

Responding to the Needs of Production Floor

Optical Absolute Method
Contact-Type Digital Displacement Sensor



Class-Top Accuracy

Resolution of 0.1 μm and accuracy of 1 μm or less
Optical absolute method for elimination of
“value skipping” and “unset zero point”

Slim & Robust

Slim body measuring 11 × 18 × 84.5 mm
Industry's top-level robustness

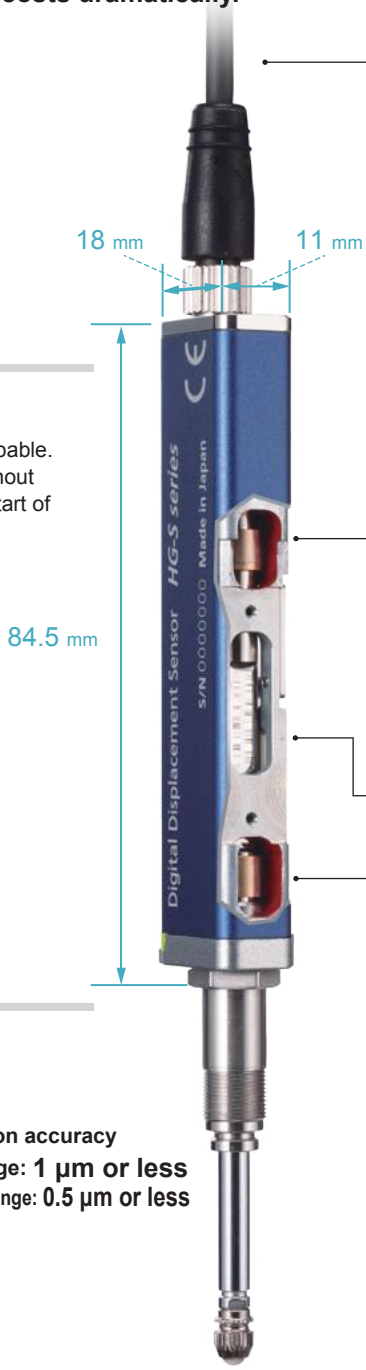
Dual Display Controller

2-line digital display for unprecedented ease of use
Full-fledged functions designed for optimum
ease of operation on production floor



Slim-Design, Robust Contact-Type Digital Displacement Sensor

The slim unit body contains plain bearings featuring a 2-point support structure disperses load and achieves superb durability. The sensor head offers long life and reduces maintenance costs dramatically.



Bending-resistant cable

Hot-swappable
The sensor head is hot-swappable. This allows setup change without power cut-off for immediate start of measurement.

Plain bearings with 2-point support structure

Ball-less bearings are installed at the upper and lower sections of the unit. This ensures excellent strength against lateral loads.

Absolute method for reliable measurements

The high-resolution CMOS sensors read the glass scales that have different slit patterns at different read positions to measure the amount of movement. This provides accurate measurements without "value skipping" even in high-speed measuring operations. It also eliminates "unset zero point."

10-mm stroke
High-precision sensor head

Resolution 0.1 μm	Indication accuracy Full range: 1 μm or less Narrow range: 0.5 μm or less
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General purpose

Resolution: 0.5 μm
Measurement range: 10 mm

- Standard type HG-S1010
- Low measuring force type HG-S1010R



High precision

Resolution: 0.1 μm
Measurement range: 10 mm

- Standard type HG-S1110
- Low measuring force type HG-S1110R



Straight connector



Length: 3 m **CN-HS-C3**
Length: 7 m **CN-HS-C7**
Length: 20 m **CN-HS-C20**

L-shaped connector



Length: 3 m **CN-HS-C3L**
Length: 7 m **CN-HS-C7L**
Length: 20 m **CN-HS-C20L**

Versatile and Easy-to-Use Controller

The controller features the industry's first* dual display and offers versatile functions and excellent ease of use.

Industry's first!

Dual display featuring NAVI function for added indication flexibility

The 2-line digital display simultaneously shows head measurement (measured value) and judgment value (calculated value).

* As a sensor product using optical absolute method, as of September 2015 (according to our company's investigation)

All-direction LCD

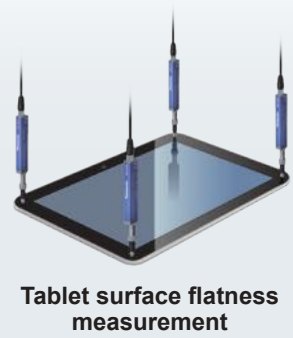
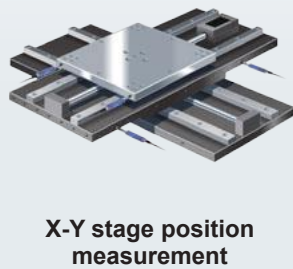
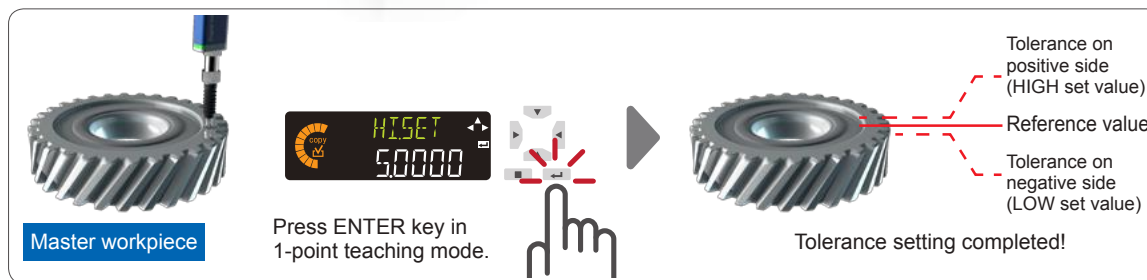
The high-contrast LCD provides sharp and clear indications and wide viewing angle.



High-speed response of 3 ms in combination with any sensor head

Easy setting

Example of tolerance setting with reference to master workpiece



Master unit Up to 15 slave units can be connected per master unit.

Slave units



• High performance type (analog current + input / output)
NPN output type **HG-SC101**
PNP output type **HG-SC101-P**



• High performance type (analog current + input / output)
NPN output type **HG-SC111**
PNP output type **HG-SC111-P**



• Standard type (input / output)
NPN output type **HG-SC112**
PNP output type **HG-SC112-P**



• Wire-saving type **HG-SC113**

Sensor head

Item	Type		General purpose		High precision	
			Standard type	Low measuring force type	Standard type	Low measuring force type
Model No.			HG-S1010	HG-S1010R	HG-S1110	HG-S1110R
Compatible controller			HG-SC101(-P), HG-SC111(-P), HG-SC112(-P), HG-SC113			
Position detection method			Optical absolute linear encoder method			
Measurement range			10 mm (Note 1)			
Stroke			10.5 mm or more (Note 1)			
Measuring force (Note 2) (Note 3)	Downward mount		1.65 N or less 1.1 N (Note 4)	0.35 N or less 0.3 N (Note 4)	1.65 N or less 1.1 N (Note 4)	0.35 N or less 0.3 N (Note 4)
	Upward mount		1.35 N or less 0.85 N (Note 4)	0.12 N or less 0.05 N (Note 4)	1.35 N or less 0.85 N (Note 4)	0.12 N or less 0.05 N (Note 4)
	Side mount		1.5 N or less 0.95 N (Note 4)	0.25 N or less 0.2 N (Note 4)	1.5 N or less 0.95 N (Note 4)	0.25 N or less 0.2 N (Note 4)
Resolution			0.5 μm		0.1 μm	
Indication accuracy (P-P)			Full range: 2.0 μm or less Narrow range: 1.0 μm or less (any 60 μm)		Full range: 1.0 μm or less Narrow range: 0.5 μm or less (any 60 μm)	
Tip deviation amount			35 μm (Typical value)			
Hot swap function			Incorporated			
Operation indicator lamp			2-color LED (Orange / Green)			
Protective structure			IP67 (IEC) (Note 5)	—	IP67 (IEC) (Note 5)	—
Accessory			Standard type (HG-S1010 / HG-S1110): Sensor head fastening wrench 1 pc., mounting nut 1 pc. Low measuring force type (HG-S1010R / HG-S1110R): Sensor head fastening wrench 1 pc., mounting nut 1 pc., rubber bellows 1 pc.			

- Notes: 1) Range of 5 to 10 mm in the case of low measurement force type (HG-S1010R / HG-S1110R) in upward mount position.
 2) Measured at ambient temperature of +20 °C.
 3) In the case of low measurement force type (HG-S1010R / HG-S1110R), measurements were obtained with products in standard configuration without rubber bellows.
 4) Typical value near center of measurement.
 5) Excludes damage and deterioration to the rubber bellows due to external causes.

Controller

Item	Type		Master unit		Slave unit	
			High performance type	High performance type	Standard type	Wire-saving type
Model No.			HG-SC101	HG-SC111	HG-SC112	HG-SC113
NPN output			HG-SC101	HG-SC111	HG-SC112	HG-SC113
PNP output			HG-SC101-P	HG-SC111-P	HG-SC112-P	HG-SC113
Compatible sensor head			HG-S1010(R), HG-S1110(R)			
Number of connectable units			Up to 15 slave units can be connected per master unit.			
Supply voltage			24 V DC ±10 %, including 0.5 V ripple (P-P)			
Current consumption (Note 2)			70 mA or less (when sensor head is connected)			
Analog current output (Note 3)			<ul style="list-style-type: none"> Current output range: 4 to 20 mA / F.S. Error output: 0 mA Linearity: ±0.25 % F.S. Load impedance: 250 Ω max. 		—	
Control output (Output 1, Output 2, Output 3)			<NPN output type> NPN open-collector transistor <ul style="list-style-type: none"> Maximum sink current: 50 mA (Note 4) Applied voltage: 30 V DC or less (between output and 0 V) Residual voltage: 1.5 V or less (at 50 mA sink current) Leakage current: 0.1 mA or less 	<PNP output type> PNP open-collector transistor <ul style="list-style-type: none"> Maximum source current: 50 mA (Note 4) Applied voltage: 30 V DC (between output and +V) Residual voltage: 1.5 V or less (at 50 mA source current) Leakage current: 0.1 mA or less 	—	
	Short-circuit protection		Incorporated (automatic reset type)			
	Decision output		Open / closed switching type when ON (output activated)			
	Alarm output		Open when ON (alarm)			
Response time			3 ms, 5 ms, 10 ms, 100 ms, 500 ms, 1,000 ms switching type			
Display resolution			0.1 μm			
Cable			0.2-mm ² , 2-core cable (brown and blue lead wires) / 0.15-mm ² , 7-core composite cable, 2 m	0.15-mm ² , 7-core composite cable, 2 m	0.15-mm ² , 6-core cable, 2 m	—

- Notes: 1) Measured at a supply voltage of +24 V DC and an ambient temperature of +20 °C, unless otherwise indicated.
 2) Power consumption does not include analog current output.
 3) Linearity F.S. = 16 mA, and is linearity with respect to digitally measured values.
 4) When slave units are connected to the master unit, the maximum sink current / source current of the control output and ambient temperature vary depending on the number of connected slave units.