Linear Gages

Laser Scan Micrometers

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Linear Gage LGK

Laser Scan Micrometer LSM-500S

Mitutoyo

Gage Heads / Display Units

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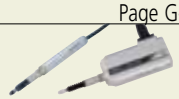
0.001mm	**LGK** series Page G-4 **LGF** series • 0.5µm high-resolution type Page G-5		**542-156** **542-161**  Page G-4 and G-5	**542-162**  Page G-5	
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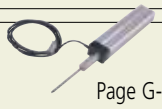
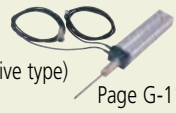
		542-312 **542-316**  Page G-10	**EG Counter** **542-075A**  Page G-21		
		542-313 (Motor-drive type)  Page G-11			
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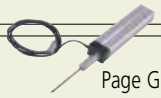
		542-332 **542-336**  Page G-10	**EH Counter** **542-075A**  Page G-19		
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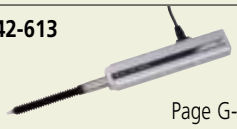
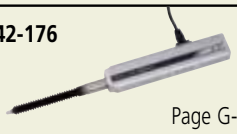
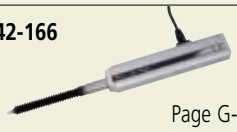
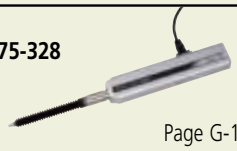
	542-613  Page G-5				
	542-176  Page G-6		**EG Counter** **542-017**  Page G-21	**EH Counter** **542-073A**  Page G-19	**EV Counter** **542-067**  Page G-23 and G-24
	542-166  Page G-6		**EB Counter** **542-094-2**  Page G-22		
	575-328  Page G-12		**EC Counter** **542-007**  Page G-20	**EH Counter** **542-072A**  Page G-19	**EV Counter** **542-064**  Page G-23 and G-24
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Mitutoyo

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/11ms (IEC 60068-2-27)

542-158

IP66

542-157

IP66

542 -156

IP66

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 upwards	0.7N or less		
	Contact point horizontal	0.75N or less		
	Contact point downwards	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 **No.901312**		
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: **No.538610**		
Remarks		Gold banded	Blue banded	Green banded

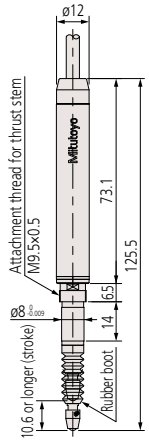
*1: When the spindle speed exceeds 1500mm/s (400mm/s for 0.1µm model), an alarm signal will be output. Also, if using Mitutoyo counter, an error message will be displayed. If using counters made by other companies, please inquire separately for the alarm signals. For the models of 0.1µm resolution, note 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.

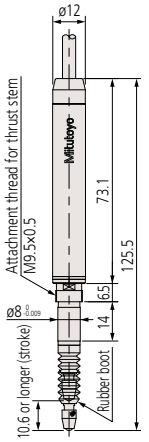
DIMENSIONS

Unit: mm

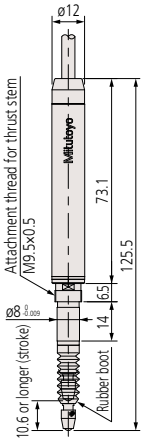
542-158



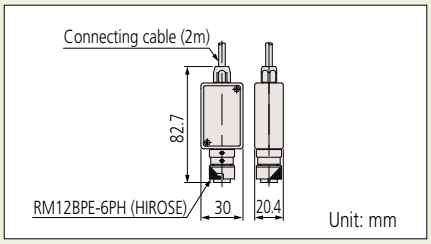
542-157



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

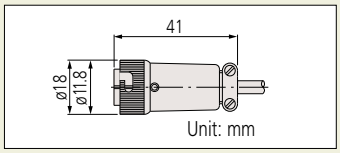
542-075A EH-101P
542-071A EH-102P
64PKA131 EG-101P
64PKA134 EB-11P
64PKA137 EV-16P (not compatible with 542-158)

Linear Gage LGF – Standard Dimensions, Robust

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

- 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.

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)

542-171, -161

542-172, -162

542-173, -163

542-612, -613

SPECIFICATIONS

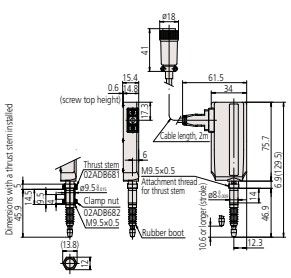
Order No.		542-171	542-161	542-172	542-162	542-612	542-173	542-163	542-613
Measuring range		10mm (.4")		25mm (1")			50mm (2")		
Resolution		0.5µm (.000020")	1µm (.000050")	0.5µm (.000020")	1µm (.000050")	5µm (.0002")	0.5µm (.000020")	1µm (.000050")	5µm (.0002")
Measuring accuracy (20°C) L=arbitrary measuring 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 upwards	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 downwards	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)x5), standard contact point **No.901312**							
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: **No.538610**		Wrench for contact point: **No.210187**					

*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.

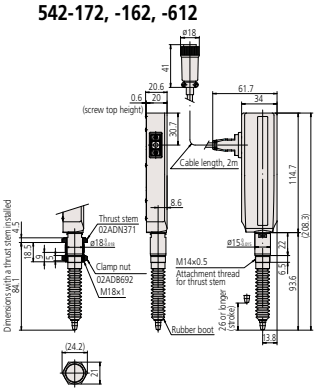
DIMENSIONS

Unit: mm

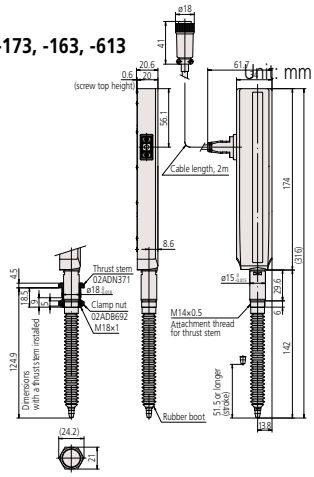
542-171, -161



542-172, -162, -612



542-173, -163, -613



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 upwards	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 downwards	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 **No.901312**					
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: **No.538610**		Wrench for contact point: **No.210187**			
Remarks		w/ origin point mark					

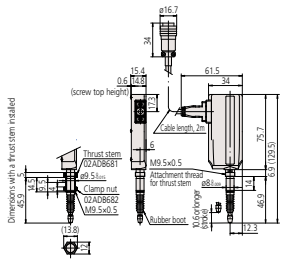
*1: When the spindle speed exceeds 1500mm/s, an alarm signal will be output. For use of alarm signals, please inquire separately. For models with 50mm stroke, note that over-speed error may occur depending on the impact amount when releasing the contact point freely.

*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.

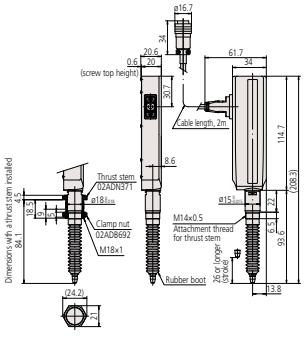
DIMENSIONS

Unit: mm

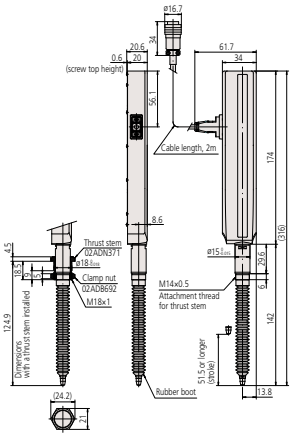
542-174, -164



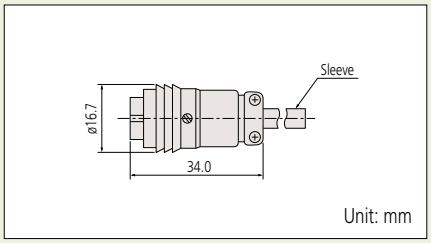
542-175, -165



542-176, -166



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

542-075A EH-101P
542-071A EH-102P
64PKA131 EG-101P
64PKA134 EB-11P
64PKA137 EV-16P
542-074A EH-1025 (for **542-401** 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).

542-204
IP54

542-222, 542-222H, 542-224

IP54

542-230
IP54

SPECIFICATIONS

Type		L-shaped	Straight		Low measuring force	Air-driven contact point *1		Sine-wave output type
Order No.		**542-204**	**542-222**	**542-222H**	**542-224**	**542-230***2	**542-223***3	**542-401**
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 upwards	Approx. 0.55N or less	Approx. 0.7N or less		Approx. 0.5N or less	Approx. 0.4N 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 downwards	Approx. 0.65N or less	Approx. 0.8N or less		Approx. 0.6N or less	Approx. 0.5N 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)

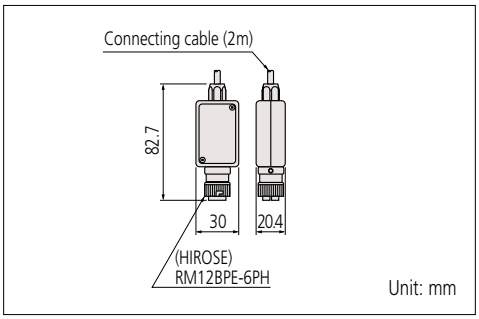
- Low measuring force, suitable for measurement of soft-material workpieces.

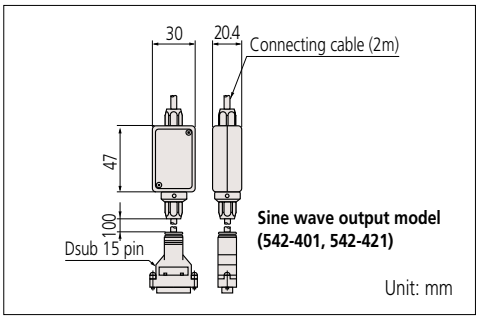
Model		LGB-105L-1	LGB-110A-1/LGB-110AR-1*2
Measuring range		5mm	10mm
Resolution		1µm	1µm
Measuring force*1	Contact point upwards	Approx. 0.4N or less	Approx. 0.5N or less
	Contact point horizontal	Approx. 0.45N or less	Approx. 0.55N or less
	Contact point downwards	Approx. 0.5N or less	Approx. 0.6N or less

*1: Measuring force at the retraction of the spindle
*2: The "R" suffix indicates air retracted spindle

The LGB-□□□-1 is la 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

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

542-262/542-262H
542-264

542-270

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 upwards	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 downwards	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 kind of liquid.

Slim head low measuring force series (made to order)

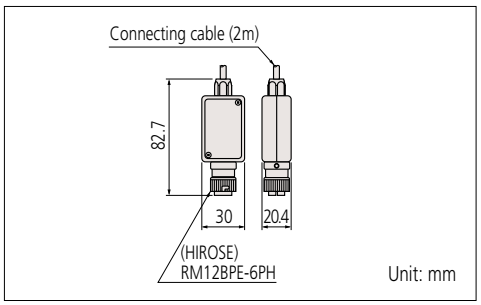
- Low measuring force, suitable for measurement of soft-material workpieces.

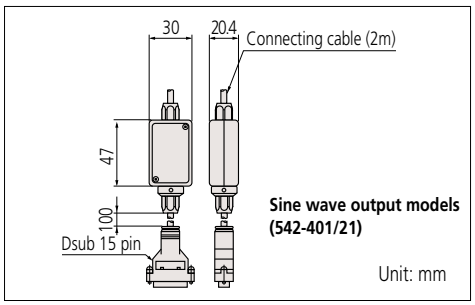
Model		LGB2-105L-1	LGB2-110AR-1
Measuring range		5µm	10µm
Resolution		1µm	1µm
Measuring force*	Contact point upwards	Approx. 0.4N or less	Approx. 0.5N or less
	Contact point horizontal/ Contact point upwards	Approx. 0.45N or less	Approx. 0.55N or less
	Contact point downwards	Approx. 0.5N or less	Approx. 0.6N 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 **542-401** only)

Linear Gage LGB2 – Slim

Series 542 — Resolution: 1µm

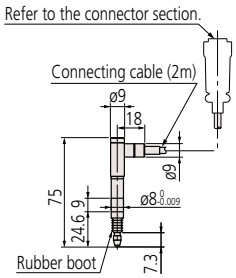
Applicable Counters

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

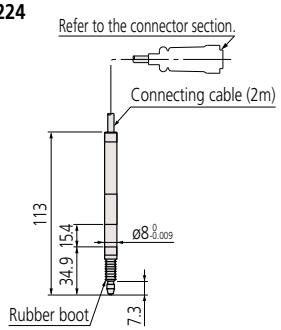
DIMENSIONS

Unit: mm

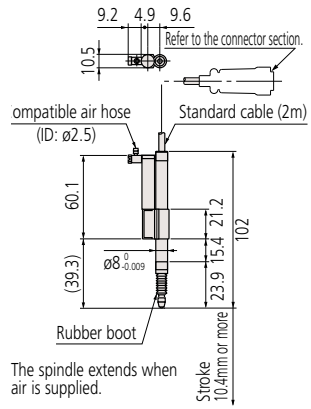
542-204



542-222/No.542-222H
542-224

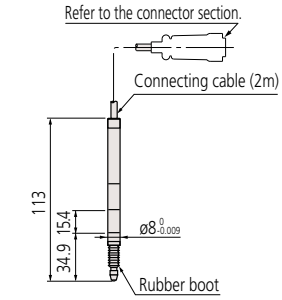


542-230



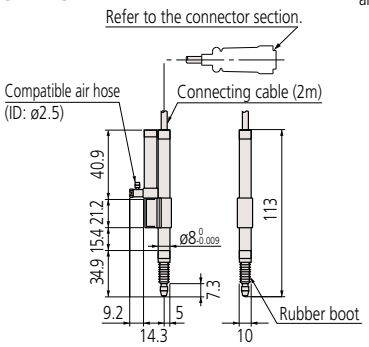
The spindle extends when air is supplied.

542-401



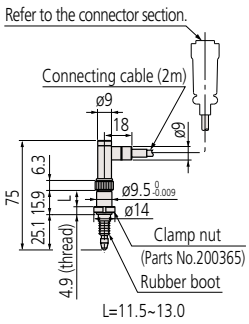
Connectable to Mitutoyo linear scale counter.

542-223

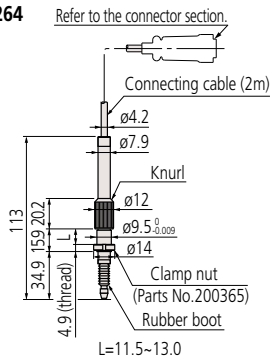


The spindle retracts when air is supplied.

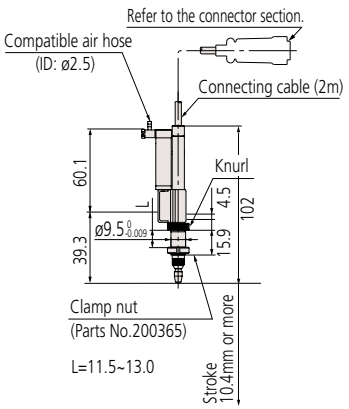
542-244



542-262/542-262H
542-264

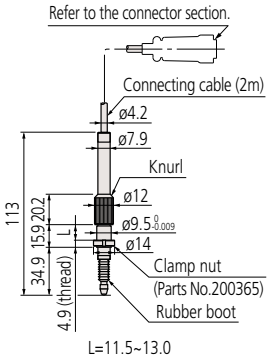


542-270



The spindle extends when air is supplied.

542-421



Connectable to Mitutoyo linear scale counter.

Mitutoyo

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.

542-312

SPECIFICATIONS

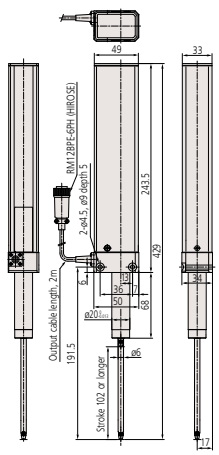
Type		Standard spar type	Low measuring force	Rubber boot type	Standard spar type	Low measuring force	Rubber boot type
Order No.		**542-312**	**542-316**	**542-314**	**542-332**	**542-336**	**542-334**
Measuring range		100mm (.4")					
Resolution		0.1µm (.000005")			1µm (.000050")		
Measuring accuracy (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 downwards	Approx. 8.0N or less	Approx. 3.0N or less	Approx. 8.0N 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	—	Approx. 6.5N or less
	Contact point upwards	Approx. 5.0N or less	—	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: **No.210187** 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: **No.137693** Fixing holder: **02ADG181** (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)

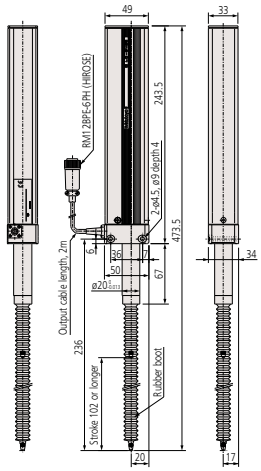
DIMENSIONS

Unit: mm

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

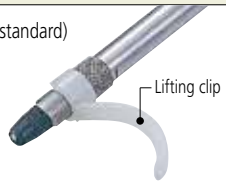


542-314, -334



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

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.

IP54

542-313

SPECIFICATIONS

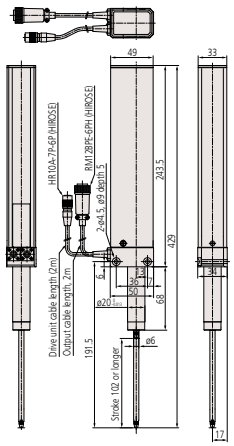
Type		Standard spar type	Rubber boot type	Standard spar type	Rubber boot type
Order No.		**542-313**	**542-315**	**542-333**	**542-335**
Measuring range		100mm (.4")			
Resolution		0.1µm (.000005")		1µm (.000050")	
Measuring accuracy (20°C)		(2+L/100) µm ≤ 2.5µm L=arbitrary measuring length (mm)		(2.5+L/100) µm ≤ 3µm L=arbitrary measuring length (mm)	
Quantizing error		±1 count			
Measuring force	Contact point downwards	H4 (9.5N)	L9 (6.0N)	H4 (9.5N)	L9 (6.0N)
	Contact point horizontal	L7 (6.5N)	—	L7 (6.5N)	—
	Contact point upwards	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: **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	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: **No.210187** Hexagon socket head cap screw, M4×0.7×35, 2 pcs. (for gage fixing) Round flat washer, nominal 4, 2 pcs. (for gage fixing) Motor drive unit: **No.02ADG400**			
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 kind of liquid.

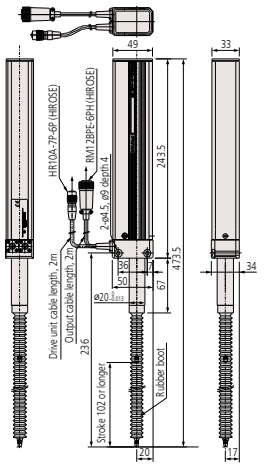
DIMENSIONS

Unit: mm

542-313, -333



542-315, -335



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

Mitutoyo

Linear Gage LGD – Absolute, Standard Dimensions, Robust

Series 575 — Resolution: 10µm

ABSOLUTE™

- 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) in 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)

575-326

575-327

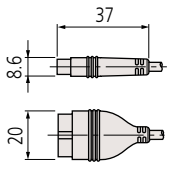
575-328

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 upwards	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 downwards	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: **No.538610**	Wrench for contact point: **No.210187**	

*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 kind of liquid.

Connector



Unit: mm

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**
  Digimatic Power Supply Unit: **965370**

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

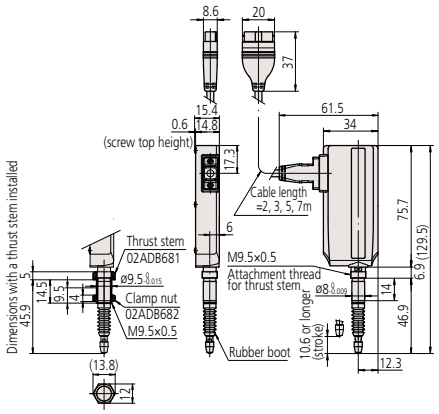
Linear Gage LGD – Absolute, Standard Dimensions, Robust

Series 575 — Resolution: 10µm

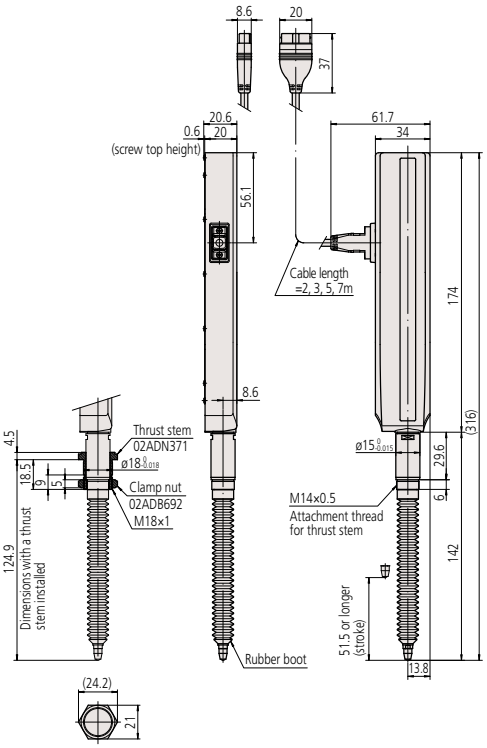
DIMENSIONS

Unit: mm

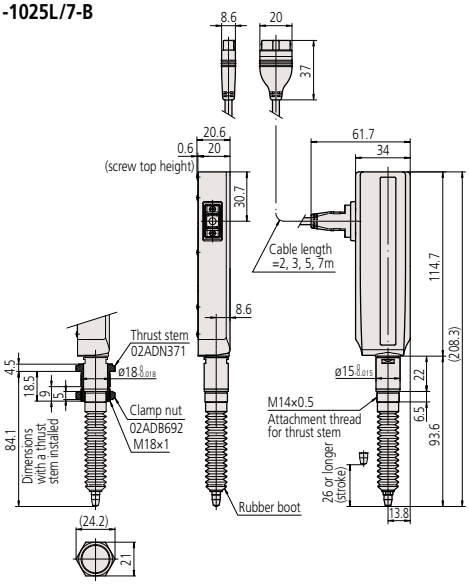
575-326



575-328



575-327
LGD®-1025L-B, -1025L/3-B, -1025L/5-B, -1025L/7-B



Applicable Counters

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

Mitutoyo

Linear Gage LGS – Absolute

Series 575 — Resolution: 10µm

- 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.

ABSOLUTE™

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 upwards	1.6N or less
	Contact point horizontal	1.8N or less
	Contact point downwards	2N or less
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 **No.901312**
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)

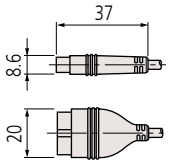
* IP Code is a standard which classifies and rates the degree of protection provided against the intrusion of solid objects and water. This may not be applicable depending on the kind of liquid.

Inch

Order No.		575-313
Measuring range		.5"
Resolution		.0005"
Measuring accuracy (20°C)		.0008"
Quantizing error		±1 count
Measuring force	Contact point upwards	1.6N or less
	Contact point horizontal	1.8N or less
	Contact point downwards	2N or less
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 **No.901312**
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 kind of liquid.

Connector



Unit: mm

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. **(0ZADF640)**

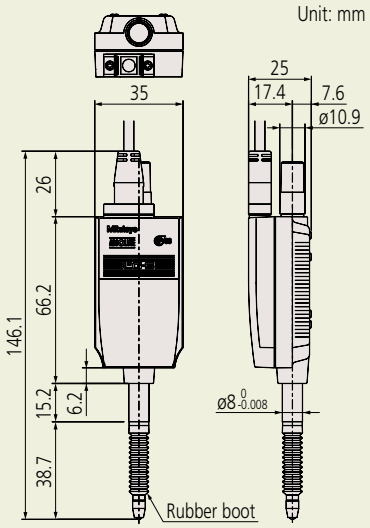
Digimatic cable extension adapter 02ADF640

Applicable Counters

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

DIMENSIONS

Unit: mm



Linear Gage LGF – High Resolution, Standard Dimensions, Robust

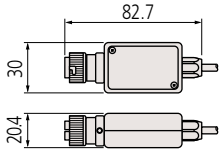
Series 542 — Resolution: 0.1 µm

- 0.1µm resolution type of reliable LGF series gage.
- Excellent protection against dust and splashing water (IP66) on the factory floor.

542-181

542-182

Connector



RM12BPE-6PH (HIROSE)

Unit: mm

Optional Accessories

- 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.

Applicable Counters

542-075A	EH-101P
542-071A	EH-102P
64PKA131	EG-101P
64PKA134	EB-11P

SPECIFICATIONS

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 upwards	1.0N or less	4.0N or less
	Contact point horizontal	1.1N or less	4.3N or less
	Contact point downwards	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 **No.901312**	
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: **No.538610**	Wrench for contact point: **No.210187**

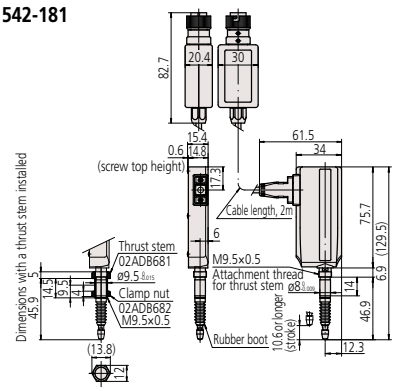
*1: When the spindle speed exceeds 400mm/s, an alarm signal will be output. Also, if using a Mitutoyo counter, an error message will be displayed. If using counters made by other companies, please consult your local Mitutoyo office. Note that over-speed error may occur depending on the impact amount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

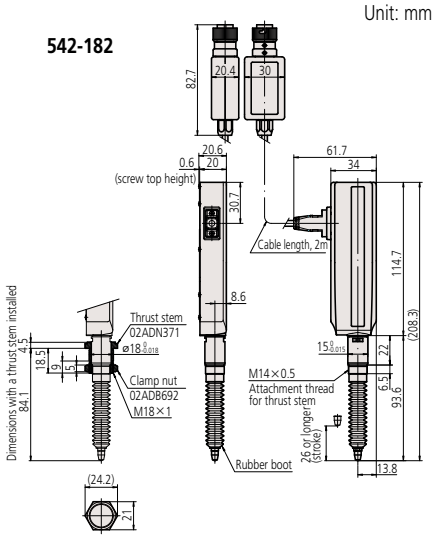
DIMENSIONS

Unit: mm

542-181



542-182



Mitutoyo

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

Series 542 — Resolution: 0.1µm

- 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

IP54

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
64PKA131	EG-101P
64PKA134	EB-11P

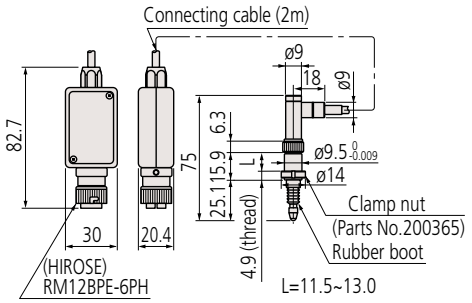
SPECIFICATIONS

Order No.		**542-246**	
Measuring range		5mm(.2")	
Resolution		0.1µm (.000005")	
Measuring accuracy (20°C)		0.8µm	
Measuring force	Contact point upwards	Approx. 0.55 or less	
	Contact point horizontal	Approx. 0.6N or less	
	Contact point downwards	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: **No.538610**	Wrench for contact point: **No.538610**, 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 kind of liquid.

DIMENSIONS

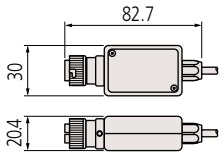
Unit: mm



Laser Hologage LGH – High Resolution

Series 542 — Resolution: 0.1µm

Connector



RM12BPE-6PH (HIROSE) Unit: mm

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)

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

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

- 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 costs 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 precision measurement in high resolution of 0.1µm.
- The design is highly resistant to unfavorable environmental conditions such as air movement and atmospheric pressure changes.
- Low measuring force models are available (LGH-1010C) for easily deformed precision molded workpieces.
- The spindle guide uses high precision linear ball bearings for extremely smooth movement and exceptional durability.

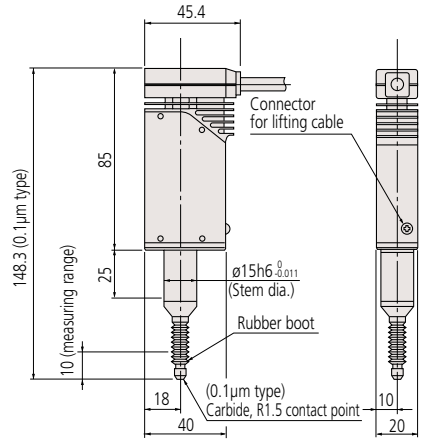
542-711-1

SPECIFICATIONS

Order No.		542-711-1	542-712-1
Measuring range		10mm (.4")	
Resolution		0.1µm (.000005")	
Measuring accuracy (20°C)		0.2µm	
Repeatability (2)		0.02µm	
Retrace error		0.05µm	
Measuring force	Contact point upwards	Approx. 0.35N or less	Approx. 0.1N
	Contact point horizontal	Approx. 0.45N or less	—
	Contact point downwards	Approx. 0.55N or less	—
Output signal		0.25µm, pitch 90°, 2-phase square wave	
Position detection method		Laser hologram length measuring sensor	
Response speed		250mm/s	
Mass		200g (cables excluded)	
Dust/water resistance		—	
Stylus		ø3mm carbide-tipped (fixing screw: M2.5 (P=0.45) x 5), standard contact point **No.901312**	
Stem dia.		ø15mm	
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 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 as same as that of operation.	
Standard Accessories		Wrench for contact point: **No.538610**	

DIMENSIONS

Unit: mm



Mitutoyo

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 costs 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 upwards	Approx. 0.35N or less		Approx. 0.1N	
	Contact point horizontal	Approx. 0.45N or less		—	
	Contact point downwards	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: **No.538610** AC adapter: **No.02ADN460** AC cable (USA): **No.02ZAA010***			
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

PROPRIETARY INSPECTION CERTIFICATE

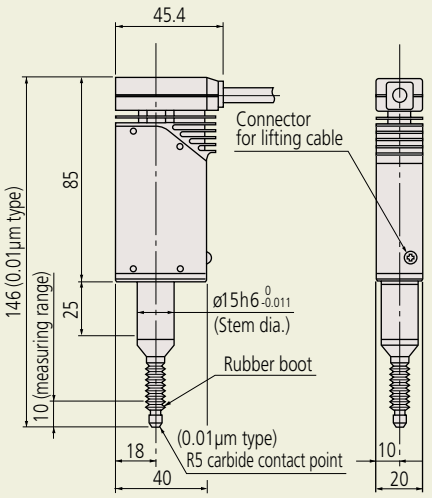
Mitutoyo guarantees the product quality. Mitutoyo guarantees the product quality.

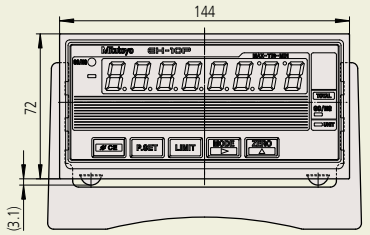
Optional Accessories

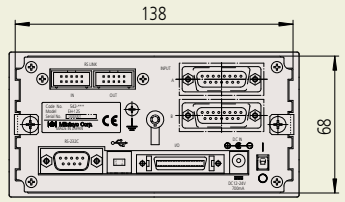
- Laser Hologage stand: **No.971750**
- Stem fixture for fixing to top surface: **No.971751**
- Stem fixture for fixing to bottom surface: **No.971752**
- Spindle lifting cable: **No.971753**
- Rubber boot: **No.238772** (spare)

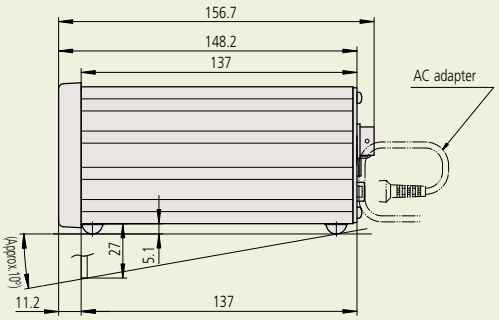
DIMENSIONS

Unit: mm









EH Counter – Multi-function Type

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

Optional Accessories

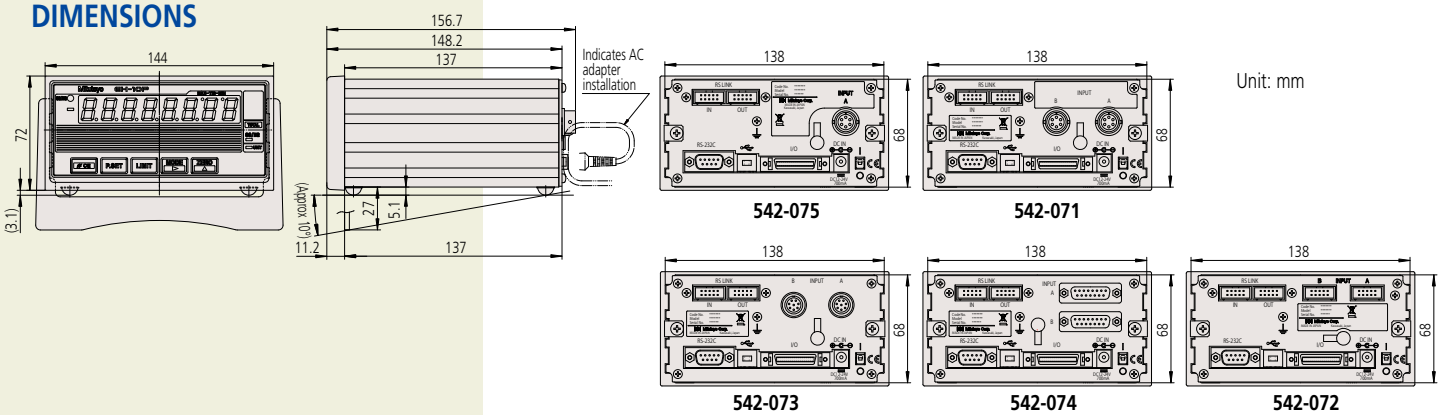
- I/O output connector (with cover): **No.02ADB440**

- 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, 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)				
Interface		RS-232C/USB/parameter selection via digimatic (only DP-1VR, digimatic mini-processor can be connected) (USB used only with SENSORPAK.) 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				
	Power consumption	8.4W (max. 700mA) 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) ×156.7 (D) mm				
AC adapter / AC cable (standard accessory)		AC adapter: **No.02ADN460** / AC cable (USA): **No.02ZAA010***,				
Applicable input		Differential square-wave			Differential sine-wave	Digimatic code output
Mass		Approx. 760g	Approx. 800g	Approx. 800g	Approx. 900g	Approx. 800g

DIMENSIONS



Unit: mm

Mitutoyo

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

542-007

Function

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

Optional Accessories

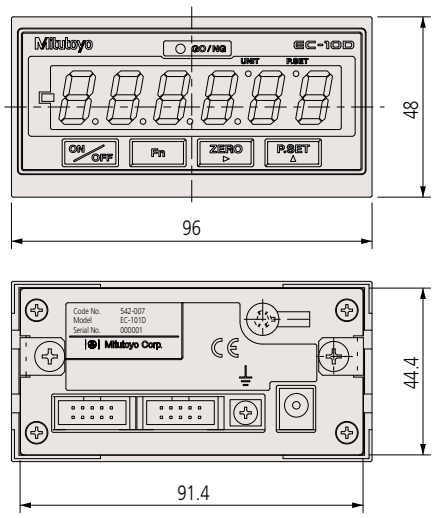
- Connecting cable for digimatic mini-processor: **No.936937** (1m), **No.965014** (2m)
- DC plug PJ-2: **No.214938**
- I/O cable (2m): **No.C162-155**

SPECIFICATIONS

Order No.		**542-007A**
Applicable head/input		**LGD**, **LGS**, **ID**, **SD,** Digimatic code (SPC)
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	–NG, OK, +NG (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) x 48 (H) x 84.6 (D) mm
Standard Accessories		AC adapter: **No.06AEG302JA**
Mass		220g

DIMENSIONS

Unit: mm



EG Counter – Single-function Type

Series 542 — Simple Display, Multi-Step Go/NG 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 kinds 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.

542-015

542-017

542-016

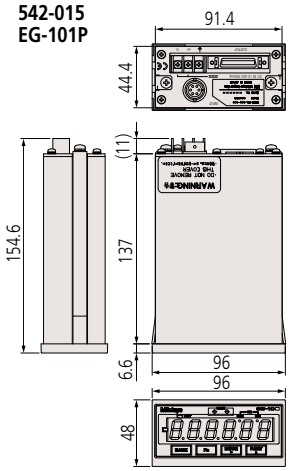
SPECIFICATIONS

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") [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		

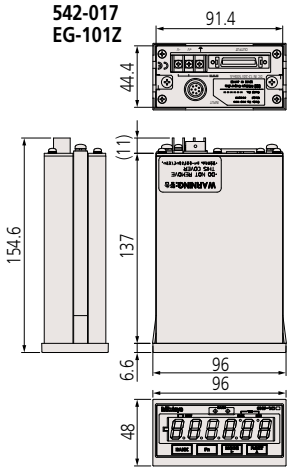
DIMENSIONS

Unit: mm

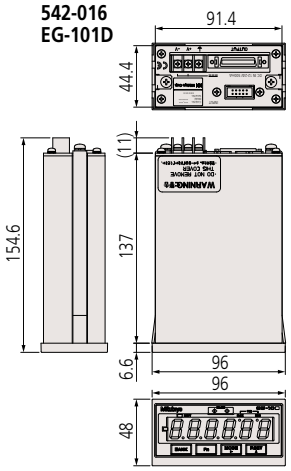
542-015
EG-101P



542-017
EG-101Z



542-016
EG-101D



Mitutoyo

EB Counter – Single-function Type

Series 542 — Simple Display, Multi-Step Go/NG Judgment and Output, BCD Output, Analog Output

- Produces 3-step/5-step, 7 kinds 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

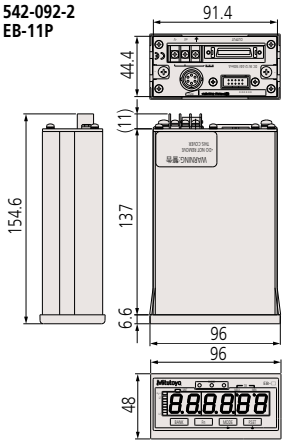
SPECIFICATIONS

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 (±99.9999mm) / .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 (±99.9999 mm) / .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	• Connecting to the external switch box (**No.02ADF180**) makes it easy to enter tolerance limits and preset values. Note) This function is not available when the gage is connected to **DP-1VR**, Digimatic Mini-Processor. • It can only be connected to **DP-1VR** Digimatic Mini-Processor (**No.264-504-5A**). • Number of tolerance steps can be expanded by assembling **EB-D** counters.		
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

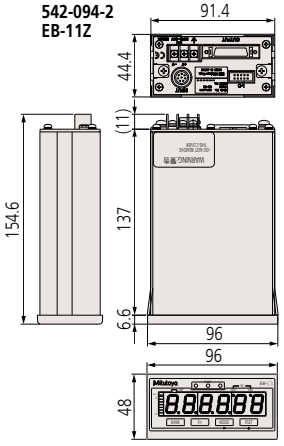
DIMENSIONS

Unit: mm

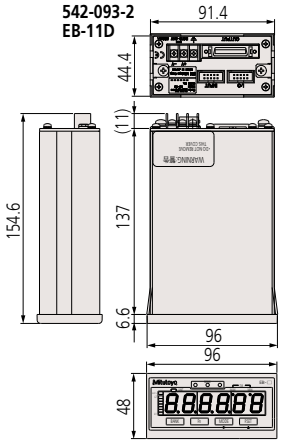
542-092-2
EB-11P



542-094-2
EB-11Z



542-093-2
EB-11D



Function

- Preset
- Tolerance judgment output (3/5-step, 7 kinds)
- Limit value output (2 kinds 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).		
	RS link	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)		
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) x 72 (H) x139 (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.

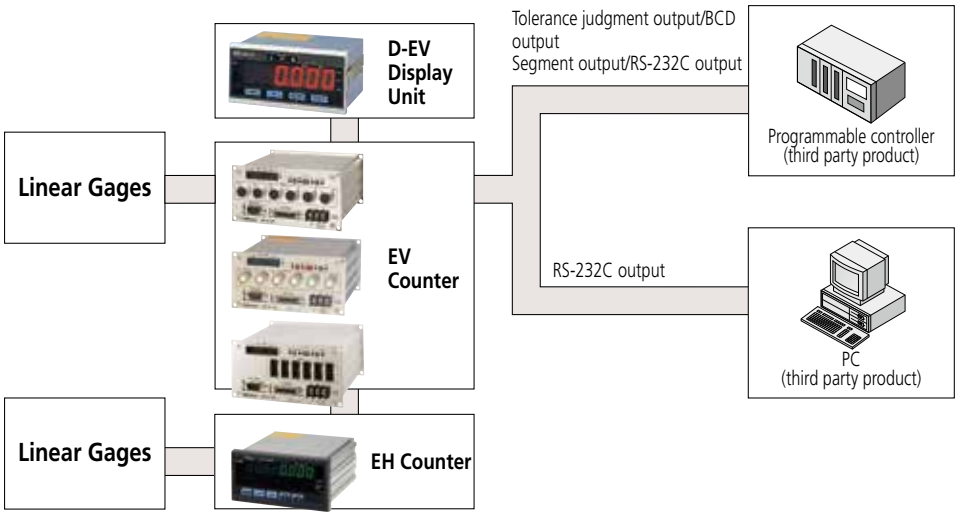
Mitutoyo

EV Counter System Configuration

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

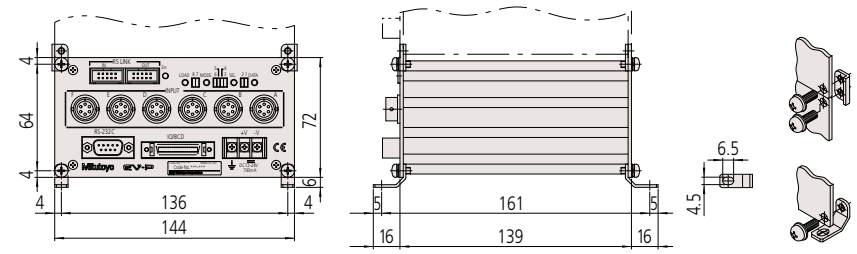
System Configuration

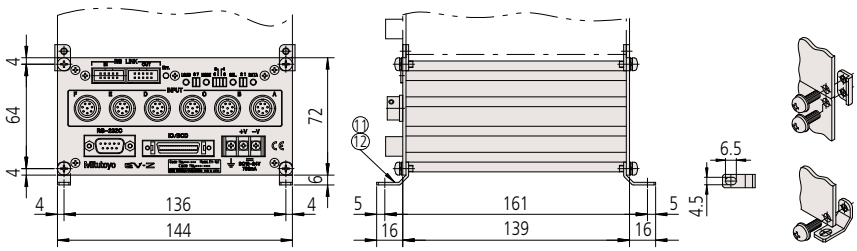
A counter system performs output and display for connected Mitutoyo linear gages.

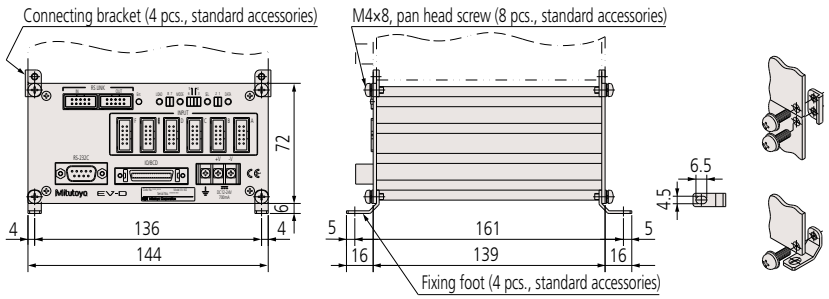


DIMENSIONS

Unit: mm







D-EV Display Unit for EV Counter

- 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/NG judgment result, total GO/NG judgment result for all gages, setting details, and errors.

02ADD400

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

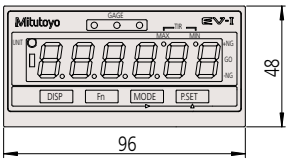
*1: Required when connecting with **EV-16P/D/Z**.
*2: Required when using AC adapter.
Note: AC adapters may not be needed if using power from EV counter to power the D-EV.

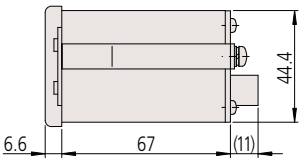
SPECIFICATIONS

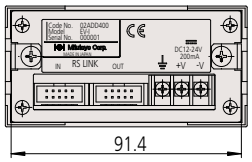
Order No.	**02ADD400**
Number of connections	1 EV counter per unit
Number of digits	Sign plus 6 digits (8 digits internal to EV counter)
LED display	Channel display (also for judgment result display): 3 (3-color LED) Measurement mode display (current data, maximum value, minimum value, runout): 2 Status 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

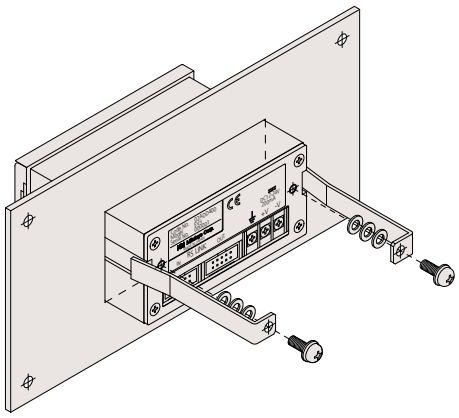
DIMENSIONS

Unit: mm









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

Measurement screen


Meter screen

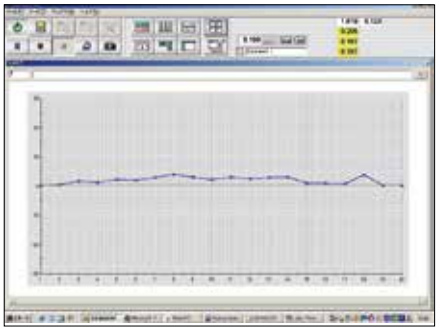


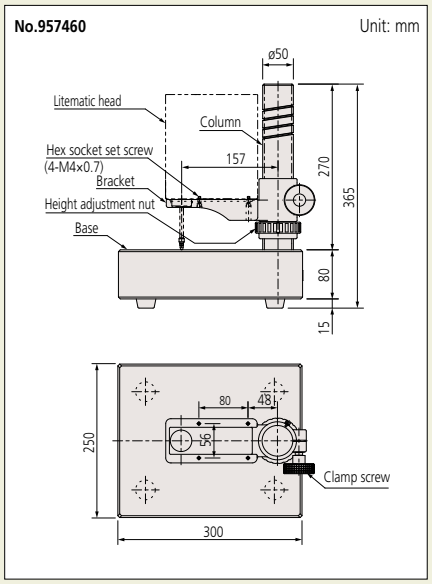
Chart screen

SPECIFICATIONS

Order No.	**02NGB030** (Software only)	**02NGB040** (Software 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/NG judgment (by specifying gages to be used for total tolerance judgment) GO/NG 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 MeasureLink)	
Connectable items	Various Mitutoyo counters (those compatible with RS Link)	
System Environments	Recommendation: PC/AT compatible machine, CPU: Pentium4 2GHz or higher, Memory: 256MB or more Disk: 100MB or more OS: Windows XP,7(32 bit)	

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

Optional Stand for VL-50S-B



Optional Accessories

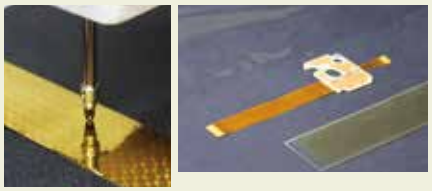
- Foot switch: **No.937179T**
- Dedicated stand: **No.957460***4
- SPC cable (1m): **No.936937***5
- SPC cable (2m): **No.965014***5
- Weight set: **No.02AZE375***6
- Recommended contact point:
  Shell type
  Carbide-tipped spherical contact point, ø7.5
  Carbide-tipped spherical contact point, ø10.5
  Carbide-tipped needle contact point, ø0.45

*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.

*1: 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 0.01µm, 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, corrosion-free for easier maintenance and storage.
- The spindle is made of low thermal expansion material.

318-221A

318-226A

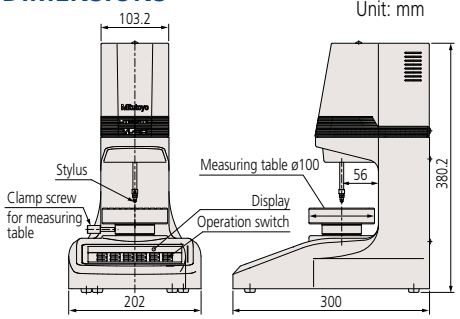
SPECIFICATIONS

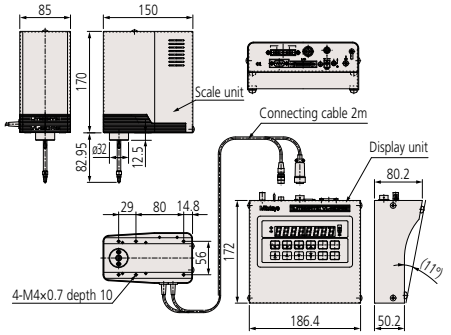
Order No.		318-221A	318-222A	318-223A	318-226A	318-227A	318-228A
Model		VL-50-B	VL-50-15-B	VL-50-100-B	VL-505-B	VL-505-15-B	VL-50-100-B
Measuring range		0 to 50mm (0-2")					
Resolution		0.01/0.1/1.0µm (.0000005"/.000005"/.00005")					
Display unit		8 digits/14mm (.6") character height (without signs)					
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)µm L=arbitrary measuring length (mm)					
Accuracy guaranteed temperature*2		20 ± 1°C					
Repeatability*1		σ=0.05µm					
Measuring force*1		0.01	0.15N*3	1N*3	0.01N	0.15N*3	1N*3
Feed speed	Measurement	Approx. 2mm/s (.08"/s) or 4mm/s (.16"/s) (changeable by parameter)					
	Fast feed	Approx. 8mm/s (.3"/s)					
Standard contact point		ø3mm carbide tipped (fixing screw: M2.5 (P=0.45)x5) **No.901312**					
Measuring table		ø100 (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 supply	85 - 264V AC (depends on AC adapter)					
	Power consumption	Max. 12 W (12V, 1A)					
Standard Accessories		AC adapter: **No.357651**, Power cable/grounding wire: **No.02ZAA000**, AC cable (USA): **No.02ZAA010*** 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

Unit: mm



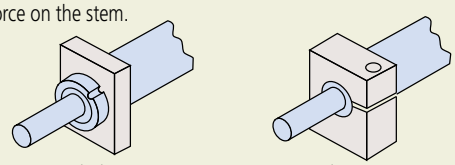


Mitutoyo

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 requires a split-fixture clamping arrangement or adhesive fixing. However, take care so as not to exert excessive force on the stem.



Stem locknut type　　Plain 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

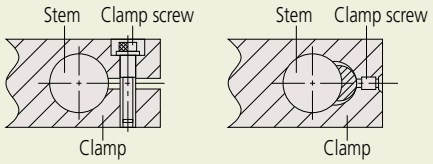
Type	Level	Description
Protection against contact with the human body and foreign objects	6: Dust tight	Protection from dust ingress Complete protection against contact
Protects against exposure to water	6: Water-resistant type	Water jets directed against the enclosure from any direction shall have no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

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.



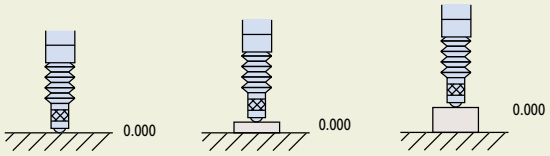
Recommended hole diameter on the fixing side: 15mm +0.034/-0.014

- 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

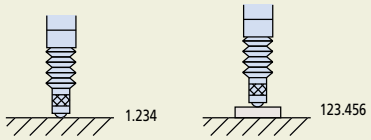
Zero-setting

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



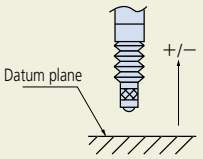
Presetting

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



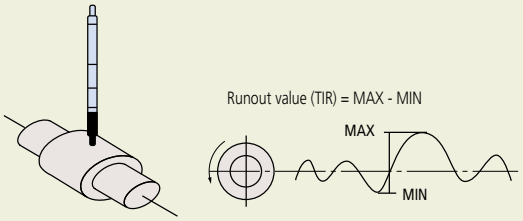
Direction changeover

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.

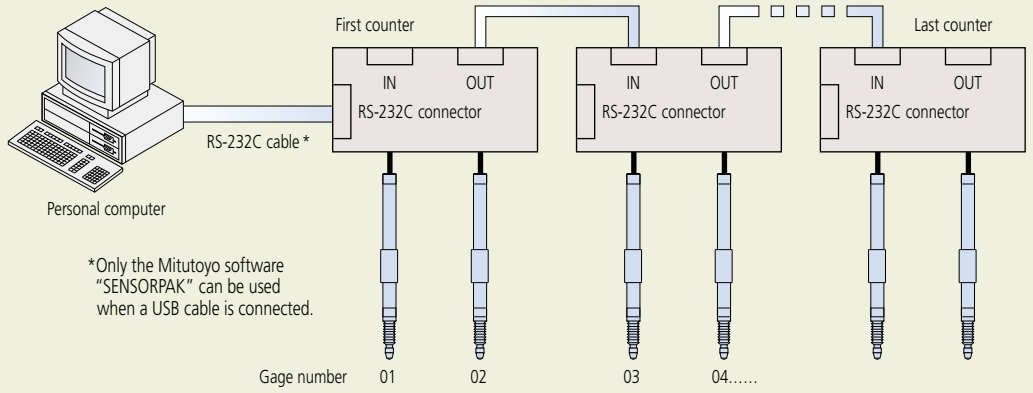
RS-232C Output

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

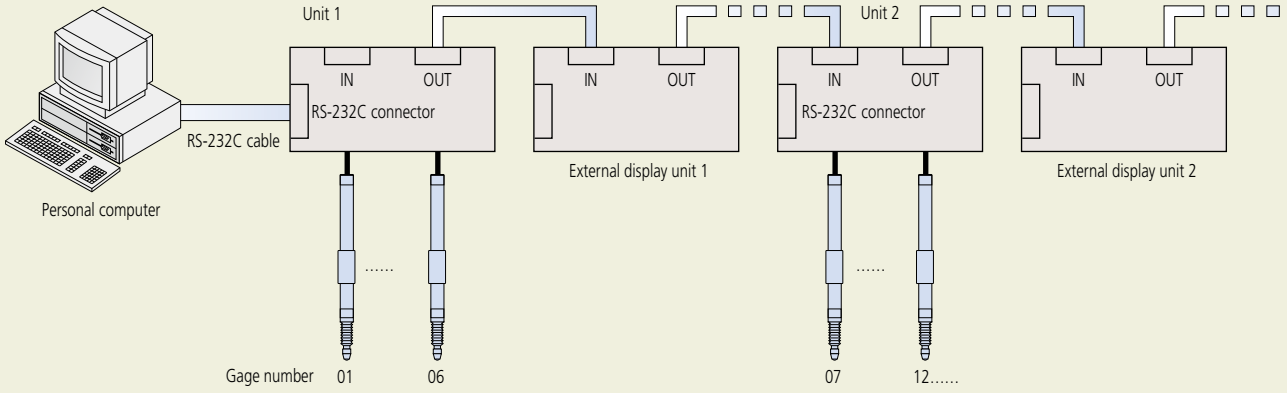
It is possible to connect a maximum of 10 counter units and handle up to 20 channels of multi-point measurement at a time.
For this connection use a dedicated RS Link cable **No.02ADD950** (0.5m), **No.936937** (1m) or **No.965014** (2m).
(The total length of RS Link cables permitted for the entire system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



Laser Scan Micrometer Selection Guide

MEASURING UNITS

Appearance	Model	Laser Classification	Measuring range	Resolution (Selectable)
	**LSM-902***	**Visible** (650nm), IEC Class 2/ FDA Class II	0.1 - 25mm (.004" - 1.0")	0.01µm - 10µm (.000001" - .0005")
	**LSM-500S**	**Visible** (650nm), IEC Class 2/ FDA Class II	0.005 - 2mm (.0002" - .08")	0.01µm - 10µm (.000001" - .0005")
	**LSM-501S**	**Visible** (650nm), IEC Class 2/ FDA Class II	0.05 - 10mm (.002" - .4")	0.01µm - 10µm (.000001" - .0005")
	**LSM-503S**	**Visible** (650nm), IEC Class 2/ FDA Class II	0.3 - 30mm (.012" - 1.18")	0.02µm - 100µm (.000001" - .005")
	**LSM-506S**	**Visible** (650nm), IEC Class 2/ FDA Class II	1 - 60mm (.04" - 2.36")	0.05µm - 100µm (.000002" - .005")
	**LSM-512S**	**Visible** (650nm), IEC Class 2/ FDA Class II	1 - 120mm (.04" - 4.72")	0.1µm - 100µm (.000005" - .005")
	**LSM-516S**	**Visible** (650nm), IEC Class 2/ FDA Class II	1 - 160mm (.04" - 6.30")	0.1µm - 100µm (.000005" - .005")
 With display unit	**LSM-9506** Measuring unit - display unit one-piece structure for bench-top use only	**Visible** (650nm), IEC Class 2/ FDA Class II	0.5 - 60mm (.02" - 2.36")	0.05µm - 100µm (.000002" - .005")

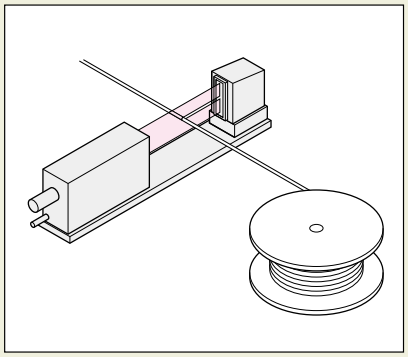
DISPLAY UNITS

Appearance	Model	Type	Application	Interface units equipped
	**LSM-6200** **LSM-6900***	Multi-function type	Bench-top use	• RS-232C • I/O • Analog output
	**LSM-5100****	Compact type (Low cost)	Assembly/ bench-top use (DIN size)	• RS-232C • I/O • Analog output

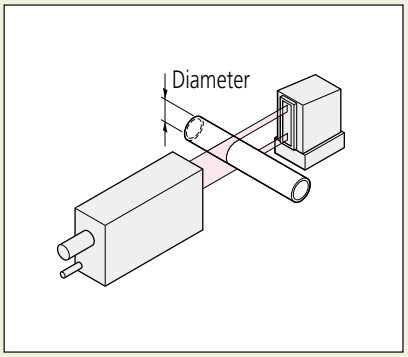
*LSM-902 and LSM-6900 are factory-set package.
**When connecting with the LSM-500S series, the scanning speed becomes 1600 scans/sec.

Measurement Examples

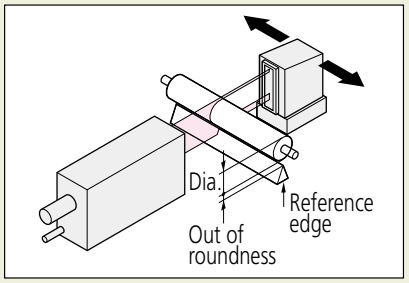
In-line measurement of glass fiber or fine wire diameter



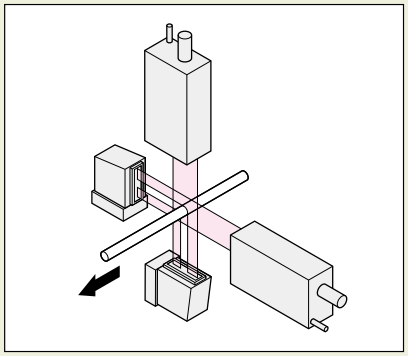
Measurement of outer diameter of cylinder



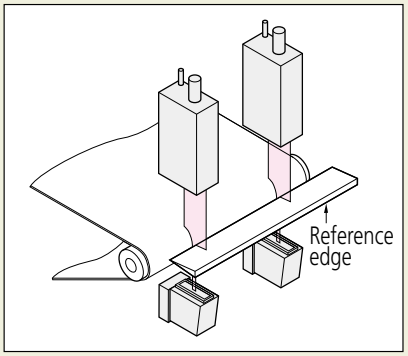
Measurement of outer diameter and roundness of cylinder



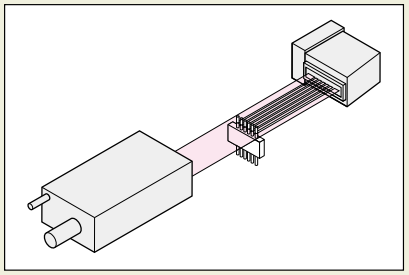
X- and Y-axis measurement of electric cables and fibers



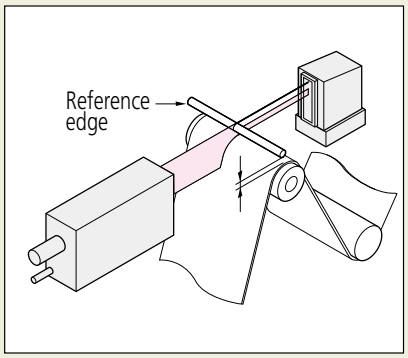
Measurement of thickness of film and sheet



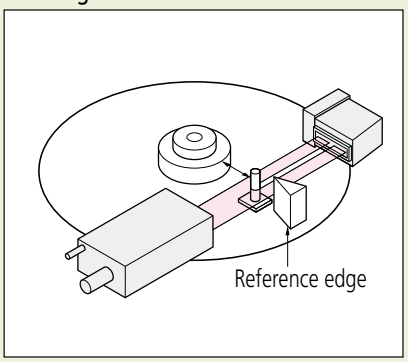
Measurement of spacing of IC chip leads



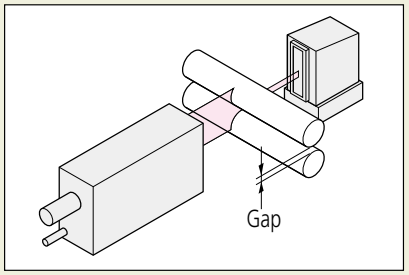
Measurement of film sheet thickness



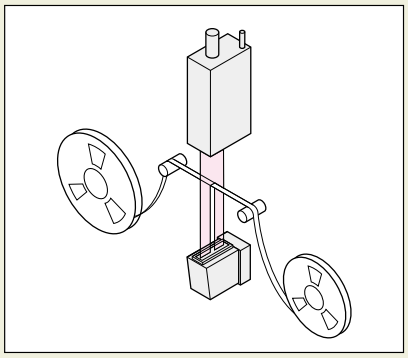
Measurement of laser disk and magnetic disk head movement



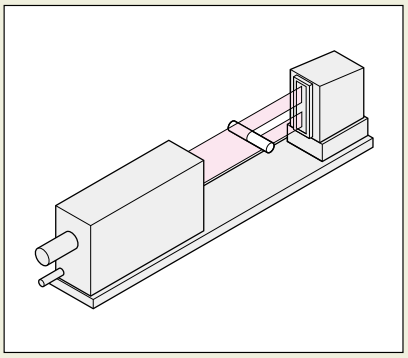
Measurement of gap between rollers



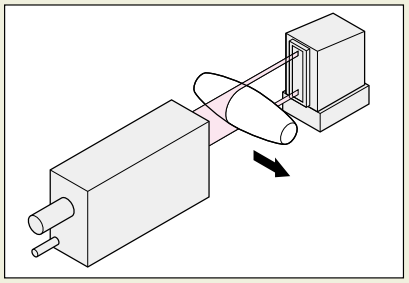
Measurement of tape width



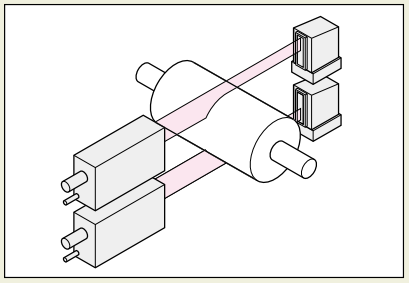
Measurement of outer diameter of optical connector and ferrule



Measurement of form



Dual system for measuring a large outside diameter



Mitutoyo

Laser Scan Micrometer LSM-902/6900

SERIES 544 — Ultra-high Accuracy Non-contact Measuring System

- Non-contact laser-based measuring system, mainly for outside diameter measurement. Suitable for delicate or moving workpieces.
- Accuracy of ±0.5µm in the ø0.1 - ø25mm range can be achieved. It is highly suitable suited for pin gage measurement.
- Narrow range accuracy of ±(0.3+0.1ΔD)µm for high precision measurement.
- Ultra-high repeatability of ±0.05µm.
- The system consists of a measuring unit (LSM-902) and a display unit (LSM-6900).

SPECIFICATIONS

Set Order No.		544-496A
Measuring unit		
Type		inch/mm
Measuring range		0.1 to 25mm (.004 - 1.0")
Resolution		0.01 to 10µm (selectable) (.000001 - .0005")
Repeatability*1		±0.05µm (±.000002")
Accuracy*2 (20°C)	Whole range	±0.5µm (±.000020")
	Small range	±(0.3+0.1ΔD) [D:mm]*5 ±(.000012+.001ΔD) [D:inch]
Positional error*3		±0.5µm (±.000020")
Measuring area*4		±1.5×25mm (±0.6x1.0")
Scanning rate		800 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		56m/s (2240"/sec)
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)

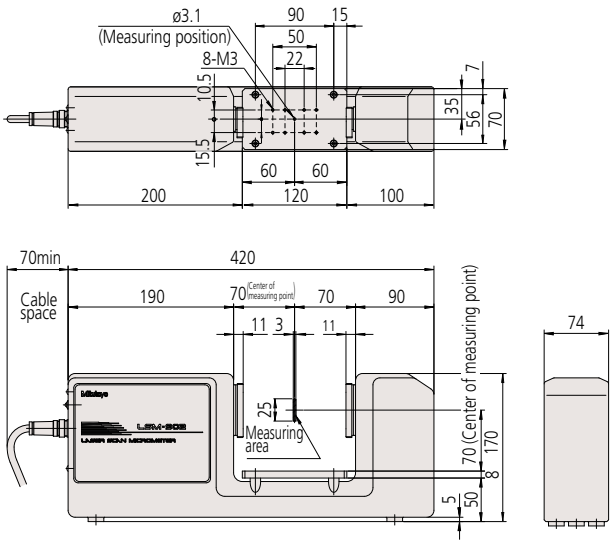
*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø25mm at the interval of 1.28 sec. (average 1024 times).
*2: At the center of the measuring range.
*3: An error due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*4: The area given by [optical axis direction]×[scanning direction]
*5: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm

Display unit

Display	16-digit plus 11-digit fluorescent display, and guide message LED
Segment	1 to 7 (1 to 3, transparent) or 1 to 255 edges
Averaging times	Arithmetic average: per 1 to 2048/ Moving average: per 32 to 2048
Judgment	Selection from "target value + tolerance", "lower tolerance + upper tolerance", or "7 classes multi-limit tolerance zone".
Measurement mode	Standby, Single measurement, Continuous measurement
Statistical analysis	Maximum, Minimum, Average, Dispersion, σ(S.D)
External dimensions	335 (W)×134 (H)×250 (D)mm
Power supply	120 V AC ±10%, 50W, 60Hz
Standard I/F	RS-232C, Analog I/O
Optional I/F	Digimatic code output unit (2-ch), 2nd I/O analog I/F, BCD I/F
Operating environment	0 to 40°C, RH 35 to 85% (no condensation)
Others	Nominal setting, sample setting, selection of unnecessary digits, transparent object measurement, automatic measurement in edge mode, output timer, abnormal data elimination, SHL change, group judgment, simultaneous measurement, statistical processing, mastering, buzzer function, automatic workpiece detection (dimension/position), zero-set/offset * Measuring unit dual connection, extra-fine line measurement, and some of the communication commands are not available.

Measuring Unit External Dimensions

Unit: mm



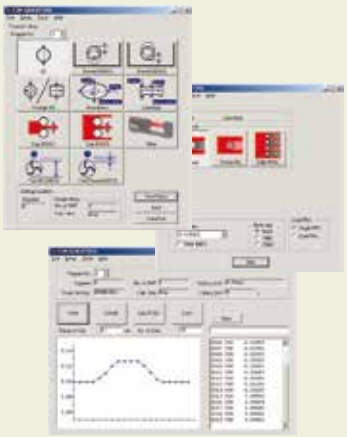
Optional Accessories

(Refer to page G-44 for details.)

- Calibration gage set (ø1.0, ø25.0) : **No.02AGD180**
- Workstage : **No.02AGD270**
- Adjustable workstage : **No.02AGD280**
- Digimatic code output unit (2-ch) : **No.02AGC840**
- 2nd I/O analog interface unit : **No.02AGC880**
- BCD interface unit : **No.02AGC910**
- Printer & cable set (120V AC C-type plug) : **No.02AGD600B**
- Printing paper TP411-28CL / 1Pack = 10pcs : **No.223663**
- Digimatic code output cable : **No.936937**
- Foot switch : **No.937179T**

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Laser Scan Micrometer LSM-500S

SERIES 544 — High Accuracy Non-contact Measuring System

- Capable of measuring down to 5µm outside diameter*1.
- Provides ultra-high accuracy of ±0.3µm over the entire measuring range (5µm to 2mm).
- Ultra-high speed measurement of 3200 scan/sec.
  Suitable for high speed lines or in applications subject to vibration.

IP64

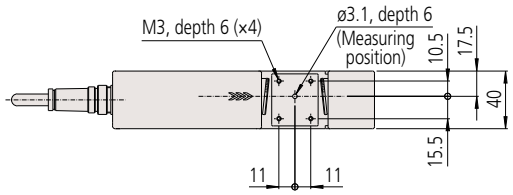
SPECIFICATIONS

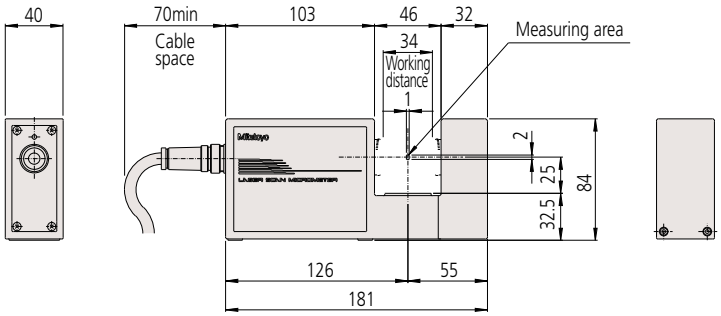
Order No. (Laser only)		**544-532**
Package No. (with LSM 6200 Display)		**64PKA117**
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.0002" to .080" (0.005 to 2mm)*1
Resolution		.000001" to .0005" (0.01 to 10µm) (selectable)
Repeatability*2		±0.03µm
Accuracy (20°C)*3		±0.3µm
Positional error*4		±0.4µm
Measuring area*5		1×2mm (0.005 to 2mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		76m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: The measuring range for the transparent object will be 0.05mm to 2mm. Please consult your local Mitutoyo office for objects smaller than 0.05mm.
The measuring range will be 0.1mm to 2mm in the 1 to 255 edge measurement mode or when activating the automatic workpiece detection.
If using the optional dual connection unit for LSM-6200, the measuring range will be 0.05mm to 2mm.
*2: Determined by the value of ±2σ (σ: standard deviation) when measuring ø2mm at the interval of 0.32 sec. (average 1024 times).
*3: Center of the measuring range for cylindrical workpieces outside diameter.
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.
Note: When using extra-fine line measurement function (FINE), guide messages for setting the following will not be displayed: dual-measurement, segment designation, automatic workpiece detection, and group judgment.

DIMENSIONS

Unit: mm





Optional Accessories

• Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

• Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

- Calibration gage set (ø0.1, ø2.0)
- Guide pulley : **No.02AGD110**
- Air blower : **No.02AGD200**
- Extension signal cables: : **No.02AGD220**

Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m

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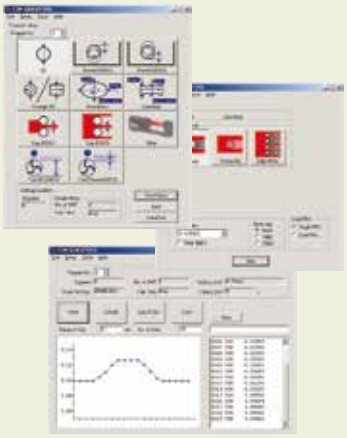
Basic data acquisition is also possible.
Included as standard accessory.
(Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Mitutoyo

Laser Scan Micrometer LSM-501S

SERIES 544 — High Accuracy Non-contact Measuring System

- Provides ultra-high accuracy of ±0.5µm over the entire measuring range (0.05 to 10mm).
- Narrow range accuracy of ±(0.3+0.1ΔD)µm for high precision measurement.
- Ultra-high speed measurement of 3200 scan/sec.
  Suitable for high speed lines or in applications subject to vibration.

IP64

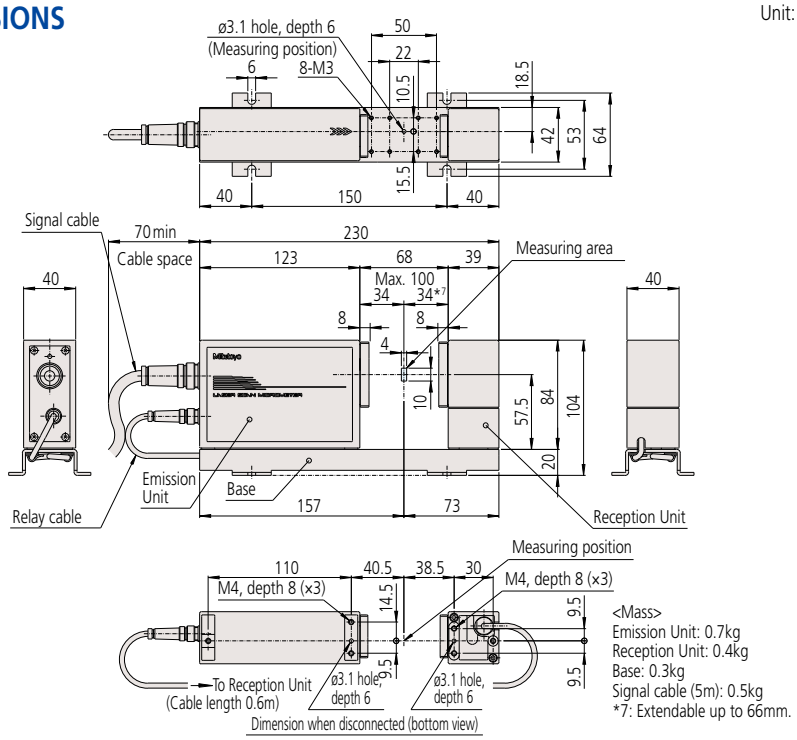
SPECIFICATIONS

Order No. (Laser Only)		544-534
Package No. (Laser w/LSM 6200 display)		64PKA118
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.002" to .4" (0.05 to 10mm)
Resolution		.000001" to .0005" (0.01 to 10µm) (selectable)
Repeatability*1		±0.04µm
Accuracy*2 (20°C)	Whole range	±0.5µm
	Small range	±(0.3+0.1ΔD)µm*3
Positional error*4		±0.5µm
Measuring area*5		2×10mm (ø0.05 to ø0.1mm) 4×10mm (ø0.1 to ø10mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		113m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø10mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

Unit: mm



<Mass>
Emission Unit: 0.7kg
Reception Unit: 0.4kg
Base: 0.3kg
Signal cable (5m): 0.5kg
*7: Extendable up to 66mm.

Optional Accessories

- Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

- Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

- Standard calibration gage set (ø0.1, ø10.0) : **No.02AGD120**
- Wire guiding pulley : **No.02AGD210**
- Adjustable workstage : **No.02AGD400**
- Air blower : **No.02AGD230**
- Workstage : **No.02AGD270**
- Extension signal cables

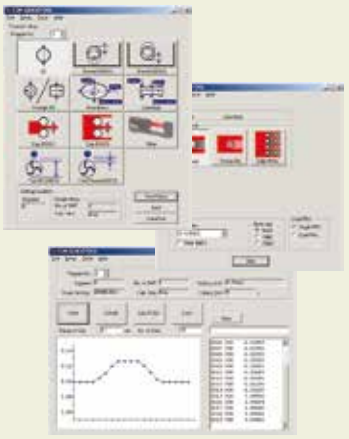
Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m

- Extension relay cables

Order No.	Cable length
02AGC150A	1m

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Laser Scan Micrometer LSM-503S

SERIES 544 — High Accuracy Non-contact Measuring System

- Ensures ±1.0μm accuracy over the entire measuring range (0.3 to 30mm).
- Narrow range accuracy of ±(0.6+0.1ΔD)μm for high precision measurement.
- Ultra-high speed measurement of 3200 scan/sec.
  Suitable for high speed lines or in applications subject to vibration.

IP64

Optional Accessories

• Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

• Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

• Standard calibration gage set (ø0.1, ø30.0) : **No.02AGD130**
• Adjustable workstage : **No.02AGD490**
• Air blower : **No.02AGD240**
• Workstage : **No.02AGD270**
• Extension signal cables

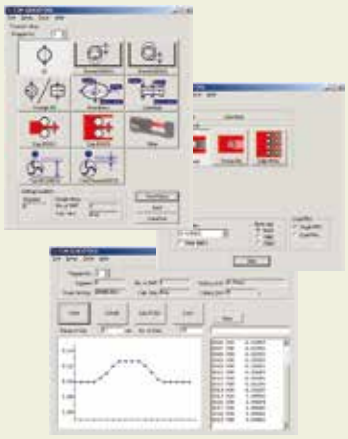
Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m
02AGN780D	20m

• Extension relay cables

Order No.	Cable length
02AGC150A	1m
02AGC150B	3m
02AGC150C	5m

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

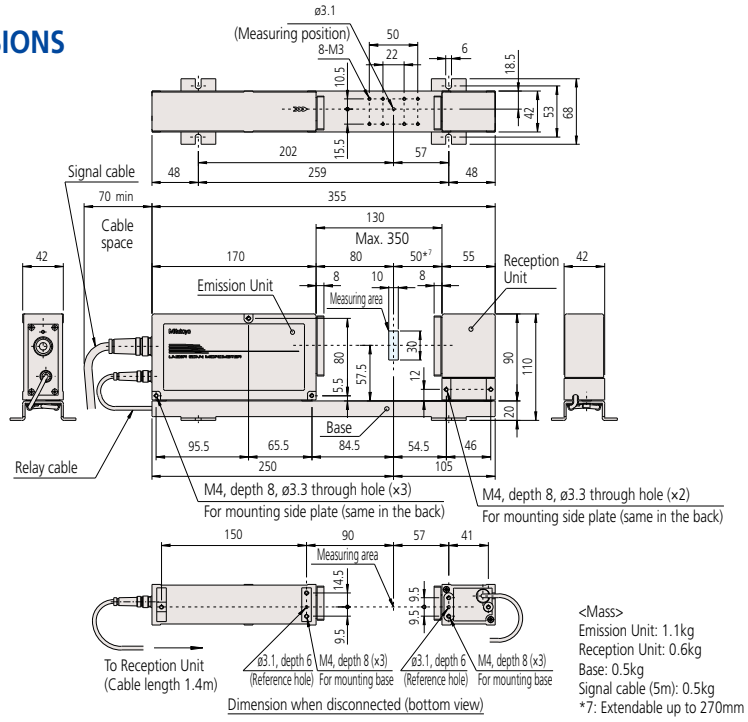
SPECIFICATIONS

Order No. (Laser only)		544-536
Package No. (Laser w/LSM 6200 display)		64PKA119
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.012" to 1.18" (0.3 to 30mm)
Resolution		.000001" to .005" (0.02 to 100μm) (selectable)
Repeatability*1		±0.11μm
Accuracy*2 (20°C)	Whole range	±1.0μm
	Small range	±(0.6+0.1ΔD)μm*3
Positional error*4		±1.5μm
Measuring area*5		10×30mm (0.3 to 30mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		226m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø30mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

Unit: mm



<Mass>
Emission Unit: 1.1kg
Reception Unit: 0.6kg
Base: 0.5kg
Signal cable (5m): 0.5kg
*7: Extendable up to 270mm

Mitutoyo

Laser Scan Micrometer LSM-506S

SERIES 544 — High Accuracy Non-contact Measuring System

- Ensures ±3μm accuracy over the entire measuring range (1 to 60mm).
- Narrow range accuracy of ±(1.5+0.5ΔD)μm in for high precision measurement.
- Ultra-high speed measurement of 3200 scan/sec. Suitable for high speed lines or in applications subject to vibration.

IP64

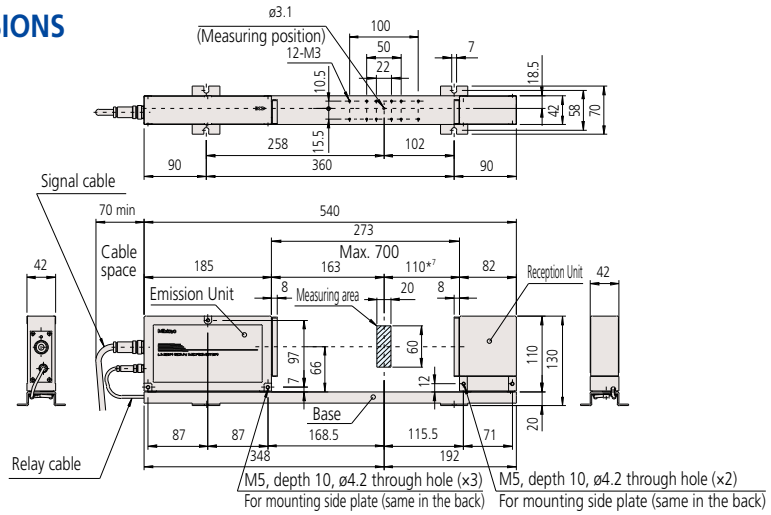
SPECIFICATIONS

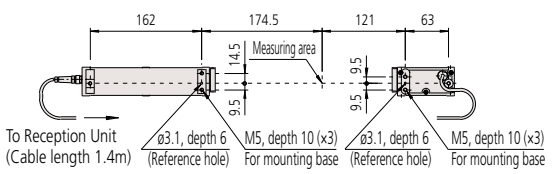
Order No. (Laser only)		544-538
Package No. (Laser w/ LSM 6200 display)		64PKA120
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.040" to 2.36" (1 to 60mm)
Resolution		.000002" to .005" (0.05 to 100μm) (selectable)
Repeatability*1		±0.36μm
Accuracy*2 (20°C)	Whole range	±3μm
	Small range	±(1.5+0.5ΔD)μm*3
Positional error*4		±4μm
Measuring area*5		20×60mm (1 to 60mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		452m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø60mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

Unit: mm





Dimension when disconnected (bottom view)

<Mass>
Emission Unit: 1.4kg
Reception Unit: 0.8kg
Base: 0.8kg
Signal cable (5m): 0.5kg
*7: Extendable up to 537mm

Optional Accessories

- Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

- Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

- Standard calibration gage set (ø1.0, ø60.0) : **No.02AGD140**
- Adjustable workstage : **No.02AGD520**
- Air blower : **No.02AGD250**
- Extension signal cables

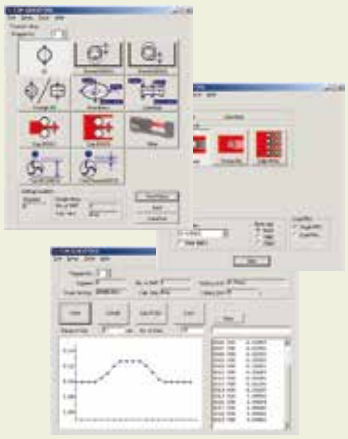
Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m
02AGN780D	20m

- Extension relay cables

Order No.	Cable length
02AGC150A	1m
02AGC150B	3m
02AGC150C	5m

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Laser Scan Micrometer LSM-512S

SERIES 544 — High Accuracy Non-contact Measuring System

- Ensures ±6µm accuracy over the entire measuring range (1 to 120mm).
- Narrow range accuracy of ±(4.0+0.5ΔD)µm in for high precision measurement.
- Ultra-high speed measurement of 3200 scan/sec. Suitable for high speed lines or in applications subject to vibration.

IP64

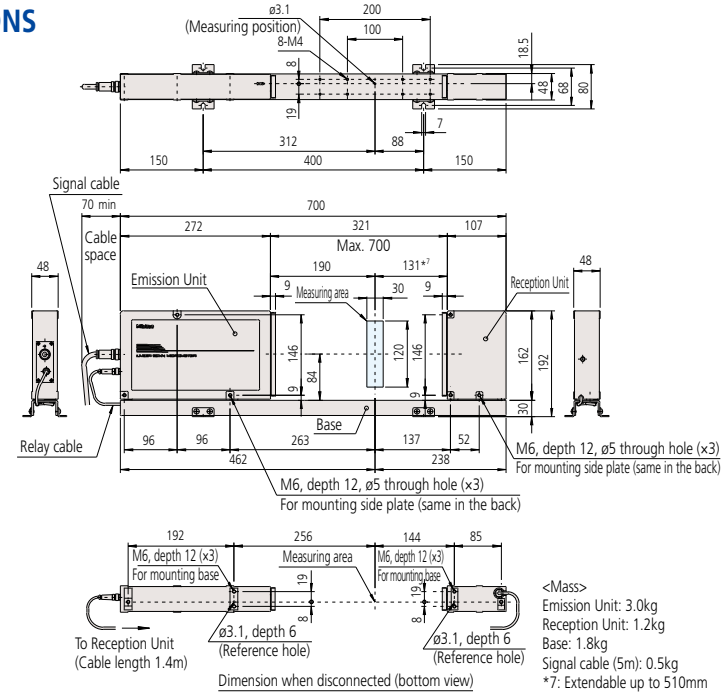
SPECIFICATIONS

Order No. (Laser Only)		544-540
Package No. (Laser w/ LSM 6200 display)		64PKA121
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.040" to 4.72" (1 to 120mm)
Resolution		.000005" to .005" (0.1 to 100µm) (selectable)
Repeatability*1		±0.85µm
Accuracy*2 (20°C)	Whole range	±6µm
	Small range	±(4.0+0.5ΔD)µm*3
Positional error*4		±8µm
Measuring area*5		30×120mm (1 to 120mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		904m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø120mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

Unit: mm



<Mass>
Emission Unit: 3.0kg
Reception Unit: 1.2kg
Base: 1.8kg
Signal cable (5m): 0.5kg
*7: Extendable up to 510mm

Optional Accessories

• Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

• Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

• Standard calibration gage set (ø20.0, ø120.0) : **No.02AGD150**
• Air blower : **No.02AGD260**
• Extension signal cables

Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m
02AGN780D	20m

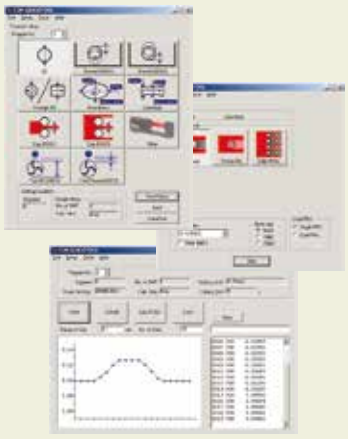
• Extension relay cables

Order No.	Cable length
02AGC150A	1m
02AGC150B	3m
02AGC150C	5m

• Roll diameter/form measuring instrument (Refer to page G-60 for details.)

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Mitutoyo

Laser Scan Micrometer LSM-516S

SERIES 544 — High Accuracy Non-contact Measuring System

- Ensures ±7µm accuracy over the entire measuring range (1 to 160mm).
- Narrow range accuracy of ±(4.0+2.0ΔD)µm for high precision measurement.
- Ultra-high speed measurement of 3200 scan/sec.
  Suitable for high speed lines or in applications subject to vibration.

IP64

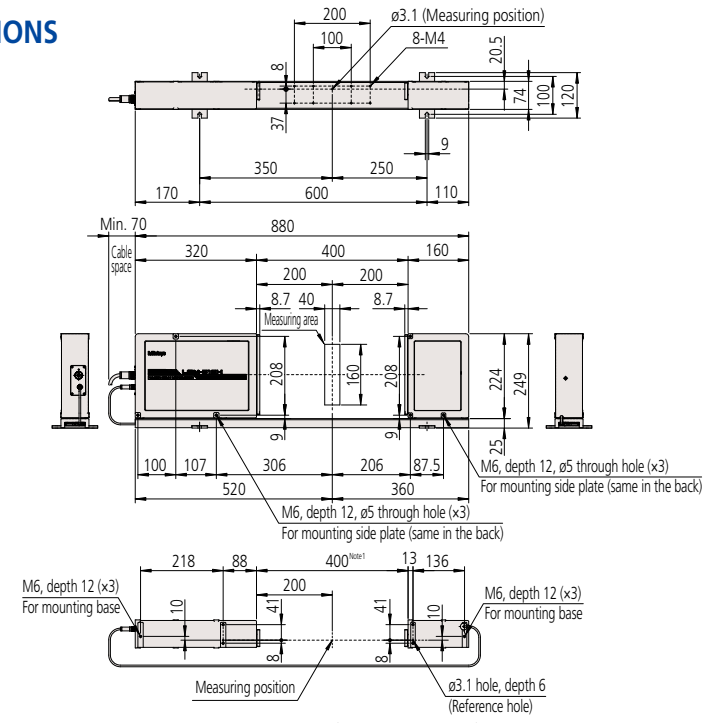
SPECIFICATIONS

Order No. (Laser only)		544-542
Package No. (Laser w/ LSM 6200 display)		64PKA122
Applicable laser standards		IEC, FDA
User's Manual		English version
Measuring range		.040" to 6.3" (1 to 160mm)
Resolution		.000005" to .005" (0.1 to 100µm) (selectable)
Repeatability*1		±1.4µm
Accuracy*2 (20°C)	Whole range	±7µm
	Small range	±(4.0+2.0ΔD)µm*3
Positional error*4		±8µm
Measuring area*5		40×160mm (1 to 160mm)
Scanning rate		3200 scans/s
Laser wavelength		650nm (Visible)
Laser scanning speed		1206m/s
Operating environment	Temperature	0 to 40°C
	Humidity	RH 35 to 85% (no condensation)
Protection Level		IP64*6

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø160mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in cylinder position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

Unit: mm



Note1: Distance between emission unit and reception unit: 400mm to 800mm

Optional Accessories

- Multifunctional display unit, **LSM-6200***:

Order No.	Display type	Remarks
544-072A	English mm/inch	English user's manual

* Included in packages

- Easy-to-operate display unit, **LSM-5200**:

Order No.	Remarks
544-047*	English user's manual

* AC adapter not included

- Standard calibration gage set (ø20, ø160)
  : **No.02AGM300**
- Extension signal cables

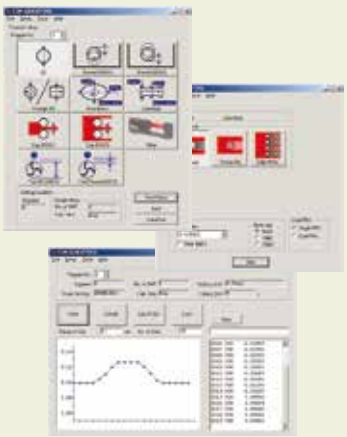
Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m
02AGN780D	20m

- Extension relay cables

Order No.	Cable length
02AGC150A	1m
02AGC150B	3m
02AGC150C	5m

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Laser Scan Micrometer LSM-9506

SERIES 544 — Bench Top Type Non-contact Measuring System

- Bench-top type with integrated display unit which includes many functions equivalent to the multi-function display unit.

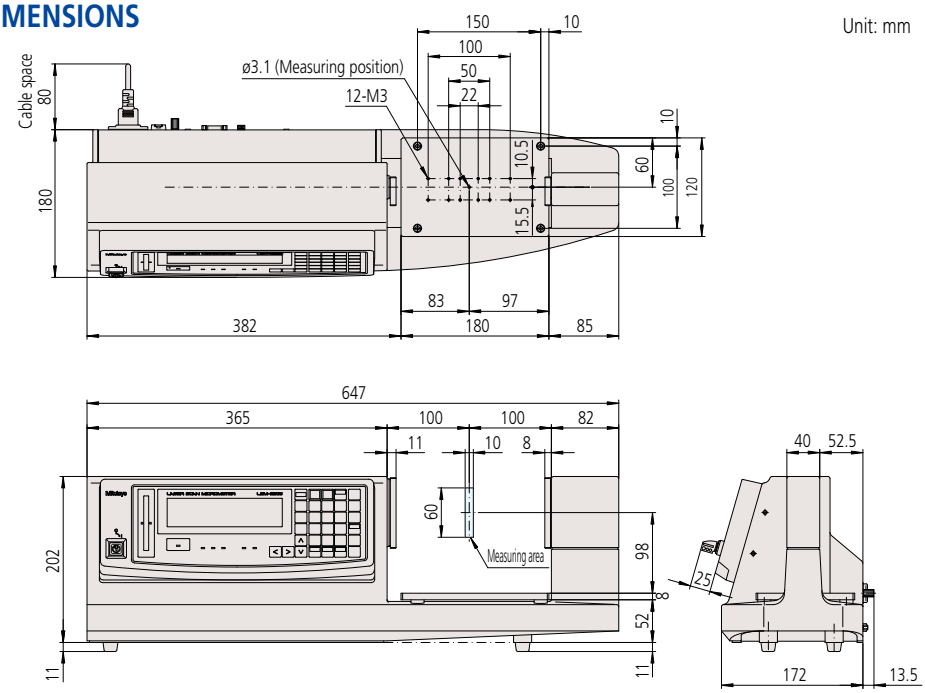
SPECIFICATIONS

Order No.	**544-116-1A**
Type	inch/mm
Measuring range	.02" - 2.36"/ 0.5 - 60mm
Resolution	.000002" - .005"/ 0.00005 - 0.1mm
Repeatability*1	±0.6µm (±.00003")
Accuracy*2 (20°C)	±2.5µm (±.0001")
Positional error*3 (optical axis/scanning direction)	±2.5µm (±.0001") L: Displacement between workpiece center and optical axis center
Measuring area*4	±5x60mm (±.2x2.36")
Scanning rate	1600 scans/s
Laser wavelength	650nm (Visible)*5
Laser scanning speed	226m/s (8900" / s)
Display unit	16-digit dot matrix (upper column) + 7 segment 11-digit (lower column),guidance LEDs
Standard interface	RS-232C, Digimatic code output unit (1ch)
Optional interface	No
Power supply	120 V AC ±10%, 40VA, 60Hz
Operating environment	0 to 40°C, RH 35 to 85% (no condensation)

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring ø10mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*4: The area given by [optical axis direction]×[scanning direction].
*5: FDA Class II (544-116-1A)/IEC Class 2 semiconductor laser for scanning. (Maximum power: 1.0mW)

DIMENSIONS

Unit: mm



Optional Accessories

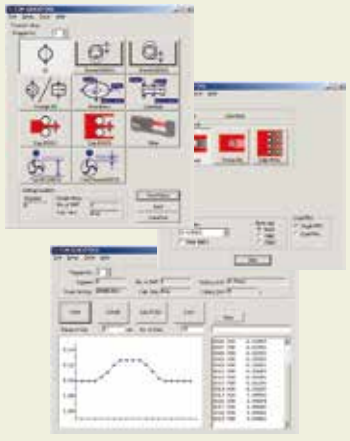
02AGD170
Calibration gage set (ø1.0mm, ø60mm)

02AGD680 Adjustable Workstage
02AGD580 Center support*
02AGD590 Adjustable V-block*
936937 SPC output cable (1m)
937179T Footswitch
264-012-10 USB Input Tool for spreadsheets (SPC cable also required)
*Use with an adjustable workstage.

*1: Determined by the value for ±2σ at the measurement interval of 0.32 sec.
*2: At the center of the measuring region.
*3: An error due to workpiece shift either in the optical axis direction or in the scanning direction. L= Distance between the center of workpiece and the center of optical axis (in mm or inches).
*4: The area given by "measuring range on the optical axis" x "measuring range in the scanning direction".
*5: FDA Class II (**544-116-1A**) semiconductor laser for scanning (Maximum power: 1.0mW)

QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

LSM-6200 Display Unit

SERIES 544 — Standard Display Unit for Laser Scan Micrometer

- 2-axis display unit enables 2 items to be displayed simultaneously.
- Capable of statistical analysis such as: average, maximum value, minimum value, range (max. - min.) and more.
- Segment measurement (7 points) or edge measurement (1 to 255 edge) can be selected.
- A function to eliminate abnormal values is standard.
- 100 tolerance values, preset values, or settings can be stored.

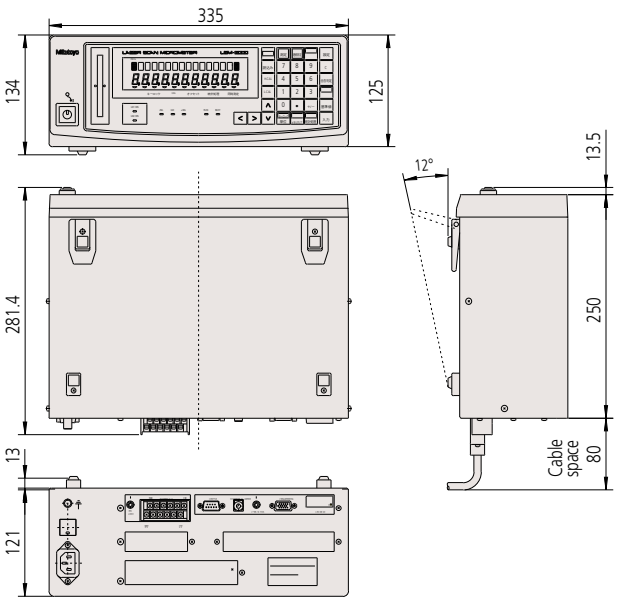
SPECIFICATIONS

Order No.	**544-072A**
Type	inch/mm
Display	16-digit plus 11-digit fluorescent display, and guide message LED
Segment	1 to 7 (1 to 3, transparent) or 1 to 255 edges*1
Averaging times	Arithmetic average: per 8 to 2048/ Moving average: per 32 to 2048 (Arithmetic average is per 16 to 2048 when using **544-531**, **544-532**)
Judgment	Selection from "target value + tolerance", "lower tolerance + upper tolerance", or "7 classes multi-limit tolerance zone".
Measurement mode	Standby, Single measurement, Continuous measurement
Statistical analysis	Maximum, Minimum, Average, Dispersion, σ (S.D)
Size	335 (W)×134 (H)×250 (D)mm
Power supply	120 V AC ±10%, 40VA, 60Hz
Standard I/F	RS-232C, Analog I/O
Optional I/F	Digimatic code output unit (2-ch), 2nd I/O analog I/F, BCD I/F
Operating environment	0 to +45°C, RH 35 to 85% (no condensation)
Others	Nominal setting, sample setting, selection of unnecessary digits, transparent object measurement*2, measurement of odd fluted parts, automatic measurement in edge mode, output timer, abnormal data elimination, SHL change, group judgment, simultaneous measurement, statistical processing, mastering, buzzer function, automatic workpiece detection (dimension/position)*1, zero-set/offset, dual measurement (optional)

*1: The measuring range will be 0.1mm to 2mm in the 1 to 255 edge measurement mode or when activating the automatic workpiece detection with **544-531**, **544-532**.
Each function has its combination limit.
*2: The measuring range is 50µm to 2mm when using **544-531**, **544-532**. For smaller range, contact your local Mitutoyo sales office.
** Cannot be connected to **544-496A**.
** Previous models such as **544-451** cannot be connected.

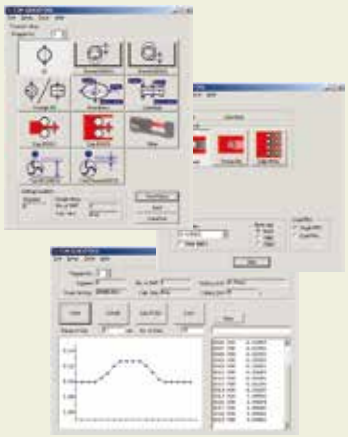
DIMENSIONS

Unit: mm



QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (Connecting cables to PC are optional)



LSM-5200 Display Unit

SERIES 544 — Compact Display Unit for Real-time Multi-channel Measurement

- A compact controller which could be used for multi-unit system configurations.
- Capable of simple connection to a PC via USB.
- A Panel-mount type display unit designed for the LSM-S series.
- Analog I/O and RS-232C is standard.
- Measurement of odd fluted parts, and simultaneous measurement / 2-program function are equipped.

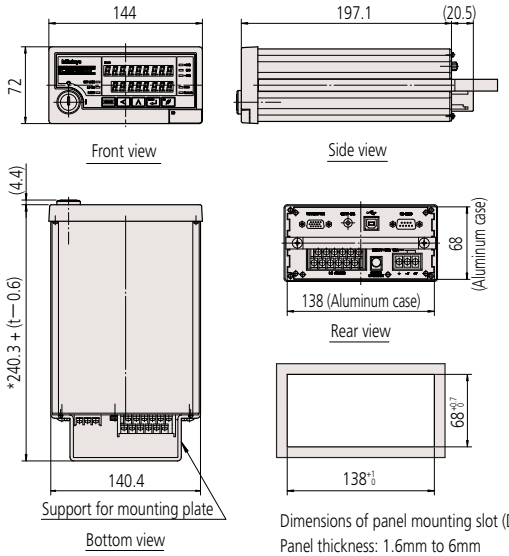
SPECIFICATIONS

Order No.	**544-047**
Display	9 digits plus 8 digits LED, guide message LED
Segment	1 to 7 (1 to 3, transparent) or 1 to 255 edges*1
Averaging method	Arithmetic average: from 4 to 2048; Moving average: from 32 to 2048 (Arithmetic average is from 16 to 2048 when using LSM-500S.)
Judgment	Selecting from "target value ± tolerance value" or "lower limit/upper limit".
Measurement mode	Standby, Single measurement, Continuous measurement
Statistical analysis	Calculation result is output via USB or RS-232C.
External dimensions	144 (W)×72 (H)×197.1 (D)mm
Power supply*3	24V DC±10%, 1.3A or more (AC adapters are optional)
Standard I/F	USB2.0, RS-232C, I/O analog
Operating environment	0 to 40°C, RH 35 to 85% (no condensation)
Preservation environments	–20 to 70°C, RH 35 to 85% (no condensation)
Others	Measurement of odd fluted parts, simultaneous measurement, nominal setting, sample setting, selection of unnecessary digits, transparent object measurement*2 Automatic workpiece detection (dimension/position detected)*1, abnormal data elimination, mastering, statistical processing (when using USB, RS-232C), output timer, automatic measurement in edge mode, presetting Note that every function is limited in its combination possibilities. See the user manual for details.
Mass	1.4 kg

*1: The measuring range will be 0.1mm to 2mm in the 1 to 255 edge measurement mode or when activating the automatic workpiece detection with **544-531**, **544-532**.
Each function has its combination limit.
*2: The measuring range is 50µm to 2mm when using **544-531**, **544-532**. For smaller ranges, contact your local Mitutoyo sales office.
*3: DC24V external power supply (commercial item) is required separately.
Note 1: Cannot be connected to **544-496A**.
Note 2: Previous models such as **544-451** cannot be connected.
Note 3: For USB communication with a PC, a dedicated device driver is required. For details, contact your local Mitutoyo sales office.

DIMENSIONS

Unit: mm



Panel thickness: 1.6mm to 6mm

Dimensions of panel mounting slot (DIN 43 700-144x76)
Panel thickness: 1.6mm to 6mm
Mass: 1.4kg

Mitutoyo

Laser Scan Micrometer

SERIES 544 Optional Accessories

LSMPAK

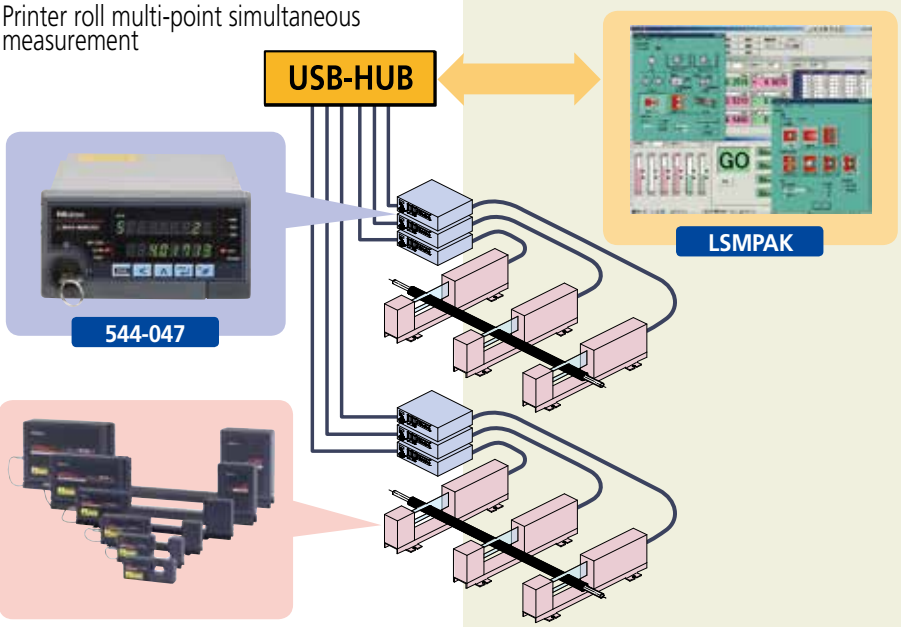
- Software can import measurement data from multiple LSM-5200 display units to a PC allowing a variety of measuring systems to be constructed.
- Capable of processing a maximum of 10 channels of measurement data (USB-HUB connection).
- Capable of Calculation between channels, statistical analysis, file output of calculation results.
- Various display functions such as counter display, graph display, and calculation result are equipped.

* Refer to page G-42 for specifications of **LSM-5200**.

Sample Screen

Measurement Examples

Printer roll multi-point simultaneous measurement



Commercially available products, such as USB hubs and cables, are available for connecting to the display unit.

SPECIFICATIONS

Order No.		**02NGA002** (English)
Applicable models		Display unit: **544-047** (Ver.1.004A or later) Measuring unit: LSM 500S Series
Display function		Max. 12 windows (counter, meter, chart, overall judgment)
Setup function		Presetting, data output, sample measurement, resolution select, judgment setting, measurement of odd number fluted parts, simultaneous measurement *Each function has its combination limit.
Measurement function		Single, continuous measurement, single automatic repetition
Calculation function		Arithmetic operation, maximum, minimum, range, average, total (any combination available)
GO/NG judgment		3-step (–NG, GO, +NG)
Interface		USB2.0 (Hi-Speed communication recommended)
Maximum connection		10 units
Operating environment (PC)	OS	Windows XP, 7 (32-bit)
	CPU	Pentium 4, 2GHz or better recommended
	Memory	1GB or more
	HDD free space	500MB or more
	Display	124×768 dot, True Color (32-bit) or more recommended

Laser Scan Micrometer

SERIES 544 Optional Accessories

Calibration gage set

- Standard cylinder gage set suitable for calibration of Laser Scan Micrometers.
- Nominal gage diameters (1 to 160mm) are as given in Specifications.

SPECIFICATIONS

For calibrating models		544-496A	544-532	544-534	545-536	544-538	544-540	544-542	544-116-1A
		LSM-902	LSM-500S	LSM-501S	LSM-503S	LSM-512S	LSM-512S	LSM-516S	LSM-9506
Set No.		02AGD180	02AGD110	02AGD120	02AGD130	02AGD140	02AGD150	02AGM300	02AGD170
Configuration (Order No.)	Stand	02AGD181	02AGD111	02AGD121	02AGD131	02AGD141	02AGD151	02AGM320	02AGD171
	Gages	ø1: 02AGD920 ø25: 02AGD963	ø0.1: 958200 ø2 : 958202	ø0.1: 958200 ø10: 229317	ø1: 02AGD920 ø30: 02AGD961	ø1: 02AGD920 ø60: 02AGD962	ø20: 229730 ø120: 234072	ø20: 229730 ø160: 02AGM303	ø1: 02AGD920 ø60: 02AGD962
	Carrying case	02AGD190	958203	958203	02AGD980	02AGD980	02AGD990	02AGM310	02AGD970

Workstage

Installation example (**LSM-902**)

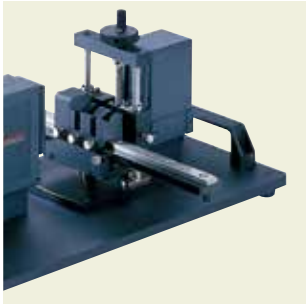
- Easy set-up and height adjustment enables high-precision measurement.

SPECIFICATIONS

Model	544-533, 544-534 544-535, 544-536 544-495, 544-496
Order No.	02AGD270

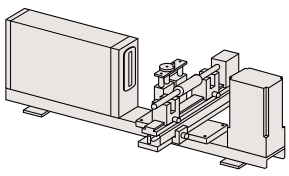
Adjustable workstage

- Vertical/horizontal slide mechanism enables easy measurement of various workpiece diameters.
- Best suited for quality assurance of high precision pin gages.

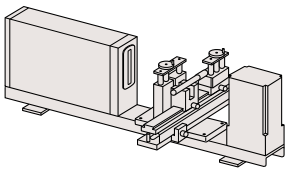


Measurement Examples

- Roller of copying machine



- Pin gage or plug gage



Basic configuration

Basic set	Order No.	Applicable Model	Standard Accessories	Measuring range (mm)	Horizontal stroke (mm)	Vertical stroke (mm)
(1) Main unit (2) V-block (3) Stop	02AGD280	544-496A	V-block (02AGD420), 2 pcs Stopper (02AGD430), 1 pc	0.1 - 25	130	47
	02AGD400	544-534		0.05 - 10	130	32
	02AGD490	544-536		0.3 - 30	200	35
	02AGD520	544-538	V-block A (02AGD550), 2 pcs V-block B (02AGD550), 1 pc V-block C (02AGD570), 1 pc	1 - 60	300	45
	02AGD370	544-116-1A		0.5 - 60	200	45
	02AGD680			0.5 - 60	300	45

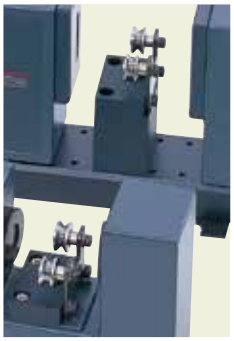
* The stop is not included in the basic set for **544-537**, **544-538**, **544-115**, **544-116**.
• Optional parts for the adjustable workstage, such as center support, adjustable V-block (up/down) etc., are available.

Mitutoyo

Laser Scan Micrometer

SERIES 544 Optional Accessories

Guide pulley



- Used for supporting measurement of outside diameter of fine wirelike materials such as magnetic wire or fiber.

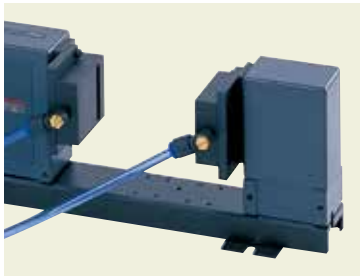
SPECIFICATIONS

Model	544-532	544-534
Order No.	02AGD200	02AGD210

Each measurement range is as follows:
544-532: ø5µm to ø1.6mm
544-534: ø50µm to ø2mm

For calibration, the calibration gage set for **544-532** (**No.02AGD110**) is required.

Air shield driven by air supply unit



- Air blows from the air outlet installed on the laser section to clear dust from adhering to the laser window.

SPECIFICATIONS

Air supply unit	Air shield	Applicable models
No.957608	**No.02AGD220**	**544-532**
	No.02AGD230	**544-534**
	No.02AGD240	**544-536**
	No.02AGD250	**544-538**
	No.02AGD260	**544-540**

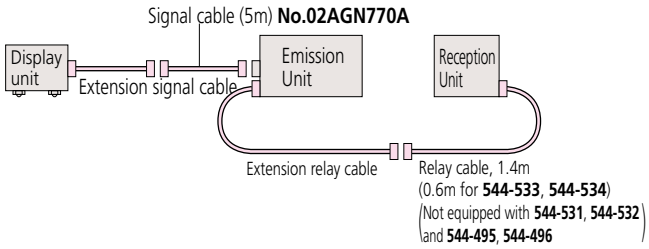
The number of air shields that can be driven per air supply unit (**No.957608**) is as follows:

Air shield	Quantity
No.02AGD220/No.02AGD230	6
No.02AGD240	3
No.02AGD250/No.02AGD260	1

*1: Air shield and air supply unit are sold separately. An air supply unit includes a flow regulating valve and filter. Note, however, that clean air should be supplied.
*2: Air shield is supplied with 5m air tube (Outside Diameter: 6mm).
*3: Air supply unit is compatible with air tube of 9mm internal diameter.

Extension signal cable / Extension relay cable

- Extension signal cables are necessary when the measuring unit and display unit are separated in operation; Extension relay cables are necessary when the optical section is separated in operation.



SPECIFICATIONS

Extension signal cable

Order No.	Cable length
02AGN780A	5m
02AGN780B	10m
02AGN780C	15m
02AGN780D	20m

Extension relay cable

Order No.	Cable length
02AGC150A	1m
02AGC150B	3m
02AGC150C	5m

* For **544-532** and **544-534** the allowable maximum length for signal cable is 20m; relay cable is 2m.
* For **544-536**, **544-538**, **544-540** and **544-542** the allowable maximum length for signal cable is 30m; relay cable is 5m.
* The maximum extension length of the signal cable and relay cable is 32m in total.
* Cannot be used with **544-496A**.

Laser Scan Micrometer

SERIES 544 Optional Accessories

Thermal printer DPU-414

- Measurement data can be printed.

SPECIFICATIONS

Order No.	**02AGD600B**
Printing method	Thermal dot matrix
Printing capacity	40 Columns (Normal)
Character configuration	9×8 dot matrix
Printing direction	Bidirectional
Interface	RS-232C
Power supply	AC 100-240V 50/60Hz (AC adapter)
Standard Accessories	Printer cable 2m (**02AGD620A**), Printer paper 1 roll, AC adapter
Printer paper (optional)	Order **No.223663** (10-roll set)

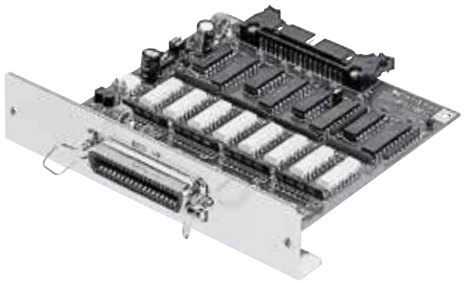
Foot switch

- **937179T**
- For LSM Order **544-072A**, **544-496A**, **544-116-1A**

Interface for LSM6200, 6900

Optional Accessories

BCD Interface



- Outputs measurement data in BCD output (7-digit) or HEX output.
- Data logic can be switched.
- Isolated I/O circuitry
- Available for, **544-072A**, **544-496A**.

SPECIFICATIONS

Order No.	**02AGC910**
Standard Accessories	Connector (DDK) **57-30360** (**No.214188**)

Mitutoyo

Laser Scan Micrometer

SERIES 544 Optional Accessories

Digimatic code output unit

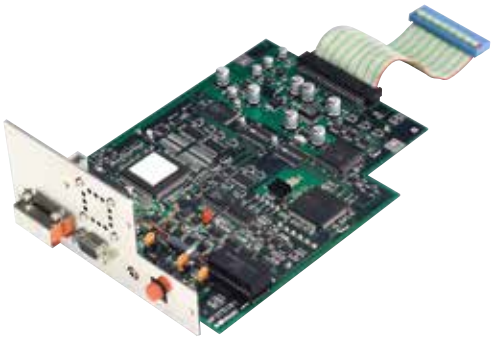
- 2-channel Digimatic code output
- In simultaneous measurement, measurement data are output as follows:
  Program No.0 to No.4 in OUTPUT-1
  Program No.5 - No.9 in OUTPUT-2 (10 programs operated)
- 10 pin MIL type connector.
- Output cable is not supplied.
  Connecting cable (optional) 1m (**No.936937**)
- Available for **544-072**, **544-496A**.

* Output is 6 digits of measurement data.
* Displaying 6th and 7th digit after the decimal point is not supported.

SPECIFICATIONS

Order No.	02AGC840

Dual connection unit



- Enables second unit connection to the **544-072A**. (both units must be the same model)

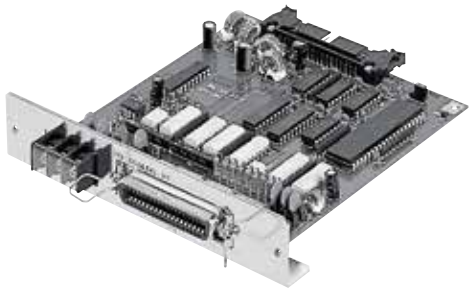
* Cannot be used for **544-496A**.

- Depending on the layout of the two measuring units, large-diameter measurement, XY measurement, and parallel measurement are possible.
- Both of the measuring units and display units can be simultaneously operated.

SPECIFICATIONS

Order No.	02AGP150

2nd I/O analog I/F



- I/O, analog output.
- Simultaneous measurement is supported by two pairs of GO/NG judgment outputs.
- Available for **544-072A**, **544-496A**.

SPECIFICATIONS

Order No.	02AGP150
Standard Accessories	Connector (DDK) **57-30360** (**No.214188**)

Cable for BCD and 2nd I/O simultaneous mount

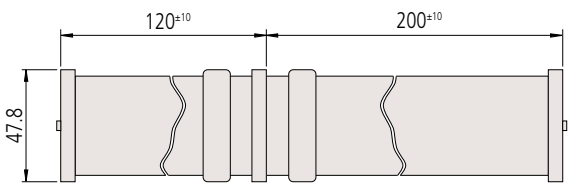
- Both BCD (**No.02AGC910**) and 2nd I/O analog I/F (**No.02AGC880**) can be mounted on **544-072A**, **544-496A** using this cable.

* If using this cable, the dual connection unit (**No.02AGP150**) cannot be used.

SPECIFICATIONS

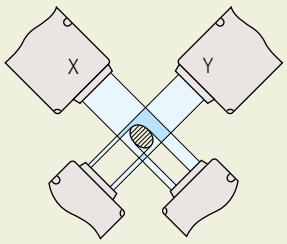
Order No.	02AGE060

DIMENSIONS



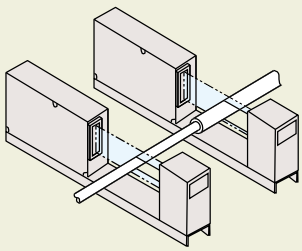
Unit: mm

XY Measurement

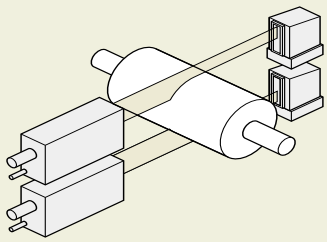


(X–Y): flatness
(X+Y)/2: average
* XY requires 10mm-interval.

Parallel Measurement



Large-diameter measurement



Compatibility

Your Laser Scan Micrometer has been adjusted together with the ID Unit, which is supplied with the measuring unit. The ID Unit, which has the same code number and the same serial number as the measuring unit, must be installed in the display unit. This means that if the ID Unit is replaced the measuring unit can be connected to another corresponding display unit.

The workpiece and measuring conditions

Depending on whether the laser is visible or invisible, the workpiece shape, and the surface roughness, measurement errors may result. If this is the case, perform calibration with a master workpiece which has dimensions, shape, and surface roughness similar to the actual workpiece to be measured.
If measurement values show a large degree of dispersion due to the measuring conditions, increase the number of scans for averaging to improve the measurement accuracy.

Electrical interference

To avoid operational errors, do not route the signal cable and relay cable of the Laser Scan Micrometer alongside a high voltage line or other cables capable of inducing noise current in nearby conductors. Ground all appropriate units and cable shields.

Connection to a computer

If the Laser Scan Micrometer is to be connected to an external personal computer via the RS-232C interface, ensure that the cable connections conform to the specification.

Laser safety

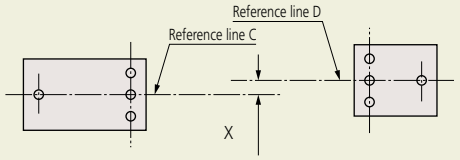
Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Re assembly after removal from the base

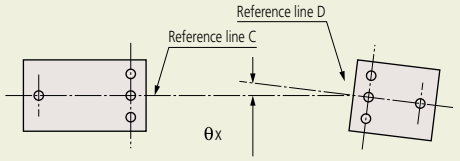
Observe the following limits when re assembling the emission unit and reception unit to minimize measurement errors due to misalignment of the laser's optical axis with the reception unit.

Alignment within the horizontal plane

a. Parallel deviation between reference lines C and D:
X (in the transverse direction)

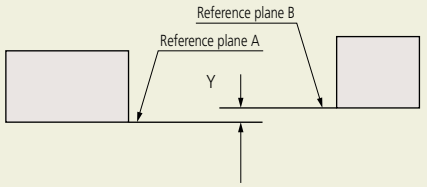


b. Angle between reference lines C and D: θx (angle)

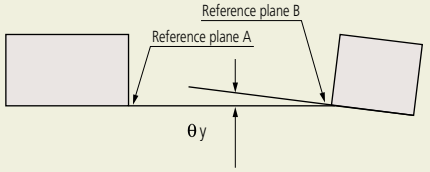


Alignment within the vertical plane

c. Parallel deviation between reference planes A and B: Y (in height)



d. Angle between reference planes A and B: θy (angle)



Allowable limits of optical axis misalignment

Model	Distance between Emission Unit and Reception Unit	X and Y	θx and θy
544-533, 544-534	68mm (2.68") or less	within 0.5mm (.02")	within 0.4° (7mrad)
	100mm (3.94") or less	within 0.5mm (.02")	within 0.3° (5.2mrad)
544-535, 544-536	130mm (5.12") or less	within 1mm (.04")	within 0.4° (7mrad)
	350mm (13.78") or less	within 1mm (.04")	within 0.16° (2.8mrad)
544-537, 544-538	273mm (10.75") or less	within 1mm (.04")	within 0.2° (3.5mrad)
	700mm (27.56") or less	within 1mm (.04")	within 0.08° (1.4mrad)
544-539, 544-540	321mm (12.64") or less	within 1mm (.04")	within 0.18° (3.6mrad)
	700mm (27.56") or less	within 1mm (.04")	within 0.08° (1.4mrad)
544-541, 544-542	800mm (31.50") or less	within 1mm (.04")	within 0.09° (1.6mrad)

Mitutoyo Quality

People – Quality starts with our people. Our team is comprised of the best and the brightest in the industry.

Confidence – Confidence you have each time you rely on a Mitutoyo product.

Reliability – Reliability of the product that you use many times every day.

Accuracy – Accuracy you need to preserve tight machining tolerances.

Relationship – Relationship you have formed with Mitutoyo staff and distributors

Longevity – Longevity of a tool or instrument that maintains factory specifications.

Savings – Savings that are realized by implementing metrology solutions that reduce production costs.

Feel – Feel of a caliper or micrometer that you have come to expect.

Pride – Pride you feel when you produce the best manufactured product possible.