Laser Displacement Sensors

BD Series

CATALOG

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc are subject to change without notice for product improvement Some models may be discontinued without notice.

Features

- Easy maintenance with detachable sensor head/amplifier unit
- Maximum resolution: 1 ㎛ (vary by model)
- Accurate measurement with minimal influence from target color or material
- Interconnection of up to 8 sensor Amplifier units
  : Mutual interference prevention function and auto channel sorting
- Various calculation functions supported (addition, subtraction, average)
- Various filter functions for stable measurement (movement average, differential, median)
- Auto sensitivity adjustment (1-point, 2-point teaching)
- DIN rail and wall mount support (bracket accessory required for wall mount)
- Sensor head: IP67 protection structure
  *Korea Patent Application 10-2017-0043925
- Extension cables available for various moving applications (sold separately)

Ordering Information

This is only for reference.
For selecting the specified model, follow the Autonics website .

■ Sensor head

Model	Reference distance (Maximum measurement range)
BD-030	30 mm (20 to 40 mm)
BD-065	65 mm (50 to 80 mm)
BD-100	100 mm (70 to 130 mm)

■ Amplifier unit

Model	Compatible sensor head
BD-A1	BD Series sensor head: 1

Specifications

■ Sensor head

Model	BD-030	BD-065	BD-100
Beam shape	Standard		
Spot diameter (near)	≈ 290×790 ㎛ (25 mm)	≈ 360×1,590 ㎛ (55 mm)	≈ 480×1,870 ㎛ (80 mm)
Spot diameter (reference)	≈ 240×660 ㎛ (30 mm)	≈ 290×1,180 ㎛ (65 mm)	≈ 410×1,330 ㎛ (100 mm)
Spot diameter (far)	≈ 190×450 ㎛ (35 mm)	≈ 210×830 ㎛ (75 mm)	≈ 330×950 ㎛ (120 mm)
Resolution 01)	1 ㎛	2 ㎛	4 ㎛
Reference distance	30 mm	65 mm	100 mm
Maximum measurement range	20 to 40 mm	50 to 80 mm	70 to 130 mm
Rated measurement ranges 02)	25 to 35 mm	55 to 75 mm	80 to 120 mm
Linearity 01) 03)	± 0.1% of F.S.	± 0.1% of F.S.	± 0.15% of F.S.
Temperature characteristic 04)	0.05% F.S./°C	0.06% F.S./°C	
Power supply 05)	-		
Light source	Red semiconductor laser (wavelength: 660 nm, IEC 60825-1:2014)		
Optical method	Diffuse reflection		
Laser class	Class 1 (IEC/EN), Class I (FDA (CDRH) CFR Part 1002)	Class 2 (IEC/EN), Class II (FDA (CDRH) CFR Part 1002)	
Output	≤ 300 ㎼	≤ 1 mW	
Operation Indicator	Power Indicator (red), Laser emission indicator (green), NEAR/FAR indicator (green)		
Connection	Connector type		
Insulation resistance	≥ 20 MΩ (500 VDC⎓ megger)		
Noise immunity	Square shaped noise by noise simulator (pulse width: 1㎲) ±500V		
Dielectric strength	1,000 VAC~ 50/60 Hz for 1 minute		
Vibration	1.5 mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours		
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times		
Ambient illumination	≤ 10,000 lx Incandescent lamp		
Ambient temperature	-10 to 50 °C, Storage: -15 to 60 °C (no freezing or condensation)		
Ambient humidity	≤ 85%RH, Storage: ≤ 85%RH (no freezing or condensation)		
Protection structure	IP67 (IEC Standards, except connector of extension cable)		
Material	Case: Polycarbonate, Sensing part: Glass, Cable: Polyvinyl chloride		
Amplifier unit compatibility	BD Series amplifier unit: 1		
Accessory	Ferrite core (made by TDK co. ZCAT2132-1130), Mounting bracket, Bolt, Nut		
Approval	CE cULus EAC		
Unit weight (packaged)	≈ 56 g (≈ 209 g)	≈ 68 g (≈ 233 g)	≈ 68 g (≈ 233 g)

01) When measuring fixed non-glossy white paper (reference temperature: 25°C, reference distance, response time: 1ms, average 128 times).
02) The rated measurement range guarantees linearity.
03) Value indicates the error with respect to the ideal straight line.
04) Value measured by using an aluminum jig fix the sensor head and non-glossy white paper.
05) Using power from the amplifier unit.

CE cULus EAC

■ Amplifier unit

Model	BD-A1
Power supply	10 - 30 VDC⎓ ±10% (when connecting BD-C Series communication converter, 12-30 VDC⎓)
Power consumption[1]	≤ 2,800 mW (30 VDC⎓)
Control Input[2]	Timing / Output reset / Laser OFF / Zero-point adjustment / Bank change: No-voltage input
Judgment output (HIGH/GO/LOW)	NPN or PNP open collector output (load current: ≤ 100 mA)
Alarm output	NPN or PNP open collector output (load current: ≤ 100 mA)
Analog voltage output[3]	-5 - 5 V, 0 - 5 V, 1 - 5 V (resistance: 100 Ω, ± 0.05% F.S., at 10 V)
Analog current output[3]	4 - 20 mA (load resistance: ≤ 350 Ω, ± 0.2% F.S., at 16 mA)
Residual voltage	NPN: ≤ 1.5 V, PNP: ≤ 2.5 V
Protection circuit	Reverse polarity protection circuit, output over current (short-circuit) protection circuit
Response Time	0.33 / 0.5 / 1 / 2 / 5 ms
Min. display unit	1 ㎛
Display type	11 segment (red, green), 6-digit, LED
Display range[4]	±99.999 mm to ±99 mm (4-step adjustment, parameter)
Display period	≈ 100 ms
Insulation resistance	≥ 20 MΩ (500 VDC⎓ megger)
Noise immunity	Square shaped noise by noise simulator (pulse width: 1 μs) ±500 V
Dielectric strength	1,000 VAC~ 50/60 Hz for 1 minute
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
Shock	300 m/s² (approx. 30 G) in each X, Y, Z direction for 3 times
Ambient temperature	-10 to 50 °C, Storage: -15 to 60 °C (no freezing or condensation)
Ambient humidity	≤ 85%RH, Storage: ≤ 85%RH (no freezing or condensation)
Material	Case: PC, Cover: PC, cable: PVC
Connection	Connector type
Sensor head compatibility	BD series sensor head: 1
Accessory	Mounting bracket, Side connector
Protection structure	IP40 (IEC standard)
Approval	CE c UL us EAC
Unit weight (packaged)	≈ 126 g (≈ 228 g)

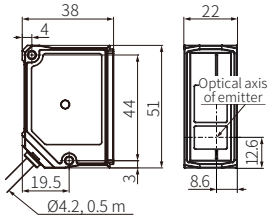
01) Power to the load is not included.
02) Use after assigning to external input line.
03) It is possible to use among -5-5V, 0-5V, 1-5V, 4-20mA by parameter setting.
04) Setting range is assigned automatically when connecting sensor head.

Dimensions

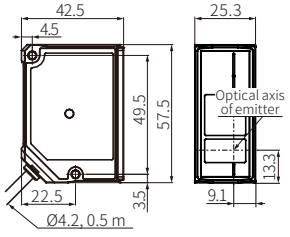
• Unit: mm, For the detailed drawings, follow the Autonics website.

■ Sensor head

• BD-030

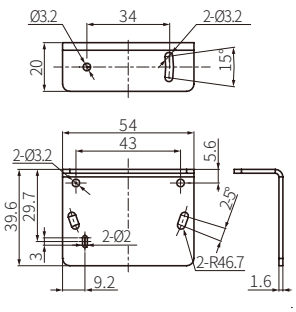


• BD-065 / 100

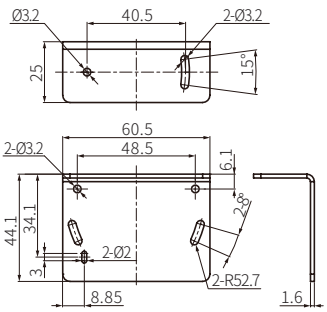


- Bracket

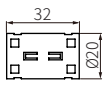
• BD-030



• BD-065 / 100

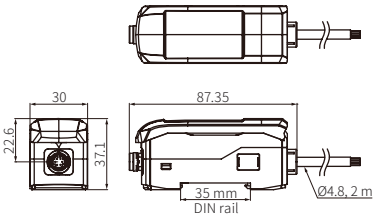


- Ferrite core

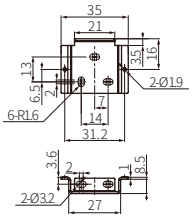


■ Amplifier unit

• BD-A1

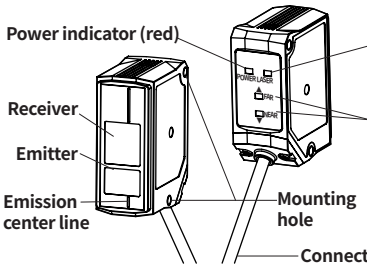


- Bracket



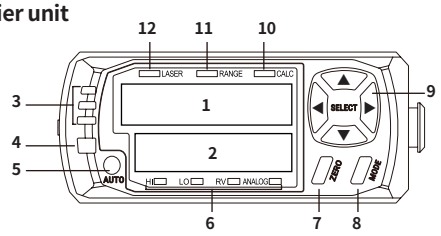
Unit Descriptions

■ Sensor head



• Emission center line and the object should be aligned because the laser is emitted along the line.
• For the details about indicators, refer to 'Indicator display'.

■ Amplifier unit



1	**PV (present value) display (red)** Displays PV (present value), calculating result (when using calculation), parameter name (when setting parameter).
2	**SV (setting value) display (green)** Displays SV (HIGH, LOW, RV, Analog output, Bank), parameter setting value (when setting parameter). The type of displaying SV can be recognized by SV display recognition lamp.
3	**Judgment indicator:** HI/LO (red), GO (green)
4	**Alarm indicator (red)**
5	**Optimization setting key [AUTO]**
6	**SV display recognition lamp (green)** - HI: HIGH judgment value - LO: LOW judgment value - RV: Real distance value - ANALOG: Analog output
7	**Zero-point adjustment setting key [ZERO]**
8	**Mode setting key [MODE]**
9	**Direction key [◀], [▶], [▲], [▼]**
10	**Calculation Indicator (CALC, green)**
11	**Measurement range Indicator (RANGE, green)**
12	**Laser emission indicator (LASER, green)**

Sold Separately

• General type extension cable: CID6P-□-SI-BD
• Robot type extension cable: CIDR6P-□-SI-BD
• Laser displacement sensor communication converter: BD-C Series

Sold Separately: Extension Cable

• Unit: mm, For the detailed drawings, follow the Autonics website.
• The connectors of general and robot type have a same dimension.

Model		Cable length
General type	Robot type	
CID6P-1-SI-BD	CIDR6P-1-SI-BD	1 m
CID6P-2-SI-BD	CIDR6P-2-SI-BD	2 m
CID6P-5-SI-BD	CIDR6P-5-SI-BD	5 m
CID6P-10-SI-BD	CIDR6P-10-SI-BD	10 m

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