

Slim Type Linear Gage LGB

MANUAL No.4685⑦
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.

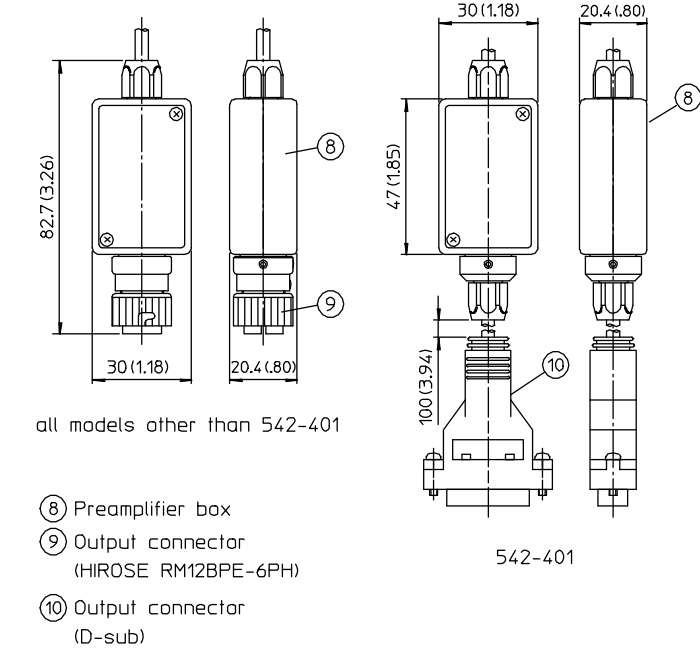
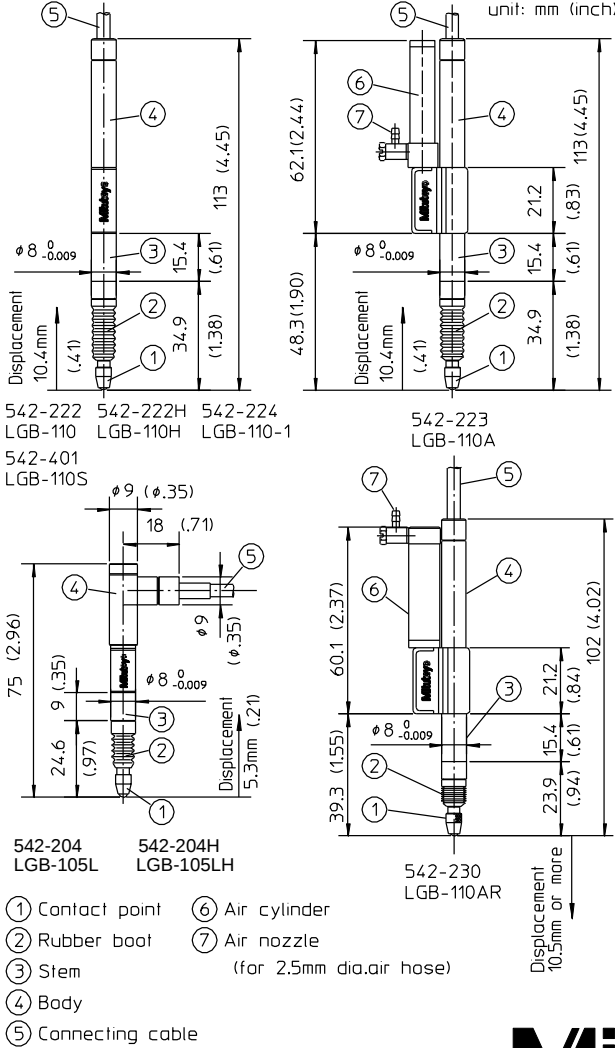
Electromagnetic Compatibility (EMC)

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

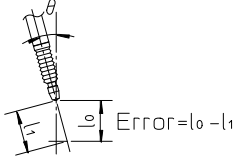


2. INSTALLING THE LINEAR GAGE

Insert the stem into the hole of the gage mount or stand and clamp it with the screw. See the Linear Gage mount examples given below.



- 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.

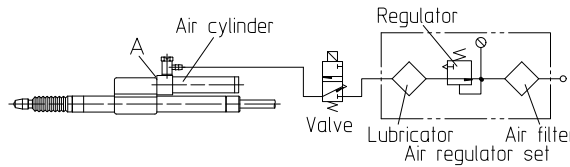


- Ensure that the gage body is not subjected to a force via the pull of the cable.

CONNECTING THE AIR HOSE(FOR 542-223, 542-230)

Connect the air hose as specified below :

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

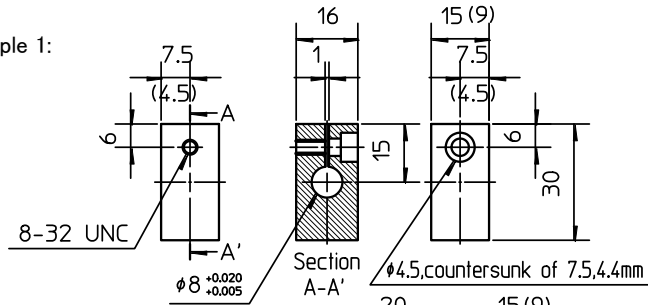


- Never hold the air cylinder when installing the gage. This may damage portion A. Be sure that portion A is not subjected to excessive force when connecting the air hose.

LINEAR GAGE MOUNT EXAMPLES

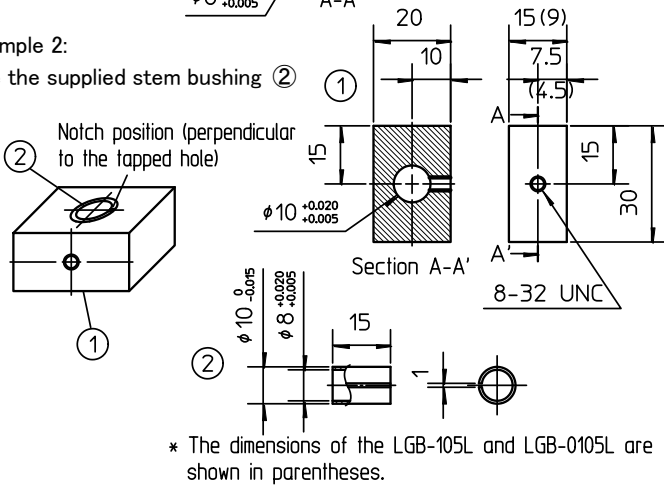
The recommended fastening torque is between 4.0kgf•cm and 5.0kgf•cm.

Example 1:



Example 2:

Use the supplied stem bushing ②



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.)

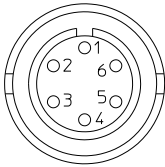


To avoid malfunction due to electrical interference, do not place the cable of the Linear Gage near the power cord for other equipment.

4. OUTPUT SIGNAL SPECIFICATIONS

4-1. All models other than 542-401

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



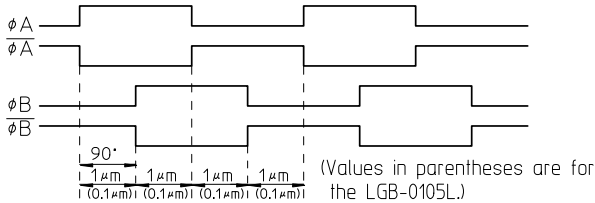
Pin No.	Signal name
1	+5V *
2	φA
3	φB
4	φA
5	GND
6	φB

* 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)

φA, φA, φB, φB, TTL output (equivalent to line driver SN75158)

4) Timing chart



5) Receiving connector and receiver

Connector (RM12BRD-6S, Hirose)

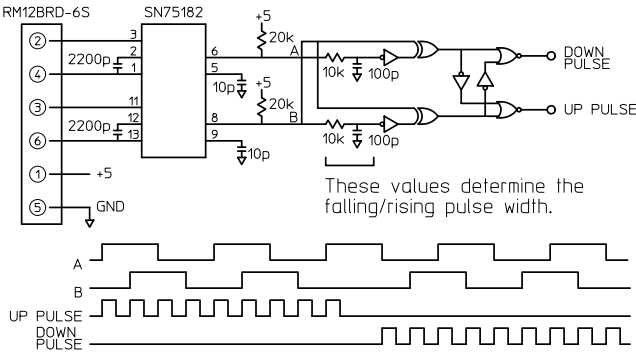
Receiver (Equivalent to differential input line receiver SN75182)

6) Maximum cable length

20m (using an optional extension cable)

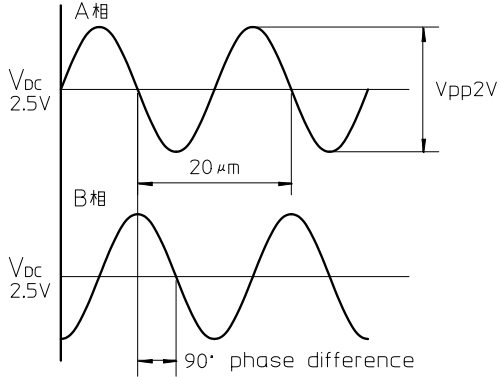
7) Basic circuitry for processing received signals

The following diagrams show the basic circuitry for processing the signals from the Linear Gage, and the waveforms of the output signals.

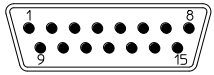


4-2. 542-401

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		

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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.

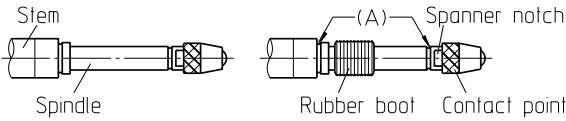


CAUTION

- 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

Order No.	542-222	542-223	542-204	542-204H
Model	LGB-110	LGB-110A	LGB-105L	LGB-105LH
Measuring range	10mm		5mm	
Resolution	1μm			
Measuring accuracy (at 20°C)	2μm			1μm
Quantizing error	± 1 count			
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(0.4μm*) pitch/conforms to RS-422A			
Stem diameter	φ 8mm			
Mass	150g	165g	145g	
Contact point	Carbide ball (M2.5x0.45)			
Supply air pressure	0.3 to 0.4MPa (3 to 4kgf/cm ²), for 542-223 only			
Protection class	Conforms to IP-54			
Operating temperature	0 to 40°C			
Storage temperature	-10 to 60°C			
Relative humidity	20 to 80%RH (no condensation)			
Standard accessory	Key spanner wrench			
Optional accessory				
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 Immunity test requirements: Clause 6.2 Table2 Emission limit: Class B			

Order No.	542-222H		542-230		542-224		542-401	
Model	LGB-110H		LGB-110AR		LGB-110-1		LGB-110S	
Measuring range	10mm							
Resolution	1μm							
Measuring accuracy (at 20°C)	1μm		2μm					
Quantizing error	±1count							
Measuring force	0.7N or less				0.5N or less		0.7N or less	
Upward spindle position								
Horizontal spindle position								
Downward spindle position								
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	φ 8mm							
Mass	150g		165g		150g		160g	
Contact point	Carbide ball (M2.5x0.45)							
Supply air pressure	0.3 to 0.4MPa (3 to 4kgf/cm ²), for 542-230 only							
Protection class	Conforms to IP-54							
Operating temperature	0 to 40°C							
Storage temperature	-10 to 60°C							
Relative humidity	20 to 80%RH (no condensation)							
Standard accessory	Key spanner wrench							
Optional accessory	238772							
Rubber boot								
Extension cable								
Interchangeable contact point	Contact points for Mitutoyo dial indicators can be used.							
CE marking	EMC Directive:EN61326-1 Immunity test requirements: Clause 6.2 Table2 Emission limit: Class B							