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# Slim Type Linear Gage LGB2

MANUAL No.4771④
SERIES No.542
Bilingual J-E

## PRECAUTIONS

In order to obtain the best possible performance and longest service life from your Linear Gage, please read this manual thoroughly prior to use.
Be sure to observe the following precautions:

- Do not apply excessive force or bump when setting up and operating the Linear Gage.
- The Linear Gage has been accurately adjusted at the factory. Never attempt to disassemble it.
- To ensure measuring accuracy, do not use the Linear Gage in an environment where it may be subjected to sudden temperature changes.
- When using the Linear Gage in conjunction with other instruments or equipment, an appropriate environment and operating conditions should be ensured for adequate performance.
- Use the Linear Gage as specified below, otherwise the rated function and performance may not be obtained.
- Have preventative safety measures in place to avoid damage should the Linear Gage malfunction.

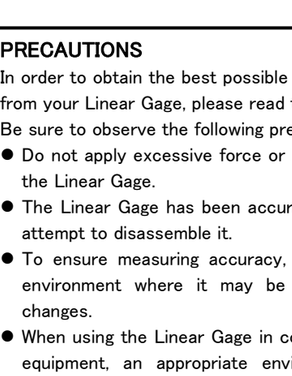
### Electromagnetic Compatibility (EMC)

This product complies with the EMC Directive. Note that in environments where electromagnetic interference exceeds EMC requirements defined in this directive, appropriate countermeasures are required to assure the product performance.

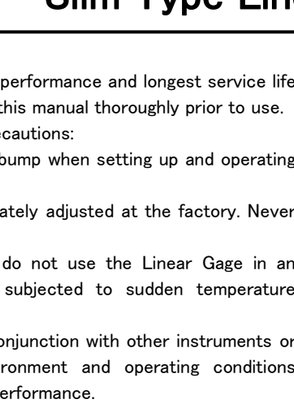
### WARRANTY

In the event that the Mitutoyo Linear Gage should prove defective in workmanship or material, within one year from the date of original purchase for use, it will be repaired or replace, at our option, free of charge upon its prepaid return to us.

## 1. PART NAMES AND DIMENSIONS

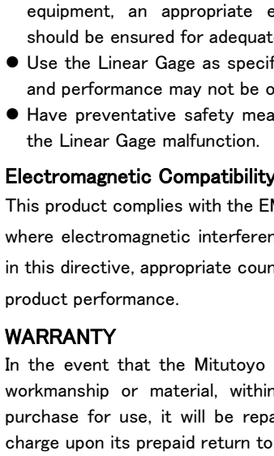



542-244 LGB2-105L



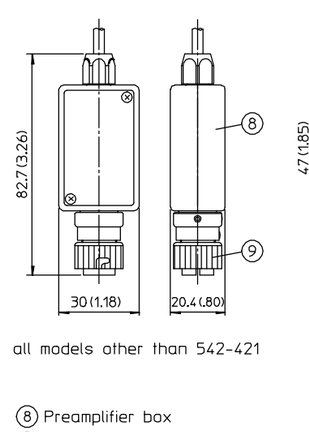

542-246 LGB2-0105L

542-262 LGB2-110 542-262H LGB2-110H 542-264 LGB2-110-1 542-421 LGB2-110S




542-270 LGB2-110AR

① Contact point
② Rubber boot
③ Stem
④ Body
⑤ Connecting cable (Standard accessory:2m)
⑥ Air cylinder
⑦ Air nozzle (for 2.5mm dia. air hose)




all models other than 542-421

⑧ Preamplifier box
⑨ Output connector (HIROSE RM12BPE-6PH)
⑩ Output connector (D-sub)

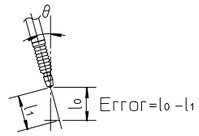
542-421

## 2. INSTALLING THE LINEAR GAGE

Insert the stem into the hole (φ9.5mm,H6) of the gage mount or stand and clamp it with the fixing nut (supplied). Use the supplied wrench.

**CAUTION**

- Do not clamp the Linear Gage using excessive force. This may cause the spindle to stick.
- Do not mount the Linear Gage by clamping with a screw on the stem.
- Do not mount the Linear Gage at any portion other than the stem.
- Mount the Linear Gage perpendicular to the surface to be measured. Otherwise, a measurement error will be produced as shown below.

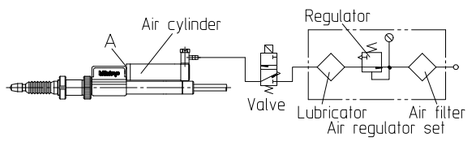



- Ensure that the gage body is not subjected to a force via the pull of the cable. Special care is required when using the LGB2-0105L, or an extension cable.

## CONNECTING THE AIR HOSE(FOR 542-270)

Connect the air hose as specified below :

- Air pressure : 0.3～0.4MPa(3～4kgf/cm²)
- Lubrication oil : Class 1 turbine oil(ISO VG32)

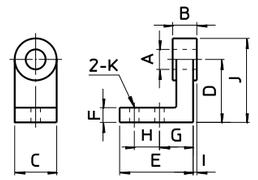



**CAUTION**

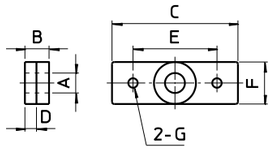
- Never hold the air cylinder when installing the gage. This may damage portion A. Be sure that portion A is not subjected to excessive force when connecting the air hose.

Mitutoyo

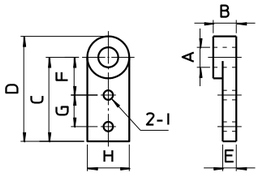
The following optional brackets are available to mount the Linear Gage. If brackets require machining, it is recommended to set dimension B (See the figures below) to 11.5mm.
This Linear Gage has very wide applications. Use of optional brackets is usually more cost-and time-efficient than fabricating custom-designed brackets.
Thus, optional brackets have been designed to mount the Linear Gage on varied machines using varied methods. The brackets are fabricated from cast iron (FC45, nickel-plated).



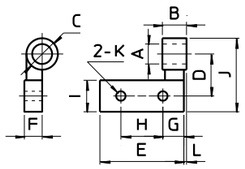

| Order No.303568 Model B-1 | | | |
|---|---|---|---|
| A | φ9.5 | G | 16 |
| B | 11.5 | H | 12 |
| C | 20 | I | 1.75 |
| D | 30 | J | 40 |
| E | 35 | K | φ4.5 |
| F | 7 | | |




| Order No.303570 Model B-3 | | | |
|---|---|---|---|
| A | φ9.5 | E | 40 |
| B | 11.5 | F | 20 |
| C | 60 | G | φ4.5 |
| D | 5.5 | | |




| Order No.303572 Model B-5 | | | |
|---|---|---|---|
| A | φ9.5 | F | 18 |
| B | 11.5 | G | 15 |
| C | 40 | H | 20 |
| D | 50 | I | φ4.5 |
| E | 6.5 | | |




| Order No.303574 Model B-7 | | | |
|---|---|---|---|
| A | φ9.5 | G | 10 |
| B | 11.5 | H | 20 |
| C | φ15 | I | 15 |
| D | 20 | J | 35 |
| E | 40 | K | φ4.5 |
| F | 8.5 | L | 1.25 |

## 3. CONNECTING THE COUNTER

Couple the connector of the Linear Gage with the INPUT connector on the Linear Gage Counter. (Refer to the operation manual that came with the Linear Gage Counter for further details.)

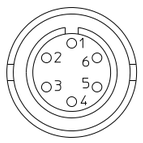
**CAUTION**

To avoid malfunction due to electrical interference, do not place the cable of the Linear Gage near the power cord for other equipment.

## 4. OUTPUT SIGNAL SPECIFICATIONS

4-1. All models other than 542-421

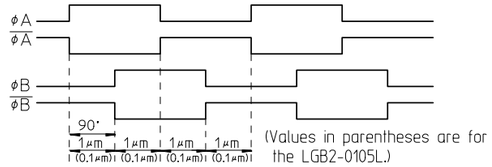
1) Output connector : RM12BPE-6PH (Manufacturer : Hirose)
2) Connector pin assignment



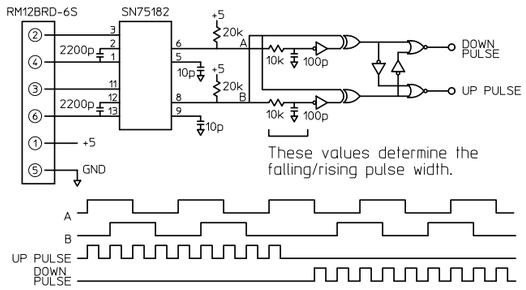

| Pin No. | Signal name |
|---|---|
| 1 | +5V * |
| 2 | φA |
| 3 | φB |
| 4 | $\overline{\phi A}$ |
| 5 | GND |
| 6 | $\overline{\phi B}$ |

* Power supply to the Linear Gage(100mA) The ripple of the power source should be less than 200mV(p-p)

3) Output signal level : +5V (4.8V to 5.3V, 80mA)
$\overline{\phi A}$、φA、$\overline{\phi B}$、φB、TTL output (equivalent to line driver SN75158)
4) Timing chart

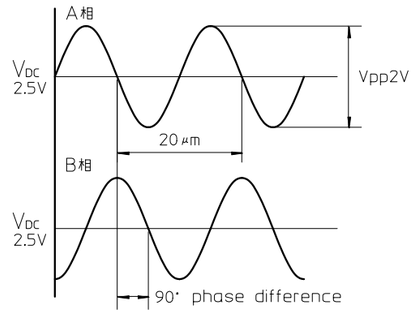



5) Receiving connector and receiver
Connector (RM12BRD-6S, Hirose)
Receiver (Equivalent to differential input line receiver SN75182)
6) Maximum cable length
20m (using an optional extension cable)
7) Basic circuitry for processing received signals
The following diagrams show the basic circuitry for processing the signals from the Linear Gage, and the waveforms of the output signals.

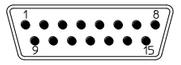



4-2. 542-421

1) Output signal




2) Output connector




・Receiving connector : DS-15S-N(JAE)

・Frame ground : Connect to casting of output connector

| Pin No. | Signal name | Pin No. | Signal name |
|---|---|---|---|
| 1 | 0V | 7 | $V_{DC}$ |
| 2 | 0V | 8 | — |
| 3 | +5V±5%、70mA | 9 | —Alarm |
| 4 | +5V±5%、70mA | 10～14 | — |
| 5 | Phase A | 15 | Do not connect |
| 6 | Phase B | | |

## 5. REPLACING THE CONTACT POINT

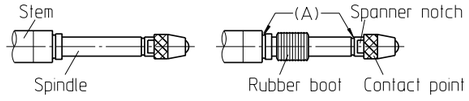
Hold the spindle at the notched portion using the supplied key spanner wrench. Put felt or a soft cloth on the contact point to protect it before removing with a pair of pliers. Then attach a new contact point.

**CAUTION**

- When replacing the contact point, firmly hold the spindle with the key spanner wrench. If torque is applied to the spindle, the internal mechanism of the Linear Gage may be damaged.
- Please be careful enough when handling the knife edge or blade type contact point, since there is a possibility of injury at exchange and use.

## 6. REPLACING THE RUBBER BOOT

① Remove the old rubber boot. Wipe off dust and oil from the grooves (A) with a cloth dampened with thinner.




② Push a new rubber boot over the spindle. The end with the larger diameter should be on the stem side.
③ Apply a small amount of silicone-type adhesive over the grooves (A). Do not allow any of the adhesive to contaminate the spindle; this may cause the spindle to stick.
④ Use a pair of tweezers to fit one end of the boot into the groove on the stem.
⑤ Stretch the boot with your fingers and fit the other end of the boot in the groove on the spindle.
⑥ Use a clean cloth to wipe off the excess adhesive.
⑦ Note: The durability of the rubber boot varies depending on environmental conditions. If the rubber boot deteriorates too quickly, contact the nearest Mitutoyo sales office.

## 7. PROTECTION AGAINST DUST AND WATER

The dust and water resistance of the Linear Gage conforms to IP-54 (DIN40 050-1/IEC529 Specifications).

**CAUTION**

- The preamplifier and counter are not resistant to water. Do not use them in a place where they may be subjected to water or oil.
- If an extension cable is used, completely coat the connections on the cable and preamplifier with a sealant.
- If the insulating cover of the connecting cable is damaged, liquid may enter the Linear Gage, causing a malfunction. Have the damaged cable repaired immediately.
- Cutting chips may damage the rubber boot, reducing its resistance to dust and water. Replace the damaged rubber boot with a new one or have it repaired immediately.
- Some types of chemicals or coolants may corrode the rubber boot and rubber seals. If rubber parts deteriorate too quickly, contact the nearest Mitutoyo sales office.
- The Linear Gage is sealed and cannot be disassembled. Never attempt to disassemble it. Otherwise, seals may be damaged, deteriorating the performance of the Linear Gage.

## 8. SPECIFICATIONS

| Code No | 542-262 | 542-244 | 542-246 |
|---|---|---|---|
| Model | LGB2-110 | LGB2-105L | LGB2-0105L |
| Measuring range | 10mm | 5mm | |
| Resolution | 1μm | | 0.1μm |
| Measuring accuracy (at 20℃) | 2μm | | 0.8μm |
| Quantizing error | ±1count | | |
| Measuring force | | | |
| Upward spindle position | 0.7N or less | 0.55N or less | |
| Horizontal spindle position | 0.75N or less | 0.6N or less | |
| Downward spindle position | 0.8N or less | 0.65N or less | |
| Output signal | Differential square wave signals, 90° phase difference, 4μm pitch (0.4μm*), (conforms to RS-422A) | | |
| Stem diameter | φ9.5mm | | |
| Mass | 150g | 145g | |
| Contact point | Carbide ball (M2.5×0.5) | | |
| Protection class | Conforms to IP-54 | | |
| Operating temperature | 0℃ to 40℃ | | 10℃ to 30℃ |
| Storage temperature | -10 to 60℃ | | |
| Relative humidity | 20 to 80% RH (with no condensation) | | |
| Standard accessory | Key wrench (2 types) | | |
| Optional accessories | | | |
| Rubber boot | 238772 | 238773 | |
| Extension cable | 902434 (5m), 902433 (10m), 902432 (20m) | | |
| Interchangeable contact point | Contact points for Mitutoyo dial indicators can be used. | | |
| CE marking | EMC Directive:EN61326-1<br>Immunity test requirements: Clause 6.2 Table2<br>Emission limit: Class B | | |

* For the LGB2-0105L

| Code No | 542-262H | 542-270 | 542-264 | 542-421 |
|---|---|---|---|---|
| Model | LGB2-110H | LGB2-110AR | LGB2-110-1 | LGB2-110S |
| Measuring range | 10mm | | | |
| Resolution | 1μm | | | |
| Measuring accuracy (at 20℃) | 1μm | 2μm | | |
| Quantizing error | ±1count | | | |
| Measuring force | | | | |
| Upward spindle position | 0.7N or less | | 0.5N or less | 0.7N or less |
| Horizontal spindle position | 0.75N or less | | 0.55N or less | 0.75N or less |
| Downward spindle position | 0.8N or less | | 0.6N or less | 0.8N or less |
| Output signal | Differential square wave signals, 90° phase difference, 4μm pitch, (conforms to RS-422A) | | | Sin Wave signals, 90° phase difference, 20μm pitch |
| Stem diameter | φ9.5mm | | | |
| Mass | 150g | 165g | 150g | 160g |
| Contact point | Carbide ball (M2.5×0.5) | | | |
| Protection class | Conforms to IP-54 | | | |
| Operating temperature | 0℃ to 40℃ | | | |
| Storage temperature | -10 to 60℃ | | | |
| Relative humidity | 20 to 80% RH (with no condensation) | | | |
| Standard accessory | Key wrench (2 types) | | | |
| Optional accessories | | | | |
| Rubber boot | 238772 | | | |
| Extension cable | 902434 (5m), 902433 (10m), 902432 (20m) | | | - |
| Interchangeable contact point | Contact points for Mitutoyo dial indicators can be used. | | | |
| CE marking | EMC Directive: EN61326-1<br>Immunity test requirements: Clause 6.2 Table2<br>Emission limit: Class B | | | |

Mitutoyo

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