

High-performance multi laser displacement sensor **CD5** series

## Specifications

## ■ Sensor head: Model based specifications

Model	CD5-L25A	CD5-LW25A	CD5-30A		CD5-W30A	
Optical method/mode	Specular reflection		Diffuse mode	Specular mode	Diffuse mode	Specular mode
Center of measurement range	25 mm		30 mm	26.1 mm	30 mm	26.1 mm
Measurement range	±1 mm		±5 mm	±2.5 mm	±5 mm	±2.5 mm
Light source	Medium	Red semiconductor laser				
	Wavelength	650 nm			658 nm	
	Max.output	390 μW		1 mW		
Laser class	IEC/JIS	Class 1		Class 2		
	FDA	Class II				
Spot size <sup>1</sup>	Approx. 25 × 35 μm	Approx. 100 × 700 μm	Approx. 30 × 100 μm		Approx. 260 × 1000 μm	
Linearity <sup>2</sup>	±0.08% F.S. (F.S. = 2 mm)		±0.08% F.S. (F.S. = 10 mm)	±0.08% F.S. (F.S. = 5 mm)	±0.08% F.S. (F.S. = 10 mm)	±0.08% F.S. (F.S. = 5 mm)
Repeat accuracy <sup>2</sup>	0.37 μm		0.46 μm	0.23 μm	0.46 μm	0.23 μm
Sampling period <sup>3</sup>	100 μs / 200 μs / 400 μs / 800 μs / 1600 μs / 3200 μs / AUTO					
Temperature drift <sup>4</sup>	±0.01% F.S./°C (F.S. = 2 mm)	±0.05% F.S./°C (F.S. = 2 mm)	±0.01% F.S./°C (F.S. = 10 mm)	±0.01% F.S./°C (F.S. = 5 mm)	±0.01% F.S./°C (F.S. = 10 mm)	±0.01% F.S./°C (F.S. = 5 mm)
Weight	Approx. 250 g (including 500 mm connector cable)					

Model	CD5-85		CD5-W85		CD5-150	CD5-W150	
Optical method/mode	Diffuse mode	Specular mode	Diffuse mode	Specular mode	Diffuse reflection		
Center of measurement range	85 mm	82.3 mm	85 mm	82.3 mm	150 mm		
Measurement range	±20 mm	±10 mm	±20 mm	±10 mm	±40 mm		
Light source	Medium	Red semiconductor laser					
	Wavelength	650 nm		658 nm		650 nm	658 nm
	Max.output	1 mW					
Laser class	IEC/JIS	Class 2					
	FDA	Class II					
Spot size <sup>1</sup>	Approx. 70 × 290 μm		Approx. 260 × 1200 μm		Approx. ø180 μm	Approx. 330 × 1600 μm	
Linearity <sup>2</sup>	±0.05% F.S. (F.S. = 40 mm)	±0.08% F.S. (F.S. = 20 mm)	±0.05% F.S. (F.S. = 40 mm)	±0.08% F.S. (F.S. = 20 mm)	±0.05% F.S. (F.S. = 80 mm)		
Repeat accuracy <sup>2</sup>	1 μm	0.5 μm	1 μm	0.5 μm	2 μm		
Sampling period <sup>3</sup>	100 μs / 200 μs / 400 μs / 800 μs / 1600 μs / 3200 μs / AUTO						
Temperature drift <sup>4</sup>	±0.01% F.S./°C (F.S. = 40 mm)	±0.01% F.S./°C (F.S. = 20 mm)	±0.01% F.S./°C (F.S. = 40 mm)	±0.01% F.S./°C (F.S. = 20 mm)	±0.01% F.S./°C (F.S. = 80 mm)		
Weight	Approx. 250 g (including 500 mm connector cable)						

Model	CD5-W350	CD5-W500	CD5-W2000
Optical method/mode	Diffuse reflection		
Center of measurement range	350 mm	500 mm	2000 mm
Measurement range	±100 mm	±200 mm	±500 mm
Light source	Medium	Red semiconductor laser	
	Wavelength	658 nm	
	Max.output	1 mW	
Laser class	IEC/JIS	Class 2	
	FDA	Class II	
Spot size <sup>1</sup>	Approx. 700 × 2400 μm	Approx. 1000 × 3700 μm	Approx. 2100 × 7800 μm
Linearity <sup>2</sup>	±0.08% F.S. (F.S. = 200 mm)	±0.08% F.S. (F.S. = 400 mm)	±0.1% F.S. (F.S. = 1000 mm)
Repeat accuracy <sup>2</sup>	5 μm	10 μm	30 μm
Sampling period <sup>3</sup>	100 μs / 200 μs / 400 μs / 800 μs / 1600 μs / 3200 μs / AUTO		
Temperature drift <sup>4</sup>	±0.01% F.S./°C (F.S. = 200 mm)	±0.01% F.S./°C (F.S. = 400 mm)	±0.05% F.S./°C (F.S. = 1000 mm)
Weight	Approx. 250 g (including 500 mm connector cable)		Approx. 450 g (including 500 mm connector cable)

<Measurement conditions>

The measurement conditions are as follows unless otherwise designated: specialized amplifier unit connected, Ambient temperature: 23°C (normal temperature), Supply voltage: 24 VDC, Sampling period: 100 μs (800 μs for CD5-W350/-W500/-W2000 models), Average number of times: 256, Center of measurement range, Measurement target (specular reflection/specular mode: aluminum deposition mirror, diffuse reflection/diffuse mode: white ceramic), digitally measured values.

\*1 Defined with center strength 1/e<sup>2</sup> (13.5%) at the center of measurement range. There may be leak light other than the specified spot size. The sensor may be affected when there is a highly reflective object close to the detection area.

\*2 With an average of 4096 times. Other conditions are the same as the <Measurement conditions> shown above.

\*3 The factory setting is 100 μs for CD5-L(W)25/-W30/-W85/-W150, and 800 μs for CD5-W350/-W500/-W2000.

\*4 Typical examples under the <Measurement conditions> shown above.

## High-performance multi laser displacement sensor **CD5** series

507

Laser Displacement Sensors

### ■ Sensor head: Common specifications

Supply voltage	12 to 24 VDC ±10% or power supplied from a CD5A-□ amplifier unit
Current consumption	45 mA or less (at 24 VDC)
Serial interface*	RS-422 9.6 k to 1843.2 kbps
Indicators	Laser emission indicator: Green (lights up during laser OFF) Measurement range indicator: Orange (ON when near the measurement center) Red (ON when at the near distance side of inside the measurement range) Green (ON when at the far distance side of inside the measurement range) Red/green alternating (alternated lighting occurs when outside the measurement range or when measurement is not possible)
Degree of protection	IP67 (including connector)
Ambient temperature	-10 to +50°C (no freezing or condensation) / when stored: -20 to +60°C
Ambient humidity	35 to 85% RH / when stored: 35 to 85% RH
Ambient illuminance	3,000 lx or less (light receiving surface illuminance with incandescent lamp)
Vibration resistance	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions
Shock resistance	Approx. 50 G (500 m/s <sup>2</sup> ), 3 times in each of the X, Y, and Z directions
Applicable regulations	EMC directive (2004/108/EC) / FDA regulations (21 CFR 1040.10)
Applicable standards	EN 60947-5-7
Warm-up time	Approx. 30 minutes
Material	Housing: Aluminum die-cast, Emitting/receiving part cover: Glass
Cable extension	Up to 50 m using an optional extension cable (not included)

\*If using sensor heads without a amplifier unit, this will always be set to 9.6 kbps when power is on. Also, the relationship between sampling periods and the baud rate at which all measurement data can be sent without loss is as follows.  
100 μs: 921.6 kbps, 200 μs: 460.8 kbps, 400 μs: 230.4 kbps, 800 μs: 115.2 kbps, 1600 μs: 57.6 kbps, 3200 μs: 38.4 kbps

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

High-performance Multi

CDX

CDA

LS

CD22

CD33

CD4

CD5

UQ1-01

UQ1-02

### ■ Amplifier unit

Model	CD5A-N	CD5A-P
No. of connectable sensor heads	Max. 3 units	
Supply voltage	12 to 24 VDC ±10%	
Current consumption	350 mA/24 V (includes analog current output when three sensor heads are connected)	
Temperature drift	±0.01% F.S./°C	
Serial interface	RS-232C/USB	
Analog output	Voltage output: ±10 V/F.S. (output impedance: 100Ω), Current output: 4 to 20 mA/F.S. (load impedance 300 Ω or less)	
Alarm output	NPN open collector	PNP open collector
	Max. 100 mA/24 VDC (residual voltage of Max. 1.8 V)	ON when sensor head measurement is not possible
Control output	NPN open collector	PNP open collector
	Max. 100 mA/24 VDC (residual voltage of Max. 1.8 V)	HI/LO settings possible, hysteresis settings possible
Bank input	ON when connected to ground	ON when connected to 12 to 24 V
Hold input	16 bank selectable	
	ON when connected to ground	ON when connected to 12 to 24 V
Zero reset input	Measured value hold (set using menu)	
	ON when connected to ground	ON when connected to 12 to 24 V
Laser OFF input	Zero resetting possible for sensor head A measured value / sensor head B measured value / sensor head C measured value / calculated values	
	ON when connected to ground	ON when connected to 12 to 24 V
Display method	Turning off is possible for lasers of sensor heads A / B / C	
Degree of protection	Liquid-crystal display	
Ambient temperature	IP20	
Ambient humidity	-10 to +45°C (no freezing or condensation) / when stored: -20 to +60°C	
Vibration resistance	35 to 85% RH / when stored: 35 to 85% RH	
Shock resistance	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions	
Applicable regulations	Approx. 20 G (196 m/s <sup>2</sup> ), 3 times in each of the X, Y, and Z directions	
Applicable standards	EMC directive (2004/108/EC)	
Material	EN 60947-5-7	
Weight	Housing: Polycarbonate Terminal block: Nylon 66	
Amplifier unit sub-functions	Approx. 550 g (including terminal block)	
	Sensor head settings, control output settings, analog output settings, calculation settings, various hold settings, filter settings, bank settings, RS-232C settings, memory copy function, measured value displayed digit settings, display brightness settings, key illumination settings	

● Added CD5-150/-W150 sensor head models can be used with CD5A-□ Hardware Ver.1.7 and Software Ver.4.3 or later. Please inquire when using an earlier version of CD5A-□.