						
Smallest detectable object*2		—	—	—	—	—	ø0.03 mm ø0.001" Copper wire	ø0.1 mm ø0.004" Copper wire
Spot diameter		—	—	—	—	ø6 mm ø0.24" At detecting distance of 70 mm 2.76"	ø0.8 mm ø0.03" At detecting distance of 10 mm 0.39"	ø1.5 mm ø0.06" At detecting distance of 50 mm 1.97"
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 (14 to + 140°F) (No freezing)						
	Relative humidity	35 to 85% RH (No condensation)						

^{*1} Depending on the mode, the response time may be different even with the same detecting distance. The detecting distance in parentheses is the 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

Type	Cable		M8 connector		Zero line	
Main/Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	Expansion unit	
Model	NPN	PS-N11N	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					
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 (28 mA max. at 24 V, 34 mA max. at 12 V) Eco on mode: 700 mW or less (24 mA max. at 24 V, 27 mA max. at 12 V) Eco Full mode: 490 mW or less (17 mA max. at 24 V, 20 mA max. at 12 V)				
	PNP	Normal: 860 mW or less (30 mA max. at 24 V, 35 mA max. at 12 V) Eco on mode (ALL): 750 mW or less (26 mA max. at 24 V, 28 mA max. at 12 V) Eco Full mode: 540 mW or less (19 mA max. at 24 V, 21 mA max. at 12 V)				
Environmental resistance	Ambient temperature	-20°C to +55°C (-4°F to +131°F) (No freezing)*3				
	Relative humidity	35 to 85% RH, (No condensation)				
	Vibration resistance	10 to 55 Hz, double amplitude: 1.5 mm 0.06", 2 hours each in the X, Y and Z axis				
	Shock resistance	500 m/s ² 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 1.28"× W 9.8 mm 0.39" × L 78.7 mm 3.1"					
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.

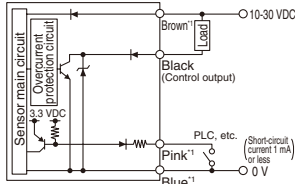
*3 If more than one unit is used together, the ambient temperature in which the sensor should be used varies with the following conditions.

One or two additional units connected: -20°C to +55°C (-4°F to +131°F); 3 to 10 additional units connected: -20°C to +50°C (-4°F to +122°F); 11 to 16 additional units connected: -20°C to +45°C (-4°F to +113°F). These values are valid when the amplifiers are mounted to a DIN rail and the output current is 20mA or less per amplifier.

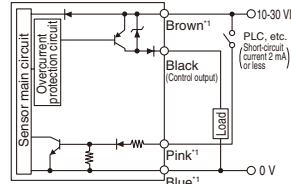
I/O Circuit Diagram

Cable type

PS-N11N/N12N

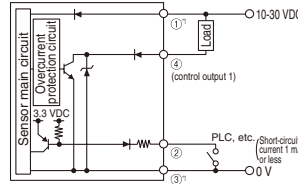
*1 **PS-N11N** only

PS-N11P/N12P

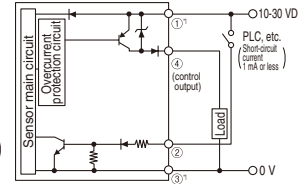
*1 **PS-N11P** only

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 27.56") (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 65.6')
OP-42114	PS-55, 05, 52, 56, 58	Thrubeam receiver side cable (20 m 65.6')
OP-42115	PS-45, 46, 47, 49	Reflective (except PS-48) cable (20 m 65.6')
OP-42116	PS-201, 202	PFA thrubeam transmitter side cable (20 m 65.6')
OP-42117	PS-201, 202	PFA thrubeam receiver side cable (20 m 65.6')
OP-42118	PS-205, 206	PFA Reflective cable (20 m 65.6')

New Products

Fiberoptic Sensors

Photoelectric Sensors

Proximity Sensors

Safety Equipment

Flow/Pressure/Temperature

Measurement Sensors

Controls

Static Eliminators

Vision Systems

Marking Equipment

Code Readers

Handheld Mobile Computers

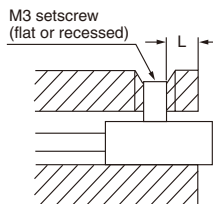
Microscopes

Projector/3D Measurement Systems



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 <i>inch</i>)	Tightening torque
PS-58	7 mm 0.28" or more	0.15 N·m (approx. 21 PSI) or less
PS-48	5 mm 0.20" or more	0.15 N·m (approx. 21 PSI) or less

- The cable for the **PS-201**, **PS-202**, **PS-205**, and **PS-206** cannot be bent within 20 mm **0.79"** of the base of the sensor head. The minimum allowable bend radius is 25 mm **0.98"**.
- 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. 71 PSI). When using screws other than those supplied, use M3 oval head machine screws (JIS B1111).

Connection

- When extending the amplifier cable, use a cable that has a nominal cross-sectional area of 0.3 mm² or greater and is 100 m [328.1'](#) or shorter.
- The stripped length must be 20 mm [0.79"](#) 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 head cable, use a single-core shielded cable of 10 m [32.8'](#) or shorter.

New Products

Fiberoptic Sensors

Photoelectric Sensors

Proximity Sensors

Safety Equipment

Flow/
Pressure/
Temperature

Measurement Sensors

Controls

Static Eliminators

Vision Systems

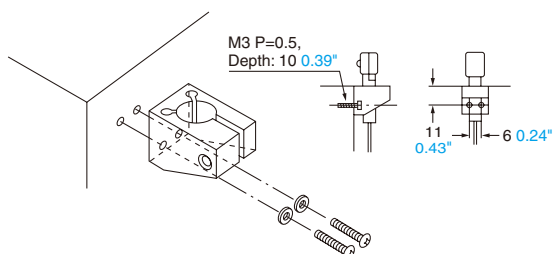
Marking Equipment

Code Readers

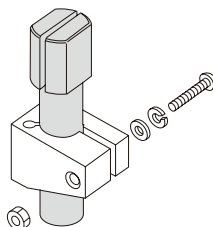
Handheld Mobile Computers

Microscopes

Projector/ 3D Measurement Systems



- 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. 71 PSI). Always adjust the optical axis after loosening this screw.



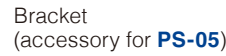
- Use the tightening torques indicated below when mounting a sensor head with built-in mounting holes.

Model	Tightening torque	Mounting screw dimensions
PS-45	0.6 N·m (approx. 85 PSI) or less	M3
PS-46	0.3 N·m (approx. 43 PSI) or less	M2
PS-47	0.6 N·m (approx. 85 PSI) or less	M3
PS-49	0.6 N·m (approx. 85 PSI) or less	M3
PS-52	0.15 N·m (approx. 21 PSI) or less	M2
PS-55	0.6 N·m (approx. 85 PSI) or less	M3
PS-56	0.3 N·m (approx. 43 PSI) or less	M2
PS-205	0.5 N·m (approx. 71 PSI) or less	M4
PS-206	0.5 N·m (approx. 71 PSI) or less	M4



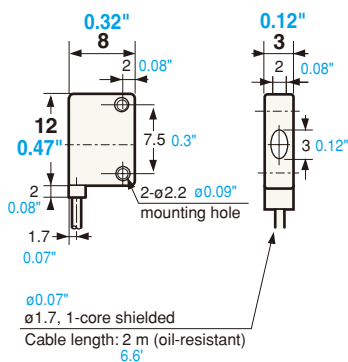
PHOTOELECTRIC SENSORS

PS-05

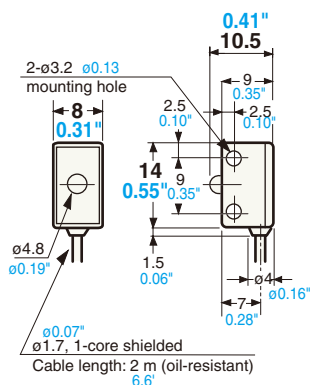


PS-N Ultra-small Separate Amplifier Photoelectric Sensors

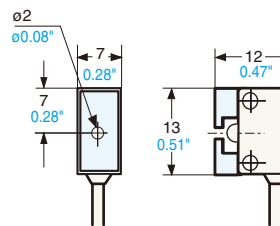
PS-52 (C)



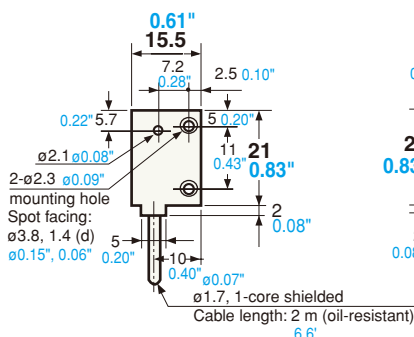
PS-55(C)



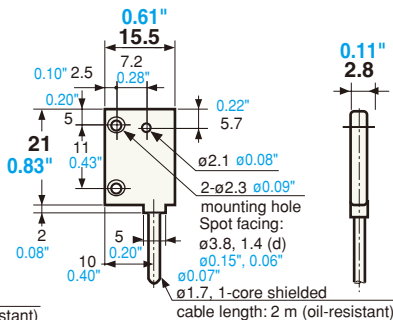
PS-55(C) with slit plate attached OP-2555



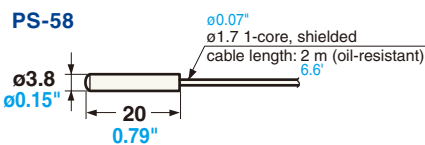
PS-56 (Receiver)



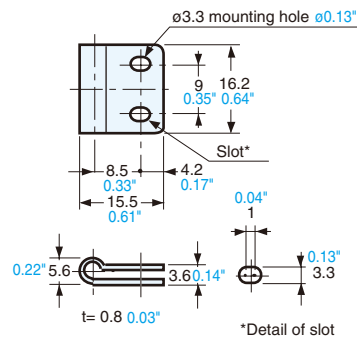
PS-56 (Transmitter)



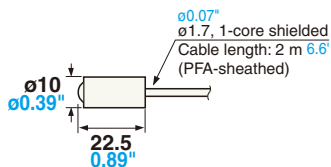
PS-58



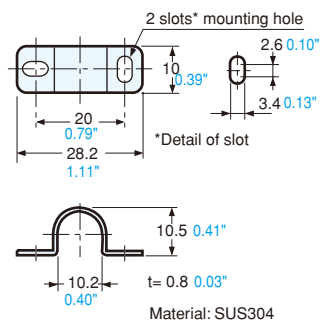
Mounting bracket (accessory for PS-58) (OP-6350)



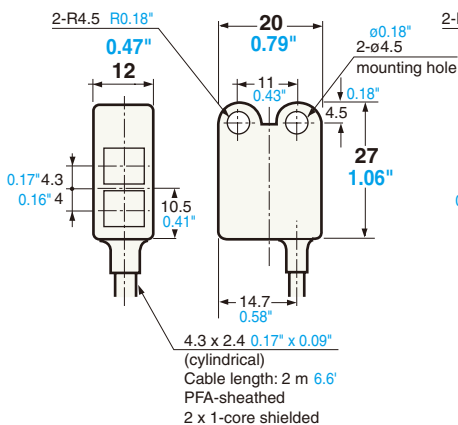
PS-201(C), PS-202



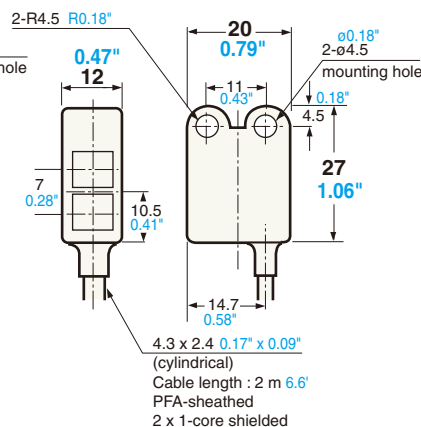
Mounting bracket (accessory for PS-201(C), PS-202) (OP-7080)

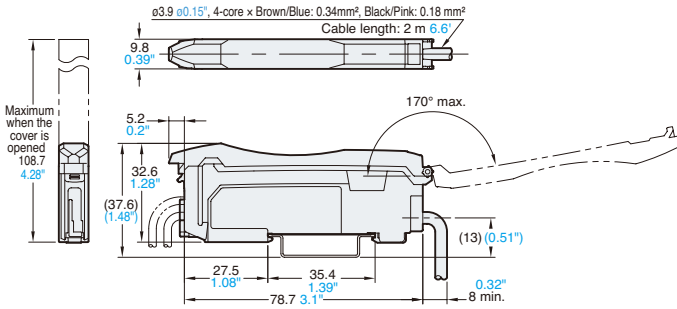
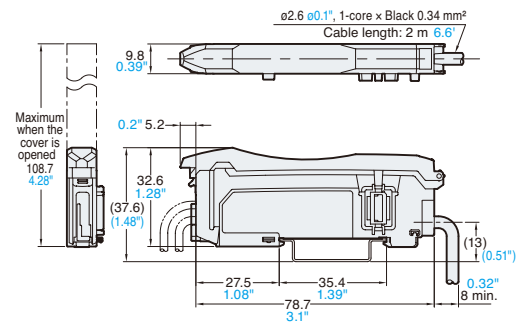
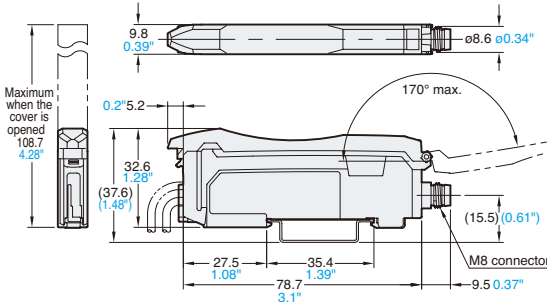
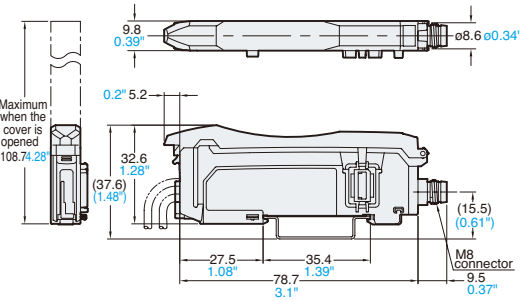


PS-205

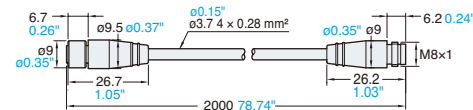
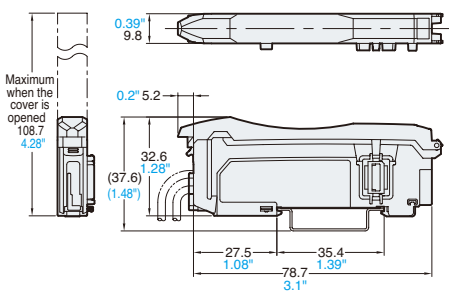
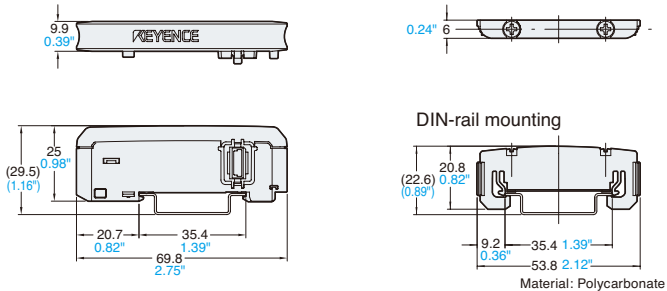


PS-206



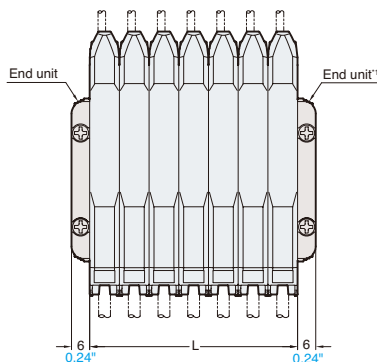
PS-N11N/N11P Cable type, Main unit

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 feet)
OP-73864	2 6.6'
OP-73865	10 32.8'

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)


Common for all types

When several units are connected:

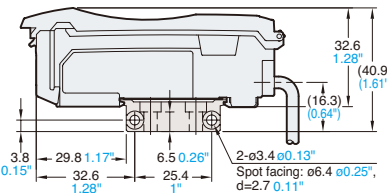


No. of units	L (mm inch)
1	9.8 0.39"
2	19.6 0.77"
3	29.4 1.16"
4	39.2 1.54"
5	49.0 1.93"
6	58.8 2.32"
7	68.6 2.7"
8	78.4 3.09"
9	88.2 3.47"
10	98.0 3.86"
11	107.8 4.24"
12	117.6 4.63"
13	127.4 5.02"
14	137.2 5.4"
15	147.0 5.79"
16	156.8 6.17"
17	166.6 6.56"

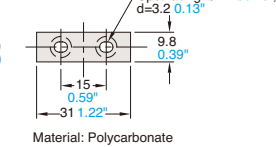
*1 End units must be used when several units are connected. (**OP-26751**)

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

Cable type



Reverse side of mounting bracket



M8 connector type

