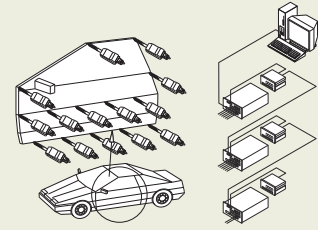


Linear Gauge Application Examples
Page 353



Digimatic and Incremental Linear Gauge
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Counters and Display Units
Page 360



SENSORPAK
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Motorized Low Force High Precision Gauges LITEMATIC
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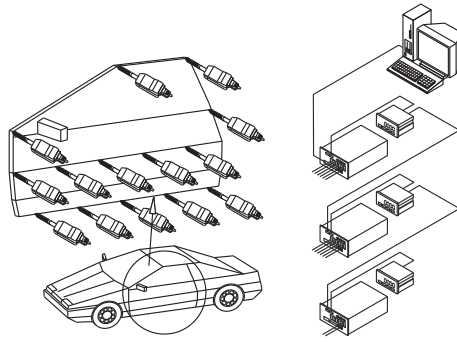


Surface Measure
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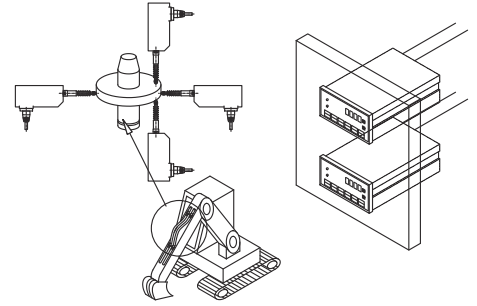


Linear Gauge Application Examples

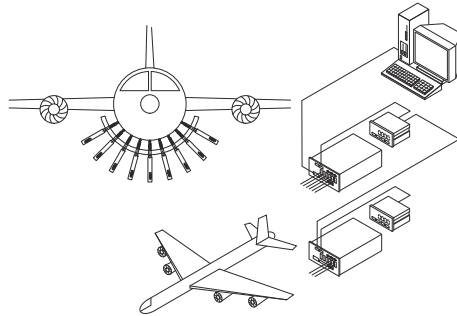
Linear Gauge Applications



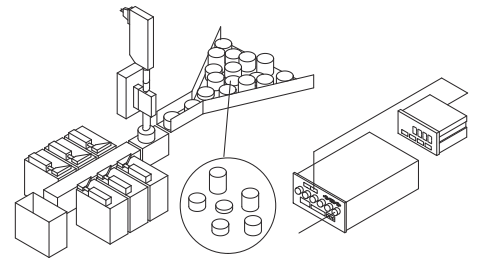
Multi-point measurement on car doors



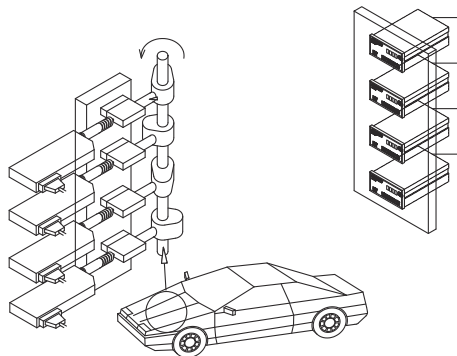
Dimensional measurement of fluid flywheels



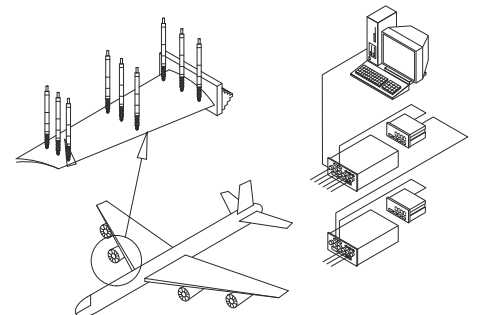
Measurement of aeroplane body deformation



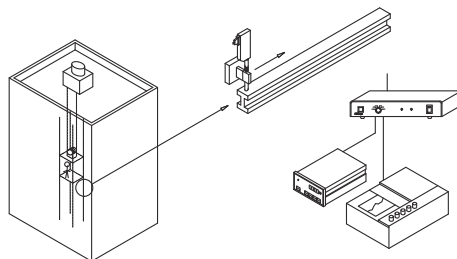
Sorting of parts according to size



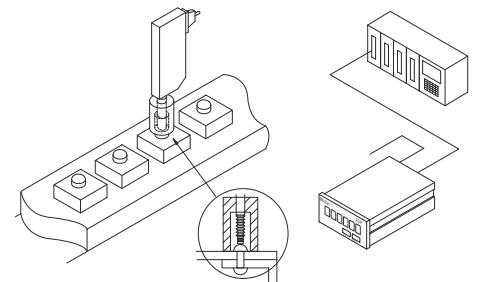
Cam measurement



Multi-point measurement on turbine blades



Measurement of deflection of lift guiding rails



Rivet head testing

Linear Gauge LG100 Series

Linear Gauge LG100 Series

The LG100 is a very robust and economical linear gauge for in-line use and automatic machines, in combination with the EJ Counter. EH-counters can be used as well.

- The advanced construction of the plunger guidance assembly makes it very resistant to external shocks and vibrations.
- Its differential square-wave signal output allows for a wide range of applications.
- Long-lasting due to linear ball-bearings in the spindle unit.
- Repeatability of 0.3 μm .
- Narrow range accuracy: 0.5 μm (20 μm range).
- Operation temperature range: 0 - 50°C.



LG100

No.	Range [mm]	Accuracy	Measuring force	Resolution [mm]	Stem \varnothing	Max. response speed [mm/s]	Signal pitch [μm]	Mass [g]
542-190	0 - 10	(1,5+L/50) μm L=measured length in mm	1,4 N with spindle down, 1,3 N with spindle horizontal, 1,2 N with spindle upwards	0,001	8 mm	1500	4	260
542-191	0 - 10	(1,5+L/50) μm L=measured length in mm	1,4 N with spindle down, 1,3 N with spindle horizontal, 1,2 N with spindle upwards	0,0005	8 mm	1500	2	260
542-192	0 - 10	(0,8+L/50) μm L=measured length in mm	1,4 N with spindle down, 1,3 N with spindle horizontal, 1,2 N with spindle upwards	0,0001	8 mm	400	0,4	260
542-193	0 - 25	(1,5+L/50) μm L=measured length in mm	4,6 N with spindle down, 4,3 N with spindle horizontal, 4 N with spindle upwards	0,001	15 mm	1500	4	300
542-194	0 - 25	(1,5+L/50) μm L=measured length in mm	4,6 N with spindle down, 4,3 N with spindle horizontal, 4 N with spindle upwards	0,0005	15 mm	1500	2	300
542-195	0 - 25	(0,8+L/50) μm L=measured length in mm	4,6 N with spindle down, 4,3 N with spindle horizontal, 4 N with spindle upwards	0,0001	15 mm	400	0,4	300
542-196	0 - 50	(1,5+L/50) μm L=measured length in mm	5,7 N with spindle down, 5,3 N with spindle horizontal, 4,9 N with spindle upwards	0,001	15 mm	1500	4	400
542-197	0 - 50	(1,5+L/50) μm L=measured length in mm	5,7 N with spindle down, 5,3 N with spindle horizontal, 4,9 N with spindle upwards	0,0005	15 mm	1500	2	400

if no EJ-Counter is used, an adapter is necessary (for all LG100 models)



Specifications

Cable length	2 m
Scale	Photoelectric linear encoder
Contact point	\varnothing 3 mm carbide ball, thread: M 2,5 x 0,45
Output signal	90° phase difference, differential square wave (RS-422 equivalent)
Environmental conditions	0°C to 50°C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing
Power supply	DC 5 V \pm 0,2 V ripple voltage 200 mVpp max
Minimum edge distance	500 ns (1 μm type), 250 ns (0,5/0,1 μm type)
Scale reference point	3 mm from the lowest rest point (10 mm type), 5mm from the lowest rest point (25/50 mm type)

Optional accessories

No.	Description
21HAA331	HNBR Rubber Boot (for 10 mm range model), 10 mm model
21HZA176	HNBR Rubber Boot (for 25 mm range model), 25 mm model
21HZA184	HNBR Rubber Boot (for 50 mm range model), 50 mm model
21HZA197	Extension Cable 5 m (10P-10P)
21HZA198	Extension Cable 10 m (10P-10P)
21HZA199	Extension Cable 20 m (10P-10P)
21HZA196	Exchange Plug (for Z-Counter)
21HZA261	Exchange cable (for Z-Counter)
21HZA195	Exchange Plug (for P-Counter)
21HZA260	Exchange cable (for P counter)
02ADE230	Air Drive Unit for Linear Gauges 10 mm, 10 mm
02ADE250	Air Drive Unit for Linear Gauges 25 mm, 25 mm
02ADE270	Air Drive Unit for Linear Gauges 50 mm, 50 mm
02ADB680	Thrust Stem Set (for 10 mm model)
02ADB681	Thrust Stem (part)
02ADB682	Nut (part)
02ADB683	Spanner Wrench (for 02ADB682)
02ADN370	Thrust Stem Set (for 25 mm and 50 mm range model)
02ADN371	Thrust Stem (part), for 25 mm and 50 mm model
02ADB692	Nut (part)
02ADB693	Spanner Wrench (for 02ADB692)
238772	Silicone Rubber Boot (for 10 mm model)
962504	Silicone Rubber Boot (for 25 mm model)
962505	Silicone Rubber Boot (for 50 mm model)
542-071D	Linear Gauge Counter EH, (need 21HZA195)
542-075D	Linear Gauge Counter EH, (need 21HZA195)
542-073D	Linear Gauge Counter EH, (need 21HZA196)
542-080	EJ-Counter -102N
542-081	EJ Counter-102NE

Consumable spares

No.	Description
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric

Linear Gauge LG200 Series



Specifications

Scale	Photoelectric linear encoder
Stem \varnothing	8 mm
Contact point	\varnothing 3 mm carbide ball, thread: M 2,5 x 0,45
Repeatability ($\pm 2\sigma$)	0,3 μ m (20°)
Cable length	2 m
Power supply	5 V (4,5 V to 5,2 V), 80 mA max.
Output signal	90° phase difference, differential square wave (RS-422A equivalent) minimum edge distance 500 ns (0,1 μ m type), 250 ns (0,1 and 0,5 μ m type)
Environmental conditions	0° C to 50° C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing

Optional accessories

No.	Description
21HZA197	Extension Cable 5 m (10P-10P)
21HZA198	Extension Cable 10 m (10P-10P)
21HZA199	Extension Cable 20 m (10P-10P)
21HZA195	Exchange Plug (for P-Counter)
21HZA260	Exchange cable (for P counter)
21HZA196	Exchange Plug (for Z-Counter)
21HZA261	Exchange cable (for Z-Counter)
02ADE230	Air Drive Unit for Linear Gauges 10 mm, 10 mm
02ADB680	Thrust Stem Set (for 10 mm model)
238772	Silicone Rubber Boot (for 10 mm model)
Connectable Counter	
542-080	EJ-Counter -102N
542-081	EJ Counter-102NE
542-075D	Linear Gauge Counter EH, (need 21HZA195)
542-071D	Linear Gauge Counter EH, (need 21HZA195)

*the EH-counter need 21HZA195

Consumable spares

No.	Description
21HAA331	HNBR Rubber Boot (for 10 mm range model), 10 mm model
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric



Refer to the Linear Gauge documentation for more details

Linear Gauge LG200 Series

This slim type linear gauge allows you to meet a variety of measurement needs.

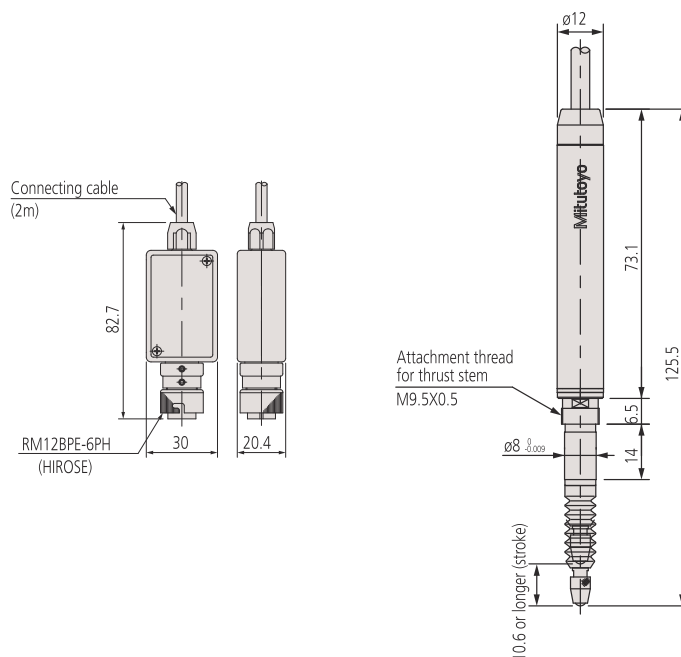
- Differential square wave signal output enables use for a wide range of applications.
- Due to its compact design, you can install it even where space is restricted.
- Its photoelectric scale delivers high precision across the entire measuring range.
- Extremely long-lasting due to linear ball-bearings in the spindle unit.
- Perfect for use in tough environments, they come with a high IP class of IP67G.
- Ideal for in-line measurement and embedded in automatic machines.



LG200

No.	Range [mm]	Accuracy	Measuring force	Resolution [mm]	Signal pitch [μ m]	Max. response speed	Mass [g]
542-186	0 - 10	(1,5 + L/50) μ m L=measured length in mm	0,8 N with spindle down, 0,75 N spindle horizontal, 0,7 N spindle upwards	0,001	4	1500	175
542-187	0 - 10	(1,5 + L/50) μ m L=measured length in mm	0,8 N with spindle down, 0,75 N spindle horizontal, 0,7 N spindle upwards	0,0005	2	1500	175
542-188	0 - 10	(0,8 + L/50) μ m L=measured length in mm	0,8 N with spindle down, 0,75 N spindle horizontal, 0,7 N spindle upwards	0,0001	0,4	400	175

*1 Spindle DOWN/Horizontal/UP



ABSOLUTE Digimatic Linear Gauge LGS Series

The LGS is a compact ABS linear gauge that offers you the following benefits:

- Its ABSOLUTE Digimatic data output and IP-66 protection class give you best-of-breed technology.

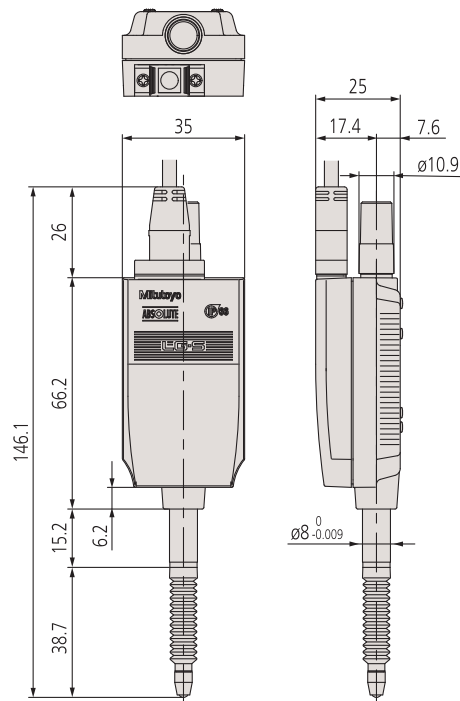


575-303

Metric

No.	Range [mm]	Accuracy	Measuring force	Stem \varnothing	Direction of counting	Mass [g]
575-303	0 - 12,7	15 μ m	2 N with spindle down, 1,8 N spindle horizontal, 1,6 N spindle upwards	8 mm	positive	190

*1 Spindle DOWN/Horizontal/UP



Specifications

Scale	Electrostatic capacitance-type ABSOLUTE linear encoder
Contact point	\varnothing 3 mm carbide ball thread : M 2,5 x 0,45 mm
Cable length	2 m
Max. response speed	Unlimited (measuring by scanning cannot be performed)
Output signal	Digimatic
Environmental conditions	0 °C to 40 °C (20 % to 80 % rel. humidity, no condensation)
Bearing type	Slide bearing
Digital step	0,01 mm

Optional accessories

No.	Description
02ADF640	Extension Adaptor, for SPC Cables.
936937	Digimatic Cable, Flat 10-Pin Type, 1 m
965014	Digimatic Cable, Flat 10-Pin Type, 2 m
903594	Air Drive Unit, Indicator/Linear Gauge, for ID-S, ID-C, LGS, 12,7 mm and 0,5" Range
542-007D	Display Unit EC-Counter, CEE, for Digimatic Gauges
542-072D	Linear Gauge Counter EH, for LGS, LGD, Scale Units
63AAA033	Digimatic Interface DMX-8/2, 8x Digimatic Input, Serial D-SUB 9 Connector
63AAA026	Digimatic Interface DMX-16, 16x Digimatic Input, Serial D-SUB 9 Connector
63AAA106	Digimatic Interface DMX-16C, 16x Digimatic Input, Serial D-SUB 9 Connector

Consumable spares

No.	Description
238774	Silicon rubber boot for ID-C, ID-N, ID-S

Specifications

Throttle

Interior \varnothing 2,5 mm
Exterior \varnothing 3,2 mm



Refer to the Linear Gauge documentation for more details

Air Drive Unit

Air Drive Unit

- Provides smooth lifting and lowering of the contact point of a gauge by pneumatic cylinder.
- The speed of lift can be regulated by the throttle on the remote cylinder.

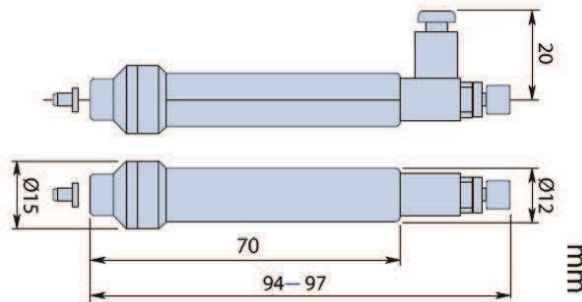


02ADE230



02ADE250/02ADE270

No.	Remarks	Suitable for gage model	Air supply [MPa]	Mass [g]
02ADE230	Need air filter, regulator and lubricator	LG200 and LG100 10mm models	0,2 to 0,4	
02ADE250	Need air filter, regulator and lubricator	LG100 25mm models	0,2 to 0,4	
02ADE270	Need air filter, regulator and lubricator	LG100 50mm models	0,2 to 0,4	
903594	Need air filter, regulator and lubricator	ID-S, ID-C, LGS 12,7mm range models	0,5	60



903594

Laser Hologauge LGH

This is a highly precise dial gauge that uses optical interference so you can measure with unparalleled accuracy.

The Mitutoyo Laser Hologauge offers you the following benefits:

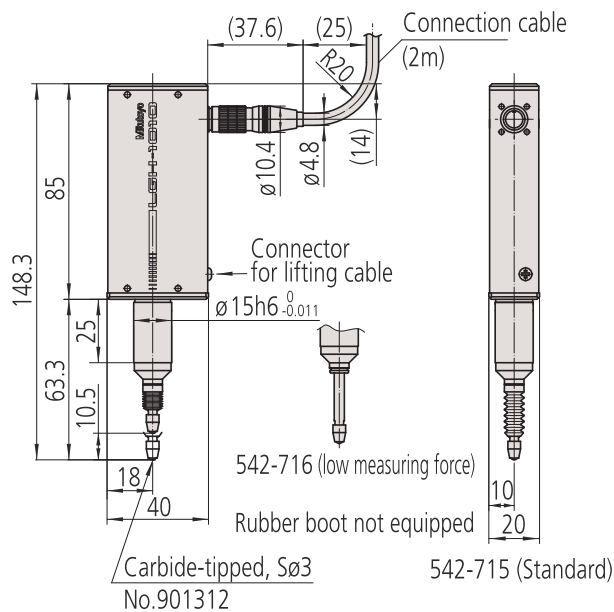
- Through optical interference of laser light through a diffraction grating it gives you an extremely precise holographic scale with 0.00001mm resolution.
- You can use the Laser Hologauge for extremely precise measurements, as well as a transducer in ultra-precise positioning and control systems.



542-715D

No.	Range [mm]	Accuracy	Measuring force	Resolution [μm]	Stem ∅	Repeatability	Mass [g]
542-715D	0 - 10	0,2 μm	0,65 N with spindle down, 0,55 N spindle horizontal, 0,45 N spindle upwards	0,01	15 mm	0,1 μm	220
542-716D	0 - 10	0,2 μm	0,12 N with spindle down/ - / -	0,01	15 mm	0,1 μm	220

*1 Spindle DOWN/Horizontal/UP



542-715D

Specifications

Scale	Laser-hologram measurement sensor
Max. response speed	700 mm/s
Contact point	∅ 3 mm carbide ball, thread: M 2,5 x 0,45
Output signal	90° phase difference, differential square wave (RS-422A equivalent)
Signal pitch	4 μm
Bearing type	High precision linear ball bearing
Environmental conditions	0C to 40°C (20% to 80% rel. humidity, no condensation)
Delivered	With Display Unit

Standard accessories

No.	Description
538610	Wrench Key/542

Optional accessories

No.	Description
971750	Laser Hologauge stand
971753	Spindle lifting cable
971751	Gage Fixture (A) LHG
971752	Fastening system, Laser Hologauge

Consumable spares

No.	Description
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric



Refer to the Linear Gauge documentation for more details

Laser Hologauge LGH

This is a highly precise dial gauge that uses optical interference so you can measure with unparalleled accuracy.

The Mitutoyo Laser Hologauge offers you the following benefits:

- Through optical interference of laser light through a diffraction grating it gives you an extremely precise holographic scale with 0.005 μm resolution.
- The measuring head is very compact, enabling you to build it into various systems far less expensively than conventional laser technology.
- You can use the Laser Hologauge for measuring extremely precise parts, as well as a transducer in ultra-precise positioning and control systems.

Functions	
Data output	●
ON/OFF	●
Error display/output	●
MAX / MIN / difference measurement	●
Mm / inch switching	●
RS-232C Output	●
USB Output for SENSORPAK	●
Extern tolerance set (when a PC is used)	●

Specifications

Scale	Laser-hologram measurement sensor
Max. response speed	250 mm/s
Contact point radius	R=5 mm carbide
Bearing type	High precision linear ball bearing
Environmental conditions	10°C to 30°C (30% to 70% rel. humidity, no condensation)
Delivered	With Display Unit

Standard accessories

No.	Description
538610	Wrench Key/542

Optional accessories

No.	Description
971750	Laser Hologauge stand
971753	Spindle lifting cable
971751	Gage Fixture (A) LHG
971752	Fastening system, Laser Hologauge

Consumable spares

No.	Description
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric



Refer to the Linear Gauge documentation for more details



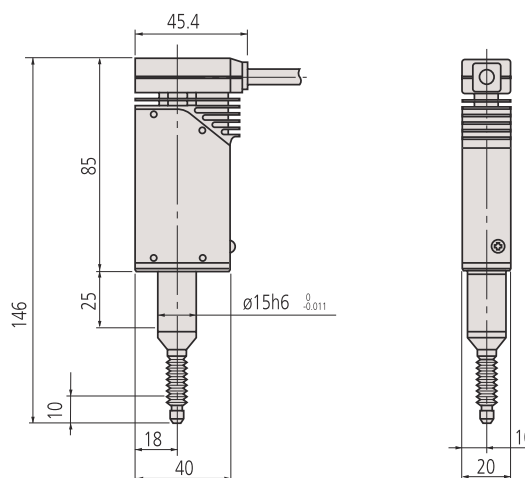
542-720D



Laser Hologauge supplied with Display Unit (2 axis counter)

No.	Range [mm]	Accuracy	Measuring force	Resolution [μm]	Stem \varnothing	Repeatability	Mass [g]
542-720D	0 - 10	0,1 μm	0,65 N with spindle down, 0,55 N spindle horizontal, 0,45 N spindle upwards	0,005	15 mm	0,02 μm	220
542-721D	0 - 10	0,1 μm	0,1 N with spindle down/ - / -	0,005	15 mm	0,02 μm	220

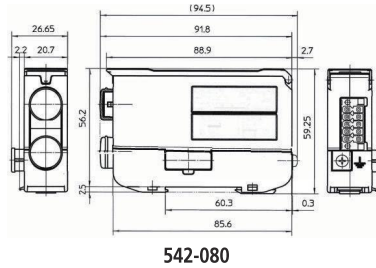
*1 Spindle DOWN/Horizontal/UP



EJ Counter and Interfaces for Linear Gauges

The EJ-Counter is targeted at secondary and automatic embedded markets as well as conventional measurement rooms.

- Multipoint measuring systems with a maximum of 16 gauges can be configured.
- The EJ-Counter is attached to a DIN rail for use. Due to the small size of the unit, it can be installed inside of switchboards /equipment. When using multiple EJ Counters linked together, connection of power to one EJ Counter also supplies power to the other linked counters.
- In addition, through the industrial I/F unit (sold separately), data can be managed on the upper side, and it is possible to support smart factories such as IoT and M2M.
- Easy setup with the LG QuickSetup Tool software (free of charge) (USB interface is required).



Metric EJ-Counter-102N

No.	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	External input / output	Mass [g]
542-080	5 MHz	differential square wave (RS422A equivalent)	LG100, LG200	2	In: 4 ports / Out: 4 ports Applicable communications standards: Supported by optional interface unit	120

Metric/Inch EJ-Counter-102NE

No.	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	External input / output	Mass [g]
542-081	5 MHz	differential square wave (RS422A equivalent)	LG100, LG200	2	In: 4 ports / Out: 4 ports Applicable communications standards: Supported by optional interface unit	120

Interface unit CC-Link

No.	Baud rate	Connector type	Industrial I/F	Data transferred	Mass [g]
21HZA186	USB 2 Full speed (12Mbps)	Type C	CC-Link Ver. 1.10 CC-Link Ver. 2.00	Current value data* (No unit, signed 32bit data); Tolerance judgment result *only Ver. 2.00 supported	154

Interface unit EtherCAT

No.	Baud rate	Connector type	Industrial I/F	Data transferred	Mass [g]
21HZA264	USB 2 Full Speed (12Mbps)	Type C	EtherCAT	Current value data (No unit, signed 32 bit data), Tolerance judgment result	165

Interface unit Ethernet/IP

No.	Baud rate	Connector type	Industrial I/F	Data transferred	Mass [g]
21HZA188	USB 2 Full Speed (12 Mbps)	Type C	EtherNet/IP	Current value data (No unit, signed 32 bit data), Tolerance judgment result	165

Interface unit PROFINET

No.	Baud rate	Connector type	Industrial I/F	Data transferred	Mass [g]
21HZA187	USB 2 Full Speed (12 Mbps)	Type C	PROFINET RT (RT Class1)	Current value data (No unit, signed 32 bit data), Tolerance judgment result	165

Interface unit USB

No.	Baud rate	Connector type	Industrial I/F	Data transferred	Mass [g]
21HZA149	USB 2 Full speed (12Mbps)	Type C	None	Current value data (No unit, signed 32 bit data), Tolerance judgment result	115

Functions

ZERO SET	●
Origin detection	●
PRESET	●
External HOLD	●
External CLEAR	●
External 1 / 2 SELECT	●
MAX / MIN / difference measurement	●
Internal calculation	●
Tolerance indicator	●
Extern tolerance set (when a PC is used)	●
Tolerance judgement (3 or 5 step)	●
Counting direction switchable	●
External PRESET / ZERO	●

Specifications

Operating temperature / humidity	0°C to 50°C / 20% to 80% rel. humidity, no condensation
Storage temperature / humidity	-10°C to 60°C / 20% to 80% rel. humidity, no condensation
Power supply	Input voltage: 10 - 27V DC supplied from EJ-Counter Maximum power consumption: Single EJ Counter: 3W or less Maximum consolidation: 30W or less

Optional accessories

No.	Description
21HZA157	DIN Stoppers
21HZA149	USB I/F unit for EJ Counter
21HZA186	CC-Link / I/F unit for EJ Counter
21HZA187	PROFINET I/F unit for EJ Counter
21HZA188	Ethernet/IP I/F unit for EJ Counter
21HZA264	EtherCAT I/F unit for EJ Counter
21HZA193	Connector Adapter Cable (for P-Gage)
21HZA194	Connector Adapter Cable (for Z-Gage)
21HZA209	DC Jack with Pin Terminal
357651	AC-Adapter 12V, CEE Type, for SJ-210/SJ-310/LH-600/QM-Data 200
02ZAA020	AC-Cordset CEE, 1,8m for EU (excl. UK)

EJ Counter and Interfaces for Linear Gauges



USB (21HZA149)



CC-Link (21HZA186)



PROFINET (21HZA187)



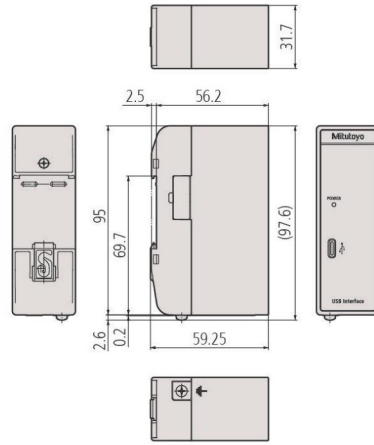
EtherNet/IP (21HZA188)



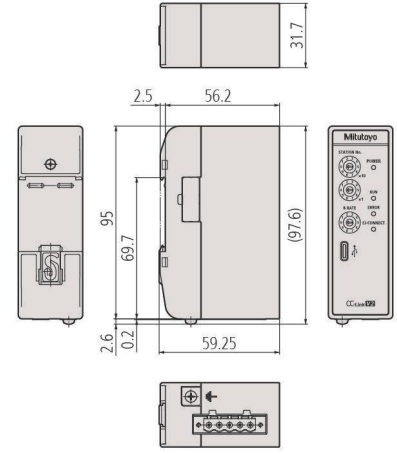
EtherCAT (21HZA264)



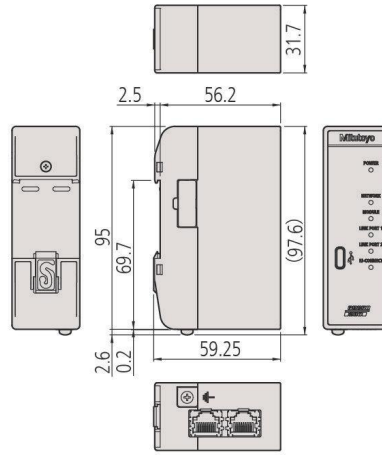
General settings



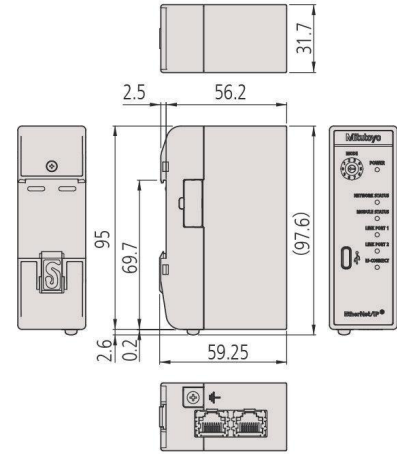
Interface unit USB (21HZA149)



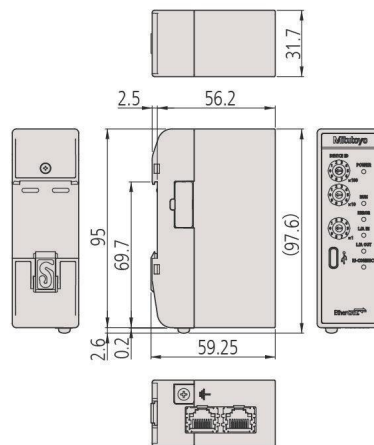
Interface unit CC-Link (21HZA186)



Interface unit PROFINET (21HZA187)



Interface unit EtherNet/IP (21HZA188)



Interface unit EtherCAT (21HZA264)

EH Counter for Linear Gauges

EH Counter for Linear Gauges

Multi-functional Counter

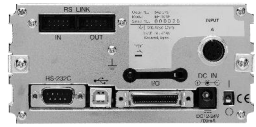
- The standard RS-232C and USB interfaces allows easy communication with an external PC (the USB can only be used with SENSORPAK).
- The built-in networking function allows you to easily create a multi-point measuring system (RS link, max. 10 Counter).
- The 2-gauge input type can calculate additions and subtractions between two gauges.



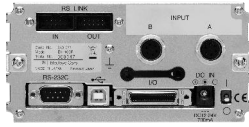
542-075D



542-071D, 542-073D, 542-072D



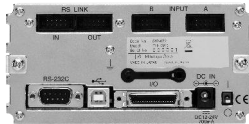
542-075D



542-071D

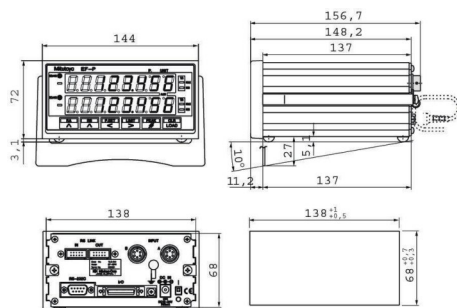


542-073D



542-072D

No.	Resolution [mm]	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-075D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LG100 with connector adapter plug 21HZA195)	1	760
542-071D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LG100 with connector adapter plug 21HZA195)	2	800
542-073D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave with reference point	LGF-Z with reference point, LG100 with connector adapter plug 21HZA196	2	800
542-072D	0,001/0,01 (automatic setting by gauge)	-	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	2	800



EH Counter for Linear Gauges				
Functions	542-071D	542-073D	542-072D	542-075D
Data output	●	●	●	●
ON/OFF	●	●	●	●
Sum/difference calculation	●	●	●	●
ABS/INC	●	●	●	●
BCD output	●	●	●	●
Error display/output	●	●	●	●
External HOLD	●	●	●	●
MAX / MIN / Difference measurement	●	●	●	●
Mm / inch switching	●	●	●	●
Lower digit blank-out	●	●	●	●
RS link	●	●	●	●
RS-232C Output	●	●	●	●
ZERO SET	●	●	●	●
PRESET	●	●	●	●
I/O Output	●	●	●	●
USB Output for SENSORPAK	●	●	●	●
Extern tolerance set (when a PC is used)	●	●	●	●
Counting direction switchable	●	●	●	●
External PRESET / ZERO	●	●	●	●

Specifications

Power supply	Via AC Adapter (12-24 V DC, 700 mA)
Tolerance judgement display	LED display (3 steps : Amber, Green, Red/5 steps : Amber, Amber flashing, Green, Red flashing, Red)

Standard accessories

No.	Description
02ZAA020	AC-Cordset CEE, 1,8m for EU (excl. UK)

Optional accessories

No.	Description
02ADB440	Data Plug I/O Interface, for Litematic
02AZD790D	Connection Cable D for U-WAVE, Flat 10-Pin Type
936937	Digimatic Cable, Flat 10-Pin Type, 1 m
965014	Digimatic Cable, Flat 10-Pin Type, 2 m
12AAA807	Cable RS-232C, 2m for LH-600 B, C, D, E
06AFM380D	USB Input Tool Direct (Digimatic to USB), 2m Cable, Digimatic/Digimatic 2, Flat 10-Pin Type
21HZA195	Exchange Plug (for P-Counter)
21HZA196	Exchange Plug (for Z-Counter)
21HZA260	Exchange cable (for P counter)



02ADB440

EC Counter for Linear Gauges

This Digimatic display can be connected to any device with Digimatic output, including micrometers, indicators, calipers and LGS/LGD Linear Gauge.

It offers you the following benefits:

- It has a data output and tolerance evaluation function.

Functions	
Data output	●
ON/OFF	●
ABS/INC	●
Error display/output	●
External HOLD	●
Mm / inch switching	●
ZERO SET	●
PRESET	●
Counting direction switchable	●
External PRESET / ZERO	●

Specifications

Power supply + 9 - 12 V DC 400 mA or AC adapter

Tolerance judgement display LED display (3 steps: Amber, Green, Red)

Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1 m
965014	Digimatic Cable, Flat 10-Pin Type, 2 m
02AZD790D	Connection Cable D for U-WAVE, Flat 10-Pin Type
06AFM380D	USB Input Tool Direct (Digimatic to USB), 2m Cable, Digimatic/Digimatic 2, Flat 10-Pin Type
21HZA195	Exchange Plug (for P-Counter)



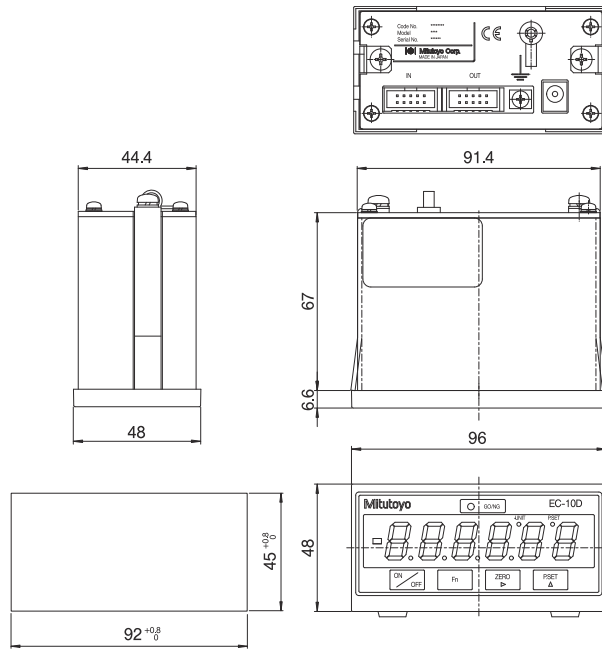
542-007D



No.	Resolution [mm]	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-007D	0,001/0,01 (automatic setting by gauge)	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	1	500



Refer to the Linear Gauge documentation for more details



542-007D

SENSORPAK

The SENSORPAK supports the development of measuring facilities and measuring stations.

It offers you the following benefits:

- It can simultaneously display measurement values from up to 60 sensors in real time.
- You can make calculations using measurement values from up to 30 sensors in real time.
- It enables a huge range of different graphical presentations of using measurement, such as number representation, pointer representation, scale representation.
- Data registration can be made in control cards or data tables.
- You can also carry out further data processing with external software, such as Microsoft® Excel® or MeasurLink.

MeasurLink ENABLED

Specifications

OS compatibility

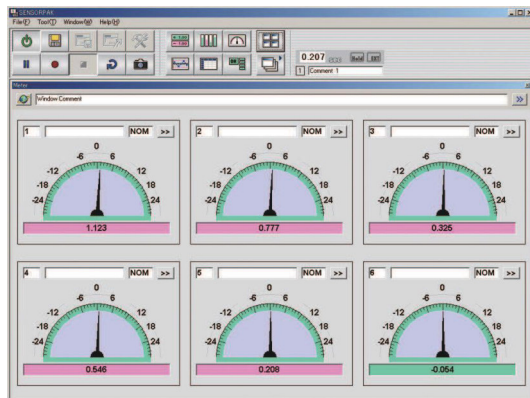
Windows® 7 (32/64 bit)
Windows® 8. 1 (32/64 bit)
Windows® 10 (64bit)
Windows® 11 (64bit)
Excel® 2007, 2010, 2013

Optional accessories

No.	Description
12AAA807	Cable RS-232C, 2m for LH-600 B, C, D, E



Measurement screen



Meter screen

Model	SENSORPAK
No.	02NGB072
Output function	Direct output to Microsoft® Excel® spreadsheet, CSV file output (compatible with Measur-Link)
Total tolerance judgement	GO/NG judgement (by specifying gauges to be used for total tolerance judgement) GO/NG signal output with optional I/O cable
Input function	Trigger function : by means of keys 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)
Applicable counter	Counters with RS-232C interface (EH and EV), with USB interface (EH)
Display	Display type : Counter, bar graph, meter, chart (capable of simultaneous display) Tolerance judgement result : Colour display (green/red) Connectable gauges : Max. 60 gages

LITEMATIC VL-50

Motorized low force, high precision gauges

LITEMATIC VL-50S separate display type

This is a high-accuracy gauge head with a separate controller. The LITEMATIC VL-50S offers you the following benefits:

- Measuring range: 0 - 50mm
- Measuring accuracy (20 °C) up to $(0.5+L/100) \mu\text{m}$
- L = arbitrary measuring length (mm)
- Repeatability up to $\sigma 0.05 \mu\text{m}$
- The granite stand shown is an optional accessory

Functions	LITEMATIC VL-50S separate display type
ABS / INC (INC ZERO)	●
Data output	●
Key lock	●
Mm / inch switching	●
Tolerance input (3 or 5 levels)	●
Motorized plunger movement	●
Mode : max-min (TIR) reading	●

Specifications

Measuring range (inside)	0-50 mm
Data output	DIGIMATIC RS 232C INTERFACE I/O

Optional accessories

No.	Description
K543722	Vacuum holder for high accuracy thickness measurement of battery foil samples, Precision Vacuum Specimen Holder for VL-50 LITEMATIC
K543753	Adaptor plate for K543722, for the attachment to stand 957460 for LITEMATIC head type
02ADB440	Data Plug I/O Interface, for Litematic
957460	Litematic Head Stand
936937	Digimatic Cable, Flat 10-Pin Type, 1 m
06AFM380D	USB Input Tool Direct (Digimatic to USB), 2m Cable, Digimatic/Digimatic 2, Flat 10-Pin Type
965014	Digimatic Cable, Flat 10-Pin Type, 2 m
12AAA807	Cable RS-232C, 2m for LH-600 B, C, D, E
02AZD790D	Connection Cable D for U-WAVE, Flat 10-Pin Type
02AZE375	Weight Part for VL
937179T	Footswitch for SPC

Consumable spares

No.	Description
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric



Controller

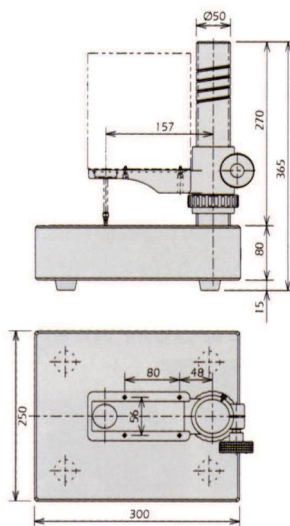


Refer to the LITEMATIC documentation for more details

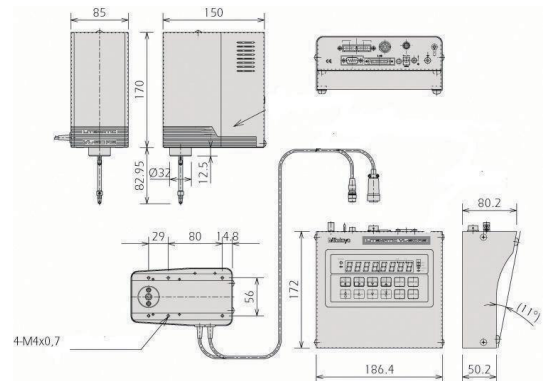


LITEMATIC VL-50S with optional Head Stand (957460).

No.	Accuracy	Measuring force	Type	Mass [kg]
318-226-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	0,01 N (1 gf)	VL-50S-B	5
318-227-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	0,15 N (15 gf)	VL-50S-15-B	5
318-228-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	1 N (102 gf)	VL-50S-100-B	5



957460 Comparator stand



318-226-10D/318-227-10D/318-228-10D

LITEMATIC VL-50

Motorized low force, high precision gauges

LITEMATIC VL50 standard type

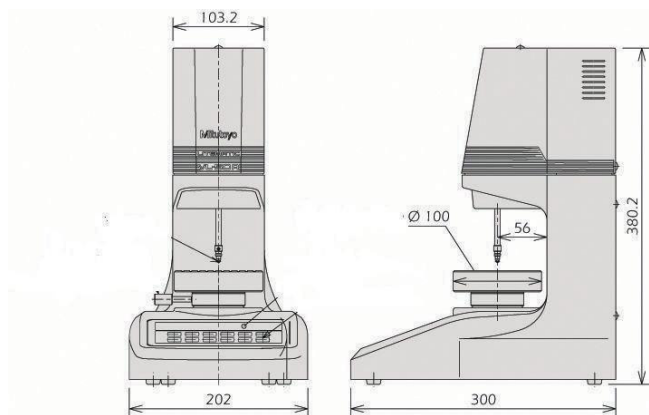
This is a high-accuracy motorised measuring machine with safe and easy operation. The LITEMATIC VL-50 offers you the following benefits:

- Measuring range: 0 - 50mm
- Measuring accuracy (20 °C) up to $(0.5+L/100) \mu\text{m}$
- L = arbitrary measuring length (mm)
- Repeatability up to $\sigma 0.05 \mu\text{m}$



318-221-10D/318-222-10D/318-223-10D

No.	Accuracy	Measuring force	Type	Mass [kg]
318-221-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	0,01 N (1 gf)	VL-50 B	16
318-222-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	0,15 N (15 gf)	VL-50-15-B	16
318-223-10D	up to $(0,5 + L/100) \mu\text{m}$ L = Measurement height	1 N (102 gf)	VL-50-100-B	16



318-221-10D/318-222-10D/318-223-10D

Functions	LITEMATIC VL50 standard type
ABS / INC (INC ZERO)	●
Data output	●
Key lock	●
Mm / inch switching	●
Tolerance input (3 or 5 levels)	●
Motorized plunger movement	●
Mode : max-min (TIR) reading	●

Specifications

Measuring range (inside)	0-50 mm
Data output	Digimatic RS-232C INTERFACE I/O

Optional accessories

No.	Description
K543722	Vacuum holder for high accuracy thickness measurement of battery foil samples, Precision Vacuum Specimen Holder for VL-50 LITEMATIC
02ADB440	Data Plug I/O Interface, for Litematic
02AZD790D	Connection Cable D for U-WAVE, Flat 10-Pin Type
06AFM380D	USB Input Tool Direct (Digimatic to USB), 2m Cable, Digimatic/Digimatic 2, Flat 10-Pin Type
12AAA807	Cable RS-232C, 2m for LH-600 B, C, D, E
936937	Digimatic Cable, Flat 10-Pin Type, 1 m
965014	Digimatic Cable, Flat 10-Pin Type, 2 m
02AZE375	Weight Part for VL
937179T	Footswitch for SPC

Consumable spares

No.	Description
901312	Contact Element Ball Point, M2,5x0,45, 7,3mm Length, Carbide, Metric



Refer to the LITEMATIC documentation for more details

Surface Measure

Specifications

Power supply	24V to 48VDC (15W)
Laser Class EN/IEC	CLASS 2 (EN/IEC 60825-1:2014)
Laser Class JIS	CLASSE 2 (JIS C 6802:2014)
Line Laser Medium	Semiconductor laser
Operating Environment Temperature	0°C to 40°C
Operating Environment Humidity	RH 20% to 80%, non-condensing
Storage Environment Temperature	-30°C to 70°C
Storage Environment Humidity	RH 20% to 95%, non-condensing
IP Protection Class	IP67*2

Optional accessories

No.	Description
Multi Sensor System:	
02AQL401	Master810 Network Hub 8 Sensors, Multi Sensor Network Hub Master for max. 8 Sensors
02AQL402	Master2410 Network Hub 24 Sensors, Multi Sensor Network Hub Master for max. 24 Sensors
02AQL421	GoMax NX smart vision plug type: F, GoMax NX high-performance smart vision embedded device, plug type: F

Surface Measure

Stand-alone non-contact line-laser sensor with small measuring range for high accuracy applications.

Main benefits:

- High accuracy and environment-resistant sensor
- Supporting automated measurement
- Excellent operability simply by using a mouse
- Simple and intuitive interface
- Web-browser based, no need to install software
- Various built-in measurement
- 2D and 3D data can be obtained



553-100



553-110



553-120

No.	Maximum measuring width [mm]	Measuring range	Working distance [mm]	Scanning error (1σ)*1 [μm]	Frame rate	Line Laser Wavelength	Line Laser Max. Power [mW]	Mass
553-100	100	80	80	20	Max. 10kHz	405nm (visible)	2,2	650 g
553-110	32,5	25	60	9	Max. 10 kHz	405 nm (visible)	2,2	650 g
553-120	292	290	299,5	65	Max. 10 kHz	405 nm (visible)	2,2	1480 g

*1 Accuracy inspection environment: Temperature 20°C ± 1°C, Humidity 50%RH ± 10%RH

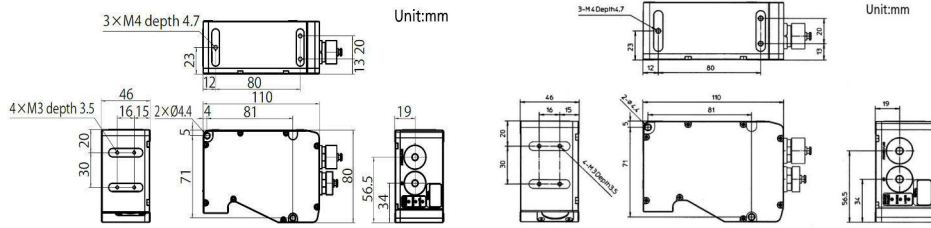
Measurement workpieces: Specified reference ball for inspection (Φ30 mm)

Inspection method: Determined by Mitutoyo-specified inspection method.

The operating environment and the storage environment are different from the guaranteed accuracy environment.

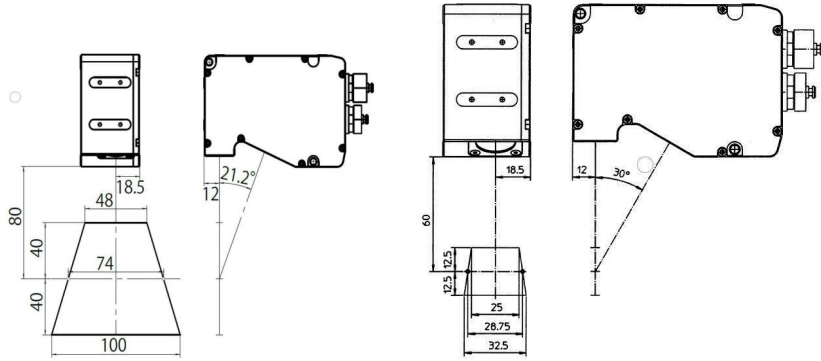
*2 Measuring accuracy may deteriorate if any water droplet or dust particle adheres to the optical path

Surface Measure



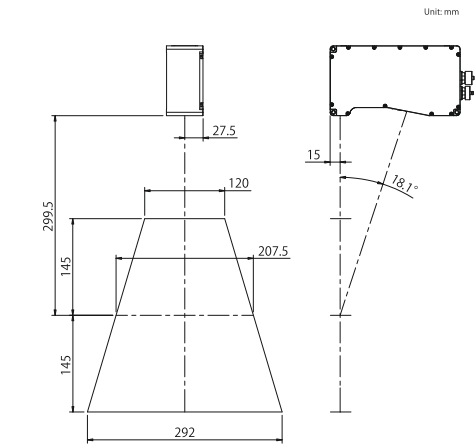
Mounting size SM1008S

Mounting size SM0303S



Measuring Range SM1008S
(553-100)

Measuring Range SM0303S
(553-110)



Measuring Range SM2929S
(553-120)



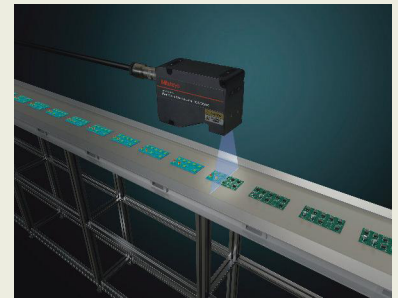
02AQL401



02AQL402



02AQL421

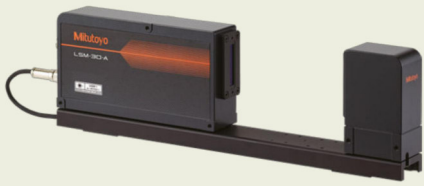


Application example



Refer to the Surface Measure documentation for more details.

Find more optional accessories at:
<https://www.mitutoyo.eu>.



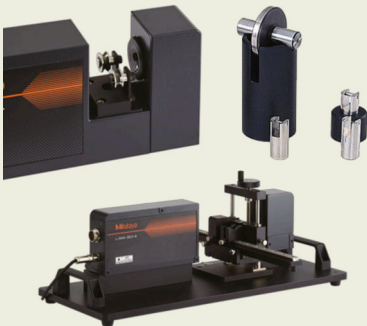
Laser Scan Micrometer Measuring Unit
Page 370



Laser Scan Micrometer Controller Unit
Page 372



Laser Scan Micrometer Interface Unit
Page 373



Laser Scan Micrometer Optional Accessories
Page 374

Laser Scan Micrometer Measuring Unit

LSM-02-A

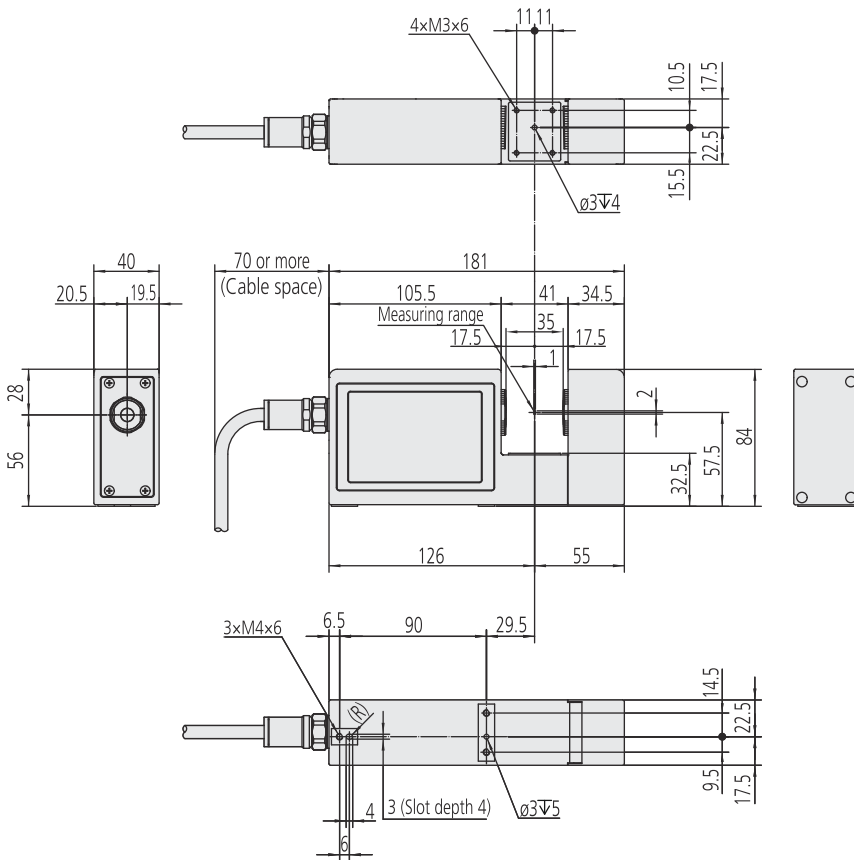
High performance Laser Scan Micrometer

- IP67 rated
- Scan rate 3200 scans/s
- Repeatability (2σ): $\pm 0,015\ \mu\text{m}$ ($\varnothing 1\ \text{mm}$)
- Linearity: $\pm 0,3\ \mu\text{m}$
- Resolution: $0,01\ \mu\text{m}$



LSM-02-A

No.	Description	Measuring range
544-123	LSM-02-A	0,005 mm to 2 mm

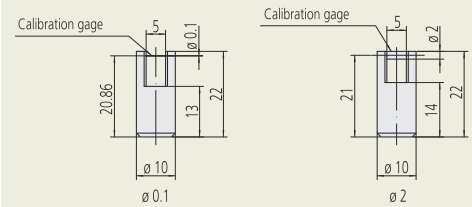


Specifications

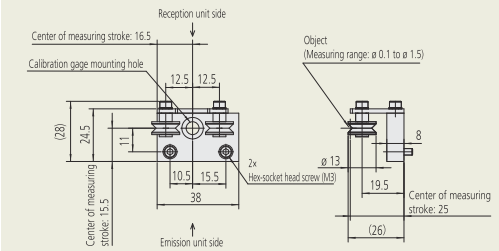
Linearity at 20°C *1	$\pm 0,3\ \mu\text{m}$
Positional error *2	$\pm 0,4\ \mu\text{m}$
Measuring region	1 x 2 [optical axis depth] x [scanning width] mm
Laser wavelength	650 nm, visible
Scanning rate	3200 scans/s
Scanning speed	76 m/s
Applicable laser standards	JIS, IEC, FDA, Class 1
Repeatability ($\pm 2\sigma$)	$\varnothing 2\ \text{mm}$: $\pm 0,03\ \mu\text{m}$ $\varnothing 1\ \text{mm}$: $\pm 0,015\ \mu\text{m}$

Optional accessories

No.	Description
02AGD200	Wire guiding pulley
02AGD110	Calibration Gauge Set, $\varnothing 0,1 - 2\ \text{mm}$
Set consists of:	
02AGD111	Gage Stand for LSM-02-A
958200	Calibration Gauge, 0,1mm
958202	Calibration Gauge, 2mm
958203	Box for Specimens



Calibration gage set for LSM-02-A



Wire guiding pulley for LSM-02-A

LSM-02-A: $\varnothing 0.1\ \text{mm}$ to $\varnothing 1.5\ \text{mm}$.
Larger than $\varnothing 1.5\ \text{mm}$, contact one of our sales or customer service representatives.
Use a calibration gage set (02AGD110) for LSM-02-A for any workpiece if calibration is necessary.

Laser Scan Micrometer Controller Unit

LSM-CU-A

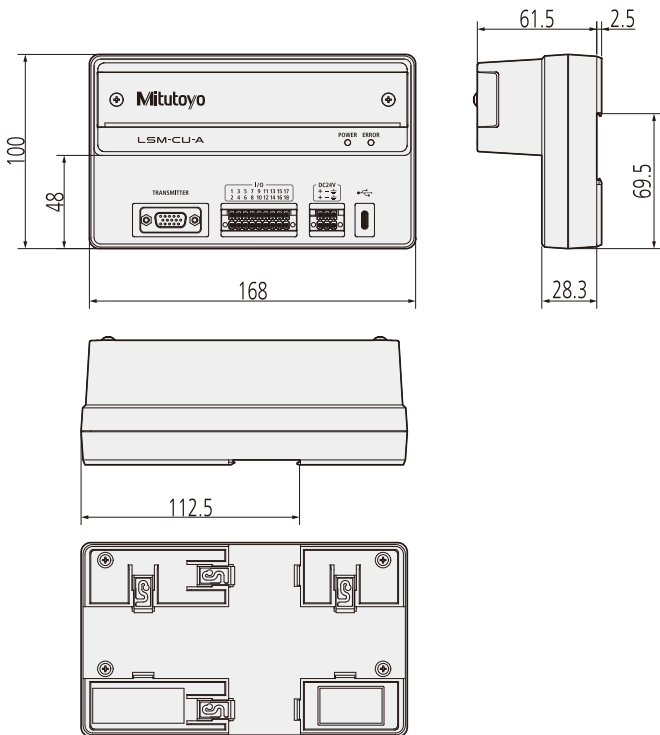
Modular industrial design controller unit for LSM-02/30-A

- Compact, slim design
- DIN rail compatible
- USB Type-C, I/O ports, and industrial interfaces (optional)
- Configuration software included



LSM-CU-A

No.	Description	Type	Mass
544-120	LSM-CU-A	metric	Approx. 550 g
544-121	LSM-CU-A	metric/inch	Approx. 550 g



Specifications

Power supply	DC+24 V \pm 10%, 3 A or more
Remarks	Transparent object measurement, Ultra-fine wire mode (LSM-2-A only), Simultaneous measurement of two items, Automatic workpiece detection, Outlier elimination, Judgment (lower limit/upper limit, multi-limit tolerance zone, target value and tolerance value), Dirt detection for protective glass, Sample measurement, Analog output, Parameter setting (Measurement condition): 20, Workpiece position, Calibration, Presetting, Offset, Statistical analysis, Calculation of two or more sets, Sensor model identification

Optional accessories

No.	Description
63AAA775	Low Power Connection Socket
63AAA679	Power Supply 24V/5A LSM, Connector 2.1mm x 5.5 center positive / EU power cord
02AGQ489	Controller Stand for LSM-CU-A

Laser Scan Micrometer Interface Unit

LSM Interface Unit

Optional module dedicated to LSM-CU-A.

Choose from four interface types to match your production line requirements: EtherNet/IP, PROFINET, EtherCAT and CC-Link IE TSN.

Controller design allows for module insertion without altering the layout.

Specifications

Communication ports	RJ45 x 2
Communication speed	100.000 kbps
Communication cable	Cat. 5e or more STP cable
Operating temperature / humidity	0 °C to 50 °C, 20% RH to 85% RH (non-condensing)
Storage temperature / humidity	-10 °C to 60 °C, 20% RH to 85% RH (non-condensing)



LSM EI-A



LSM CC-A

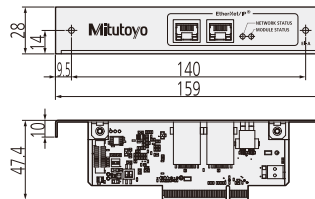


LSM PN-A

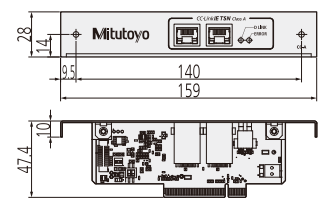


LSM EC-A

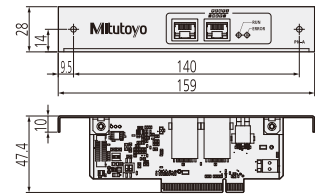
No.	Description	Industrial I/F
02AGQ300	LSM-EI-A	EtherNet/IP
02AGQ350	LSM-PN-A	PROFINET
02AGQ370	LSM-EC-A	EtherCAT
02AGQ390	LSM-CC-A	CC-Link IE TSN



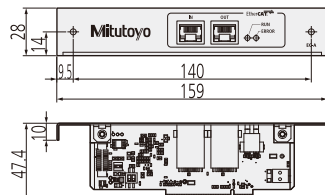
LSM-EI-A



LSM-CC-A



LSM-PN-A



LSM-EC-A

Laser Scan Micrometer Optional Accessories

Accessories



Refer to the LSM brochure

	No.	Application	Description
	02AGQ450	LSM-30-A	Air Shield
	02AGQ452	LSM-30-A	Laser Beam stabilization shield
	02AGD110	LSM-02-A	Calibration gauge set \varnothing 0.1-2 mm
	02AGD130	LSM-30-A	Calibration gauge set \varnothing 1-30 mm
	02AGD200	LSM-02-A	Wire guiding pulley
	02AGD490	LSM-30-A	Adjustable Workstage
	02AGQ461	LSM-30-A	Mounting Kit for LSM-30-A in dual mode for diameters from 40 to 90mm
	02AGQ462	LSM-30-A	Mounting Kit for LSM-30-A in dual mode for diameters from 90 to 140mm
	02AGQ463	LSM-30-A	Mounting Kit for LSM-30-A in dual mode for diameters from 140 to 180mm
	63AAA775	LSM-CU-A	Low Power Connection Socket
	63AAA679	LSM-02/30-A	Power Supply 24V/5A LSM
	02AGD270	LSM-30-A	Workstage
	02AGQ489	LSM-CU-A	Controller stand for LSM-CU-A
	02AGD440	LSM-30-A	Center support f. 02AGD490
	02AGD450	LSM-30-A	Adjustable V-Block f. 02ADG490
	02AGN780A	LSM-02/30-A	Extension signal cable 5 m
	02AGN780B	LSM-02/30-A	Extension signal cable 10 m
	02AGN780C	LSM-02/30-A	Extension signal cable 15 m
	02AGN780D	LSM-02/30-A	Extension signal cable 20 m

For LSM-02-A, the signal cable length is 20m max. and the relay cable is 2m max.
 For LSM-30-A, the signal cable length is 29m max. and the relay cable is 5m max.
 The total length of signal and relay cable is 29m max.