## Laser Scan Micrometer Selection Guide

### MEASURING UNITS

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Laser Classification</th>
<th>Measuring Range</th>
<th>Resolution (Selectable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LSM-902*</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>0.1 - 25mm (.004&quot; - 1.0&quot;)</td>
<td>0.01μm - 10μm (.00001&quot; - .0005&quot;)</td>
</tr>
<tr>
<td></td>
<td>LSM-500S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>0.005 - 2mm (.0002&quot; - .08&quot;)</td>
<td>0.01μm - 10μm (.00001&quot; - .0005&quot;)</td>
</tr>
<tr>
<td></td>
<td>LSM-501S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>0.05 - 10mm (.002&quot; - .4&quot;)</td>
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</tr>
<tr>
<td></td>
<td>LSM-503S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>0.3 - 30mm (.012&quot; - 1.18&quot;)</td>
<td>0.02μm - 100μm (.000002&quot; - .005&quot;)</td>
</tr>
<tr>
<td></td>
<td>LSM-506S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>1 - 60mm (.04&quot; - 2.36&quot;)</td>
<td>0.05μm - 100μm (.000002&quot; - .005&quot;)</td>
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<tr>
<td></td>
<td>LSM-512S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>1 - 120mm (.04&quot; - 4.72&quot;)</td>
<td>0.1μm - 100μm (.000005&quot; - .005&quot;)</td>
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<tr>
<td></td>
<td>LSM-516S</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>1 - 160mm (.04&quot; - 6.30&quot;)</td>
<td>0.1μm - 100μm (.000005&quot; - .005&quot;)</td>
</tr>
<tr>
<td></td>
<td>LSM-9506*</td>
<td>Visible (650nm), IEC Class 2/ FDA Class II</td>
<td>0.5 - 60mm (.02&quot; - 2.36&quot;)</td>
<td>0.05μm - 100μm (.000002&quot; - .005&quot;)</td>
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*LSM-902 and LSM-6900 are factory-set package.
**When connecting with the LSM-500S series, the scanning speed becomes 1600 scans/sec.
***USB connectivity for use with Quicktool and LSM Pak.

**With display unit**

### DISPLAY UNITS

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Type</th>
<th>Application</th>
<th>Interface Units Equipped</th>
</tr>
</thead>
</table>
|            | LSM-6200 | Multi-function type | Bench-top use | • RS-232C  
• I/O  
• Analog output |
|            | LSM-6900* | Compact type (Low cost) | Assembly/ bench-top use (DIN size) | • RS-232C  
• I/O  
• Analog output  
• USB*** |

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**Laser Scan Micrometer Selection Guide**

**MEASURING UNITS**

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*LSM-902 and LSM-6900 are factory-set package.
**When connecting with the LSM-500S series, the scanning speed becomes 1600 scans/sec.
***USB connectivity for use with Quicktool and LSM Pak.**
### Measurement Examples

- **In-line measurement of glass fiber or fine wire diameter**
- **Measurement of outer diameter of cylinder**
- **Measurement of outer diameter and roundness of cylinder**

- **X- and Y-axis measurement of electric cables and fibers**
- **Measurement of thickness of film and sheet**
- **Measurement of spacing of IC chip leads**

- **Measurement of film sheet thickness**
- **Measurement of laser disk and magnetic disk head movement**
- **Measurement of gap between rollers**

- **Measurement of tape width**
- **Measurement of outer diameter of optical connector and ferrule**
- **Measurement of form**

- **Dual system for measuring a large outside diameter**
Laser Scan Micrometer LSM-902/6900
SERIES 544 — Ultra-high Accuracy Non-contact Measuring System

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

### Optional Accessories
(Refer to page G-44 for details.)
- Calibration gage set (ø1.0, ø25.0)
- Workstage
- Adjustable workstage
- Digimatic code output unit (2-ch)
- 2nd VO analog interface unit
- BCD interface unit
- Printer & cable set (120V AC C-type plug)
- Printing paper TP411-28CL / 1Pack = 10pcs
- Digimatic code output cables
- Foot switch

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Set Order No.</th>
<th>544-496A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring unit</td>
<td>inch/mm</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.1 to 25mm (0.004 - 1.0&quot;)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 to 10μm (selectable) (0.0001 to 0.0005&quot;)</td>
</tr>
<tr>
<td>Repeatability*1</td>
<td>(±0.05μm (±0.00002&quot;))</td>
</tr>
<tr>
<td>Accuracy*2 (20°C)</td>
<td>Whole range</td>
</tr>
<tr>
<td></td>
<td>Small range</td>
</tr>
<tr>
<td></td>
<td>(±0.00012 (D:mm))</td>
</tr>
<tr>
<td>Positional error*3</td>
<td>(±0.5μm (±0.00002&quot;))</td>
</tr>
<tr>
<td>Measuring area*4</td>
<td>(±1.3×25mm (±0.6×1.0&quot;))</td>
</tr>
<tr>
<td>Scanning rate</td>
<td>800 scans/s</td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm (Visible)</td>
</tr>
<tr>
<td>Laser scanning speed</td>
<td>56m/s (2240&quot;/sec)</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
</tr>
</tbody>
</table>

\*1: Determined by the value of \(±2σ\) (σ: standard deviation) when measuring ø25mm at the interval of 1.28 sec. (average 1024 times).

\*2: At the center of the measuring range.

\*3: An error due to variation in workpiece position either in the optical axis direction or in the scanning direction.

\*4: The area given by [optical axis direction]×[scanning direction] × \(ΔD=\)Difference in diameter between the master gage and workpiece (Unit: mm)

### Display unit
- Display: 16-digit plus 11-digit fluorescent display, and guide message LED
- Segment: 1 to 7 (1 to 3, transparent) or 1 to 255 edges
- Averaging times: Arithmetical average: per 1 to 2048 Moving average: per 32 to 2048
- Judgment: Selection from target value + tolerance, lower tolerance + upper tolerance, or 7 classes multi-limit tolerance zone.
- Measurement mode: Standby, Single measurement, Continuous measurement
- Statistical analysis: Maximum, Minimum, Average, Dispersion, σ(S.D)
- External dimensions: 335 (W)×134 (H)×250 (D)mm
- Power supply: 120 V AC ±10%, 50W, 60Hz
- Standard I/F: RS-232C, Analog I/O
- Optional I/F: Digimatic code output unit (2-ch), 2nd I/O analog I/F, BCD I/F
- Operating environment: 0 to 40°C, RH 35 to 85% (no condensation)

### Others
- Nominal setting, sample setting, selection of unnecessary digits, transparent object measurement, automatic measurement in edge mode, output timer, abnormal data elimination,舍入 group judgment, simultaneous measurement, statistical processing, master, buzzer function, automatic workpiece detection (dimension/position), zero-set/offset
- Measuring unit dual connection, extra-fine line measurement, and some of the communication commands are not available.

### Laser safety
Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN IEC60825-1 (2007) device. Warning and explanation labels, as shown below, are attached to the Laser Scan Micrometers as is appropriate.
Optional Accessories
• Multifunctional display unit, LSM-6200*
  Order No. Display type Remarks
  544-072A English mm/inch English user’s manual
* Included in packages
• Easy-to-operate display unit, LSM-5200
  Order No. Remarks
  544-047* English user’s manual
* AC adapter not included
• Calibration gage set (ø0.1, ø2.0)
• Guide pulley: No.02AGD110
• Air blower: No.02AGD200
• Extension signal cables: No.02AGD220

Cable space measuring area (Measuring position) M3, depth 6 (×4) ø3.1, depth 6
55 126 181
2 1
34
32
11
11
40
70mm
130
103
46
32
MEASURING AREA

Laser Scan Micrometer LSM-500S
SERIES 544 — High Accuracy Non-contact Measuring System

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

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

SPECIFICATIONS
Order No. (Laser only)  544-532
Package No. (with LSM-6200 Display)  64PKA117
Applicable laser standards IEC, FDA
User’s manual English version
Measuring range 0.002" to 0.080" (0.005 to 2mm)*1
Resolution 0.000001" to 0.0005" (0.01 to 10μm) (selectable)
Repeatability*2 ±0.03μm
Accuracy (20°C)*3 ±0.3μm
Positional error*4 ±0.4μm
Measuring area*5 1x2mm (0.005 to 2mm)
Scanning rate 3200 scans/sec
Laser wavelength 650nm (Visible)
Laser scanning speed 76m/sec
Operating environment Temperature 0 to 40°C
Humidity RH 35 to 85% (no condensation)
Protection Level IP64*6

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

DIMENSIONS

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

Warning: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION: Laser radiation visible - avoid direct eye exposure.
Laser Scan Micrometer LSM-501S
SERIES 544 — High-accuracy Non-contact Measuring System

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

SPECIFICATIONS

Order No. (Laser only)  |  544-534
Package No. (Laser w/LSM 6200 display)  |  64PKA118
Applicable laser standards  |  IEC, FDA
User's manual  |  English version
Measuring range  |  0.02” to 4” (0.05 to 10mm)
Resolution  |  0.000001” to 0.0005” (0.01 to 10μm) (selectable)
Repeatability**  |  ±0.5μm
Accuracy** (20°C) |  Whole range ±0.5μm
|  Small range ±(0.3+0.1ΔD)μm**
Positional error**  |  ±0.5μm
Measuring area**  |  2×10mm (φ0.05 to φ0.1mm) 4×10mm (φ0.1 to φ10mm)
Scanning rate  |  3200 scans/s
Laser wavelength  |  650nm (Visible)
Laser scanning speed  |  113m/s
Operating environment  |  Temperature 0 to 40°C
|  Humidity RH 35 to 85% (no condensation)
Protection Level  |  IP64**

*1: Determined by the value of ±2σ (σ: standard deviation) when measuring φ10mm at the interval of 0.32 sec. (average 1024 times).
*2: Center of the measuring range for cylindrical workpieces outside diameter.
*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)
*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.
*5: The area given by [optical axis direction]×[scanning direction].
*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS
Unit: mm

Optional Accessories

- Multifunctional display unit, LSM-6200*.

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<tr>
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<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>544-072A</td>
<td>English mm/\ inch English user's manual</td>
<td></td>
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</tbody>
</table>

* Included in packages

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

<table>
<thead>
<tr>
<th>Order No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>544-042*</td>
<td>English user's manual</td>
</tr>
</tbody>
</table>

* AC adapter not included

- Calibration gage set (φ0.1, φ10.0)

| No.02AGD120 |

- Wire guiding pulley

| No.02AGD210 |

- Adjustable workstage

| No.02AGD400 |

- Air blower

| No.02AGD230 |

- Workstage

| No.02AGD270 |

- Extension signal cables

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Cable length</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGN780A</td>
<td>5m</td>
</tr>
<tr>
<td>02AGN780B</td>
<td>10m</td>
</tr>
<tr>
<td>02AGN780C</td>
<td>15m</td>
</tr>
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- Extension relay cables

<table>
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<tr>
<td>02AGC150A</td>
<td>1m</td>
</tr>
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QUICKTOOL

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

Laser safety

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

- **Multifunctional display unit, LSM-6200***
- **Easy-to-operate display unit, LSM-5200**
- **Calibration gage set (Ø0.1, Ø30.0)**
  - No.02AGD130
- **Adjustable workstage**
  - No.02AGD490
- **Air blower**
  - No.02AGD240
- **Workstage**
  - No.02AGD270
- **Extension signal cables**
  - Ø3.1
  - 8-M3
  - 80
  - 5.5
  - 105
  - 250
  - 54.5
  - 84.5
  - 42
  - 70
  - 170
  - 55
  - 80
  - 50
  - 8
  - 8
  - 48
  - 259
  - 48
  - 202
  - 6
  - 110
  - 90
  - 20
  - 10
  - 30
  - 355
  - 46
  - 53
  - 68
  - 42
  - 95.5
  - 65.5
  - 130
  - 57
  - 41
  - 9
  - 9
  - 9
  - 14.5
  - 41
  - 57
  - 90
  - 12
  - 110
  - 90
  - 20
  - 10
  - 30
  - 355
  - 46
  - 53
  - 68
  - 42
  - 95.5
  - 65.5
  - 150
  - 20

### SPECIFICATIONS

- **Order No.** (Laser only) : 544-536
- **Package No.** (Laser with LSM-6200 display) : 64PKA119
- **Applicable laser standards** : IEC, FDA
- **Measuring range** : 0.012” to 1.18” (0.3 to 30mm)
- **Resolution** : .000001” to .005” (0.02 to 100μm) (selectable)
- **Repeatability** : ±0.11μm
- **Accuracy**:
  - Whole range : ±1.0μm
  - Small range : ±(0.6+0.1D)μm**3**
- **Positional error** : ±1.5μm
- **Measuring area** : 10×30mm (0.3 to 30mm)
- **Scanning rate** : 3200 scans/s
- **Laser wavelength** : 650nm (Visible)
- **Laser scanning speed** : 226m/s
- **Temperature** : 0 to 40°C
- **Humidity** : RH 35 to 85% (no condensation)
- **Protection Level** : IP64**6**

**1:** Determined by the value of ±2σ (σ: standard deviation) when measuring ø30mm at the interval of 0.32 sec. (average 1024 times).

**2:** Center of the measuring range for cylindrical workpieces outside diameter.

**3:** D = Difference in diameter between the master gage and workpiece (Unit: mm).

**4:** An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.

**5:** The area given by [optical axis direction] × [scanning direction].

**6:** The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

### Laser safety

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

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### Laser Scan Micrometer LSM-503S

#### SERIES 544 — High-accuracy Non-contact Measuring System

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

### QUICKTOOL

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

### Laser Scan Micrometer LSM-503S

**Dimensions**

(Unit: mm)

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**Laser safety**

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

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**Order No.** Remarks
544-047*  English user’s manual
544-072A  English mm/inch English user’s manual

* AC adapter not included

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

* Included in packages

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

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

---

**Order No.** Remarks
544-047*  English user’s manual
544-072A  English mm/inch English user’s manual

* AC adapter not included

---

**Order No.** (Laser only) Remarks
544-536

---

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

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**Dimension when disconnected (bottom view)**

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**Mass**

- Emission Unit: 1.1kg
- Reception Unit: 0.6kg
- Base: 0.5kg
- Signal cable (5m): 0.5kg

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*7: Extendable up to 270mm

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**Laser Scan Micrometer LSM-503S**

**SERIES 544 — High-accuracy Non-contact Measuring System**

- Ensures ±1.0μm accuracy over the entire measuring range (0.3 to 30mm).
- Narrow range accuracy of ±(0.6+0.1D)μm for high-precision measurement.
- Ultra-high speed measurement of 3200 scans/sec. Suitable for high-speed lines or in applications subject to vibration.
Laser Scan Micrometer LSM-506S
SERIES 544 — High-accuracy Non-contact Measuring System

• Ensures ±3μm accuracy over the entire measuring range (1 to 60mm).

• Narrow range accuracy of ±(1.5+0.5ΔD)μm for high precision measurement.

• Ultra-high speed measurement of 3200 scan/sec. Suitable for high-speed lines or in applications subject to vibration.

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

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<td>English mm/inch</td>
<td>English user’s manual</td>
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* Included in packages

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

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<thead>
<tr>
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<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>544-067*</td>
<td>English user’s manual</td>
</tr>
</tbody>
</table>

* AC adapter not included

• Calibration gage set (ø1.0, ø60.0):

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGD140</td>
<td>No.02AGD140</td>
</tr>
</tbody>
</table>

• Adjustable workstage:

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGD520</td>
<td>No.02AGD520</td>
</tr>
<tr>
<td>02AGD250</td>
<td>No.02AGD250</td>
</tr>
</tbody>
</table>

• Air blower:

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGD250</td>
<td>No.02AGD250</td>
</tr>
</tbody>
</table>

• Extension signal cables

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-M3</td>
<td>Extension relay cables</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Cable length</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGN780A</td>
<td>5m</td>
</tr>
<tr>
<td>02AGN780B</td>
<td>10m</td>
</tr>
<tr>
<td>02AGN780C</td>
<td>15m</td>
</tr>
<tr>
<td>02AGN780D</td>
<td>20m</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No. (Laser only)</th>
<th>544-538</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package No. (Laser w/ LSM 6200 display)</td>
<td>64PKA120</td>
</tr>
<tr>
<td>Applicable laser standards</td>
<td>IEC, FDA</td>
</tr>
<tr>
<td>User’s manual</td>
<td>English version</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.040” to 2.36” (1 to 60mm)</td>
</tr>
<tr>
<td>Resolution</td>
<td>±0.00002” to ±0.005” (0.05 to 100μm) (selectable)</td>
</tr>
<tr>
<td>Repeatability*1</td>
<td>±0.36μm</td>
</tr>
<tr>
<td>Accuracy*2</td>
<td>(20°C) Whole range ±3μm</td>
</tr>
<tr>
<td></td>
<td>Small range ±(1.5+0.5ΔD)μm*2</td>
</tr>
<tr>
<td>Positional error**</td>
<td>±4μm</td>
</tr>
<tr>
<td>Measuring area**</td>
<td>20×60mm (1 to 60mm)</td>
</tr>
<tr>
<td>Scanning rate</td>
<td>3200 scans/s</td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm (Visible)</td>
</tr>
<tr>
<td>Laser scanning speed</td>
<td>452m/s</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature: 0 to 40°C</td>
</tr>
<tr>
<td></td>
<td>Humidity: RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Protection Level</td>
<td>IP64**</td>
</tr>
</tbody>
</table>

*1: Determined by the value of ±(2σ: standard deviation) when measuring ø60mm at the interval of 0.32 sec. (average 1024 times).

*2: Center of the measuring range for cylindrical workpieces outside diameter.

*3: ΔD=Difference in diameter between the master gage and workpiece (Unit: mm)

*4: An error of the outside diameter due to variation in workpiece position either in the optical axis direction or in the scanning direction.

*5: Largest area given by [optical axis direction]×[scanning direction].

*6: The protection level provided for the interior. If the workpiece or glass of the measuring unit window is soiled by water or dust, the unit may malfunction.

DIMENSIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>02AGN780A</td>
<td>5m</td>
</tr>
<tr>
<td>02AGN780B</td>
<td>10m</td>
</tr>
<tr>
<td>02AGN780C</td>
<td>15m</td>
</tr>
<tr>
<td>02AGN780D</td>
<td>20m</td>
</tr>
</tbody>
</table>

QUICKTOOL

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

Laser safety

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

- Multifunctional display unit, LSM-6200*
  - Order No.: 544-027A
  - Display type: English mm/ind
  - Remarks: English user’s manual
  * Included in packages

- Easy-to-operate display unit, LSM-5200
  - Order No.: 544-047*
  - Remarks: English user’s manual
  * AC adapter not included

- Calibration gage set (ø20.0, ø120.0)
  - No.02AGD150

- Air blower
  - No.02AGD260

- Extension signal cables
  - ø3.1, depth 6
  - (Reference hole) ø3.1, depth 6

**DIMENSIONS**

**Laser Scan Micrometer LSM-512S**

**SERIES 544 — High-accuracy Non-contact Measuring System**

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

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No. (Laser only)</th>
<th>544-540</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package No. (Laser w/ LSM 6200 display)</td>
<td>64PKA121</td>
</tr>
<tr>
<td>Applicable laser standards</td>
<td>IEC, FDA</td>
</tr>
<tr>
<td>User’s manual</td>
<td>English version</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.040&quot; to 4.72&quot; (1 to 120mm)</td>
</tr>
<tr>
<td>Resolution</td>
<td>.000005&quot; to .003&quot; (0.1 to 100μm) (selectable)</td>
</tr>
<tr>
<td>Repeatability**</td>
<td>±0.85μm</td>
</tr>
<tr>
<td>Accuracy** (20°C)</td>
<td>Whole range ±6μm</td>
</tr>
<tr>
<td>Positional error</td>
<td>±8μm</td>
</tr>
<tr>
<td>Measuring area**</td>
<td>30×120mm (1 to 120mm)</td>
</tr>
<tr>
<td>Scanning rate</td>
<td>3200 scans/s</td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm (Visible)</td>
</tr>
<tr>
<td>Laser scanning speed</td>
<td>904m/s</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature 0 to 40°C, Humidity RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP64**</td>
</tr>
</tbody>
</table>

**QUICKTOOL**

QUICKTOOL is a free downloadable software program that makes programming the LSM-6200 quick and easy.

Basic data acquisition is also possible. (Connecting cables to PC are optional)

**Laser safety**

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN IEC60825-1 (2007) device. Warning and explanation labels, as shown below, are attached to the Laser Scan Micrometers as is appropriate.
Laser Scan Micrometer LSM-516S
SERIES 544 — High-accuracy Non-contact Measuring System

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

**Optional Accessories**

- Multifunctional display unit, LSM-6200:
  - Order No. 544-072A
  - Display type: English mm/inch
  - Remarks: User’s manual

- Easy-to-operate display unit, LSM-5200:
  - Order No. 544-047*
  - Display type: English user’s manual
  - Remarks: Ac adapter not included

- Calibration gage set (ø20, ø160):
  - Order No. No.02AGM300

- Extension signal cables:
  - Order No. 02AGN780A/B/C/D
  - Cable length: 5m, 10m, 15m, 20m

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No. (Laser only)</th>
<th>544-542</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package No. (Laser w/ LSM 6200 display)</td>
<td>64PKA122</td>
</tr>
<tr>
<td>Applicable laser standards</td>
<td>IEC, FDA</td>
</tr>
<tr>
<td>User’s manual</td>
<td>English version</td>
</tr>
<tr>
<td>Measuring range</td>
<td>.040&quot; to 6.3&quot; (1 to 160mm)</td>
</tr>
<tr>
<td>Resolution</td>
<td>.000005&quot; to .005&quot; (0.1 to 100μm) (selectable)</td>
</tr>
<tr>
<td>Repeatability**</td>
<td>±1.4μm</td>
</tr>
<tr>
<td>Accuracy** (20°C)</td>
<td>±2μm</td>
</tr>
<tr>
<td>Whole range</td>
<td>±(4.0+2.0ΔD)μm**</td>
</tr>
<tr>
<td>Small range</td>
<td>±8μm</td>
</tr>
<tr>
<td>Positional error**</td>
<td>±8μm</td>
</tr>
<tr>
<td>Measuring area**</td>
<td>40×160mm (1 to 160mm)</td>
</tr>
<tr>
<td>Scanning rate</td>
<td>3200 scans/sec</td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm (Visible)</td>
</tr>
<tr>
<td>Laser scanning speed</td>
<td>1206m/s</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Temperature 0 to 40°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP64**</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

Unit: mm

QUICKTOOL

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

Laser safety

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

Note: Distance between emission unit and reception unit: 400mm to 800mm
Laser Scan Micrometer LSM-9506

SERIES 544 — Bench-top Type Non-contact Measuring System

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>544-116-1A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>inch/mm</td>
</tr>
<tr>
<td>Measuring range</td>
<td>.02&quot; - 2.36&quot; / 0.5 - 60mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>.000002&quot; / .000005 - .01mm</td>
</tr>
<tr>
<td>Repeatability*1</td>
<td>±0.6μm (±0.0003&quot;)</td>
</tr>
<tr>
<td>Accuracy*2 (20°C)</td>
<td>±2.5μm (±0.0001&quot;)</td>
</tr>
<tr>
<td>Positional error*3 (optical axis/scanning direction)</td>
<td>±2.5μm (±.0001&quot;)</td>
</tr>
<tr>
<td>Measuring area*4</td>
<td>±5x60mm (±.2x2.36&quot;)</td>
</tr>
<tr>
<td>Scanning rate</td>
<td>1600 scans/s</td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm (Visible)*5</td>
</tr>
<tr>
<td>Laser scanning speed</td>
<td>226m/s (8900&quot; / s)</td>
</tr>
<tr>
<td>Display unit</td>
<td>16-digit dot matrix (upper column) + 7 segment 11-digit (lower column), guidance LEDs</td>
</tr>
<tr>
<td>Standard interface</td>
<td>RS-232C, Digimatic code output unit (1ch)</td>
</tr>
<tr>
<td>Optional interface</td>
<td>No</td>
</tr>
<tr>
<td>Power supply</td>
<td>120 V AC ±10%, 40VA, 60Hz</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0 to 40°C, RH 35 to 85% (no condensation)</td>
</tr>
</tbody>
</table>

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

DIMENSIONS

Unit: mm

Laser safety

Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN IEC60825-1 (2007) device. Warning and explanation labels, as shown below, are attached to the Laser Scan Micrometers as is appropriate.
LSM-6200 Display Unit
SERIES 544 — Standard Display Unit for Laser Scan Micrometer

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>544-072A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>inch/mm</td>
</tr>
<tr>
<td>Display</td>
<td>16-digit plus 11-digit fluorescent display and guide message LED</td>
</tr>
<tr>
<td>Segment</td>
<td>1 to 7 (1 to 3, transparent) or 1 to 255 edges**</td>
</tr>
<tr>
<td>Averaging method</td>
<td>Arithmetic average: per 8 to 2048 Moving average: per 32 to 2048 (Arithmetic average is per 16 to 2048 when using 544-531, 544-532)</td>
</tr>
<tr>
<td>Measurement mode</td>
<td>Standby, Single measurement, Continuous measurement</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>Maximum, Minimum, Average, Dispersion, (S.D)</td>
</tr>
<tr>
<td>Size</td>
<td>335 (W)x134 (H)x250 (D)mm</td>
</tr>
<tr>
<td>Power supply</td>
<td>120 V AC ±10%, 40VA, 60Hz</td>
</tr>
<tr>
<td>Standard I/F</td>
<td>RS-232C, Analog I/O</td>
</tr>
<tr>
<td>Optional I/F</td>
<td>Digimatic code output unit (2-ch), 2nd I/O analog I/F, BCD I/F</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0 to +45°C, RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Others</td>
<td>Nominal setting, sample setting, selection of unnecessary digits, transparent object measurement**, measurement of odd fluted parts, automatic measurement in edge mode, output timer, abnormal data elimination, S/H change, group judgment, simultaneous measurement, statistical processing, mastering, buzzer function, automatic workpiece detection (dimension/position)**, zero-set/offset, dual measurement (optional)</td>
</tr>
</tbody>
</table>

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

DIMENSIONS

Unit: mm

Optional Accessory
12AAA807
Serial cable (RS-232C null)

QUICKTOOL
QUICKTOOL is a free downloadable software program that makes programming the LSM-6200 quick and easy.
Basic data acquisition is also possible.
(Connecting cables to PC are optional)
LSM-5200 Display Unit
SERIES 544 — Compact Display Unit for Real-time Multi-channel Measurement

- A compact controller which could be used for multi-unit system configurations.
- Capable of simple connection to a PC via USB.
- A panel-mount type display unit designed for the LSM-5 series.
- Analog I/O and RS-232C is standard.
- Measurement of odd fluted parts, and simultaneous measurement / 2-program function included.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>544-047</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>9 digits plus 8 digits LED, guide message LED</td>
</tr>
<tr>
<td>Segment</td>
<td>1 to 7 (1 to 3, transparent) or 1 to 255 edges*1</td>
</tr>
<tr>
<td>Averaging method</td>
<td>Arithmetic average: from 4 to 2048; Moving average: from 32 to 2048 (Arithmetic average is from 16 to 2048 when using LSM-500S.)</td>
</tr>
<tr>
<td>Judgment</td>
<td>Selecting from target value a tolerance value or lower limit/upper limit.</td>
</tr>
<tr>
<td>Measurement mode</td>
<td>Standby, Single measurement, Continuous measurement</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>Calculation result is output via USB or RS-232C.</td>
</tr>
<tr>
<td>External dimensions</td>
<td>144 (W)x72 (H)x197.1 (D)mm</td>
</tr>
<tr>
<td>Power supply*2</td>
<td>24V DC ±10%, 1.3A or more (AC adapters are optional)</td>
</tr>
<tr>
<td>Standard I/F</td>
<td>USB 2.0, RS-232C, I/O analog</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0 to 40°C, RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Preservation environments</td>
<td>−20 to 70°C, RH 35 to 85% (no condensation)</td>
</tr>
<tr>
<td>Others</td>
<td>Measurement of odd fluted parts, simultaneous measurement, nominal setting, sample setting, selection of unnecessary digits, transparent object measurement*2</td>
</tr>
<tr>
<td></td>
<td>Automatic workpiece detection (dimensions/position detected)*3, abnormal data elimination, mastering, statistical processing (when using USB, RS-232C), output timer, automatic measurement in edge mode, presetting note that every function is limited in its combination possibilities. See the user manual for details.</td>
</tr>
<tr>
<td>Mass</td>
<td>1.4 kg</td>
</tr>
</tbody>
</table>

*1: The measuring range will be 0.1mm to 2mm in the 1 to 255 edge measurement mode or when activating the automatic workpiece detection with 544-531, 544-532. Each function has its combination limit.

*2: The measuring range is 50μm to 2mm when using 544-531, 544-532. For smaller ranges, contact your local Mitutoyo sales office.

*3: DC24V external power supply (commercial item) is required separately.

Note 1: Cannot be connected to 544-456A.
Note 2: Previous models such as 544-451 cannot be connected.
Note 3: For USB communication with a PC, a dedicated device driver is required. For details, contact your local Mitutoyo sales office.

DIMENSIONS

Unit: mm

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

QUICKTOOL
QUICKTOOL is a free downloadable software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. (Connecting cables to PC are optional)
**Laser Scan Micrometer**

**SERIES 544 Optional Accessories**

**LSMPAK**
- Software can import measurement data from multiple LSM-5200 display units to a PC, allowing a variety of measuring systems to be constructed.
- Capable of processing a maximum of 10 channels of measurement data (USB-HUB connection).
- Capable of calculation between channels, statistical analysis, file output of calculation results.
- Various display functions such as counter display, graph display, and calculation result are included.
  * Refer to page G-42 for specifications of LSM-5200.

**Sample Screen**

**Measurement Examples**

Printer roll multi-point simultaneous measurement

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02NGA002 (English)</th>
</tr>
</thead>
</table>
| Applicable models | Display unit: 544-047 [Ver. 1.004A or later]  
Measuring unit: LSM 500S Series |
| Display function | Max. 12 windows (counter, meter, chart, overall judgment) |
| Setup function  | Presetting, data output, sample measurement, resolution select, judgment setting, measurement of odd number fluted parts, simultaneous measurement  
*Each function has its combination limit. |
| Measurement function | Single, continuous measurement, single automatic repetition |
| Calculation function | Arithmetic operation, maximum, minimum, range, average, total (any combination available) |
| Go/No-go judgment | 3-step (–NG, GO, +NG) |
| Interface       | USB2.0 (Hi-Speed communication recommended) |
| Maximum connection | 10 units |
| Operating environment (PC) |  
**CPU**  
Windows XP, 7 (32-bit)  
**Memory**  
1GB or more  
**HDD free space**  
500MB or more  
**Display**  
124x768 dot, True Color (32-bit) or more recommended |
**Laser Scan Micrometer**

**SERIES 544 Optional Accessories**

### Calibration Gage Set

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

### Workstage

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

### Adjustable workstage

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

### Measurement Examples

- Roller of copying machine
- Pin gage or plug gage

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Basic set</th>
<th>Order No.</th>
<th>Applicable model</th>
<th>Standard accessories</th>
<th>Measuring range (mm)</th>
<th>Horizontal stroke (mm)</th>
<th>Vertical stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Main unit</td>
<td>02AGD280</td>
<td>544-496A</td>
<td>V-block (02AGD420), 2 pcs Stopper (02AGD430), 1 pc</td>
<td>0.1 - 25</td>
<td>130</td>
<td>47</td>
</tr>
<tr>
<td>(2) V-block</td>
<td>02AGD400</td>
<td>544-534</td>
<td>V-block A (02AGD550), 2 pcs</td>
<td>0.05 - 10</td>
<td>130</td>
<td>32</td>
</tr>
<tr>
<td>(3) Stop</td>
<td>02AGD490</td>
<td>544-536</td>
<td>V-block B (02AGD550), 1 pc</td>
<td>0.3 - 30</td>
<td>200</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>02AGD520</td>
<td>544-538</td>
<td>V-block C (02AGD570), 1 pc</td>
<td>1 - 60</td>
<td>300</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>02AGD370</td>
<td>544-116-1A</td>
<td>Pin gage or plug gage</td>
<td>0.5 - 60</td>
<td>200</td>
<td>45</td>
</tr>
</tbody>
</table>

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

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

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

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

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

Air shield driven by air supply unit
- Air blows from the air outlet installed on the laser section to clear dust from adhering to the laser window.

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

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

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

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

SPECIFICATIONS
Extension Signal Cable
Order No. | Cable length
--- | ---
02AGN780A | 5m
02AGN780B | 10m
02AGN780C | 15m
02AGN780D | 20m

Extension Relay Cable
Order No. | Cable length
--- | ---
02AGC150A | 1m
02AGC150B | 3m
02AGC150C | 5m

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

Thermal printer DPU-414

- Measurement data can be printed.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02AGD600B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printing method</td>
<td>Thermal dot matrix</td>
</tr>
<tr>
<td>Printing capacity</td>
<td>40 Columns (Normal)</td>
</tr>
<tr>
<td>Character configuration</td>
<td>9x8 dot matrix</td>
</tr>
<tr>
<td>Printing direction</td>
<td>Bidirectional</td>
</tr>
<tr>
<td>Interface</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC 100-240V 50/60Hz (AC adapter)</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>Printer cable 2m (02AGD620A), Printer paper 1 roll, AC adapter</td>
</tr>
<tr>
<td>Printer paper (optional)</td>
<td>Order No.223663 (10-roll set)</td>
</tr>
</tbody>
</table>

Foot switch

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

Interface for LSM6200, 6900
Optinal Accessories

BCD Interface

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

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02AGC910</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard accessories</td>
<td>Connector (DDK) 37-30360 (No.214188)</td>
</tr>
</tbody>
</table>
**Laser Scan Micrometer**

**SERIES 544 Optional Accessories**

### Digimatic Code Output Unit

- 2-channel digimatic code output
- In simultaneous measurement, measurement data are output as follows:
  - Program No.0 to No.4 in OUTPUT-1
  - Program No.5 - No.9 in OUTPUT-2 (10 programs operated)
- 10 pin MIL type connector.
- Output cable is not supplied.
- Connecting cable (optional) 1m (No.936937)
- Available for 544-072A, 544-496A.
  * Output is 6 digits of measurement data.
  * Displaying 6th and 7th digit after the decimal point is not supported.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02AGC840</th>
</tr>
</thead>
</table>

### Dual Connection Unit

- Enables second unit connection to the 544-072A.
  (both units must be the same model)
- Cannot be used for 544-496A.
- Depending on the layout of the two measuring units, large-diameter measurement, XY measurement and parallel measurement are possible.
- Both of the measuring units and display units can be simultaneously operated.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02AGP150</th>
</tr>
</thead>
</table>

### 2nd I/O Analog I/F

- I/O, analog output.
- Simultaneous measurement is supported by two pairs of go/no-go judgment outputs.
- Available for 544-072A, 544-496A.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Order No.</th>
<th>02AGC880</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard accessories</td>
<td>Connector (DDX) 57-30360 / No.214188</td>
</tr>
</tbody>
</table>

### Cable for BCD and 2nd I/O Simultaneous Mount

- Both BCD (No.02AGC910) and 2nd I/O analog V/F (No.02AGC880) can be mounted on 544-072A, 544-496A using this cable.
- If using this cable, the dual-connection unit (No.02AGP150) cannot be used.

### SPECIFICATIONS

| Order No. | 02AGE060 |

### DIMENSIONS

![Dimensions Diagram]

**XY Measurement**

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

**Parallel Measurement**

**Large-diameter Measurement**
Compatibility
Your laser scan micrometer has been adjusted together with the ID unit, which is supplied with the measuring unit. The ID unit, which has the same code number and the same serial number as the measuring unit, must be installed in the display unit. This means that if the ID unit is replaced, the measuring unit can be connected to another corresponding display unit.

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

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

Connection to a computer
If the laser scan micrometer is to be connected to an external personal computer via the RS-232C interface, ensure that the cable connections conform to the specification.

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

Re-assembly after removal from the base
Observe the following limits when re-assemblying the emission unit and reception unit to minimize measurement errors due to misalignment of the laser’s optical axis with the reception unit.

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

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

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

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

Allowable limits of optical axis misalignment

<table>
<thead>
<tr>
<th>Model</th>
<th>Distance between Emission Unit and Reception Unit</th>
<th>X and Y</th>
<th>( \theta_x ) and ( \theta_y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>544-533, 544-534</td>
<td>68mm (2.68&quot;) or less</td>
<td>within 0.5mm (.02&quot;)</td>
<td>within 0.4° (7mrad)</td>
</tr>
<tr>
<td></td>
<td>100mm (3.94&quot;) or less</td>
<td>within 0.5mm (.02&quot;)</td>
<td>within 0.3° (5.2mrad)</td>
</tr>
<tr>
<td>544-535, 544-536</td>
<td>130mm (.5.12&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.4° (7mrad)</td>
</tr>
<tr>
<td></td>
<td>250mm (9.84&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.16° (2.8mrad)</td>
</tr>
<tr>
<td>544-537, 544-538</td>
<td>273mm (10.75&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.2° (3.5mrad)</td>
</tr>
<tr>
<td></td>
<td>700mm (27.56&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.08° (1.4mrad)</td>
</tr>
<tr>
<td>544-539, 544-540</td>
<td>321mm (12.64&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.18° (3.6mrad)</td>
</tr>
<tr>
<td>544-541, 544-542</td>
<td>800mm (31.50&quot;) or less</td>
<td>within 1mm (.04&quot;)</td>
<td>within 0.09° (1.6mrad)</td>
</tr>
</tbody>
</table>