

# Digital Linear Gauge Sensors

**GS-4500/4600 series**  
**GS-6500/6600 series**



Conforming to protection class IP64G (GS-4500/4600 series) and IP64 (GS-6500/6600 series), the GS-4500/4600 and GS-6500/6600 series sensors are designed to be used in harsh environments.

A resolution of either 1  $\mu\text{m}$  or 10  $\mu\text{m}$  can be selected in accordance with the measurement application.

All models are compatible with our DG-4000 series of digital gauge counters which have comparator, offset, peak hold, multiplying, and other functions depending on the model.

**ONO SOKKI**

# Digital Linear Gauge Sensors

A selection of eight models suitable for installation in production lines with environments subject to water splashes, oil splashes or dust.

## Features

- Conforming to environmental protection class IP64G or IP64.
- Various optional parts.
- Compatible with DG-4000 series.
- Compact and small body with high accuracy.
- Low price.

### Structure Conforms to the IP64G Protection Class

The IP64G International Protection number code indicates the protection class with respect to the penetration of dust, water, and oil.  
**IP6X** indicates that the enclosure is dust-tight, with no ingress of dust  
**IPX4** indicates that the enclosure is protected against drops of water and splashing water. Water splashed against the enclosure from any direction shall have no harmful effect.  
**IPXXG** indicates that the enclosure is protected against oil drips and oil splashes. Oil splashed against the enclosure from any direction shall have no harmful effect.

## Compatible counters

**DG-4140**  
(Comparator function)



**DG-4240**  
(Comparator function)



**DG-4280**  
(Preset function)



## A Brief Explanation of Terms

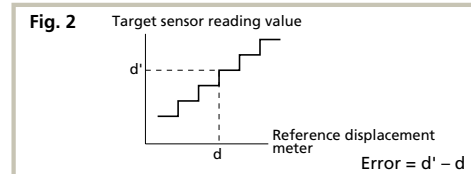
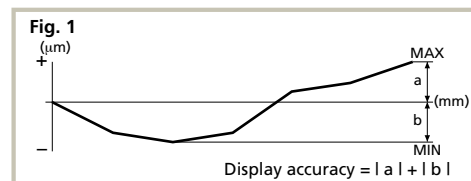
### Display Accuracy

This is the measurement error inherent in a linear gauge sensor. The error (the amount of difference from the actual value) is measured at each specified measurement value, and, when the overall length of the spindle movement is considered, the sum of the absolute values of the maximum error in the positive direction and of the maximum error in the negative direction becomes the display accuracy of that gauge sensor (see Fig. 1).  
Measurement of the accuracy is performed by making comparisons with a reference displacement meter. The difference between the reading value at the time that the lowest order digit of the target sensor changed and the value of the reference displacement meter is taken as the error. This is the reason why the display accuracy of a sensor with a resolution of 10  $\mu\text{m}$  is lower than that of a sensor with a resolution of 3  $\mu\text{m}$ . (see Fig. 2).

### Measurement force

The force used to hold down the workpiece is called the measurement force. Since our gauge sensors feature an internal spring-return mechanism for the spindle, the measurement force is the force measured at the maximum extension limit. The force unit is expressed as N (Newton). The measurement force can be changed by replacing the spindle (except for HS Series models). Please specify your requirements when placing your order.  
Please note that depending on the modification, there may be times when the attachment does not return completely if it is facing upwards or sideways. Likewise, you will need to consult us if modification to a fixed value (see\*1 below) is required.

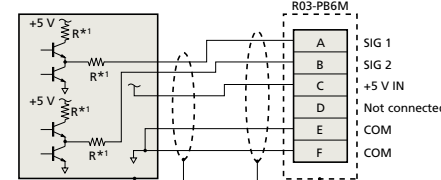
\*1: If, for example, modification to a fixed value for a linear sensor gauge with a measurement range of 13 mm was made, the measurement force for the amount moved within the 0 to 13 mm range becomes a fixed value (variation of  $\pm 10\text{gf}$ ).



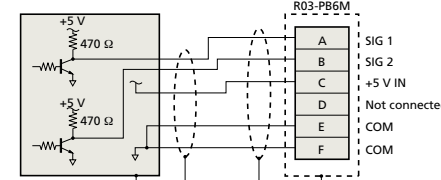
# GS-4500/4600/6500/6600 series

## Output signal circuit

GS-4513/4530/4630/6513/6530/6630



GS-4613/6613

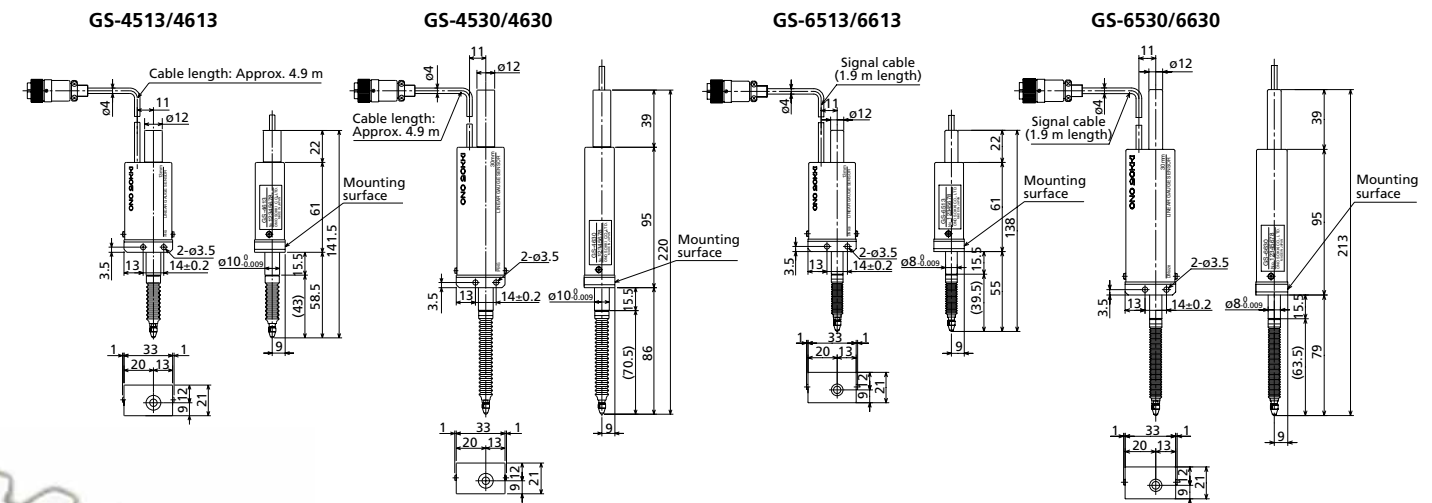


Signal connector R03-PB6M

Pin No.	Signal name	Line color
A	SIG1	Blue
B	SIG2	White
C	+5 V IN	Red
D	NC	Not used
E	COM	Black
F	COM	Green

\* At Ono Sokki, we recommend the use of a linear gauge sensor together with a digital gauge counter. If you plan to use a linear gauge sensor without an Ono Sokki digital counter, please refer to the specifications in the user's manual for the sensor and/or other materials to design your own.

## Dimensional outline drawings



## Specifications

Model name	GS-4513		GS-4530		GS-4613		GS-4630		GS-6513		GS-6530		GS-6613		GS-6630	
Item	GS-4513		GS-4530		GS-4613		GS-4630		GS-6513		GS-6530		GS-6613		GS-6630	
Measuring range	13 mm		30 mm		13 mm		30 mm		13 mm		30 mm		13 mm		30 mm	
Resolution	10 μm				1 μm				10 μm				1 μm			
Display accuracy (at +20°C)	3 μm				2 μm		3 μm		3 μm		3 μm		2 μm		3 μm	
Maximum response speed*1	1 (4) m/s				0.3 (1.2) m/s				1 (4) m/s				0.3 (1.2) m/s			
Measurement force (downward)	3.0 N		4.0 N		3.0 N		4.0 N		1.5 N		2.0 N		1.5 N		2.0 N	
Measurement force (optional modification range)	Approx. 2.3 to 3 N or less*2		Approx. 2.8 to 4.3 N or less*2		Approx. 2.3 to 3 N or less*2		Approx. 2.8 to 4.3 N or less*2		Approx. 0.65 to 1.45 N or less*2		Approx. 0.85 to 2.25 N or less*2		Approx. 0.65 to 1.45 N or less*2		Approx. 0.85 to 2.25 N or less*2	
Number of strokes (measured according to our specified conditions)	At least 5 million															
Protection class (excluding the connector section)	IP64G								IP64							
Stem diameter	ø10 <sup>+0</sup> <sub>-0.009</sub> mm								ø8 <sup>+0</sup> <sub>-0.009</sub> mm							
Power supply	4.5 to 6.0 VDC															
Current consumption (when 5 VDC)	50 mA or less				100 mA or less				50 mA or less				100 mA or less			
Signal output (when 5 VDC)	Two-phase square wave, Phase difference: 90° ± 20°, Output voltage Hi: At least 4.5 V Lo: 0.4V or less															
Output impedance	Approx. 140 Ω				Approx. 470 Ω		Approx. 440 Ω		Approx. 140 Ω				Approx. 470 Ω		Approx. 440 Ω	
Vibration resistance (when the power is off)*3	196 m/s <sup>2</sup> In each of the three axial directions (for 75 minutes each) 10 to 150 Hz sweep								147 m/s <sup>2</sup> In each of the three axial directions (for 75 minutes each) 10 to 150 Hz sweep							
Shock resistance (when the power is off)*4	1960 m/s <sup>2</sup> On each face and in each of the three axial directions Three times each in the ± X, Y, Z directions Total of 18 times Half sine wave								1471 m/s <sup>2</sup> On each face and in each of the three axial directions Three times each in the ± X, Y, Z directions Total of 18 times Half sine wave							
Operating temperature range	0 to +40 °C															
Storage temperature range	-10 to +55 °C															
Cable length	Approx. 4.9 m								Approx. 1.9 m (up to 30 m if the extension option is used)							
Weight (including cables and connectors)	Approx. 270 g		Approx. 310 g		Approx. 270 g		Approx. 310 g		Approx. 190 g		Approx. 220 g		Approx. 190 g		Approx. 220 g	

\*1: Maximum spindle velocity when using our gauge counter; the figures in parentheses represent the maximum response speed when using the DG-4140.

\*2: Due to the modifications, the attachment may not return completely if it is facing upwards.

\*3: The 196 m/s<sup>2</sup> vibration resistance and 1960 m/s<sup>2</sup> shock resistance values are not guaranteed during a measurement operation (GS-4500/4600 Series).

\*4: The 147 m/s<sup>2</sup> vibration resistance and 1471 m/s<sup>2</sup> shock resistance values are not guaranteed during a measurement operation (GS-6500/6600 Series).



