

# Detection, discernment and measurement sensors

Ultra high-speed laser displacement sensor **CCD Style** **New**

## HL-C1 SERIES

Measures displacement with high speed and stability

### Sampling rate of 100μs

The HL-C1 series provides an ultra-fast sampling rate that is the highest level in the industry for displacement sensors in the same class. It allows ultra high-speed measurement of rotating, vibrating and moving workpieces within a wide measurement range of ±20mm.

### Linearity of ±0.1% F.S.

The adoption of a linear image sensing method provides high-precision measurement with a linearity of ±0.1% F.S. (for white ceramic plates).

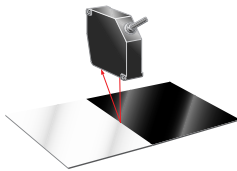
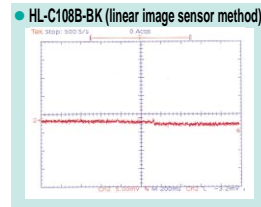
### Touch panel operation, Easy and compact **Industry first**

A variety of setting and measurement data can be displayed easily. (Option)

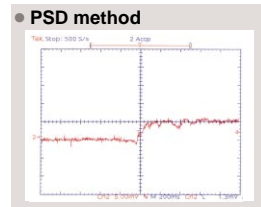


### Color differences unimportant

The linear image sensing method that has been adopted all but eliminates loss in resolution due to changes in the amount of light received that occurs with conventional PSD type sensors. Even black rubber that does not reflect much light can be measured with high precision.



Almost no change in measurement data due to color difference



### Two sensors can be connected to a controller

The controller has two independent channels for input and output which allow up to two sensors to be connected. Furthermore, the controller includes a computational function for carrying out level difference and thickness measurement without the need for a digital panel controller, thus providing additional cost savings.

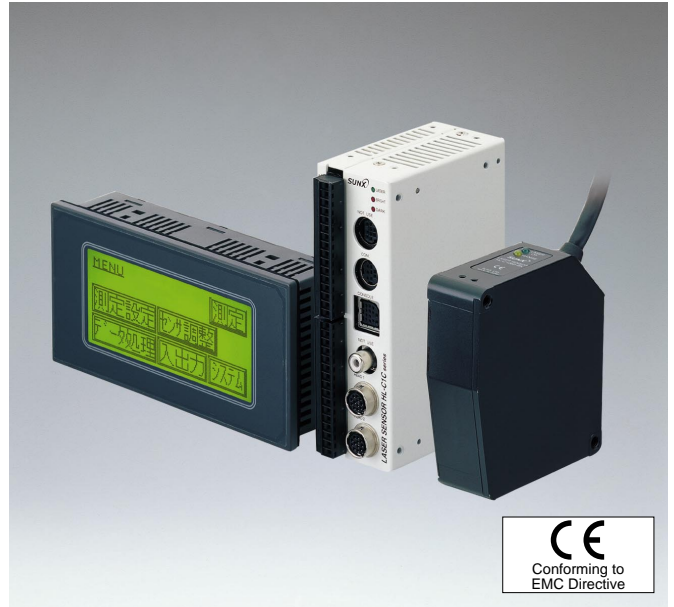
### Upcoming models

A general-purpose type sensor with a center measuring distance of 85mm and a 50mm type will be released in the near future to respond to an even wider range of applications.

#### Sensor

Type	For sensing black objects
Model No.	<b>HL-C108B-BK</b>
Center measuring distance	85mm
Measuring range	±20mm
Emitting element	Red semiconductor laser Class 2 (JIS/IEC) (Max. output: 1mW, peak wavelength: 685nm)
Spot diameter	100 × 140 μm approx. (setting distance: 85mm)
Resolution	6 μm (Note2)
Linearity	±0.1%F.S.
Protection	IP67 (not including connector)
Ambient temperature	0 to +45°C
Cable	Cabletyre cable, 0.5mm long, with connector
Dimensions	W26.6 × H82 × D87mm

Notes: 1) Conditions which have not been specified are to be taken as: 24V DC supply voltage, +20°C ambient temperature, 144μs sampling rate, 64 cycle average, center measuring distance and white ceramic plate. Values are subject to change depending on the object being measured.  
2) This is the average value based on 64 cycles using the SUNX white ceramic plate.



### Controller compact and front connection reduces setup space

The ultra-compact controller with dimensions of W40 × H120 × D74mm requires much less space for installation. Adhesive installation is also possible. Furthermore, the cables can be connected directly or to a removable terminal block, so that all connections come from the same direction in order to further save space.

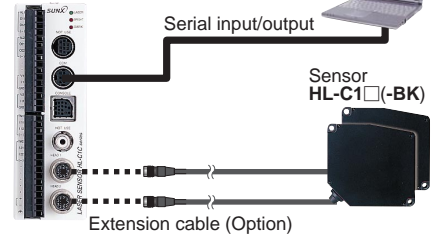
Side-by-side installation OK!



### Equipped with serial input/output

An RS-232C interface for serial input and output is provided so that settings can be retrieved and saved. Measurement values can also be retrieved.

Controller HL-C1C



#### Controller

Model No.	HL-C1C	
Connectable sensor	Max. 2 sensors	
Supply voltage	24V DC ±10%	
Sampling rate	Selectable from 100 μs/144 μs/200 μs/255 μs/332 μs/498 μs/1,000 μs	
Analog output	Voltage	Supply voltage: ±5V/F.S., Output current: Max. 2mA, Output impedance: 50Ω
	Current	Output current: 4 to 20mA/F.S., Load resistance: 250Ω or less
	Output range	Voltage: -10.9 to +10.9V, Current: 1 to 29.5mA
I/O (terminals)	Input	Timing (laser emission stopped), zero set ON, zero set OFF (2 systems: sensor 1 and sensor 2)
	Output	ALARM OUT1, OUT2, N channel FET open drain (2 systems: sensor 1 and sensor 2)
Average cycles	OFF, 2 to 32,768 cycles (switching in 16 steps)	
Ambient temperature	0 to +50°C	
Dimensions	W40 × H120 × D74mm	

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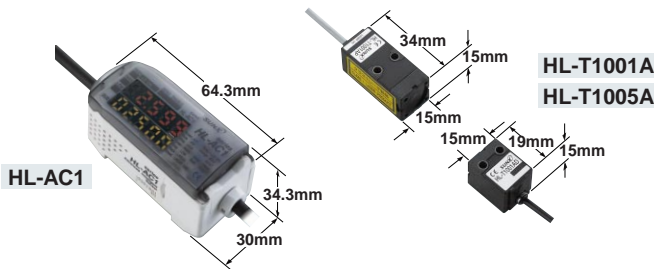
Ultra-compact laser collimated sensors **Class 1** **New**

## HL-T1 SERIES

Ultra-small with a high-functionality intelligent controller

### The industry's smallest sensor head

The most compact size (HL-T1001A/T1005A) and yet the highest level of performance in their class. These sensors save space.



### Resolution of 4μm

A high resolution of 4μm (at an average 64 cycles) allows high-precision positioning and size judgement.

### Long sensing range

Long sensing range of 500mm (HL-T1005A/T1010A) and 2m (HL-T1001A) are available.

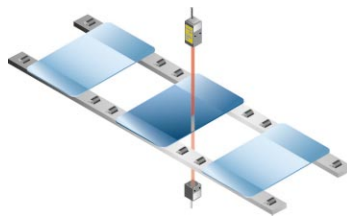
### Adoption of a Class 1 laser

The adoption of a Class 1 laser (IEC/JIS) eliminates the need for safety countermeasures, so that these sensors can be used in photoelectric sensor applications with confidence.

### High-precision judgement even from minute differences in light intensity

The sensors are sensitive to minute differences in light intensity, so that they can judge even the opacity of glass and turbidity of liquids. In addition, the amount of light received can be displayed as a percentage to allow you to determine permeation rates.

Sheet width measurement to determine glass opacity



### Sensor heads

Type	φ 1mm type		5mm type	10mm type
Model No.	HL-T1001A		HL-T1005A	HL-T1010A
Sensing range	0 to 500mm	500 to 2,000mm	0 to 500mm	
Sensing width	φ 1mm	φ 1 to φ 2.5mm	5mm	10mm
Min. sensing object	φ 8 μm opaque object	φ 8 to φ 50 μm opaque object	φ 0.05mm opaque object	φ 0.1mm opaque object
Repeatability (semi-shaded)	4 μm (Note)	—	4 μm (Note)	
Linear output resolution	4 μm (Note)	—	4 μm (Note)	
Ambient temperature	0 to +50°C			
Emitting element	Red semiconductor laser, Class 1 (IEC/JIS) (modulated type, max. output 0.2mW, peak wave length: 650nm)		Red semiconductor laser, Class 1 (IEC/JIS) (modulated type, max. output 0.35mW, peak wave length: 650nm)	
Dimensions	HL-1001A/HL-1005A: Emitter W15×H15×D34mm, Receiver W15×H15×D19mm HL-1010A: Emitter W20×H20×D42mm, Receiver W20×H20×D25mm			

Note: This is the average value based on 64 cycles using the SUNX white ceramic plate.

### Computation unit

Model No.	HL-AC1-CL
Connected	HL-AC1, HL-AC1P
Linked indicator	Orange LED (lights up when controller connected)
Ambient temperature	0 to +50°C
Connection method	Connector
Dimensions	W15.1×H30×D57mm



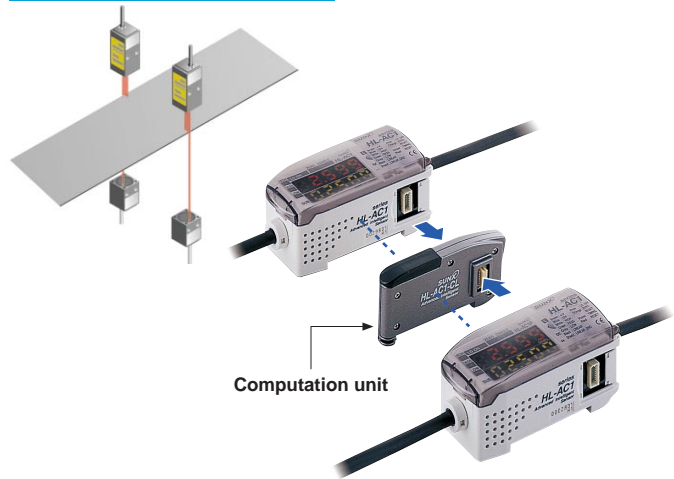
### Minimum sensing object diameter 8μm/ HL-T1001A

The laser with a beam diameter of 1mm can sense extremely small objects with dimensions in micrometers such as bonding wires.

### Computations for 2 sensors are possible

The computation unit (option) just needs to be connected between the two controllers to enable computations (addition and subtraction) to be carried out for two sensors. No digital panel controller is needed either.

#### Sheet width measurement



### Controllers

Type	NPN output type	PNP output type
Model No.	HL-AC1	HL-AC1P
Supply voltage	12 to 24V DC ± 10%	
Measurement rate	150 μs	
Linear output	Current/voltage output selection • For current output: 4 to 20mA/F.S., max. load resistance 300Ω • For voltage output: ± 4V/F.S., output impedance 100Ω (Monitor focus function also allows settings such as ± 5V and 0 to 5V)	
Temperature characteristics	± 0.2% F.S./°C	
Average cycle setting range	1/2/4/8/16/32/64/128/256/512/1,024/2,048/4,096	
Judgment output (HIGH, PASS, LOW)	NPN open-collector transistor	PNP open-collector transistor
Main functions	Basic received light setting, automatic scaling, display reverse, display off mode, ECO mode, variable display precision, measurement processing (timer functions, hold functions), direct threshold value setting, mutual interference prevention (when using computation unit), lock, initialization reset, zero reset, differentiation, sensitivity selection, monitor focus	
Ambient temperature	0 to +50°C	
Dimensions	W30×H34.3×D64.3mm	