LSM-5200/6200/6900/9506 Functions

Measuring Setup Memory

The measuring setup can be registered as a program and saved (LSM-6200: 100 programs, LSM-6900: 10 programs, LSM-5200: 1 program). These programs can be recalled with a single operation.

Multiple Calibration Data Memory Function

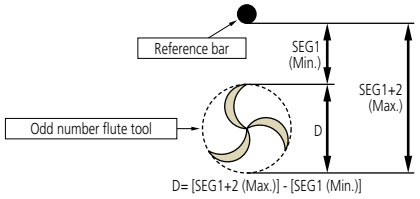
This function allows storage of 10 types of calibration data. In this function mode, up to 10 sets of 10 programs are available in hand.

- 10 programs (a piece of calibration data) X 10 sets

* Only LSM-6200 has this function.

Drill/Endmill (odd number flute) diameter measurement

The diameter of drills or endmills that have an odd number of flutes can be measured by changing the parameter set up.



Automatic Workpiece Detection

This function automatically starts measurement when a workpiece advances into the specified measuring area.

Preset/Offset

Sets the currently displayed measurement value to zero or a specified numeric value. This is useful, for example, if a difference in the diameters of a reference gage and a workpiece is to be allowed for in calibration, or if a dimension of a workpiece that exceeds the measurement range of the LSM is to be measured.

Mastering

For continuous processing of high-precision workpieces, fine-adjusting the preset or offset value is called mastering. By specifying a mastering value, the total correction will be (zero-set/offset value) + (±mastering value). If a positive mastering value is specified, the displayed value for a workpiece diameter measurement will be greater than the actual value. If a negative value is specified, the displayed value will be smaller than the actual value.

Sample Measurement

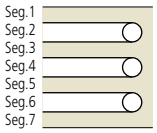
On a sample measurement the number of measurements will be defined (in the range of 2 to 999) in advance. From this sample, measurement various calculation results (mean, maximum, minimum, and range) can be derived. These measurements can be used for runout measurements on a revolving workpiece and simplified cylindricity measurements.

Arithmetical Average/Moving Average

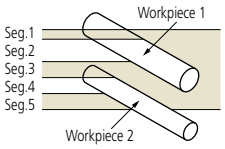
Arithmetical/moving average modes are provided to obtain the average of measurement values. On this type of LSM, either of them can be specified before starting measurement. In the arithmetical average mode, the number of scans over which to take an averaging can be set at one of twelve steps between 1 (0.32ms) and 2048 (0.64sec). In the moving average mode, the number of scans can be set at one of seven steps between 32 (0.01sec) and 2048 (0.64sec), and the measurement value will be updated every sixteen scans on and after the second measurement, irrespective of the specified number of scans for averaging. The latter mode is suitable for judging the trend in the diameter or width of an endless workpiece, such as wire or tape from a measurement that requires a long period.

Measurement using Segment Specification

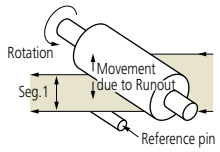
The following conventions are used to set up to the maximum of seven segments. However, if the transparent object measuring mode is set, no more than three segments can be set at one time.



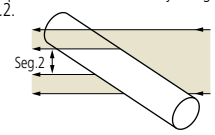
- Measurement of spacing of two parallel pins (pitch measurement)
  Pitch = ((Seg.2+Seg.4)/2)+Seg.3



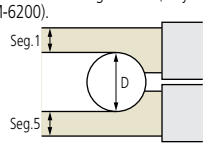
- The Runout of a revolving workpiece can be obtained by observing the variation in Seg.1 which is measured against a stationary reference pin.



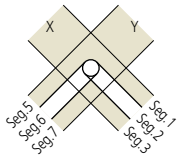
- The outside diameter of a wire or cylindrical workpiece can be measured by using Seg.2.



- The outside diameter of a large workpiece can be measured by using Seg.1 and Seg.5 in a dual-unit configuration. (only with LSM-6200).

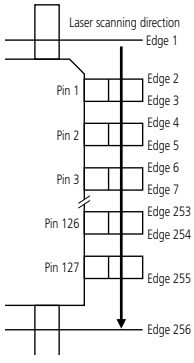


- If dimensions in both X and Y directions (min. distance of X/Y scanning section: 10mm) are measured through dual-unit measurement, use Seg.2 and Seg.6 (only with LSM-6200).



Automatic Measurement using Edges

The edges created by scanning a workpiece can be used to program an LSM. A maximum of 127 workpiece features, and 127 of the spaces between these features, can be used, which involves a total of 255 edges. This is most useful for measuring such things as IC chip leads or connector pins that are approximately equally spaced. This method cannot be applied to transparent objects.



External trigger signal input*

*Not available for LSM-5200

By supplying a contact signal to the footswitch connector at the rear panel of the LSM-6200/6900/9506, the measurement can be triggered.

Abnormal Data Elimination

If a piece of data significantly exceeds the tolerance limit because the workpiece or measuring unit is contaminated by a water droplet, oil droplet or dust, the piece of data will be automatically removed by this function.

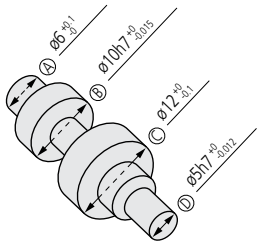
Data Output Interval Setting

By setting an interval (between 1 and 999 seconds) to continuous measurement in advance, data output will take place at each specified period of time.

Statistical Calculation

With this function, multiple measurements are taken from the same type of workpiece, statistical values are calculated from the measurement results and quality evaluation is executed for each lot.

- Example of measuring a stepped cylinder using the statistical calculation function.



Measuring procedure: Measure the dimensions numbered Ⓐ to Ⓓ, perform tolerance judgment, and statistically process the resulting data for every ten samples defined as one lot.

```
P:0 +NG    6.1700
P:0 -NG    5.7340

STAT. DATA                          Ⓐ
 PROGRAM NO. = 0
     N          10
     X      6.0045
   MAX      6.0155
   MIN      5.9970
     R      0.0185
   S.D    0.00600

STAT. DATA                          Ⓑ
 PROGRAM NO. = 1
     N          10
     X      9.9890
   MAX      9.9950
   MIN      9.9775
     R      0.0175
   S.D    0.00530

STAT. DATA                          Ⓒ
 PROGRAM NO. = 2
     N          10
     X     11.9485
   MAX     11.9835
   MIN     11.9145
     R      0.0690
   S.D    0.01900

STAT. DATA                          Ⓓ
 PROGRAM NO. = 3
     N          10
     X      4.9930
   MAX      5.0160
   MIN      4.9595
     R      0.0565
   S.D    0.01485
```

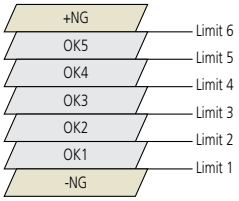
Data Output

Every model has a standard RS-232C interface unit, allowing data to be output to an external PC or printer.
The LSM-5200/6200 has the standard I/O-Analog output interface that allows the LSM to be connected to a sequencer, etc. The SPC (Digimatic Code) output interface is standard with the LSM-9506, allowing for easy construction of a quality control system. With the LSM-6200 there are additional means of data output, including SPC, BCD and GP-IB output interfaces.

Multi-Limit Judgment*

*Not available for LSM-5200

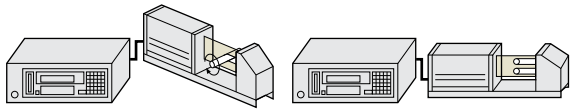
In addition to +NG, GO, and -NG judgment criteria limit values from Limit 1 to Limit 6 can also be set. If an optional 2nd I/O-Analog interface unit (**02AGC880**) is used with the LSM-6200/6900/9506, seven-step judgment signals can be output to external devices to support go/no-go judgment.



*Not available for LSM-5200

Simultaneous (Dual-program) Measurement*

It is possible to measure two items simultaneously with one Laser Scan Micrometer unit, and to output the data. This function can be used to simultaneously measure the outside diameter and runout of a bar that is rotating, or to measure the outside diameters of two cylinders or wires at the same time.



Restrictions Associated with Particular Combinations of Functions

Combinations of Functions		Edge specification: Manual measurement	Edge specification: Automatic measurement	Transparent object measurement	Ultra-fine wire measurement*	Automatic workpiece detection	Abnormal data elimination	Sample measurement	Moving average	Group judgment**
Edge specification	Manual measurement		—	—	—	●	●	●	●	●
	Automatic measurement	—		—	—	●	—	—	—	—
Transparent object measurement		—	—		●	●	●	●	●	●
Ultra-fine wire measurement*		—	—	●		—	●	●	●	●
Automatic workpiece detection		●	●	●	—		●	●	—	●
Abnormal data elimination		●	—	●	●	●		●	●	●
Sample measurement		●	—	●	●	●	●		●	●
Moving average		●	—	●	●	—	●	●		—
Group judgment**		●	—	●	●	●	●	●	—	

●: Permitted combination, —: Combination that is not permitted
*Function that is not provided for LSM-9506
**Function that is not provided for LSM-5200