Laser Scan Micrometers



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Laser Scan Micrometer

Series 544

Application examples



On-line measurement of glass fibre or fine wire diameters



XY measurement of electric cables and fibres



Measurement of film sheet thickness 1 Reference edge



Measurement of tape width



Measurement of outside diameters of cylindrical workpieces



Measurement of unevenness of film and sheet 1 Reference edge



Measurement of laser disk and magnetic disk head movement 1 Reference edge



Measurement of outer diameter of large rollers/cylinders



Measurement of outer diameter and roundness of cylinder 1 Roundness error 2 Reference edge



Measurement of spacing of IC chip leads 1 Reference edge



Measurement of gap between rollers 1 Gap



Measurement of workpiece form



| Functions | Series 544 |
|----------------------------------|------------|
| GO/±NG judgement | 0 |
| OFFSET | 0 |
| Multi-limit judgement | 0 |
| Sample Measurement | 0 |
| Statistical calculation | 0 |
| Data output | 0 |
| Zero set | 0 |
| PRESET | 0 |
| Group judgement | 0 |
| Workpiece position display | 0 |
| Dual-gauge calibration | 0 |
| Transparent object measurement | 0 |
| Automatic measurement | 0 |
| Dual-unit measurement (optional) | 0 |
| Abnormal data elimination | |

Specifications

| Linearity at 20°C *1 | Entire range : ±0,5 µm Narrow range : ±(0,3+0,1∆D) µm |
|-------------------------------|---|
| Positional error *2 | ±0,5 μm |
| Repeatability (±20) | ±0,05 μm |
| Measuring region | 3 x 25 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 800 scans/s |
| Scanning speed | 56m/s |
| Applicable laser standards | IEC |
| Main display | 16-digit fluorescent tube |
| Interface units equipped | RS-232C, Analog I/O, Footswitch |
| Power supply | 100 - 240VAC, 40 VA, 50/60Hz |

Optional accessories

| No. | Description |
|----------|-------------------------------|
| 02AGD180 | Calibration gauge set (ø1-25) |
| 02AGD270 | Workstage |
| 02AGD280 | Adjustable workstage |

*1 At the centre of the measuring region
*2 Potential measurement error due to variation in workpiece position

within the measuring region ΔD = Difference in diameter between the mastergauge and workpiece

LSM brochure on request

Laser Scan Micrometer Measuring Unit and Display **Unit Package**

Series 544

The LSM-902/6900 is a high accuracy, non-contact measuring system that uses a high speed scanning laser beam to accurately measure workpieces. It is ideal for measuring items that are difficult or impossible to measure with conventional instruments, such as elastic parts or soft parts that might deform under pressure.

The LSM-902/6900 offers you the following benefits:

- Suitable for pin and plug gauge measurements.
- It has a wide measuring range of 0.1 mm to 25 mm.
- Provides ultra-high accuracy with a linearity of ±0.5 μm over the entire measuring range and \pm (0.3+0.1 Δ D) μ m in the narrow range.
- Ultra-high repeatability of ±0.05 μm.



LSM-6900 display unit



LSM-902 measuring unit

| Metric | | |
|----------|---------------|-------------------------|
| No. | Range [mm] | Resolution (selectable) |
| 544-495D | 0.1-25 | 0,01-10 µm |



LSM-6900 display unit



LSM-902 measuring unit

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Laser Scan Micrometer Measuring Unit

Series 544

LSM-500S

High Accuracy Non-contact Measuring System

- Measuring range starting from ø5 μm.
- Provides ultra-high accuracy with a linearity of ±0,3 µm over the entire measuring range (5 µm up to 2 mm).
- Ultra-high repeatability of ±0,03 μm.
- High scanning rate of 3200 scans/s



LSM-500S



| Metric | | |
|---------|------------|----------------------------|
| No. | Range | Resolution (selectable) |
| 544-532 | 0,005-2 mm | 0,00001-0,01 mm |

Series 544

LSM-501S

High Accuracy Non-contact measuring system

- Provides ultra-high accuracy with a linearity of ±0,5 μm over the entire measuring range (0,05 mm to 10 mm) and \pm (0,3+0,1 Δ D) μ m in the narrow range.
- Ultra-High repeatability of ±0,04 µm.
- High scanning rate of 3200 scans/s



Resolution

(selectable)

| 1.5 | | 2 | 2 6 | 10.5 | | - 1 |
|---------|-------|----------------|--------|------|-----|-----|
| | | -1 | 1 | | 4 5 | 59 |
| 4 | 0 8xM | A3/ 150 230 | 40 | 15.5 | | |
| 70 min. | 123 | 68 (10 | 0 max) | 39 | | |
| Ē | | 8 -4 | - 8 | | - | 40 |
| E | | - <u>p</u> | | 57.5 | 104 | |
| | 15 | 7 | 73 | 02 | 1 | |



Specifications

| Linearity at 20°C *1 | ±0,3 μm |
|----------------------------|-----------------|
| Positional error *2 | ±0,4 μm |
| Repeatability (±2ơ) | ±0,03 μm |
| Measuring region | 1 x 2 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 3200 scans/s |
| Scanning speed | 76m/s |
| Applicable laser standards | IFC. FDA |

Optional accessories

| No. | Description |
|-----------|--------------------------------|
| 02AGD110 | Calibration gauge set (ø0,1-2) |
| 02AGD200 | Wire guiding pulley |
| 02AGD220 | Air shield |
| 957608 | Air cleaner for air shield |
| 02AGN780A | Extension signal cable 5 m |
| 02AGN780B | Extension signal cable 10 m |
| 02AGN780C | Extension signal cable 15 m |



Specifications

| inearity | at | 20°C | *1 |
|----------|----|------|----|
| | | | |

| Entire range : ± 0,5 µm Narrow range : ±(0,3+0,1∆D) µm |
|---|
| ±0,5 μm |
| ±0,04 μm |
| 2 x 10 mm (ø0,05-0,1 mm) 4 x 10 mm (ø0,1-10 mm) |
| 650 nm, Visible |
| 3200 scans/s |
| 113 m/s |
| IEC, FDA |
| |

Optional accessories

| No. | Description |
|------------------|--|
| 02AGD120 | Calibration gauge set (ø0,1-10) |
| 02AGD210 | Wire guiding pulley |
| 02AGD400 | Adjustable workstage |
| 02AGD440 | Centre support |
| 02AGD450 | Adjustable V-block |
| 02AGD230 | Air shield |
| 957608 | Air cleaner for air shield |
| 02AGC150A | Extension relay cable 1 m |
| 02AGN780A | Extension signal cable 5 m |
| 02AGN780B | Extension signal cable 10 m |
| 02AGN780C | Extension signal cable 15 m |
| 02AGD440 and 02A | GD450 : use with an adjustable workstage |

*1 At the centre of the measuring region

*2 Potential measurement error due to variation in workpiece position within the measuring region

 ΔD = Difference in diameter between the mastergauge and workpiece





Range

[mm]

Range

544-534 0.05-10 0,05-10 mm 0,00001-0,01 mm

No.

Specifications

| Linearity at 20°C *1 | Entire range : ±1,0 µm Narrow range : ±(0,6+0,1∆D) µm | | |
|----------------------------|--|--|--|
| Positional error *2 | ±1,5 μm | | |
| Repeatability (±2ơ) | ±0,11 μm | | |
| Measuring region | 10 x 30 mm | | |
| Laser wavelength | 650 nm, Visible | | |
| Scanning rate | 3200 scans/s | | |
| Scanning speed | 226 m/s | | |
| Applicable laser standards | IEC, FDA | | |
| | | | |

Optional accessories

| No. | Description | |
|--|-------------------------------|--|
| 02AGD130 | Calibration gauge set (ø1-30) | |
| 02AGD490 | Adjustable workstage | |
| 02AGD440 | Centre support | |
| 02AGD450 | Adjustable V-block | |
| 02AGD240 | Air shield | |
| 957608 | Air cleaner for air shield | |
| 02AGC150A | Extension relay cable 1 m | |
| 02AGC150B | Extension relay cable 3 m | |
| 02AGC150C | Extension relay cable 5 m | |
| 02AGN780A | Extension signal cable 5 m | |
| 02AGN780B | Extension signal cable 10 m | |
| 02AGN780C | Extension signal cable 15 m | |
| 02AGN780D | Extension signal cable 20 m | |
| 02AGD440 and 02AGD450 : use with an adjustable workstage | | |

Specifications

| Linearity at 20°C *1 | Entire Range : ±3 µm Narrow range : ±(1,5+0,5∆D) µm |
|----------------------------|--|
| Positional error *2 | ±4 μm |
| Repeatability (±2o) | ±0,36 μm |
| Measuring region | 20 x 60 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 3200 scans/s |
| Scanning speed | 452 m/s |
| Applicable laser standards | IEC, FDA |
| | |

Optional accessories

| No. | Description |
|-----------|-------------------------------|
| 02AGD140 | Calibration gauge set (ø1-60) |
| 02AGD520 | Adjustable workstage |
| 02AGD580 | Centre support |
| 02AGD590 | Adjustable V-block |
| 02AGD250 | Air shield |
| 957608 | Air cleaner for air shield |
| 02AGC150A | Extension relay cable 1 m |
| 02AGC150B | Extension relay cable 3 m |
| 02AGC150C | Extension relay cable 5 m |
| 02AGN780A | Extension signal cable 5 m |
| 02AGN780B | Extension signal cable 10 m |
| 02AGN780C | Extension signal cable 15 m |
| 02AGN780D | Extension signal cable 20 m |

02AGD580 and 02AGD590 : use with an adjustable workstage

*1 At the centre of the measuring region

*2 Potential measurement error due to variation in workpiece position within the measuring region

 ΔD = Difference in diameter between the mastergauge and workpiece

Laser Scan Micrometer Measuring Unit

Series 544

LSM-503S

High Accuracy Non-contact measuring system

- General-purpose type with a measuring range of 0,3 mm to 30 mm.
- Provides high accuracy with a linearity of ±1,0 µm over the entire measuring range and $\pm(0,6+0,1\Delta D)$ µm in the narrow range.
- Excellent repeatability of ±0,1 μm.
- High scanning rate of 3200 scans/s.





| Metric | | |
|---------|-----------|----------------------------|
| No. | Range | Resolution (selectable) |
| 544-536 | 0,3-30 mm | 0,00002-0,1 mm |

Series 544

LSM-506S

High Accuracy Non-contact Measuring System

- General-purpose type with a measuring range of 1 mm to 60 mm.
- Provides high accuracy with a linearity of ±3 µm over the entire measuring range and $\pm(1,5+0,5\Delta D)$ µm in the narrow range.

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- Excellent repeatability of ±0,36 μm.
- High scanning rate of 3200 scans/s.





Metric Resolution Range No. (selectable) 544-538 1-60 mm 0,00005-0,1 mm



LSM brochure on request

The prices listed are suggested retail prices (valid until 31st May 2014). All products to be sold to commercial customers. Therefore VAT is no included. Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon.







Laser Scan Micrometer Measuring Unit

Series 544

LSM-512S

High Accuracy Non-contact measuring system

- General-purpose type with a wide measuring range of 1 mm to 120 mm.
- Provides high accuracy with a linearity of ±6 µm over the entire measuring range and \pm (4,0+0,5 Δ D) μ m in the narrow range.
- Excellent repeatability of ±0,8 μm.
- High scanning rate of 3200 scans/s



| Metric | | | |
|--------|---------|----------|----------------------------|
| | No. | Range | Resolution (selectable) |
| | 544-540 | 1-120 mm | 0,0001-0,1 mm |

Series 544

LSM-516S

High Accuracy Non-contact measuring system

- General-purpose type with a wide measureming range of 1 mm to 160 mm.
- Provides high accuracy with a linearity of ±7 μm over the entire measuring range and \pm (4,0+2 Δ D) μ m in the narrow range.
- Excellent repeatability of $\pm 1,4 \ \mu m$.
- High scanning rate of 3200 scans/s





| Metric | | |
|---------|----------|----------------------------|
| No. | Range | Resolution (selectable) |
| 544-542 | 1-160 mm | 0.0001-0.1 mm |



Specifications Linearity at 20°C *1

| | Narrow range : ±(4,0+0,5∆D) μm |
|----------------------------|-----------------------------------|
| Positional error *2 | ±8 μm |
| Repeatability (±2ơ) | ±0,8 μm |
| Measuring region | 30 x 120 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 3200 scans/s |
| Scanning speed | 904 m/s |
| Applicable laser standards | IEC, FDA |

Entire range :

±6 μm

Optional accessories

| No. | Description |
|-----------|---------------------------------|
| 02AGD150 | Calibration gauge set (ø20-120) |
| 02AGD260 | Air shield |
| 957608 | Air cleaner for air shield |
| 02AGC150A | Extension relay cable 1 m |
| 02AGC150B | Extension relay cable 3 m |
| 02AGC150C | Extension relay cable 5 m |
| 02AGN780A | Extension signal cable 5 m |
| 02AGN780B | Extension signal cable 10 m |
| 02AGN780C | Extension signal cable 15 m |
| 02AGN780D | Extension signal cable 20 m |



Specifications

| Linearity at 20°C *1 | Entire range : $\pm 7 \ \mu m$ Narrow range : $\pm (4,0+2\Delta D) \ \mu m$ |
|----------------------------|--|
| Positional error *2 | ±8 μm |
| Repeatability (±20) | ±1,4 μm |
| Measuring region | 40 x 160 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 3200 scans/s |
| Scanning speed | 1206 m/s |
| Applicable laser standards | IEC, FDA |
| | |

Optional accessories

| No. | Description |
|-----------|----------------------------------|
| 02AGM300 | Calibration gauge set (ø 20-160) |
| 02AGC150A | Extension relay cable 1 m |
| 02AGC150B | Extension relay cable 3 m |
| 02AGC150C | Extension relay cable 5 m |
| 02AGN780A | Extension signal cable 5 m |
| 02AGN780B | Extension signal cable 10 m |
| 02AGN780C | Extension signal cable 15 m |
| 02AGN780D | Extension signal cable 20 m |
| | |

*1 At the centre of the measuring region
*2 Potential measurement error due to variation in workpiece position within the measuring region AD = Difference in diameter between the mastergauge and workpiece

LSM brochure on request

| Functions | Series 544 |
|--------------------------------|------------|
| GO/±NG judgement | 0 |
| OFFSET | 0 |
| Multi-limit judgement | 0 |
| Sample Measurement | 0 |
| Statistical calculation | 0 |
| Data output | 0 |
| Zero set | 0 |
| PRESET | 0 |
| Group judgement | 0 |
| Workpiece position display | 0 |
| Dual-gauge calibration | 0 |
| Transparent object measurement | 0 |
| Automatic measurement | 0 |
| Abnormal data elimination | |

Specifications

| Linearity at 20°C *1 | ±2,5 μm |
|-------------------------------|------------------------------------|
| Positional error *2 | ±2,5 μm |
| Repeatability (±2ơ) | ±0,6 μm |
| Measuring region | 10 x 60 mm |
| Laser wavelength | 650 nm, Visible |
| Scanning rate | 1600 scans/s |
| Scanning speed | 226 m/s |
| Applicable laser standards | IEC |
| Main display | 16-digit fluorescent tube |
| Interface units equipped | RS-232C, Digimatic, Foot Switch |
| Power supply | 100-240VAC, 40VA, 50/60Hz |

Laser Scan Micrometer

Series 544

The LSM-9506 is a bench-top, non-contact measuring system that uses a high speed scanning laser beam to accurately measure workpieces. It is ideal for measuring items that are difficult or impossible to measure with conventional instruments, such as elastic parts or soft parts that might deform under pressure.

The LSM-9506 offers you the following benefits:

- Its measurement system has an integrated display, allowing easy bench-top inspection.
- A statistical calculation function is also provided.
- Includes standard RS-232C serial port and data output interface.



LSM-9506

| Metric | | |
|----------|---------------|----------------------------|
| No. | Range [mm] | Resolution (selectable) |
| 544-115D | 0.5-60 | 0.00005-0.1 mm |





Refer to the LSM brochure

*1 At the centre of the measuring region *2 Potential measurement error due to variation in workpiece position within the measuring region



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Mitutoy

Laser Scan Micrometer Display Unit

Series 544

The LSM-5200 Display Unit is a versatile display unit dedicated to Laser Scan Micrometers. This dual-display design allows setup values to be continuously monitored with. You can also get simultaneous readout of two measurement values, and segment measurement

and edge measurement are both supported. Statistical calculation and abnormal-data elimination functions are provided as well.

The LSM-5200 Display Unit offers you the following benefits:

- Panel-mount type (with dimensions conforming to DIN 43700) making system integration easy.
- Capable of calculating mean, maximum, and range (maximum to minimum).
- You can select either segment measurement (7 segments max) or edge measurement (1 to 255 edges).
- USB, RS-232C, I/O and analogoue interfaces are provided as standard.
- The arithmetical average or moving average can also be selected.
- GO/±NG judgement function.



| No. |
|---------|
| 544-047 |

| Functions | Series 544 |
|--------------------------------|------------|
| ZERO/ABS | 0 |
| GO/±NG judgement | 0 |
| OFFSET | 0 |
| Sample Measurement | 0 |
| Statistical calculation | 0 |
| Data output | 0 |
| PRESET | 0 |
| Workpiece position display | 0 |
| Dual-gauge calibration | 0 |
| Transparent object measurement | e |
| Automatic measurement | 0 |
| Abnormal data elimination | 0 |

Specifications

| • | |
|-----------------------------|---|
| Main display | 9-digit LED |
| Interface units equipped | USB2.0, RS-232C, Analog I/O, Foot Switch |
| Power supply | +24VDC ±10%, 1A |
| | |

Specifications Operating

Environment

Other

Functions

- Connection interface: USB2.0
 - PC : MS-DOS®/V(IBM®) compatible machine
 - CPU : 2GHz or more (recommended)
 - OS/software : Windows® XP, Microsoft® Excel® 2000 or higher
- Memory : 256MB or more (recommended)
 Applicable display unit : LSM-5200
 - Rich choice of functions (e.g. counter, graphs, calculation results)

Laser Scan Micrometer Display Unit

Series 544

LSMPAK is Laser Scan Micrometer data software that enables and administers multi- point measurements.

LSMPAK offers you the following benefits:

- You can use it to import measurement data from multiple LSM-5200 Display Units to a personal computer, allowing a variety of measuring systems to be constructed.
- Capable of processing measurement-point data of max 10 channels (USB-HUB connection).
- Capable of composite calculation between measuring units (multiple channels), and it outputs statistical calculation and calculation results as a file.





System Diagram (Example of concurrent multi-point measurement of printer rollers)

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No. 02AGP690A

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Laser Scan Micrometer Display Unit

Series 544

The LSM-6200 Display Unit is a versatile display unit dedicated to Laser Scan Micrometers. This dualdisplay design allows setup values to be continuously monitored with. You can also get simultaneous readout of two measurement values, and segment measurement and edge measurement are both supported. Statistical calculation and abnormal-data elimination functions are provided as well.

The LSM-5200 Display Unit offers you the following benefits:

- With this dual-display design, you can continuously monitor setup values, and also simultaneously display two measurement values.
- You can select either the segment measurement (7 segments max) or edge measurement (1 to 255 edges).
- Includes RS-232C and I/O and analogue interface capabilities.
- Includes statistical calculation and abnormal data eliminating functions.



LSM-6200 display unit







02agp150 - Dual-type add-on unit

| Functions | Series 544 |
|----------------------------------|------------|
| GO/±NG judgement | 0 |
| OFFSET | 0 |
| Multi-limit judgement | 0 |
| Sample Measurement | 0 |
| Statistical calculation | 0 |
| Data output | 0 |
| Zero set | 0 |
| PRESET | 0 |
| Group judgement | 0 |
| Workpiece position display | 0 |
| Dual-gauge calibration | 0 |
| Transparent object measurement | 0 |
| Automatic measurement | 0 |
| Dual-unit measurement (optional) | 0 |
| Abnormal data elimination | 0 |
| | |

Specifications

A S N

e

P

| Applicable laser tandards | IEC, FDA (544-534), JIS (544-533) |
|------------------------------|-----------------------------------|
| /lain display | 16-digit fluorescent tube |
| nterface units quipped | RS-232C, Analog I/O, Foot Switch |
| ower supply | 100-240V AC, 40 VA, 50/60Hz |



Mitutoyo

Laser Scan Micrometer Optional Accessories



Series 544 - Accessories

| | No. | Application | L | Description |
|-----|----------|-------------------|-----|------------------------------------|
| | 02AGD110 | LSM-500S | | Calibration gauge set (ø0,1-2 mm) |
| | 02AGD120 | LSM-501S | | Calibration gauge set (ø0,1-10 mm) |
| | 02AGD130 | LSM-503S | 175 | Calibration gauge set (ø1-30 mm) |
| | 02AGD140 | LSM-506S | 175 | Calibration gauge set (ø1-60 mm) |
| | 02AGD150 | LSM-512S | 175 | Calibration gauge set (ø20-120 mm) |
| | 02AGD170 | LSM-9506 | | Calibration gauge set (ø1-60 mm) |
| | 02AGD180 | LSM-902 | 175 | Calibration gauge set (ø1-25 mm) |
| | 02AGM300 | LSM-516S | 175 | Calibration gage set (ø 20-160 mm) |
| | 02AGD200 | LSM-500S | 175 | Wire guiding pulley |
| | 02AGD210 | LSM-5015 | 175 | Wire guiding pulley |
| | 02AGD220 | LSM-500S | 175 | Air shield |
| | 02AGD230 | LSM-501S | 175 | Air shield |
| | 02AGD240 | LSM-503S | 175 | Air shield |
| | 02AGD250 | LSM-506S | 175 | Air shield |
| | 02AGD260 | LSM-512S | 175 | Air shield |
| | 957608 | All LSM models | 175 | Air cleaner for air shield |
| *** | 02AGD270 | LSM-501S/503S/902 | 175 | Workstage |
| | 02AGD280 | LSM-902 | 175 | Adjustable workstage |
| | 02AGD370 | LSM-9506 | 175 | Adjustable workstage |
| | 02AGD400 | LSM-501S | 175 | Adjustable workstage |
| | 02AGD490 | LSM-503S | 175 | Adjustable workstage |
| | 02AGD520 | LSM-506S | 175 | Adjustable workstage |
| | 02AGD680 | LSM-9506 | 175 | Adjustable workstage |
| | 02AGD440 | LSM-501S/503S/902 | 175 | Centre support |
| | 02AGD580 | LSM-506S/9506 | 175 | Centre support |
| | 02AGD450 | LSM-501S/503S/902 | 175 | Adjustable V-block |
| | 02AGD590 | LSM-506S/9506 | 175 | Adjustable V-block |
| | 937179T. | | | Footswitch |

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Laser Scan Micrometer Optional Accessories

Series 544 - Accessories

| No. | Application | Description |
|-----------|---|--|
| 02AGC840 | LSM-6200/6900 | Digimatic (SPC) code-out unit |
| 02AGC880 | LSM-6200/6900 | 2nd I/O & analog interface |
| 02AGC910 | LSM-6200/6900 | BCD interface unit |
| 02AGC150A | All LSM models (1) | Extension relay cable 1 m |
| 02AGC150B | All LSM models (1) | Extension relay cable 3 m |
| 02AGC150C | All LSM models (1) | Extension relay cable 5 m |
| 02AGC330A | All LSM models (1) | Output signal cable 5 m |
| 02AGC330B | All LSM models ⁽¹⁾ | Output signal cable 10 m |
| 02AGN780A | All LSM models (2) | Extension signal cable 5 m |
| 02AGN780B | All LSM models (2) | Extension signal cable 10 m |
| 02AGN780C | All LSM models (2) | Extension signal cable 15 m |
| 02AGN780D | All LSM models (2) | Extension signal cable 20 m |
| 02AGN780E | All LSM models (2) | Extension signal cable 30 m |
| 02AGP150 | LSM-6200 | Dual-type add-on unit |
| | No. 02AGC840 02AGC880 02AGC910 02AGC150A 02AGC150B 02AGC150C 02AGC330A 02AGC330B 02AGC330B 02AGN780A 02AGN780A 02AGN780B 02AGN780C 02AGN780E 02AGN780E 02AGP150 | No.Application02AGC840LSM-6200/690002AGC880LSM-6200/690002AGC910LSM-6200/690002AGC150AAll LSM models (1)02AGC150BAll LSM models (1)02AGC150CAll LSM models (1)02AGC330AAll LSM models (1)02AGC330BAll LSM models (1)02AGC330BAll LSM models (2)02AGN780AAll LSM models (2)02AGN780CAll LSM models (2)02AGN780EAll LSM models (2)02AGN780EAll LSM models (2)02AGN780EAll LSM models (2)02AGP150LSM-6200 |

⁽¹⁾ Except for LSM-500S/902 ⁽²⁾ Except for LSM-902



Quick Guide to Precision Measuring Instruments



Laser Scan Micrometers

Compatibility

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

The workpiece and measuring conditions

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

Electrical interference

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

Connection to a computer

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

Laser safety

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

Re-assembly after removal from the base

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

Alignment within the horizontal plane

a. Parallel deviation between reference lines C and D:



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



Alignment within the vertical plane

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



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



Allowable limits of optical axis misalignment

| Model | Distance between Emission Unit and Reception Unit | X and Y | θx and θy |
|------------|---|----------------------------|-------------------------------|
| I SM 501S | 68mm (2.68") or less | within 0.5mm (.02") | within 0.4 ° (7mrad) |
| L3IVI-3013 | 100mm (3.94") or less | within 0.5mm (.02") | within 0.3° (5.2mrad) |
| | 130mm (5.12") or less | within 1mm (.04") | within 0.4° (7mrad) |
| LSIVI-5035 | 350mm (13.78") or less | within 1mm (.04") | within 0.16° (2.8mrad) |
| ISM FORS | 273mm (10.75") or less | within 1mm (.04") | within 0.2° (3.5mrad) |
| L3IVI-5005 | 700mm (27.56") or less | within 1mm (.04") | within 0.08° (1.4mrad) |
| | 321mm (12.64") or less | within 1mm (.04") | within 0.18° (3.6mrad) |
| LSIVI-STZS | 700mm (27.56") or less | within 1mm (.04") | within 0.08° (1.4mrad) |
| LSM-516S | 800mm (31.50") or less | within 1mm (.04") | within 0.09° (1.6mrad) |





Measurement Examples

On-line measurement of glass fiber or fine wire diameter



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



Measurement of film sheet thickness



Measurement of tape width



Measurement of outer diameter of cylinder



Measurement of thickness of film and sheet



Measurement of laser disk and magnetic disk head movement



Measurement of outer diameter of optical connector and ferrule



Measurement of outer diameter and roundness of cylinder



Measurement of spacing of IC chip leads



Measurement of gap between rollers



Measurement of form



Dual system for measuring a large outside diameter



Mitutoyo