

Linear Gages (Environment-Resistant) LG100 Series Refer to pages G-5 to G-6 for details.



Linear Gages (Environment-Resistant and Slim Type) LG200 Series Refer to page G-7 for details.



Industrial Interface-mounted Compact Counter EJ-102N/NE Counter, Interface Unit Refer to page G-13 for details.



G-1

Laser Scan Micrometers LSM-6902H Refer to pages G-30 for details.



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LG100 SERIES 542 — Environment-Resistant type

- High-accuracy gage head suitable for in-line and in-laboratory use.
- Assures the expected repeatability (2σ) in the full measurement range and the narrowrange precision.
- Protection grade IP67G with sliding durability of 50 million times and more*1 and adoption of highly oil-resistant materials.
- *1 10 mm range models (Actual value from in-house tests)
- All models have the origin point signal output function to restore the origin point position after recovery from problems such as overspeed.
- It can be connected to a compact counter (EJ counter) suitable for in-line use or building into a device or a multifunctional counter (EH counter)*2 suitable for use in measurement rooms. *2 A conversion plug is required.

542-190/542-191/542-192 542-193/542-194/542-195 542-196/542-197 542-190 542-193 542-196 Enables real-time measurement and data management Counter Industrial interfac Measurement PLC Data management

Compact-type counter EJ Series*3

System Configuration

G-5

RS-232C/USB*1

USB

(P)67 G

• Rubber boot (spare) For 10 mm range models: 21HAA331 For 25 mm range models: 21HZA176 For 50 mm range models: 21HZA184 Note 3: Dimensions are shown in the external dimensions drawing of the product. • Thrust stem set: For 10 mm range models: 02ADB680 (Thrust stem: 02ADB681, Clamp nut: 02ADB682) For 25/50 mm range models: 02ADN370 (Thrust stem: 02ADN371, Clamp nut: 02ADB692) This is a combination of thrust stem and a clamp nut. Spanner wrench: For 10 mm range models : 02ADB683 For 25/50 mm range models: 02ADB693 If required spanner wrench is required for tightening. If using multiple gages, a thrust stem set is required for each gage and one spanner wrench. • Extension cable 5 m: 21HZA197 10 m: 21HZA198 20 m: 21HZA199

- Note 4: Connectable up to 3 pieces, 20 m at maximum. • Conversion plug
- Connection to EH-101P/102P: 21HZA195 Connection to EH-102Z : 21HZA196

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SPECIFICATIONS

Order No.		542-190	542-191	542-192	542-193	542-194	542-195	542-196	542-197
Measuring range		10 mm			25 mm		50 mm		
Resolution		1 µm	0.5 µm	0.1 µm	1 µm	0.5 µm	0.1 µm	1 µm	0.5 µm
Measuring ac L=arbitrary m	curacy (20 °C) easuring length (mm)	1.5 + L/50 μm 0.8 + L/50 μm		1.5 + L/50 μm 0.8 + L/50 μm		1.5 + L/50 μm			
Small range a	ccuracy (20 °C)				0.5 µm (Arbitra	ry 20 µm range)			
Repeatability:	2σ (20 °C)				0.3	μm			
Reference ma	rk repeatability: σ (20 °C)		σ≤0.5 µn	n (at a constant refe	rence point passing	speed less than 30	00 mm/s in the same	e direction)	
Mar. 201	Contact point downwards		1.4 N or less			4.6 N or less		5.7 N	or less
force	Contact point horizontal		1.3 N or less			4.3 N or less		5.3 N	or less
	Contact point upwards		1.2 N or less			4.0 N or less		4.9 N	or less
Position detection method			Optical transmission-type Linear encoder						
Maximum response speed		1,500	1,500 mm/s 400 mm/s		1,500 mm/s 400 mm/s		1,500 mm/s		
Output signal		90° phase difference, differential square wave (RS-422A equivalent)							
Minimum edge intervals		500 ns (2 MHz)	250 ns	(4 MHz)	500 ns (2 MHz)	250 ns	(4 MHz)	500 ns (2 MHz)	250 ns (4 MHz)
Output signal	pitch	4 µm	2 µm	0.4 µm	4 µm	2 µm	0.4 µm	4 µm	2 µm
Reference ma	rk position (Phase-Z)	Approx. 3 mm from contact point tip (lowest rest point) Approx. 5 mm from contact point tip (lowest rest			(lowest rest point)				
Mass		Approx. 260 g Approx. 300 g Approx			. 400 g				
Contact poin	t	ø3 mm carbide tipped (fixing screw: M2.5 (P=0.45) x5), standard contact point: 901312							
Stem		ø8 mm ø15 mm							
Bearing		Linear ball type							
Output cable length		2 m (directly from casing)							
Connector		Plug: HR10A-10P-10P (HIROSE), Compatible receptacle: HR10A-10R-10S (HIROSE), Compatible connector: HR10A-10J-10S (HIROSE)							
Operating temperature (humidity) ranges		0 to 50 °C (RH 20 to 80%, non-condensing)							
Storage temp	erature (humidity) ranges	-10 to 60 °C (RH 20 to 80%, non-condensing)							
Standard acce	essories	Wrench for contact point: 538610 Wrench for contact point: 210187							

542-190/542-191/542-192 0.6 14.8 173 ø Dimensions with an optional thrust stem installed

V 918.°. (24.2)

Dimensions with an optional thrust stem installed

542-193/542-194/542-195

Unit: mm

DIMENSIONS

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Refer to the Linear Gage Brochure (**E13007**) for more details.

G-6

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LG200 SERIES 542 — Environment-Resistant and Slim Type

- Slimmer body with approx. 1/5 cross section compared with **542-190** (**LG100**).
- High-accuracy gage head suitable for in-line and in-laboratory use.
- Assures the expected repeatability (2 σ) in the full measurement range and the narrow-range precision.
- Protection grade IP67G with sliding durability of 100 million times and more^{*1} and adoption of highly oil-resistant materials.
- *1 Actual value from in-house tests.
- It can be connected to a compact counter (EJ counter) suitable for in-line use or building into a device or a multifunctional counter (EH counter)*² suitable for use in measurement rooms.
 *2 A conversion plug is required.

542-186/542-187/542-188

P67 **G**

Optional Accessories

Air lifter: 02ADE230
Note 1: Required air pressure: 0.2 to 0.4 MPa
 (With a 0.1 µm resolution type: 0.2 MPa)

SPECIFICATIONS

Order No.		542-186	542-187	542-188	
Measuring range		10 mm			
Resolution		1 µm	0.5 µm	0.1 µm	
Measuring accuracy (20 °C)		(1.5 + L/50) µm L=arbitrary measuring length (mm)		(0.8 + L/50) μm L=arbitrary measuring length (mm)	
Small range	accuracy		0.5 µm (Arbitrary 20 µm range))	
Repeatabilit	y: 2 σ (20 °C)		0.3 µm		
Manauring	Contact point downwards		0.8 N or less		
force	Contact point horizontal		0.75 N or less		
IUICC	Contact point upwards		0.7 N or less		
Position det	ection method	Opti	cal transmission-type Linear end	coder	
Maximum re	esponse speed	1500 mm/s 400 mm/s			
Output sign	al	90° phase difference, differential square wave (RS-422A equivalent)			
Minimum ed	dge intervals	500 ns (2 MHz) 250 ns (4 MHz)			
Output sign	al pitch	4 µm	2 µm	0.4 µm	
Mass		Approx. 210 g			
Contact poi	nt	ø3 mm carbide tipped (fixing screw: M2.5 (P=0.45) ×5), standard contact point: 901312			
Stem		ø8 mm			
Bearing		Linear ball type			
Output cabl	e length	Approx. 2.5 m (directly from casing)			
Connector		Plug: HR10A-10P-10P (HIROSE), Compatible receptacle: HR10A-10R-10S (HIROSE), Compatible connector: HR10A-10J-10S (HIROSE)			
Operating temperature (humidity) ranges		0 to 50 °C (RH 20 to 80%, non-condensing)			
Storage temperature (humidity) ranges		–10 to 60 °C (RH 20 to 80%, non-condensing)			
Standard Ac	cessories	W	rench for contact point: 5386	10	

Unit[.] mm

DIMENSIONS

542-186/542-187/542-188

Dimensions with an optional thrust stem installed

G-7

• Rubber boot: **21HAA331** (spare) • Thrust stem set: **02ADB680**

- (Thrust stem: **02ADB681**, Clamp nut: **02ADB682**) This is a combination of thrust stem and a clamp nut.
- Spanner wrench: 02ADB683
- If required spanner wrench is required for tightening. If using multiple gages, a thrust stem set is required for each gage and one spanner wrench.

Thrust stem set/Spanner Wrench

- Extension cable
- 5 m: **21HZA197**
- 10 m: 21HZA198
- 20 m: 21HZA199
- Note 1: Connectable up to 3 pieces, 20 m at maximum. • Conversion plug
- Connection to EH-101P/102P: 21HZA195 Connection to EH-102Z: 21HZA196
- Note 2: Connectable to EH-102Z but the function of reference point detection is disabled.

Custom order example

- Measuring force change
- Cable length change (less than 2 m)
- Connector change

ABSOLUTE™ (P66

Connector

Optional Accessories • Rubber boot: 238774 (spare) • Air lifter (metric): 903594 • Air lifter (inch): 903598

- Air lifter (inch): 903598
 SPC cable extension adapter: 02ADF640
 Extension cable for Digimatic gages (0.5 m): 02ADD950
 Extension cable for Digimatic gages (1 m): 936937
 Extension cable for Digimatic gages (2 m): 965014
 Note: When connecting an extension cable, an SPC cable extension adapter is required.

- 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.

575-303

SPECIFICATIONS

Metric		- -
Order No.		575-303
Measuring	range	12.7 mm
Resolution		10 µm
Measuring	accuracy (20 °C)	15 µm
Measuring	Contact point downwards	2 N or less
fincasuring	Contact point horizontal	1.8 N or less
force	Contact point upwards	1.6 N or less
Position detection method		ABSOLUTE electrostatic capacitance type linear encoder
Response s	peed	Unlimited (not applicable to scanning measurement)
Output		Digimatic code
Mass		Approx. 190 g
Contact po	int	ø3 mm carbide tipped (fixing screw: M2.5 (P=0.45) ×5), standard contact point: 901312
Stem		ø8 mm
Bearing		Plain type
Output cable length		2 m (directly extended from the main unit)
Operating temperature (humidity) ranges		0 to 40 °C (RH 20 to 80%, non-condensing)
Storage ten	nperature (humidity) ranges	-10 to 60 °C (RH 20 to 80%, non-condensing)

Inch

Order No.		575-313	
Measuring	range	0.5 in	
Resolution		0.0005 in	
Measuring	accuracy (20 °C)	0.0008 in	
Measuring	Contact point downwards	2 N or less	
wicasumig	Contact point horizontal	1.8 N or less	
torce	Contact point upwards	1.6 N or less	
Position detection method		ABSOLUTE electrostatic capacitance type linear encoder	
Response speed		Unlimited (not applicable to scanning measurement)	
Output		Digimatic code	
Mass		Approx. 190 g	
Contact po	int	ø3 mm carbide tipped (fixing screw: 4-48 UNF), standard contact point: 21BZB005	
Stem		ø9.52=3/8 in DIA	
Bearing		Plain type	
Output cable length		2 m (directly extended from the main unit)	
Operating temperature (humidity) ranges		0 to 40 °C (RH 20 to 80%, non-condensing)	
Storage temperature (humidity) ranges		-10 to 60 °C (RH 20 to 80%, non-condensing)	

7.6 ø10.9

DIMENSIONS

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Refer to the Linear Gage Brochure (**E13007**) for more details.

G-8

Unit: in

0.30

LGH (0.01/0.005 µm resolution) SERIES 542 — High-accuracy/resolution Type

- This series has achieved very high accuracy combined with a resolution of 0.01/0.005 µm (according to model), practically equivalent to that of a laser interferometer, and a wide measuring range of 10 mm.
- A compact body design makes a significant contribution to a downsizing of this gage itself, which is best suited for calibration/ evaluation of master gages as well as

measurement of high-precision parts and as a length measuring sensor incorporated into high-precision positioning/control units.

- A low measuring force model is available for those applications where measurement of easily deformed or damaged workpieces is required.
- Every **LGH** Series gage is bundled with a dedicated counter.

Dedicated counter

TYPICAL APPLICATIONS

Master gage calibration/evaluation Inspection of high-precision parts

Needle contact-point mounting example

DIMENSIONS

542-716

542-721

G-9

* Minimum bending radius or minimum dressed dimension

156 (Stand equipped)

Dedicated counter (set)

Refer to the Linear Gage Brochure (**E13007**) for more details.

Optional Accessories • Measuring stand: 971750

• Spindle lifting cable: 971753

• I/O connector: 02ADB440

• SENSORPAK

Note: Refer to page G-16 for more details.

• Rubber boot: 238772 (Spare for 542-715 and 542-720)

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SPECIFICATIONS

		Resolution 0.01 µm/A	ccuracy 0.2 µm model	
	Order No.	542-715 (Standard)	542-716 (Low measuring force)	
Measuring	range	10 r	mm	
Resolution		0.01 μ m (0.05 μ m, 0.1 μ m, 0.5 μ m, 1 μ m can be selected from the counter)		
Measuring	accuracy (20 °C)*1	0.2 μm		
Repeatabili	ty (20 °C)*1	0.1 μm (2 <i>σ</i>)		
Retrace erro	or (20 °C)*1	0.1	μm	
Moocuring	Contact point downwards	0.65 N or less	Approx. 0.12 N	
force	Contact point horizontal	0.55 N or less	Not applicable	
TOTCE	Contact point upwards	0.45 N or less	Not applicable	
Position de	tection method	Optical reflection t	ype linear encoder	
Detectable	operation speed	In normal measurement: 700 mm/se	ec; for peak detection: 120 mm/sec	
Mass of ga	ge head	Approx	. 370 g	
Contact po	int	Carbide tipped, Sø3 mm (M2.5 (P=0.45) :	×5 mm), standard contact point: 901312	
Stem		ø15 mm		
Bearing		Linear b	all type	
Output cable length		Appro	x. 2 m	
Operating te	emperature (humidity) ranges	0 to 40 °C (Reference temperature 20	°C)/20 to 80% RH (non-condensing)	
Storage ten	nperature (humidity) ranges	−10 to 60 °C/20 to 80 °	% RH (non-condensing)	
Counter Sp	ecifications			
Display ran	ge	±999.99	999 mm	
Functions		Zero-setting, presetting, direction changeover,	tolerance judgment (3 steps/5 steps), RS-LINK	
Peak hold f	unction	Ye	25	
Interface		RS-232C, USB (only for SENSORPAK), Digimati	ic (Printer: DP-1VA LOGGER)*3, I/O Connector	
External ou	tput	RS-232C: counting data • Dig I/O connector: counting data (simplified BCD), to	gimatic output: counting data* ³ plerance judgment result, simplified analog output	
External control		Zero-setting, presetting, data hold, peak measurement mode selection, peak clear		
Power supply		Suppplied AC Adapter, or 12 to 24 V DC, max. 700 mA		
Power cons	umption	8.4 W (max. 700 mA), ensure at least 1 A power supply per unit.		
Mass of co	unter	Approx. 900 g (AC Adapter excluded)		
Standard accessories		Wrench for contact point, rubber boot, stand DC plug, user's manua	, washer (for counter), AC Adapter, AC cord, I, inspection certificate	

		Resolution 0.005 µm/A	Accuracy 0.1 µm model		
	Order No.	542-720 (Standard)	542-721 (Low measuring force)		
Measuring	range	10	mm		
Resolution		0.005 μ m (0.01 μ m, 0.05 μ m, 0.1 μ m $$ can be selected from the counter)			
Measuring	accuracy (20 °C)*1	0.1	0.1 µm		
Repeatabili	ty (20 °C)*1	0.02 μr	n (2 0)		
Retrace err	or (20 °C)*1	0.05 μm			
Massuring	Contact point downwards	0.65 N or less	Approx. 0.1 N		
force	Contact point horizontal	0.55 N or less	Not applicable		
IUICE	Contact point upwards	0.45 N or less	Not applicable		
Position de	tection method	Ultra-high accuracy transm	nission type linear encoder		
Detectable	operation speed	In normal measure	ment: 250 mm/sec		
Mass of ga	ge head	Approx	. 370 g		
Contact po	vint	Carbide sphere SR5 (M2.5 (P=0.45) ×5	mm), standard contact point: 120058		
Stem		ø15	mm		
Bearing		Linear b	all type		
Output cable length		Appro	x. 2 m		
Operating temperature (humidity) ranges		15 to 25 °C (Reference temperature 20	0 °C)/30 to 60% RH (non-condensing)		
Storage tem	nperature (humidity) ranges	-10 to 60 °C/20 to 80	% (non-condensing)* ²		
Counter Sp	ecifications				
Display ran	ge	±99.999	995 mm		
Functions		Zero-setting, presetting, direction changeover,	tolerance judgment (3 steps/5 steps), RS-LINK		
Peak hold f	unction	N	0		
Interface		RS-232C, USB (only for SENSORPAK), Digimat	ic (Printer: DP-1VA LOGGER)* ³ , I/O Connector		
External output		• RS-232C: counting data • Digimatic output: counting data* ³ • I/O connector: counting data (simplified BCD), tolerance judgment result, simplified analog output			
External control		Zero-setting, presetting, data hold			
Power supply		Suppplied AC Adapter, or +1	2 to 24 V DC, max. 700 mA		
Power cons	sumption	8.4 W (max. 700 mA), ensure at least 1 A power supply per unit.			
Mass of co	unter	Approx. 900 g (AC	Adapter excluded)		
Standard accessories		Wrench for contact point, rubber boot, stand	, washer (for counter), AC Adapter, AC cord,		

*1 Applies when used with counter.
*2 The storage temperature/humidity ranges after unpacking are the same as the operating temperature/humidity ranges.
*3 Digimatic output shall be up to 6 digits of data. For data of 7 digits or more, all digits will not be output to the display.

Refer to the Linear Gage Brochure (**E13007**) for more details.

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G-10

EC Counter SERIES 542 — Only for Digimatic output

- This Digimatic display can be connected to Linear gages with Digimatic output (LGS).
 Employs DIN size (96×48 mm) and mount-on-panel configuration to facilitate system integration.
- It has a data output and tolerance evaluation function.

542-007

Function

- Preset
- Tolerance judgment (3 steps)Digimatic output

Optional Accessories

- Connecting cable for digimatic mini-processor: 936937 (1 m), 965014 (2 m)
 DC plug: 214938
 I/O cable (2 m): 21HZA222

SPECIFICATIONS

Order No.		542-007*
Model		EC-101D
Resolution () indicates maximum display range		0.01 mm (±9999.99)/0.0005 in (±99.9995 in)/0.001 in (±999.999 in) 0.001 mm (±999.999)/0.00005 in (±9.99995 in)/0.0001 in (±99.999 in) [Automatic setting by gage]
Display		Sign plus 6 digits (Green LED)
Tolerance judgr	ment display	LED display (3 steps: Amber, Green, Red)
External output	Tolerance judgment output	–NG, OK, +NG (open-collector)
(switching type)	Data output	Digimatic output
Control input		External PRESET, external HOLD
Power supply	Voltage	Supplied AC adapter, or 9 to 12 V DC
Power supply	Consumption	4.8 W (max. 400 mA) Ensure at least 1 A is available per unit.
Operating temp	perature (humidity) ranges	0 to 40 °C (RH 20 to 80%, non-condensing)
External dimens	sions	96 (W) ×48 (H) ×84.6 (D) mm
Standard Accessories		AC adapter: 12BAR954 AC cable: 12BAK729 (Japan), 12BAK730 (U.S.), 12BAK731 (EU), 12BAK734 (UK), 12BAK732 (China), 12BAK733 (Korea)
Applicable gage head		LGS, ID
Mass		500 g

* To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE.

DIMENSIONS

Unit: mm

G-11

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Refer to the Linear Gage Brochure (**E13007**) for more details.

Optional Accessories

- I/O output connector (with cover): 02ADB440
- SPC cable (0.5 m): 02ADD950
 SPC cable (1 m): 936937
- SPC cable (2 m): 965014
 Measurement data loading software: SENSORPAK
- Note: The Digimatic connecting cable doubles as a RS Link cable.
- Conversion plug for without origin point mark: 21HZA195 (For connecting LG100/LG200 to EH-101P/EH-102P)
- Conversion plug for with origin point mark: 21HZA196 (For connecting LG100/LG200 to EH-102Z. However, the origin detection function is disabled for LG200)

EH Counter

SERIES 542 — Panel mount, Multi-function Type with RS-232C **Communication Functions**

- Two types are available for this model: a 1-axis A multi-point measuring system (max. 20 points display and a 2-axis display, both of which enable addition or subtraction calculations between two gages.
- Multifunctional counter equipped with zerosetting, 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.)
- and max. 10 units) can easily be configured with the built-in RS Link networking function. Refer to "Quick Guide to Precision Measuring Instruments" on page G-18 for details of the RS link.
- Employs DIN size (144×72 mm) and mounton-panel configuration to facilitate system integration.

542-072

542-073

SPECIFICATIONS

542-075

542-075* 542-073 Order No 542-071³ 542-072* EH-101P EH-102P EH-102Z EH-102D Mode Number of axes to be 1 axis 2 axes displayed Origin point detection function 2.5 MHz (2-phase square wave) Maximum input frequency 0.01 mm (±9999.99 mm)/0.0005 in (±99.9995 in) 0.005 mm (±999.995 mm)/0.00005 in (±9.99995 in) Resolution Automatic setting by 0.001 mm (±999.999 mm)/0.00005 in (±9.99995 in) 0.0005 mm (±99.9995 mm)/0.000005 in (±0.999995 in)) indicates maximum gage display range 0.0001 mm (±99.9999 mm)/0.000005 in (±0.999995 in) [Parameter set] Tolerance judgment display LED display (3 steps: Amber, Green, Red / 5 steps: Amber, Amber flashing, Green, Red flashing, Red) RS-232C/USB/parameter selection via digimatic (only **DP-1VA LOGGER**, Digimatic Mini-Processor can be connected) (USB used only with **SENSORPAK**.) Selection by parameter from 3-step, 5-step, or simple BCD Total tolerance judgment output (when tolerance function is enabled) Analog output (1 V to 4 V) Interface Control output Open-collector Display BANK switching, peak mode, presetting, display hold, hold per axis: open-collector or no-voltage contact signal (with/without contact point) Input/output Control input Voltage Supplied AC adapter, or 12 to 24 V DC 8.4 W (max. 700 mA) Ensure at least 1 A is available per unit Power supply Consumption Operating temperature 0 to 40 °C (RH 20 to 80%, non-condensing) (humidity) ranges Storage temperature -10 to 50 °C (RH 20 to 80%, non-condensing) (humidity) ranges AC adapter: **357651**/ AC cable (Japan): **02ZAA000***, AC cable (USA): **02ZAA010***, AC cable (EU): **02ZAA020***, AC cable (UK): **02ZAA030***, AC cable (China): **02ZAA040***, AC cable (Korea): **02ZAA050*** Standard Accessories LG100/LG200 ersion plug A conversion plug 21HZA196 is required LG100/LG200 A conversion plug **21HZA195** is required (The origin point detection function is disabled) Applicable gage head LGS, ID The origin point detection function is disabled when connected to **LG200**)

Mass Approx. 800 g Approx. 800 g Approx. 760 g Approx. 800 g * To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE

For those models of the Order No. with Suffix "1", an AC adapter is not supplied as a standard accessory.

DIMENSIONS

G-12

Unit: mm

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Refer to the Linear Gage Brochure (E13007) for more details

EJ-102N/NE Counter, Interface Unit: CC-Link, PROFINET, EtherNet/IP, EtherCAT, USB SERIES 542 — Linear Gage Counter

- A small, high-speed, space-saving counter for linear gage suitable for in-line and inlaboratory use. It brings visibility into the production site, improves productivity, and enables data accumulation.
- Up to 8 compact counters (**EJ** counters) can be linked providing the capacity to connect up to 16 gages.
- On a DIN rail, each unit can be connected directly without using cables, so it takes up minimal space. All linked units and gages can be driven by a single power source.
- Data can be output through an industrial interface (CC-Link) by linking a compact counter (**EJ** counter) with an interface unit. Constant data monitoring and positional management are performed. A USB interface is also provided for easy connection with a computer.
- Enables sum difference operations between 2 gages connected to the same counter.

Optional Accessories

- AC adapter: 357651
 AC cable*: 02ZAA000 (Japan) 02ZAA010 (USA) 02ZAA020 (EU) 02ZAA030 (UK) 02ZAA030 (UK) 02ZAA040 (China) 02ZAA050 (Korea)
- DC connector with bar terminal: **21HZA209*** * Required when using AC adapter.
- Counter unit
 Interface unit

 EJ-102N/NE
 CC-Link
 PROFINET
 EtherNet/IP
 EtherCAT
 USB
 Image of mounting

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SPECIFICATIONS

Order No.		542-080		542-081
Model		EJ-102N		EJ-102NE
Unit			mm	inch/mm
Resolution		0.0	05, 0.001, 0.0005, 0.0001 (mm)	0.0002, 0.00005, 0.00002, 0.000005 (inch)/ 0.005, 0.001, 0.0005, 0.0001 (mm)
Number of line connection po	ear gage rts			2
Supported gag	je signal	Diffe	rential square wave, d reference	ifferential square wave with point mark
Maximum inpu	ut frequency		5 N	ЛНz
User Interface	Display	Negative sign + 8 digits and indicator (1 gage value displayed, manually switchable)		digits and indicator d, manually switchable)
	Number of I/O ports	Input: 4 ports (Ch switch, peak clear, data hold, preset) Output: 4 ports (Err/ALLGO, Tolerance judgment)		
External I/O	Compatible communication standards	CC-Link, USB (Supported with optional interface units)		nk, USB tional interface units)
Max. number	of linked units	EJ Counter 8 units + 1 (optional) interface unit (Max. number of linear gage connections: 16)		
	Input voltage	10 V to 27 V DC		
Power supply	Power consumption	1	unit only: 3 W or less Max. number of l (Interface unit and 16	(Includes 2 linear gages) inks: 30 W or less linear gages included)
Operating temperature (humidity) ranges		0 to 50 °C (RH 20 to 80%, non-condensing)		80%, non-condensing)
Storage temperature (humidity) ranges		-10 to 60 °C (RH 20 to 80%, non-condensing)		
Mass			Approx	«. 120 g
Connectable li	near gage Series		Conversion cable (op	tional)

LG100/LG200^	Not necessary
LGF-Z	Necessary (21HZA194)
LGF*/LGK*/LGB*/LG*	Necessary (21HZA193)

* The origin point detection function is disabled.

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SPECIFICATIONS

Order No.	21HZA188
Model	Interface unit EtherNet/IP
Applicable interface	EtherNet/IP
User Interface	POWER (green), NETWORK (green/red), MODULE (green/ red), LINK PORT1 (green/amber), LINK PORT2 (green/ amber), EJ-CONNECT (green)
Functions	Common protocols for USB and EtherNet/IP Readout of current value, Current value hold (software hold), Parameter setting on EJ counter, Tolerance judgment value settings, Preset valuesettings, preset/ zero-set clear, peak clear, error clear
Power supply	Power is supplied from EJ-102N/NE (542-080/542-081) (Cannot be charged via USB)
Operating temperature (humidity) ranges	0 to 50 °C (RH 20 to 80%, non-condensing)
Storage temperature (humidity) ranges	-10 to 60 °C (RH 20 to 80%, non-condensing)

Order No.	21HZA149
Model	Interface unit USB
Applicable interface	USB 2.0 Full Speed
User Interface	POWER (green)
Functions	Readout of current value, Current value hold (software hold), Parameter setting on EJ counter, Tolerance judgment value settings, Preset value settings, preset/ zero-set clear, peak clear, error clear
Power supply	Power is supplied from EJ-102N/NE (542-080/542-081) (Cannot be charged via USB)
Operating temperature (humidity) ranges	0 to 50 °C (RH 20 to 80%, non-condensing)
Storage temperature (humidity) ranges	-10 to 60 °C (RH 20 to 80%, non-condensing)

Order No.	21HZA264		
Model	Interface unit EtherCAT		
Applicable interface	EtherCAT		
User Interface	POWER (green), RUN (green), ERROR (red), L/A IN (green), L/A OUT (red), EJ-CONNECT (green)		
Functions	Common protocols for USB and EtherCAT Readout of current value, Current value hold (software hold), Parameter setting on EJ counter, Tolerance judgment value settings, Preset valuesettings, preset/ zero-set clear, peak clear, error clear		
Power supply	Power is supplied from EJ-102N/NE (542-080/542-081) (Cannot be charged via USB)		
Operating temperature (humidity) ranges	0 to 50 °C (RH 20 to 80%, non-condensing)		
Storage temperature (humidity) ranges	-10 to 60 °C (RH 20 to 80%, non-condensing)		

Unit: mm

DIMENSIONS

Interface unit PROFINET

Interface unit EtherNet/IP

Interface unit EtherCAT

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Interface unit USB

Note: Can be mounted on DIN rail. Case material: PC, POM

Mitutoyo

LG QuickSetupTool Application Software

- A configuration tool is available for use with the **EJ** counter when connected via the optional USB interface.
- All kinds of settings normally carried out with counter operating keys can now be easily applied from a computer.
- Measurement value display and operation results can also be viewed on a PC.
- Note: This software can be used free of charge and downloaded from the Mitutoyo website. https://www.mitutoyo.co.jp/eng/contact/ products/lg/

Chart

Parameter setting

General settings

Recommended system environment

OS: Windows10 Pro 32 bit/64 bit Display: 1600×1200 or more Memory: 1024 MB or more Communication method: USB2.0 (Full speed) USB connector: Type C connector Note: USB device drivers are standard Windows drivers.

Mitutoyo

Refer to the Linear Gage Brochure (**E13007**) for more details.

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MeasurLink[®] ENABLED

Optional Accessory • I/O cable: 21HZA137

- Communication cable (1 pc.) Connection between PC and counter: 2 m Input/output cable: 1 m
- Input/output connector (1 pc.)

Mitutoyo

Refer to the Linear Gage Brochure (E13007) for more details.

SENSORPAK Measurement data loading software

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).

- This software facilitates loading measurement 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 bargraph or meter is provided.

Chart screen

SPECIFICATIONS

Order No.		02NGB072			
Product Configuration		Program disk (CD), license key, operation manual			
Compatible devices (Connection method)		Mitutoyo RS_LINK compatible devices • LGH Series (USB, RS-232C) • EH counter (USB, RS-232C) • EV counter (RS-232C) • Litematic VL (RS-232C) • Litematic VL (RS-232C)			
Connecting cable		A cable should be prepared to the following specifications: Accessory • RS-232C connection: V/O cable (21HZA137)* ¹ Commercial product • USB connection: USB cable (type A to type B) • RS-232C connection: RS-232C cross cable* ¹			
Number of connectable gages		Max. 60 units (when 10 units of EV counter for linear gage are connected via RS-Link)			
	Display* ²	Display format: counting, bar graph, indicator, chart, and table Display cycle: 1s (when 60 gage units are connected, 1-window display, and no Excel output)			
	Calculation	Calculation (up to 30 items) between designated gages is available. Calculation items: Sum, difference, total, average, maximum, minimum, range (maximum-minimum), calculation with a co			
Functions	Tolerance judgment	Per item: Displays the result in colors (3-step tolerance: red/green/red; 5-step tolerance: red/yellow/green/yellow/red) Total judgment: Displays in colors (red/green) by monitoring the multiple gages and calculation result			
T unctions	Recording* ²	Items: channel values, calculation result, tolerance judgment, total tolerance judgment, timestamp Max. number of records: 60000 for software recording (with 6 gages connected); up to 9000 (with 60 gages connected) Output function: Direct output to Excel, CSV file output (compatible with MeasurLink [®]) Recording trigger: key, timer, external TRG			
	Input/ output* ³	Input: TRG for recording (HOLD) Output: Total tolerance judgment result			
System Environment		DOS/V compatible PC environment CPU: Pentium4 2 GHz or more, Memory: 2 GB or more, Hard disk: 2 GB or more free space OS: Windows 7 (32 bit/64 bit), Windows 8.1 (32 bit/64 bit), Windows 10 (64 bit)			
*1 If the PC is not equipped with an RS-232C port, please contact the nearest Mitutoyo sales office.					

*2 Display cycle and the maximum number of records differ depending on the environment (specification of PC, number of

*3 With use of the I/O cable (accessory). When an I/O cable is not used, the I/O connector of the counter alternatively functions. (Refer to the user's manual of the counter in use.)

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Quick Guide to Precision Measuring Instruments

Linear Gages

Gage Head

Plain Stem

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.

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

	Protection code	Туре	Level	Description
IF	IP66	Protection against contact with the human body and foreign objects	6: Dust tight	Protection from dust ingress Complete protection against contact
		Protection against exposure to water	6: Water-resistant type	Water jets directed against the enclosure from any direction shall have no harmful effects.
	IP67	Protection against contact with the human body and foreign objects	6: Dust tight	Protection from dust ingress Complete protection against contact
		Protection against exposure to water	7: Immersion- protection	Protection against the effects of immersion in water between 1 cm and 1 m for 30 minutes
	IP 🗆 G	Protection against entry of oil	_	Protection against entry of oil droplets or splashes from all directions

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 LGH Series

To fix the **LGH** Series, insert the stem into the dedicated stand or fixture.

Recommended hole diameter on the fixing side: 15 mm +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 **LGH** Series, do not clamp the stem too tightly. Overtightening the stem may impair the sliding ability of the spindle.
- If measurement is performed while moving the LGH Series, mount it so that the cable will not be strained and no undue force will be exerted on the gage head.

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Display Unit

Zero-setting

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

Note: Perform the zero-setting beyond 0.2 mm stroke from the rest position. This puts the spindle in the guaranteed accuracy region.

Presetting

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

Note: Perform the zero-setting beyond 0.2 mm stroke from the rest position. This puts the spindle in the guaranteed accuracy region.

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 the run out value (TIR) 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 Judgment result, etc.

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-1VA LOGGER** 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.

CC-Link

An abbreviation of Control & Communication Link, the new open field network developed by Mitsubishi Electric Corporation. It is a high-speed field network that allows for control and communication at the same time.

RS Link Function Multi-point measurement can be performed by connecting multiple **EH** 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 **02ADD950** (0.5 m), **936937** (1 m) or **965014** (2 m). (The overall length of RS Link cables permitted for the entire system is up to 10 m.)

Measurement Examples

Roll gap measurement

FPD board multipoint measurement

Brake disk multipoint measurement

Workpiece discrimination

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Chip parallelism measurement

Cam-lift measurement

Machine device tool length measurement

Inspection fixture

