

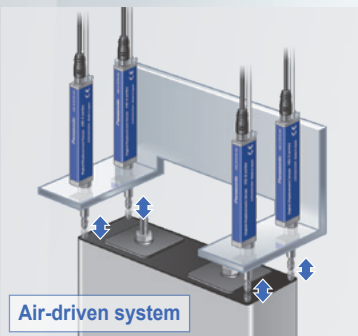
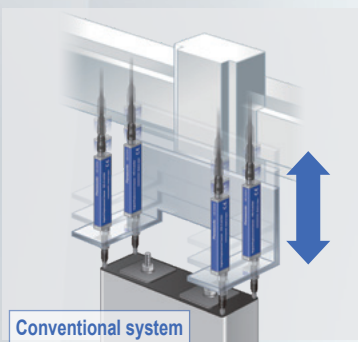
Air-Driven Type · General purpose **HG-S1010-AC**
 Air-Driven Type · High precision **HG-S1110-AC**

Reflecting **opinions of line workers**

Air-Driven Type Digital Displacement Sensor Heads Featuring Slim Body!



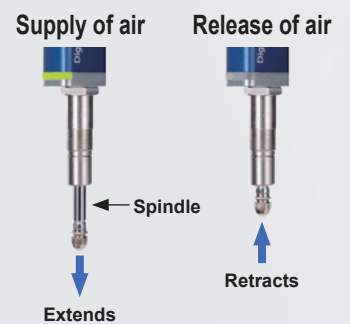
Air-driven type sensor heads simplify equipment mechanisms.



Advantages

- Eliminates the cost and manhours for designing a mechanism to move the sensor head and improves accuracy of the equipment.
- Reduces installation spaces

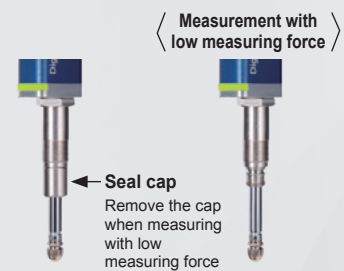
Supply and release of air moves the spindle up and down.



Eliminates the need for designing and installing a mechanism to move the sensor head up and down.

Low measuring force capability

Removal of the seal cap from the main unit allows measurement with low measuring force. The low probe contact force minimizes the possibility of workpiece damage.



10 mm 0.394 in type

Measurement range
 10 mm 0.394 in

Applications

Smartphone flatness measurement



Lithium-ion battery flatness measurement



Parts installation inspection



Robust and slim body contributes to a longer service life

Robust and slim body

Slim & light body

Even with the air-driven mechanism, the sensor head is very slim, with the same 11 mm 0.433 in width as a conventional sensor head. Furthermore, the unit weighs only approx. 80 g. (Note)

Note: Same unit size and weight as HG-S1010(R) / HG-S1110(R)

Plain bearings with 2-point support structure

A new structure supports the spindle with upper and lower plain bearings to significantly increase rigidity. These bearings efficiently disperse lateral loads on the spindle, significantly reducing the risk of breakage.

Metal guide whirl-stop structure



Spindle whirl-stop is accomplished by means of a metal guide requiring a several µm level assembly precision.

Bending-resistant cable

Hot-swappable

The sensor head can be replaced without turning OFF the instrument power.

Optical absolute method

No "value skipping" even when spindle is moving at high speeds

Displacement is measured by reading a glass scale using a high-resolution sensor.

Class-top accuracy

High-precision sensor head (HG-S1110-AC)

Resolution
0.1 µm
0.004 mil

Indication accuracy
Full range:
1.0 µm 0.039 mil or less
Narrow range:
0.5 µm 0.020 mil or less

Resolution
No.1* in class

Indication accuracy
No.1* in class

* As of February 2019, in-company survey.

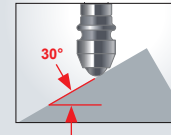
High durability against lateral sliding load

Number of lateral sliding cycles:
10,000,000 or more (typical value)
(under continuous testing)

The robust sensor head helps reduce damage caused by workpiece setup mistakes.

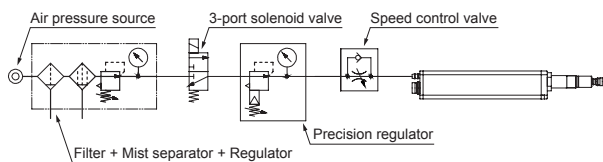
■ Our original durability test against lateral sliding load

Air is supplied and then released repeatedly to move the sensor head positioned at an angle of 30° from the workpiece in the vertical direction. This original test is used to check the durability against lateral sliding load.



Air circuit (recommended)

• When using air-driven type sensor heads (HG-S1010-AC, HG-S1110-AC), configure an air circuit similar to the one shown in the diagram below, and adjust the spindle speed using the speed control valve as needed.



- Notes: 1) Supply clean air (free from moisture, oil, dust, or other foreign objects) to this product.
2) Air pressure may decrease, depending on the length of the air pipe from the air supply source or any pneumatic components (such as needle valves, speed controllers, or mini-filters) that are added. Take care to ensure that air pressure supply to the product is sufficient. Select pneumatic components suitable for the supplied air pressure.
3) The 3-port solenoid valve and speed control valve have their respective mounting directions. Mount each valve in their correct direction by referring to the diagram on the left.
4) A filter with a rated filtration of 5 µm 0.197 mil or less and a mist separator with a rated filtration of 0.3 µm 0.012 mil or less are recommended.

Controller

HG-SC □



Dual display designed for easy, intuitive operation



The controller features a dual display and offers versatile functions and excellent ease of use.

It allows simple and reliable operation of the advanced measurement function in a diversity of applications.

- Dual display for added indication flexibility (equipped with NAVI function)
- All-direction LCD
- Equipped with intuitive circle meter
- Anytime selection of function to copy
- Provided with maintenance mode useful on production floor
- Alarm setting for notification of upward thrust


PRODUCT LINEUP

• Sensor heads




Item	Type	Air-driven type · 10 mm 0.394 in type (Note 1)	
		General purpose	High precision
Appearance			
Model No.		HG-S1010-AC	HG-S1110-AC

Note 1: Be sure to use the sensor in combination with an **HG-SC** controller manufactured in or after February 2019.




• Sensor head connection cables (Bending-resistant type)

Item	Type	Straight connector		
		Length: 3 m 9.843 ft	Length: 7 m 22.966 ft	Length: 20 m 65.617 ft
Appearance				
Model No.		CN-HS-C3	CN-HS-C7	CN-HS-C20





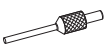




• Controllers

Item	Type	Master unit				
		High performance type (analog current + input / output)				
		NPN output		PNP output		
Appearance						
Model No.		HG-SC101		HG-SC101-P		
Slave units						
		High performance type (analog current + input / output)		Standard type (input / output)	Wire-saving type	
		NPN output	PNP output	NPN output	PNP output	—
Appearance						
Model No.		HG-SC111	HG-SC111-P	HG-SC112	HG-SC112-P	HG-SC113

• Communication units for digital displacement sensors

Item	Type	CC-Link IE Field communication unit	CC-Link communication unit	RS-485 communication unit
Appearance				
Model No.		SC-HG1-CEF	SC-HG1-C	SC-HG1-485

• Options

Item	Type	End plates for controller	Seal cap Provided on air-driven type sensor head	Probe (Note 2)		
				Standard type	Super-hard type	
Appearance						
Model No.		MS-DIN-E 2 pcs. per set	HG-SASC×5 5 pcs. per set	TR-S10-C×5 5 pcs. per set	TR-S10-H	
			Probe (Note 2)		Joint (Note 2)	
Super-hard needle type	Flat-seated type	Roller type	Length 15 mm 0.591 in type	Length 25 mm 0.984 in type		
						
TR-S321-H	TR-S411-K	TR-S601	TR-J102	TR-J104		

Note 2: Available on made-to-order basis

SPECIFICATIONS

Item	Type	Air-driven type · 10 mm 0.394 in type			
		General purpose		High precision	
Model No.		HG-S1010-AC		HG-S1110-AC	
		With no seal cap mounted		With no seal cap mounted	
Regulatory compliance		EMC Directive, RoHS Directive			
Compatible controller (Note 2)		HG-SC101(-P), HG-SC111(-P), HG-SC112(-P), HG-SC113			
Position detection method		Optical absolute linear encoder method			
Measurement range		10 mm 0.394 in (Note 3)			
Stroke		10.5 mm 0.413 in or more (Note 3)			
Measuring force (Note 4)		Downward mount: (Note 5), Upward mount: (Note 5), Side mount: (Note 5)			
Resolution		0.5 μm 0.02 mil		0.1 μm 0.004 mil	
Sampling cycle		1 ms			
Indication accuracy (P-P)		Full range: 2.0 μm 0.079 mil or less Limited range: 1.0 μm 0.039 mil or less (any 60 μm 2.362 mil)		Full range: 1.0 μm 0.039 mil or less Limited range: 0.5 μm 0.02 mil or less (any 60 μm 2.362 mil)	
Tip deviation amount		35 μm 1.378 mil (typical value)			
Hot swap function		Incorporated			
Working pressure range		0.14 to 0.16 MPa	0.035 to 0.045 MPa	0.14 to 0.16 MPa	0.035 to 0.045 MPa
Capacity to resist pressure		0.2 MPa			
Usable fluid		Clean air (Dew point temperature: -10 °C +14 °F or less)			
Applicable tube		Outside diameter: ø4 mm ø0.157 in / Inside diameter: ø2.5 mm ø0.098 in			
Operation indicator		Equipped (2-color LED: Orange / Green)			
Pollution degree		2			
Operating altitude		2,000 m 6561.68 ft or less (Note 6)			
Environmental resistance	Protection	IP67 (IEC) (Note 7)	—	IP67 (IEC) (Note 7)	—
	Ambient temperature	-10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F			
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH			
	Insulation resistance	100 MΩ or more at 250 V DC			
	Vibration resistance	10 to 500 Hz frequency, 3 mm 0.118 in double amplitude (10 to 58 Hz), maximum acceleration 196 m/s ² , (58 to 150 Hz) in X, Y, and Z directions for two hours each			
Shock resistance	1,960 m/s ² acceleration in X, Y, and Z directions three times each				
Grounding method		Capacitor grounding			
Material		Body: Zinc, Holder: Stainless steel, Spindle: Tool steel, Probe (Note 8): Ceramic, Air tube clamp: S60CM			
Weight		Net weight: 80 g approx.			
Accessories		Sensor head fastening wrench: 1 pc., Mounting nut: 1 pc., Seal cap: 1pc, Air tube clamp: 1 pc.			

Notes: 1) Where measurement conditions are not specified, the conditions used were as follows: standard type measurement probe (**TR-S10-C**), ambient temperature of +20 °C **+68 °F**, and a clean atmosphere where water, oil, other liquids or dust does not come in contact with the equipment.

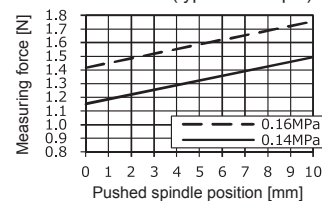
2) Be sure to use the sensor in combination with an **HG-SC** controller manufactured in or after February 2019.

3) The position that represents "0" as an absolute value is a position where the spindle is pushed further down from the bottom dead point by 0.1 mm **0.004 in** or more. The term "stroke" indicates the total stroke length from the bottom dead point to the top dead point.

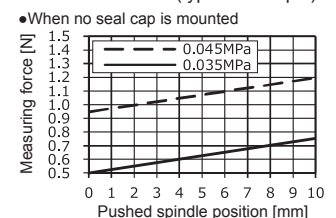
4) Measuring force changes with the air pressure used. Removing the seal cap enables the product to be used as the low measuring force type.

5) For the relationship between supplied air pressure and measuring force or between measuring force and pushed spindle position, see the figures below. For upward mount without a seal cap, subtract 0.2 N from the measuring force. For side mount, subtract 0.1 N from the measuring force. The following figures are only typical examples, and these relationships differ depending on the assembly accuracy of the product or the abrasion status of sealing materials.

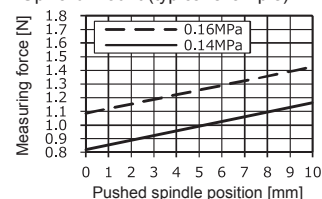
<Downward mount (typical example)>



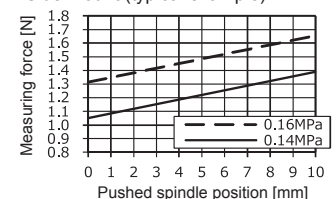
<Downward mount (typical example)>



<Upward mount (typical example)>



<Side mount (typical example)>



6) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.

7) Protective structure is not applicable when the sealing portions have deteriorated or become damaged. The protection level is zero when the seal cap is removed.

8) The probe is also available as an option.

PRECAUTIONS FOR PROPER USE

Refer to the instruction manual for details.
The instruction manual can be downloaded from our website.



- Never use this product as a sensing device for personnel protection.
- When using sensing devices for personnel protection, use products that meet the laws and standards for personnel protection that apply in each region or country, such as OSHA, ANSI and IEC.

• This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its use.

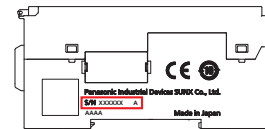
- This device has been developed / produced for industrial use only.
- Do not use this product outside the range of the specifications. Risk of an accident and product damage. There is also a risk of a noticeable reduction of service life.
- This product is suitable for indoor use only.
- Mount the sensor unit perpendicular to the measured surface. Mounting the sensor unit obliquely may not only result in measurement error but also significantly shorten its service life.
- Do not allow excessive horizontal force to be applied to the spindle. This may cause reduced accuracy and durability.
- Mount a pressure-reducing valve to use the product within the allowable working pressure range. Excessive pressure may result in failure or damage.
- Do not use air containing foreign objects (such as dust), water, or oil. Doing so may result in electric shock or failure. To prevent such problems, take appropriate measures such as mounting air filters or mist separators.
- Before performing maintenance, inspection, or cleaning, always shut off air supply completely and check that the pressure inside the product and piping is zero. Failure to do so may result in accidents or failures due to air pressure.
- Sensor head connection cable with L-shape connector **CN-HS-C□L** (optional) cannot be used with an air-driven type sensor head.

How to identify newer and older controllers, and combinations with sensor heads

- Air-driven type sensor heads must be used in combination with **HG-SC□** controllers manufactured in or after February 2019.
- If the **HG-SC□** controller is used together with the **HG-TC□** controller for thru-beam type digital displacement sensor **HG-T** series, make sure to use the **HG-SC□** controller manufactured in or after February, 2019. Furthermore, connect the slaves units of the same series to the side closer to the master unit and the slave units of the other series to the far side.
- When connecting only **HG-S** series controllers, both newer and older controllers can be connected.

How to identify newer controllers (manufactured in or after February 2019)

- Indication on the side of main unit



"A" at the end of serial No.

Combinations with sensor heads

Combination		Newer controller	Older controller
		Manufactured in or after February 2019	Manufactured in or before January 2019
		HG-SC□	HG-SC□
Sensor head	HG-S1010(R)	Possible	Possible
	HG-S1110(R)		
	HG-S1032		
Air-driven type	HG-S1010-AC	Possible	Not possible
	HG-S1110-AC		

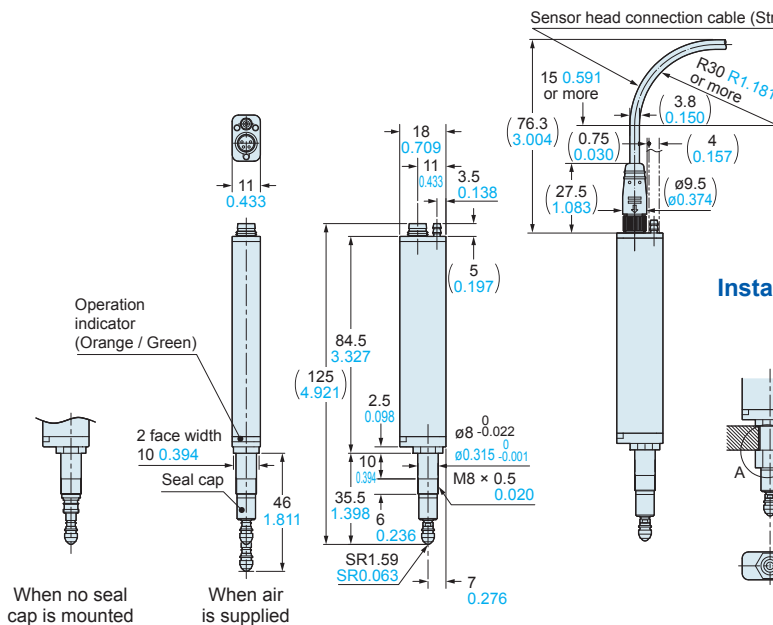
DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

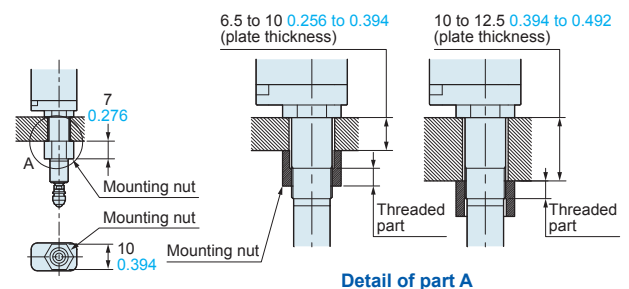
HG-S1010-AC HG-S1110-AC

Sensor head (Air-driven type)

Installation of sensor head connection cable



Installation of mounting nut attachment



Please contact

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