

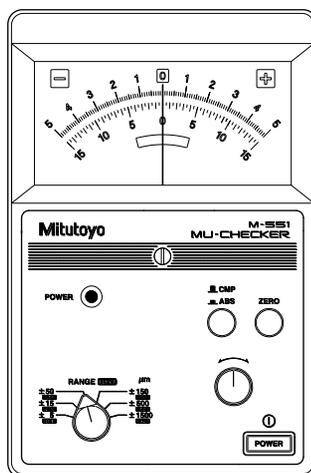
Electric Micrometer Analog Mu-Checker

M-551: Analog display unit for Mu-checker (standard type)

M-552: Analog display unit for Mu-checker (standard type)

M-553: Analog display unit for Mu-checker (differential type)

M-554: Analog display unit for Mu-checker (differential type)



User's Manual - Instructions for use -

Read this document thoroughly before operating the product. After reading, retain it close at hand for future reference. This English language version of the document contains the original instructions.

No. 99MBC600B4
Date of publication: July 1, 2021 (1)



■ Product names and model numbers covered in this document

Product name	Model number
Analog Mu-checker (Analog display unit for Mu-checker (standard type))	M-551
	M-552
Analog Mu-checker (Analog display unit for Mu-checker (differential type))	M-553
	M-554

■ Notice regarding this document

- Mitutoyo Corporation assumes no responsibilities for any damage to the product, caused by its use not conforming to the procedure described in this document.
- Upon loan or transfer of this product, be sure to attach this document to the product.
- In the event of loss or damage to this document, immediately contact a Mitutoyo sales office or your dealer.
- Read this document thoroughly before operating the product. In particular, be sure to fully understand "Safety Precautions" and "Precautions for Use" in the preface.
- The contents of this document are based on information current as of July, 2021.
- No part or whole of this document may be transmitted or reproduced by any means without prior written permission of Mitutoyo Corporation.
- Some screen displays in this document may be highlighted, simplified or partially omitted for convenience of explanation. In addition, some of them may differ from actual ones to the extent that no user will misunderstand the functions and operations.
- The corporation, organization and product names that appear in this document are their trademarks or registered trademarks.

© 2017-2021 Mitutoyo Corporation. All rights reserved.

Conventions and Wording Used in This Document

■ Safety reminder conventions and wording warning against potential hazards

 WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.
	Electricity Alerts the user to a specific hazardous situation that means "Caution, risk of electric shock".
	Flammable material Alerts the user to a specific hazardous situation that means "Caution, risk of igniting gas".

■ Conventions indicating prohibited and mandatory actions

	Indicates concrete information about prohibited actions.
	Indicates concrete information about mandatory actions.
	Indicates that grounding needs to be implemented.

■ Conventions and wording indicating referential information or reference location

Tips

Indicates further information and details relevant for the operating methods and procedures that are explained in that section.



Indicates reference location if there is information that should be referred to in this document or an extraneous User's Manual.

E.g.: For details about the gain adjustment, see  "4 Gain Adjustment" (page 7).

Safety Precautions

Read these "Safety Precautions" thoroughly before operating the product to use it properly. These safety precautions include such information as to prevent injury to the operator and other persons, damage to property and product defects. Be sure to observe these precautions carefully.

WARNING



In order to prevent fire or electric shock, observe the following precautions.



- Do not disassemble or modify this product.
- Do not place containers with water, such as flower pots, near this product. If water, etc., enters the product, unplug the power outlet first, and then contact Mitutoyo.



Use this product with the specified power source voltage.

WARNING



In order to prevent fire, observe the following precautions.



Do not use the device in areas where volatile gases may be released.

WARNING



Do not place the product on an unstable surface. It may fall or topple over, causing an injury.

CAUTION



Only use the optional equipment specified in this document with the product. Using optional equipment other than specified may cause fire, electric shock, or malfunction.

NOTICE



- Do not exert external forces to this product. Doing so may cause malfunction or breakage.
- Do not use high-voltage equipment, such as an electric engraver, with this product. Doing so may damage the electronic components in this product.

Precautions for Use

■ Product applications and handling

● This product is a measuring instrument.



Do not use it for any purposes other than measuring.

● This product is precision equipment.



It must be carefully handled.



Do not to apply excessive shock or force to any of the parts during operation.

Functionality and performance are not guaranteed if the product is used in conditions outside of those indicated in the specifications (☞ "7.1 Specifications" (page 24)).

■ Installation environment



Use this product in the following environments:

- Areas free of dirt and dust
- Areas free of vibrations
- Areas with an ambient temperature from 0 °C through 40 °C
- Areas with low humidity
- Installed on a horizontal surface



Take special shielding measures when using this product in the following locations:

- In locations subject to electric noise, such as from static electricity
- In locations subject to strong electric fields
- In locations near power supply lines or power lines
- In locations that may be exposed to radiation
- In locations that may be exposed to corrosive gas

■ Paying attention to working clothes



The heat radiated by the human body can influence measurements. Wear clothes that minimize the effect of heat from the human body, such as long sleeved working clothes and gloves.

■ Power supply



Connect this product to ground.



- Turn off the power after use.
 - Use a separate power source from other electric equipment, such as machine tools, that run with highly variable power consumption.
 - Use only the power cable that is supplied with this product. If there is a problem with the power cable or the power inlet, contact Mitutoyo.
- * For questions about the power source or electrical work, contact a licensed electrician or other qualified individual.

■ Removing of the cover, disassembling this product



This product is a precisely calibrated measuring instrument and contains electronic components internally.
To maintain maximum performance, never remove the cover of this product.

■ Maintenance



Gently wipe dirt off of the product with a soft, tightly woven cloth. If dirt is difficult to remove, wipe the dirt off with a cloth soaked in a neutral detergent, and then gently wipe the product with a dry cloth or a cloth that is tightly wrung after being soaked in water.



Do not use organic solvents such as thinner or benzene.

Electromagnetic Compatibility (EMC)

This product complies with the EMC Directive and the UK Electromagnetic Compatibility Regulations; however, if this receives electromagnetic interference that exceeds these requirements, it will be out of warranty and require appropriate measures.

Export Control Compliance

This product falls into the Catch-All-Controlled Goods and/or Catch-All-Controlled Technologies (including Programs) under Category 16 of Appended Table 1 of Export Trade Control Order or under Category 16 of Appended Table of Foreign Exchange Control Order, based on Foreign Exchange and Foreign Trade Act of Japan.

If you intend re-export of the product from a country other than Japan, re-sale of the product in a country other than Japan, or re-providing of the technology (including Programs), you shall observe the regulations of your country.

Also, if an option is added or modified to add a function to this product, this product may fall under the category of List-Control Goods, List-Control Technology (including Programs) under Category 1 - 15 of Appended Table 1 of Export Trade Control Order or under Category 1 - 15 of Appended Table of Foreign Exchange Control Order, based on Foreign Exchange and Foreign Trade Act of Japan. In that case, if you intend re-export of the product from a country other than Japan, re-sale of the product in a country other than Japan, or re-providing of the technology (including Programs), you shall observe the regulations of your country. Please contact Mitutoyo in advance.

Notes on Export to European Countries

When you intend exporting of this product to any of the European countries, it may be required to provide User's Manual(s) in English and Declaration of Conformity in English (in some cases, the official language of the country to be exported). For detailed information, please contact Mitutoyo in advance.

Disposal of Products outside the European Countries

Please follow the official instruction in each community and country.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Countries with Separate Collection Systems)



This symbol on the product or on its packaging is based on WEEE Directive (Directive on Waste Electrical and Electronic Equipment), and this symbol indicates that this product shall not be treated as household waste.

To reduce the environmental impact and minimize the volume of landfills, please cooperate in reuse and recycle.

For how to dispose of the product, please contact your dealer or the nearest Mitutoyo sales office.

China RoHS Compliance Information

This product meets China RoHS requirements. See the table below.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
本体	×	○	○	○	○	○
配件	○	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。



环保使用期限标识是根据《电器电子产品有害物质限制使用管理办法》以及《电子电气产品有害物质限制使用标识要求(SJ/T11364-2014)》制定的,适用于中国境内销售的电子电气产品的标识。

电器电子产品只要按照安全及使用说明内容在正常使用情况下,从生产日期算起,在此期限内产品中含有的有毒有害物质不致发生外泄或突变,不致对环境造成严重污染或对其人身、财产造成严重损害。

产品使用后,要废弃在环保使用年限内或者刚到年限的产品,请根据国家标准采取适当的方法进行处置。

另外,此期限不同于质量/功能的保证期限。

Warranty

This product has been manufactured under strict quality management, but should it develop problems within one year of the date of purchase in normal use, repair shall be performed free of charge. Please contact the agent where you purchased the product or Mitutoyo sales representative (☎ "SERVICE NETWORK" (page App-1)). This warranty, however, shall not affect any provisions of the Mitutoyo Software End User License Agreement.

If this product fails or is damaged for any of the following reasons, it will be subject to a repair charge, even if it is still under warranty.

- Failure or damage owing to fair wear and tear
- Failure or damage owing to inappropriate handling, maintenance or repair, or to unauthorized modification
- Failure or damage owing to transport, dropping, or relocation of the product after purchase
- Failure or damage owing to fire, salt, gas, abnormal voltage, lightning surge, or natural disaster
- Failure or damage owing to use in combination with hardware or software other than those designated or permitted by Mitutoyo
- Failure or damage owing to use in ultra-hazardous activities

This warranty is effective only where the product is properly installed and operated in conformance with the instructions in this document within the original country of the installation.

EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES OF ANY NATURE WHATSOEVER INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR WARRANTY ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE MAXIMUM EXTENT ALLOWED BY APPLICABLE LAW.

You assume responsibility for all results due to the selection of this product to achieve your intended results.

Disclaimer

IN NO EVENT WILL MITUTOYO, ITS AFFILIATED AND RELATED COMPANIES AND SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT, OR DATA, OR FOR SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THIS PRODUCT EVEN IF MITUTOYO OR ITS AFFILIATED AND RELATED COMPANIES AND/OR SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

If, notwithstanding the foregoing, Mitutoyo is found to be liable to you for any damage or loss which arises out of or is in any way connected with use of this product by you, in no event shall Mitutoyo's and/or its affiliated and related companies' and suppliers' liability to you, whether in contract, tort (including negligence), or otherwise, exceed the price paid by you for the product only.

The foregoing limitations shall apply even if the above-stated warranty fails of its essential purpose.

BECAUSE SOME COUNTRIES, STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR THE LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, IN SUCH COUNTRIES, STATES OR JURISDICTIONS, MITUTOYO'S LIABILITY SHALL BE LIMITED TO THE EXTENT PERMITTED BY LAW.

About This Document

■ Positioning of this document, document map

This describes the positioning of this document and its relationship with other install-ments.

● For display units

User's Manual (This document)

Explains how to use the product and provides troubleshooting information.

● For probes

User's Manual

Explains the usage of the probe (detector) that connects to this product.

■ Intended readers and purpose of this document

● Intended readers

This document is intended for beginners of the analog display units for Mu-checker. They are also assumed to be able to understand instructions by reading technical draw-ings.

● Purpose

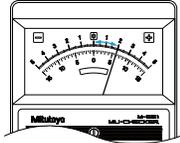
The purpose of this document is to help you understand the overview of this product, the functions of each part, how to use this product, and maintenance.

■ How to read this document

Indicates an operating procedure to be performed or its outline.

2 Measuring the workpiece

- 1 Remove the standard gage, and then set the workpiece.
- 2 Set the workpiece.
 - » The meter will indicate the difference in diameter between the standard gage and the workpiece.



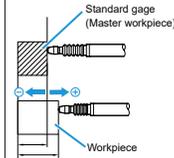
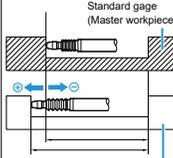
Tips
In the case of the measurement below (sum or difference calculation with two probes), the measurement result will not be affected even if the workpiece set position is shifted along the measuring direction.

Indicates supplementary information.

Indicates detailed supplementary information.

Selecting the polarity

By switching the polarity (plus or minus) of the position signal from the probe, you can select in which direction the pointer of the meter moves, either to the right (+) or to the left (-), when the contact point is pressed in. The polarity setting is reversed depending on the dimension you are measuring (inside dimension or outside dimension). For the details, see the following.

Comparing the outside dimension of a workpiece	Comparing the inside dimension of a workpiece
<p>If the outside dimension of the workpiece is larger than that of the standard gage (master workpiece), the contact point will be pressed in. (The direction in which the contact point is pressed in will be "+".)</p> 	<p>If the inside dimension of the workpiece is larger than that of the standard gage (master workpiece), the contact point will be pulled out. (The direction in which the contact point is pressed in will be "-".)</p> 
<p>Polarity: +</p> 	<p>Polarity: -</p> 

Tips

- If you do not know a certain operating procedure, see the following sections.
 - Operation Flow:  "2 Operation Flow" (page 3)
 - Troubleshooting:  "6 Troubleshooting" (page 22)
- For detailed supplemental information, see the following sections.
 -  "Measuring direction and lever positioning" (page 6)
 -  "Selecting the polarity" (page 9)
 -  "How to set the gauge block" (page 11)
 -  "How to select the indication range" (page 12)
 -  "How to read the meter for each indication range" (page 12)
 -  "Pointer movement" (page 12)
 -  "Relationship between the indication range and graduations" (page 13)

■ Brackets, quotation marks and numbers (1, 1)

The meanings of brackets, quotation marks and numbers to be used in this document are as follows.

(): Round brackets	Represent a paraphrase of an immediately preceding phrase or a supplementary explanation.
" ": Double quotation marks	Represent a highlighted phrase. They also indicate an index where information to be referenced is described.
[]: Square brackets	Indicates characters, numbers, and symbols that are printed on the product.
1, 2, 3 1, 2, 3, ...	Indicates the order and the contents of tasks. (1: indicates main tasks, 1: indicates detailed tasks)

Contents

Conventions and Wording Used in This Document	i
Safety Precautions	i
Precautions for Use	ii
Electromagnetic Compatibility (EMC).....	iii
Export Control Compliance	iii
Notes on Export to European Countries	iii
Disposal of Products outside the European Countries.....	iii
Disposal of Old Electrical & Electronic Equipment (Applicable in the European Countries with Separate Collection Systems).....	iii
China RoHS Compliance Information	iii
Warranty	iv
Disclaimer	iv
About This Document	v
Contents	vii
1 Overview	1
1.1 Features	1
1.2 Included Items	2
2 Operation Flow	3
3 Connections	4
4 Gain Adjustment	7
4.1 Devices for Gain Adjustment	7
4.2 Gain Adjustment Method	8
4.2.1 Connection Check and Switch Settings	8
4.2.2 Zero Point Setting	10
4.2.3 Adjusting a Gain	15
5 Measuring.....	16
5.1 Measuring with One Probe	16
5.2 Measuring with Two Probes	18

6 Troubleshooting.....	22
7 Technical Data	24
7.1 Specifications	24
7.2 I/O Connector (Female)	26
7.2.1 Analog Output Connector (Female)	26
7.3 Options	28
8 Probe (Option).....	29
8.1 List of Applicable Probes	29
8.2 Common Specifications	31
8.3 Changing the Contact Point.....	32
8.3.1 Lever Head Probe.....	32
8.3.2 Cartridge Head Probe	32
SERVICE NETWORK.....	App-1

1 Overview

This product is an analog display unit for Mitutoyo Mu-checker (electric micrometer). (Hereafter, referred to as "the display unit".) This product is used in combination with a probe accessory (detector).

1.1 Features

This product is an analog-type display unit for electric micrometers with an instant zero-setting function. With the analog meter display, variations in the measured values are continuously indicated by the motion of the pointer, so the displacement is easy to read. With a probe that uses a differential inductance method, you can perform high-accuracy comparison measurements. The available models and example use cases are introduced below.

Available models

Model	Number of connectable probes
M-551 and M-552: Standard type	1
M-553 and M-554: Differential type	2

Tips

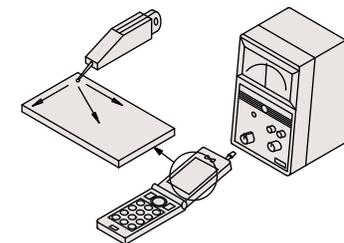
Some older probes with a different shaped connector cannot be connected to this product.

Usage examples

Measuring warping in liquid crystal glass

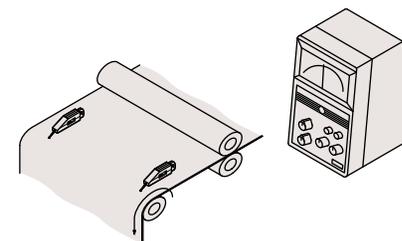
With a low measuring force type lever head probe (MLH-522), you can measure warping without damage to the liquid crystal glass.

- Lever head probe
MLH-522
- Standard type display unit
M-551/M-552



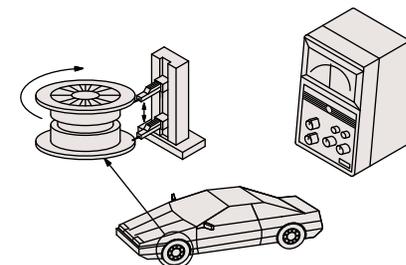
Measuring the thickness of a roll sheet

- Lever head probe
MLH-521 × 2
- Differential type display unit
M-553/M-554



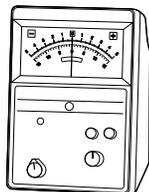
Measuring the width of wheels for vehicles

- Lever head probe
MLH-521 × 2
- Differential type display unit
M-553/M-554

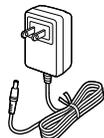


1.2 Included Items

The following items are included with this product: an AC adapter, this document, and a warranty card. The included AC adapter varies according to the code number of the product as follows.



This product



AC adapter



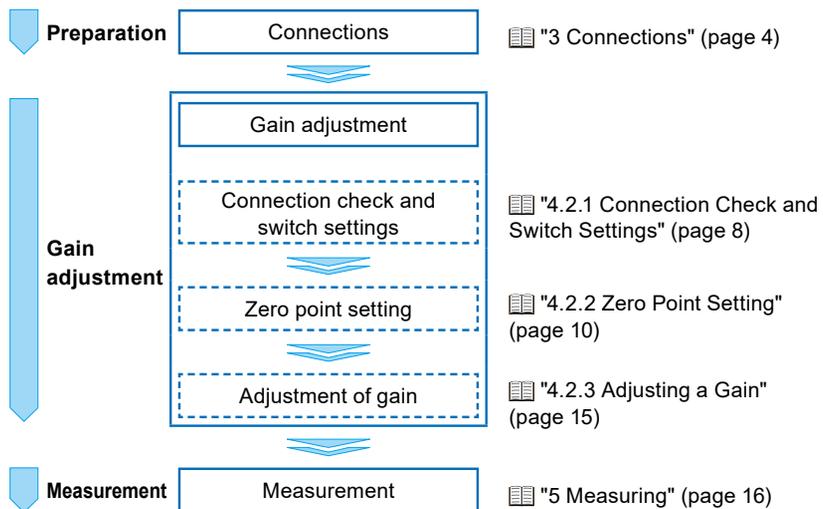
This document



Warranty card

Product code no.	AC adapter part no.	Destination
519-5XX	06AGC585JA	For use in Japan
519-5XXA	06AGC585JA	For use in North America
519-5XXD	06AGC585D	For use in Europe
519-5XXE	06AGC585E	For use in the UK
519-5XXDC	06AEG302DC	For use in China
519-5XXK	06AGC585K	For use in Korea

2 Operation Flow



3 Connections

This section explains the procedures for connecting the AC adapter, probe, and other equipment, as well as the operation check procedure.

NOTICE



Only connect probes or other equipment while the power is turned off. Making connections while the power turned on may cause a malfunction.

■ Connection procedure

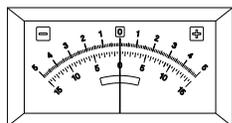
- 1 Check that the power switch is turned off (in extended position).



Tips

When the power is off, the power lamp is also off.

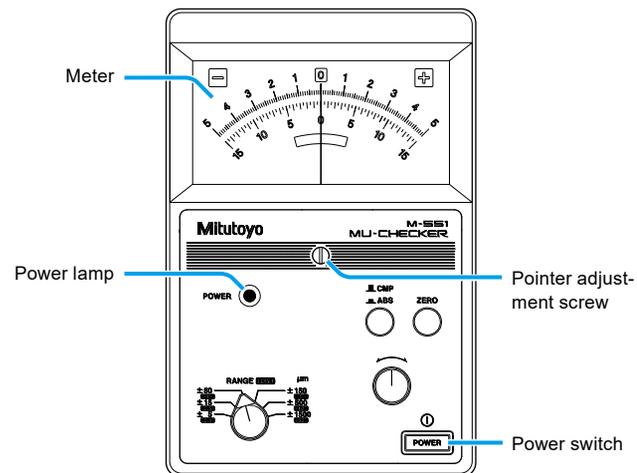
- 2 Check that the pointer of the meter is pointing at zero.



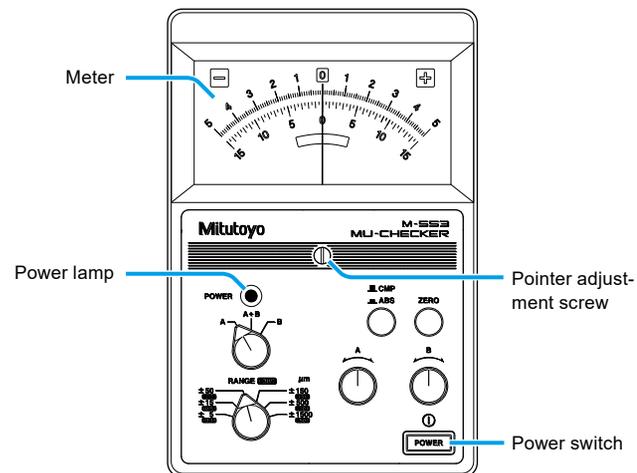
Tips

If the pointer is not pointing at zero, adjust the pointer adjustment screw with a screwdriver to set the pointer to zero.

Front panel (standard type)



Front panel (differential type)



3 Connections

3 Connect this product to ground.



Be sure to connect this product to ground. If this product is not grounded, it will be more susceptible to electric noise.

4 Connect the probe to the probe connector.

NOTICE

When mounting a cartridge head probe, note the following:



- Do not tighten the clamp screw of the transfer stand with pliers, etc. If the clamp screw is overtightened, the probe may deform and be damaged.
- Do not directly tighten the probe with the feed screw to secure it. A force concentrated on one point may deform and damage the probe.



- When mounting the cartridge head probe, the probe should be perpendicular to the measuring surface. Not mounting it at right angles may cause a measurement error.
- If the cable of the probe vibrates, the zero point may shift or the measured value may not be constant. When mounting the probe, fasten the connection cable in the vicinity of the probe in order to prevent the cable from swinging.

Tips

When using a differential type display unit, it can work with a single probe. (Either probe connector, INPUT A or INPUT B, can be used.)

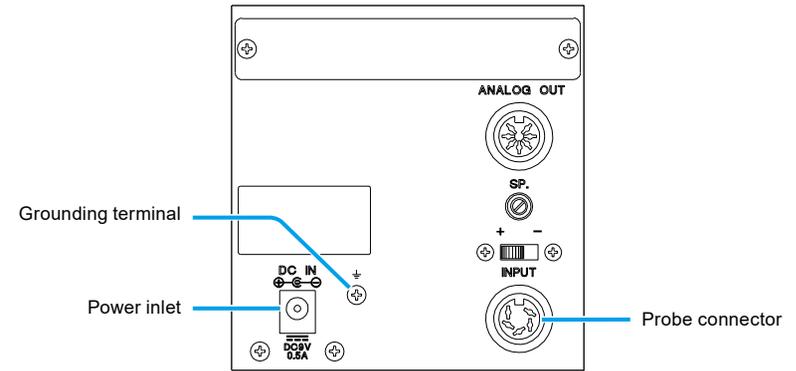
5 Connect other equipment.

Tips

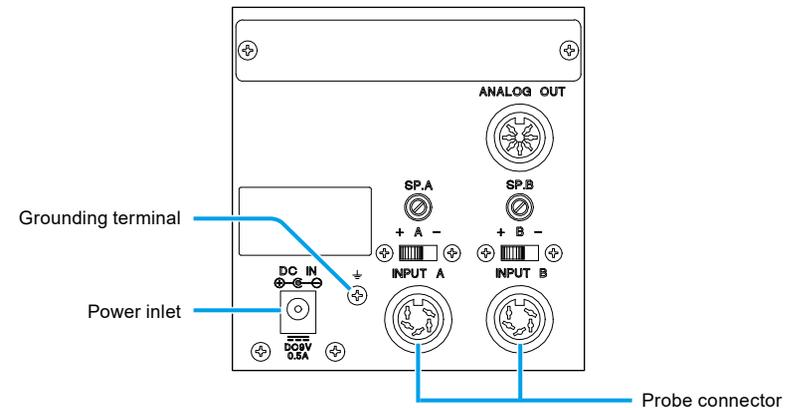
For details about connecting other equipment, see "7.2 I/O Connector (Female)" (page 26).

6 Connect the plug of the AC adapter to power inlet.

Rear panel (standard type)



Rear panel (differential type)



3 Connections

■ Operation check procedure

- 1 Turn the power switch on (pressed-in position).



» The power lamp will turn on.

- 2 Check that the pointer of the meter moves by moving the contact point of the probe.
- 3 When using a lever head probe (MLH-521), check that the measuring direction switching lever is set in right position for your application.



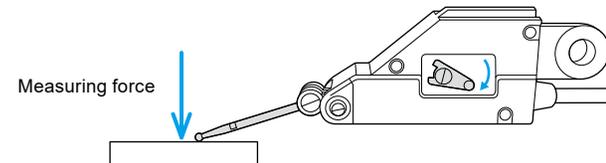
If you switch the position of the lever, the tip of the contact point will move slightly. Be sure to set the zero point again if you switch the position of the lever during measurement.

Tips

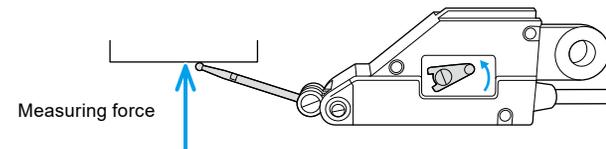
For information about the measuring direction and lever positioning, see the column on the right.

Measuring direction and lever positioning

To apply measuring force downward (for measuring an upward facing surface), put the measuring direction switching lever in the down position.



To apply measuring force upward (for measuring a downward facing surface), put the measuring direction switching lever in the up position.



4 Gain Adjustment

Perform gain adjustment (switch setting, zero point setting, and adjustment of gain) in the following cases.

- The first time that you use this product and the probe
- After changing the probe (the gain differs for each probe)
- After changing the indication range (there are gain errors between indication ranges)
- After changing the posture of the probe mounted (the gain will be influenced by the mounting direction)

Set the zero point again in the following cases.

- After changing the polarity of the probe
- After a long period of time has elapsed (e.g., ambient temperature has changed).



Avoid performing gain adjustment immediately after turning the power on or mounting a probe. Wait about 20 minutes to 30 minutes for the display to settle, and then perform gain adjustment.



- If you are using a differential type display unit with two probes connected, perform gain adjustment for both of the probes.
- Perform gain adjustment in a location subject to minimal vibration and temperature variation.

Tips

To ensure accurate measurements, we recommend periodic calibration of Mu-checker (probe and display unit) in addition to timely gain adjustment. Please contact a sales representative at the Mitutoyo service center to request calibration.

4.1 Devices for Gain Adjustment

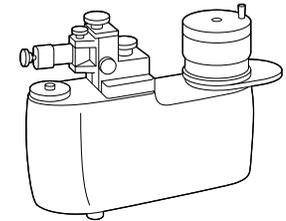
Gain adjustment can be performed for this product with the following two types of optional devices.

Tips

The cartridge head probe No. 519-347 (MCHS-347) cannot be mounted on either of these devices.

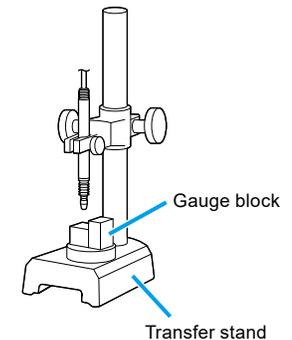
■ Calibration tester (No. 521-103, No. 521-105)

For performing an efficient and highly-accurate gain adjustment and for an accuracy testing.



■ Transfer stand (No. 519-109-10)

The probe is mounted on the stand, and gain adjustment is performed using two gauge blocks with a length difference equal to the indication range to be used. Gain adjustment can also be performed with a combination of "a gauge block and a feeler gauge (thickness gage) with the same thickness as the indication range to be used".



4.2 Gain Adjustment Method

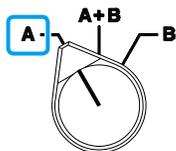
Perform gain adjustment in the following order: "switch setting", "zero point setting", "adjustment of gain".

This section explains the procedure for gain adjustment using the transfer stand.

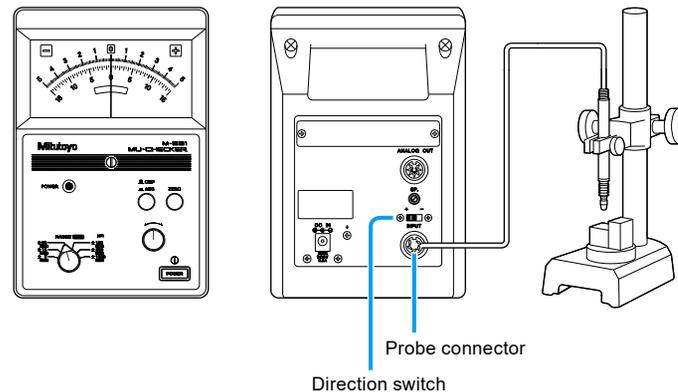
4.2.1 Connection Check and Switch Settings

Perform the probe connection check, probe selection (for differential type), and the polarity setting.

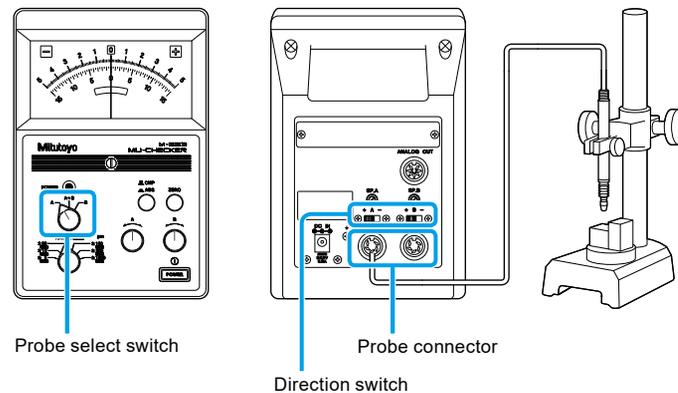
- 1 Check that the probe is correctly connected to the probe connector.
- 2 For differential type, use the probe select switch to select which probe to perform gain adjustment for. (Example: probe A is selected.)



Standard type



Differential type

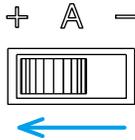


4 Gain Adjustment

3 Switch the direction switch. (Example: [+] is selected for probe A.)

Tips

For information about selecting the polarity, see the column on the right.



Selecting the polarity

By switching the polarity (plus or minus) of the position signal from the probe, you can select in which direction the pointer of the meter moves, either to the right (+) or to the left (-), when the contact point is pressed in. The polarity setting is reversed depending on the dimension you are measuring (inside dimension or outside dimension). For the details, see the following.

Comparing the outside dimension of a workpiece	Comparing the inside dimension of a workpiece
<p>If the outside dimension of the workpiece is larger than that of the standard gage (master workpiece), the contact point will be pressed in. (The direction in which the contact point is pressed in will be " + ".)</p>	<p>If the inside dimension of the workpiece is larger than that of the standard gage (master workpiece), the contact point will be pulled out. (The direction in which the contact point is pressed in will be " - ".)</p>
<p>Polarity: +</p>	<p>Polarity: -</p>

4 Gain Adjustment

4.2.2 Zero Point Setting

There are two steps to set the zero point.

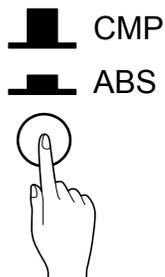
Step 1: Zero point adjustment with the zero point adjustment knob in ABS mode

Step 2: Zero point setting with the zero-set switch in CMP mode

First, in ABS mode, repeatedly perform zero point adjustment while narrowing the indication range until you reach the indication range to be used in measuring. Then, switch to CMP mode, and then press the zero-set switch to set the zero point precisely.

■ Zero point adjustment in ABS mode (instant zero-setting is disabled)

- 1 Set the measuring mode switch (ABS/CMP switch) to ABS mode (pressed-in position).

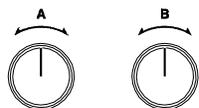


- 2 Set the line on the zero point adjustment knob to the center.

Standard type



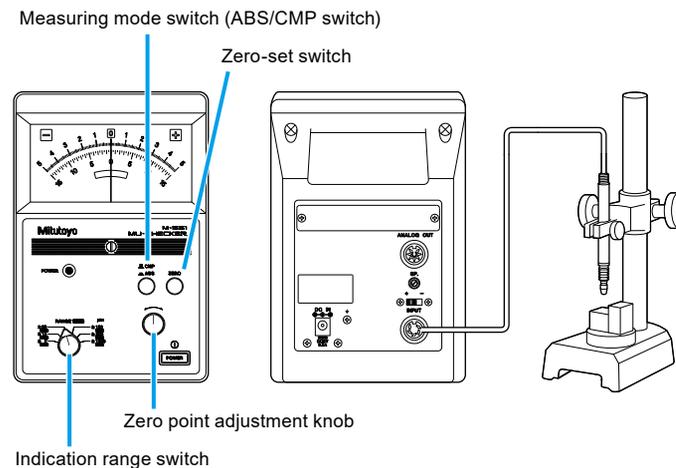
Differential type



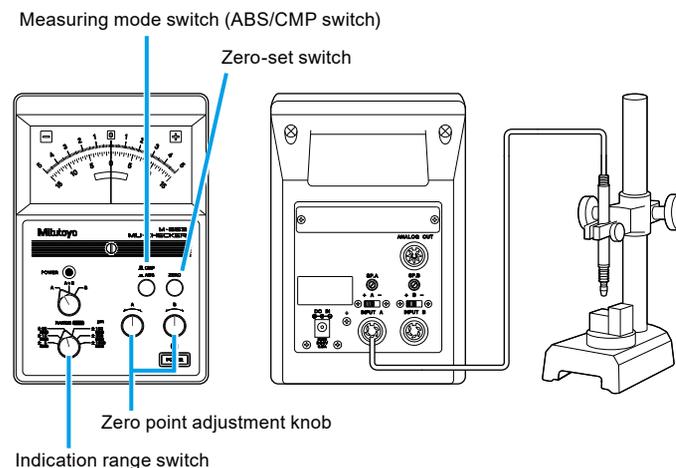
Tips

For differential type, one zero point adjustment knob is provided for each probe.

Standard type



Differential type



4 Gain Adjustment

3 Set the gauge block to be used for gain adjustment on the transfer stand.

Tips

For information about setting the gauge block, see the column on the right.

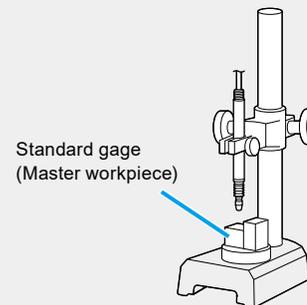
How to set the gauge block

Prepare two gauge blocks, and then adjust the gain with the length difference between the two gauge blocks. (Hereafter, the gauge block used for setting the zero point is referred to as the "standard gage".)

Select the two gauge blocks so that the length difference matches with the indication range to be used in measuring.

Tips

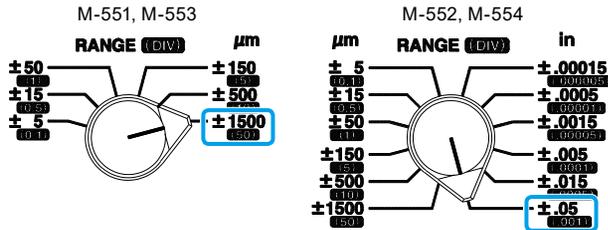
- When measuring with an indication range of $\pm 1500 \mu\text{m}$, prepare two gauge blocks with a length difference of $1500 \mu\text{m}$ (1.5 mm). (For example, blocks of size 20 mm and 21.5 mm.)
Likewise, when measuring with an indication range of $\pm 5 \mu\text{m}$, prepare two gauge blocks with the length difference of $5 \mu\text{m}$ (0.005 mm). (For example, blocks of size 1 mm and 1.005 mm.)
- When measuring with a large indication range, set the zero point on the upper surface of a granite surface plate, and adjust the gain with the length of the gauge block. (For example, 1.5 mm.)



- To perform gain adjustment accurately, use a standard gage like a gauge block that is calibrated periodically.
Please contact a sales representative at the Mitutoyo service center to request calibration of the gauge block.

4 Gain Adjustment

- Set the indication range switch at the largest indication range (for coarse adjustment).



Tips

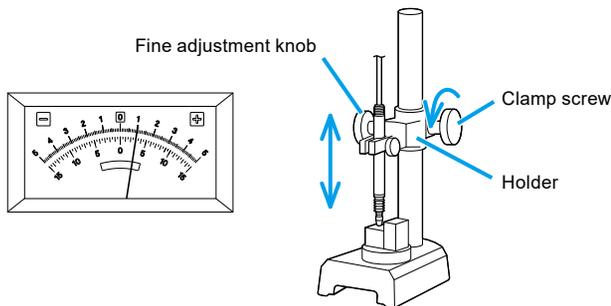
For information about how to select the indication range, see the column on the right.

- Secure the holder with one hand, and then loosen the clamp screw.
- Bring the contact point of the probe into contact with the gauge block (standard gage).
- Move the holder up and down, and tighten the clamp screw at a position where the pointer of the meter is pointing close to zero.

Tips

For information about how to read the meter for each indication range and about the pointer's movement, see the column on the right.

- Bring the pointer of the meter even closer to zero by turning the fine adjustment knob.



How to select the indication range

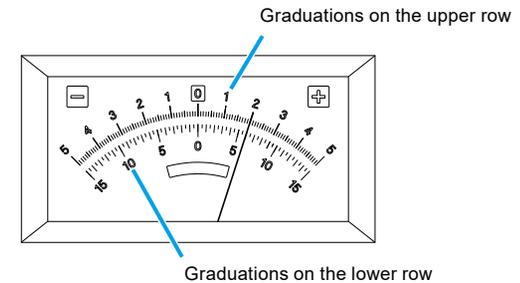
Select the indication range that matches with the dimensional tolerance or the required accuracy of the workpiece. If the variation in dimension among workpieces is expected to fall within $0 \pm 10 \mu\text{m}$, select the narrowest indication range ($\pm 15 \mu\text{m}$) which can cover the whole variation.

How to read the meter for each indication range

When you select the indication ranges $\pm 5 \mu\text{m}/\pm 50 \mu\text{m}/\pm 500 \mu\text{m}$ ($\pm .0005$ inch/ $\pm .005$ inch/ $\pm .05$ inch), read the graduations on the upper row. When you select the indication ranges $\pm 15 \mu\text{m}/\pm 150 \mu\text{m}/\pm 1500 \mu\text{m}$ ($\pm .00015$ inch/ $\pm .0015$ inch/ $\pm .015$ inch), read the graduations on the lower row.

In the following figure, readings will be as follows.

- If the indication range is $\pm 5 \mu\text{m}$ (graduation: $0.1 \mu\text{m}$).
Reading: $2 \mu\text{m}$ (Graduations on the upper row)
- If the indication range is $\pm 15 \mu\text{m}$ (graduation: $0.5 \mu\text{m}$).
Reading: $6 \mu\text{m}$ (Graduations on the lower row)



Pointer movement

If the pointer goes off the scale: select a larger indication range.

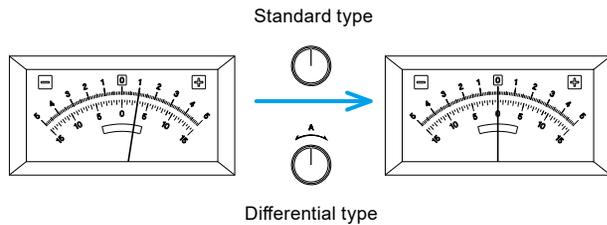
If the pointer moves only a little: select a narrower indication range.



If you switch the indication range, perform the gain adjustment again.

4 Gain Adjustment

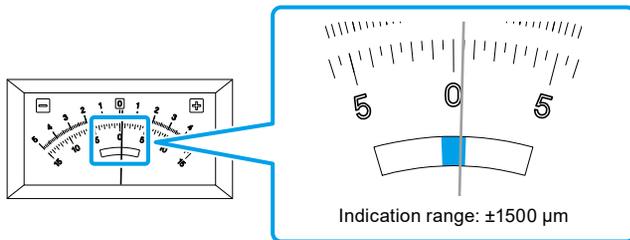
- 9 Bring the pointer of the meter closer to zero by turning the zero point adjustment knob.



Tips

If the pointer does not get close to zero even after turning the zero point adjustment knob all the way, return the line on the zero point adjustment knob to the center. Then, repeat the procedure from step 5 to adjust the height of the holder so that the pointer gets even closer to zero.

- 10 Repeat step 9, narrowing down to the indication range to be applied for measurement at the same time.
- 11 Bring the pointer of the meter within a range of $\pm 5\%$ from zero (upper row: ± 2.5 graduations, lower row: ± 1.5 graduations).



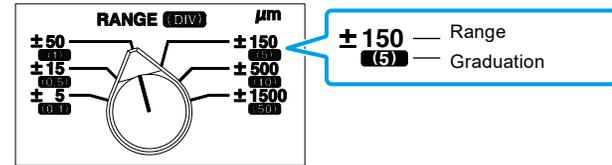
Tips

- When you are performing operations other than gain adjustment, if the pointer is positioned within the zero-set stand-by zone, further narrowing-down is not necessary.
- For information about the relationship between indication range and graduations, see the column on the right.

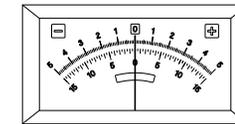
Continue to zero point setting in CMP mode.

Relationship between the indication range and graduations

Confirm the numerical values indicated in the following table or the numbers printed around the indication range switch.



M-551 / M-553		M-552 / M-554			
Range	Graduation	Range	Graduation	Range	Graduation
$\pm 1500 \mu\text{m}$	$50 \mu\text{m}$	$\pm 1500 \mu\text{m}$	$50 \mu\text{m}$	$\pm .05 \text{ inch}$	$.001 \text{ inch}$
$\pm 500 \mu\text{m}$	$10 \mu\text{m}$	$\pm 500 \mu\text{m}$	$10 \mu\text{m}$	$\pm .015 \text{ inch}$	$.0005 \text{ inch}$
$\pm 150 \mu\text{m}$	$5 \mu\text{m}$	$\pm 150 \mu\text{m}$	$5 \mu\text{m}$	$\pm .005 \text{ inch}$	$.0001 \text{ inch}$
$\pm 50 \mu\text{m}$	$1 \mu\text{m}$	$\pm 50 \mu\text{m}$	$1 \mu\text{m}$	$\pm .0015 \text{ inch}$	$.00005 \text{ inch}$
$\pm 15 \mu\text{m}$	$0.5 \mu\text{m}$	$\pm 15 \mu\text{m}$	$0.5 \mu\text{m}$	$\pm .0005 \text{ inch}$	$.00001 \text{ inch}$
$\pm 5 \mu\text{m}$	$0.1 \mu\text{m}$	$\pm 5 \mu\text{m}$	$0.1 \mu\text{m}$	$\pm .00015 \text{ inch}$	$.000005 \text{ inch}$

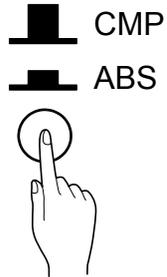


4 Gain Adjustment

■ Zero point setting in CMP mode (instant zero-setting is enabled)

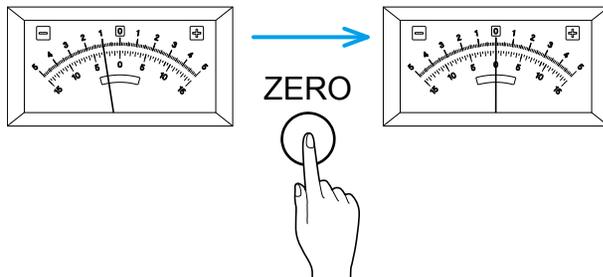
Perform this operation after adjusting the zero point in ABS mode.

- 1 Set the measuring mode switch (ABS/CMP switch) to CMP mode (extended position).



- 2 Press the zero-set switch.

- » The pointer of the meter will point precisely at zero. (Zero point setting is complete.)



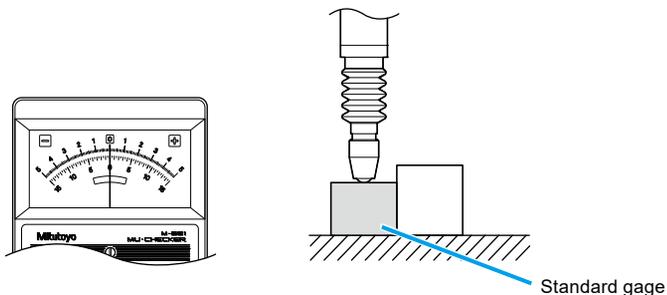
Perform the instant zero-setting for gain adjustment only when the pointer position is within $\pm 5\%$ (upper row: ± 2.5 graduations, lower row: ± 1.5 graduations) of the selected indication range.

4 Gain Adjustment

4.2.3 Adjusting a Gain

After the zero point setting is complete, adjust the gain.

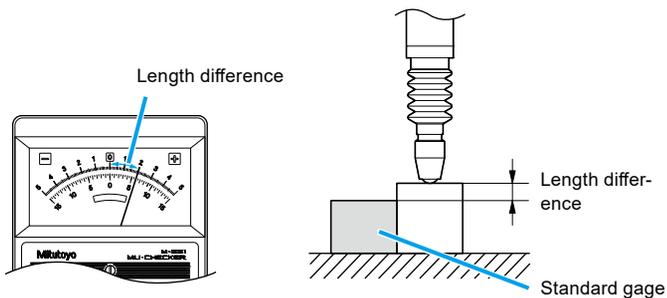
- 1 Check that the indication range switch is set to the indication range to be used in measuring.
- 2 Check that the contact point of the probe is set on the standard gage, and the pointer of the meter is pointing at zero.



- 3 Slide the two gauge blocks sideways, and set the contact point of the probe on the other gauge block.

Tips

Lift up the contact point with your fingers to prevent it from catching on the step before you slide the gauge blocks.

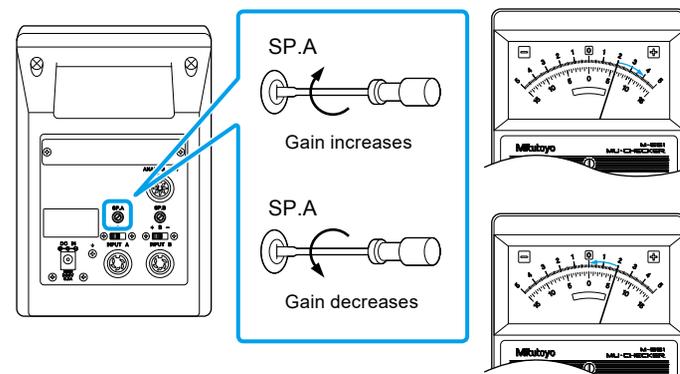


- 4 Check that the pointer of the meter is correctly indicating the length difference.

Tips

If the correct value is not indicated, turn the gain adjustment volume with a screwdriver.

For probe A of differential type



- 5 Return the contact point to the standard gage, and then check that the pointer of the meter is pointing at zero.

Tips

If the pointer is not pointing at zero, press the zero-set switch.

- 6 Repeat step 3 to step 5 to check that the length difference is indicated correctly.

Tips

- If the length difference is still not indicated correctly, set the zero point again. For details, see [4.2.2 Zero Point Setting](#) (page 10).
- If you are using two probes with a differential type display unit, after completing adjustment of the first probe, repeat the procedures starting from "switch setting" to perform gain adjustment for the second probe. For details, see [4.2.1 Connection Check and Switch Settings](#) (page 8) and [4.2.2 Zero Point Setting](#) (page 10).

5 Measuring

Perform measurement after completing gain adjustment. This section explains how to measure with one probe (probe A) and how to measure with two probes.



- If you change the probe after gain adjustment or if you will perform measurement with an indication range different from the one used in gain adjustment, perform gain adjustment again.
- If you need high precision measurements, perform measurements in an environment subject to minimal temperature change.
- If the ambient temperature has changed considerably since performing gain adjustment, perform gain adjustment again.
- Measured values may vary as the equipment heats up immediately after turning the power on. Therefore, start measuring after the movement of the pointer of the meter becomes stable.

5.1 Measuring with One Probe

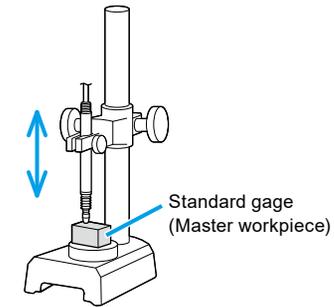
Basic measurement

Perform comparison measurement between the height of the workpiece and the standard gage (master workpiece) using the transfer stand, etc. Begin measuring with the following procedure after you complete gain adjustment in the indication range to be used for measurement.

1 Setting the zero point

- 1 Check that the probe select switch is set to [A].
- 2 Press the measuring mode switch (ABS/CMP switch) to set ABS mode (pressed-in position).
- 3 Set the line on the zero point adjustment knob to the center.

- 4 Set the standard gage on the transfer stand, etc.



- 5 In ABS mode, bring the pointer of the meter close to zero.

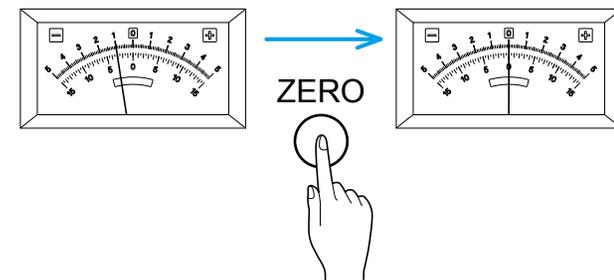
Tips

For details, see "Zero point adjustment in ABS mode (instant zero-setting is disabled)" (page 10), step 4 to step 11.

- 6 Switch to CMP mode, and then press the zero-set switch to set the pointer of the meter precisely to zero.

Tips

For details, see "Zero point setting in CMP mode (instant zero-setting is enabled)" (page 14), step 1 to step 2.

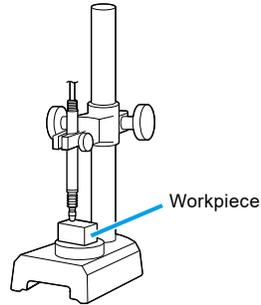
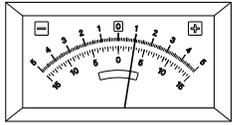


Continued on the next page

5 Measuring

2 Measuring the workpiece

- 1 Remove the standard gage.
- 2 Set the workpiece.
 - » The meter will indicate the length difference between the standard gage and the workpiece.



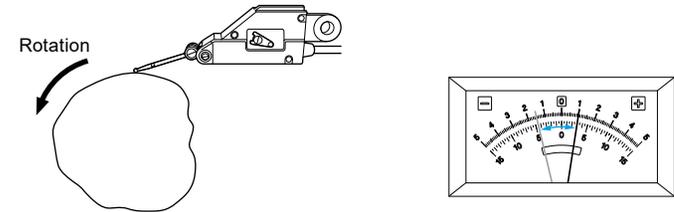
Other types of measurement

With a lever head probe, the run-out or the displacement on a flat surface can also be measured by moving the workpiece as shown in the following figures.

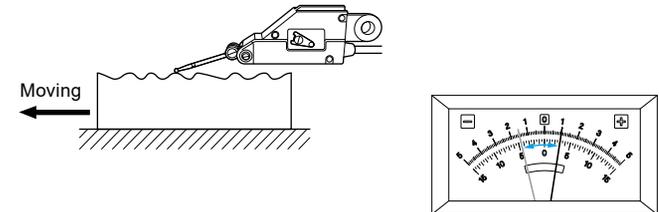
Tips

Select an indication range within which the amount of run-out or the displacement falls, and then perform gain adjustment for that indication range.

Example of run-out measurement



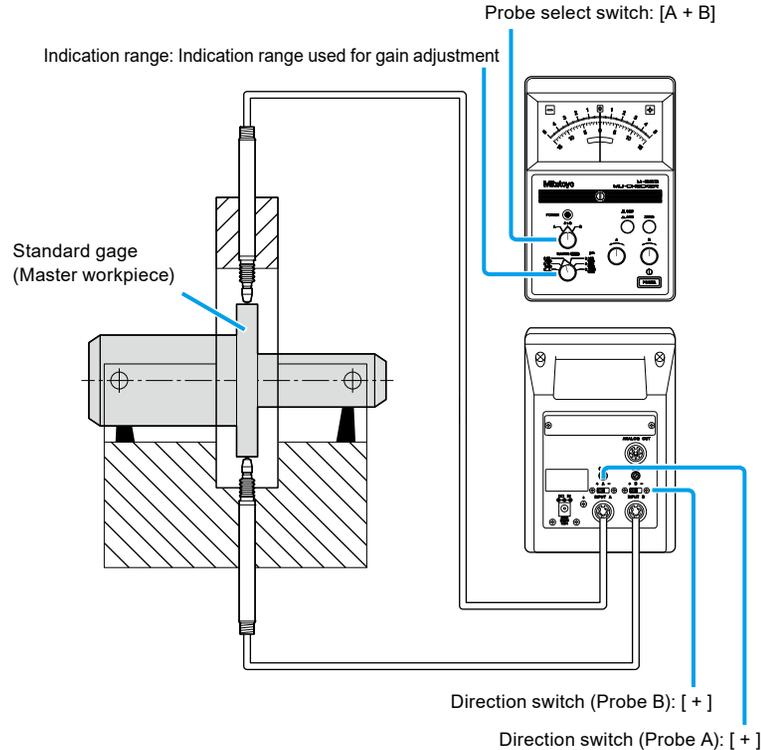
Example of measuring displacement on a flat surface



5.2 Measuring with Two Probes

Available only to differential type display units.

Various types of measurements can be performed by connecting two probes to a differential type display unit and then calculating the sum or the difference of the measured value from each probe.



Basic measurement

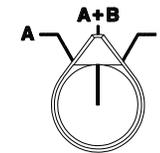
Perform comparison measurement (difference in diameter) between the workpiece and the standard gage (master workpiece) using a jig. Begin measuring with the following procedure after completing gain adjustment for both probes in the indication range to be used for measurement.

Tips

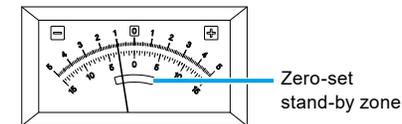
When mounting the probes on the jig, set the standard gage, and then adjust the position of each probe so that the pointer of the meter for each probe points close to zero in the indication range to be used for measurement.

1 Setting the zero point

- 1 Press the measuring mode switch (ABS/CMP switch) to set ABS mode (pressed-in position).
- 2 Set the standard gage in the jig.
- 3 Switch the probe select switch to [A].
- 4 Bring the pointer of the meter close to zero by turning the zero point adjustment knob (probe A).
- 5 Switch the probe select switch to [B].
- 6 Bring the pointer of the meter close to zero by turning the zero point adjustment knob (probe B).
- 7 Switch the probe select switch to [A + B].



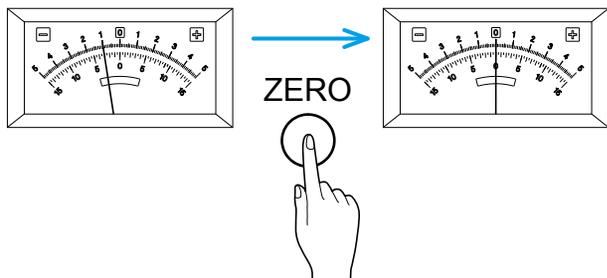
» The pointer of the meter will enter the zero-set stand-by zone.



Continued on the next page

5 Measuring

- 8 Press the measuring mode switch (ABS/CMP switch) to set CMP mode (extended position).
- 9 Press the zero-set switch.
 - » The pointer of the meter will point at zero.

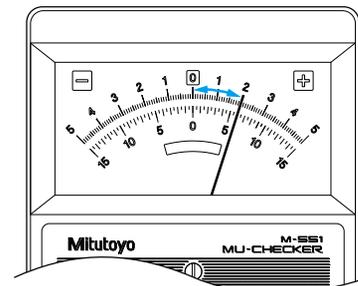


Tips

Perform measurement without switching from CMP mode (ABS/CMP switch is in extended position).

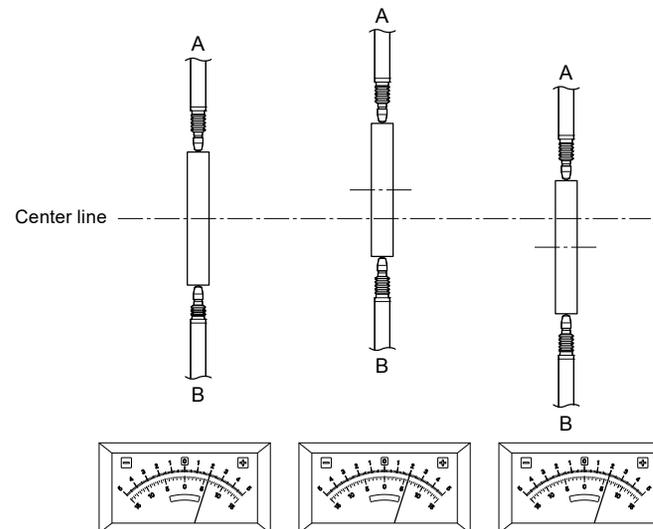
2 Measuring the workpiece

- 1 Remove the standard gage.
- 2 Set the workpiece.
 - » The meter will indicate the difference in diameter between the standard gage and the workpiece.



Tips

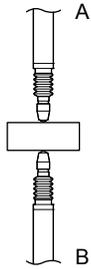
In the case of the measurement below (sum or difference calculation with two probes), the measurement result will not be affected even if the workpiece set position is shifted along the measuring direction.



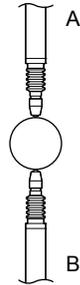
■ Other types of measurement

You can perform other types of comparison measurements between a standard gage and a workpiece as shown in the following measurement examples.

Plate thickness measurement



Sphere diameter measurement



For the above figures, note the following when mounting the probes. You can perform measurements with accuracy.

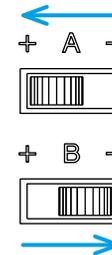
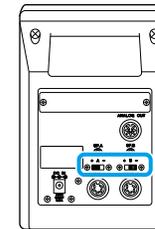
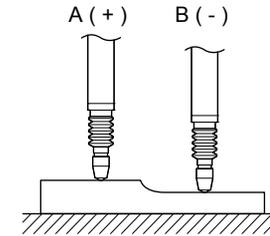
- The probes should be perpendicular to the measuring surface.
- The two probes should be aligned coaxially.

■ Step measurement

Set the zero point with the standard gage, and then measure the step on the workpiece.

Begin measuring with the following procedure after completing gain adjustment for both probes in the indication range to be used for measurement.

Gain adjustment is performed with the polarity of probe A set to (+) and the polarity of probe B set to (-).

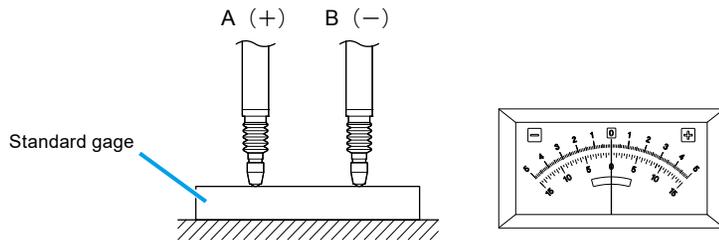


Continued on the next page

5 Measuring

1 Setting the zero point

- 1 Set the standard gage.



Tips

Prepare a standard gage that fits the thickness of the workpiece.

In the following measurement example, a standard gage that fits the thickness of the workpiece for probe A is used.

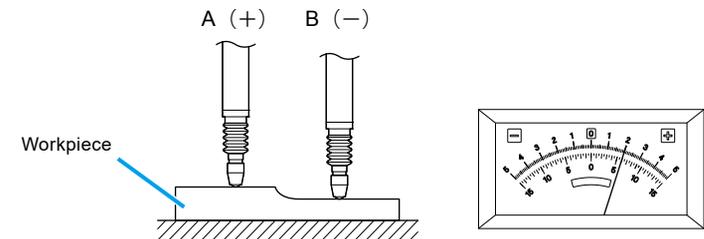
- 2 Check that the polarity of probe A is (+) and that the polarity of probe B is (-).
- 3 Press the measuring mode switch (ABS/CMP switch) to set ABS mode (pressed-in position).
- 4 Switch the probe select switch to [A].
- 5 Bring the pointer of the meter close to zero by turning the zero point adjustment knob (probe A).
- 6 Switch the probe select switch to [B].
- 7 Bring the pointer of the meter close to zero by turning the zero point adjustment knob (probe B).
- 8 Switch the probe select switch to [A + B].
- 9 Press the measuring mode switch (ABS/CMP switch) to set CMP mode (extended position).
- 10 Press the zero-set switch.
 - » The pointer of the meter will point at zero.

Tips

Perform measurement without switching from CMP mode (ABS/CMP switch is in extended position).

2 Measuring the step of the workpiece

- 1 Remove the standard gage.
- 2 Set the workpiece.
 - » The meter will indicate the length difference between probe A's part and probe B's part.

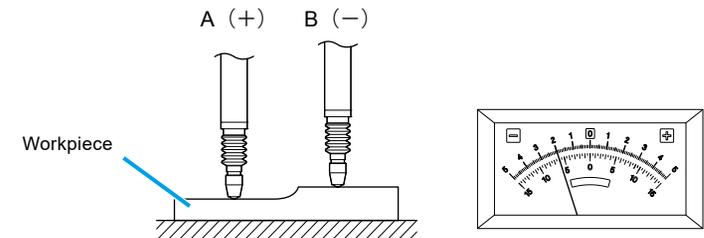


Tips

With the polarity set as in the above figure, if you set the workpiece in opposite direction (i.e., probe A's part is thinner than probe B's), the step size will be indicated as a negative value.



Take care when setting the polarity.



6 Troubleshooting

If a problem occurs during operation, follow the countermeasures described here. If the problem cannot be resolved, please contact a sales representative at the Mitutoyo service center.

Problem	Cause	Countermeasure
The pointer of the meter is moving and is not stable. Instant zero-setting cannot be performed.	You switched to CMP mode (instant zero-setting enabled) and pressed the zero-set switch before the pointer had entered the zero-set stand-by zone in ABS mode (instant zero-setting is disabled).	Switch to CMP mode after the pointer has entered the zero-set stand-by zone in ABS mode, and then press zero-set switch.  "4.2.2 Zero Point Setting" (page 10)
After changing the indication range, the pointer indication shifts widely. (The zero position shifts widely.)	CMP mode is active.	Check the indicated value in ABS mode, and then change the indication range.  "4.2.2 Zero Point Setting" (page 10)  "4.2.3 Adjusting a Gain" (page 15)
The effective indication range is narrower than the selected indication range.	<ul style="list-style-type: none"> You performed instant zero-setting at a large indicated value. (In this case, the effective indication range will be narrower.) Gain is not appropriately adjusted. 	<ul style="list-style-type: none"> Return to ABS mode, and then bring the pointer near to the center of the zero-set stand-by zone. Then switch to CMP mode and perform instant zero-setting. Perform gain adjustment using the correct procedure.  "4.2.3 Adjusting a Gain" (page 15)

Problem	Cause	Countermeasure
The measured value fluctuates and is not stable.	<ul style="list-style-type: none"> The workpiece or the probe was affected by vibration or temperature change. Magnetic coupling occurred from two probes coming too close to each other. 	<ul style="list-style-type: none"> Perform measurement in a location subject to minimal vibration and minimal temperature change. Keep the two probes further apart. Or, shield the two probes from the magnetism using a steel plate, etc.
When using a differential type display unit with two probes connected, the displacement from one probe affects that from the other probe.	Depends on the type of probe you connect.	Apply a large displacement to one probe, and check an amount of the effect on the other probe. Use this product within a displacement range where the effect can be ignored.
The pointer of the meter is constantly moving and is not stable.	The display unit or the probe is being affected by electric noise.	<ul style="list-style-type: none"> Use a separate power source from other electric equipment, such as machine tools, that run with highly variable power consumption. (Prepare a power supply exclusively for the display unit.) Take measures against electric noise, such as grounding.  "3 Connections" (page 4)

6 Troubleshooting

Problem	Cause	Countermeasure
After turning the display unit on, the pointer of the meter does not move even when the contact point of the probe is moved.	<ul style="list-style-type: none"> The probe you are operating and the setting of the probe select switch do not match. (For differential type) Either the probe or the display unit is malfunctioning. 	<ul style="list-style-type: none"> Match the setting of the probe select switch with the probe you are operating. <ul style="list-style-type: none"> "4.2.1 Connection Check and Switch Settings" (page 8) Disconnect the probe, and then turn the display unit on. <ul style="list-style-type: none"> If the power turns on (the power lamp lights), the probe is malfunctioning. If the power does not turn on (the power lamp does not light), the display unit is malfunctioning. <p>If the problem is not resolved even after you have performed the the previous countermeasures, please contact a sales representative at the Mitutoyo service center for repair.</p>

Problem	Cause	Countermeasure
The accuracy is poor when using a lever head probe.	<ul style="list-style-type: none"> Gain is not appropriately adjusted. An appropriate compensation value has not been applied. Either the probe or the display unit is malfunctioning. 	<ul style="list-style-type: none"> Perform gain adjustment. <ul style="list-style-type: none"> "4 Gain Adjustment" (page 7) Perform correction by multiplying the measured value by a compensation factor that corresponds to the actual angle of inclination of the contact point. <ul style="list-style-type: none"> "Lever Head Probe for Mu-checker User's Manual" Disconnect the probe, and then turn the display unit on. <ul style="list-style-type: none"> If the power turns on (the power lamp lights), the probe is malfunctioning. If the power does not turn on (the power lamp does not light), the display unit is malfunctioning. <p>If the problem is not resolved even after you have performed the the previous countermeasures, please contact a sales representative at the Mitutoyo service center for repair.</p>
The indication range is appropriately set, but the pointer shows unstable movement and then points at zero.	There may be a problem with an external reset signal.	Please contact a sales representative at the Mitutoyo service center for repair.

7 Technical Data

7.1 Specifications

Model number	M-551	M-553	M-552	M-554
Code No.	519-551	519-553	519-552	519-554
Number of connectable probes	One probe	Two probes	One probe	Two probes
Probe switchover	—	A, B, A + B ^{*1}	—	A, B, A + B ^{*1}
Indication range (graduation)	±1500 µm (50 µm)			
	±500 µm (10 µm)			
	±150 µm (5 µm)			
	±50 µm (1 µm)			
	±15 µm (0.5 µm)			
	±5 µm (0.1 µm)			
	—		±.05 inch (.001 inch)	
	—		±.015 inch (.0005 inch)	
	—		±.005 inch (.0001 inch)	
	—		±.0015 inch (.00005 inch)	
Indication accuracy	Linearity: ±1.0 % / FS ^{*2} (excluding the linearity of probe)			
	Analog output (voltage output) Gain: ±1.0 V / FS ^{*2} Accuracy: ±0.1 % / FS ^{*2} (excluding the linearity of probe)			
Gain error between indication ranges	±2.0 % / FS ^{*2}			
Adjustment range of zero point adjustment knob	±40 µm		±40 µm (±.0015 inch)	
Response output	10 Hz			

Model number	M-551	M-553	M-552	M-554
Code No.	519-551	519-553	519-552	519-554
Instant zero-setting	Applicable mode: CMP mode (Disabled in ABS mode) Setting error: ±0.2 % / FS ^{*2} Zero-set stand-by zone: ±30 % ^{*3} / FS ^{*2} Restriction: Change the indication range after zero point setting This also applies to analog output			
Mass (main body)	1.8 kg			
External dimensions (W × D × H)	134 mm × 183 mm × 208 mm			
Power	Main body: DC 9 V 0.5 A (4.5 W) AC adapter: AC 100 V through 240 V, 50 Hz / 60 Hz			
Operating environment	Temperature: 0 °C through 40 °C Humidity: 80 % RH or below (without condensation)			
Storage environment	Temperature: -10 °C through 50 °C Humidity: 80 % RH or below (without condensation)			
CE marking/ UKCA marking	EMC Directive/Electromagnetic Compatibility Regulations: EN 61326-1 Immunity test requirement: Clause 6.2 Table 2 Emission limit: Class B RoHS Directive/The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations: EN IEC 63000			

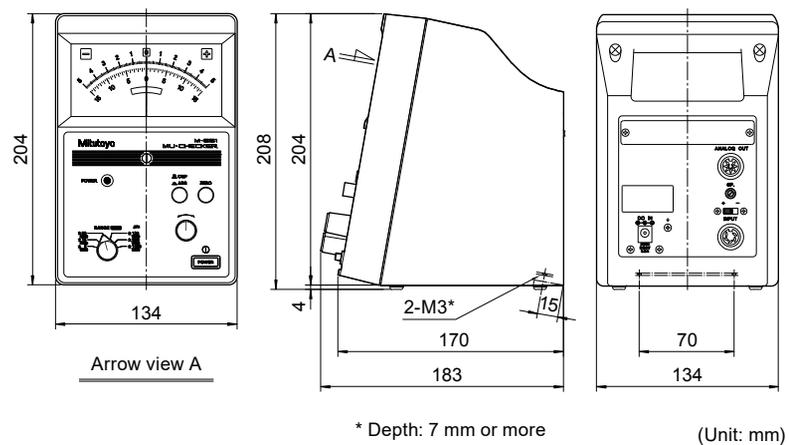
*1 The calculations "A+(-B)" and "(-A)+B" are also possible by combining different polarities.

*2 FS: Full-scale (width of maximum run-out on the meter)

*3 When you perform the instant zero-setting for gain adjustment, set the pointer of the meter within a range of ±5 % from zero.

■ Diagram of external dimensions

External dimensions are the same for all models.



7.2 I/O Connector (Female)

Outputs voltage corresponding to the indicated value on the meter via the DIN connectors (7 pins). Also, by connecting a push switch and then inputting a zeroset signal, you can set the pointer of the meter and analog output to zero.

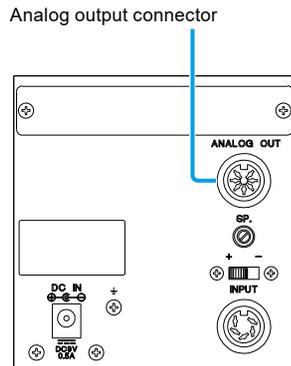


For analog output, connect an analog output code A (option) to an external output connector.

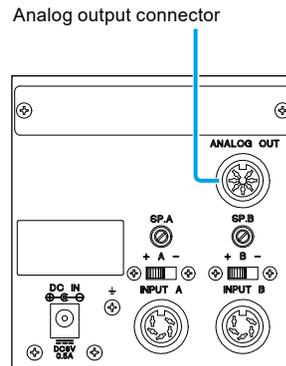
Tips

For details about the analog output code A, see "7.3 Options" (page 28).

Standard type

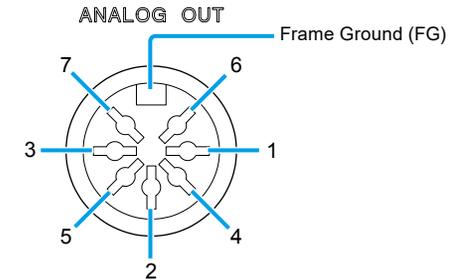


Differential type



7.2.1 Analog Output Connector (Female)

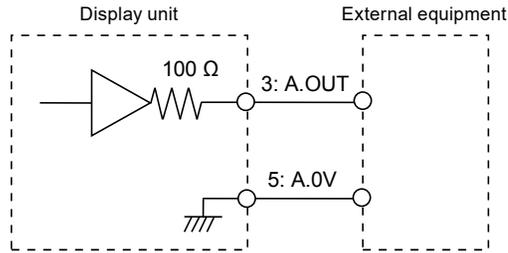
■ Analog output pins



Pin No.	Signal name	Function
1	NC	Unconnected
2	NC	Unconnected
3	A.OUT	Analog output (± 1 V)
4	GND	Ground for input signal (0 V)
5	A.0V	Ground for analog output (0 V)
6	NC	Unconnected
7	/ZERO	Zeroset signal input

■ Analog output specifications

Extract analog output signals from pin no. 3 (A.OUT) and pin no. 5 (A.0V).

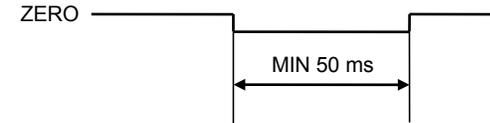


Specification	Specification details
Gain	$\pm 1.0 \text{ V} / \text{FS}^*1$
Load	300 k Ω or more (protection resistance: 100 Ω)
Accuracy	$\pm 0.1 \% / \text{FS}^*1$ (excluding the linearity of probe)

*1 FS: Full-scale (width of maximum run-out on the meter)

■ Zeroset signal input

This signal operates as a zero-set switch. Input the signal after switching the display unit to CMP mode (instant zero-setting enabled).

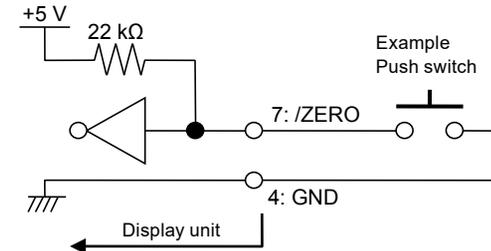


Connect the push switch as shown in the following figure.

NOTICE



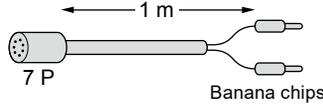
Do not apply voltage to the input terminal when the power is off. Doing so may cause failure.



Tips

For non-contact input: LOW (MAX): 1.0 V (0.3 mA)

7.3 Options

Part name	Overview / Appearance	Part No.
Analog output code A	<p>Can be connected to an external recorder, etc.</p>  <p>1 m</p> <p>7 P</p> <p>Banana chips</p>	934795
External output connector	Used for output to an external recorder, a sequencer, etc.	529035
Extension cord A	For using the probe far away from the display unit (Length: 5 m)	934386

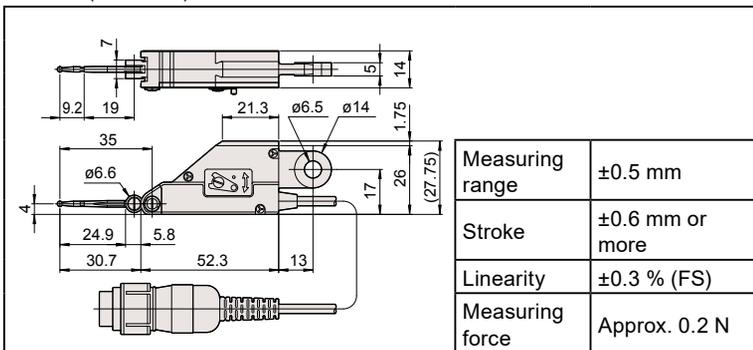
8 Probe (Option)

This section shows the probes that can be connected to this product. Select a probe according to the workpiece's specifications or the required accuracy.

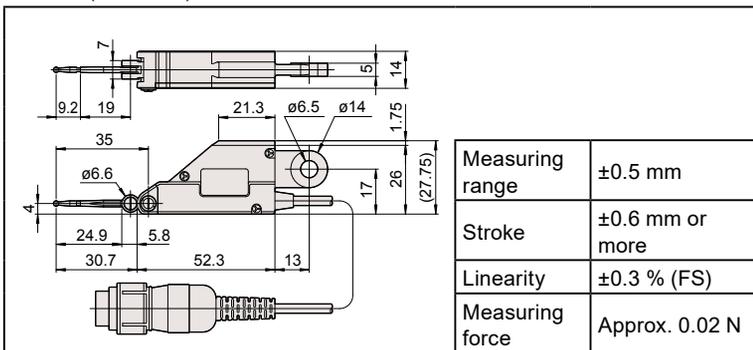
8.1 List of Applicable Probes

■ Lever head probe

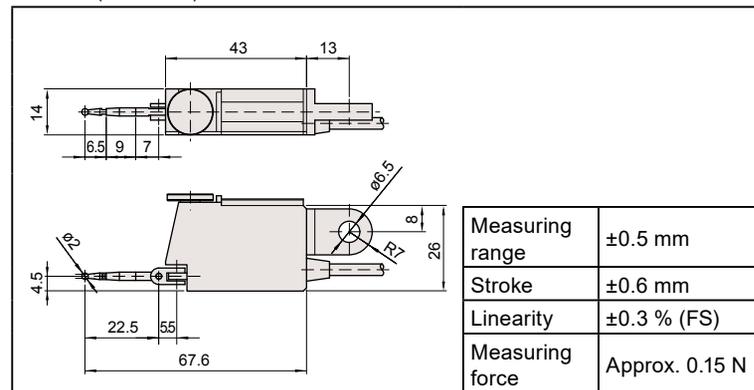
519-521 (MLH-521)



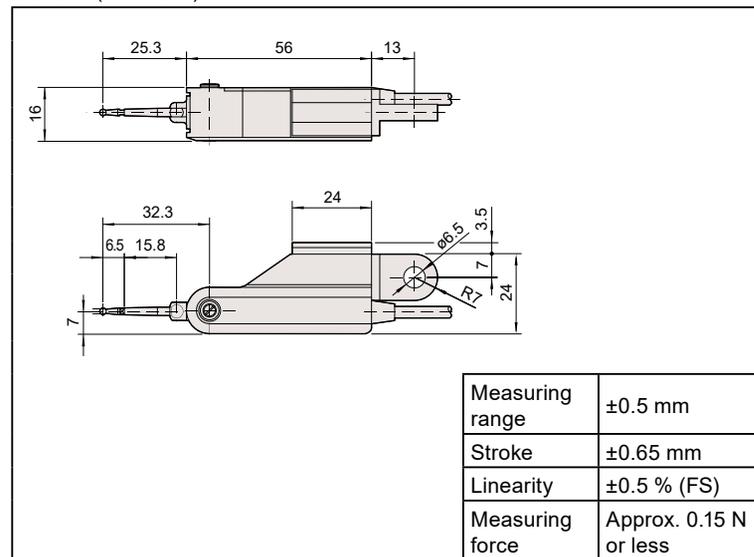
519-522 (MLH-522)



519-326 (MLH-326)



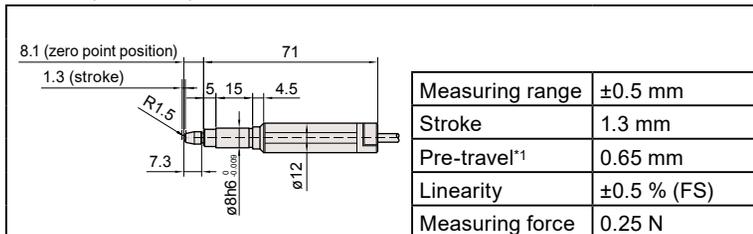
519-327 (MLH-327)



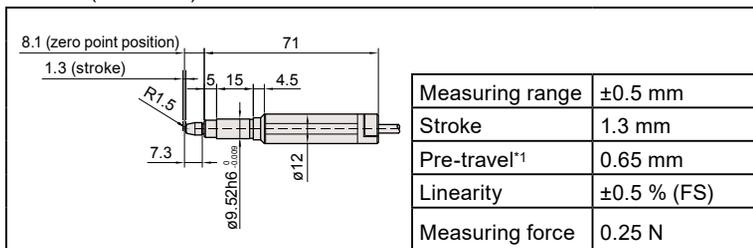
8 Probe (Option)

■ Cartridge head probe

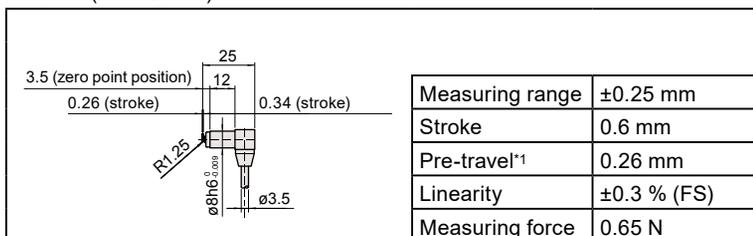
519-331 (MCH-331)



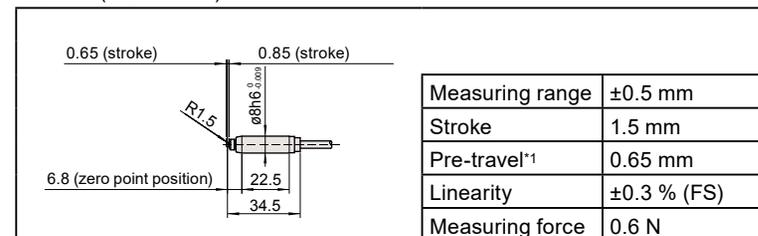
519-332 (MCH-332)



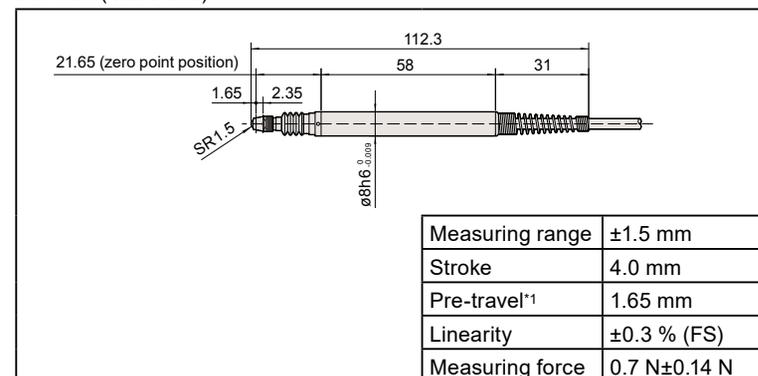
519-346 (MCHS-346)



519-347 (MCHS-347)



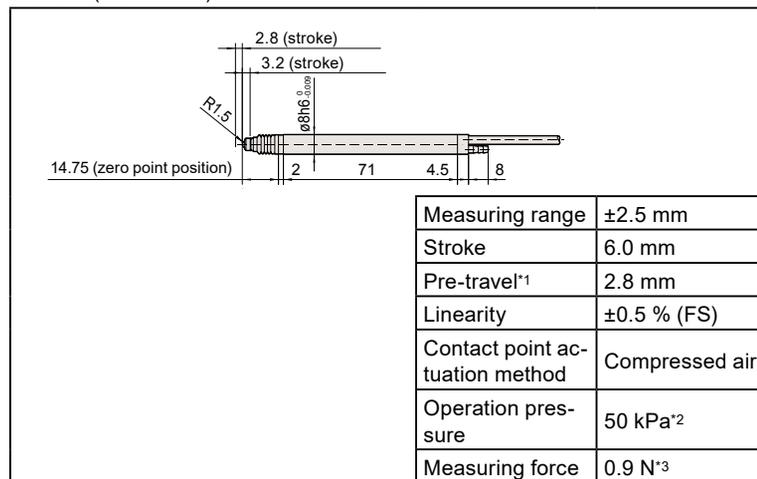
519-385 (MCH-385)



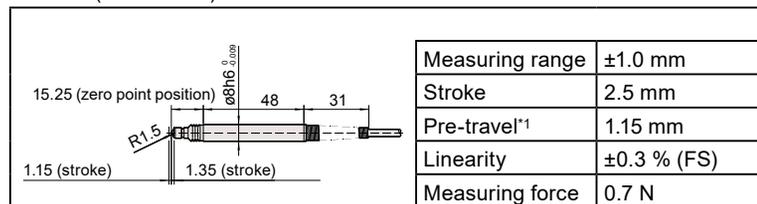
*1 Push-in amount of the contact point of the probe from the free position (no push-in amount) to a point at which the meter indicates zero.

8 Probe (Option)

519-341 (MCHP-341)



519-348 (MCHS-348)



*1 Push-in amount of the contact point of the probe from the free position (no push-in amount) to a point at which the meter indicates zero.

*2 Operation pressure when the measuring range is ± 2.5 mm. When the air supply is turned off, the contact point is pushed in.

*3 Measuring force when operation pressure is 50 kPa

8.2 Common Specifications

Specification	Details
Coil type	Linear voltage differential transformer (half-bridge)
Excitation voltage	3 V (rms)
Excitation frequency	5 kHz
Excitation waveform	Sine wave
Connection cable	2 m, $\varnothing 4$ mm
Connector type	DIN 5 pins (Male)

8.3 Changing the Contact Point

8.3.1 Lever Head Probe

The contact point is a consumable item. Change the contact point if, for example, its tip has worn down.

As an example, the following procedure explains how to change the contact point of the MLH-521/MLH-522.

NOTICE



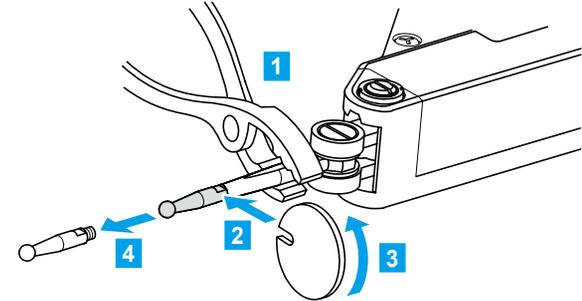
Do not fix the probe body in place while changing the contact point. If the probe body is fixed in place when you rotate the contact point, the fulcrum part of the stem swing will twist, and the bearing may be damaged. Damage to the bearing will adversely affect the stem swing and also may cause large errors in the measurement results.

- 1 Hold the stem (contact point fixing part) with pliers, etc.

Tips

Using pliers with plastic-covered blades or a soft cloth to cover the stem of the contact point will help avoid scratching the stem.

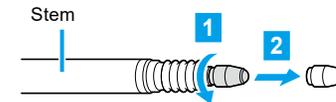
- 2 Fit the opening of the supplied spanner on the notch of the contact point.
- 3 Rotate the spanner counterclockwise to loosen the contact point.
- 4 Remove the contact point.
- 5 Attach a new contact point by the reversing the removal procedure.



8.3.2 Cartridge Head Probe

The contact point of a cartridge head probe (excluding MCHS-346 and MCHS-347) can be changed to any type of contact point (option) according to the workpiece or your application. Change the contact point using the following procedure.

- 1 Hold the stem part of the probe with one hand, and then rotate the contact point counterclockwise to loosen the contact point.



- 2 Remove the contact point.
- 3 Put a new contact point onto the spindle.
- 4 Rotate the contact point clockwise to fasten the contact point. (Recommended clamping torque: 5 N·cm)

NOTICE



- When changing the contact point, do not apply rotating force which exceeds the recommended clamping torque to the spindle (the axis onto which the contact point is attached). The probe body may be damaged.
- Do not hold the spindle with pliers, etc. The spindle may deform and be damaged.

SERVICE NETWORK

*As of February 2021

Europe

Mitutoyo Europe GmbH

Borsigstrasse 8-10, 41469 Neuss, GERMANY
TEL: 49 (0)2137 102-0 FAX: 49 (0)2137 102-351

Mitutoyo CTL Germany GmbH

Von-Gunzert-Strasse 17, 78727 Oberndorf,
GERMANY
TEL: 49 (0)7423 8776-0 FAX: 49 (0)7423 8776-99

KOMEG Industrielle Messtechnik GmbH

Zum Wasserwerk 3, 66333 Völklingen, GERMANY
TEL: 49 (0)6898 91110 FAX: 49 (0)6898 9111100

Germany

Mitutoyo Deutschland GmbH

Borsigstrasse 8-10, 41469 Neuss, GERMANY
TEL: 49 (0)2137 102-0 FAX: 49 (0)2137 86 85

M³ Solution Center Hamburg

Tempowerkring 9-im HIT-Technologiepark 21079
Hamburg, GERMANY
TEL: 49 (0)40 791894-0 FAX: 49 (0)40 791894-50

M³ Solution Center Berlin

Ernst-Lau-Straße 6, 12489 Berlin, GERMANY
TEL: 49(0)30 2611 267 FAX: 49 30 67988729

M³ Solution Center Eisenach

Neue Wiese 4, 99817 Eisenach, GERMANY
TEL: 49 (0)3691 88909-0 FAX: 49 (0)3691 88909-9

M³ Solution Center Ingolstadt

Marie-Curie-Strasse 1A, 85055 Ingolstadt,
GERMANY
TEL: 49 (0)841 954920 FAX: 49 (0)841 9549250

M³ Solution Center Leonberg

Steinbeisstrasse 2, 71229 Leonberg, GERMANY
TEL: 49 (0)7152 6080-0 FAX: 49 (0)7152 608060

Mitutoyo-Messgeräte Leonberg GmbH

Heidenheimer Strasse 14, 71229 Leonberg,
GERMANY
TEL: 49 (0)7152 9237-0 FAX: 49 (0)7152 9237-29

U.K.

Mitutoyo (UK) Ltd.

Joule Road, West Point Business Park, Andover,
Hampshire SP10 3UX, UNITED KINGDOM
TEL: 44 (0)1264 353 123 FAX: 44 (0)1264 354883

M³ Solution Center Coventry

Unit6, Banner Park, Wickmans Drive, Coventry,
Warwickshire CV4 9XA, UNITED KINGDOM
TEL: 44 (0)2476 426300 FAX: 44 (0)2476 426339

M³ Solution Center Halifax

Lowfields Business Park, Navigation Close, Elland,
West Yorkshire HX5 9HB, UNITED KINGDOM
TEL: 44 (0)1422 375566 FAX: 44 (0)1422 328025

M³ Solution Center East Kilbride

The Baird Building, Rankine Avenue, Scottish
Enterprise Technology Park, East Kilbride G75
0QF, UNITED KINGDOM
TEL: 44 (0)1355 581170 FAX: 44 (0)1355 581171

France

Mitutoyo France

Paris Nord 2-123 rue de la Belle Etoile, BP 59267
ROISSY EN FRANCE 95957 ROISSY CDG
CEDEX, FRANCE
TEL: 33 (0)149 38 35 00

M³ Solution Center LYON

Parc Mail 523, cours du 3ème millénaire, 69791
Saint-Priest, FRANCE
TEL: 33 (0)149 38 35 70

M³ Solution Center STRASBOURG

Parc de la porte Sud, Rue du pont du péage, 67118
Geispolsheim, FRANCE
TEL: 33 (0)149 38 35 80

M³ Solution Center CLUSEUS

Espace Scionzier 480 Avenue des Lacs, 74950
Scionzier, FRANCE
TEL: 33 (0)1 49 38 35 90

M³ Solution Center TOULOUSE

Aeroparc Saint Martin Cellule B08 ZAC de Saint
Martin du Touch 12 rue de Caulet 31300 Toulouse,
FRANCE
TEL: 33 (0)1 49 38 42 90

M³ Solution Center RENNES

2, rue Claude Chappe, PA le Vallon - ZAC Mivoie,
35230 Noyal-Châtillon-sur-Seiche, FRANCE
TEL: 33 (0)1 49 38 42 10

Italy

MITUTOYO ITALIANA S.r.l.

Corso Europa, 7 - 20045 Lainate (MI), ITALY
TEL: 39 02 935781
FAX: 39 02 93578255

M³ Solution Center BOLOGNA

Via dei Carpini1/A - 40011 Anzola Emilia (BO),
ITALY
TEL: 39 02 93578215 FAX: 39 02 93578255

M³ Solution Center CHIETI

Contrada Santa Calcaigna - 66020 Rocca S.
Giovanni (CH), ITALY
TEL: 39 02 93578280 FAX: 39 02 93578255

M³ Solution Center PADOVA

Via G. Galilei 21/F - 35035 Mestrino (PD), ITALY
TEL: 39 02 93578268 FAX: 39 02 93578255

Netherlands

Mitutoyo Nederland B.V.

Wiltonstraat 25, 3905 KW Veenendaal,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Nederland B.V. / M³ Solution Center Enschede

Institutenweg 50, 7521 PK Enschede,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Nederland B.V. / M³ Solution Center Eindhoven

De Run 1115, 5503 LB Veldhoven,
THE NETHERLANDS
TEL: 31(0)318-534911

Mitutoyo Research Center Europe B.V.

De Rijn 18, 5684 PJ Best, THE NETHERLANDS
TEL: 31(0)499-320200 FAX: 31(0)499-320299

Belgium

Mitutoyo Belgium N.V. / M³ Solution Center Melsele

Schaarbeekstraat 20, B-9120 Melsele, BELGIUM
TEL: 32 (0)3-2540444

Sweden

Mitutoyo Scandinavia AB

Släntvägen 6, 194 61 Upplands Väsby, SWEDEN
TEL: 46 (0)8 594 109 50 FAX: 46 (0)8 590 924 10

M³ Solution Center Alingsås

Ångsvaktaregatan 3A, 441 38 Alingsås, SWEDEN
TEL: 46 (0)8 594 109 50 FAX: 46 (0)322 63 31 62

M³ Solution Center Värnamo

Storgalsbacken 1, 331 30 Värnamo, SWEDEN
TEL: 46 (0)8 594 109 50 FAX: 46 (0)370 463 34

Switzerland

Mitutoyo (Schweiz) AG

Steinackerstrasse 35, 8902 Urdorf,
SWITZERLAND
TEL: 41 (0)447361150 FAX: 41(0)447361151

Mitutoyo (Suisse) SA

Rue Gallié 4, 1400 Yverdon-les Bains,
SWITZERLAND
TEL: 41 (0)244259422 FAX: 41 (0)447361151

Poland

Mitutoyo Polska Sp.z o.o.

Ul.Graniczna 8A, 54-610 Wroclaw, POLAND
TEL: 48 (0)71354 83 50 FAX: 48 (0)71354 83 55

Czech Republic

Mitutoyo Česko s.r.o.

Dubská 1626, 415 01 Teplice, CZECH REPUBLIC
TEL: 420 417-514-011 FAX: 420 417-579-867

Mitutoyo Česko s.r.o. M³ Solution Center Ivančice

Ke Karlovu 62/10, 664 91 Ivančice, CZECH REPUBLIC
TEL: 420 417-514-011 FAX: 420 417-579-867

Mitutoyo Česko s.r.o. M³ Solution Center Ostrava Mošnov

Mošnov 314, 742 51 Mošnov, CZECH REPUBLIC
TEL: 420 417-514-050 FAX: 420 417-579-867

Mitutoyo Česko s.r.o. Slovakia Branch

Hviezdoslavova 124, 017 01 Povážská Bystrica,
SLOVAKIA
TEL: 421 948-595-590

Hungary

Mitutoyo Hungária Kft.

Záhony utca 7, D-épület / fsz, 1031 Budapest,
HUNGARY
TEL: 36 (0)1 2141447 FAX: 36 (0)1 2141448

Romania

Mitutoyo Romania SRL

1A Drumul Garii Odai Street, showroom, Ground Floor, 075100 OTOPENI-ILFOV, ROMANIA

TEL: 40 (0)311012088 FAX: +40 (0)311012089

Showroom in Brasov

Strada Ionescu Crum Nr.1, Brasov Business Park Turnul 1, Mezanin, 500446 Brasov-Judetul Brasov, ROMANIA

TEL/FAX: 40 (0)371020017

Russian Federation

Mitutoyo RUS LLC

13 Sharikopodshipnikovskaya, bld.2, 115088 Moscow, RUSSIAN FEDERATION

TEL: 7 495 7450 752

Finland

Mitutoyo Scandinavia AB Finnish Branch

Viherkittaja 2A, 33960, Pirkkala, FINLAND

TEL: 358 (0)40 355 8498

Austria

Mitutoyo Austria GmbH

Salzburger StraÙe 260 / 3 A-4600 Wels, AUSTRIA
TEL: 43 (0)7242 219 998

Mitutoyo Austria GmbH Goetzis Regional showroom

Lastenstrasse 48a 6840 Götzis AUSTRIA

Singapore

Mitutoyo Asia Pacific Pte. Ltd.

Head office / M³ Solution Center

24 Kallang Avenue, Mitutoyo Building, SINGAPORE 339415

TEL: (65)62942211 FAX: (65)62996666

Malaysia

Mitutoyo (Malaysia) Sdn. Bhd.

Kuala Lumpur Head Office / M³ Solution Center
Mah Sing Integrated Industrial Park, 4, Jalan Utarid U5/14, Section U5, 40150 Shah Alam, Selangor, MALAYSIA

TEL: (60)3-78459318 FAX: (60)3-78459346

Penang Branch office / M³ Solution Center

30, Persiaran Mahsuri 1/2, Sunway Tunas, 11900 Bayan Lepas, Penang, MALAYSIA

TEL: (60)4-6411998 FAX: (60)4-6412998

Johor Branch office / M³ Solution Center

70 (Ground Floor), Jalan Molek 1/28, Taman Molek, 81100 Johor Bahru, Johor, MALAYSIA

TEL: (60)7-3521626 FAX: (60)7-3521628

Thailand

Mitutoyo(Thailand)Co., Ltd.

Bangkok Head Office / M³ Solution Center

76/3-5, Chaengwattana Road, Kwaeng Anusaowaree, Khet Bangkaen, Bangkok 10220, THAILAND

TEL: (66)2080 3500 FAX:(66)2521 6136

Chonburi Branch / M³ Solution Center

7/1, Moo 3, Tambon Bowin, Amphur Sriracha, Chonburi 20230, THAILAND

TEL: (66)2080 3563 FAX:(66)3834 5788

ACC Branch / M³ Solution Center

122/8, 122/9, Moo 6, Tambon Donhuaroh, Amphur Muangchonburi, Chonburi 20000, THAILAND

TEL: (66)2080 3565

Indonesia

PT. Mitutoyo Indonesia

Head Office / M³ Solution Center

Jalan Sriwijaya No.26 Desa cibatu Kec. Cikarang Selatan Kab. Bekasi 17530, INDONESIA

TEL: (62)21-2962 8600 FAX: (62)21-2962 8604

Vietnam

Mitutoyo Vietnam Co., Ltd

Hanoi Head Office / M³ Solution Center

1st & 2nd floor, MHDl Building, No. 60 Hoang Quoc Viet Road, Nghia Do Ward, Cau Giay District, Hanoi, VIETNAM

TEL: (84)24-3768-8963 FAX: (84)24-3768-8960

Ho Chi Minh City Branch Office / M³ Solution Center

123 Dien Bien Phu Street, Ward 15, Binh Thanh District, Ho Chi Minh City, VIETNAM

TEL: (84)28-3840-3489 FAX: (84)28-3840-3498

Philippines

Mitutoyo Philippines, Inc.

Head Office / M³ Solution Center

Unit 1B & 2B LTI, Administration Building 1, Annex 1, North Main Avenue, Laguna Technopark, Binan Laguna 4024, PHILIPPINES

TEL: (63)49 544 0272 FAX: (63)49 544 0272

India

Mitutoyo South Asia Pvt. Ltd. Head Office

C-122, Okhla Industrial Area, Phase-I, New Delhi-110 020, INDIA

TEL: (91) 11-26372090 FAX: (91) 11-26372636

MSA Technical Center

Plot no. 65, Ground Floor, Udyog Vihar, Phase-4 Gurgaon, Haryana - 122016, INDIA

TEL: (91) 124-2340286/287

Mumbai Region Head office

303, Sentinel Hiranandani Business Park Powai, Mumbai-400 076, INDIA

TEL: (91) 22-25700684/837/839

FAX: (91) 22-25700685

Pune Office / M³ Solution Center

G4/G5, Pride Kumar Senate, Off. Senapati Bapat Road, Pune-411 016, INDIA

TEL: (91) 20-25660043/44/45

FAX: (91) 20-66033644

Bengaluru Region Head office / M³ Solution Center

No. 5, 100 Ft. Road, 17th Main, Koramangala, 4th Block, Bengaluru-560 034, INDIA

TEL: (91) 80-25630946/47/48

FAX: (91) 80-25630949

Chennai Office / M³ Solution Center

No. 624, Anna Salai Teynampet, Chennai-600 018, INDIA

TEL: (91) 44-24328823/24

FAX: (91) 44-24328825

Kolkata Office

Unit No. 1208, Om Tower, 32, J.L. Nehru Road, Kolkata-700 071, INDIA

TEL: 91 33-22267088/40060635

FAX: (91) 33-22266817

Ahmedabad Office/M³ Solution Center

(Ahmedabad)

A-104 & A-105, First Floor, Solitaire Corporate Park, Near Divya Bhaskar Press, S.G. Road, Ahmedabad - 380 015, INDIA

TEL: (91) 079 - 29704902/903

Coimbatore Office

Regus, Srivari Srimath, 3rd Floor, Door No:1045, Avinashi Road, Coimbatore - 641 018, INDIA

TEL: (91) 9345005663

Taiwan

Mitutoyo Taiwan Co., Ltd. / M³ Solution Center Taipei

4F, No.71, Zhouzi St., Neihu Dist., Taipei City 114, TAIWAN (R.O.C.)

TEL: 886(2)5573-5900 FAX: 886(2)8752-3267

Taichung Branch / M³ Solution Center Taichung

1F, No. 299, Gaotie 1st Rd., Wuri Dist., Taichung City 414, TAIWAN (R.O.C.)

TEL: 886(4)2338-6822 FAX: 886(4)2338-6722

Kaohsiung Branch / M³ Solution Center Kaohsiung

1F, No.31-1, Haibian Rd., Lingya Dist., Kaohsiung City 802, TAIWAN (R.O.C.)

TEL: 886(7)334-6168 FAX: 886(7)334-6160

South Korea

Mitutoyo Korea Corporation

Head Office / M³ Solution Center

(Sanbon-Dong, Geumjeong High View Build.), 6F, 153-8, Ls-Ro, Gunpo-Si, Gyeonggi-Do, 15808 KOREA

TEL: 82(31)361-4200 FAX: 82(31)361-4201

Busan Office / M³ Solution Center

(3150-3, Daejeo 2-dong) 8, Yutongdanji 1-ro 49beon-gil, Gangseo-gu, Busan, 46721 KOREA

TEL: 82(51)324-0103 FAX: 82(51)324-0104

Daegu Office / M³ Solution Center

(Galsan-dong, Daegu Business Center), 301-Ho, 217, Seongseongdan-ro, Dalseo-gu, Daegu 42704 KOREA

TEL: 82(53)593-5602 FAX: 82(53)593-5603

China

Mitutoyo Measuring Instruments (Shanghai) Co., Ltd.

8th Floor, Tower 1 Lujiazui Jinkong Square No.1788/1800 Century Ave., Pudong New District, Shanghai 200122, CHINA

TEL: 86(21)5836-0718 FAX: 86(21)5836-0717

Suzhou Office / M³ Solution Center (Suzhou)

No. 46 Baiyu Road, Suzhou 215021, CHINA

TEL: 86(512)6522-1790 FAX: 86(512)6251-3420

Wuhan Office / M³ Solution Corner

Room 1701, Wuhan Wanda Center, No. 96, Linjiang Road, Wuchang District, Wuhan Hubei 430060, CHINA

TEL: 86(27)8544-8631 FAX: 86(27)8544-6227

Chengdu Office

1-701, New Angle Plaza, 668# Jindong Road,
Jinjiang District, Chengdu, Sichuan 610066, CHINA
TEL: 86(28)8671-8936 FAX: 86(28)8671-9086

Hangzhou Office

Room 804, Eastern International Business Center
Building 1, No.600 Jinsha Road of Hangzhou
Economic and Technological Development Zone,
310018, CHINA

TEL: 86(571)8288-0319 FAX: 86(571)8288-0320

Tianjin Office / M³ Solution Center China (Tianjin)

Room D 12/F, TEDA Building, No.256 Jie-fang Nan
Road Hexi District, Tianjin 300042, CHINA

TEL: 86(22)5888-1700 FAX: 86(22)5888-1701

Changchun Office

Room 815, 8F, Building A1, Upper East
International No.3000 Dongsheng Street, Erdao
District, Changchun, Jilin, 130031, CHINA

TEL: 86(431)8192-6998 FAX: 86(431)8192-6998

Chongqing Office

Room 1312, Building 3, Zhongyu Plaza, No.86,
Hongjin Avenue, Longxi Street, Yubei District,
Chongqing, 400000, CHINA

TEL: 86(23)6595-9950 FAX: 86(23)6595-9950

Qingdao Office

Room 638, 6F, No.192 Zhengyang Road,
Chengyang District, Qingdao, Shandong, 266109,
CHINA

TEL: 86(532)8096-1936 FAX: 86(532)8096-1937

Xi'an Office

Room 805, Xi'an International Trade Center, No. 196
Xiaozhai East Road, Xi'an, 710061, CHINA

TEL: 86(29)8538-1380 FAX: 86(29)8538-1381

Dalian Office / M³ Solution Center China (Dalian)

Room A-106 Shuijing SOHO, No.16 Harbin
Road, Economic Development Zone, Dalian, 116600
CHINA

TEL: 86(411)8718 1212 FAX: 86(411)8754-7587

Zhengzhou Office

Room1801, 18/F, Unit1, Building No.23,
Shangwu Inner Ring Road, Zhengdong New
District, Zhengzhou City, Henan 450018, CHINA

TEL: 86(371)6097-6436 FAX: 86(371)6097-6981

Dongguan Office / M³ Solution Center China (Dongguan)

Room 801, No 65, Chang'an Section Guanchang
Road, Chang'an Town, Dongguan City, Guangdong
523841, CHINA

TEL: 86(769)8541 7715 FAX: 86(769)-8541 7745

Fuzhou Office

Room 2104, City Commercial Centre, No.129 Wu Yi
Road N., Fuzhou City, Fujian 350005, CHINA

TEL: 86 (591) 8761 8095 FAX: 86 (591) 8761 8096

Changsha Office

Room 2207, Building 1, Shiner International Plaza,
No. 88, Kaiyuan Middle Road, Changsha City,
Hunan 410100, CHINA

TEL: 86 (731) 8401 9276 FAX: 86 (731) 8401 9376

Mitutoyo Leepport Metrology (Hong Kong) Limited

Room 818, 8/F, Vanta Industrial Centre, No.21-33,
Tai Lin Pai Road, Kwai Chung, NT, HONG KONG

TEL: (852)2992-2088 FAX: (852)2670-2488

Mitutoyo Measuring Instruments (Suzhou) Co., Ltd.

No. 46 Baiyu Road, Suzhou 215021, CHINA

TEL: 86(512)6252-2660 FAX: 86(512)6252-2580

U.S.A.**Mitutoyo America Corporation**

965 Corporate Blvd., Aurora, IL 60502, U.S.A.

TEL: 1-(630)820-9666

Toll Free No. 1-888-648-8869

FAX: 1-(630)978-3501

M³ Solution Center-Illinois

965 Corporate Blvd., Aurora, IL 60502, U.S.A.

M³ Solution Center-Ohio

6220 Hi-Tek Ct., Mason, OH 45040, U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(513)754-0718

M³ Solution Center-Michigan

46850 Magellan Drive, Suite 100 Novi, MI 48377,
U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(248)-926-0928

M³ Solution Center-California

16925 E. Gale Ave., City of Industry, CA 91745,
U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(626)369-3352

M³ Solution Center-North Carolina

11515 Vanstory Dr., Suite 140, Huntersville, NC
28078, U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(704)875-9273

M³ Solution Center-Alabama

2100 Riverchase Center Suite 106, Birmingham,
AL 35244, U.S.A.

TEL: 1-(888)-648-8869 FAX: s1-(205)-988-3423

M³ Solution Center-Washington

1000 SW 34th St. Suite G, Renton, WA 98057
U.S.A.

TEL: 1-(888)-648-8869

M³ Solution Center-Texas

4560 Kendrick Plaza Drive Suite 120 Houston, TX
77032, U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(281)227-0937

M³ Solution Center-Massachusetts

753 Forest Street, Suite 110, Marlborough, MA
01752, U.S.A.

TEL: 1-(888)648-8869 FAX: 1-(508)485-0782

Mitutoyo America Corporation Calibration Lab

965 Corporate Blvd., Aurora, IL 60502, U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(630)978-6477

Mitutoyo Research & Development America, Inc.

11533 NE 118th St., Kirkland, WA 98034-7111,
U.S.A.

TEL: 1-(425)821-3906 FAX: 1-(425)821-3228

Mitutoyo Research & Development America, Inc. - California Office

16925 Gale Ave. City of Industry, CA 91745-1806
U.S.A.

TEL: 1-(425)821-3906 FAX: 1-(425)821-3228

Mitutoyo America Corporation CT-Lab Chicago

965 Corporate Blvd., Aurora, IL 60502, U.S.A.

TEL: 1-(888)-648-8869 FAX: 1-(630)-820-3418

Canada**Mitutoyo Canada Inc.**

2121 Meadowvale Blvd., Mississauga, Ont. L5N
5N1., CANADA

TEL: 1-(905)821-1261 FAX: 1-(905)821-4968

Montreal Office

7075 Place Robert-Joncas Suite 129, Montreal,
Quebec H4M 2Z2, CANADA

TEL: 1-(514)337-5994 FAX: 1-(514)337-4498

Brazil**Mitutoyo Sul Americana Ltda.****Head office / M³ Solution Center**

Rodovia Índio Tibiriçá 1555, CEP 08655-000 - Vila
Sol Nascente - Suzano - SP - BRASIL

TEL: 55 (11)5643-0040

Argentina**Mitutoyo Sul Americana Ltda.****Argentina Branch / M³ Solution Center**

Av. B. Mitre 891/899 - C.P. (B1603CQI) Vicente
López -Pcia. Buenos Aires - ARGENTINA

TEL: 54(11)4730-1433 FAX: 54(11)4730-1411

Sucursal Cordoba / M³ Solution Center

Av. Amadeo Sabattini, 1296, esq. Madrid B° Crisol
Sur - CP 5000, Cordoba, ARGENTINA

TEL/FAX: 54 (351) 456-6251

Mexico**Mitutoyo Mexicana, S.A. de C.V.**

Industria Eléctrica No.15, Parque Industrial,
Naucalpan de Juárez, Estado de México C.P.53370,
MÉXICO

TEL: 52 (01-55) 5312-5612

FAX: 52 (01-55) 5312-3380

Monterrey Office/ M³ Solution Center

Blv. Interamericana No. 103, Parque Industrial
FINSA, C.P. 66636 Apodaca, N.L., MÉXICO

TEL: 52(01-81) 8398-8227/8228/8242/8244

FAX: 52(01-81) 8398-8226

Tijuana Office/ M³ Solution Center

Calle José María Velasco 10501-C, Col. Cd.
Industrial Nueva Tijuana, C.P. 22500 Tijuana, B.C.,
MÉXICO

TEL: 52 (01-664) 647-5024

Querétaro Office / M³ Solution Center

Av. Cerro Blanco No.500-1, Colonia Centro Sur,
Querétaro, Querétaro, C.P. 76090, MÉXICO

TEL: 52 (01-442) 340-8018, 340-8019 and 340-
8020

FAX: 52 (01-442) 340-8017

Mitutoyo Mexicana, S.A. de C.V. Querétaro Calibration Laboratory

Av. Cerro Blanco 500 30 Centro Sur, Querétaro,
Querétaro, C.P. 76090, MÉXICO

TEL: 52 (01-442) 340-8018, 340-8019 and 340-
8020

FAX: 52 (01-442) 340-8017

Aguascalientes Office / M³ Solution Center

Av. Aguascalientes No. 622, Local 15 Centro
Comercial El Cilindro Fracc. Pulgas Pandas Norte,
C.P. 20138, Aguascalientes, Ags. MÉXICO

TEL: 52 (01-449) 174-4140 and 174-4143

Irapuato Office / M³ Solution Center

Boulevard a Villas de Irapuato No. 1460 L.1 Col.
Ejido Irapuato C.P. 36643 Irapuato, Gto., MÉXICO

TEL: 52 (01-462) 144-1200 and 144-1400

Revision History

Date of publication	No. of revisions	Revision details
August 1, 2017	First edition	Printed
March 1, 2019	Revised first edition	Revised in accordance with changes to modification of product specification
October 1, 2020	Revised second edition	Revised in accordance with changes to modification of product specification
December 1, 2020	Revised third edition	Revision due to changes of the harmonized European standards, etc.
July 1, 2021	Revised fourth edition	Additions and changes due to application of the UKCA (UK Conformity Assessed) marking

Mitutoyo Corporation

20-1, Sakado 1-Chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8533, Japan
Tel: +81 (0)44 813-8230 Fax: +81 (0)44 813-8231
Home page: <http://www.mitutoyo.co.jp/global.html>

For the EU Directive, Authorized representative and importer in the EU:
Mitutoyo Europe GmbH
Borsigstrasse 8-10, 41469 Neuss, Germany

For the UK Regulation, Authorized representative and importer in the UK:
Mitutoyo (UK) Ltd.
Joule Road, West Point Business Park, Andover, Hampshire SP10 3UX,
UNITED KINGDOM

Printed in Japan

No. 99MBC600B