

# Mitutoyo

Mitutoyo Quality

## Environment-Resistant Digital Gage LINEAR GAGE LG100 Series Compact-type Counter EJ Counter

Sensor Systems



IP67 G

1.800.561.8187

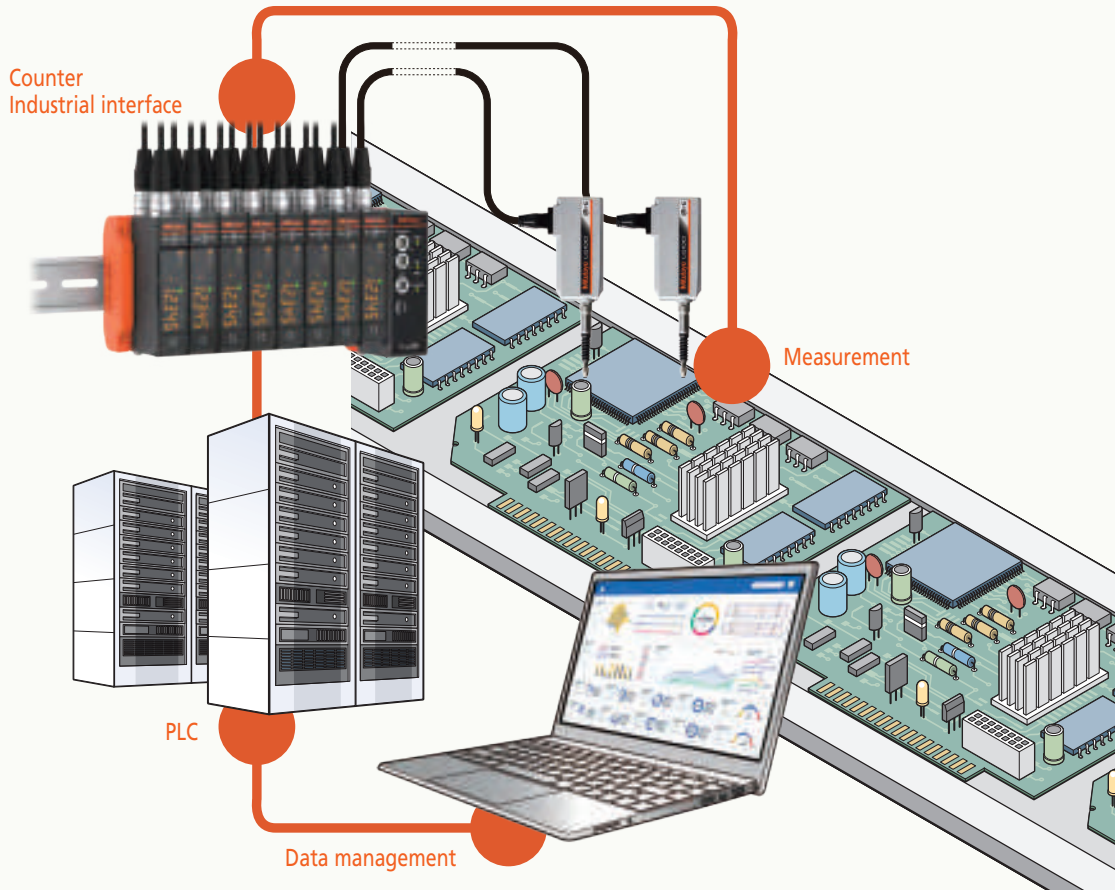
www.itm.com

information@itm.com

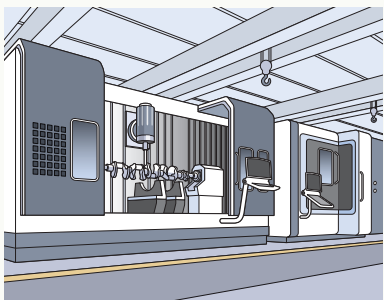
Can be used inline or in measurement cells

**Best-in-class precision and environmental resistance.**

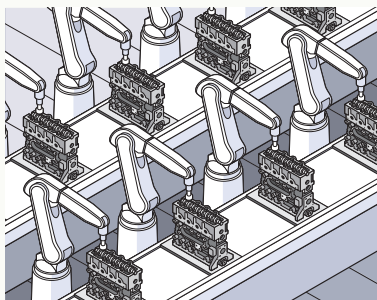
Enables real-time measurement and data management



Can be used in various production settings



Processing



Assembly



Inspection

## Linear Gage LG100 Series

**IP67 G**

**542-190/542-191/542-192**  
(10 mm stroke)

**542-193/542-194/542-195**  
(25 mm stroke)

**542-196/542-197**  
(50 mm stroke)

### High accuracy

Precision and accuracy demanded by the automated assembly and inspection markets, are guaranteed. Due to our expertise as a manufacturer of measuring instruments, repeatability in the full measurement range ( $2\sigma$ ) and narrow-range precision are also guaranteed.

### Environment resistance

Sliding durability of more than 50 million cycles\*, with protection level of IP67G. A highly oil-resistant material is used in the rubber cap and cable sheath, so it can be used even in harsh environments.

\* 10 mm range models (Actual value from in-house tests)

### Reference point detection

Reference point signal output functions are featured throughout this series. When incorporating into a device the master setting value is easy to set and is retained after shutdown. The ability to recall the origin ensures excellent reliability.

### Combining compact size and ease of use

High-speed and compact, delivering production site visualization, improved productivity, and information feedback. 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.

### CC-Link connection, USB connection

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.

Note: The range of interfaces is set to be expanded in the near future.

### Calculation function

Enables sum difference operations between 2 gages connected to the same counter. Functions such as tolerance judgment and peak hold are also included.

## Industrial interface-mounted compact counter EJ Series

Image of mounting

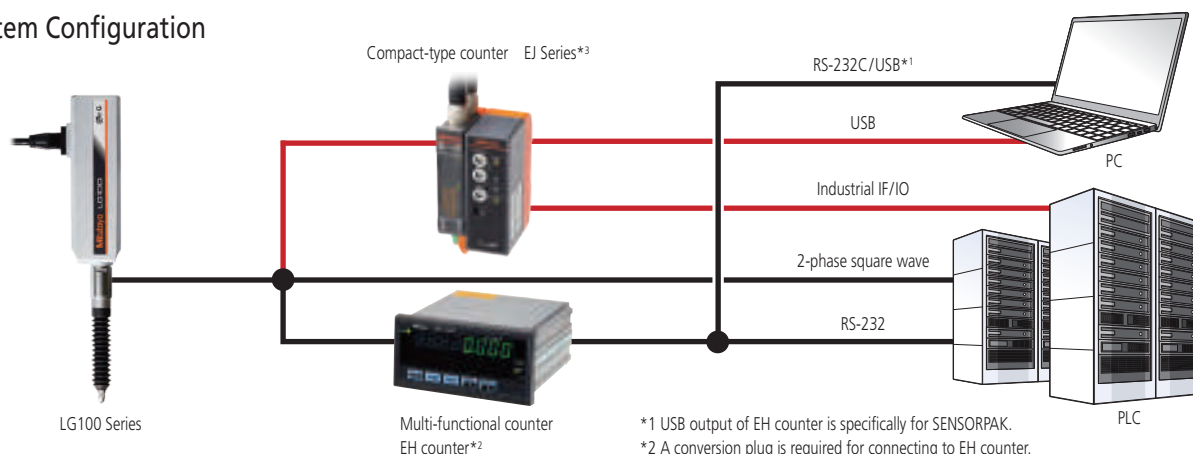
Counter unit  
**542-081A**

Interface unit  
CC-Link

USB



## System Configuration



\*1 USB output of EH counter is specifically for SENSORPAK.

\*2 A conversion plug is required for connecting to EH counter.

\*3 Conventional gages can be connected using conversion connectors.  
(Please contact us for details of connectable gages.)



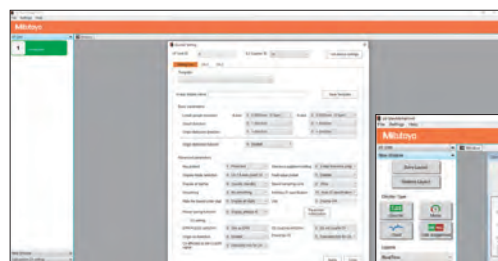
## SOFTWARE

### LG QuickSetupTool

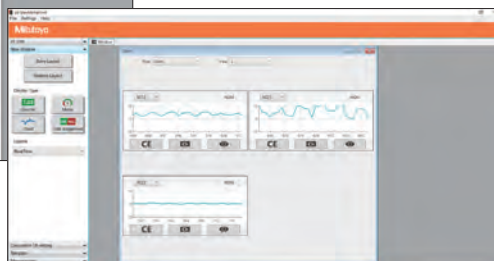
A configuration tool is FREE for use with the EJ counter when connected via the optional USB interface. Multiple settings normally carried out with counter operating keys can now be easily applied from a computer.

Live displays allow for easily viewing gage positions or measurements at a glance.

Note: This software can be used free of charge and downloaded



Parameter setting



Chart

#### Recommended system environment

OS: Windows10 Pro 32 bit/64 bit

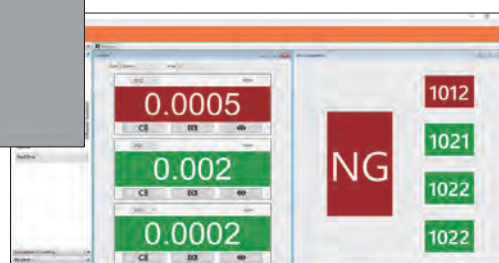
Display: 1600×1200 or more

Memory: 1024 MB or more

Communication method: USB2.0 (Full speed)

USB connector: Type C connector

Note: USB device drivers are standard Windows drivers.



General settings

## OPTIONS

### Pneumatic lifter



For 10 mm range models: **02ADE230**

For 25 mm range models: **02ADE250**

For 50 mm range models: **02ADE270**

### Rubber boot (spare)

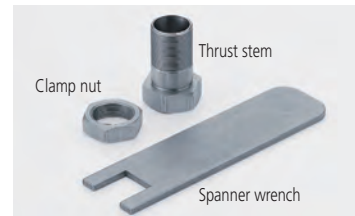


For 10 mm range models: **21HAA331**

For 25 mm range models: **21HZA176**

For 50 mm range models: **21HZA184**

### Thrust stem set/ Spanner wrench



• Thrust stem set (Thrust stem, Clamp nut)

For 10 mm range models: **02ADB680**

For 25/50 mm range models: **02ADN370**

• Spanner wrench

For 10 mm range models: **02ADB683**

For 25/50 mm range models: **02ADB693**

### Extension cable



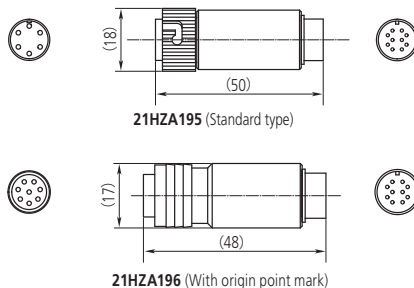
Extension cable 5 m: **21HZA197**

Extension cable 10 m: **21HZA198**

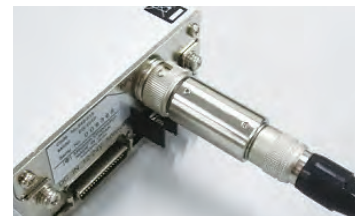
Extension cable 20 m: **21HZA199**

Total length (gage to counter) must not exceed 20 m.

### Conversion plug for connecting to EB/EG/EV Counter



### Adapter shown installed on EH Counter

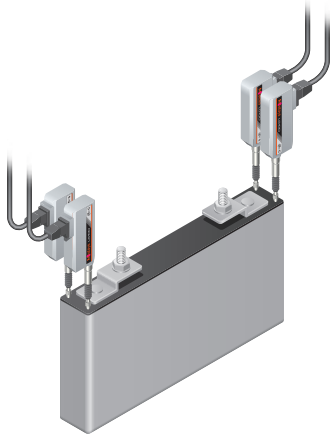


Standard type (for P counter): **21HZA195**

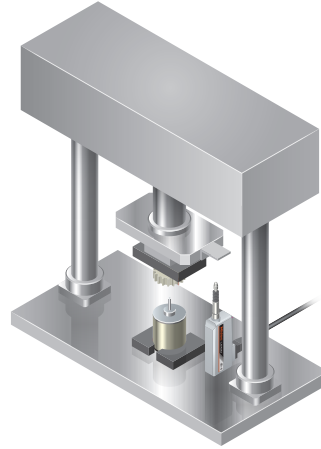
With origin point mark (for Z counter): **21HZA196**

For details of other options, please check the Linear Gage Brochure No. **E13007**.

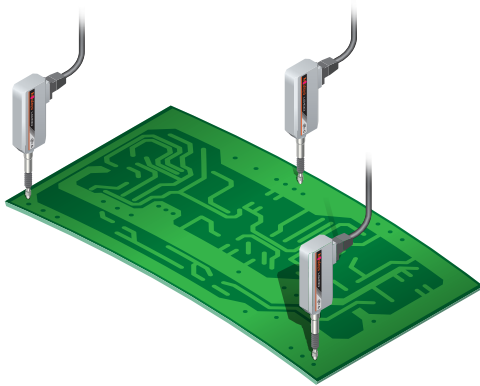
## APPLICATION



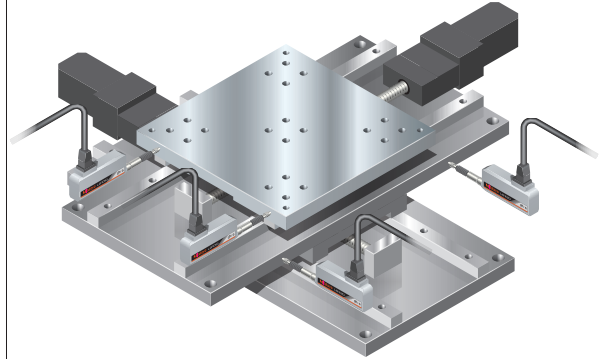
Battery flatness measurement



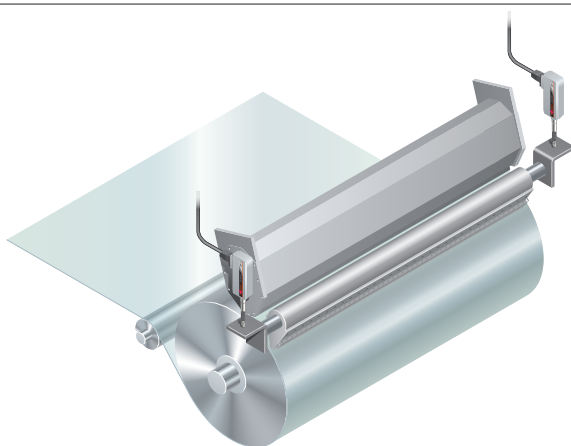
Insertion depth check



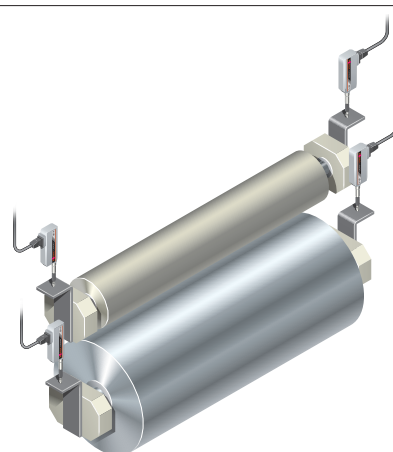
Base material warp detection



Stage positioning



Air knife gap detection



Roll gap measurement

## LG100 Series

## SPECIFICATIONS

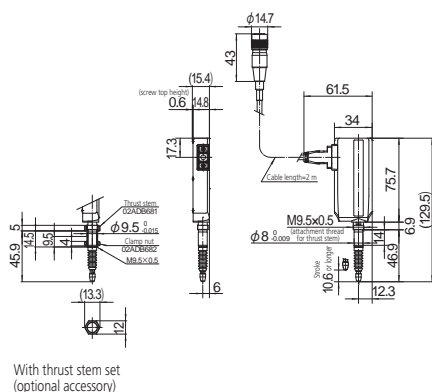
Order No.		542-190	542-191	542-192
Measuring range		.4" / 10mm		
Resolution		.000050" / 1µm	.000020" / 0.5µm	5 uinch / 0.1µm
Measuring accuracy (20 °C)				
L=arbitrary measuring length (mm)		1.5 + L/50 µm		0.8 + L/50 µm
Small range accuracy		0.5 µm (Arbitrary 20 µm range)		
Repeatability: 2 σ (20 °C)		0.3 µm		
Reference mark repeatability: σ (20 °C)		σ ≤0.5 µm (at a constant reference point passing speed less than 300 mm/s in the same direction)		
Measuring force	Contact point downwards	1.4 N or less		
	Contact point horizontal	1.3 N or less		
	Contact point upwards	1.2 N or less		
Maximum response speed		1,500 mm/s		400 mm/s
Minimum edge intervals		500 ns (2 MHz)	250 ns (4 MHz)	
Output signal pitch		4 µm	2 µm	0.4 µm
Reference mark position (Phase-Z)		Approx. 3 mm from contact point tip (lowest rest point)		
Stem		ø8 mm		
Mass		Approx. 260 g		
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 accessories		Wrench for contact point: <b>538610</b>		

## SPECIFICATIONS

Order No.		542-196	542-197
Measuring range		50 mm	
Resolution		1 µm	0.5 µm
Measuring accuracy (20 °C) L=arbitrary measuring length (mm)		1.5 + L/50 µm	
Small range accuracy		0.5 µm (Arbitrary 20 µm range)	
Repeatability: 2 σ (20 °C)		0.3 µm	
Reference mark repeatability: σ (20 °C)		σ ≤ 0.5 µm (at a constant reference point passing speed less than 300 mm/s in the same direction)	
Measuring force	Contact point downwards	5.7 N or less	
	Contact point horizontal	5.3 N or less	
	Contact point upwards	4.9 N or less	
Maximum response speed		1,500 mm/s	
Minimum edge intervals		500 ns (2 MHz)	250 ns (4 MHz)
Output signal pitch		4 µm	2 µm
Reference mark position (Phase-Z)		Approx. 5 mm from contact point tip (lowest rest point)	
Stem		ø15 mm	
Mass		Approx. 400 g	
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 accessories		Wrench for contact point: <b>210187</b>	

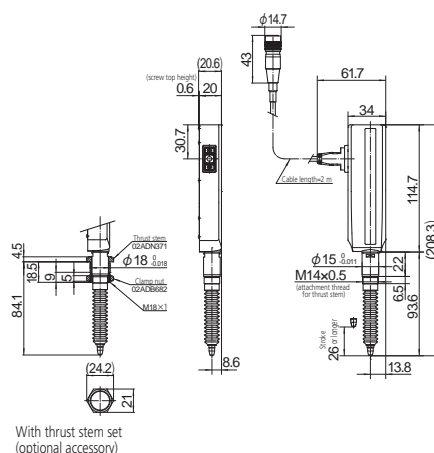
## DIMENSIONS

• 542-190/542-191/542-192



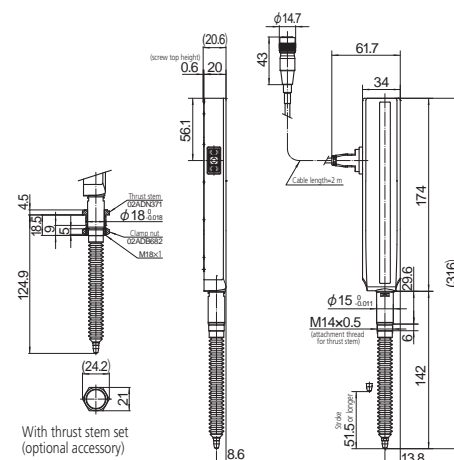
With thrust stem set  
(optional accessory)

• 542-193/542-194/542-195



With thrust stem set  
(optional accessory)

• 542-196 / 542-197

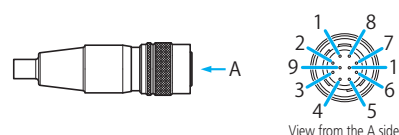


Unit: mm

## SPECIFICATIONS

Order No.		542-193	542-194	542-195
Measuring range		1" / 25mm		
Resolution		.000050" / 1µm	.000020" / 0.5µm	5 uinch / 0.1µm
Measuring accuracy (20 °C)		1.5 + L/50 µm		0.8 + L/50 µm
L=arbitrary measuring length (mm)				
Small range accuracy		0.5 µm (Arbitrary 20 µm range)		
Repeatability: 2 σ (20 °C)		0.3 µm		
Reference mark repeatability: σ (20 °C)		σ ≈ 0.5 µm (at a constant reference point passing speed less than 300 mm/s in the same direction)		
Measuring force	Contact point downwards	4.6 N or less		
	Contact point horizontal	4.3 N or less		
	Contact point upwards	4.0 N or less		
Maximum response speed		1,500 mm/s		400 mm/s
Minimum edge intervals		500 ns (2 MHz)	250 ns (4 MHz)	
Output signal pitch		4 µm	2 µm	0.4 µm
Reference mark position (Phase-Z)		Approx. 5 mm from contact point tip (lowest rest point)		
Stem		ø15 mm		
Mass		Approx. 300 g		
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 accessories		Wrench for contact point: <b>210187</b>		

### Pin assignment



Pin No.	Signal	Pin No.	Signal
1	PA	7	N.C
2	$\overline{PA}$	8	$\overline{PZ}$
3	N.C	9	+5V
4	PB	10	GND
5	$\overline{PB}$	Shell	FG
6	N.C		

- Power supply to a Linear gage  
Power supply voltage: DC5 V (4.8 V to 5.2 V), Ripple voltage: 0.2 Vpp  
or less, Maximum current consumption: 80 mA
- Suitable receptacle and jack  
Receptacle: HR10A-10R-10S (HIROSE)  
Jack: HR10A-10J-10S (HIROSE)

## EJ-102N/Interface unit CC-Link/Interface unit USB

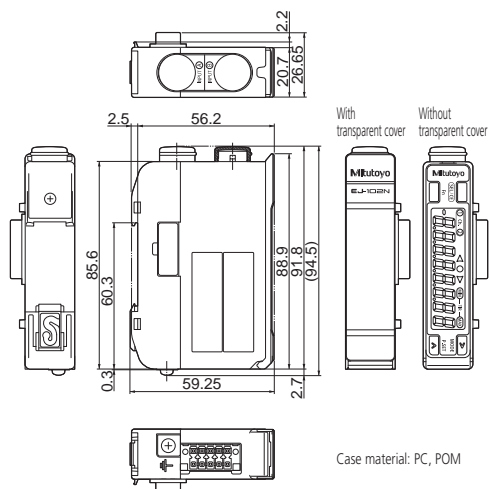
### SPECIFICATIONS

Order No.		542-081A Includes AC components	542-081
Unit		inch/mm	
Resolution		0.0002, 0.00005, 0.00002, 0.000005 (inch)/ 0.005, 0.001, 0.0005, 0.0001 (mm)	
Number of linear gage connection ports		2	
Supported gage signal		Differential square wave, differential square wave with reference point mark	
Maximum input frequency		5 MHz	
User Interface	Display	Negative sign + 8 digits and indicator (1 gage value displayed, 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)	
	Max. number of linked units	EJ Counter 8 units + 1 (optional) interface unit (Max. number of linear gage connections: 16)	
Power supply	Input voltage	10 V to 27 V DC	
	Power consumption	1 unit only: 3 W or less (Includes 2 linear gages) Max. number of links: 30 W or less (Interface unit and 16 linear gages included)	
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)	
Mass		Approx. 120 g	
CE Marking		EMC Directive: EN 61326-1 Immunity test requirement: Clause 6.2 Table 2 Emission limit: Class A RoHS Directive: EN IEC 63000	

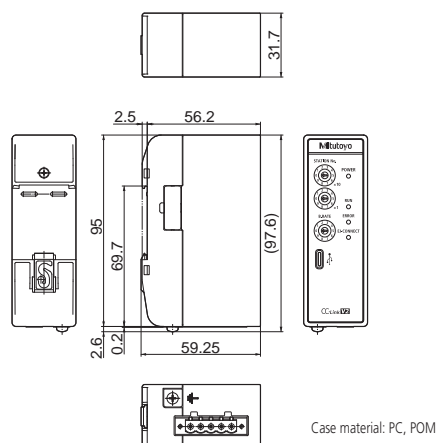
Connectable linear gage series	Conversion cable (optional)
LG100	Not necessary
LGF-Z	Necessary ( <b>21HZA194</b> )
LGF/LGK/LGB/LG	Necessary ( <b>21HZA193</b> )

## DIMENSIONS

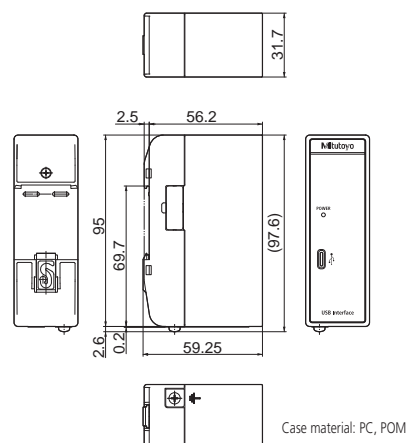
### • 542-081A/542-081



### • Interface unit CC-Link



### • Interface unit USB



### SPECIFICATIONS

Order No.		21HZA186
Model No.		Interface unit CC-Link
Applicable interface		USB 2.0 Full Speed
		CC-Link Ver. 1.10
		CC-Link Ver. 2.00
User Interface	Display	POWER (green), RUN (green), ERROR (red), EJ-CONNECT (green)
	Switch	Rotary switch×3 (Exchange number settings×2, communication speed settings×1)
Functions		Common protocols for USB and CC-Link, Readout of current value*1, 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 *1 Only Ver. 2.00 is supported with CC-Link.
Power supply		Power is supplied from <b>542-081A/542-081</b> (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)
CE Marking		EMC Directive: EN 61326-1 Immunity test requirement: Clause 6.2 Table 2 Emission limit: Class A RoHS Directive: EN IEC 63000

### SPECIFICATIONS

Order No.		21HZA149
Model No.		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 <b>542-081A/542-081</b> (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)
CE Marking		EMC Directive: EN 61326-1 Immunity test requirement: Clause 6.2 Table 2 Emission limit: Class A RoHS Directive: EN IEC 63000

Unit: mm