








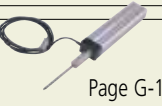







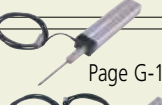

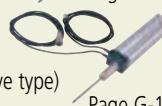






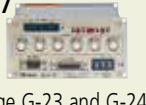










# Gage Heads / Display Units

Resolution	Gage Heads				
	Measuring range				
		5mm / .2"	10mm / .4"	25mm / .1"	
0.00001mm	<b>Laser Hologage</b> Page G-17 Page G-18		<b>542-715A, 542-716A, 542-925A, 542-926A, 542-927A, 542-928A</b> (Low measuring force) Page G-17 and G-18		
0.0001mm	<b>LGB series</b> (nut clamp) Page G-8 <b>LGK series</b> Page G-4 <b>LGF series</b> Page G-15	<b>542-246</b> Refer to page G-16	<b>542-158</b> <b>542-181</b>  Page G-4 and G-15	<b>542-182</b> Page G-15	
	Long Stroke series (Motor-drive type) Page G-11				
0.0005mm	<b>LGK series</b> Page G-4 <b>LGF series</b> Page G-5		<b>542-171</b> <b>542-157</b>  Page G-45 and G-5	<b>542-172</b> Page G-5	
0.001mm	<b>LGK series</b> Page G-4 <b>LGF series</b> • 0.5µm high-resolution type Page G-5		<b>542-156</b> <b>542-161</b>  Page G-4 and G-5	<b>542-162</b> Page G-5	
	<b>LGB series</b> (ø8mm Straight) Page G-7	<b>542-204</b> Refer to page G-7	<b>542-222, 542-401</b> (Sine-wave output) <b>542-222H</b> (High-precision) <b>542-223</b> (air drive) <b>542-224</b> (Low measuring force) <b>542-230</b> (air drive) Page G-7		
	Long Stroke series (Motor-drive type) Refer to page G-11				
	<b>LGB series</b> (nut clamp) Page G-8	<b>542-244</b> Refer to page G-8	<b>542-262</b> <b>542-262H</b> (High accuracy) <b>542-264</b> (Low measuring force) <b>542-421</b> (Sine-wave output) <b>542-270</b> (Air drive) Page G-8		
0.005mm	<b>LGF series</b> Page G-5			<b>542-612</b> Page G-5	
0.0005mm	<b>LGF series</b> Series with reference point mark Page G-6		<b>542-174</b>  Page G-6	<b>542-175</b> Page G-6	
0.001mm	<b>LGF series</b> Series with reference point mark Page G-6		<b>542-164</b>  Page G-6	<b>542-165</b> Page G-6	
0.01mm	<b>LGD series</b> Page G-12		<b>575-326</b>  Page G-12	<b>575-327</b> Page G-12	
	<b>LGS series</b> Page G-14		<b>575-303</b>  Page G-14		

Gage Heads			Display unit		
Measuring range			Point measurement	Calculation measurement (addition and subtraction)	Multi-point measurement
	50mm / 2"	100mm / 4"	EH Counter 542-074A 	Page G-19	
		542-312 542-316  Page G-10	EG Counter 542-015  Page G-21		
		542-313 (Motor-drive type)  Page G-11			
542-173  Page G-5			EB Counter (LGH excluded) 542-092-2  Page G-22	EH Counter 542-071A  Page G-19	EV Counter (LGH excluded) 542-063  Page G-23 and G-24
542-163  Page G-5					
		542-332 542-336  Page G-10	EH Counter 542-075A  Page G-19		
		542-333 (Motor-drive type)  Page G-11	EG Counter 542-015  Page G-21		
542-613  Page G-5			EG Counter 542-015  Page G-21		
542-176  Page G-6			EG Counter 542-017  Page G-21	EH Counter 542-073A  Page G-19	EV Counter 542-067  Page G-23 and G-24
542-166  Page G-6			EB Counter 542-094-2  Page G-22		
575-328  Page G-12			EC Counter 542-007A  Page G-20	EH Counter 542-072A  Page G-19	EV Counter 542-064  Page G-23 and G-24
			EG Counter 542-016  Page G-21		
			EB Counter 542-093-2  Page G-22		

# Linear Gage LGK – Slim, Robust

**Series 542 — Resolutions: 0.1μm, 0.5μm, 1μm**

- Ideal for integration into harsh environments such as automation applications.
- Compact model offers the vibration/shock resistance of the proven LGF series at 1/5 the size compared to LGF-110L-B. Cross-sectional area is approx. 1/5 compared to LGF-110L-B.
- Resolution of each model can be selected from 0.1μm, 0.5μm, or 1μm.
- Excellent sliding durability improved to remain serviceable for at least 15 million cycles (in-house testing).
- Excellent shock resistance, 100g/11 ms (IEC 60068-2-27).

542-158



542-157



542-156



## SPECIFICATIONS

Order No.	542-158	542-157	542-156
Measuring range	10mm (.4")		
Resolution	0.1μm (.000005")	0.5μm (.000020")	1μm (.000050")
Measuring accuracy (20°C)	(0.8+L/50) μm (L=mm)	(1.5+L/50) μm (L=mm)	
Quantizing error	±1 count		
Measuring force	Contact point upward	0.7N or less	
	Contact point horizontal	0.75N or less	
	Contact point downward	0.8N or less	
Position detection method	Photoelectric linear encode		
Response speed*1	400mm/s	1500mm/s	
Output signal	90° phase difference, differential square wave (RS-422A equivalent), minimum edge intervals: 200ns for 0.1μm model, 200ns for 0.5μm model, 400ns for 1μm model		
Output signal pitch	0.4μm	2μm	4μm
Mass	Approx. 175g		
Dust/water resistance*2	Equivalent to IP66 (only gage head)		
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point <b>No.901312</b>		
Stem dia.	ø8mm		
Bearing type	Linear ball bearing		
Output cable length	2m (directly from casing)		
Connector	Plug: RM12BPE-6PH (HIROSE), Compatible receptacle: RM12BRD-6S (HIROSE)		
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)		
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)		
Standard Accessories	Wrench for contact point: <b>No.538610</b>		
Remarks	Gold banded	Blue banded	Green banded

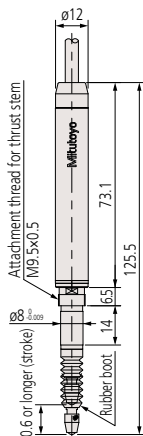
\*1: When the spindle speed exceeds 1500mm/s (400mm/s for 0.1μm model), an alarm signal will be output. Also, if using Mitutoyo counter, an error message will be displayed. If using counters made by other companies, please inquire separately for the alarm signals. For the models of 0.1μm resolution, note that over-speed error may occur depending on the impact amount when releasing the contact point freely.

\*2: IP Code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the kind of liquid.

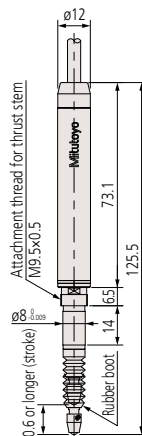
## DIMENSIONS

Unit: mm

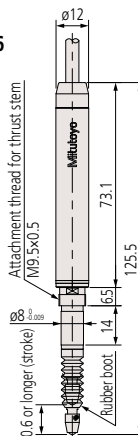
542-158



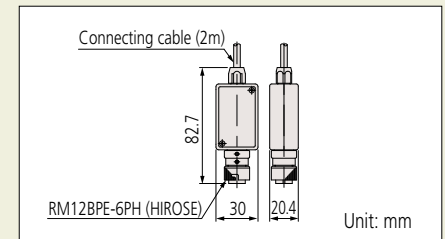
542-157



542-156



## Connector



## Optional Accessories

- Air lifter 10: **No.02ADE230**
- \* Required air pressure: 0.2 to 0.4MPa
- \* Spindle extends when air is supplied.



- Rubber boot: **No.238772** (spare)
- Thrust stem set: \***No.02ADB680**
- Thrust stem: **No.02ADB681**
- Clamp nut: **No.02ADB682**
- Spanner wrench: **No.02ADB683**
- \* A thrust stem set is a combination of thrust stem and a clamp nut. A special spanner is required for tightening. If using multiple gages, a thrust stem set for each gage and one special spanner are required.

Extension cable (5m): **902434**

Extension cable (10m): **902433**

Extension cable (20m): **902432**

## Applicable Counters

**542-075A** EH-101P

**542-071A** EH-102P

**64PKA131** EG-101P

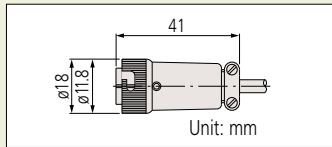
**64PKA134** EB-11P

**64PKA137** EV-16P (not compatible with 542-158)

# Linear Gage LGF – Standard Dimensions, Robust

## Series 542 — Resolutions: 0.5μm, 1μm, 5μm

### Connector



### Optional Accessories

- Air drive unit  
For 10mm range models: **No.02ADE230**  
For 25mm range models: **No.02ADE250**  
For 50mm range models: **No.02ADE270**
- Required air pressure: 0.2 to 0.4MPa
- Spindle extends when air is supplied.



- Rubber boot (spare)  
For 10mm range models: **No.238772**  
For 25mm range models: **No.962504**  
For 50mm range models: **No.962505**
- Thrust stem set  
For 10mm range models: **No.02ADB680**  
Thrust stem: **No.02ADB681**  
Clamp nut: **No.02ADB682**  
For 25/50mm range models: **No.02ADN370**  
Thrust stem: **No.02ADN371**  
Clamp nut: **No.02ADB692**
- External dimensions are described in the dimensional drawing of the product.
- A thrust stem set is a combination of thrust stem and a clamp nut. A special spanner is required for tightening. If using multiple gages, a thrust stem set for each gage and one special spanner are required.
- Spanner wrench  
For 10mm range models: **No.02ADB683**  
For 25/50mm range models: **No.02ADB693**

Extension cable (5m): **902434**  
Extension cable (10m): **902433**  
Extension cable (20m): **902432**

### Applicable Counters

**542-075A** EH-101P  
**542-071A** EH-102P  
**64PKA131** EG-101P  
**64PKA134** EB-11P  
**64PKA137** EV-16P (not compatible with 542-158)

- Excellent vibration/shock resistance due to the design of the spindle guide section.
- Sliding durability improved to remain serviceable for at least 15 million cycles (in-house testing).
- Shock resistance, 100g/11ms (IEC 60068-2-27)
- LGF-Z series, which is equipped with reference point mark on the linear encoder (refer to page G-7), and 0.1μm resolution type (refer to page G-16) are also available.

542-171, -161

IP66



542-172, -162

IP66



542-173, -163

IP66



542-612, -613

IP66



### SPECIFICATIONS

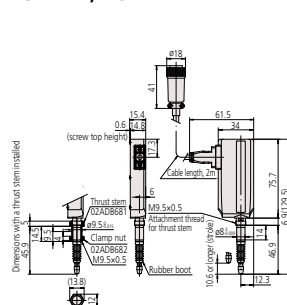
Order No.	542-171	542-161	542-172	542-162	542-612	542-173	542-163	542-613
Measuring range	10mm (.4")		25mm (1")			50mm (2")		
Resolution	0.5μm (.000020")	1μm (.000050")	0.5μm (.000020")	1μm (.000050")	5μm (.0002")	0.5μm (.000020")	1μm (.000050")	5μm (.0002")
Measuring accuracy (20°C) L=arbitrary measuring length (mm)	(1.5+L/50) μm				(7.5+L/50) μm	(1.5+L/50) μm		(7.5+L/50) μm
Quantizing error	±1 count							
Measuring force	Contact point upward	1.0N or less		4.0N or less		4.9N or less		
	Contact point horizontal	1.1N or less		4.3N or less		5.3N or less		
	Contact point downward	1.2N or less		4.6N or less		5.7N or less		
Position detection method	Photoelectric linear encoder							
Response speed*1	1500mm/s							
Output	90° phase difference, differential square wave (RS-422A equivalent), minimum edge intervals: 1000ns for 5μm model, 500ns for 1μm model, 250ns for 0.5μm model							
Output square wave pitch	2μm	4μm	2μm	4μm	20μm	2μm	4μm	20μm
Mass	Approx. 260g		Approx. 300g			Approx. 400g		
Dust/water resistance	Equivalent to IP66 (only gage head)							
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point <b>No.901312</b>							
Stem dia.	ø8mm		ø15mm					
Bearing type	Linear ball bearing							
Output cable length	2m (directly from casing)							
Connector	Plug: RM12BPE-6PH (HIROSE), Compatible receptacle: RM12BRD-6S (HIROSE)							
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)							
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)							
Standard accessories	Wrench for contact point: <b>No.538610</b>		Wrench for contact point: <b>No.04GAA857</b>					

\*1: When the spindle speed exceeds 1500mm/s, an alarm signal will be output. Also, if using a Mitutoyo counter, an error message will be displayed. If using counters made by other companies, please inquire separately for the alarm signals. For the models using 50mm stroke gage, note over-speed speed error may occur depending on the impact amount when releasing the contact point freely.

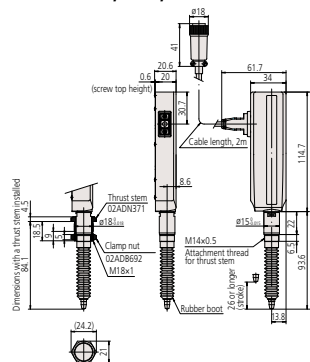
\*2: IP Code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the kind of liquid.

### DIMENSIONS

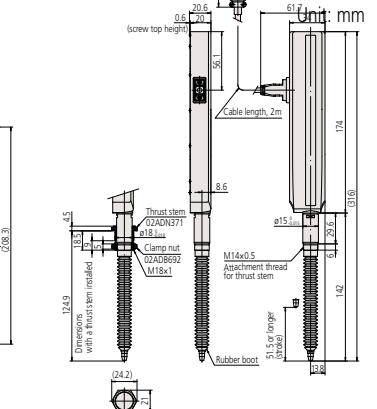
542-171, -161



542-172, -162, -612



542-173, -163, -613



**Mitutoyo**

# Linear Gage LGF-Z – with Reference Point, Standard Dimensions, Robust

**Series 542 — Resolutions: 0.5μm, 1μm**

- LGF series with reference point signal output function.

The master setting to use it, incorporated in the unit, is easy to operate. The origin point can be easily detected even when a fault, such as over-speed error, etc. occurs.

- Sliding durability improved to remain serviceable for at least 15 million cycles (in-house testing).
- Shock resistance, 100g/11ms (IEC 60068-2-27).
- Resolutions are available in 0.5μm or 1μm.

542-174, -164



542-175, -165



542-176, -166



## SPECIFICATIONS

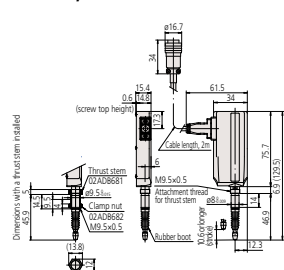
Order No.	542-174	542-164	542-175	542-165	542-176	542-166
Measuring range	10mm (.4")		25mm (1")		50mm (2")	
Resolution	0.5μm (.000020")	1μm (.000050")	0.5μm (.000020")	1μm (.000050")	0.5μm (.000020")	1μm (.000050")
Measuring accuracy (20°C)	(1.5+L/50)μm (L= measuring length (mm))					
Quantizing error	±1 count					
Measuring force	Contact point upward	1.0N or less	4.0N or less		4.9N or less	
	Contact point horizontal	1.1N or less	4.3N or less		5.3N or less	
	Contact point downward	1.2N or less	4.6N or less		5.7N or less	
Position detection method	Photoelectric linear encoder					
Reference mark position	3mm from contact point tip (lowest rest point)		5mm from contact point tip (lowest rest point)			
Reference mark repeatability (20°C): σ	σ≤0.5μm (at a constant reference point passing speed less than 300mm/s in the same direction)					
Response speed*1	1500mm/s					
Output signal	90° phase difference, differential square wave (RS-422A equivalent), minimum edge intervals: 250ns for 0.5μm model, 500ns for 1μm model					
Output square wave pitch	2μm	4μm	2μm	4μm	2μm	4μm
Mass	Approx. 260g		Approx. 300g		Approx. 400g	
Dust/water resistance*2	Equivalent to IP66 (only gage head)					
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point <b>No.901312</b>					
Stem dia.	ø8mm		ø15mm			
Bearing type	Linear ball bearing					
Output cable length	2m (directly extended from the main unit)					
Connector	Plug: PRC05-P8M (TAJIMI), Compatible receptacle: PRC05-R8F (TAJIMI)					
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)					
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)					
Standard accessories	Wrench for contact point: <b>No.538610</b>		Wrench for contact point: <b>No.04GAA857</b>			
Remarks	w/ origin point mark					

\*1: When the spindle speed exceeds 1500mm/s, an alarm will signal. For use of alarm signals, please inquire separately. For models with 50mm stroke, note that over-speed error may occur depending on the impact amount when releasing the contact point freely.

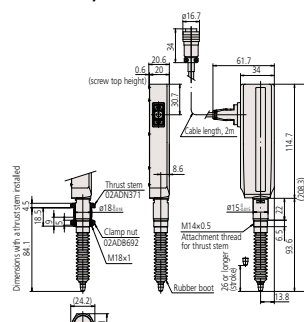
\*2: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the kind of liquid.

## DIMENSIONS

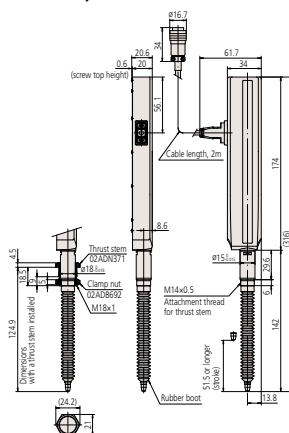
542-174, -164



542-175, -165

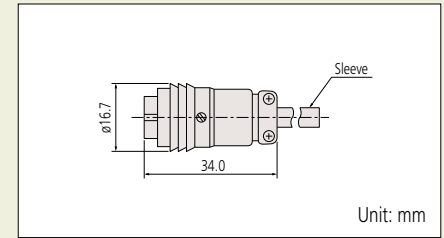


542-176, -166



Unit: mm

## Connector



## Optional Accessories

- Air drive unit
  - For 10mm range models: **No.02ADE230**
  - For 25mm range models: **No.02ADE250**
  - For 50mm range models: **No.02ADE270**
- \* Required air pressure: 0.2 to 0.4MPa
- \* Spindle extends when air is supplied.



- Rubber boot (spare)
  - For 10mm range models: **No.238772**
  - For 25mm range models: **No.962504**
  - For 50mm range models: **No.962505**
- Thrust stem set
  - For 10mm range models: **No.02ADB680**
  - Thrust stem: **No.02ADB681**
  - Clamp nut: **No.02ADB682**
  - For 25/50mm range models: **No.02ADN370**
  - Thrust stem: **No.02ADN371**
  - Clamp nut: **No.02ADB692**
- \* External dimensions are described in the dimensional drawing of the product.
- \* Thrust stem set is a combination of thrust stem and a clamp nut. A special spanner is required for tightening. If using multiple gages, a thrust stem set for each gage and one special spanner are required.
- Spanner wrench
  - For 10mm range models: **No.02ADB683**
  - For 25/50mm range models: **No.02ADB693**

Extension cable (5m): **02ADF260**  
 Extension cable (10m): **02ADF280**  
 Extension cable (20m): **02ADF300**

## Applicable Counters

542-073A EH-102Z  
 64PKA133 EG-101Z  
 64PKA136 EB-11Z  
 64PKA139 EV-16Z





# Linear Gage LGB - Slim

## Series 542 — Resolution: 1μm

### Optional Accessories

- Rubber boot (spare)  
For 5mm range models: **No.238773**  
For 10mm range models: **No.238772**
- Extension cable (5m): **902434**
- Extension cable (10m): **902433**
- Extension cable (20m): **902432**

### Applicable Counters

<b>542-075A</b>	EH-101P
<b>542-071A</b>	EH-102P
<b>64PKA131</b>	EG-101P
<b>64PKA134</b>	EB-11P
<b>64PKA137</b>	EV-16P
<b>542-074A</b>	EH-1025 (for sine wave gages only)

- Compact form (ø8mm straight stem) is an optimal choice as a built-in type sensor.
- The spindle guide uses high-precision linear ball bearings for extremely smooth

- movement and exceptional durability.
- Nut clamp type is also available (LGB2: refer to page G-9).



### SPECIFICATIONS

Type	L-shaped	Straight		Low measuring force	Air-driven contact point *1		Sine-wave output type
Order No.	<b>542-204</b>	<b>542-222</b>	<b>542-222H</b>	<b>542-224</b>	<b>542-230*2</b>	<b>542-223*3</b>	<b>542-401</b>
Measuring range	5mm (.2")	10mm (.4")					
Resolution	1μm (.000050")						*4
Measuring accuracy (20°C)	2μm		1μm	2μm			
Quantizing error	±1 count						
Measuring force*4	Contact point upward	Approx. 0.55N or less	Approx. 0.7N or less	Approx. 0.5N or less	Approx. 0.7N or less		
	Contact point horizontal	Approx. 0.6N or less	Approx. 0.75N or less	Approx. 0.55N or less	Approx. 0.45N or less		
	Contact point downward	Approx. 0.65N or less	Approx. 0.8N or less	Approx. 0.6N or less	Approx. 0.8N or less		
Protection level	Equivalent to IP54 (only gage head)						
Mass	145g	150g		165g		160g	

\*1: Required air pressure: 0.3 to 0.4MPa

\*2: Spindle extends when air is supplied.

\*3: Spindle retracts when air is supplied.

\*4: Depends on the settings of the connected counter. Potential resolution down to 1μm.

### Slim-head low-measuring force series (made to order)

- Low measuring force, suitable for measurement of soft material workpieces.

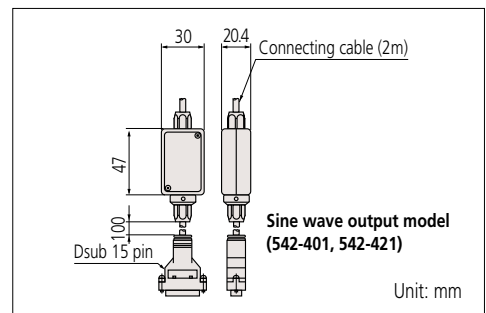
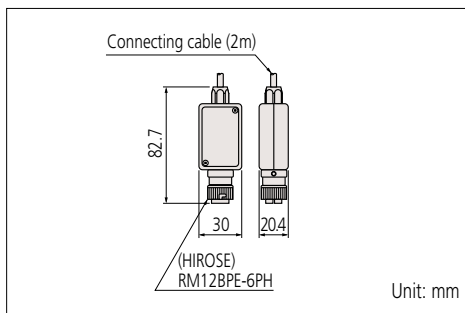
Model	LGB-105L-1	LGB-110A-1/LGB-110AR-1*2
Measuring range	5mm	10mm
Resolution	1μm	1μm
Measuring force*1	Contact point upward	Approx. 0.4N or less
	Contact point horizontal	Approx. 0.45N or less
	Contact point downward	Approx. 0.5N or less

\*1: Measuring force at the retraction of the spindle

\*2: The "R" suffix indicates air retracted spindle

The LGB-□□□-1 is a low measuring force model. Depending on the operating method, the spindle forward speed may become slow compared to the standard model. Please check if this restriction is compatible with the application. Please contact Mitutoyo to verify the application.

### Connector



External dimensions: refer to page G-9.

**Mitutoyo**

1.888.610.7664



www.calcert.com

sales@calcert.com

# Linear Gage LGB2 – Slim, w/Clamp Nut

**Series 542 — Resolution: 1μm**

- Slim design, nut clamp type (Stem dia. is ø9.5mm)
- The spindle guide uses high precision linear ball bearings for extremely smooth movement and exceptional durability.

542-244

IP54



542-262/542-262H

542-264

IP54



542-270

IP54



## SPECIFICATIONS

Type	L-shaped	Straight		Low measuring force	Air-driven contact point*1	Sine-wave output type
Order No.	542-244	542-262	542-262H	542-264	542-270*2	542-421
Measuring range	5mm (.2")	10mm (.4")				
Resolution	1μm (.000050")					*3
Measuring accuracy (20°C)	2μm		1μm		2μm	
Maximum response speed	900mm/s					
Measuring force	Contact point upward	Approx. 0.55N or less	Approx. 0.7N or less		Approx. 0.5N or less	Approx. 0.7N or less
	Contact point horizontal	Approx. 0.6N or less	Approx. 0.75N or less		Approx. 0.55N or less	Approx. 0.75N or less
	Contact point downward	Approx. 0.65N or less	Approx. 0.8N or less		Approx. 0.6N or less	Approx. 0.8N or less
Protection level*4	IP54					
Mass	160g	170g			170g	180g

\*1: Required air pressure: 0.3 to 0.4MPa

\*2: Spindle extends when air is supplied.

\*3: Depends on the settings of the connected counter. Potential resolution down to 1μm.

\*4: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

## Slim head low measuring force series (made to order)

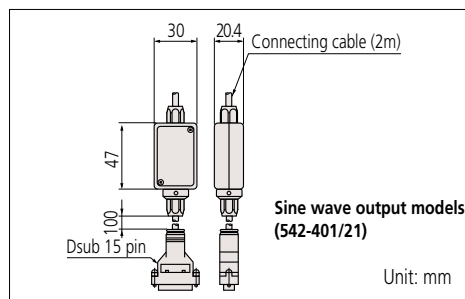
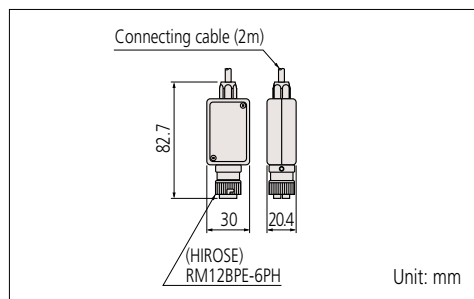
- Low measuring force, suitable for measurement of soft-material workpieces.

Model	LGB2-105L-1	LGB2-110AR-1
Measuring range	5μm	10μm
Resolution	1μm	1μm
Measuring force*	Contact point upwards	Approx. 0.4N or less
	Contact point horizontal/Contact point upwards	Approx. 0.45N or less
	Contact point downwards	Approx. 0.5N or less

\* Measuring force at the retraction of the spindle

The LGB2-□□□-1 is a low measuring force model. Depending on the operating method, the spindle forward speed may become slow compared to the standard model. Please check if this restriction is compatible with the application. Please contact Mitutoyo to verify the application

## Connector



External dimensions: refer to page G-9.

## Optional Accessories

- Rubber boot (spare)  
For 5mm range models: **No.238773**  
For 10mm range models: **No.238772**
- Extension cable (5m): **902434**
- Extension cable (10m): **902433**
- Extension cable (20m): **902432**

## Applicable Counters

- 542-075A** EH-101P
- 542-071A** EH-102P
- 64PKA131** EG-101P
- 64PKA134** EB-11P
- 64PKA137** EV-16P
- 542-074A** EH-1025 (for sine wave gages only)

# Linear Gage LGB2 – Slim

Series 542 — Resolution: 1µm

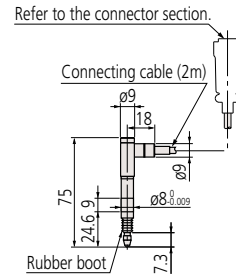
## Applicable Counters

542-075A	EH-101P
542-071A	EH-102P
64PKA131	EG-101P
64PKA134	EB-11P
64PKA137	EV-16P
542-074A	EH-102S (for sine wave gages only)

## DIMENSIONS

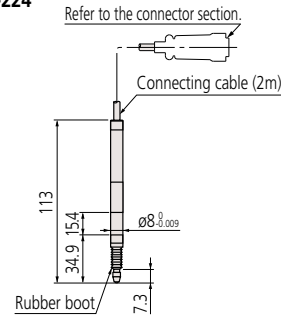
Unit: mm

542-204

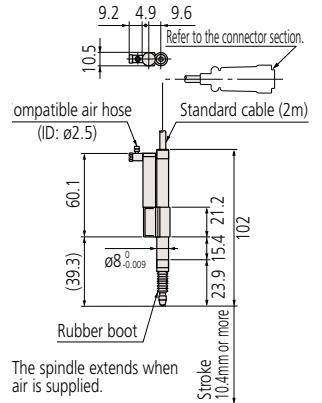


542-222/No.542-222H

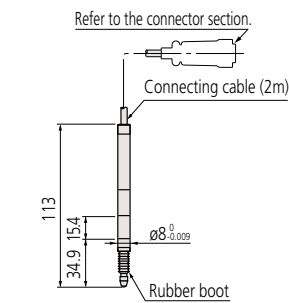
542-224



542-230

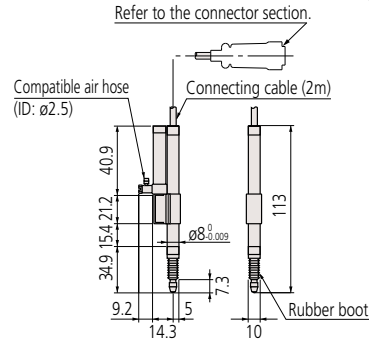


542-401



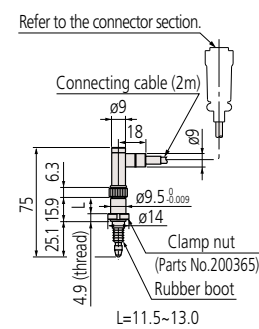
Connectable to Mitutoyo linear scale counter.

542-223



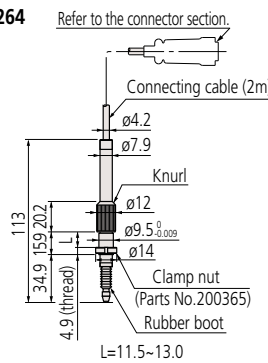
The spindle retracts when air is supplied.

542-244

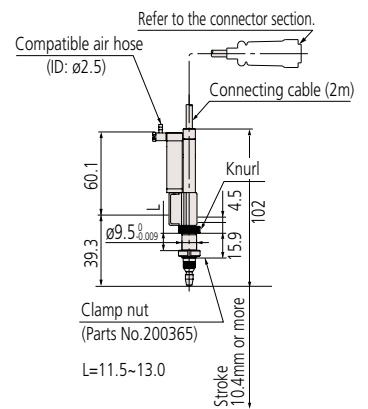


542-262/542-262H

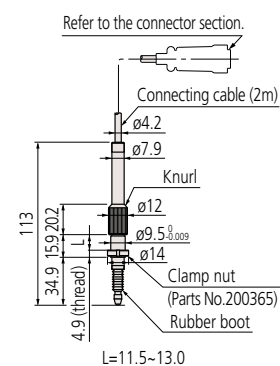
542-264



542-270



542-421



Connectable to Mitutoyo linear scale counter.

The spindle extends when air is supplied.

**Mitutoyo**

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# Linear Gage LG – Long Range

**Series 542 — Resolutions: 0.1μm, 1μm**

- A series to cover maximum measuring range, 100mm.
- Three versions are available; standard model, low measuring force model, and rubber boot type (made to order).
- The resolution of each model can be selected from 0.1μm and 1μm.



IP54

542-312

## SPECIFICATIONS

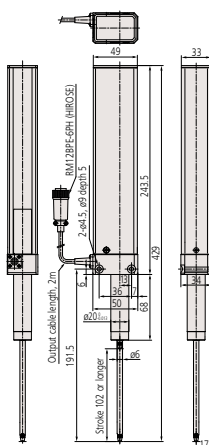
Type	Standard spar type	Low measuring force	Rubber boot type	Standard spar type	Low measuring force	Rubber boot type
Order No.	<b>542-312</b>	<b>542-316</b>	<b>542-314</b>	<b>542-332</b>	<b>542-336</b>	<b>542-334</b>
Measuring range	100mm (4")					
Resolution	0.1μm (.000005")			1μm (.000050")		
Measuring accuracy (20°C)	(2+L/100)μm≤2.5μm L= measuring length (mm)			(2+L/100)μm≤2.5μm L= measuring length (mm)		
Quantizing error	±1 count					
Measuring force	Contact point downward	Approx. 8.0N or less	Approx. 3.0N or less	Approx. 8.0N or less	Approx. 3.0N or less	Approx. 8.0N or less
	Contact point horizontal	Approx. 6.5N or less	—	Approx. 6.5N or less	—	Approx. 6.5N or less
	Contact point upward	Approx. 5.0N or less	—	Approx. 5.0N or less	—	Approx. 5.0N or less
Position detection method	Photoelectric linear encoder					
Response speed*1 (max. electrical response speed)	Approx. 400mm/s			Approx. 800mm/s		
Output signal	90° phase difference, differential squarewave (RS-422A equivalent)					
Spindle drive	Helical extension spring					
Spindle guide	Bearing guide					
Stem diameter	ø20mm					
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5) Standard contact point No.901312					
Shock resistance	60g (in-house testing)					
Cable length	Approx. 2m (directly extended from the gage unit)					
Spindle sealing method	Scraper type		Rubber boot type	Scraper type		Rubber boot type
Dust/water resistance*2	Equivalent to IP54		Equivalent to IP66	Equivalent to IP54		Equivalent to IP66
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)					
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)					
Input/output connector	For calculation: RM12BPE-6PH (HIROSE) Compatible receptacle: RM12BRD-6S (HIROSE)					
Mass (including cables)	Approx. 750g		Approx. 780g	Approx. 750g		Approx. 780g
Standard accessories	Wrench for contact point: <b>No.04GAA857</b> Hexagon socket head cap screw, M4×0.7×35, 2 pcs. (for gage fixing) Round flat washer, nominal 4, 2 pcs. (for gage fixing) Lifting clip: <b>No.137693</b> Fixing holder: <b>02ADG181</b> (for fixing lifting lever)					
Remarks	Standard	Low measuring force	w/ rubber boot	Standard	Low measuring force	w/ rubber boot

\*1: Note that over-speed error may occur depending on the indentation amount when releasing the contact point freely after indentation.

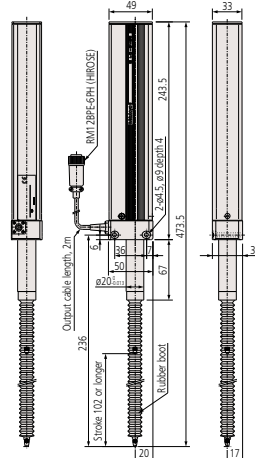
\*2: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the kind of liquid. (Only gage head)

## DIMENSIONS

542-312, -316, -332, -336



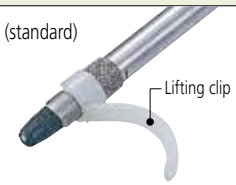
542-314, -334



Unit: mm

## Lifting clip attachment

137693 (standard)



## Optional Accessories

- Rubber boot: **02ADA004** (for rubber boot type)

Extension cable (5m): **902434**

Extension cable (10m): **902433**

Extension cable (20m): **902432**

## Applicable Counters

For **542-312, 542-316, 542-314**

**542-075A** EH-101P

**542-071A** EH-102P

**64PKA131** EG-101P

**64PKA134\*** EB-11P

For **542-332, 542-336, 542-334**

**542-075A** EH-101P

**542-071A** EH-102P

**64PKA131** EG-101P

**64PKA134\*** EB-11P

**64PKA137\*** EV-16P

\* Not for use with 0.1μm resolution gages.

**Motor drive unit**  
**No.02ADG400**  
 (standard accessory for LGM series main unit)



- A unit to move the spindle of the LGM series forward and backward.

### Measuring force

Can be set with the rotary switch of the main unit (to one of the combinations of H/L and a number between 0 and 9) depending on the mounting position.

### External dimensions

90 (W)×175 (D)×74 (H)mm (rubber boot excluded)

### External input signal

Spindle retract  
 Spindle extend

### External output signal

Spindle stop signal at upper limit

### Mass

Approx. 700g

### Power supply

120V AC

### Optional Accessories

- Rubber boot: **02ADA004** (for rubber boot type)

Extension cable (5m): **902434**

Extension cable (10m): **902433**

Extension cable (20m): **902432**

### Applicable Counters

For **542-313**, and **542-315**

**542-075A** EH-101P

**542-071A** EH-102P

**64PKA131** EG-101P

**64PKA134\*** EB-11P

For **542-333**, and **542-335**

**542-075A** EH-101P

**542-071A** EH-102P

**64PKA131** EG-101P

**64PKA134\*** EB-11P

**64PKA137\*** EV-16P

\* Not for use with 0.1μm resolution gages.

# Linear Gage LG – Long Range, Motorized

## Series 542 — Resolutions: 0.1μm, 1μm

- Long stroke (100mm), motor-driven spindle.
- Rubber boot type (made-to-order) is also available.
- Resolutions are available in 0.1μm and 1μm.



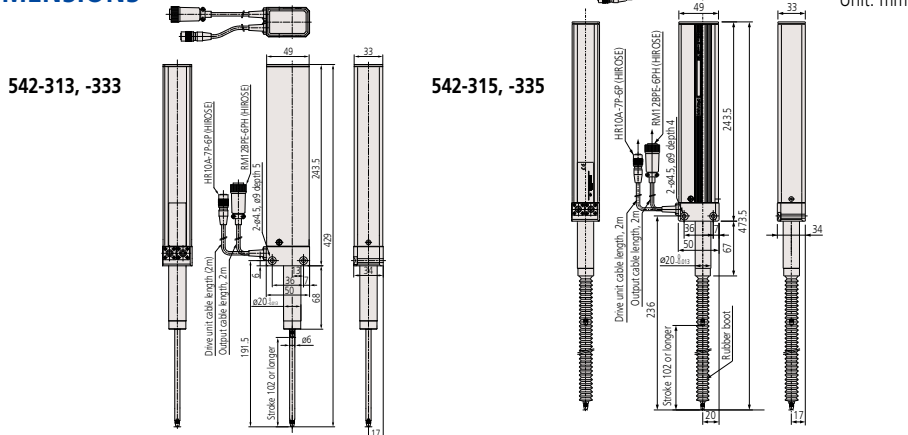
### SPECIFICATIONS

Type	Standard spar type		Rubber boot type		Standard spar type		Rubber boot type			
Order No.	542-313		542-315		542-333		542-335			
Measuring range			100mm (4")							
Resolution			0.1μm (.000005")			1μm (.000050")				
Measuring accuracy (20°C)			(2+L/100) μm ≤ 2.5μm L=arbitrary measuring length (mm)			(2.5+L/100) μm ≤ 3μm L=arbitrary measuring length (mm)				
Quantizing error			±1 count							
Measuring force	Contact point downward	H4 (9.5N)	L9 (6.0N)		H4 (9.5N)		L9 (6.0N)			
	Contact point horizontal	L7 (6.5N)	—		L7 (6.5N)		—			
	Contact point upward	L3 (3.0N)	L4 (4.5N)		L3 (3.0N)		L4 (4.5N)			
Position detection method			Reflection-type photoelectric linear encoder							
Response speed*1 (max. electrical response speed)			Approx. 400mm/s			Approx. 800mm/s				
Output signal			90° phase difference, differential squarewave (RS-422A equivalent)							
Spindle drive			Motor drive							
Spindle guide			Bearing guide							
Stem diameter			ø20mm							
Contact point			ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5) Standard contact point: <b>No.901312</b>							
Shock resistance			60g (in-house testing)							
Cable length			Approx. 2m (directly extended from the gage unit)							
Spindle sealing method			Scraper type		Rubber boot type		Scraper type		Rubber boot type	
Dust/water resistance*2			Equivalent to IP54		Equivalent to IP66		Equivalent to IP54		Equivalent to IP66	
Operating temperature (humidity) range			0 to 40°C (RH 20 to 80%, no condensation)							
Storage temperature (humidity) range			-10 to 60°C (RH 20 to 80%, no condensation)							
Input/ output connector	Gage (counter output)		Connector for counter: RM12BPE-6PH (HIROSE) Compatible receptacle: RM12BRD-6S (HIROSE)							
	Gage (I/O for driving)		Gage side plug: HR10A-7P-6P (HIROSE) Receptacle on motor drive unit: HR10A-7R-6S (HIROSE)							
	Motor drive unit (for external control)		Receptacle on motor drive unit: HR10A-10R-10S (HIROSE) Motor drive unit plug: HR10A-10P-10P (HIROSE)							
Mass (including cables)			Approx. 940g		Approx. 970g		Approx. 940g		Approx. 970g	
Standard accessories			Wrench for contact point: <b>No.04GAA857</b> Hexagon socket head cap screw, M4x0.7x35, 2 pcs. (for gage fixing) Round flat washer, nominal 4, 2 pcs. (for gage fixing) Motor drive unit: <b>No.02ADG400</b>							
Remarks			Motor-driven type							

\*1: The speed and measuring force are adjustable on the motor drive unit. Note that the rubber boot type cannot be used in the horizontal position.

\*2: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

### DIMENSIONS



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# Linear Gage LGD – Absolute, Standard Dimensions, Robust

**Series 575 — Resolution: 10µm**

- Absolute position detection makes it possible to maintain the reference point even when the power is switched off.
- Excellent protection against dust and splashing water (IP66) on the factory floor.
- Ultra-compact design enables installation in very tight spaces.
- The spindle guide uses high-precision linear ball bearings for extremely smooth movement and exceptional durability.
- Sliding durability improved to remain serviceable for at least 15 million cycles (in-house testing).
- Shock resistance, 100g/11ms (IEC 60068-2-27)



## SPECIFICATIONS

Order No.*1		575-326	575-327	575-328
Measuring range		.4" / 10mm	1" / 25mm	2" / 50mm
Resolution		.0005" / 10μm		
Measuring accuracy (20°C)		.001" / 20μm		30μm
Quantizing error		±1 count		
Measuring force	Contact point upward	1.0N or less	4.0N or less	4.9N or less
	Contact point horizontal	1.1N or less	4.3N or less	5.3N or less
	Contact point downward	1.2N or less	4.6N or less	5.7N or less
Position detection method		ABSOLUTE electrostatic capacitance-type linear encoder		
Response speed		Unlimited (not applicable to scanning measurement)		
Output		Digimatic output		
External input		Reference-setting signal (Absolute reference position*2) can be changed externally.		
Mass*3		Approx. 260g	Approx. 300g	Approx. 400g
Contact point		ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point No.901312		
Stem dia.		ø8	ø15	
Bearing type		Linear ball bearing		
Dust/water resistance*4		Equivalent to IP66 (only gage head)		
Output cable length (directly extended from the main unit)		2m, 3m, 5m, 7m		
Operating temperature (humidity) range		0 to 40°C (RH 20 to 80%, no condensation)		
Storage temperature(humidity) range		-10 to 60°C (RH 20 to 80%, no condensation)		
Standard Accessories		Wrench for contact point: <b>No.538610</b>	Wrench for contact point: <b>No.04GAA857</b>	

\*1: The last number of the Code No. represents special cable length. (meters)

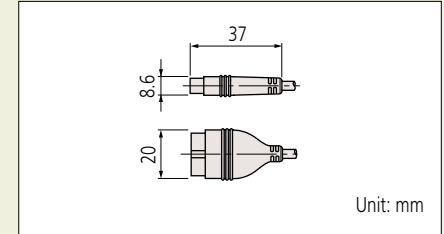
\*2: The absolute reference point is near the lowest rest point at shipment.

\*3: Mass including 2m cable.

\*4: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

**ABSOLUTE™**

## Connector



## Optional Accessories

- Air drive unit
  - For 10mm range models: **No.02ADE230**
  - For 25mm range models: **No.02ADE250**
  - For 50mm range models: **No.02ADE270**
- \* Required air pressure: 0.2 to 0.4MPa
- \* Spindle extends when air is supplied.
- Rubber boot (spare)
  - For 10mm range models: **No.238772**
  - For 25mm range models: **No.962504**
  - For 50mm range models: **No.962505**
- Thrust stem set
  - For 10mm range models: **No.02ADB680**
  - Thrust stem: **No.02ADB681**
  - Clamp nut: **No.02ADB682**
  - For 25/50mm range models: **No.02ADN370**
  - Thrust stem: **No.02ADN371**
  - Clamp nut: **No.02ADB692**
- \* External dimensions are described in the dimensional drawing of the product.
- \* Thrust stem set is a combination of thrust stem and a clamp nut. A special spanner is required for tightening. If using multiple gages, a thrust stem set for each gage and one special spanner are required.
- Spanner wrench
  - For 10mm range models: **No.02ADB683**
  - For 25/50mm range models: **No.02ADB693**

SPC cable extension adapter: **02ADF640**

Extension cable (0.5m): **02ADD950**

Extension cable (1m): **936937**

Extension cable (2m): **965014**

\*when connecting an extension cable, an SPC cable extension adapter is required (02ADF640)

**Digimatic cable extension adapter 02ADF640**

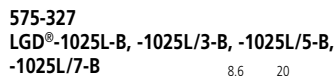


## Applicable Counters

- 542-007A** EC-101D Counter, 120V
- 64PKA132** EG-101D
- 64PKA135** EB-11D
- 542-072A** EH-102D
- 542-064** EV-16D COUNTER

## Series 575 — Resolution: 10µm

**575-326**

[illegible]

**3D models available on request.**

# Linear Gage LGS – Absolute

Series 575 — Resolution: 10µm

575-303

IP66



- ABSOLUTE electrostatic capacitance-type encoder makes it possible to maintain the reference point even when the power is switched off.
- Excellent protection against dust and splashing water (IP66) on the factory floor.

## SPECIFICATIONS

Metric	
Order No.	575-303
Measuring range	12.7mm
Resolution	10µm
Measuring accuracy (20°C)	15µm
Quantizing error	±1 count
Measuring force	Contact point upward
	Contact point horizontal
	Contact point downward
Position detection method	ABSOLUTE electrostatic capacitance-type linear encoder
Response speed	Unlimited (not applicable to scanning measurement)
Output	Digimatic output
Mass	Approx. 190g
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5) Standard contact point <b>No.901312</b>
Stem dia.	ø8mm
Bearing type	Slide bearing
Dust/water resistance	Equivalent to IP66 (only gage head)
Output cable length	2m (directly extended from the main unit)
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)

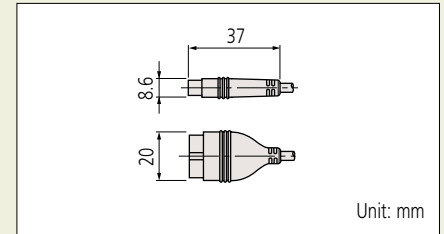
\* IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

Inch	
Order No.	575-313
Measuring range	.5"
Resolution	.0005"
Measuring accuracy (20°C)	.0008"
Quantizing error	±1 count
Measuring force	Contact point upward
	Contact point horizontal
	Contact point downward
Position detection method	ABSOLUTE electrostatic capacitance-type linear encoder
Response speed	Unlimited (not applicable to scanning measurement)
Output	Digimatic output
Mass	Approx. 190g
Contact point	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5) Standard contact point <b>No.901312</b>
Stem dia.	ø9.52=3/8"
Bearing type	Slide bearing
Dust/water resistance	Equivalent to IP66 (only gage head)
Output cable length	2m (directly extended from the main unit)
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)
Storage temperature (humidity) range	-10 to 60°C (RH 20 to 80%, no condensation)

\* IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

ABSOLUTE™

## Connector



## Optional Accessories

- Rubber boot: **No.238774** (spare)
- Air drive unit (metric): **No.903594**
- Air drive unit (inch): **No.903598**
- SPC cable extension adapter: **No.02ADF640**
- Extension cable (0.5m): **No.02ADD950**
- Extension cable (1m): **No.936937**
- Extension cable (2m): **No.965014**

\* When connecting an extension cable, an SPC cable extension adapter is required. (**02ADF640**)

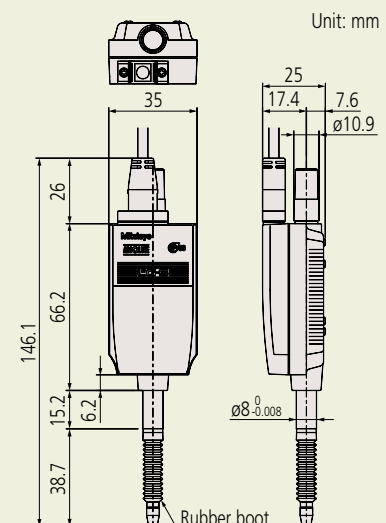
Digimatic cable extension adapter **02ADF640**



## Applicable Counters

542-007A	EC-101D Counter, 120V
64PKA132	EG-101D
64PKA135	EB-11D
542-072A	EH-102D
64PKA138	EV-16D COUNTER

## DIMENSIONS



**Series 542 — Resolution: 0.1  $\mu\text{m}$**

Technical drawing of the RM12BPE-6PH (HIROSE) connector. The drawing shows two views: a top view and a side view. The top view indicates a width of 82.7 mm and a height of 30 mm. The side view indicates a length of 20.4 mm. The unit is specified as mm.

RM12BPE-6PH (HIROSE)

Unit: mm

- Rubber boot (spare)  
For 10mm range models: **No.238772**  
For 25mm range models: **No.962504**  
For 50mm range models: **No.962505**
- Thrust stem set  
For 10mm range models: **No.02ADB680**  
Thrust stem: **No.02ADB681**  
Clamp nut: **No.02ADB682**  
For 25mm range models: **No.02ADN370**  
Thrust stem: **No.02ADN371**  
Clamp nut: **No.02ADB692**
- \* External dimensions are described in the dimensional drawing of the product.
- \* Thrust stem set is a combination of thrust stem and a clamp nut. A special spanner is required for tightening.  
If using multiple gages, a thrust stem set for each gage and one special spanner are required.
- Wrench  
For 10mm range models: **No.02ADB683**  
For 25mm range models: **No.02ADB693**
- Extension cable (5m): **902434**
- Extension cable (10m): **902433**
- Extension cable (20m): **902432**
- Air drive unit  
For 10mm range models: **No.02ADE230**  
For 25mm range models: **No.02ADE250**  
For 50mm range models: **No.02ADE270**
- \* Required air pressure: 0.2 to 0.4MPa
- \* Spindle extends when air is supplied.

542-075A	EH-101P
542-071A	EH-102P

- 542-181  
IP66



542-182  
IP66

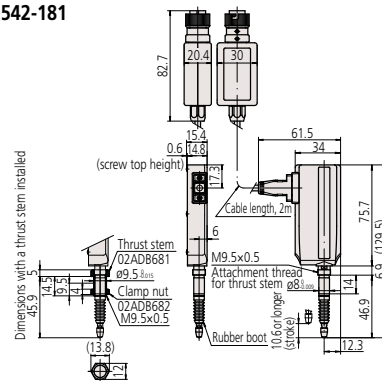


Order No.		542-181	542-182
Measuring range		10mm (.4")	25mm (1")
Resolution		0.1μm (.000005")	
Measuring accuracy (20°C)		(0.8+L/50) μm (L=arbitrary measuring length (mm))	
Quantizing error		±1 count	
Measuring force	Contact point upward	1.0N or less	4.0N or less
	Contact point horizontal	1.1N or less	4.3N or less
	Contact point downward	1.2N or less	4.6N or less
Position detection method		Photoelectric linear encoder	
Response speed*1		400mm/s	
Output signal		90° phase difference, differential squarewave (RS-422A equivalent) Minimum edge-to-edge interval, 200ns	
Output signal pitch		0.4μm	
Mass		Approx. 310g	Approx. 350g
Dust/water resistance*2		Equivalent to IP66 (only gage head)	
Stylus		ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point <b>No.901312</b>	
Stem dia.		ø8	ø15
Bearing type		Linear ball bearing	
Output cable length		2m (directly extended from the main unit)	
Connector		Plug: RM12BPE-6PH (HIROSE), Compatible receptacle: RM12BRD-6S (HIROSE)	
Operating temperature (humidity) range		0 to 40°C (RH 20 to 80%, no condensation)	
Storage temperature (humidity) range		-10 to 60°C (RH 20 to 80%, no condensation)	
Standard accessories		Wrench for contact point: <b>No.538610</b>	Wrench for contact point: <b>No.04GAA857</b>

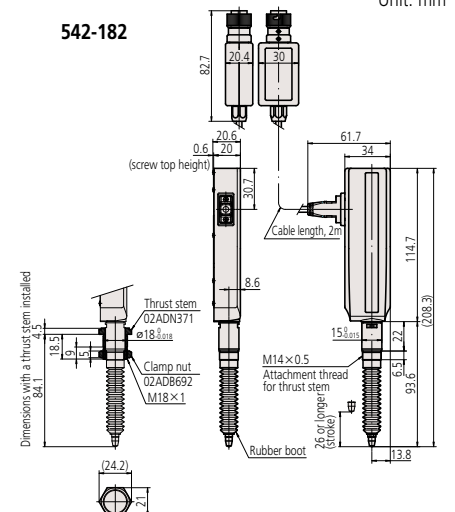
\*1: When the spindle speed exceeds 400mm/s, an alarm will signal. Also, if using a Mitutoyo counter, an error message will be displayed. If using counters made by other companies, please consult your local Mitutoyo office. Note that over-speed error may occur depending on the impact amount when releasing the contact point freely.

\*2: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

## 542-181



542-182



Unit: mm



# Linear Gage LGB2 – High Resolution, Slim, with Clamp Nut

## Series 542 (0.1μm resolution)

- Slim type high-precision linear gage with resolution of 0.1μm. It is an optimal choice as a built-in type sensor.
- High-precision linear ball bearings are used in the spindle guide for extremely smooth movement and exceptional durability.

542-246



### Optional Accessories

- Rubber boot: **No.238773** (spare)
- Extension cable (5m): **902434**
- Extension cable (10m): **902433**
- Extension cable (20m): **902432**

### Applicable Counters

**542-075A** EH-101P

**542-071A** EH-102P

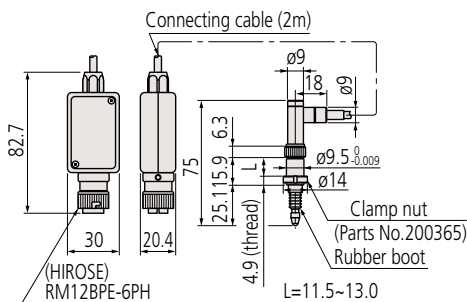
## SPECIFICATIONS

Order No.		542-246
Measuring range		5mm (.2")
Resolution		0.1μm (.000005")
Measuring accuracy (20°C)		0.8μm
Measuring force	Contact point upward	Approx. 0.55 or less
	Contact point horizontal	Approx. 0.6N or less
	Contact point downward	Approx. 0.65 or less
Output signal		90° phase difference, differential square wave (RS-422A equivalent)
Position detection method		Photoelectric linear encoder
Response speed		380mm/s
Mass		160g
Dust/water resistance*		Equivalent to IP54 (only gage head)
Contact point		Carbide ball (M2.5x0.45)   Steel ball (4-48UNF)
Stem dia.		ø9.5mm
Bearing type		Linear ball bearing
Output cable length		2m
Connector		Plug: RM12BPE-6PH (HIROSE), Compatible receptacle: RM12BRD-6S (HIROSE)
Operating temperature (humidity) range		10 to 30°C (RH 20 to 80%, no condensation)
Standard accessories		Wrench for contact point: <b>No.538610</b>   Wrench for contact point: <b>No.538610</b> , Stem bushing

\*1: IP code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the type of liquid.

## DIMENSIONS

Unit: mm



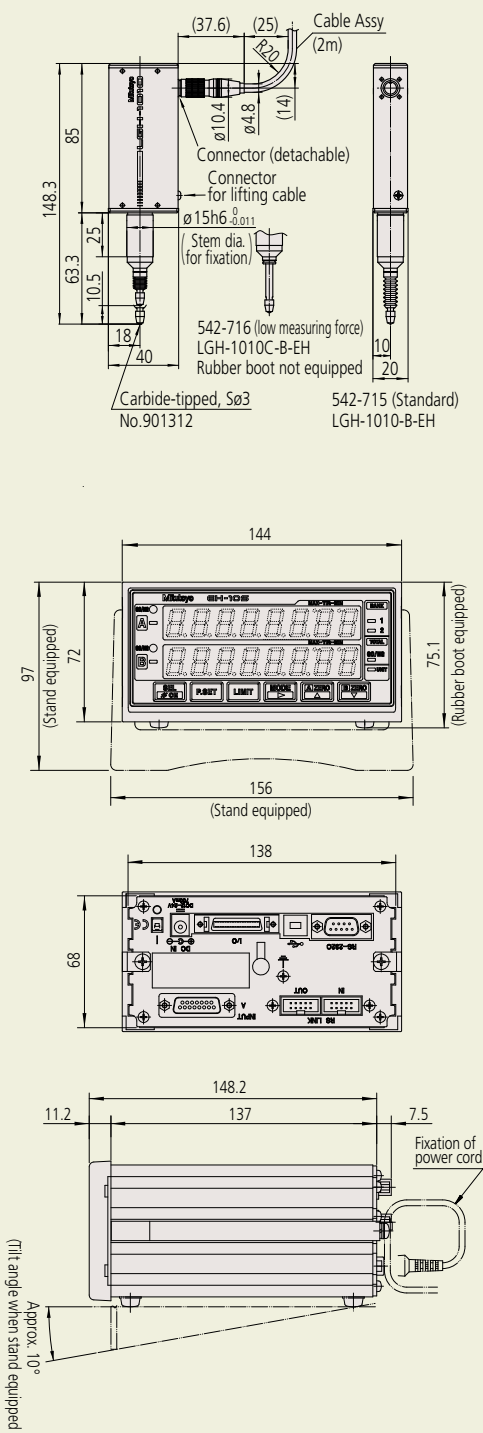


## Optional Accessories

- LGH stand: **971750**
- Stem fixture for fixing to top surface: **971751**
- Stem fixture for fixing to bottom surface: **971752**
- Spindle lifting cable: **971753**
- Rubber boot: **238772** (spare for **542-715**)
- I/O output connector (with cover): **02ADB440**

## DIMENSIONS

Unit: mm



# Linear Gage LGH – High Resolution, High Accuracy

## SERIES 542 (0.01μm resolution)

- A gage head featuring a very accurate, ultra-high-resolution photoelectric linear encoder that approaches laser interferometer performance over its measuring range of 10mm. This head is suitable for measuring high-precision components and inclusion in high-accuracy positioning applications.
- Relatively long range, very high accuracy and extreme resolution enable the head to act as a master gage for measuring-instrument calibration in many instances.
- The compact design contributes to reducing measuring system costs and permits downsizing entire system configurations.
- Linear encoder is highly resistant to being affected by unfavorable environmental conditions, such as drafts and rapid atmospheric pressure, temperature and humidity changes.
- A low measuring force model is available (**542-716A**). As low as 0.12N can be selected, which enables measurement of easily-deformed workpieces or thickness of delicate films.
- Responsivity has been improved by 2.8 times (250mm/s => 700mm/s) compared to the previous model.
- Every **LGH** series gage is bundled with a dedicated counter.



## SPECIFICATIONS

Linear gage		Standard	Low measuring force
Order No.		542-715A	542-716A
Measuring range		10mm	
Resolution		0.01μm (0.05μm, 0.1μm, 0.5μm, 1μm can be selected from the counter)	
Measuring accuracy (20°C)*		0.2μm	
Repeatability (20°C)*		0.1μm (2σ)	
Retrace error (20°C)*		0.1μm	
Measuring force	Contact point downwards	0.65N or less	Approx. 0.12N
	Contact point horizontal	0.55N or less	Not applicable
	Contact point upwards	0.45N or less	Not applicable
Position detection method		Photoelectric reflection type linear encoder	
Detectable operation speed		In normal measurement: 700mm/sec; for peak detection: 120mm/sec	
Mass of gage head		220g (excluding cable of approx. 150g)	
Contact point		ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5)	
Stem		ø15mm	
Bearing		Linear ball type	
Output cable length		Approx. 2m	
Operating temperature/humidity		0 to 40°C/RH 20 to 80% (no condensation)	
Storage temperature		-10 to 60°C/RH 20 to 80% (no condensation)	
Counter			
Quantizing error		±1 count	
Display range		±999.99999mm	
Functions		Presetting, tolerance judgment, peak measurement, analog output	
Interface		RS-232C/Digimatic/USB (only for SENSORPAK)	
Power supply		Supplied AC Adapter, or +12 to 24 V DC, max. 700mA	
Current Consumption		8.4W (MAX 700mA) (Ensure at least 1A power supply per unit.)	
External dimensions		144(W)×157(D)×75(H)	
Mass		Approx. 900g (AC Adapter excluded)	
Standard accessories		Wrench for contact point, rubber boot, stand, washer (for counter), AC Adapter, AC cord, DC plug, user's manual, inspection certificate	

\*Indication accuracy applies when used with counters.

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# Laser Hologage LGH – High Resolution, High Accuracy

## Series 542 — Resolution: 0.01μm

- The Mitutoyo Laser Hologage is a high-end digital gaging system that employs laser beam interference to make highly accurate and repeatable measurements.
- The compact gage head reduces the cost required for assembling the laser scale unit for each device. The head can also contribute to downsizing the entire system. The master gage is the best tool available for measuring tools or for a length measurement sensor of the control unit, as well as for measuring high-precision components.
- High resolution and high accuracy. Highly accurate measurement due to an ultra-high resolution of 0.00001mm (0.01μm), which is close to the performance of laser interferometers.
- Excellent measuring stability. The design is also highly resistant to unfavorable environmental conditions such as air movement and atmospheric pressure changes.
- Low measuring force models are also available. Low measuring force models are available for easily deformed precision workpieces.
- High reliability and excellent durability. High-precision linear ball bearings are used in the spindle guide for extremely smooth movement and exceptional durability.
- 0.01μm resolution LGH is for use with counter EH-102S.



LGH-110



EH-102S

## SPECIFICATIONS

Code No.	542-925A	542-927A	542-926A	542-928A
Configuration	Set of 1-axis gage head and display unit	Set of 2-axis gage head and display unit	Set of 1-axis gage head and display unit	Set of 2-axis gage head and display unit
Measuring range	10mm			
Resolution	0.01μm (.5 microinch)			
Measuring accuracy (20°C)	0.1μm*1			
Repeatability (2σ)	0.02μm			
Retrace error	0.05μm			
Measuring force	Contact point upward	Approx. 0.35N or less		Approx. 0.1N
	Contact point horizontal	Approx. 0.45N or less		—
	Contact point downward	Approx. 0.55N or less		—
Stylus	ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45)×5), standard contact point No.120058			
Output cable length	2m			
Display range	±999.99999mm			
Minimum reading	0.01μm			
Operating temperature (humidity) range	10 to 30°C (RH 30 to 70%, no condensation)			
Storage temperature (humidity) range	-10 to 50°C (RH 30 to 70%, no condensation) The temperature and humidity range for storage after unpacking is the same as that for operation.			
Standard accessories	Wrench for contact point: <b>No.538610</b> AC adapter: <b>No.02ADN460</b> AC cable (USA): <b>No.02ZAA010*</b>			
Mass (gage head + display unit)	1400g			

\*1: Indication accuracy applies when used with counters.

### Laser Beam Safety Precautions

This system uses a low-power invisible laser beam (780nm) which corresponds to a CLASS 1 (invisible radiation) of IEC60825-1 for measurement. The CLASS 1 laser warning label as shown below is attached to the main unit.

CLASS 1 LASER PRODUCT

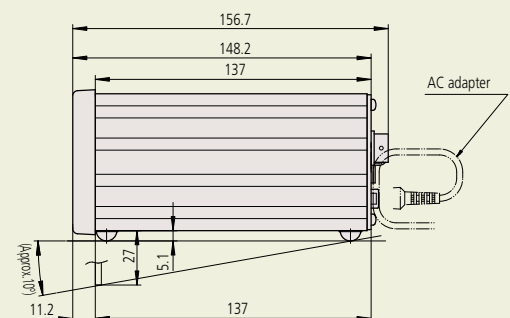
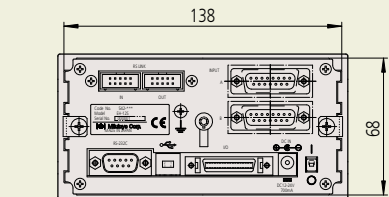
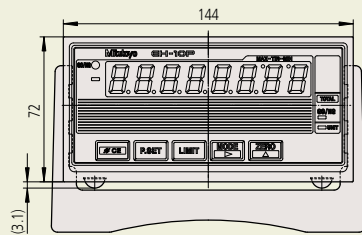
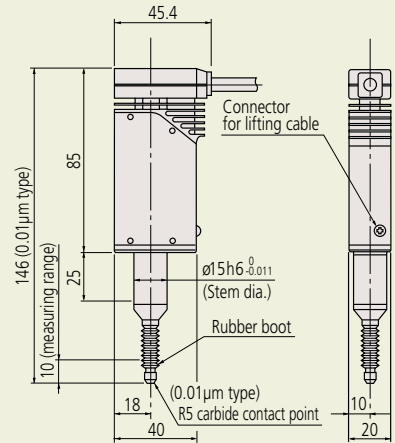


## Optional Accessories

- Laser hologage stand: **No.971750**
- Stem fixture for fixing to top surface: **No.971751**
- Stem fixture for fixing to bottom surface: **No.971752**
- Spindle lifting cable: **No.971753**
- Rubber boot: **No.238772** (spare)

## DIMENSIONS

Unit: mm



# EH Counter – Multi-function Type

**Series 542 — Versatile, Multi-function Displays for all Linear Gage Formats**

## Optional Accessories

- I/O output connector (with cover): **No.02ADB440**

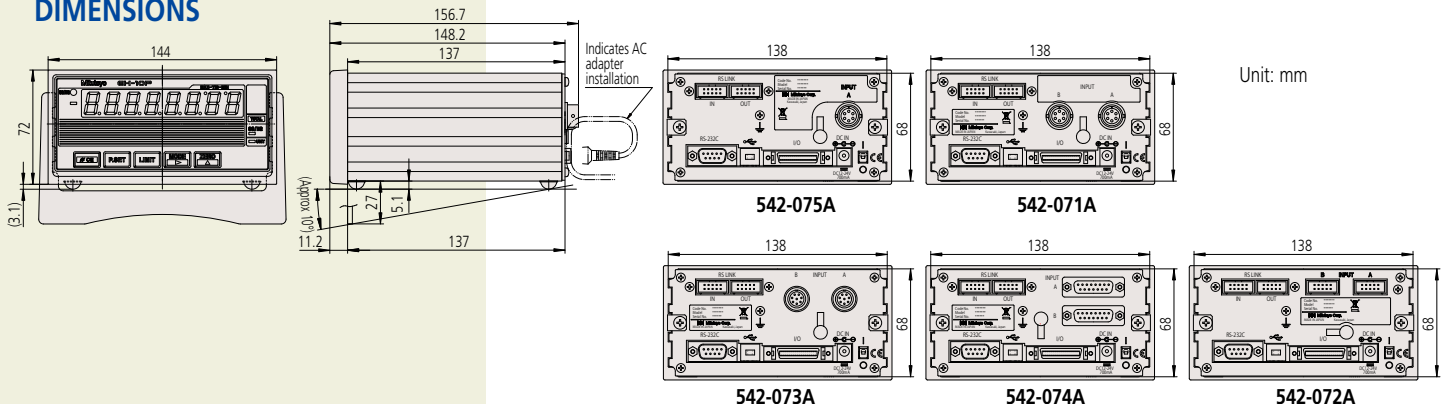
- Two types are available for this model: a 1-axis display and a 2-axis display, which enables addition or subtraction calculations between two gages.
- Multifunctional counter equipped with zero-setting, presetting and tolerance judgment.
- RS-232C and USB are equipped as standard. Data transfer to a PC is possible. (\*USB is supported only by Mitutoyo SENSORPAK.)
- A multi-point (max. 12 points) measuring system can easily be configured with the built-in RS link networking function. Refer to "Quick Guide to Precision Measuring Instruments" on page G-32 for details of the RS link.
- Employs DIN size (144x72mm) and mount-on-panel configuration to facilitate system integration.



## SPECIFICATIONS

Order No.		542-075A	542-071A	542-073A	542-074A	542-072A
Applicable gage head		LGE, LGF, LGK, LGB, LGM, LG, LGH (not compatible with LGH-110, reference point, or sine wave models)		LGF with reference point mark	LGB sine wave output / Linear scale sine wave output	LGD, LGS, ID, SD
Number of gage inputs		1		2		
Number of axes to be displayed		1 axis		2 axes		
Quantizing error		±1 count				
Maximum input frequency		2.5MHz (2-phase square wave)			1MHz (2-phase sine wave)	
Resolution		0.01mm (±9999.99mm) / .0005" (±99.9995") 0.001mm (±999.999mm) / .00005" (±9.99995") 0.0001mm (±99.9999mm) / .000005" (±.999995") [Parameter set]				Automatic setting by gage
		—			0.01 / 0.001μm	
Display		Sign plus 8 digits (Green LED)				
Tolerance judgment display		LED display (3 steps: Amber, Green, Red/ 5 steps: Amber, Amber flashing, Green, Red flashing, Red) RS-232C/USB/parameter selection via digimatic (only DP-1VR, digimatic mini-processor can be connected) (USB used only with SENSORPAK.)				
Interface		Selection by parameter from 3-step, 5-step, or digit BCD Total tolerance judgment output (when tolerance function is enabled) Analog output (1V-4V)				
Input/output	Control output	Normal operation signal (NOM): open collector				
	Control input	Display BANK switching, peak mode, presetting, display hold, hold per axis: open-collector or no-voltage contact signal (with/without contact point)				
Rating	Power supply voltage	Supplied AC adapter, or 12 - 24V DC 8.4W (max. 700mA)				
	Power consumption	Ensure at least 1A is available per unit.				
Operating temperature (humidity) range		0 to 40°C (RH 20 to 80%, no condensation)				
Storage temperature (humidity) range		-10 to 50°C (RH 20 to 80%, no condensation)				
External dimensions		144 (W) x72 (H) x156.7 (D) mm				
AC adapter / AC cable (standard accessory)		AC adapter: <b>No.02ADN460</b> / AC cable (USA): <b>No.02ZAA010*</b>				
Applicable input		Differential square-wave			Differential sine-wave	Digimatic code output
Mass		Approx. 760g	Approx. 800g	Approx. 800g	Approx. 900g	Approx. 800g

## DIMENSIONS



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# EC Counter – Single-function Type

**Series 542 — Simple Display for LGD, LGS, or other Digimatic Gages, Go/NG Judgment and Output**

- Produces 3-step/5-step, 3 types of tolerance output and BCD output.
- Employs DIN size (96×48mm) and mount-on-panel configuration to facilitate system integration.



542-007A



## Function

- Preset
- Tolerance judgment (3/5-step, 3 types)
- Zero

## Optional Accessories

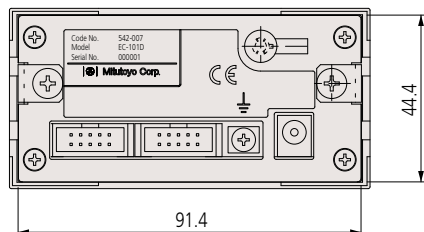
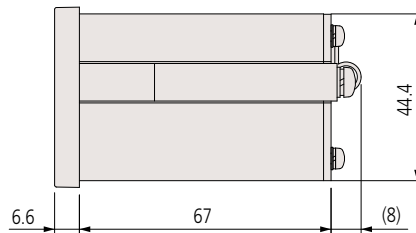
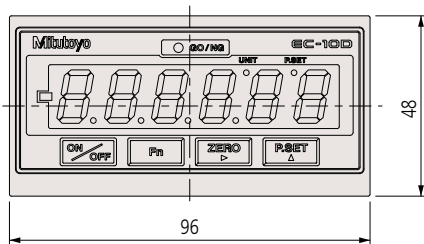
- Connecting cable for digimatic mini-processor: **No.936937** (1m), **No.965014** (2m)
- DC plug PJ-2: **No.214938**
- I/O cable (2m): **No.C162-155**

## SPECIFICATIONS

Order No.	<b>542-007A</b>	
Applicable head/input	<b>LGD, LGS, ID, SD, Digimatic code (SPC)</b>	
Number of gage inputs	1	
Resolution	0.01mm (±9999.99) / .0005" (±99.9995") / .001" (±999.999") 0.001mm (±9999.999) / .00005" (±9.99995") / .0001" (±99.999") [automatic setting by gage]	
Display	Sign plus 6 digits (Green LED)	
Tolerance judgment display	LED display (3 steps: Amber, Green, Red)	
External output (switching type)	Tolerance judgment output	Go/No-Go (open-collector)
	Data output	Digimatic output
Control input	External PRESET, external HOLD	
Rating	Power supply voltage	Supplied AC adapter, or 9 - 12V DC
	Power consumption	4.8W (max. 400mA)
		Ensure at least 1A is available per unit.
Operation/storage temperature range	Operation: 0 - 40°C / Storage: -10 to 50°C	
External dimensions	96 (W) × 48 (H) × 84.6 (D) mm	
Standard accessories	AC adapter: <b>No.06AEG302JA</b>	
Mass	220g	

## DIMENSIONS

Unit: mm





# EG Counter – Single-function Type

## Series 542 — Simple Display, Multi-Step Go/No Go Judgment and Output, BCD Output, Open Collector

### Function

- Preset
- Direction switch
- Tolerance judgment (3/5-step, 3 kinds)
- Peak (max., min., runout) measurement
- Constant number
- Smoothing
- Error display/output
- Key protection

### Optional Accessories

- I/O output connector (with cover): **No.02ADB440**
- AC adapter: **No.02ADN460\***
- AC cable (USA): **02ZAA010\***
- Terminal connecting cable: **No.02ADD930\***
- \* Included in package Order No.

- Produces 3-step/5-step, 7 types of tolerance output and limit value output independently for each of 7 channels.
- Comes with serial BCD output capability, for connection to a programmable controller or personal computer, etc.

- Employs DIN size (96×48mm) and mount-on-panel configuration to facilitate system integration.



542-015



542-017



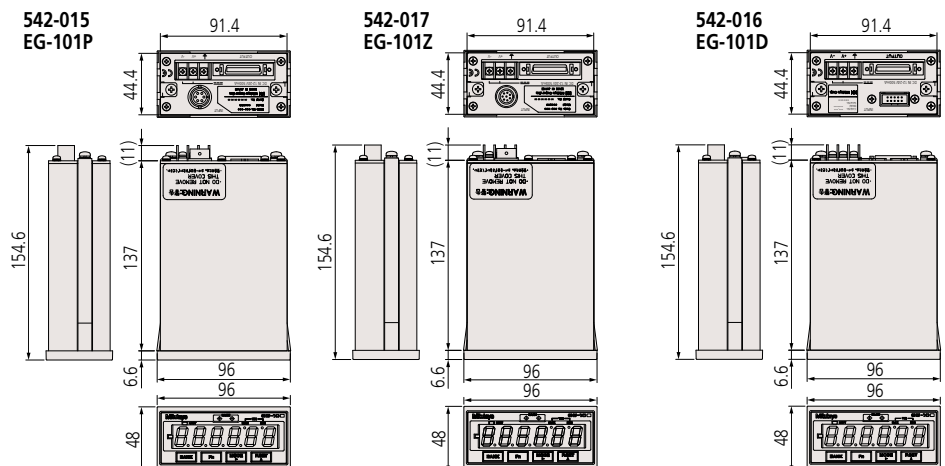
542-016

### SPECIFICATIONS

Order No. (counter only)	542-015	542-017	542-016	
Package No. (counter w/AC adapter)	64PKA131	64PKA133	64PKA132	
Applicable gage head	LGE, LGF, LGK, LGB, LGM, LG, LGH (Not compatible with LGH110, reference point or sine wave models)	LGF with reference point mark (LGF-Z)	LGD, LGS, ID, SD	
Number of gage inputs	1			
Quantizing error	±1 count			
Maximum input frequency	1.25MHz, response speed depends on gage specification.			
Resolution	0.01mm (±9999.99mm) / .0005" (±99.9995") / .001" (±999.999") 0.005mm (±9999.995mm) / .00005" (±9.99995") / .0001" (±99.999") 0.001mm (±999.999mm) / .00005" (±9.99995") / .0001" (±99.999") 0.0005mm (±99.9995mm) / .000005" (±.999995") / .00001" (±9.99999") 0.0001mm (±99.9999mm) / .000005" (±.999995") / .00001" (±9.99999")		— 0.01mm (±9999.99mm) / .0005" (±99.9995") / .001" (±999.999") 0.001mm (±999.999mm) / .00005" (±9.99995") / .0001" (±99.999") 0.0005" (±9.99995") / .0001" (±99.999") [Automatic setting by gage]	
Display	Sign plus 6 digits (Green LED)			
Tolerance judgment display	LED display (3 steps: Amber, Green, Red/ 5 steps: Amber, Amber flashing, Green, Red flashing, Red)			
Tolerance judgment output	L1 to L5 (Open-collector / Switchover between L1 to L5 and BCD output with parameter)			
Control output	Normal operation signal (NOM): open-collector			
BCD output	Open-collector / Switchover between 6-digit (positive/negative-true logic) and tolerance judgment output with parameter			
Control input	Presetting, display hold, peak value clear, tolerance judgment BANK switch			
Rating	Power supply voltage	12 - 24V DC		
	Power consumption	6W or less (500mA max.) Ensure at least 1A is available per unit.		
Operating temperature range	0 to 40°C (RH 20 to 80%, no condensation)			
Storage temperature range	-10 to 50°C (RH 20 to 80%, no condensation)			
External dimensions	96 (W) × 48 (H) × 156 (D) mm			
Applicable input	Differential square-wave	Differential square-wave with origin point mark	Digimatic code (SPC)	
Number of gage inputs	1			
Mass	Approx. 400g			

### DIMENSIONS

Unit: mm



**Mitutoyo**



# EB Counter – Single-function Type

## Series 542 — Simple Display, Multi-Step Go/No-Go Judgment, BCD Output and Analog Output

- Produces 3-step/5-step, 7 types of tolerance output and limit value output independently for each of 7 channels.
- Comes with serial BCD output capability, for connection to a programmable controller or personal computer, etc.
- Dynamic measurement possible with simplified analog output.
- Employs DIN size (96×48mm) and mount-on-panel configuration to facilitate system integration.



542-092-2



542-094-2



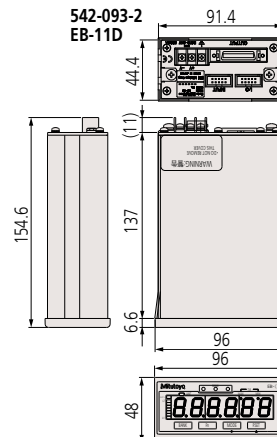
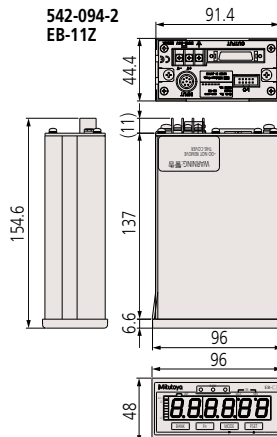
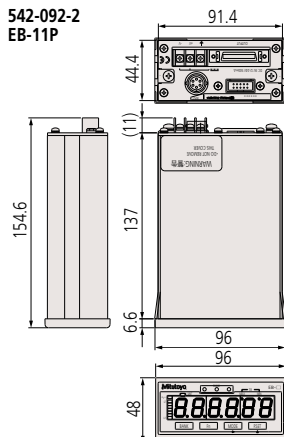
542-093-2

### SPECIFICATIONS

Order No. (counter only)	542-092-2	542-094-2	542-093-2
Package No. (counter w/AC Adapter)	64PKA134	64PKA136	64PKA135
Applicable gage head	LGF, LGK, LGE, LGB (not compatible with reference point or sine wave output type models)	LGF with reference point mark (LGF-Z)	LGS, LGD, LGD-M
Number of gage inputs	1		
Quantizing error	±1 count		
Maximum input frequency	1.25MHz (2-phase square wave), response speed depends on gage specification.		Response speed depends on gage specification.
Resolution	0.01mm (±9999.99mm) / .0005" (±99.9995") 0.005mm (±9999.995mm) / .00005" (±9.99995") 0.001mm (±999.999mm) / .00005" (±9.99995") 0.0005mm (±99.9995mm) / .000005" (±.999995") 0.0001mm (±9.9999mm) / .000005" (±.999995")		0.01mm (±9999.99mm) / .0005" (±99.9995") 0.005mm (±9999.995mm) / .00005" (±9.99995") 0.001mm (±999.999mm) / .00005" (±9.99995") 0.0005mm (±99.9995mm) / .000005" (±.999995") 0.0001mm (±9.9999mm) / .000005" (±.999995")
Display	Sign plus 6 digits (Green LED)		
Tolerance judgment display	LED display (3 steps: Amber, Green, Red / 5 steps: Amber, Amber flashing, Green, Red flashing, Red)		
Input/output	Tolerance judgment output	L1 to L5, open-collector	
	Control output	Normal operation signal (NOM), open-collector	
	Control input	Presetting, display hold, peak value clear, tolerance judgment BANK switch, open-collector or no-voltage contact signal (with/without contact point)	
Interface	Serial BCD	Bit serial format, open-collector	
	Analog output	2.5V+Counting value× Voltage resolution (25mV/2.5mV): Full-scale 0 to 5V	
	Digimatic input/output	<ul style="list-style-type: none"><li>Connecting to the external switch box (<b>No.02ADF180</b>) makes it easy to enter tolerance limits and preset values. Note: This function is not available when the gage is connected to <b>DP-1VR</b>, Digimatic Mini-Processor.</li><li>It can only be connected to <b>DP-1VR</b> Digimatic Mini-Processor (<b>No.264-504-5A</b>).</li><li>Number of tolerance steps can be expanded by assembling <b>EB-D</b> counters.</li></ul>	
Rating	Power supply voltage	12 - 24V DC	
	Power consumption	6W or less (50mA max.) Ensure at least 1A is available per unit.	
Operating temperature range	0 to 40°C (RH 20 to 80%, no condensation)/ -10 to 50°C (RH 20 to 80%, no condensation)		
External dimensions	96(W)×48(H)×156(D)mm		
Applicable input	Differential square-wave	Differential square-wave with origin point mark	Digimatic code (SPC)
Mass	Approx. 400g	Approx. 400g	Approx. 400g

### DIMENSIONS

Unit: mm



### Function

- Preset
- Tolerance judgment output (3/5-step, 7 types)
- Limit value output (2 types independently for each of the 7 channels)
- Peak (max., min., runout) measurement
- Diverse data output  
(Serial BCD, Simplified analog, Digimatic)

### Optional Accessories

- I/O output connector (with cover): No.02ADB440
  - AC adapter: No.02ADN460\*
  - AC cable (USA): 02ZAA010\*
  - Terminal connecting cable: No.02ADD930\*
- \* Included in package Order No.  
The tolerance values or preset values can be easily input.  
No.02ADF180 (with 2m cable)



# EV Counter – Multi-function, Multiple Input Type

## Series 542 — Processor (Optional Display), Multi-function/output

- Up to six gages can be connected to one unit, extendable up to 10 units (60 gages at maximum) using the RS Link function\* to facilitate the configuration of a multi-point measurement system.

\* Refer to "Quick Guide to Precision Measuring Instruments" on page G-32 for details of the RS link.

- A range of output modes to choose from: I/O output for tolerance judgment and segment output, BCD data output and RS-232C output are available.
- Other than normal measurement, peak measurement or differential measurement between gages are available.



542-063



542-067



542-064

### Function

- External Control (Zero-set, Preset etc.)
- Direction switch
- Error display
- Tolerance judgment output
- Diverse data output (RS-232C, BCD, Segment)
- Peak measurement

Maximum value, minimum value, runout, and differential measurement between two gages  
Addition, averaging, maximum value, minimum value, and maximum width

### Optional Accessories

- D-EV External display unit: **No.02ADD400**
- SPC cable (0.5m): **No.02ADD950**
- SPC cable (1m): **No.936937**
- SPC cable (2m): **No.965014**
- AC adapter: **No.02ADN460\***
- AC cable (USA): **02ZAA010\***
- Terminal connecting cable: **No.02ADD930\***

\* Included in package Order No.

### SPECIFICATIONS

Order No.	542-063	542-067	542-064
Pkg No.(counter w/AC adapter)	64PKA137	64PKA139	64PKA138
Applicable gage head	LGE, LGF, LGK, LGB, LGM, LG not compatible with reference point mark, sine wave output type or 0.1μm resolution models.	LGF with reference point mark (LGF-Z)	LGD, LGS
Number of input channels	6		
Maximum input frequency	1.25MHz (2-phase square wave), response speed depends on gage specification. Max. counting speed: 5MHz	1.25MHz (2-phase square wave), response speed depends on gage specification. Max. counting speed: 5MHz	Response speed depends on gage specification.
Quantizing error	±1 count		
Resolution	10μm (±999999.99mm) / .0005" (±9999.9995") 5μm (±999999.995mm) / .00005" (±999.99995") 0.5μm (±9999.9995mm) / .000005" (±.99.999995")*1 [Parameter set]	10μm (±999999.99mm) / .0005" (±9999.9995") 5μm (±999999.995mm) / .00005" (±999.99995") 1μm (±99999.999mm) / .00005" (±999.99995") 0.5μm (±9999.9995mm) / .000005" (±.99.999995") [Parameter set]	Depends on gage specification.
LED display	8 digits for parameter display (displays settings), 1 for error display		
Error message	Overspeed, gage error etc.		
External display	Dedicated external display unit D-EV (optional) can be connected.		
Number of input switches	4		
Function of input switches	Measurement mode switching, parameter setting		
Input/ output	Tolerance judgment output	1 to 6 channels (L1, L2, L3), open-collector	
	BCD output	Parallel BCD output (positive/negative-true logic), open-collector	
	Segment output	Function to set on only the terminals corresponding to the counting values, open-collector	
	Control output	Normal operation signal (NOM), open-collector	
	Control input	Output channel designation (segment, in the BCD mode), presetting, peak value clear, range changeover (at segment output), holding counting value open-collector or no-voltage contact signal (with/without contact point)	
Interface	RS-232C	Measurement data output and control input EIA RS-232C-compatible Use cross cables for home position, DTE (terminal definition). Max. connecting unit: 10 (6 when using EF counter) Connecting cable length: Max. 10m (sum of link cable length) Data transfer time: 1sec./60ch (when transmission rate is 19200bps)	
	RS link		
Rating	Power supply voltage	12 - 24V DC, terminal block (M3 screw)	
	Power consumption	8.4W or less (700mA max.) Ensure at least 1A is available per unit.	
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)		
Storage temperature (humidity) range	-10 to 50°C (RH 20 to 80%, no condensation)		
External dimensions	144 (W) × 72 (H) × 139 (D) mm		
Mass	Approx. 910g	Approx. 910g	Approx. 830g
Standard accessories	Fixing foot (4), connecting bracket (4), fixing screw M4×12 (8)		
Applicable input	Differential square-wave		
	Digimatic code (SPC)		

\*1: Available when using D-EV.

\*2: D-EV is required when selecting 0.1μm resolution.

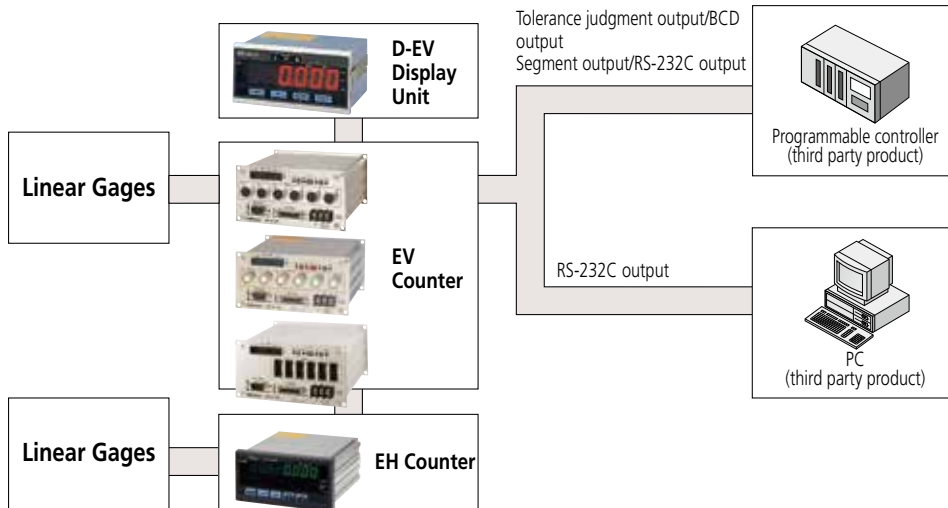
**Mitutoyo**

# EV Counter System Configuration

Series 542 — Processor (Optional Display), Multi-function/output

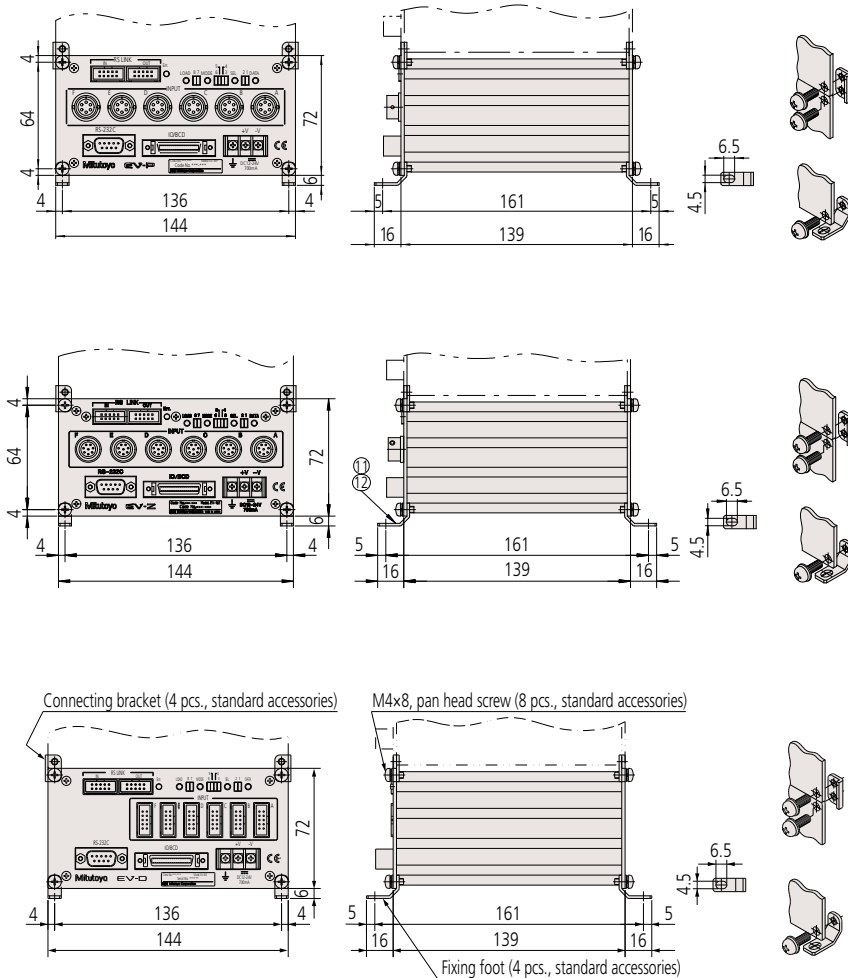
## System Configuration

A counter system performs output and display for connected Mitutoyo linear gages.



## DIMENSIONS

Unit: mm



# D-EV Display Unit for EV Counter

## Function

- External Control (Zero-set, Preset etc.)
- Direction switch
- Error display
- Tolerance judgment output
- Data output (RS-232C, BCD, Segment)
- Peak measurement

Maximum value, minimum value, runout, and differential measurement between two gages  
Addition, averaging, maximum value, minimum value, and maximum width

## Optional Accessories

- SPC cable (0.5m): **No.02ADD950**\*1
- SPC cable (1mm): **No.936937**\*1
- SPC cable (2m): **No.965014**\*1
- AC adapter: **No.02ADN460**
- AC cable (USA): **02ZAA010**\*2
- Terminal connecting cable: **02ADD930**\*2

\*1: Required when connecting with **EV-16P/D/Z**.

\*2: Required when using AC adapter.

Note: AC adapters may not be needed if using power from EV counter to power the D-EV.

- Display unit for the EV counter.
- Allows set up of EV counter without a personal computer or other equipment.

- Able to display each gage measurement value and go/no-go judgment result, total go/no-go judgment result for all gages, setting details and errors.



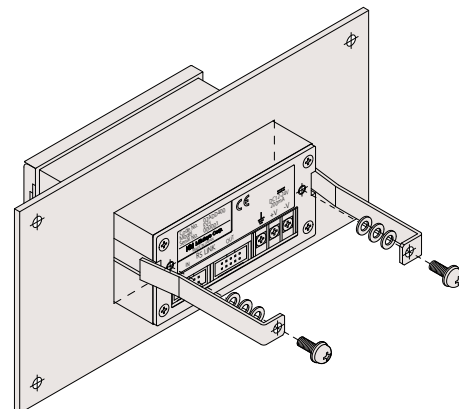
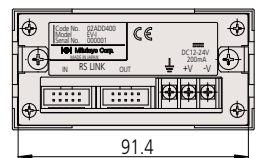
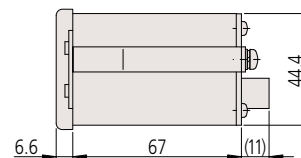
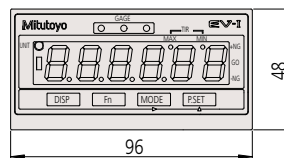
02ADD400

## SPECIFICATIONS

Order No.	02ADD400
Number of connections	1 EV counter per unit
Number of digits	Sign plus 6 digits (8 digits internal to EV counter)
LED	Channel display (also for judgment result display): 3 (3-color LED) Measurement mode display (current data, maximum value, minimum value, runout): 2 Status display: 1 (2 colors)
Operation switches	4
Function of operation switch	Channel switching, measurement mode switching (current data, maximum value, minimum value, runout), parameter setting, presetting, tolerance setting
Input/output	RS Link connectors: 1 each for IN, OUT
Error message	Overspeed, gage error etc.
Power supply	Terminal block (M3 screw), 12 - 24V DC, 200mA
Operating temperature (humidity) range	0 to 40°C (RH 20 to 80%, no condensation)
Storage temperature(humidity) range	-10 to 50°C (RH 20 to 80%, no condensation)
External dimensions	96(W)×48(H)×84.6(D)mm

## DIMENSIONS

Unit: mm



**Mitutoyo**

# Sensorpak Software

**Dynamically Displays Positions, Tolerances and Calculations, and Acquires Basic Data from EH, EV Counters and Litematics**

- This software facilitates loading measurement data onto a personal computer from a linear gage counter with RS-232C output (EH, EV), with USB output (EH), or from a Litematic display (VL).
- 60 channels (max.) of measurement data can be processed.
- Arithmetical calculations and maximum width calculations can be performed using the measurement data.
- Exporting measurement data into MS-Excel format is supported.
- Real-time graphical display by means of bar-graph or meter is provided.
- Any gage that can be connected to an EH or EV counter can be used in Sensorpak.

**MiCAT**

Mitutoyo Intelligent Computer Aided Technology

the standard in world  
metrology software

**SENSOR**



Meter screen

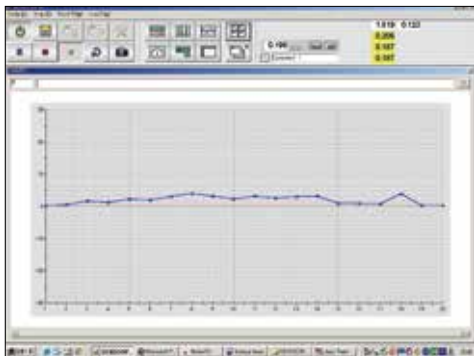


Chart screen



Measurement screen

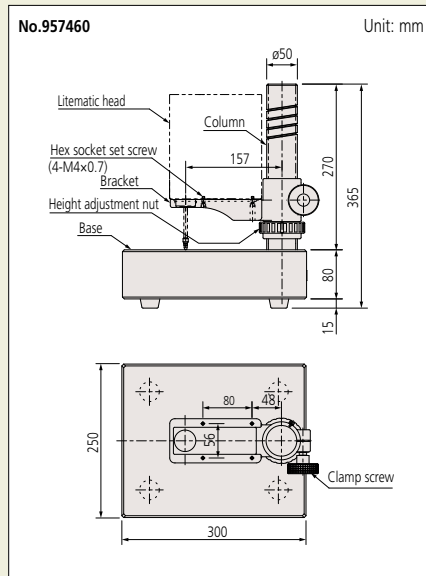
## SPECIFICATIONS

Order No.	<b>02NGB073</b> (Software v 3.0 plus I/O cable)
Display function	Display type: Counter, bar graph, meter, chart (capable of simultaneous display) Tolerance judgment result: Color display (green/red) Connectable gages: max. 60 gages
Calculation functions	Calculation items: Sum, difference, total, average, maximum, minimum, range (maximum–minimum), calculation with a constant Connectable gages: Max. 30 calculation functions (between two gages)
Total tolerance judgment	Go/No-go judgment (by specifying gages to be used for total tolerance judgment) Go/No-go signal output with optional I/O cable
Input function	Trigger function: by means of key, timer or external TRG (with optional I/O cable) Data input frequency: Max. 9999 times (with 60 gages connected) to 60000 times (with 6 gages connected)
Output function	Direct output to EXCEL spreadsheet, CSV file output (compatible with MeasurLink)
Connectable items	EF, EH, EV, Litematic (RS Link ready products)
System requirements	CPU: DOS/V PC, 2GHZ or more OS: Windows 7 (32/64 bit), 8.1 (32/64 bit) Memory: 2 GB or more Display: 1024 x 786 or more Excel: 2007, 2010, 2013

Currently supported languages: English, German, French, Spanish  
User's manual: English



## Optional Stand for VL-50S-B



## Optional Accessories

- Foot switch: **No.937179T**
- Dedicated stand: **No.957460**\*4
- SPC cable (1m): **No.936937**\*5
- SPC cable (2m): **No.965014**\*5
- Weight set: **No.02AZE375**\*6
- Recommended contact point:
  - Shell type
  - Carbide-tipped spherical contact point,  $\phi 7.5$
  - Carbide-tipped spherical contact point,  $\phi 10.5$
  - Carbide-tipped needle contact point,  $\phi 0.45$

\*4: Only available for **VL-50S** models

\*5: Refer to page G-32 for details of the RS link.

\*6: Not applicable to **VL-50-100-B**, **VL-50S-100-B**.

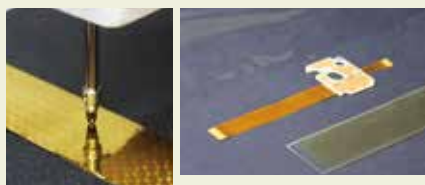
## Measurement Examples



Glass dimensional measurement



Thin sheet metal thickness



Thickness measurement of non-metallic sheet

## Laser Beam Safety Precautions

This system uses a low-power invisible laser beam (780nm) which corresponds to a CLASS 1 (invisible radiation) of IEC60825-1 for measurement. The CLASS 1 laser warning label as shown below is attached to the main unit.

**CLASS 1 LASER PRODUCT**

# Litematic – Low-Force Measurement

## Series 318 — Low Force, High-resolution, Motorized Measurement of Easily-deformed Parts

- The Litematic is designed for measuring easily deformed workpieces and high-precision parts, with extra-low measuring force of 0.01N.
- 0.15N and 1N types are capable of measuring at a certain measuring force by using a Litematic feature, while the 0.01N type is suitable for measuring delicate workpieces.
- \*0.15N, 1N types are factory-installed option.
- The motor-driven spindle moves up/down and stops when the contact point touches the workpiece. Then the maximum, minimum values and runout value are measured under a constant force.
- High resolution of 0.01 $\mu$ m, and wide measuring range of 50mm.
- Measuring system VL-50-B, integrated display type, and VL-50S-B, a separate display type, are available.
- The measuring table supplied with VL-50-B is ceramic and corrosion-free for easier maintenance and storage.
- The spindle is made of low thermal-expansion material.



318-221A



318-226A

## SPECIFICATIONS

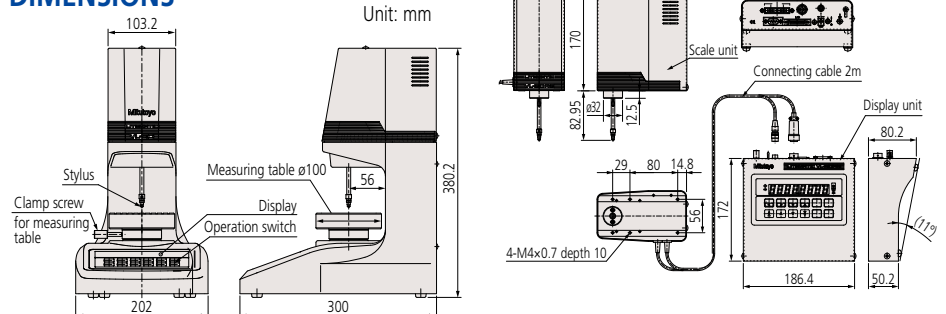
Order No.	318-221A	318-222A	318-223A	318-226A	318-227A	318-228A
Model	VL-50-B	VL-50-15-B	VL-50-100-B	VL-50S-B	VL-50S-15-B	VL-50S-100-B
Measuring range	0 to 50mm (0-2")					
Resolution	0.01/0.1/1.0 $\mu$ m (.000005"/.000005"/.00005")					
Display unit	8 digits/14mm (.6") character height (without signs)					
Detection method	Reflection-type linear encoder					
Stroke	51.5mm (.2") (when using a standard contact point)					
Indication accuracy (20°C)*1	(0.5+L/100) $\mu$ m L=arbitrary measuring length (mm)					
Accuracy guaranteed temperature*2	20 $\pm$ 1°C					
Repeatability*1	$\sigma$ =0.05 $\mu$ m					
Measuring force*1	0.01	0.15N*3	1N*3	0.01N	0.15N*3	1N*3
Feed Measurement speed	Approx. 2mm/s (.08"/s) or 4mm/s (.16"/s) (changeable by parameter)					
Fast feed	Approx. 8mm/s (.3"/s)					
Standard contact point	$\phi$ 3mm carbide tipped (fixing screw: M2.5 (P=0.45)×5) <b>No.901312</b>					
Measuring table	$\phi$ 100 (ceramic, grooved, removable)					
Input	Foot switch input (when optional foot switch is used) External control					
Output	Digimatic output/RS-232C output (changeable by parameter)					
Rating Power consumption	85 - 264V AC (depends on AC adapter) Max. 12 W (12V, 1A)					
Standard accessories	AC adapter: <b>No.357651</b> , Power cable/grounding wire: <b>No.02ZAA000</b> , AC cable (USA): <b>No.02ZAA010</b> * Hex wrench (2 pcs, for fixing contact point and for removing fixing bracket)					

\*1: Normal measurement using standard contact point.

\*2: Or less temperature change. Hot or cold direct air flow should be avoided.

\*3: 0.15N, 1N types are factory-installed option.

## DIMENSIONS



**Mitutoyo**

1.888.610.7664

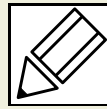


www.calcerc.com

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# Quick Guide to Precision Measuring Instruments

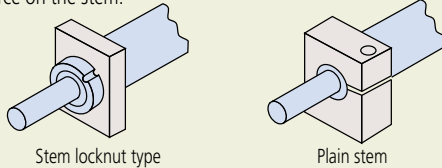


## Linear Gages

### Head

#### ■ Plain Stem and Stem with Clamp Nut

The stem used to mount a linear gage head is classified as a plain type or clamp nut type as illustrated below. The clamp nut stem allows fast and secure clamping of the linear gage head. The plain stem has the advantage of wider application and slight positional adjustment in the axial direction on final installation, although it does require a split-fixture clamping arrangement or adhesive fixing. However, take care so as not to exert excessive force on the stem.



#### ■ Measuring Force

This is the force exerted on a workpiece during measurement by the contact point of a linear gage head, at its stroke end, expressed in newtons.

#### ■ Comparative Measurement

A measurement method where a workpiece dimension is found by measuring the difference in size between the workpiece and a master gage representing the nominal workpiece dimension.

#### ■ Ingress Protection Code

IP54 protection code

Type	Level	Description
Protects the human body and protects against foreign objects	5: Dust protected	Protection against harmful dust
Protects against exposure to water	4: Splash-proof type	Water splashing against the enclosure from any direction shall have no harmful effect.

IP66 protection code

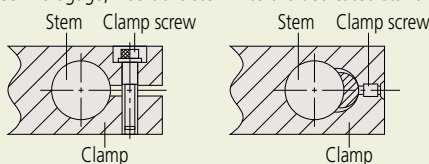
Type	Level	Description
Protection against contact with the human body and foreign objects	6: Dust tight	Protection from dust ingress Complete protection against contact
Protects against exposure to water	6: Water-resistant type	Water jets directed against the enclosure from any direction shall have no harmful effect.

#### ■ Precautions in Mounting a Gage Head

- Insert the stem of the gage into the mounting clamp of a measuring unit or a stand and tighten the clamp screw.
- Notice that excessively tightening the stem can cause problems with spindle operation.
- Never use a mounting method in which the stem is clamped by direct contact with a screw.
- Never mount a linear gage by any part other than the stem.
- Mount the gage head so that it is in line with the intended direction of measurement. Mounting the head at an angle to this direction will cause an error in measurement.
- Exercise care so as not to exert a force on the gage through the cable.

#### ■ Precautions in Mounting a Laser Hologage

To fix the Laser Hologage, insert the stem into the dedicated stand or fixture.



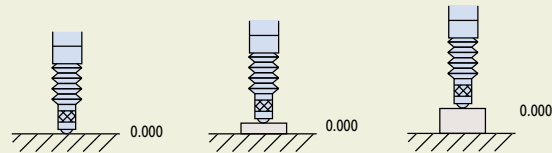
Recommended hole diameter on the fixing side: 15mm +0.034/-0.014

- Machine the clamping hole so that its axis is parallel with the measuring direction. Mounting the gage at an angle will cause a measuring error.
- When fixing the Laser Hologage, do not clamp the stem too tightly. Over-tightening the stem may impair the sliding ability of the spindle.
- If measurement is performed while moving the Laser Hologage, mount it so that the cable will not be strained and no undue force will be exerted on the gage head.

### Display Unit

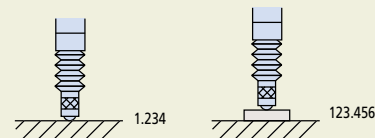
#### ■ Zero-setting

A display value can be set to 0 (zero) at any position of the spindle.



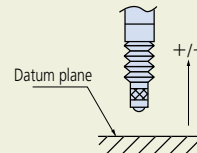
#### ■ Presetting

Any numeric value can be set on the display unit for starting the count from this value.



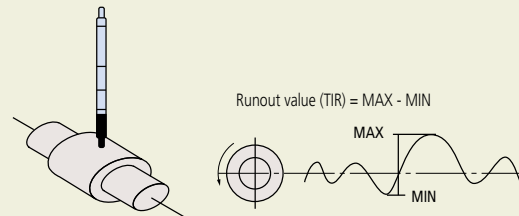
#### ■ Direction Changeover

The measuring direction of the gage spindle can be set to either plus (+) or minus (-) of count.



#### ■ MAX, MIN, TIR Settings

The display unit can hold the maximum (MAX) and minimum (MIN) values, and MAX - MIN value during measurement.



#### ■ Tolerance Setting

Tolerance limits can be set in various display units for automatically indicating if a measurement falls within those limits.

#### ■ Open Collector Output

An external load, such as a relay or a logic circuit, can be driven from the collector output of an internal transistor which is itself controlled by a tolerance judgement result, etc.

#### ■ Relay output

Contact signal that outputs the open/closed status.

#### ■ Digimatic Code

A communication protocol for connecting the output of measuring tools with various Mitutoyo data processing units. This allows output connection to a Digimatic Mini Processor DP-1VR for performing various statistical calculations and creating histograms, etc.

#### ■ BCD Output

A system for outputting data in binary-coded decimal notation.

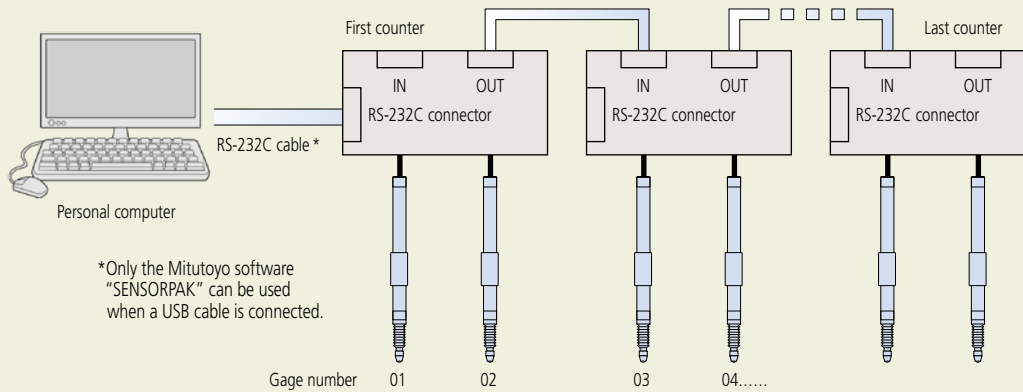
#### ■ RS-232C Output

A serial communication interface in which data can be transmitted bi-directionally under the EIA Standards. For the transmission procedure, refer to the specifications of each measuring instrument.

**RS Link Function** Multi-point measurement can be performed by connecting multiple EH or EV counters with RS Link cables.

### ■ RS Link for EH Counter

It is possible to connect a maximum of 10 counter units and handle up to 20 channels of multi-point measurement at a time.  
For this connection use a dedicated RS Link cable **No.02ADD950** (0.5m), **No.936937** (1m) or **No.965014** (2m).  
(The total length of RS Link cables permitted for the entire system is up to 10m.)



### ■ RS Link for EV Counter

It is possible to connect a maximum of 10\* counter units and handle up to 60 channels of multi-point measurement at a time.  
For this connection use a dedicated RS Link cable **No.02ADD950** (0.5m), **No.936937** (1m) or **No.965014** (2m).  
(The total length of RS Link cables permitted for the entire system is up to 10m.)

\* The maximum number of counter units that can be connected is limited to 6 (six) if an EH counter is included in the chain.

