ONO SOKKI

Linear Gauge Sensor
GS-7710A / GS-7710NA
Instruction Manual

This manual describes operations, maintenance, specifications, and handling precautions of the GS-7710A/7710NA Linear Gauge Sensor (hereafter referred to as GS-7710A Series).

Be sure to read this manual before using the GS-7710A Series. In particular, failure to follow some CAUTIONS in this manual may cause property damage. Be sure to handle the GS-7710A Series with the procedures described in this manual. As the manual serves as a warranty card, store it in a safe place after reading it.

Overview and Features

The GS-7710A Series Linear Gauge Sensor is a detector that employs the linear scale method in the displacement conversion mechanism to directly convert the displacement of the spindle to an electrical signal.
Connecting the GS-7710A Series with a Digital Gauge Counter (DG-4140*, DG-4160*, DG-4190*, or DG-2310) from Ono Sokki enables high-precision dimensional measurement.

*) The DG-4140/DG-4160/DG-4190 operates with 1µm resolution and the DG-2310 operates with 0.5µm resolution. When the GS-7710A Series is used with the DG-4140/DG-4160/DG-4190 (1µm resolution), be sure to activate the setup mode and set the factor value to "0.500."

● Features

- Immune to dust and water because of the environmental-proof performance of the IP67.
- Robust body design that endures 5,000,000 slidings (with in-house durability test)

Notes on Use

- The GS-7710A Series Linear Gauge Sensor is a precision instrument. Do not drop the instrument or apply excessive vibration or shock to it. There is a risk of failure or a measurement error.
- Do not disassemble the instrument. Dust such as cutting powder, cutting oil, etc. inside the unit may cause failure. In the case of the GS-7710A Series, the IP67 is not guaranteed.
- Use the instrument in an environment without rapid temperature change and condensation.
- Do not use the instrument in locations where there is corrosive gas or inflammable gas.
- Avoid using the instrument in locations where there is a strong magnetic field or electromagnet noise. There is a risk of malfunction or failure.
- Perform inspection before starting operation.
  - Check whether the spindle smoothly moves.
  - Make sure that the indicated value at a reference point is stable with a block gauge or the like.
  - Make sure that the probe is not loose.
- Do not apply lateral force to the spindle or fasten the stem with excessive force. Doing so may degrade the spindle operation or shorten the operating life of the Sensor.
- Do not suddenly release the pushed-in spindle or perform measurement in the same way. Doing so may degrade the Sensor accuracy or cause damage to the internal mechanism.

  When releasing the spindle is necessary during measurement, be sure that the distance between the spindle and the object under measurement is 1 mm or less. Be careful not to apply shock to the Sensor.
- Attach the Sensor so that the measurement terminal is oriented between the three and nine o'clock directions. If the Sensor is to be oriented in other way, contact Ono Sokki sales office.
- Attach the Sensor so as to be perpendicular to the measurement surface. Obliquely attaching it may cause a measurement error or shorten the operating life of the bearing.
- When the probe is replaced, be careful not to apply torsional force exceeding 0.3 Nm to the spindle. (For replacement of the probe, refer to "Replacing the Probe" on the reverse side.)
- The dust-proof rubber of the GS-7710A Series Linear Gauge Sensor is a dust- and waterproof functional component. Never remove the dust-proof rubber.
- Be careful not to damage the dust-proof rubber by cutting powder or the like. For the dust-proof rubber, perform preventive replacement before being damaged. (For replacement of the dust-proof rubber, refer to "Replacing the Dust-proof Rubber" on the reverse side.)
- Appropriately secure the connection cable so that excessive force is not applied to the Sensor when used. Excessive force applied to the Sensor through the connection cable may cause degradation of accuracy or damage to the Sensor.
- Avoid connecting the cable in parallel with high-voltage cables or power lines. There is a risk of malfunction.
- Be careful not to allow over-stroke (stroke exceeding T.D.C.) at the time of measurement setup. There is a risk of damage to the Sensor.
- Although protection measures equivalent to the IP67 are applied to the GS-7710A Series Linear Gauge Sensor, apply a cover or take other protection measures to prevent the Sensor from getting water and being hit by substance such as cutting powder that damages the dust-proof rubber. Further, do not use the Sensor in locations where it is exposed to direct jet flow.
- Minimize the side pressure to the spindle, that is, 1 N or less.

Measurement Procedures

Follow the steps below to perform measurement with the GS-7710A Series Linear Gauge Sensor.

① Connect the GS-7710A Series Linear Gauge Sensor and a gauge counter.

② Set parameters for the gauge counter.
- When the DG-4140/DG-4160/DG-4190 is used, set the factor value to 0.500.
- When the DG-2310 is used, set the sensor resolution to 0.5µm.

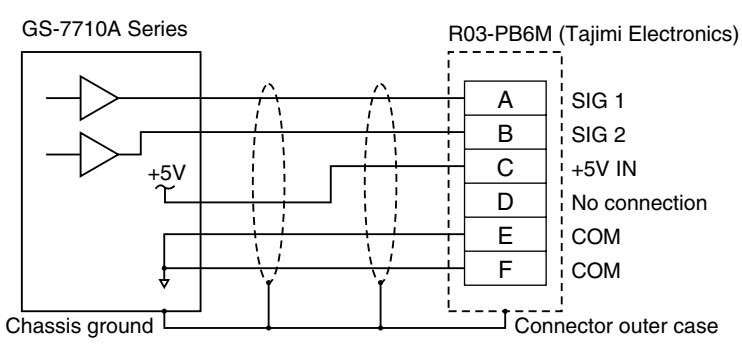
③ Pinch the probe by hand, gently move the spindle, and perform measurement. (Bring the spindle close to the object under measurement by 1 mm or less. Then, drop the spindle being careful not to apply shock to it.)

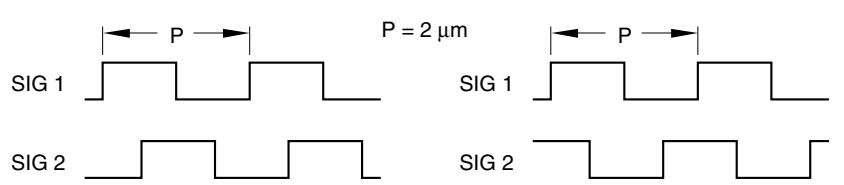
CAUTION:

- The spindle stopper inside the Sensor is made of rubber. Therefore, it does not serve as a reference point for measurement. Use a position at which the spindle is pushed in by 0.2 mm or more as a reference point.
- Never remove the dust-proof rubber that covers the spindle of the GS-7710A Series. If the dust-proof rubber is damaged, urgently contact your dealer or Ono Sokki sales office nearby.

Pin Arrangements and Output Circuit of Output Connector

The following shows pin arrangements and output circuit of the output connector of the GS-7710A Series Linear Gauge Sensor, and phase relation of output signals SIG1/SIG2 at the time of spindle operation. One period of each of the output signals equals to 2µm.





Mounting the Sensor

Follow the steps below to attach the Sensor to equipment or a support fitting.

● Holding the GS-7710A (standard type)

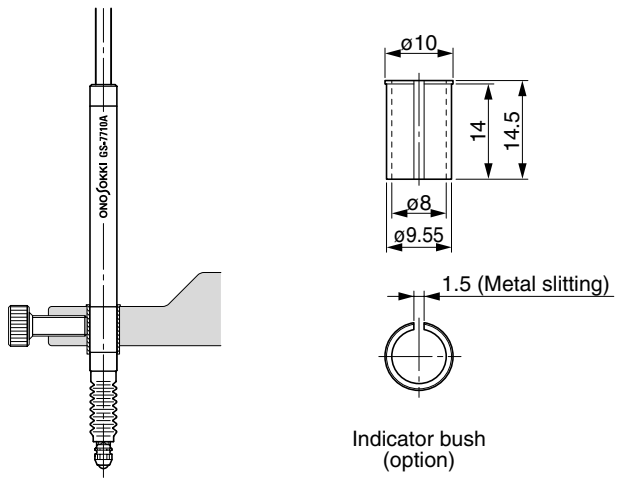
With the GS-7710A, use the gauge stand from Ono Sokki or the following indicator bush (option) to hold the Sensor.

When the indicator bush is used, fasten it with fastening torque of 0.5 Nm or less using a M6 screw. Do not fix the Sensor by directly applying a screw or the like to the stem of the Gauge Sensor.

Fastening the indicator bush too much may disturb the spindle operation. Therefore, make sure that the spindle smoothly operates after clamping.

When the stem is to be fastened, be careful of the following points:

1. After the stem is fastened, check the movement of the spindle.
2. If the spindle does not smoothly move, the stem is fastened too much. Loose the stem.
3. If the spindle is normally moving after the stem is fastened, the stem is fastened appropriately.



● Holding the GS-7710NA (nut type)

With the GS-7710NA, attachable plate thickness is 9.8 to 12.4 mm.

Fasten the nut with fastening torque of 0.8 Nm or less.

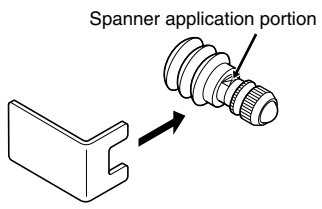
Fastening the nut too much may disturb the spindle operation. Therefore, make sure that the spindle smoothly operates after the nut is fastened.

Replacing the Probe

Do not replace the probe of the GS-7710A Series Linear Gauge Sensor with the Sensor unit fixed. If the probe is replaced with the unit fixed, torque is applied to the inside of the unit through the spindle resulting in an error in a photoelectric converter attached to the spindle. There is a risk of damage to the Sensor.

① Press down the spanner application portion of the spindle with the attached spanner so that torsional force is not applied to the spindle. In this case, be careful not to apply excessive force to the dust-proof rubber.

② Rotate the probe by hand and then attach or detach it. When the probe is to be attached or detached using pliers, etc., apply a soft cloth to the probe to prevent the probe from being damaged.



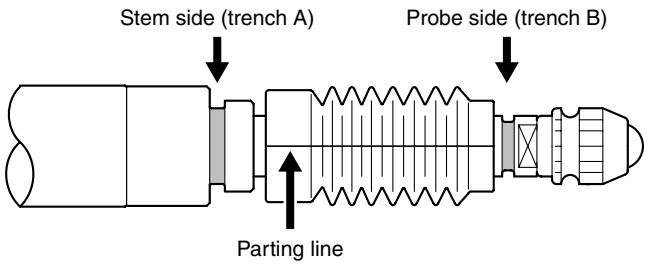
Replacing the Dust-proof Rubber

● Detachment

Remove the probe with the above-mentioned procedures.
Remove the dust-proof rubber from the stem side and then remove the same from the probe side; then remove the entire dust-proof rubber.

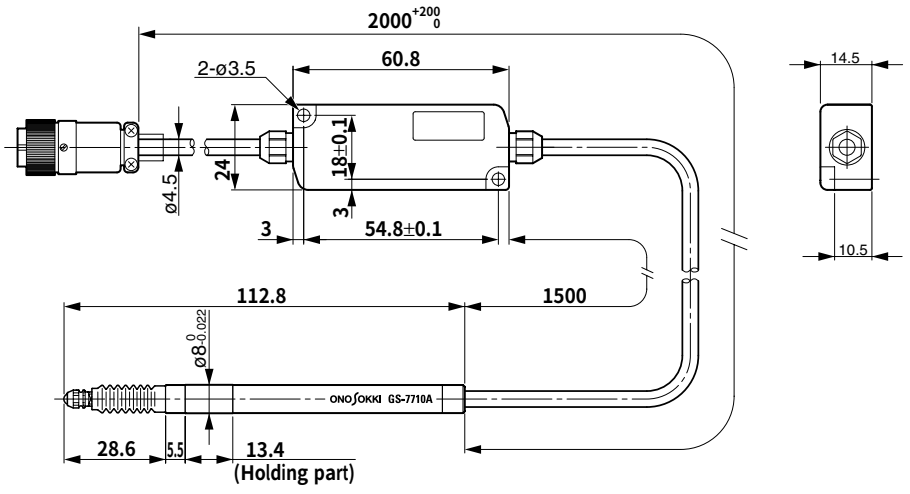
● Attachment

Before attachment, clean the spindle using a cloth dampened with absolute alcohol or the like.
Insert the dust-proof rubber to the middle of the stem and the probe (as shown below).
Then, attach the dust-proof rubber to trench A on the stem side and the same to trench B on the probe side. Note that stained spindle may cause malfunction. If the spindle is stained, clean it using a cloth dampened with absolute alcohol or the like.
After the dust-proof rubber is attached, make sure that the parting line (mold split line formed at the time of molding) of the dust-proof rubber is not twisted. The Sensor does not exhibit sufficient performance if the parting line is twisted.
After the dust-proof rubber is attached, attach the probe according to the attachment procedures.

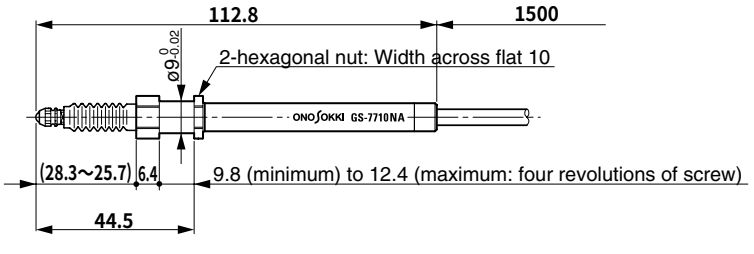


Outside Dimensions (Unit: mm)

■ GS-7710A Outside Dimensions



■ GS-7710NA Outside Dimensions
(Same as GS-7710A Except for Sensor Attachment Section)



Troubleshooting

If you perceive an abnormal condition, check the following points before requesting repair. If the Sensor does not normally operate after check, contact your dealer or Ono Sokki sales office nearby.

Symptom	Cause	Solution/Check Point
Abnormal or rumble movement of the spindle	The stem is fastened too much at the time of attachment.	Do not excessively fasten the stem.
	The dust-proof rubber is degraded by oil, chemicals, or the like.	Oil- and chemical-resistance of the dust-proof rubber is not sufficient. When dust-proof rubber is replaced with new one, take measures for preventing oil or chemicals.
Unstable measurement value	The attachment condition of the Gauge Sensor is not stable.	Securely fix the Gauge Sensor.
	The attachment portion of the probe is loose.	Securely attach the probe.
	Noise is present.	Separate the sensor cable from power lines and equipment generating noise such as switching surge.
	Excessive vibration, excessive shock, or overspeed	Minimize vibration and shock applied to the Gauge Sensor.

Specifications

● Mechanical specifications

Item	GS-7710A	GS-7710NA
Measurement range (mm)	10	10
Resolution (µm)	1 Note	1 Note
Indication accuracy (µm)	2	2
Response speed (m/s)	0.5	0.5
Measured force (N)	1.08 or less	1.08 or less

● Electrical specifications

Item	GS-7710A	GS-7710NA
Power voltage	DC 5 V ±0.5 V	
Current consumption	60 mA or less (5VDC)	
Signal output	Two-phase square wave signal Phase difference 90±20 ° Output voltage Hi: Between 4.4V and power voltage / Lo: 0.4V or lower	
Output profile	CMOS pulse output (equivalent to 74HC4050)	

● General specifications

Operating temperature range	-10°C to +55°C
Storage temperature range	-20°C to +60°C (with an annual average humidity of 75% or less, without condensation)
Cable length	About 2 m
Cable extension	Up to 20 m
Mass	About 140 g (including the cable)
Accessories	Spanner wrench x1, Instruction manual (this manual) x1
Protection class	IP67
Options * Refer to catalog for details.	• Gauge stand: ST-011/022/044B (When the ST-044B is used, the gauge stand for AA-892ϕ10 is required.) • Indicator bush: AA-2500 • Dust-proof rubber for replacement (built-to-order product)

*) The DG-4140/DG-4160/DG-4190 operates with 1µm resolution and the DG-2310 operates with 0.5µm resolution.

Omission of Test Qualification Issuance

Since this product has been tested through a series of strict inspections and a complete program of quality control, issuance of the test qualification has been omitted.

Warranty

1. This product is covered by a warranty for a period of one year from the date of purchase.
2. This warranty covers free-of-charge repair for defects judged to be the responsibility of the manufacturer, i.e., defects occurred while the product is used under normal operating conditions according to descriptions in this manual and notices on the unit label.
3. For free-of-charge repair, contact either your sales representative or our sales office nearby.
4. The following failures will be handled on a fee basis even during the warranty period.
   (a)Failures occurring through misuse, mis-operation, or modification
   (b)Failures occurring through mishandling (dropping) or transportation
   (c)Failures occurring through natural calamities (fires, earthquakes, flooding, and lightening), environmental disruption, or abnormal voltage.

* For repairs after the warranty period expired, contact your sales representative or our sales office nearby.

*Outer appearance and specifications are subject to change without prior notice.
HOME PAGE: http://www.onosokki.co.jp/English/english.htm

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