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.

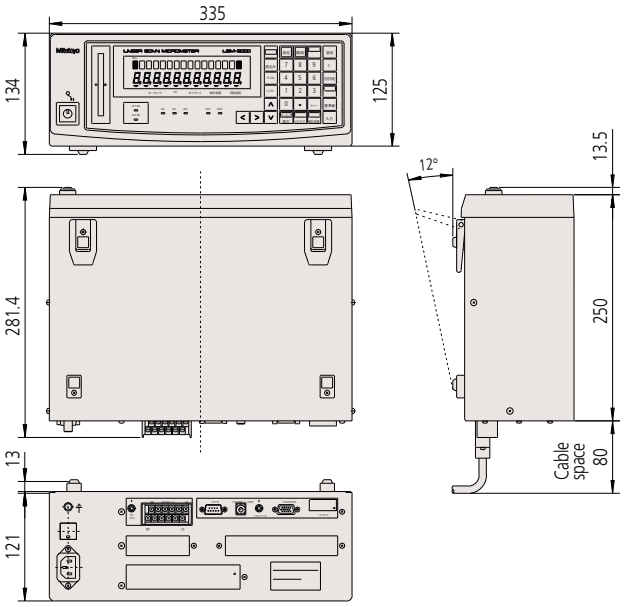
SPECIFICATIONS

Order No.	**544-072A**
Type	inch/mm
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*1
Averaging times	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**)
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)
Size	335 (W)×134 (H)×250 (D)mm
Power supply	120 V AC ±10%, 40VA, 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 +45°C, RH 35 to 85% (no condensation)
Others	Nominal setting, sample setting, selection of unnecessary digits, transparent object measurement*2, measurement of odd fluted parts, automatic measurement in edge mode, output timer, abnormal data elimination, SHL change, group judgment, simultaneous measurement, statistical processing, mastering, buzzer function, automatic workpiece detection (dimension/position)*1, zero-set/offset, dual measurement (optional)

*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.

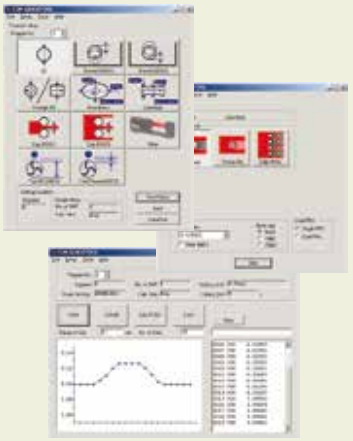
DIMENSIONS

Unit: mm



QUICKTOOL

QUICKTOOL is a free software program that makes programming the LSM-6200 quick and easy. Basic data acquisition is also possible. Included as standard accessory. (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-S series.
- Analog I/O and RS-232C is standard.
- Measurement of odd fluted parts, and simultaneous measurement / 2-program function are equipped.

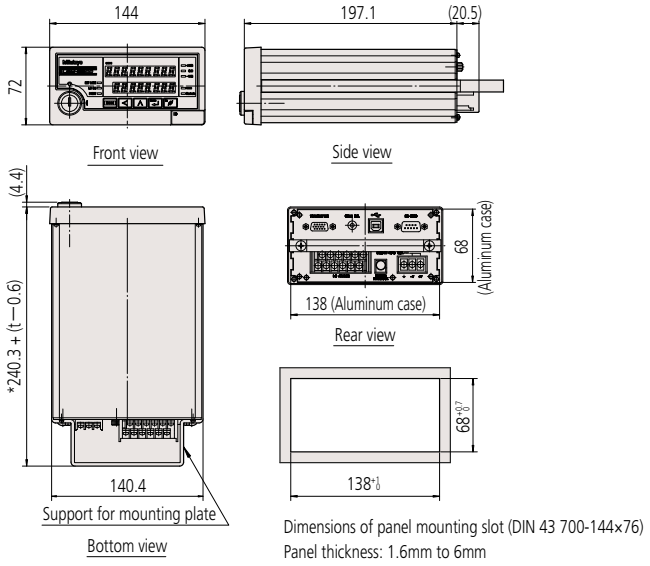
SPECIFICATIONS

Order No.	**544-047**
Display	9 digits plus 8 digits LED, guide message LED
Segment	1 to 7 (1 to 3, transparent) or 1 to 255 edges*1
Averaging method	Arithmetic average: from 4 to 2048; Moving average: from 32 to 2048 (Arithmetic average is from 16 to 2048 when using LSM-500S.)
Judgment	Selecting from "target value ± tolerance value" or "lower limit/upper limit".
Measurement mode	Standby, Single measurement, Continuous measurement
Statistical analysis	Calculation result is output via USB or RS-232C.
External dimensions	144 (W)×72 (H)×197.1 (D)mm
Power supply*3	24V DC±10%, 1.3A or more (AC adapters are optional)
Standard I/F	USB2.0, RS-232C, I/O analog
Operating environment	0 to 40°C, RH 35 to 85% (no condensation)
Preservation environments	–20 to 70°C, RH 35 to 85% (no condensation)
Others	Measurement of odd fluted parts, simultaneous measurement, nominal setting, sample setting, selection of unnecessary digits, transparent object measurement*2 Automatic workpiece detection (dimension/position detected)*1, 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.
Mass	1.4 kg

*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 **544-496A**.
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



Laser Scan Micrometer

SERIES 544 Optional Accessories

LSMPAK

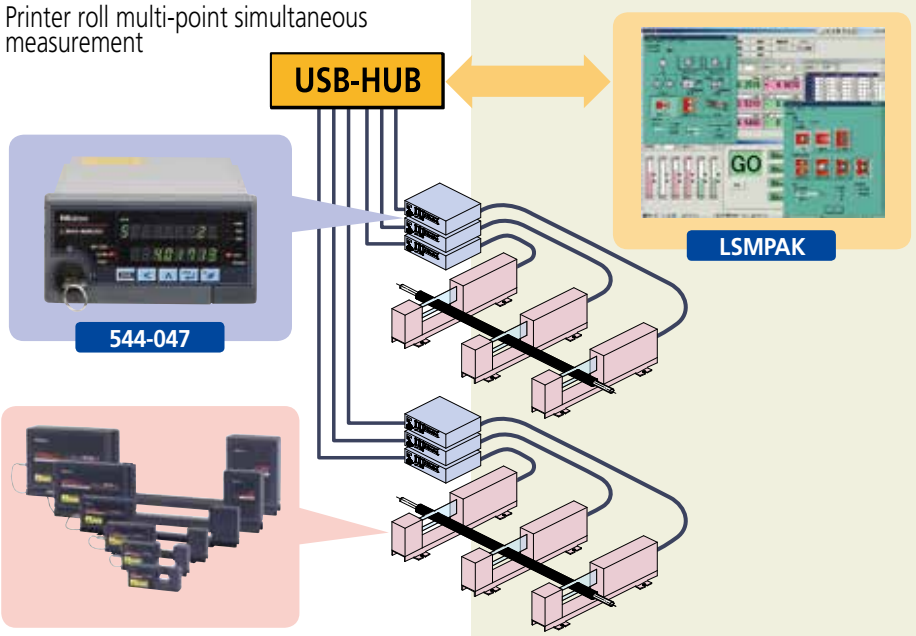
- Software can import measurement data from multiple LSM-5200 display units to a PC allowing a variety of measuring systems to be constructed.
- Capable of processing a maximum of 10 channels of measurement data (USB-HUB connection).
- Capable of Calculation between channels, statistical analysis, file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

* Refer to page G-42 for specifications of **LSM-5200**.

Sample Screen

Measurement Examples

Printer roll multi-point simultaneous measurement



Commercially available products, such as USB hubs and cables, are available for connecting to the display unit.

SPECIFICATIONS

Order No.		**02NGA002** (English)
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/NG judgment		3-step (–NG, GO, +NG)
Interface		USB2.0 (Hi-Speed communication recommended)
Maximum connection		10 units
Operating environment (PC)	OS	Windows XP, 7 (32-bit)
	CPU	Pentium 4, 2GHz or better recommended
	Memory	1GB or more
	HDD free space	500MB or more
	Display	124×768 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.

SPECIFICATIONS

For calibrating models		544-496A	544-532	544-534	545-536	544-538	544-540	544-542	544-116-1A
		LSM-902	LSM-500S	LSM-501S	LSM-503S	LSM-512S	LSM-512S	LSM-516S	LSM-9506
Set No.		02AGD180	02AGD110	02AGD120	02AGD130	02AGD140	02AGD150	02AGM300	02AGD170
Configuration (Order No.)	Stand	02AGD181	02AGD111	02AGD121	02AGD131	02AGD141	02AGD151	02AGM320	02AGD171
	Gages	ø1: 02AGD920 ø25: 02AGD963	ø0.1: 958200 ø2 : 958202	ø0.1: 958200 ø10: 229317	ø1: 02AGD920 ø30: 02AGD961	ø1: 02AGD920 ø60: 02AGD962	ø20: 229730 ø120: 234072	ø20: 229730 ø160: 02AGM303	ø1: 02AGD920 ø60: 02AGD962
	Carrying case	02AGD190	958203	958203	02AGD980	02AGD980	02AGD990	02AGM310	02AGD970

Workstage

Installation example (**LSM-902**)

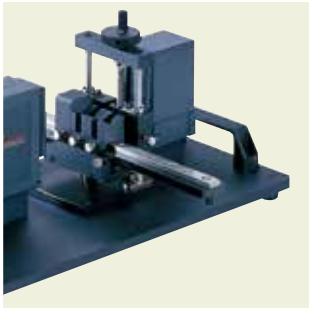
- Easy set-up and height adjustment enables high-precision measurement.

SPECIFICATIONS

Model	544-533, 544-534 544-535, 544-536 544-495, 544-496
Order No.	02AGD270

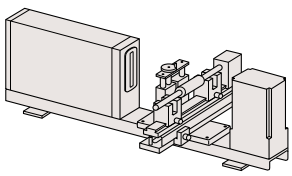
Adjustable workstage

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

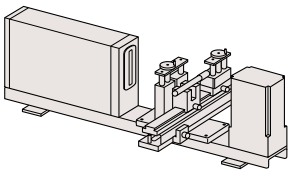


Measurement Examples

- Roller of copying machine



- Pin gage or plug gage



Basic configuration

Basic set	Order No.	Applicable Model	Standard Accessories	Measuring range (mm)	Horizontal stroke (mm)	Vertical stroke (mm)
(1) Main unit (2) V-block (3) Stop	02AGD280	544-496A	V-block (02AGD420), 2 pcs Stopper (02AGD430), 1 pc	0.1 - 25	130	47
	02AGD400	544-534		0.05 - 10	130	32
	02AGD490	544-536		0.3 - 30	200	35
	02AGD520	544-538	V-block A (02AGD550), 2 pcs V-block B (02AGD550), 1 pc V-block C (02AGD570), 1 pc	1 - 60	300	45
	02AGD370	544-116-1A		0.5 - 60	200	45
	02AGD680			0.5 - 60	300	45

* The stop is not included in the basic set for **544-537**, **544-538**, **544-115**, **544-116**.
• Optional parts for the adjustable workstage, such as center support, adjustable V-block (up/down) etc., are available.

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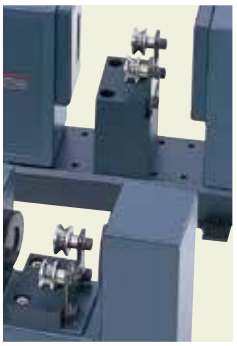
Laser Scan Micrometer

SERIES 544 Optional Accessories

Guide pulley

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



SPECIFICATIONS

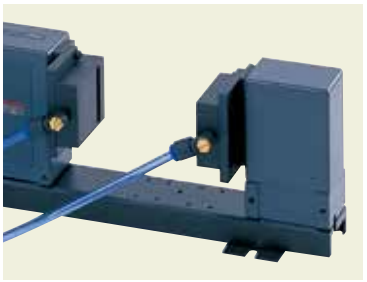
Model	544-532	544-534
Order No.	02AGD200	02AGD210

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**

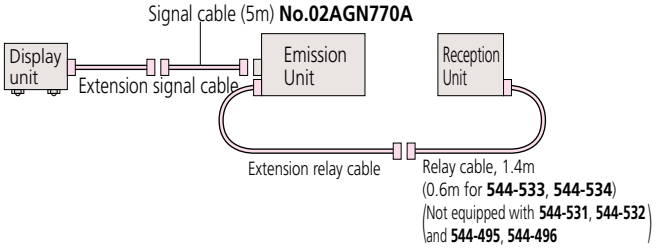
The number of air shields that can be driven per air supply unit (**No.957608**) is as follows:

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

Order No.	**02AGD600B**
Printing method	Thermal dot matrix
Printing capacity	40 Columns (Normal)
Character configuration	9×8 dot matrix
Printing direction	Bidirectional
Interface	RS-232C
Power supply	AC 100-240V 50/60Hz (AC adapter)
Standard Accessories	Printer cable 2m (**02AGD620A**), Printer paper 1 roll, AC adapter
Printer paper (optional)	Order **No.223663** (10-roll set)

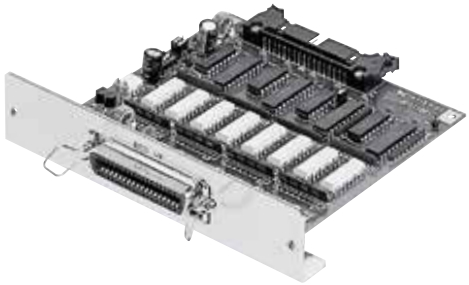
Foot switch

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

Interface for LSM6200, 6900

Optional 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

Order No.	**02AGC910**
Standard Accessories	Connector (DDK) **57-30360** (**No.214188**)

Mitutoyo

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 **544-072**, **544-496A**.

* Output is 6 digits of measurement data.
* Displaying 6th and 7th digit after the decimal point is not supported.

SPECIFICATIONS

Order No.	02AGC840

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

Order No.	02AGP150

2nd I/O analog I/F

- I/O, analog output.
- Simultaneous measurement is supported by two pairs of GO/NG judgment outputs.
- Available for **544-072A**, **544-496A**.

SPECIFICATIONS

Order No.	02AGP150
Standard Accessories	Connector (DDK) **57-30360** (**No.214188**)

Cable for BCD and 2nd I/O simultaneous mount

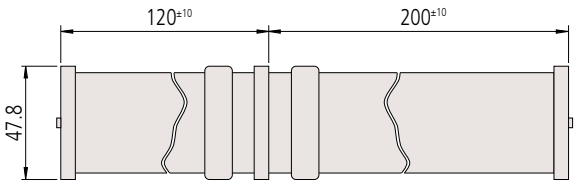
- Both BCD (**No.02AGC910**) and 2nd I/O analog I/F (**No.02AGC880**) can be mounted on **544-072A**, **544-496A** using this cable.

* If using this cable, the dual connection unit (**No.02AGP150**) cannot be used.

SPECIFICATIONS

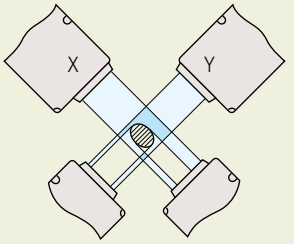
Order No.	02AGE060

DIMENSIONS



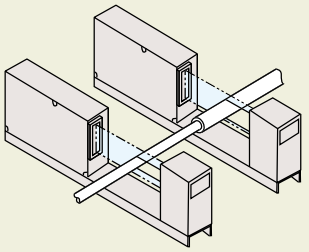
Unit: mm

XY Measurement

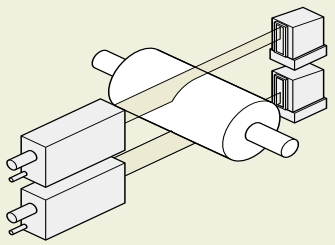


(X–Y): flatness
(X+Y)/2: average
* XY requires 10mm-interval.

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

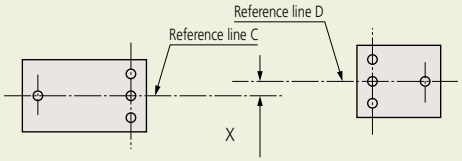
Mitutoyo Laser Scan Micrometers use a low-power visible laser for measurement. The laser is a CLASS 2 EN/IEC60825-1 (2007) device. Warning and explanation labels, as shown right, are attached to the Laser Scan Micrometers as is appropriate.

Re assembly after removal from the base

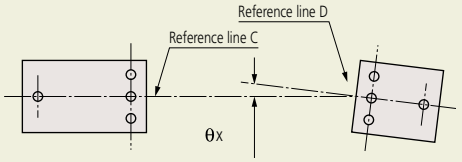
Observe the following limits when re assembling the emission unit and reception unit to minimize measurement errors due to misalignment of the laser's optical axis with the reception unit.

Alignment within the horizontal plane

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

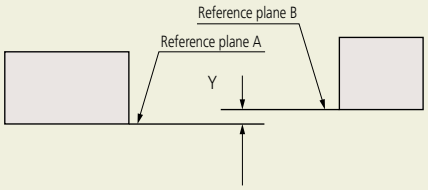


b. Angle between reference lines C and D: θx (angle)

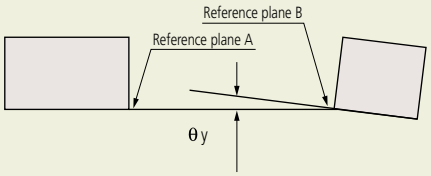


Alignment within the vertical plane

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



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



Allowable limits of optical axis misalignment

Model	Distance between Emission Unit and Reception Unit	X and Y	θx and θy
544-533, 544-534	68mm (2.68") or less	within 0.5mm (.02")	within 0.4° (7mrad)
	100mm (3.94") or less	within 0.5mm (.02")	within 0.3° (5.2mrad)
544-535, 544-536	130mm (5.12") or less	within 1mm (.04")	within 0.4° (7mrad)
	350mm (13.78") or less	within 1mm (.04")	within 0.16° (2.8mrad)
544-537, 544-538	273mm (10.75") or less	within 1mm (.04")	within 0.2° (3.5mrad)
	700mm (27.56") or less	within 1mm (.04")	within 0.08° (1.4mrad)
544-539, 544-540	321mm (12.64") or less	within 1mm (.04")	within 0.18° (3.6mrad)
	700mm (27.56") or less	within 1mm (.04")	within 0.08° (1.4mrad)
544-541, 544-542	800mm (31.50") or less	within 1mm (.04")	within 0.09° (1.6mrad)

Mitutoyo Quality

People – Quality starts with our people. Our team is comprised of the best and the brightest in the industry.

Confidence – Confidence you have each time you rely on a Mitutoyo product.

Reliability – Reliability of the product that you use many times every day.

Accuracy – Accuracy you need to preserve tight machining tolerances.

Relationship – Relationship you have formed with Mitutoyo staff and distributors

Longevity – Longevity of a tool or instrument that maintains factory specifications.

Savings – Savings that are realized by implementing metrology solutions that reduce production costs.

Feel – Feel of a caliper or micrometer that you have come to expect.

Pride – Pride you feel when you produce the best manufactured product possible.