

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

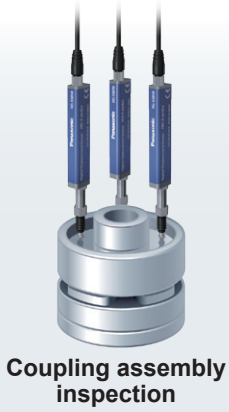
Dual Display Controller

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

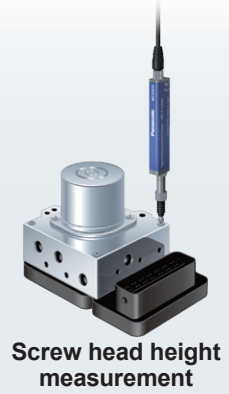


Slim-Design, Robust Contact-Type Digital Displacement Sensor

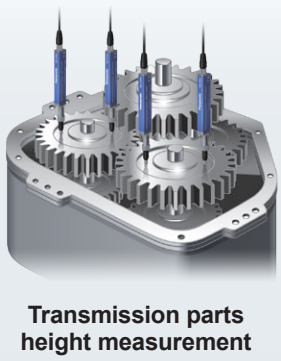
The slim unit body contains plain bearings featuring a 2-point support structure disperses load and achieves superb durability. The sensor head offers long life and reduces maintenance costs dramatically.



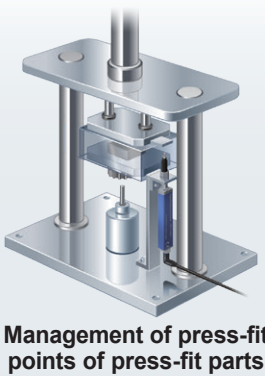
Coupling assembly inspection



Screw head height measurement



Transmission parts height measurement



Management of press-fit points of press-fit parts

Hot-swappable

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

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

84.5 mm

18 mm 11 mm



Bending-resistant cable

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.

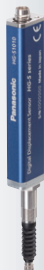
Absolute method for reliable measurements

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."

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

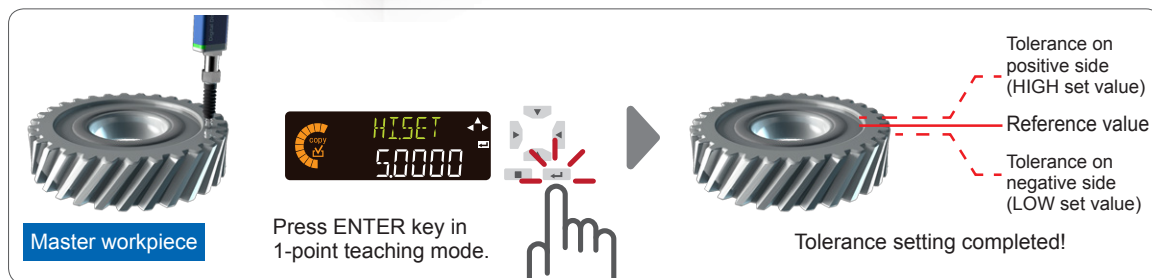
The high-contrast LCD provides sharp and clear indications and wide viewing angle.



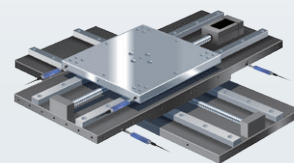
High-speed response of 3 ms in combination with any sensor head

Easy setting

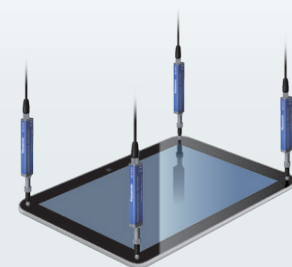
Example of tolerance setting with reference to master workpiece



Motor shaft eccentricity measurement



X-Y stage position measurement



Tablet surface flatness measurement



Resin roller eccentricity measurement

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 | Model No. | General purpose | | High precision | |
|-----------------------------------|----------------|---|-----------------------------------|--|-----------------------------------|
| | | Standard type | Low measuring force type | Standard type | Low measuring force type |
| | | 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 | Model No. | Type | | Master unit | | Slave unit | | |
|---|--------------------------|--|--|--|---|-------------------|------------------|---|
| | | NPN output | PNP output | High performance type | High performance type | Standard type | Wire-saving type | |
| | | | | HG-SC101 | HG-SC111 | HG-SC112 | HG-SC113 | |
| | | | | HG-SC101-P | HG-SC111-P | HG-SC112-P | | |
| 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.