Automation for a Changing World

Delta Smart Sensors

Δ NELTA

Smarter. Greener. Together.

Sensing for Smart Manufacturing

Delta's smart sensors feature a slim design with different exteriors and can be applied to a wide range of applications, such as food and beverages, packaging, pharmaceuticals, electronic component equipment, rubber and plastics, warehouses, machine tool industries, and other industrial automation production lines. All types of sensors have stable quality and superior performance, to provide a best solution for smart manufacturing.

Inductive Proximity Sensor M12 / M18 Series

► **Nickel coated brass**

► **Standard sensors for detecting ferrous metals**

► **IP67**

► **CE certification**

► **Electrical circuit protection**
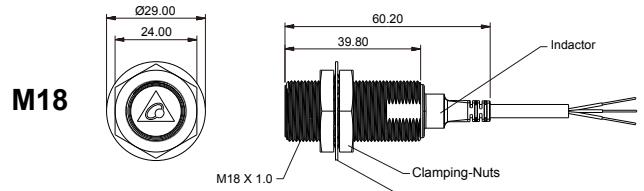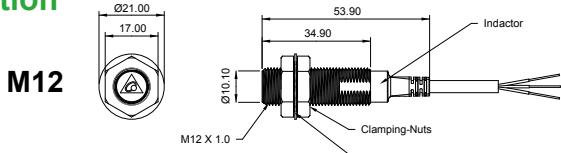
Appearance	Sensing Distance	NPN		PNP	
		NO	NC	NO	NC
M12 Isolation	2 mm	IS-E1202-BNOB2	IS-E1202-BNCB2	IS-E1202-BPOB2	IS-E1202-BPCB2
	4 mm	IS-E1204-BNOB2	IS-E1204-BNCB2	IS-E1204-BPOB2	IS-E1204-BPCB2
M12 Non-isolation	4 mm	IS-N1204-BNOB2	IS-N1204-BNCB2	IS-N1204-BPOB2	IS-N1204-BPCB2
	8 mm	IS-N1208-BNOB2	IS-N1208-BNCB2	IS-N1208-BPOB2	IS-N1208-BPCB2
M18 Isolation	5 mm	IS-E1805-BNOB2	IS-E1805-BNCB2	IS-E1805-BPOB2	IS-E1805-BPCB2
	8 mm	IS-E1808-BNOB2	IS-E1808-BNCB2	IS-E1808-BPOB2	IS-E1808-BPCB2
M18 Non-isolation	8 mm	IS-N1808-BNOB2	IS-N1808-BNCB2	IS-N1808-BPOB2	IS-N1808-BPCB2
	12 mm	IS-N1812-BNOB2	IS-N1812-BNCB2	IS-N1812-BPOB2	IS-N1812-BPCB2
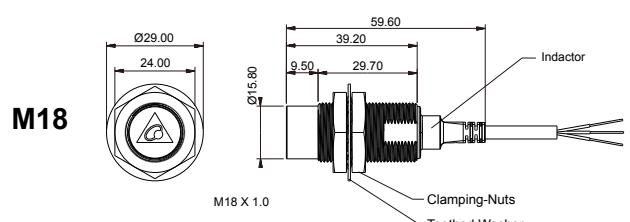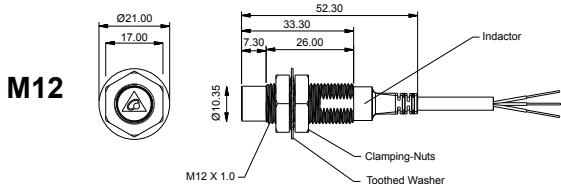
Dimensions Unit：mm

• **Isolation**

M12

Ø21.00
17.00
Ø10.10
53.90
34.90
Indactor
M12 X 1.0
Clamping-Nuts
Toothed Washer

M18

Ø29.00
24.00
60.20
39.80
Indactor
M18 X 1.0
Clamping-Nuts
Toothed Washer

• **Non-Isolation**

M12

Ø21.00
17.00
Ø10.35
52.30
33.30
7.30
26.00
Indactor
M12 X 1.0
Clamping-Nuts
Toothed Washer

M18

Ø29.00
24.00
Ø15.80
59.60
39.20
9.50
29.70
Indactor
M18 X 1.0
Clamping-Nuts
Toothed Washer

Specifications

Inductive Proximity Sensor	M12				M18			
Type	Isolation		Non-Isolation		Isolation		Non-Isolation	
Model	IS-E1202	IS-E1204	IS-N1204	IS-N1208	IS-E1805	IS-E1808	IS-N1808	IS-N1812
Sensing Distance	2 mm ± 10%	4 mm ± 10%	4 mm ± 10%	8 mm ± 10%	5 mm ± 10%	8 mm ± 10%	8 mm ± 10%	12 mm ± 10%
Standard Target	Iron, 12 × 12 × 1 mm		Iron, 24 × 24 × 1 mm		Iron, 18 × 18 × 1 mm	Iron, 24 × 24 × 1 mm		Iron, 36 × 36 × 1 mm
Response Frequency	1.0 kHz	1.0 kHz	1.0 kHz	1.0 kHz	1.0 kHz	1.0 kHz	1.0 kHz	1.0 kHz
Weight	65 g				85 g			
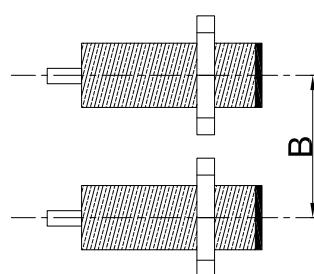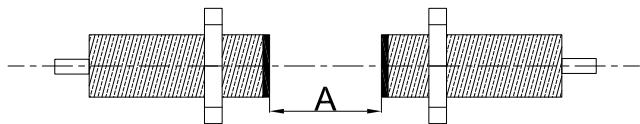
Inductive Proximity Sensor	M12 / M18 Common Specifications			
Voltage Range	12 ~ 24 V_{DC} ± 10%			
Different Travel	10% max. of sensing distance	Detectable Object		Ferrous metal (the sensing distance decreases with no-ferrous metal)
Current Consumption	15 mA max.	Vibration Resistance		10 ~ 55 Hz, 1.5mm, 3 axes for 2 hours
Control Output — Load Current	200 mA max.	Shock Resistance		Max. 1000 m/s², 3 axes, 6 directions and 3 times in each
Control Output — Residual Voltage	2 V max. (load current: 200 mA, cable length: 2m)	Insulating Resistance		50 MΩ or more (500VDC) between current-carrying parts and case
Indicators	Operation indicator (red)	Withstand Voltage		1,000 V_{AC} 50 / 60 Hz 1 min
Operation Mode	NPN: NO / NC; PNP: NO / NC	Cables		3 Wires 2m PVC cable M12 connector with 200mm cable
Protection Circuits	Protection against reverse power connection, output overcurrent, power supply surge, output surge	Materails	Case	Nickel coated brass
Ambient Temperature	Operating: -25 ~ 70 ℃ / Storage: -40 ~ 80 ℃ (with no icing or condensation)		Sensing Surface	PBT
Ambient Humidity	≦ 50% RH (at 70 ℃)		Clamping Nuts	Nickel coated brass
Temperature Influence	±10% max. of sensing distance at + 23℃ in the temperature range of -25 ~ +70℃		Toothed Washer	Zinc-plated iron
Enclosure Rating	IP67	Certifications		CE

Mutual Interference

	Isolation	Non-Isolation
A	≧ 3d	≧ 5d
B	≧ 3d	≧ 5d

▶ When installing sensors face to face or in parallel, be sure to maintain the minimum distances in the following table to avoid mutual interference.

d: Outside DIM.   Sn: Sensing distance   Units: mm

Photoelectric Sensor PS-R Series

► **Different range adjustment (Trimmer or TEACH)**

► **M3 mounting hole, easy to assemble**

► **IP67**

► **CE certification**

► **Electrical circuit protection**
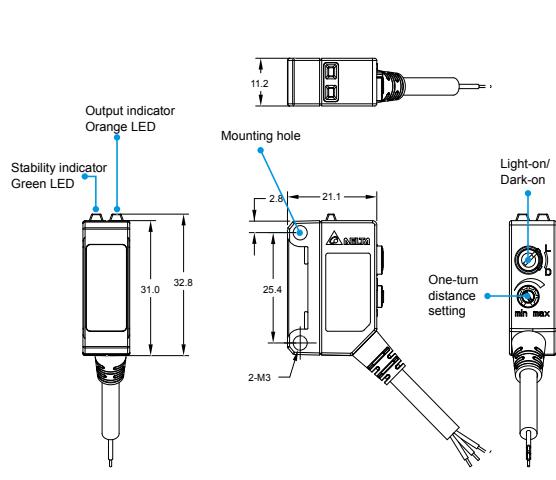
Appearance	Sensing Method	Sensing Distance	NPN	PNP / Push-pull	Connection
Rectangular Type (Trimmer)	Small Spot Reflective	5 ~ 100 mm	PS-RS1-NS12	PS-RS1-PS12	2 m cable (3 wires)
	Diffuse Reflective	5 ~ 300 mm	PS-RR3-NS12	PS-RR3-PS12	2 m cable (3 wires)
		1 m	PS-RR9-NS12	PS-RR9-PS12	
	Retro-reflective	4.2 m	PS-RL4-NS12	PS-RL4-PS12	2 m cable (3 wires)
	Through-beam	12 m	PS-RT9-NS12	PS-RT9-PS12	2 m cable (3 wires)
Rectangular Type (TEACH)	Small Spot Reflective	5 ~ 100 mm	PS-RS1-NS22	PS-RS1-US22	2 m cable (4 wires)
			PS-RS1-NS2B	PS-RS1-US2B	M8 connector
	Diffuse Reflective	5 ~ 300 mm	PS-RR3-NS22	PS-RR3-US22	2 m cable (4 wires)
			PS-RR3-NS2B	PS-RR3-US2B	M8 connector
		5 ~ 1,000 mm	PS-RR9-NS22	PS-RR9-US22	2 m cable (4 wires)
			PS-RR9-NS2B	PS-RR9-US2B	M8 connector
	Retro-reflective	4.2 m	PS-RL4-NS22	PS-RL4-US22	2 m cable (4 wires)
			PS-RL4-NS2B	PS-RL4-US2B	M8 connector
	Through-beam	10 m (Fixed)	PS-RT5-NSB2	PS-RT5-USB2	2 m cable (4 wires)
			PS-RT5-NSBB	PS-RT5-USBB	M8 connector

Dimensions   Unit：mm

• **Trimmer**

Output indicator Orange LED
Stability indicator Green LED
Mounting hole
11.2
21.1
2.8
31.0
32.8
25.4
2-M3
Light-on/Dark-on
One-turn distance setting
min max

• **TEACH**

Cable Type

TEACH Button
17.00
3.00
41.50
31.10
28.20
2.80
1.00
1.80

Connector Type

TEACH Button
11.00
17.00
3.00
31.10
28.20
2.80
1.00
1.80
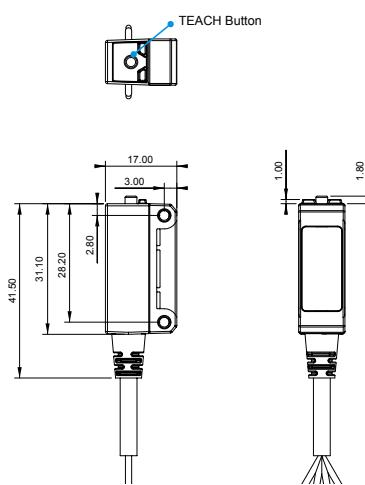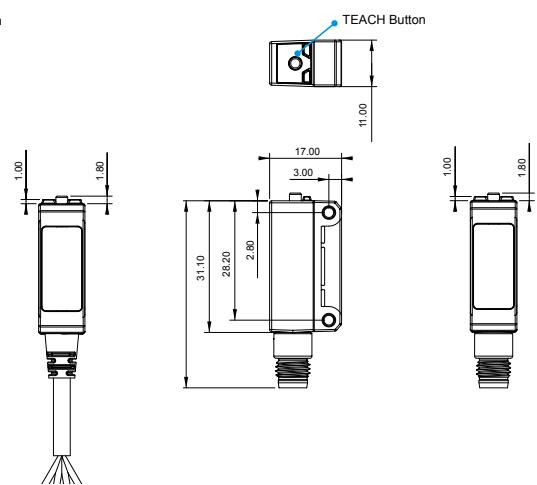
Photoelectric Sensor PS-F / PS-L Series

► **Slim and small, easy to assemble**

► **IP67**

► **CE certification**

► **Electrical circuit protection**
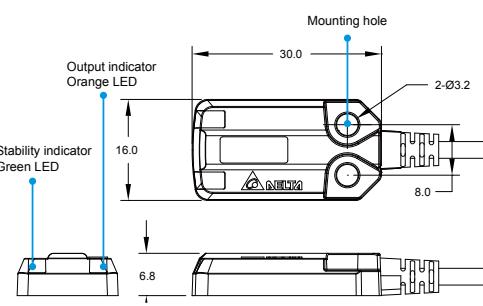
Appearance	Sensing Method	Sensing Distance (Fixed)	NPN		PNP		Connection
			Light-on	Dark-on	Light-on	Dark-on	
Flat Type	Diffuse Reflective	5~50 mm	PS-FR2-NLB2	PS-FR2-NDB2	PS-FR2-PLB2	PS-FR2-PDB2	2 m cable (3 wires)
	Diffuse Reflective BGS	5~30 mm	PS-FB1-NLB2	PS-FB1-NDB2	PS-FB1-PLB2	PS-FB1-PDB2	2 m cable (3 wires)
	Retro-reflective	1 m	PS-FL3-NLB2	PS-FL3-NDB2	PS-FL3-PLB2	PS-FL3-PDB2	2 m cable (3 wires)
	Through-beam	1 m	PS-FT3-NLB2	PS-FT3-NDB2	PS-FT3-PLB2	PS-FT3-PDB2	2 m cable (3 wires)

Appearance	Sensing Method	Sensing Distance (Fixed)	NPN		Push-pull		Connection
			Light-on	Dark-on	Light-on	Dark-on	
Lateral Type	Diffuse Reflective	5~50 mm	PS-LR2-NSB2		PS-LR2-USB2		2 m cable (4 wires)*
	Retro-reflective	1 m	PS-LL3-NSB2		PS-LL3-USB2		2 m cable (4 wires)*
	Through-beam	1 m	PS-LT3-NSB2		PS-LT3-USB2		2 m cable (4 wires)*

* 4 wires: Light-on, dark-on are switched by white wire.
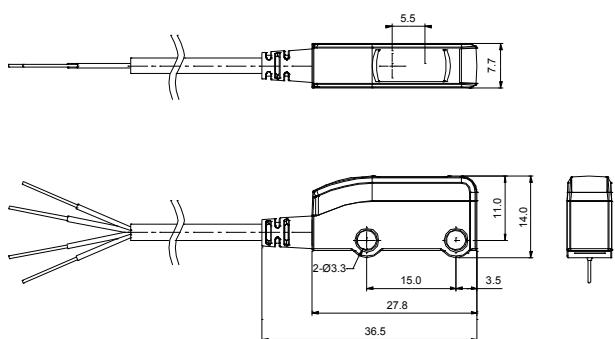
Dimensions   Unit：mm

• **Flat Type (PS-F)**

Mounting hole
Output indicator Orange LED
30.0
2-Ø3.2
Stability indicator Green LED
16.0
8.0
6.8

• **Lateral Type (PS-L)**

5.5
7.7
11.0
14.0
2-Ø3.3
15.0
3.5
27.8
36.5

Photoelectric Sensor PS-M Series

► **Standard size for mounting (M18)**

► **Setting via button**

► **IP67**

► **CE certification**

► **Electrical circuit protection**
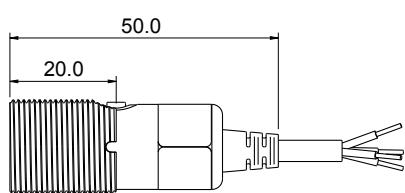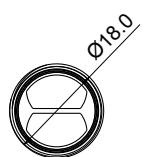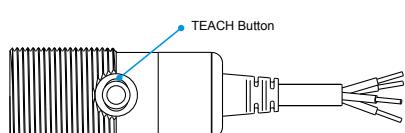
| Appearance	Sensing Method	Sensing Distance	NPN	Push-pull	Connection
Cylindrical Type (TEACH)	Diffuse Reflective	5 ~ 100 mm (Fixed)	PS-MR1-NSB2	PS-MR1-USB2	2 m cable (4 wires)*
			PS-MR1-NSBD	PS-MR1-USBD	M12 connector
		5 ~ 300 mm	PS-MR3-NS22	PS-MR3-US22	2 m cable (4 wires)*
			PS-MR3-NS2D	PS-MR3-US2D	M12 connector
		5 ~ 1,000 mm	PS-MR9-NS22	PS-MR9-US22	2 m cable (4 wires)*
			PS-MR9-NS2D	PS-MR9-US2D	M12 connector
	Retro-reflective	4.2 m	PS-ML4-NS22	PS-ML4-US22	2 m cable (4 wires)*
			PS-ML4-NS2D	PS-ML4-US2D	M12 connector
	Through-beam	5 m (Fixed)	PS-MT5-NSB2	PS-MT5-USB2	2 m cable (4 wires)*
			PS-MT5-NSBD	PS-MT5-USBD	M12 connector

* 4 wires: Light-on, dark-on are switched by white wire.
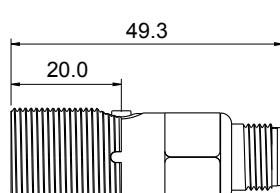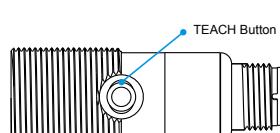
Dimensions   Unit : mm

• **Cable Type**

TEACH Button

Ø18.0

50.0

20.0

• **Connector Type**

TEACH Button

Ø18.0

49.3

20.0
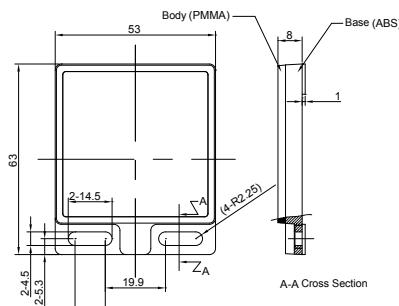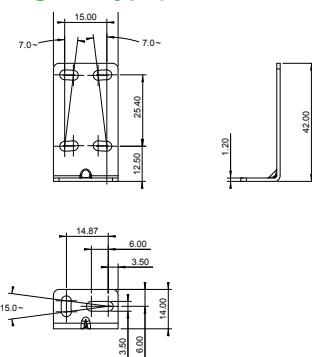
Accessories

- **Reflector**

Body (PMMA) — Base (ABS)

53
8
1
63
2-14.5
(4-R2.25)
A
Z A
2-4.5
2-5.3
19.9
2-10
A-A Cross Section
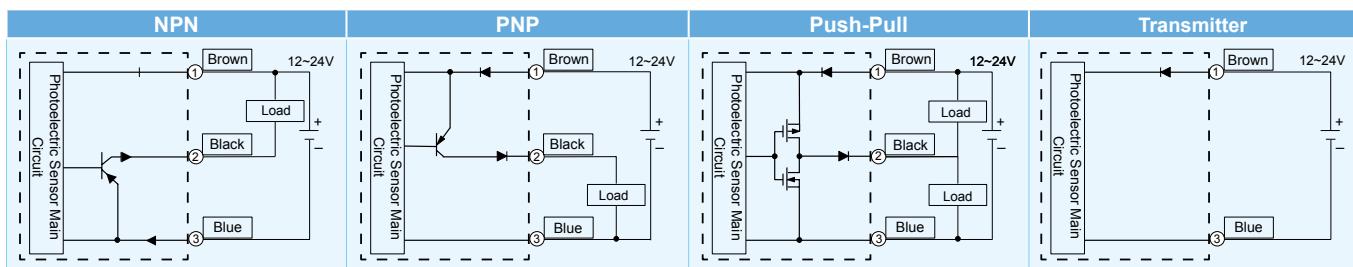
- **Bracket (Rectangular type)**

15.00
7.0~
7.0~
25.40
12.50
1.20
42.00
14.87
6.00
3.50
15.0~
14.00
3.50
6.00
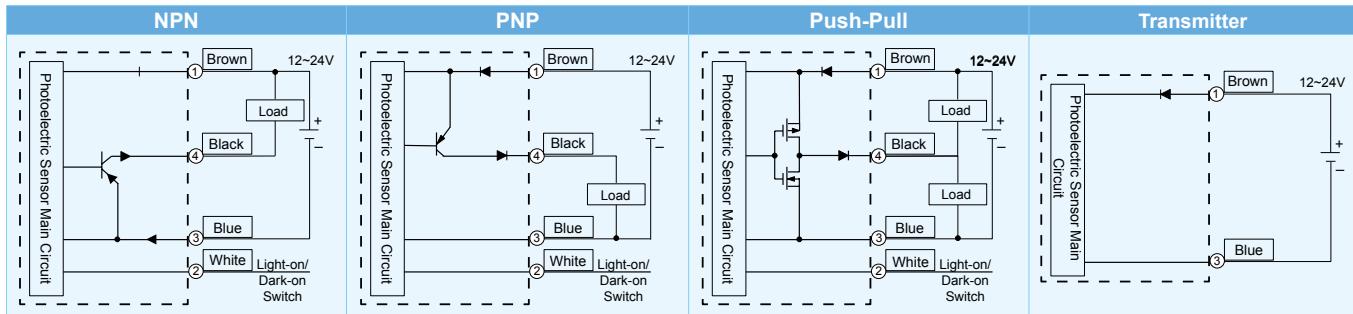
Input / Output Circuits

- **3 Wires**

NPN	PNP	Push-Pull	Transmitter
Photoelectric Sensor Main Circuit — Brown ① 12~24V — Black ② — Blue ③ — Load + −	Photoelectric Sensor Main Circuit — Brown ① 12~24V — Black ② — Blue ③ — Load + −	Photoelectric Sensor Main Circuit — Brown ① **12~24V** — Black ② — Blue ③ — Load Load + −	Photoelectric Sensor Main Circuit — Brown ① 12~24V — Blue ③ — + −

- **4 Wires**

NPN	PNP	Push-Pull	Transmitter
Photoelectric Sensor Main Circuit — Brown ① 12~24V — Load — Black ④ — Blue ③ — White ② Light-on/Dark-on Switch + −	Photoelectric Sensor Main Circuit — Brown ① 12~24V — Black ④ — Load — Blue ③ — White ② Light-on/Dark-on Switch + −	Photoelectric Sensor Main Circuit — Brown ① **12~24V** — Load — Black ④ — Load — Blue ③ — White ② Light-on/Dark-on Switch + −	Photoelectric Sensor Main Circuit — Brown ① 12~24V — Blue ③ — + −

Common Specifications

Photoelectric Sensor	
Voltage Range	12 ~ 24 V_{DC} ± 10%
Response Time	ON → OFF: 0.5ms; OFF → ON: 0.5ms
Indicator	Output indicator (orange), stable operation indicator (green)
Protection Circuit	Protection against reverse power connection, output overcurrent, power supply surge, output surge
Operating Temperature	-25 ℃ ~ 55℃
Storage Temperature	-25 ℃ ~ 75℃
Ambient Humidity	30 ~ 85%
Enclosure Rating	IP67
Ambient Light Resistance	5,000 lux or less
Vibration Resistance	10~55 Hz, 1.5mm, 3 axes for 2 hours
Shock Resistance	Max. 1,000 m/s², 3 axes, 6 directions and 3 times in each.
Insulating Resistance	20 MΩ or more (500V_{DC})
Withstand Voltage	1,000 VAC 50 / 60 Hz 1min
Certifications	CE

ΔELTA

Photoelectric Sensor Specifications

Appearance

	Small Spot Reflective		Diffuse Reflect
Sensing Method	Small Spot Reflective		Diffuse Reflect
Model — 2 m Cable	PS-RS1-NS12	PS-RS1-PS12	PS-RR3-NS12 / PS-RR3-PS12
Sensing Distance	5 ~ 100 mm		5 ~ 300 mm
Operation Output	NPN	PNP	NPN / PNP
	Light-on / Dark-on		Light-on / Dark-on
Light Source	Red LED (630 nm)		
Power Consumption			20 mA MAX
Material			
Cables			3 Wires 2 m PVC Cable (Throug
Dimensions			
Weight			

Appearance

	Small Spot Reflective		Diffuse Reflect
Sensing Method	Small Spot Reflective		Diffuse Reflect
Model — 2 m Cable	PS-RS1-NS22	PS-RS1-US22	PS-RR3-NS22 / PS-RR3-US22
Model — M8 Connector	PS-RS1-NS2B	PS-RS1-US2B	PS-RR3-NS2B / PS-RR3-US2B
Sensing Distance	5 ~ 100 mm		5 ~ 300 mm
Operation Output	NPN	Push-pull	NPN / Push-pull
	Light-on / Dark-on		Light-on / Dark-on
Light Source	Red LED (630 nm)		
Power Consumption			20 mA MAX
Material			
Cables			4 Wires 2 m PVC Cable
Dimensions			Cable Type: 3
Weight			

Appearance

	Diffuse Reflective				Diffuse Reflective - Background Suppress			
Sensing Method	Diffuse Reflective				Diffuse Reflective - Background Suppress			
Model — 2 m Cable	PS-FR2-NLB2	PS-FR2-NDB2	PS-FR2-PLB2	PS-FR2-PDB2	PS-FB1-NLB2	PS-FB1-NDB2	PS-FB1-PLB2	
Sensing Distance	5 ~ 50 mm				5 ~ 30 mm			
Operation Output	NPN		PNP		NPN		PNP	
	Light-on	Dark-on	Light-on	Dark-on	Light-on	Dark-on	Light-on	
Light Source								
Power Consumption	20 mA MAX				30 mA MAX			
Material								
Cables				3 Wires 2 m PVC Cable (Throug				
Dimensions								
Weight								

Appearance

	Diffuse Reflective		
Sensing Method	Diffuse Reflective		
Model — 2 m Cable (4 Wires)	PS-LR2-NSB2	PS-LR2-USB2	PS-LL
Sensing Distance	5 ~ 50 mm		
Operation Output	NPN	Push-pull	N
	Light-on / Dark-on		
Light Source			
Power Consumption			20 mA MAX
Material			
Cables			4 Wires 2 m PVC
Dimensions			
Weight			

Appearance

	Diffuse Reflective			
Sensing Method	Diffuse Reflective			
Model — 2 m Cable	PS-MR1-NSB2	PS-MR1-USB2	PS-MR3-NS22	PS-MR3-US22
Model — M12 Connector	PS-MR1-NSBD	PS-MR1-USBD	PS-MR3-NS2D	PS-MR3-US2D
Sensing Distance	5 ~ 100 mm		5 ~ 300 mm	
Operation Output	NPN	Push-pull	NPN	Push-pull
	Light-on / Dark-on		Light-on / Dark-on	
Light Source				
Power Consumption				20 mA MAX
Material				
Cables				4 Wires 2 m PVC Cable (
Dimensions				M18, Cable
Weight				

Rectangular Type (Trimmer) PS-R

		Retro-reflective		Through-beam	
PS-RR9-NS12	PS-RR9-PS12	PS-RL4-NS12	PS-RL4-PS12	PS-RT9-NS12	PS-RT9-PS12
5 ~ 1,000 mm		4.2 m		5 m	
NPN	PNP	NPN	PNP	NPN	PNP
Light-on / Dark-on		Light-on / Dark-on		Light-on / Dark-on	
Infrared LED (850 nm)		Red LED (630 nm)			
				Transmitter: 6 mA Max; Receiver: 14 mA Max	
Lens: PC; Case: PBT; Wire: PC					
-beam: Transmitter- 2 Wires 2 m PVC Cable), M8 Connector (200 mm Cable)					
32.8 × 11.2 × 21.1mm					
55 g					

Rectangular Type (TEACH) PS-R

		Retro-reflective		Through-beam	
PS-RR9-NS22	PS-RR9-US22	PS-RL4-NS22	PS-RL4-US22	PS-RT5-NSB2	PS-RT5-USB2
PS-RR9-NS2B	PS-RR9-US2B	PS-RL4-NS2B	PS-RL4-US2B	PS-RT5-NSBB	PS-RT5-USBB
5 ~ 1,000 mm		4.2 m		5 m	
NPN	Push-pull	NPN	Push-pull	NPN	Push-pull
Light-on / Dark-on		Light-on / Dark-on		Light-on / Dark-on	
Infrared LED (850 nm)		Red LED (630 nm)		Infrared LED (850 nm)	
				Transmitter: 6 mA Max; Receiver: 14 mA Max	
Lens: PC; Case: PBT; Wire: PC					
(Through-beam: Transmitter- 2 Wires 2 m PVC Cable), M8 Connector					
32.8 × 11.2 × 17 mm; Connector Type: 32.8 × 11.2 × 17 mm					
Cable Type: 67 g; Connector Type: 19 g					

Flat Type (Fixed)

	Retro-reflective				Through-beam			
PS-FB1-PDB2	PS-FL3-NLB2	PS-FL3-NDB2	PS-FL3-PLB2	PS-FL3-PDB2	PS-FT3-NLB2	PS-FT3-NDB2	PS-FT3-PLB2	PS-FT3-PDB2
	25 ~ 1,000 mm				1 m			
P	NPN		PNP		NPN		PNP	
Dark-on	Light-on	Dark-on	Light-on	Dark-on	Light-on	Dark-on	Light-on	Dark-on
Red LED (630nm)								
	20 mA MAX				Transmitter: 6 mA Max; Receiver: 14 mA Max			
Lens: PC; Case: PBT; Wire: PC								
-beam: Transmitter- 2 Wires 2 m PVC Cable), M8 Connector (200mm Cable)								
16 × 30 × 6.8mm								
25 g								

Lateral Type (Fixed)

Retro-reflective		Through-beam	
L3-NSB2	PS-LL3-USB2	PS-LT3-NSB2	PS-LT3-USB2
25 ~ 1,000 mm		1 m	
NPN	Push-pull	NPN	Push-pull
Light-on / Dark-on		Light-on / Dark-on	
Red LED (630 nm)			
		Transmitter: 6 mA Max; Receiver: 14 mA Max	
Lens: PC; Case: PBT			
C Cable (Through-beam: Transmitter- 2 Wires 2 m PVC Cable)			
14 × 27 × 7 mm			
26 g			

Cylindrical Type (TEACH)

		Retro-reflective		Through-beam	
PS-MR9-NS22	PS-MR9-US22	PS-ML4-NS22	PS-ML4-US22	PS-MT5-NSB2	PS-MT5-USB2
PS-MR9-NS2D	PS-MR9-US2D	PS-ML4-NS2D	PS-ML4-US2D	PS-MT5-NSBD	PS-MT5-USBD
5 ~ 1,000 mm		4.2 m		5 m	
NPN	Push-pull	NPN	Push-pull	NPN	Push-pull
Light-on / Dark-on		Light-on / Dark-on		Light-on / Dark-on	
Infrared LED (850 nm)					
				Transmitter: 6 mA Max; Receiver: 14 mA Max	
Lens: PC; Case: PBT; Wire: PC					
Through-beam: Transmitter- 2 Wires 2 m PVC Cable), M12 Connector					
Type (Length): 50 mm; Connector Type (Length):50 mm					
Cable Type: 67 g ; Connector Type: 19 g					

ΔNELTA

Fiber Amplifier FA Series

▶ **Concise and slim, easy to assemble**

▶ **Dual display, visualization for setting**

▶ **SET button makes operation easy**

▶ **CE certification**
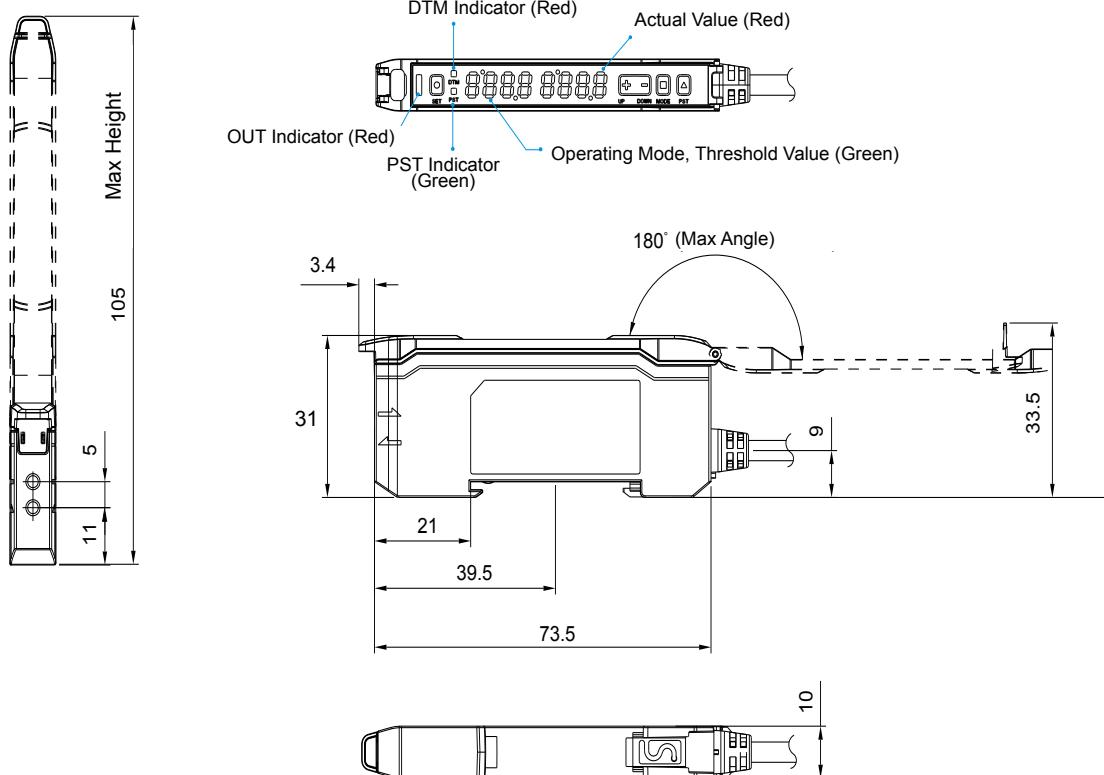
* To be launched

Appearance	Display	Model Name	Output 1	Output 2 / Input	Connection
Standard	Dual (7-Segments x 2)	FA-HS21-R2	1	1	2 m cable (4 wires)
	Dual (7-Segments x 2)	FA-HS1B-R2	1	1	2 m cable (4 wires)

Dimensions Unit：mm

DTM Indicator (Red)

Actual Value (Red)

OUT Indicator (Red)

PST Indicator (Green)

Operating Mode, Threshold Value (Green)

Max Height

105

5

11

3.4

31

21

39.5

73.5

9

180° (Max Angle)

33.5

10
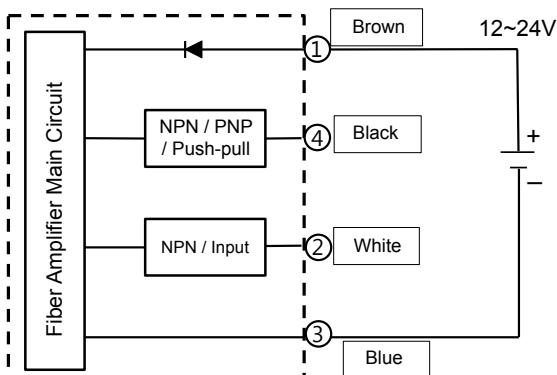
Specifications

Fiber Amplifier		
Appearance	Standard	
Display	7-Segment (dual)	
Model Name	FA-HS21-R2	FA-HS1B-R2
Output 1	1	1
Output 2/ Input	1	1
Connection Method	Cable 2 m (4 wires)	Cable 2 m (4 wires)
Light Source	Red LED	
Voltage Range	12 ~ 24 V_{DC} ± 10%	
Output Selection	Light-on / Dark-on (system-selectable)	
Response Time	50 µs (high speed), 200 µs (normal speed)	
Display Indicator	Sub digital display: green, Main digital display: red Display direction: switchable between normal and reversed	
Indicator	Output: red, PST: green, DTM: red	
Protection Circuit	Protection against reverse power connection, output overcurrent, power supply surge, output surge	
Operating Temperature	-10 ℃ ~ 55℃	
Storage Temperature	-25 ℃ ~ 75℃	
Ambient Humidity	30 ~ 85%	
Enclosure Rating	IP50	
Ambient Light Resistance	5,000 lux or less	
Vibration Resistance	10 ~ 55 Hz, 1.5mm, 3 axes for 2 hours	
Shock Resistance	Max. 1,000 m/s², 3 axes, 6 directions and 3 times in each.	
Insulating Resistance	20 MΩ or more (500 V_{DC})	
Withstand Voltage	1,000 V_{AC} 50 / 60 Hz 1min	
Materials	Case: PC, Cover: PC, Angle of cover: 180°	
Cable	4 wires 2 m PVC cable	
Dimensions	73.5 mm x 10 mm x 33.5 mm	
Certification	CE	

Input / Output Circuits

- **4 Wires**

Laser Displacement LD Series

► **Aluminum case, strong structure**

► **Slim and small, easy to assemble**

► **High precision, average time setting**

► **IP67**

► **CE certification**
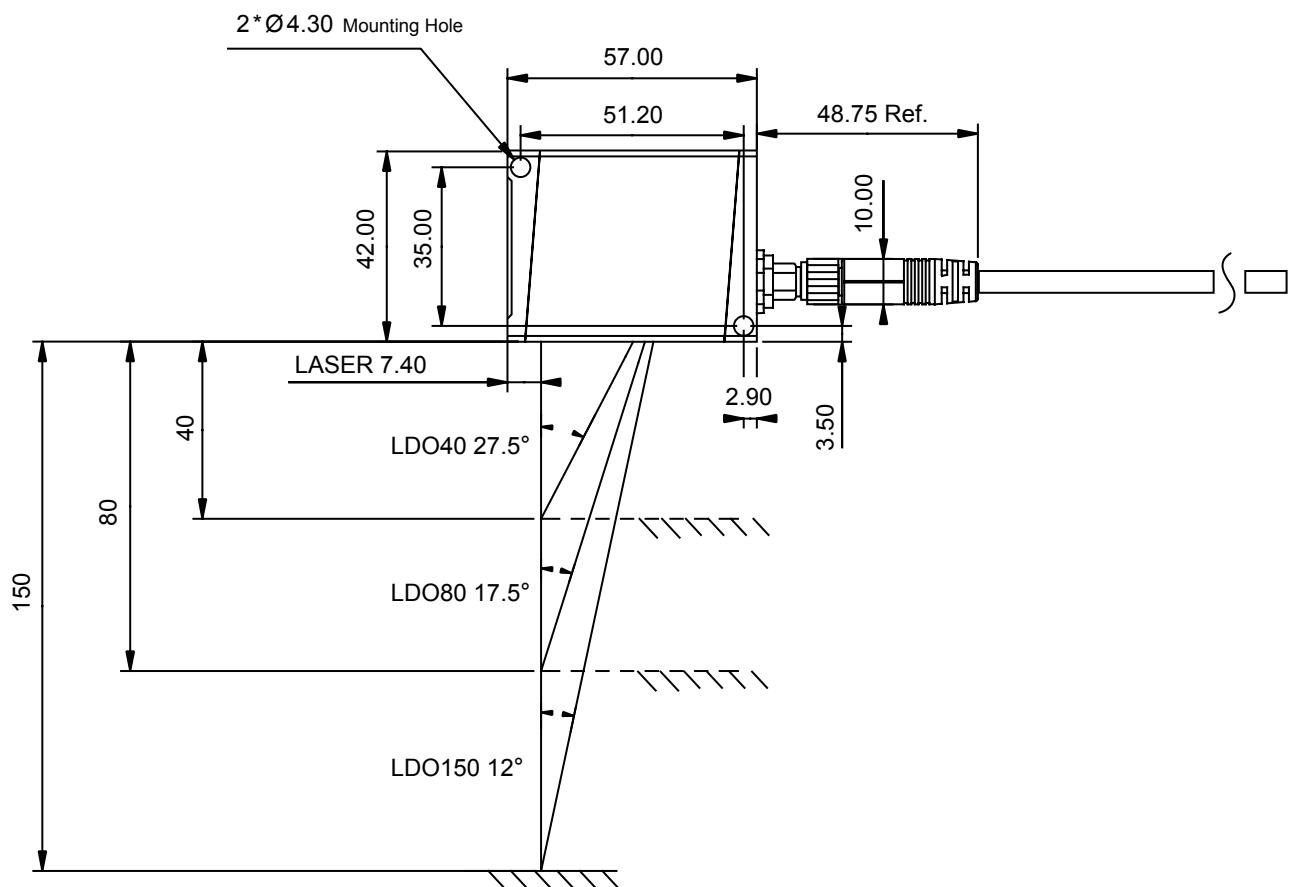
| Model Name	Sensing Distance	Repeatability	Interface
LD-040N	30 ~ 50 mm	2 µm*	Digital I/O / MODBUS Communication (RS-485)
LD-080N	55 ~ 105 mm	5 µm	Digital I/O / MODBUS Communication (RS-485)
LD-150N	90 ~ 210 mm	15 µm	Digital I/O / MODBUS Communication (RS-485)

* For an average count of 100. The value is ±2 µm for an average count of 100 (Sensing objective: white ceramic substrate).

Dimensions   Unit : mm

Specifications

Laser Displacement			
Sensing Method	Triangulation		
Model Name	LD-040N	LD-080N	LD-150N
Reference Distance	40 mm	80 mm	150 mm
Measurement Range	± 10 mm	± 25 mm	± 60 mm
Interface	Digital IO / MODBUS RS-485	Digital IO / MODBUS RS-485	Digital IO / MODBUS RS-485
	RS-485		
Light Source	Laser CLASS 2		
Input Voltage	12 ~ 24 V_{DC} ± 10%		
Repeatability*	2 μm	5 μm	15 μm
Linearity	± 0.1%	± 0.1%	± 0.1%
Sampling Rate	1 ms		
Indicator	Laser ON: blue, Measurement range: green, Out of measurement range: orange, DO: yellow, DI: red		
Protection Circuit	Protection against reverse power connection, output overcurrent, power supply surge, output surge		
Operating Temperature	10 ℃ ~ 50 ℃		
Storage Temperature	-20 ℃ ~ 75 ℃		
Ambient Humidity	30 ~ 85%		
Enclosure Rating	IP67		
Ambient Light Resistance	5,000 lux or less		
Vibration Resistance	10 ~ 55 Hz, 1.5 mm, 3 axes for 2 hours		
Insulating Resistance	20 MΩ or more (500 V_{DC})		
Withstand Voltage	1,000 V_{AC} 50 / 60 Hz 1min		
Certifications	CE		
Materials	Optical window: Glass; Case: Aluminium; Cable: PVC		
Cables	M8 Connector (8 Pin)		
Dimensions	55 × 42 × 24 mm		
Weight	113 g		
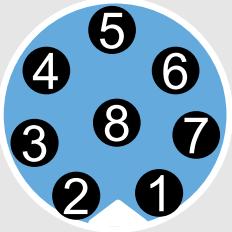
* For an average count of 100. The value is ±2 μm for an average count of 100 (Sensing objective: white ceramic substrate).

Laser Label Description
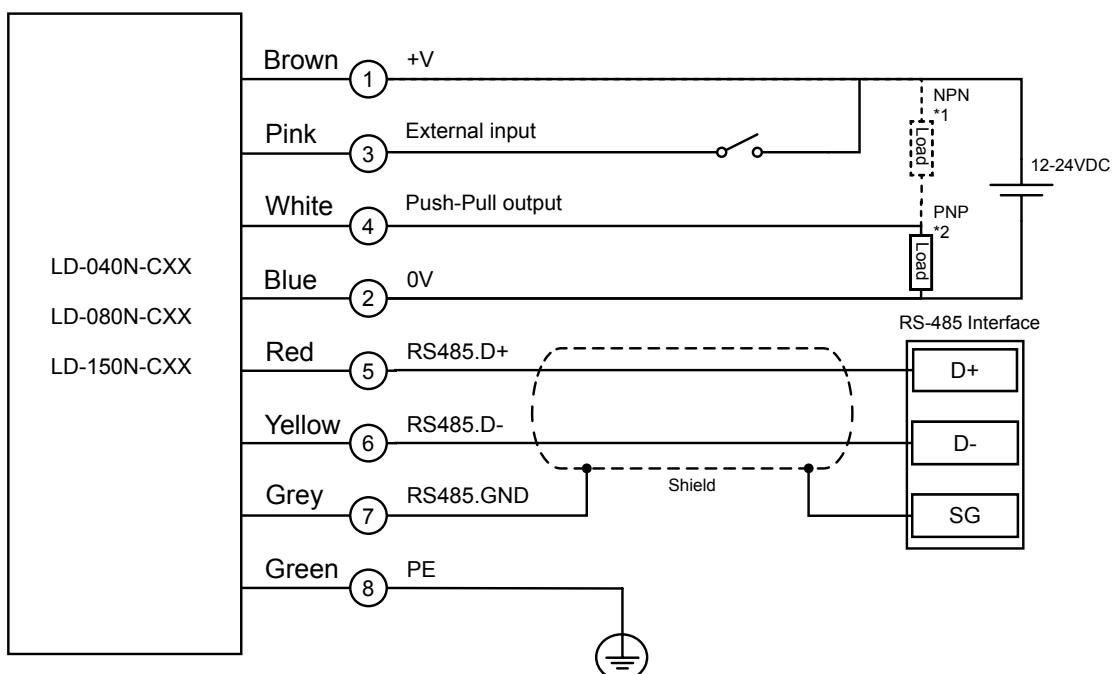
Laser Radiations： Class 2 Product

Maximum Output: <1mW

Pulse Duration: 0.5ms max.

Wave Length: 635nm, IEC 60825-1:2014

Input / Output Circuits

Pin	Color	Definition
1	Brown	+24V
2	Blue	PGND
3	Pink	DI
4	White	DO
5	Red	485-D+
6	Yellow	485-D-
7	Grey	485-GND
8	Green	FG

Wiring Instructions

LD-040N-CXX
LD-080N-CXX
LD-150N-CXX

Brown	1	+V
Pink	3	External input
White	4	Push-Pull output
Blue	2	0V
Red	5	RS485.D+
Yellow	6	RS485.D-
Grey	7	RS485.GND
Green	8	PE
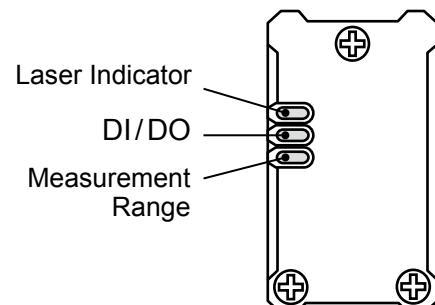
*1. In case of NPN connection, please connect the load between Pin 4 and Pin 1

*2. In case of PNP connection, please connect the load between Pin 4 and Pin 2

Laser Indicator

Indicator	Color	Description
Laser Indicator	Blue light	Start (laser on)
Measurement Range	Green light	Within measurement range
	Orange light	Out of measurement range
DI/DO	Red light	DO
	Green light	DI

15

Ordering Information

Model Name	Sensing Distance	Repeatability	Interface
LD-040N-C2B	30 ~ 50 mm	2 μm*	Digital I/O / MODBUS Communication (RS-485)
LD-080N-C2B	55 ~ 105 mm	5 μm	Digital I/O / MODBUS Communication (RS-485)
LD-150N-C2B	90 ~ 210 mm	15 μm	Digital I/O / MODBUS Communication (RS-485)
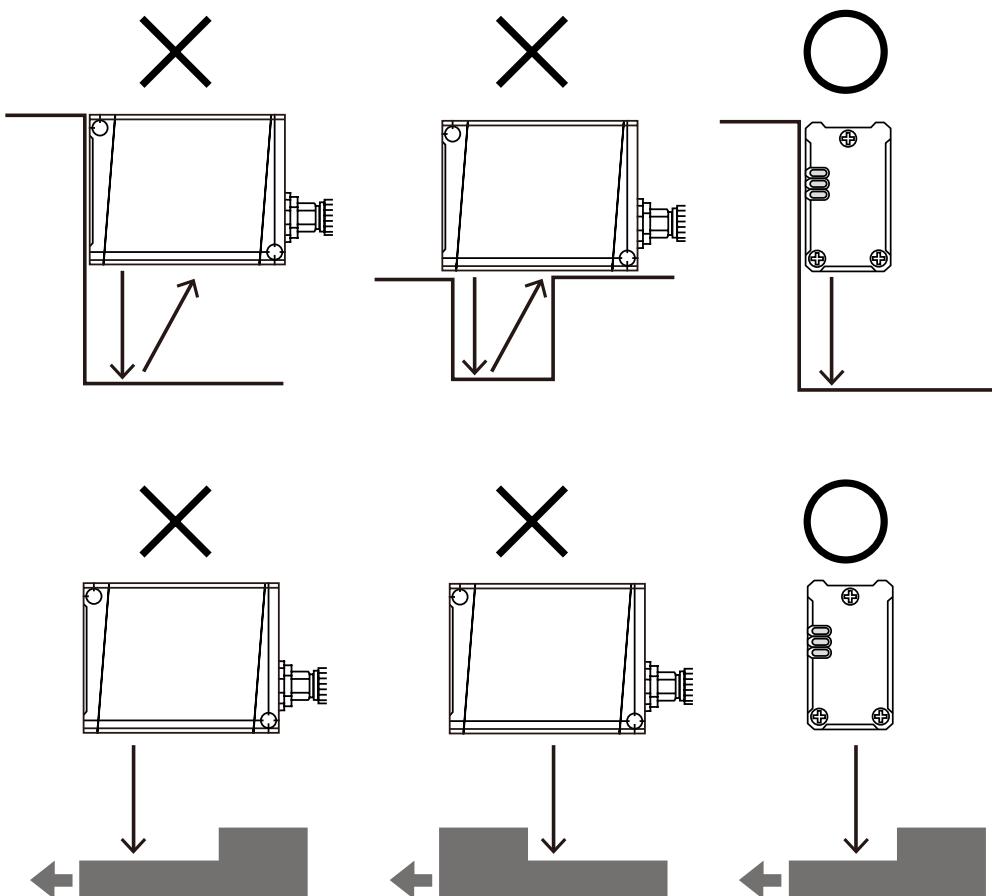
* When measuring for 100 times, the average repeatability rate is 2 μm (inspecting object: white ceramic substrate)

Wiring Material	Item	Serial Number
	1.5 m PUR cable	UC-S015088
PUR Cable + M8 Connector	3 m PUR cable	UC-S030088
	5 m PUR cable	UC-S050088

Caution on Mounting Direction
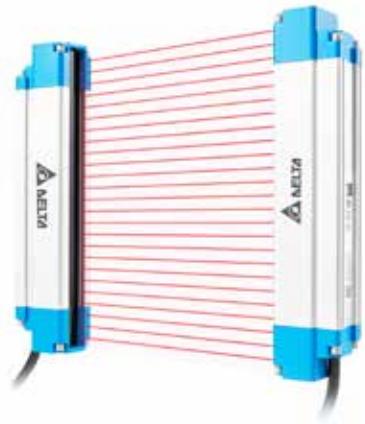
For best product performance, please note the following instructions when installing products:

► When products cling to devices, install the products in parallel with the devices to assure product performance

► When the shape of an inspection object is extrusive, ensure the product's lighting route is vertical to the inspection object's path to assure product performance

DELTA

Area Sensor AS Series

▶ **Aluminum case, strong structure**

▶ **No dead zone curtains for detection**

▶ **Effective aperture angle < 2.5°**

▶ **IP67**

▶ **CE certification**
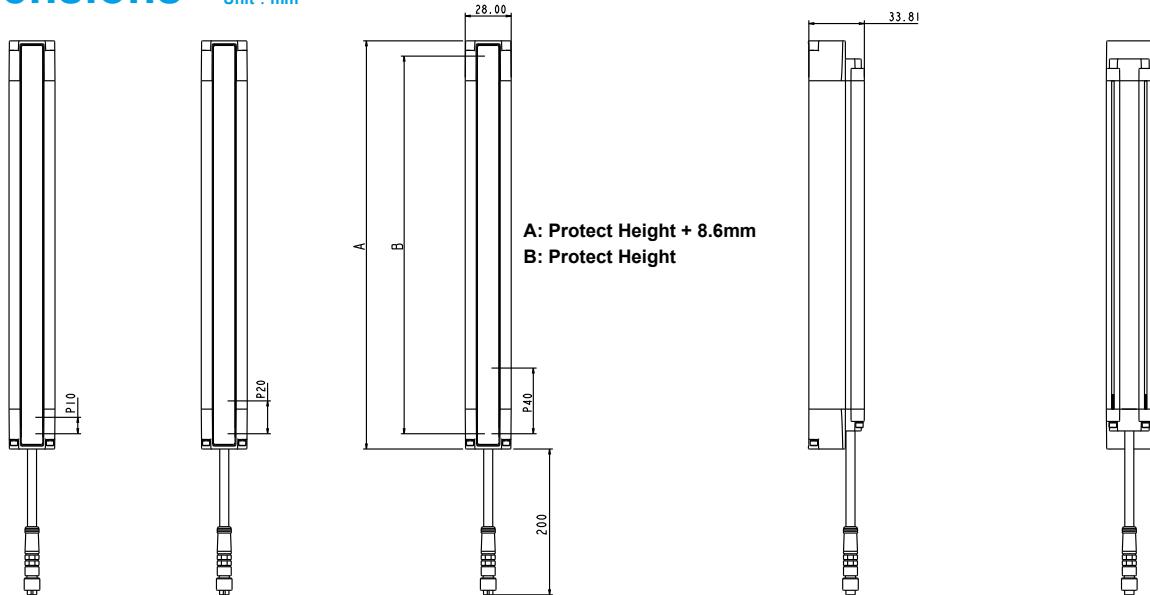
Pitch	10 mm	20 mm	40 mm
Channels	24～128	8～96	4～36
Protect Height	240 ~ 1,280 mm	160 ~ 1,920 mm	160 ~ 1,440 mm
Sensing Distance	0.1 m～5 m	0.1 m～10 m	0.1 m～10 m
Model Name	AS - BF □□□	AS - BH □□□	AS - BA □□□

Dimensions Unit : mm

28.00

33.81

A

B

A: Protect Height + 8.6mm
B: Protect Height

P10

P20

P40

200
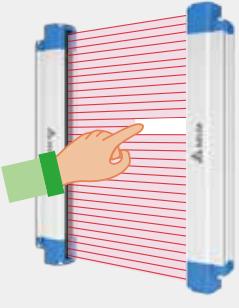
Specifications

Finger Detection (Pitch: 10 mm)				
Model Name	Channels	Protect Height (B)	Brackets	Sensing Distance
AS-BF024	24	240	2	0.1m ~ 5m
AS-BF032	32	320	2	
AS-BF040	40	400	4	
AS-BF048	48	480	4	
AS-BF056	56	560	4	
AS-BF064	64	640	4	
AS-BF072	72	720	4	
AS-BF080	80	800	4	
AS-BF088	88	880	4	
AS-BF096	96	960	4	
AS-BF104	104	1,040	4	
AS-BF112	112	1,120	4	
AS-BF120	120	1,200	4	
AS-BF128	128	1,280	4	

Hand Detection (Pitch: 20 mm)				
Model Name	Channels	Protect Height (B)	Brackets	Sensing Distance
AS-BH008	8	160	2	0.1m ~ 10m
AS-BH012	12	240	2	
AS-BH016	16	320	2	
AS-BH020	20	400	4	
AS-BH024	24	480	4	
AS-BH028	28	560	4	
AS-BH032	32	640	4	
AS-BH036	36	720	4	
AS-BH040	40	800	4	
AS-BH044	44	880	4	
AS-BH048	48	960	4	
AS-BH052	52	1,040	4	
AS-BH056	56	1,120	4	
AS-BH060	60	1,200	4	
AS-BH064	64	1,280	4	
AS-BH068	68	1,360	4	
AS-BH072	72	1,440	4	
AS-BH076	76	1,520	4	
AS-BH080	80	1,600	4	
AS-BH084	84	1,680	4	
AS-BH088	88	1,760	6	
AS-BH092	92	1,840	6	
AS-BH096	96	1,920	6	

DELTA

Specifications
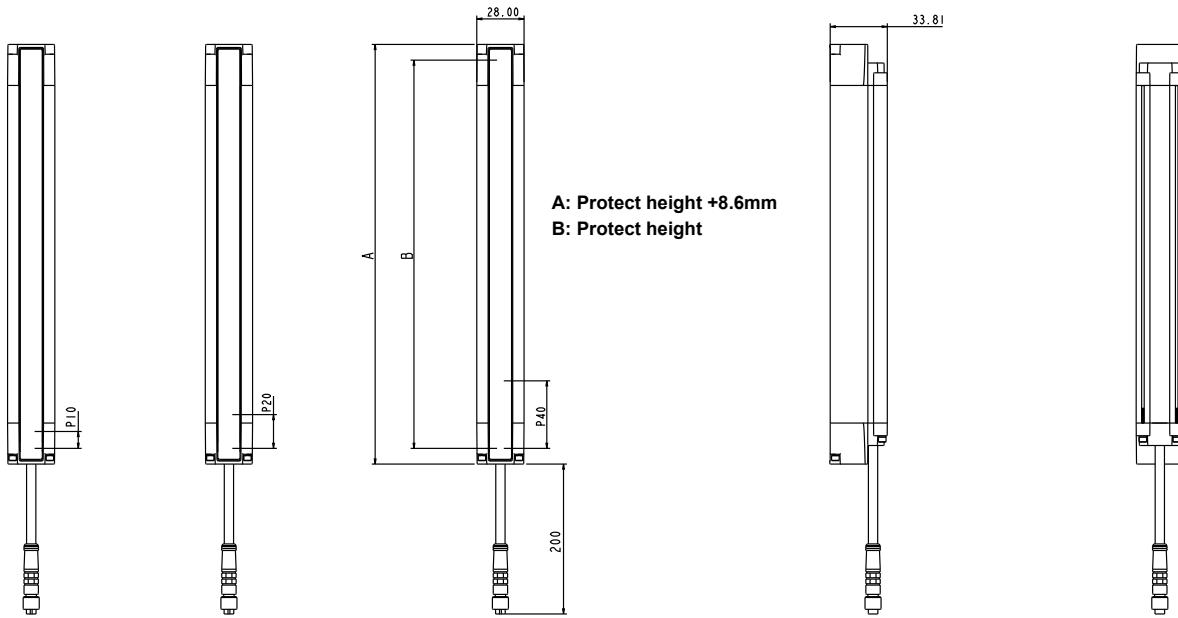
Arm Detection (Pitch: 40 mm)				
Model Name	Channels	Protect Height (B)	Brackets	Sensing Distance
AS-BA004	4	160	2	
AS-BA006	6	240	2	
AS-BA008	8	320	2	
AS-BA010	10	400	4	
AS-BA012	12	480	4	
AS-BA014	14	560	4	
AS-BA016	16	640	4	
AS-BA018	18	720	4	
AS-BA020	20	800	4	0.1 m ~ 10 m
AS-BA022	22	880	4	
AS-BA024	24	960	4	
AS-BA026	26	1,040	4	
AS-BA028	28	1,120	4	
AS-BA030	30	1,200	4	
AS-BA032	32	1,280	4	
AS-BA034	34	1,360	4	
AS-BA036	36	1,440	4	

Electrical Specifications

Area Sensor	
Voltage Range	24V_{DC} ± 10%
Light Source	Infrared LED (850nm)
Indicator	■ Upper / lower indicator (blue light): when the top and bottom are aligned ■ Green light: all channels are aligned ■ Red light: any channel is mis-aligned or blocked ■ Orange light: without synchronization signal
Protection Circuit	Protection against reverse power connection, output overcurrent, power supply surge, output surge
Operating Temperature	-10 ℃ ~ 55℃ , no freezing
Storage Temperature	-25 ℃ ~ 75℃
Ambient Humidity	30 ~ 85%
Enclosure Rating	IP67
Ambient Light Resistance	5,000 lux or less
Vibration Resistance	10 ~ 55 Hz, 1.5mm, 3 axes for 2 hours
Shock Resistance	Max. 100 m/s², 3 axes, 6 directions and 3 times in each
Insulating Resistance	20 MΩ or more (500 V_{DC})
Withstand Voltage	1,000 V_{AC} 50 / 60 Hz 1min
Material	Case: Aluminum, Cover lens: PMMA, Upper / lower case: Zinc alloy
Cables	M12 connector, 200mm PVC cable
Certifications	CE

Dimensions Unit : mm

A: Protect height +8.6mm
B: Protect height
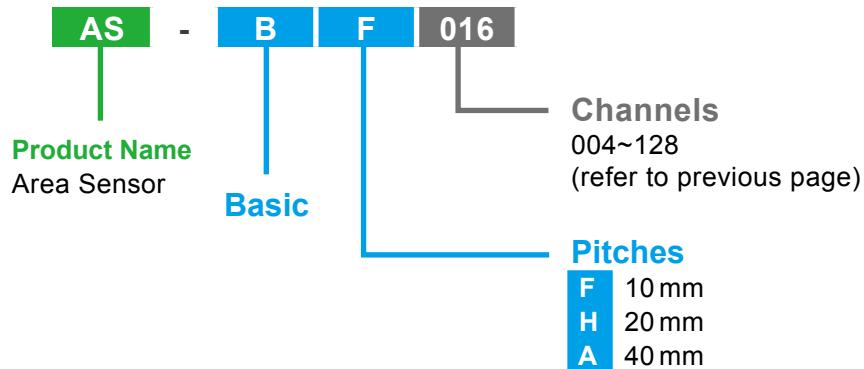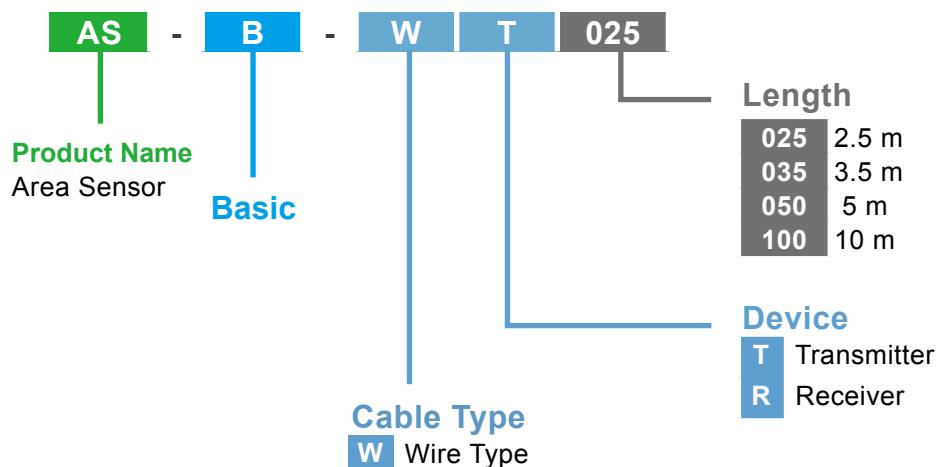
Ordering Information

- **Light Curtain**

| AS | - | B | F | 016 |

Product Name
Area Sensor

Basic

Channels
004~128
(refer to previous page)

Pitches

F	10 mm
H	20 mm
A	40 mm

- **Cable**

| AS | - | B | - | W | T | 025 |

Product Name
Area Sensor

Basic

Length

025	2.5 m
035	3.5 m
050	5 m
100	10 m

Device

| T | Transmitter |
| R | Receiver |

Cable Type

| W | Wire Type |

20
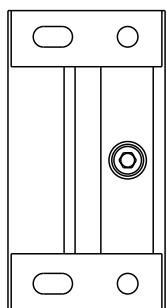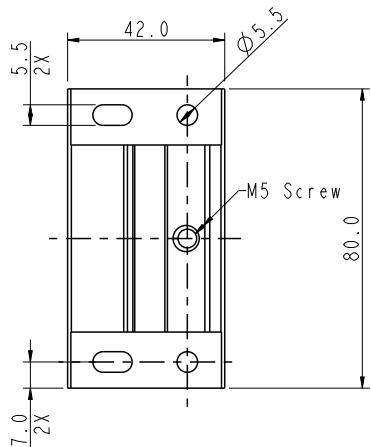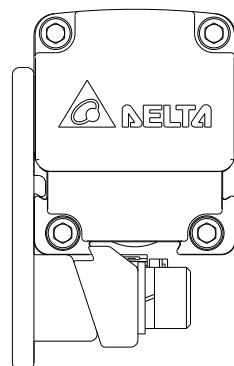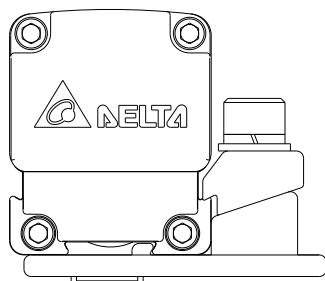
Bracket Dimensions Unit : mm
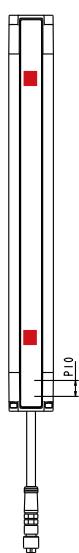
Bracket Installation

Sensor Calibration After Power-on

1. Power on
Red indicator on when power on
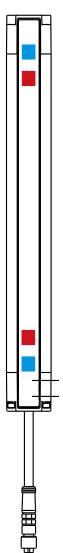
2. Calibration (top)
Top indicator in blue on when top calibration is finished
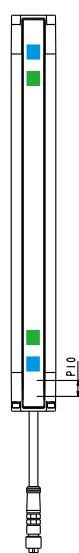
3. Calibration (bottom)
Bottom indicator in blue on when bottom calibration is finished
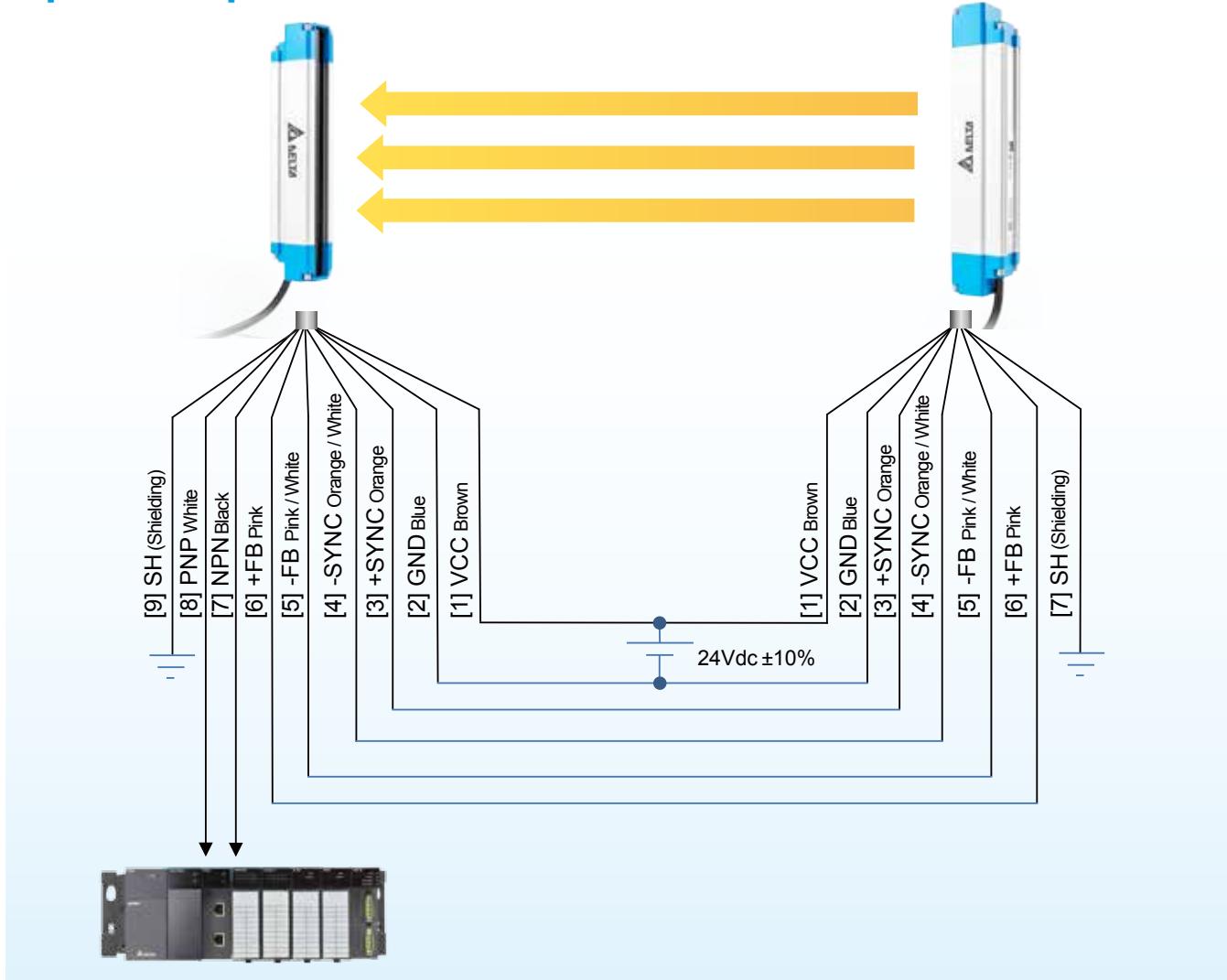
4. Complete
Green indicator on when calibration is complete

Input / Output Circuits

Connection labels (left device):
- [9] SH (Shielding)
- [8] PNP White
- [7] NPN Black
- [6] +FB Pink
- [5] -FB Pink / White
- [4] -SYNC Orange / White
- [3] +SYNC Orange
- [2] GND Blue
- [1] VCC Brown

Connection labels (right device):
- [1] VCC Brown
- [2] GND Blue
- [3] +SYNC Orange
- [4] -SYNC Orange / White
- [5] -FB Pink / White
- [6] +FB Pink
- [7] SH (Shielding)

24Vdc ±10%
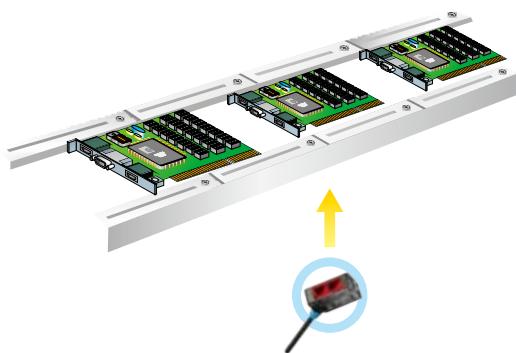
Troubleshooting

Indicator	Description	Solution
All indicators are off	Cables are disconnected or not connected correctly	Check the power connection and reconnect cables if necessary
An indicator on one side is orange, another is off	Cables are not connected correctly or over power supply voltage	Check the power connection and reconnect cables if necessary
Indicators on both receiver and transmitter sides are red	Beam axes are not properly aligned	Perform sensor calibration
Indicators on receiver or transmitter side show 1 blue 1 red, or 2 blue 1 red	Beam axes are not properly aligned	Perform sensor calibration
Indicators on both receiver and transmitter sides are orange	Light channel or internal voltage is not properly functioning	Please inquire with Delta Service Team
All blue, green, and red indicators on both receiver and transmitter sides are on	Overcurrent	Check output loading

Applications
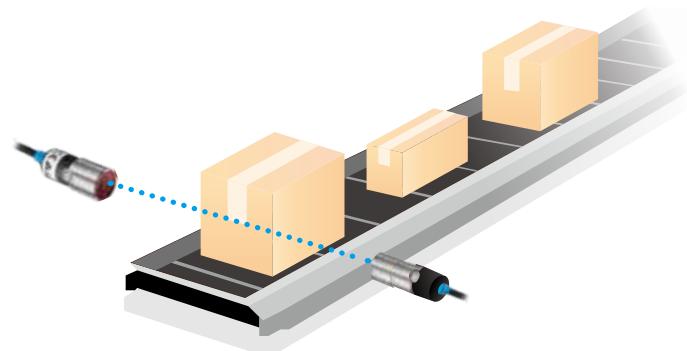
Electronics Industry
Detects PCB boards
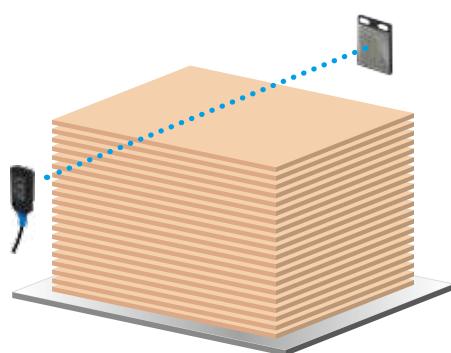
Warehouse / Logistics
Detects cartons
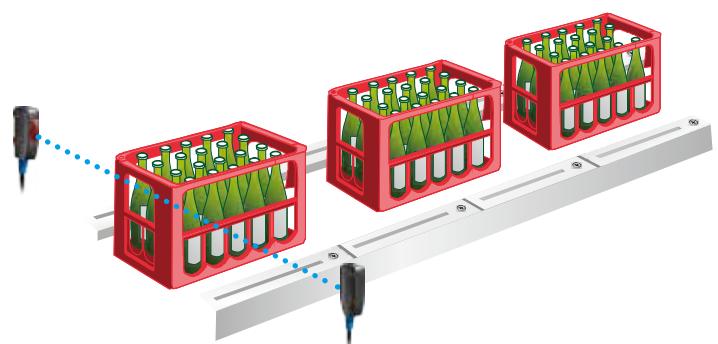
Wood Industry
Detects wood stacking
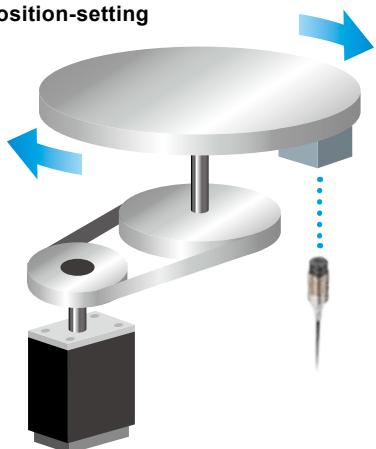
Food and Beverages
Detects boxes of beverages

Equipment & Machines
Sensor for position-setting
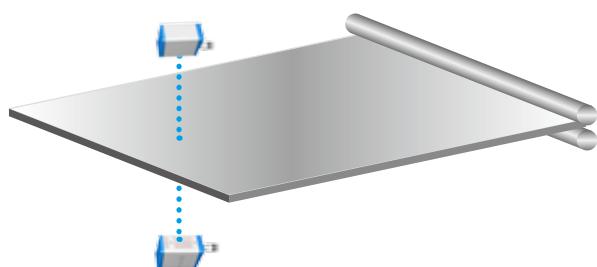
Electronics Industry
Detects IC components
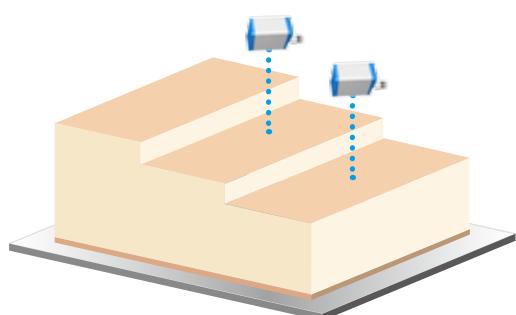
## Wood and Steel industry
Measures the thickness of wood or steel

Electronics Industry
Robot arm's reproducibility test

Electronics Industry
Measures the depth/ thickness of product
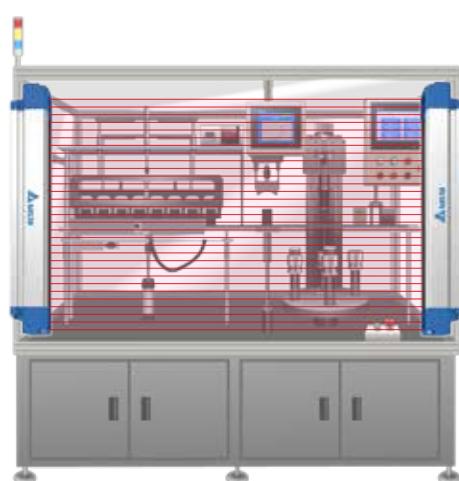
Textile Industry
Measures the hoop slack

Safety
Marks a dangerous zone and protects operators

Safety
Marks a dangerous zone and protects operators

Multifunction Pressure Sensor DPA Series

▶ **Energy-saving mode**

▶ **Various unit conversion**

▶ **Analog output function**

▶ **Various output modes**

▶ **10 sets of output response time setup**

▶ **3 sets of color displays**

▶ **Fast zero reset**

▶ **Safety control function**

▶ **Easy code display**

▶ **Parameter copy function**

Various Unit Conversion

The DPA Series offers 6 kinds of globally adopted pressure units for measurement and display.

Fast Parameter Copy

The DPA Series fast copies the internal parameters to other slaves and saves repeated parameter setup time.
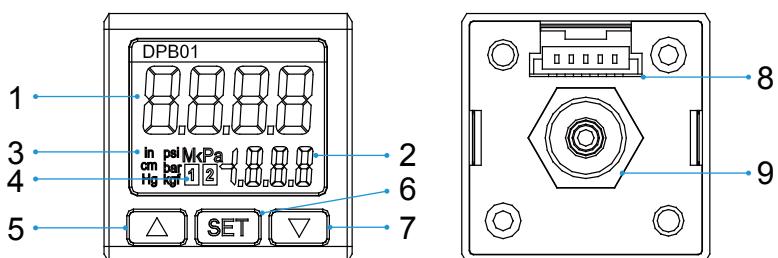
Master   Slave

3-Color LCD Display (Green, Red, Orange)

The large LCD with a green, red and orange 3-color LCD display allows users to set the display color according to the ambient environment, such as when the pressure is in normal range or exceeds the tolerance range. The display's color is orange when in parameter setup mode. This makes it easier for reading and reduces operation errors.

Color for upper / lower limit display
(green / red)

Parameter set up
(orange)

Safety Control Mode

The safety control mode prevents operators from carelessly touching relevant parameters and affecting the operation and production of the equipment.

In safety control mode

Locked

Specifications
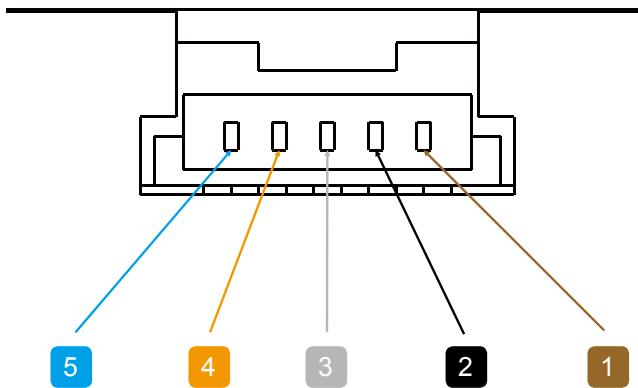
| Power Supply	Voltage range	12 ~ 24 V$_{DC}$ ± 10% no isolation
	Power consumption	40 mA Max.; current output type 60 mA Max.
Pressure Measurement	Pressure type	Non-corrosive gas, gauge type
	Measurable range	DPA01: -100 kPa ~ 100 kPa
		DPA10: -100 kPa ~ 1,000 kPa
	Max. durable pressure	DPA01: 200 kPa
		DPA10: 1,500 kPa
	Measurement accuracy	± 3% entire process
	Temperature inaccuracy	± 2% entire process
Display	Setup display	2-line LCD display, 4 digits for measured value and 3.5 digits for setup display
	Status display	LCD output status display
	Display mode	3 colors for different modes
	Cycle	250 ms, 500 ms, 1,000 ms
Output	Number of outputs	Built-in 2 NPN or PNP transistor digital outputs and 1 analog output
	Transistor output	NPN: Max. durable pressure 30V / 100 mA, residual voltage 1.5 V
		PNP: Max. durable pressure 30V / 100 mA, residual voltage 1.5 V
	Analog output	1 ~ 5 V: Min. output load resistance 1,000 Ω
		4 ~ 20 mA: Max. output load resistance 400 Ω; linear inaccuracy < 2% entire process
	Response time	2 ms, 4 ms, 10 ms, 30 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, 5,000 ms
	Output inaccuracy	Linear inaccuracy: < ± 2% entire process
Shock Resistance		10 ~ 550 Hz, 100 mm, 3 axes for 2 hours
Vibration Resistance		Max. 100 m/s^2, 3 axes 6 directions, 3 times each
Operating Ambient Temperature		0°C ~ +50°C
Storage Temperature		-20°C ~ +65°C
Altitude		< 2,000 m
Operating Relative Humidity		35% ~ 80% RH (non-condensing)

Product Profile & Outline
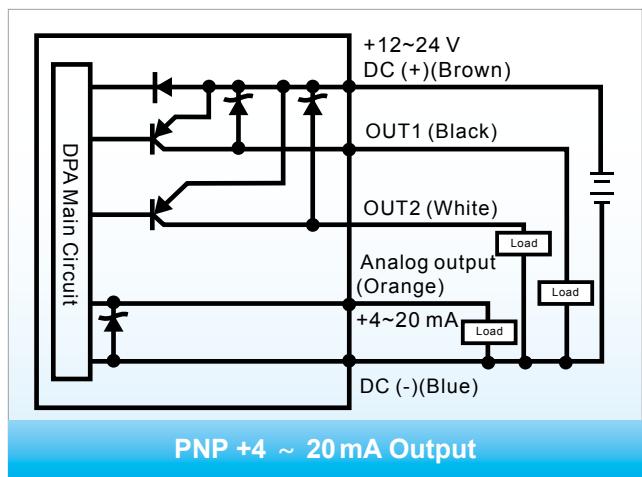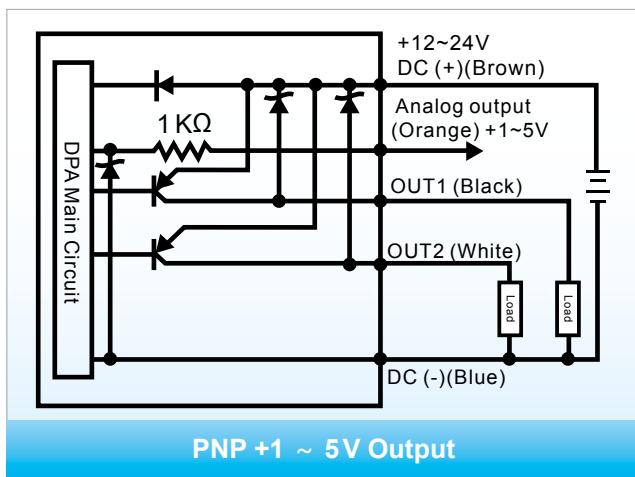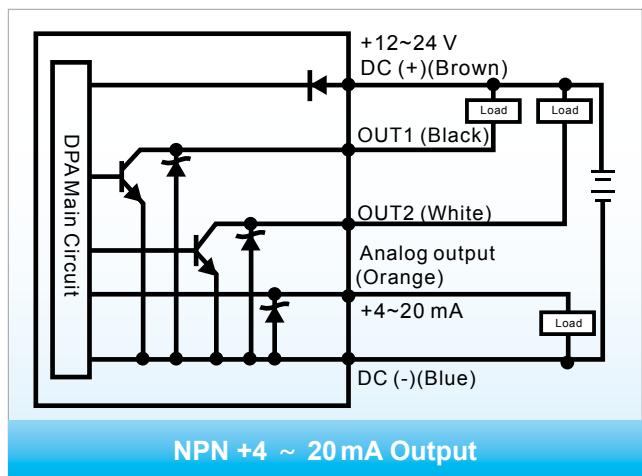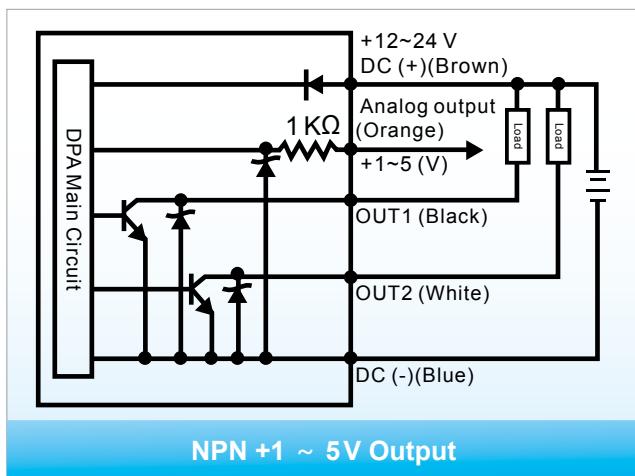
1. Analog output indicator
2. Digital output 1 indicator
3. Digital output 2 indicator
4. Pressure / parameter display
5. SV / setup item display
6. UP key
7. SET key
8. DOWN key
9. Power supply and output terminals
10. Pressure input pore
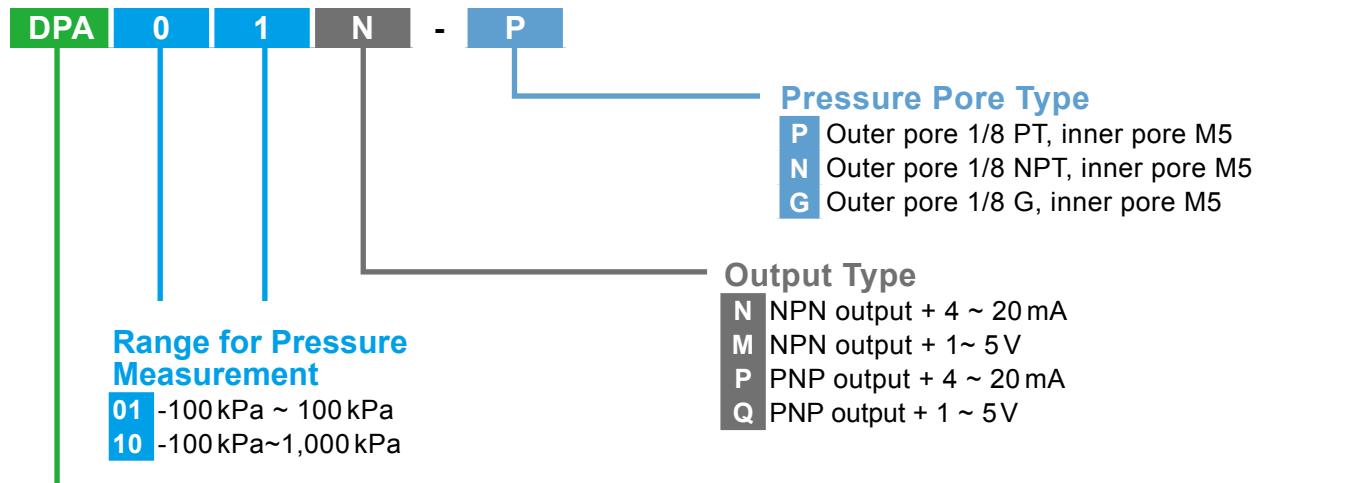
DELTA

Terminals

1	Positive power supply input (Brown)
2	Digital output 1 signal (Black)
3	Digital output 2 signal (White)
4	Analog output signal (Orange)
5	Negative power supply input (Blue)

Various Output Control Modes

NPN +1 ~ 5V Output

NPN +4 ~ 20 mA Output

PNP +1 ~ 5V Output

PNP +4 ~ 20 mA Output

27

Ordering Information

DPA **0** **1** **N** - **P**

Pressure Pore Type
P Outer pore 1/8 PT, inner pore M5
N Outer pore 1/8 NPT, inner pore M5
G Outer pore 1/8 G, inner pore M5

Output Type
N NPN output + 4 ~ 20 mA
M NPN output + 1~ 5 V
P PNP output + 4 ~ 20 mA
Q PNP output + 1 ~ 5 V

Range for Pressure Measurement
01 -100 kPa ~ 100 kPa
10 -100 kPa~1,000 kPa
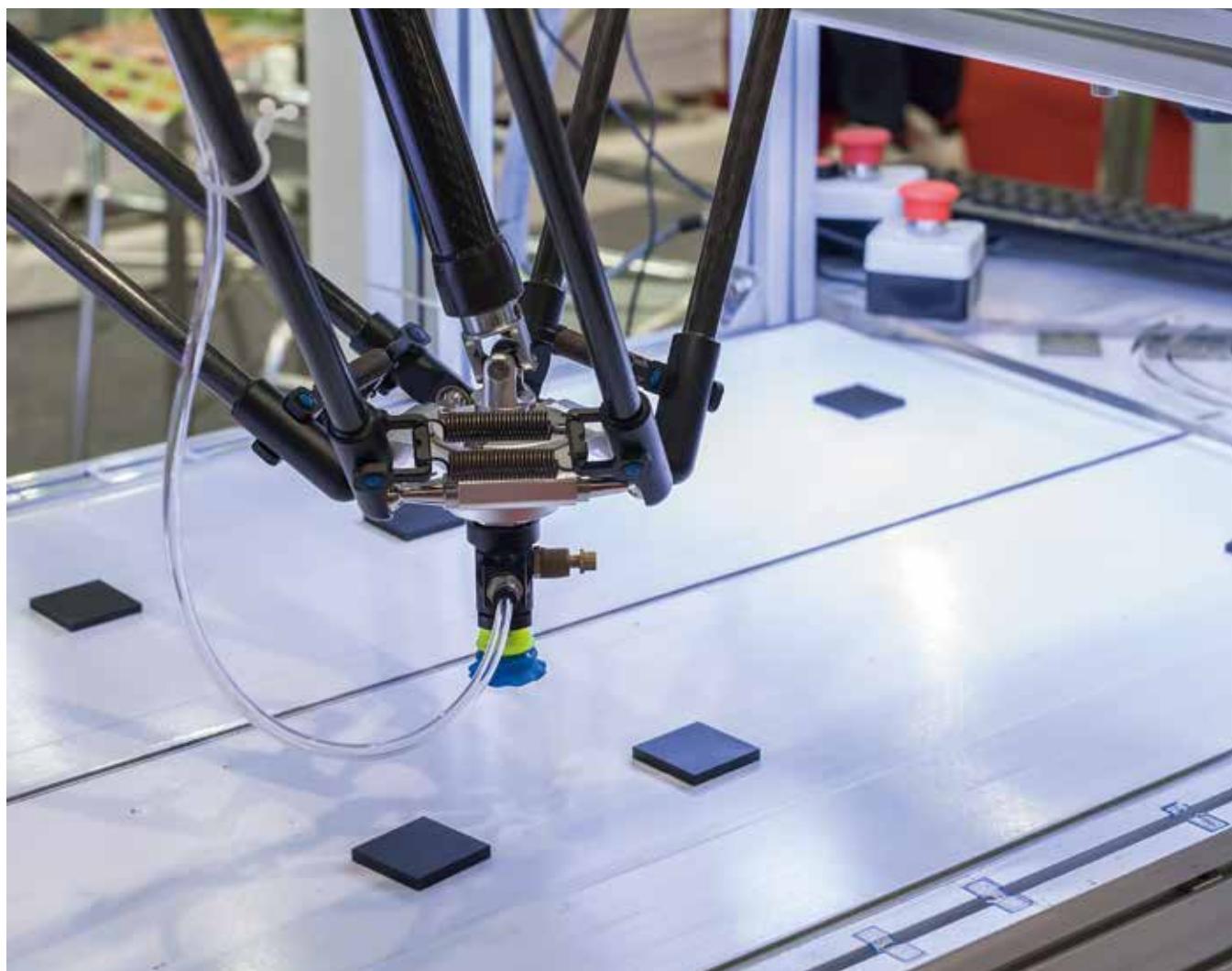
Product Name
DPA Series pressure sensor

△DELTA

Cost-efficient Multifunction Pressure Sensor DPB Series

► **Various unit conversion**

► **Various output modes**

► **3 sets of color displays**

► **10 sets of output response time setup**

► **Fast zero reset**

► **Safety control function**

► **Easy code display**

Various Unit Conversion

The DPB Series offers 6 kinds of globally adopted pressure units for measurement and display.

inchHg · psi · kPa · mmHg · kg/cm² · bar

3-Color LCD Display (Green, Red, Orange)

The large LCD with a green, red and orange 3-color LCD display allows users to set the display color according to the ambient environment, such as when the pressure is in normal range or exceeds the tolerance range. The display's color is orange when in parameter setup mode. This makes it easier for reading and reducing operation errors.

Color for upper / lower limit display
(green / red)

Parameter set up
(orange)

Safety Control Mode

The safety control mode prevents operators from carelessly touching relevant parameters and affecting the operation and production of the equipment.

In safety control mode

Locked

29
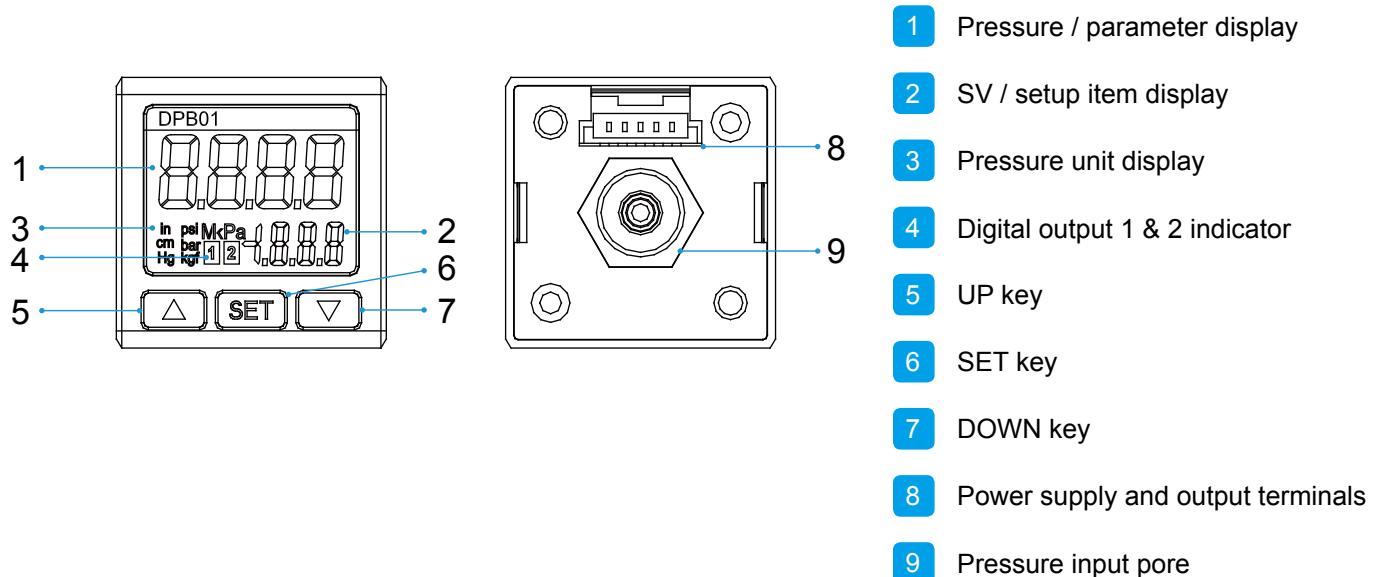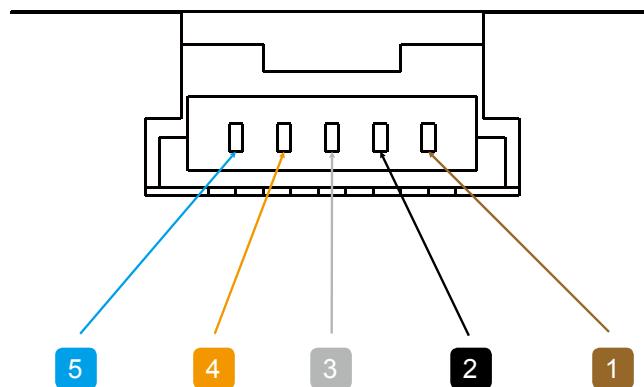
Specifications

| Power Supply	Voltage range	12 ~ 24 V_{DC} ± 10% no isolation
	Power consumption	40 mA Max.
Pressure Measurement	Pressure type	Non-corrosive gas, gauge type
	Measurable range	DPB01: -100 kPa ~ 100 kPa; DPB10: -100 kPa ~ 1,000 kPa
	Max. durable pressure	DPB01: 200 kPa; DPB10: 1,500 kPa
	Accuracy	± 3% entire process
Display	Setup display	2-line LCD display, 4 digits for measured value and 3.5 digits for setup display
	Cycle	100ms, 250ms, 500ms, 1,000ms
Output	Number of outputs	Built-in 2 NPN or PNP transistor digital outputs
	Transistor output	Max. durable pressure 30V / 100mA, residual voltage 1.5V
	Response time	2ms, 4ms, 10ms, 30ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms
Temperature		Ambient: 0°C ~ +50°C; Storage: -20°C ~ +65°C
Ambient humidity		35% ~ 80% RH (non-condensing)
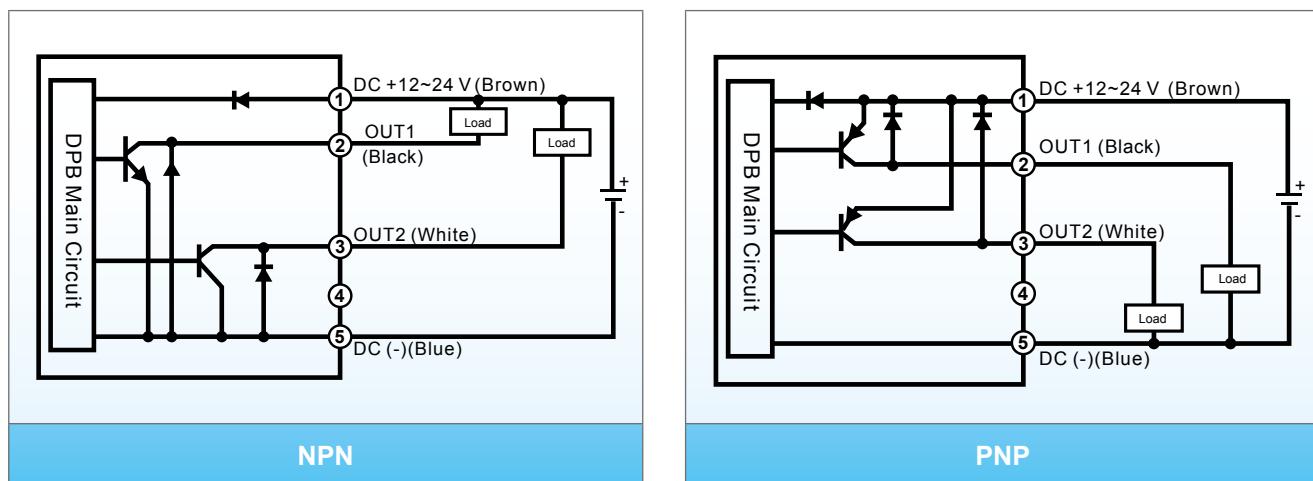
Product Profile & Outline

1. Pressure / parameter display
2. SV / setup item display
3. Pressure unit display
4. Digital output 1 & 2 indicator
5. UP key
6. SET key
7. DOWN key
8. Power supply and output terminals
9. Pressure input pore

DELTA

Terminals

1	Positive power supply input (Brown)
2	Digital output 1 signal (Black)
3	Digital output 2 signal (White)
4	No function (Orange)
5	Negative power supply input (Blue)

Various Output Control Modes

NPN

PNP

Ordering Information

| DPB | 0 | 1 | N | - | P |

Pressure Pore Type
- **P** Outer pore 1/8 PT, inner pore M5
- **N** Outer pore 1/8 NPT, inner pore M5
- **G** Outer pore 1/8 G, inner pore M5

Output Type
- **N** NPN output
- **P** PNP output

Range for Pressure Measurement
- **01** -100 kPa ~ 100 kPa
- **10** -100 kPa ~ 1,000 kPa
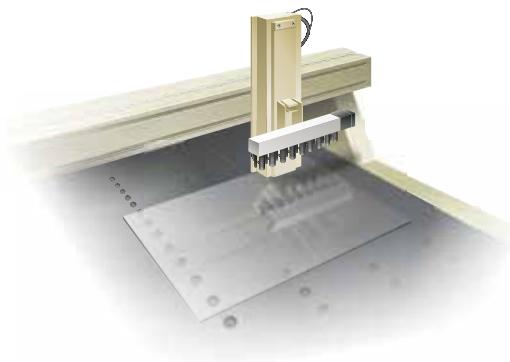
Product Name
DPB Series pressure sensor

Applications
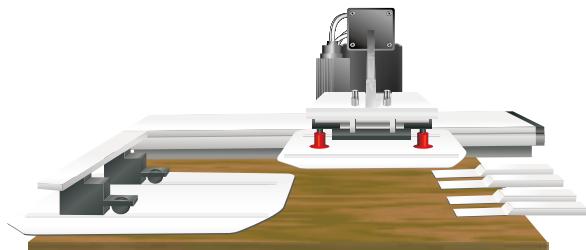
■ Mechanical Processing Industry
Mechanical product processing and fixing
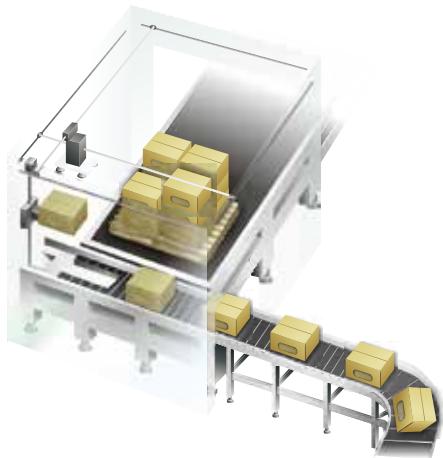
## ■ Solar Energy Industry
Turnkey module lines suction

■ Food Packaging Industry
**Drinks, cans suction and packaging**

■ Semiconductor Industry
Wafer suction and loading
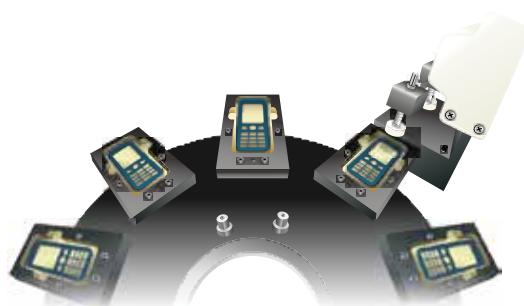
■ Electronic Components Industry
**IC component suction and confirmation**
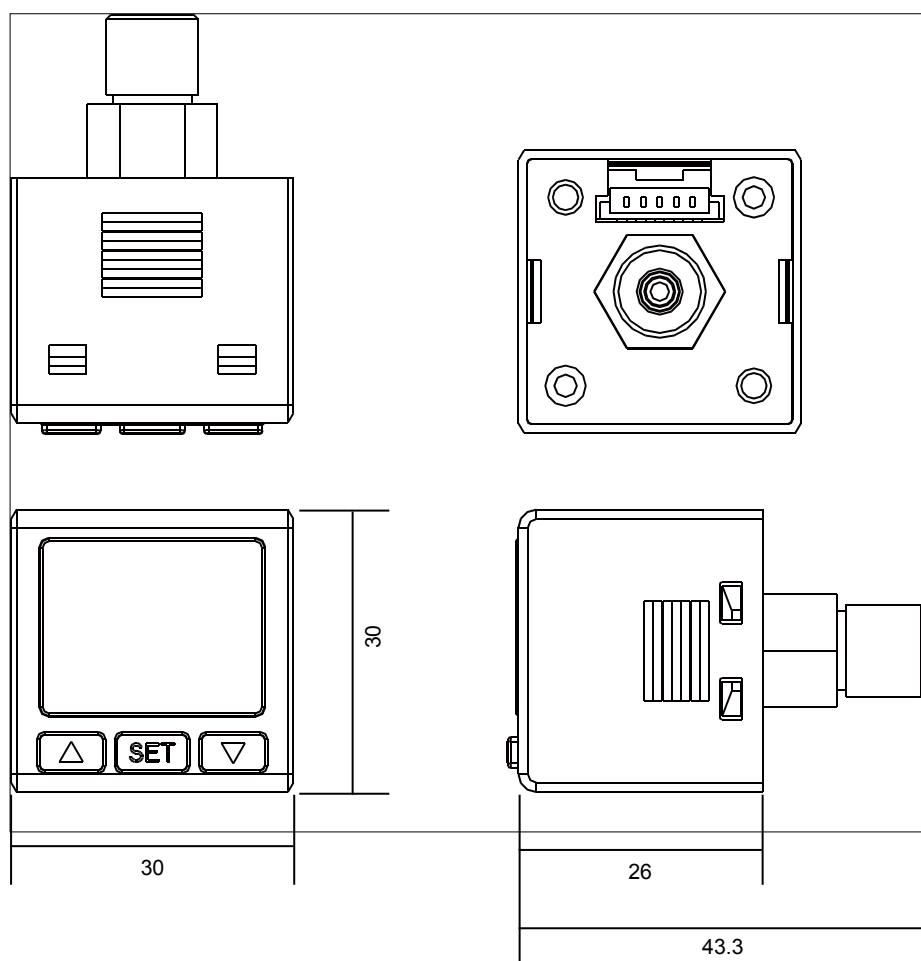
■ Automatic Assembly Industry
**Automation component assembly and confirmation**

DELTA
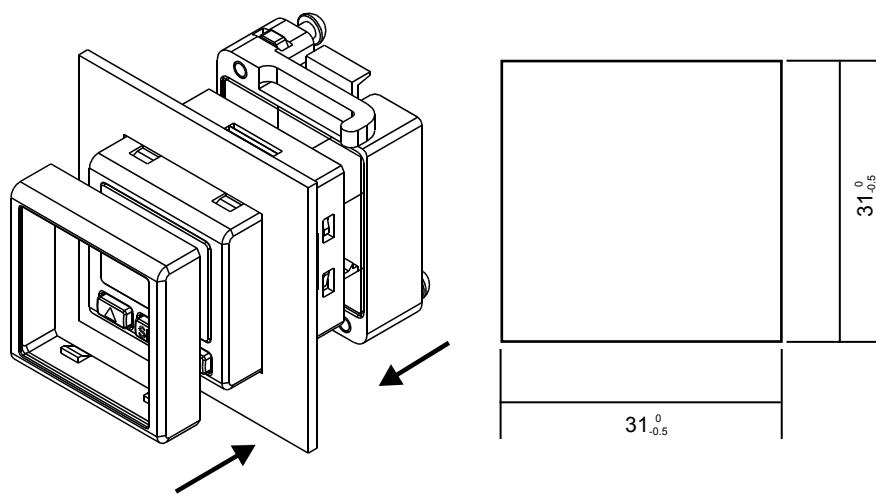
Dimensions (DPA / DPB) Unit : mm

30

30

26

43.3
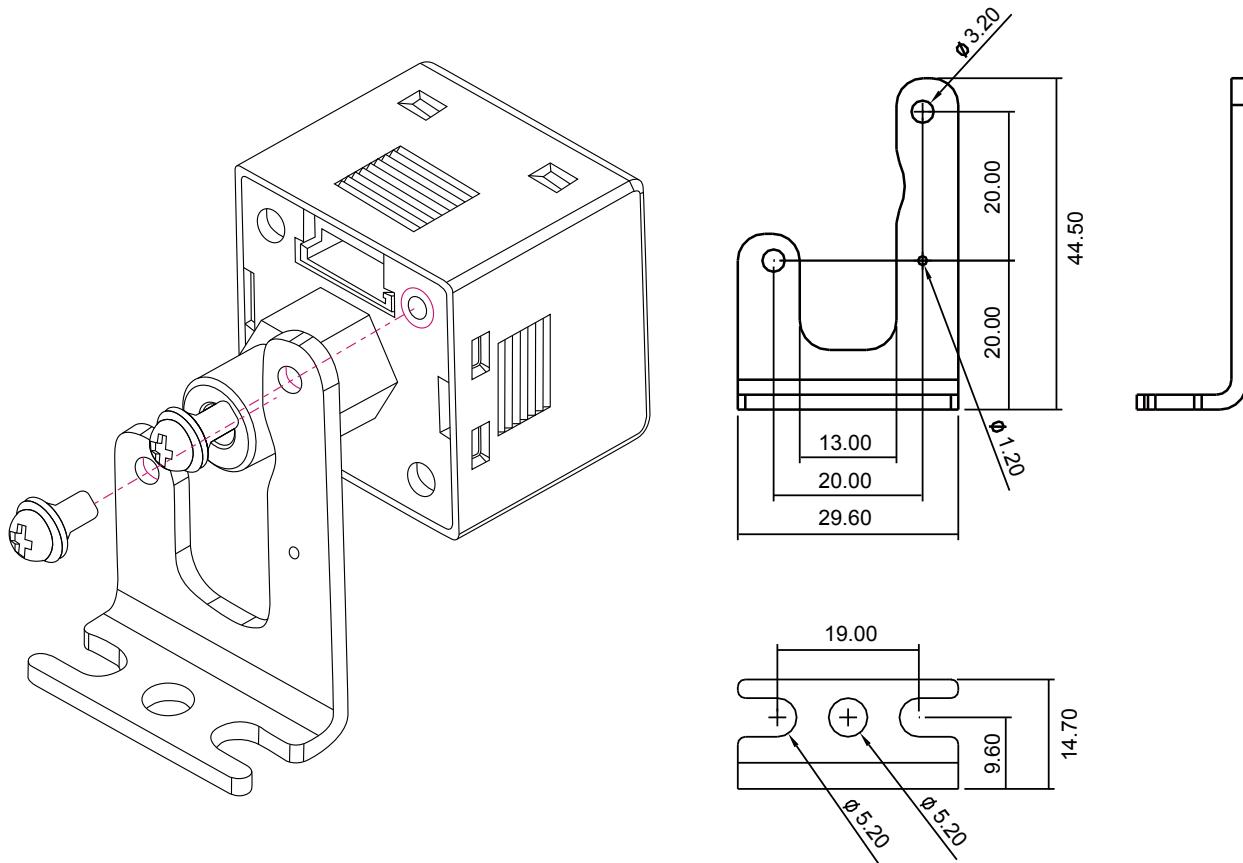
Panel Accessory (DPA / DPB) Unit : mm

Model: DPA-PFKit

$31^{0}_{-0.5}$

$31^{0}_{-0.5}$

33
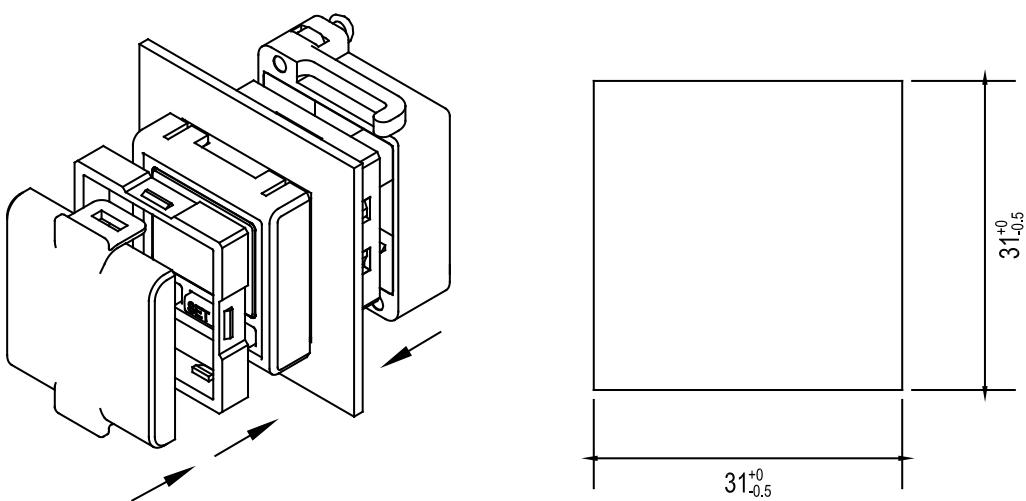
Shelf Accessory (DPA / DPB) Unit : mm

Model: DPA-FMKit

ø3.20

20.00

44.50

20.00

ø1.20

13.00

20.00

29.60

19.00

9.60

14.70

ø5.20

ø5.20

Transparent Protective Cover (DPA / DPB) Unit : mm

Model: DPA-FPCKIT

$31^{+0}_{-0.5}$

$31^{+0}_{-0.5}$

DELTA

Smarter. Greener. Together.

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