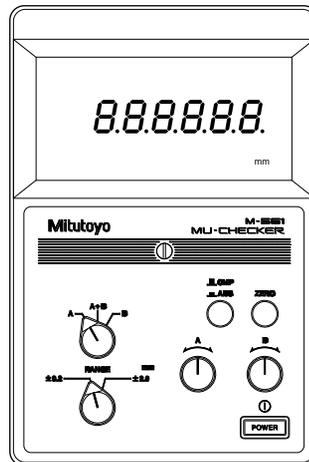


Electric Micrometer Digital Mu-Checker

M561: Digital display unit for Mu-checker (differential type)

M562: Digital 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. 99MBC601B4
Date of publication: July 1, 2021 (1)



■ Product names and model numbers covered in this document

Product name	Model number
Digital Mu-checker	M-561
(Digital display unit for Mu-checker (differential type))	M-562

■ 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.

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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.
	
	<ul style="list-style-type: none"> 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	
	<ul style="list-style-type: none"> 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 Specification" (page 25)).

■ 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 digital display unit 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.

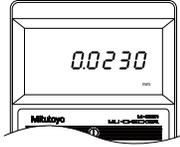
■ How to read this document

Indicates an operating procedure to be performed or its outline.

2 Measuring the workpiece

- 1 Remove the standard gage.
- 2 Set the workpiece.

» The difference in diameter between the standard gage and the workpiece will be displayed.



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.

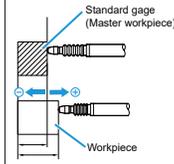
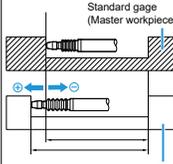
Indicates supplementary information.

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
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 "+".)	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 "-".)
	
Polarity: + 	Polarity: - 

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.
 -  "Selecting the polarity" (page 9)
 -  "How to set the gauge block" (page 11)
 -  "How to select the indication range" (page 12)
 -  "If [OF] or [-OF] is displayed" (page 12)
 -  "Relationship between the indication range and minimum reading" (page 13)
 -  "Offset of the display range after performing zero point setting" (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	25
7.1 Specification	25
7.2 I/O Connector (Female)	27
7.2.1 Analog Output Connector (Female)	27
7.2.2 Digimatic code input/output connector (Female)	29
7.3 Options	30
8 Probe (Option)	31
8.1 List of Applicable Probes	31
8.2 Common Specifications	33
8.3 Changing the Contact Point.....	34
8.3.1 Lever Head Probe.....	34
8.3.2 Cartridge Head Probe	34
SERVICE NETWORK	App-1

1 Overview

This product is a digital 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 a digital-type display unit for electric micrometers with an instant zero-setting function. With a probe that uses a differential inductance method, you can perform high-accuracy comparison measurements. Also, it can be connected to various types of Digimatic devices. The available models and example use cases are introduced below.

Available models

Model	Number of connectable probes
M-561 and M-562: Differential type	2

Tips

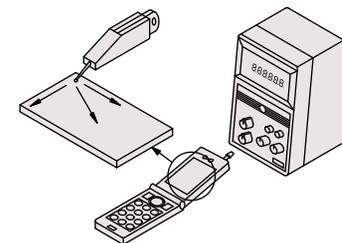
Some older probes with a different shaped connector cannot be connected to this product.

Usage examples

Measuring warping in liquid crystal glass

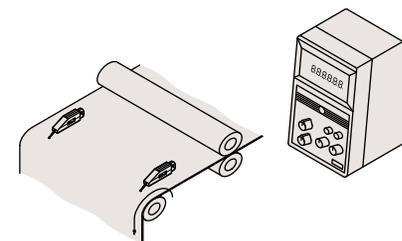
With a low measuring force type lever head probe (MLH-522), you can measure warping without damage to the liquid crystal glass.

- Lever head probe
MLH-522
- Differential type display unit
M-561/M-562



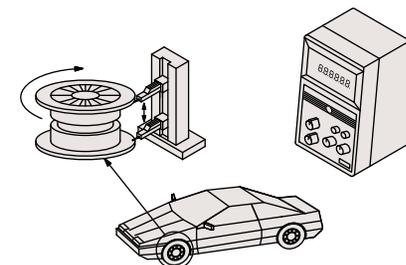
Measuring the thickness of a roll sheet

- Lever head probe
MLH-521 × 2
- Differential type display unit
M-561/M-562



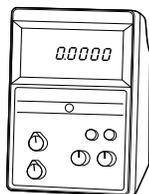
Measuring the width of wheels for vehicles

- Lever head probe
MLH-521 × 2
- Differential type display unit
M-561/M-562

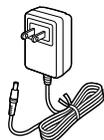


1.2 Included Items

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



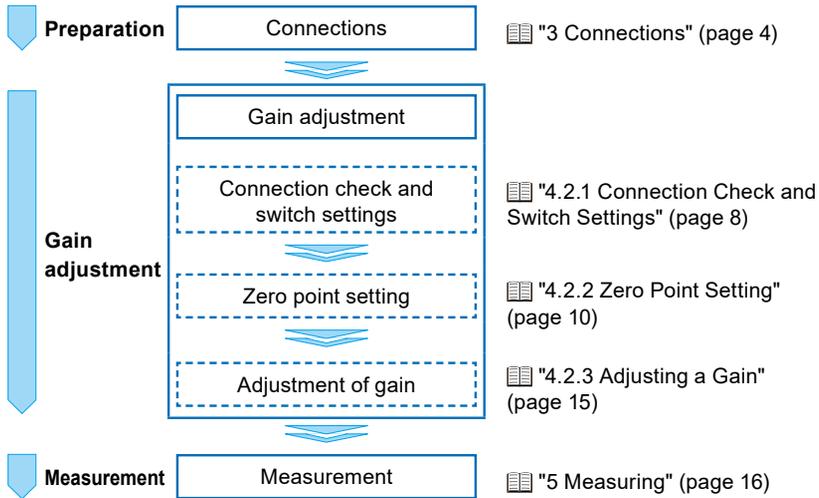
This document



Warranty card

Product code no.	AC adapter part no.	Destination
519-561 519-562	06AGC585JA	For use in Japan
519-561A 519-562A	06AGC585JA	For use in North America
519-561D 519-562D	06AGC585D	For use in Europe
519-561E 519-562E	06AGC585E	For use in the UK
519-561DC 519-562DC	06AEG302DC	For use in China
519-561K 519-562K	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



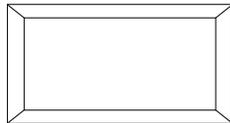
Only connect probes or other equipment while the power is turned off. Making connections while the power turned on may cause a malfunction.

■ Connection procedure

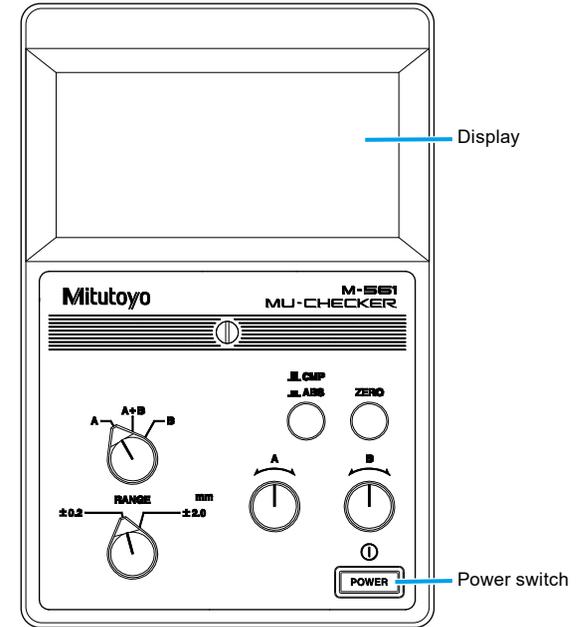
- 1 Check that the power switch is turned off (in extended position).



- 2 Check that the display is not lit.



Front panel



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

This product can work with a single probe. (Either probe connector, INPUT A or INPUT B, can be used.)

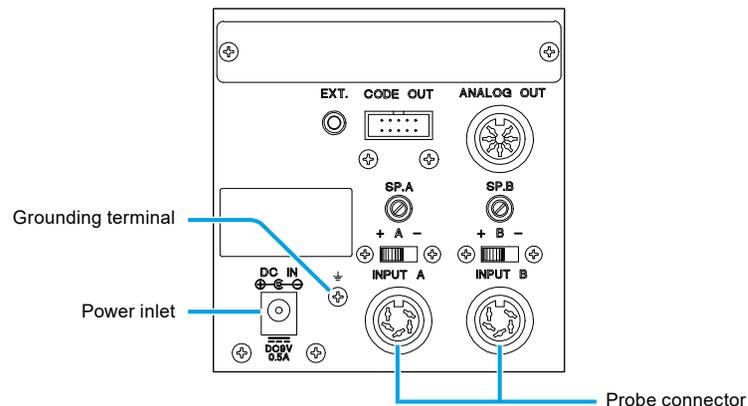
5 Connect other equipment.

Tips

For details about connecting other equipment, see "7.2 I/O Connector (Female)" (page 27).

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

Rear panel



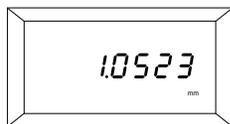
3 Connections

■ Operation check procedure

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



- 2 Check that a numerical value has appeared on the display.



- 3 Check that the numerical value on the display changes by moving the contact point of the probe.

- 4 When using a lever head probe (MLH-521), check that the measuring direction switching lever is set in right position for your application.



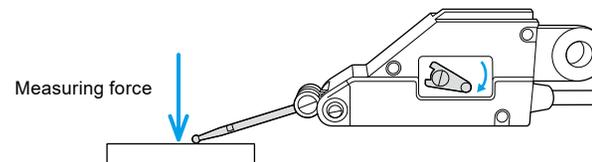
If you switch the position of the lever, the tip of the contact point will move slightly. Be sure to set the zero point again if you switch the position of the lever during measurement.

Tips

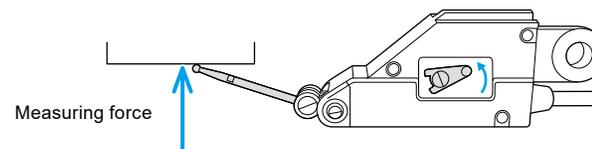
For information about the measuring direction and lever positioning, see the column on the right.

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 the 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

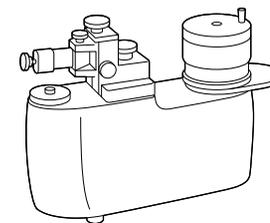
Gain adjustment can be performed for this product with the following two types of optional devices.

Tips

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

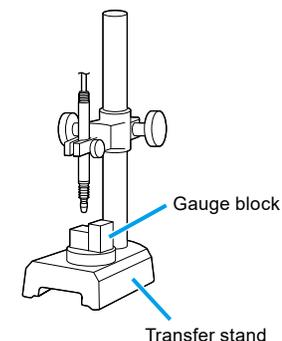
■ Calibration tester (No. 521-103, No. 521-105)

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

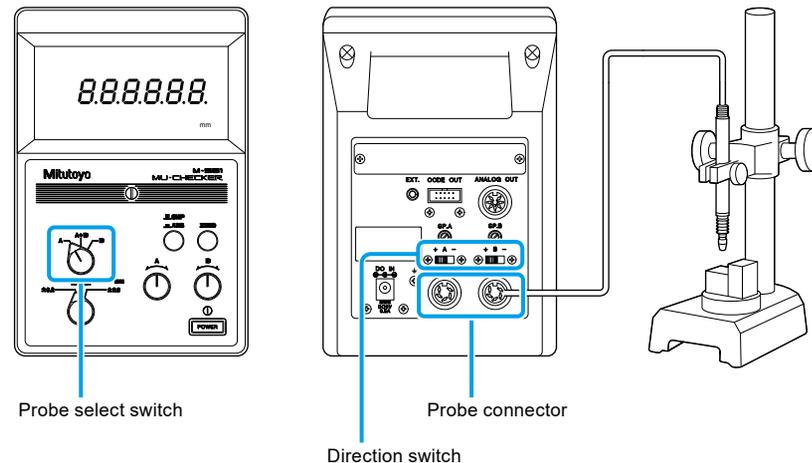
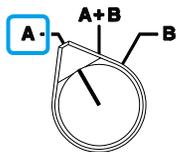
Perform gain adjustment in the following order: "switch setting", "zero point setting", "adjustment of gain".

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, and the polarity setting.

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

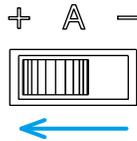


4 Gain Adjustment

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 whether the display value will increase (+) or decrease (-), 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.

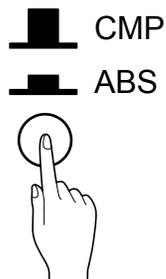
Step 1: Zero point adjustment with the zero point adjustment knob in ABS mode

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

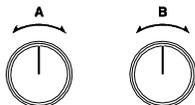
First, in ABS mode, repeatedly perform zero point adjustment while narrowing the indication range until you reach the indication range to be used in measuring. Then, switch to CMP mode, and then press the zero-set switch to set the zero point precisely.

■ 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.

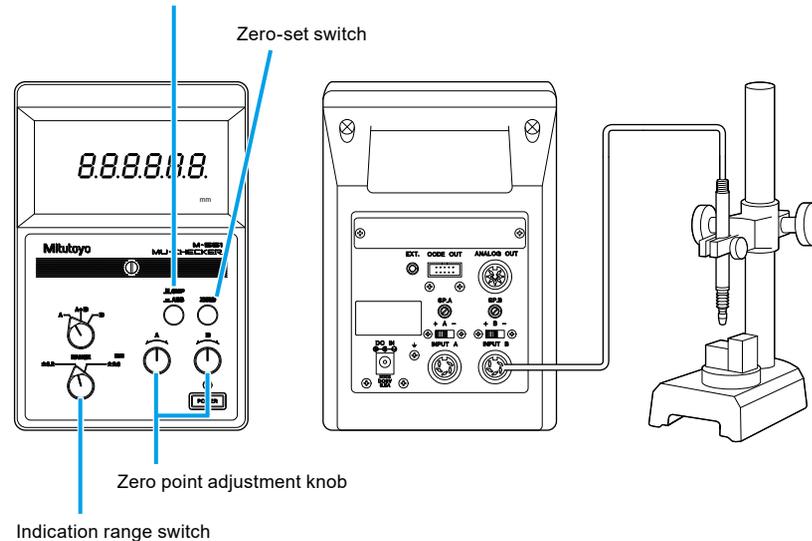


Tips

One zero point adjustment knob is provided for each probe.

Measuring mode switch (ABS/CMP switch)

Zero-set switch



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.

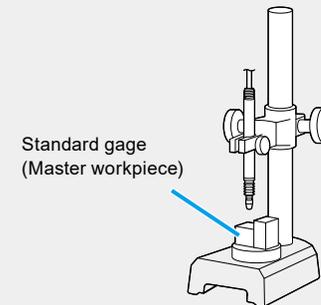
How to set the gauge block

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

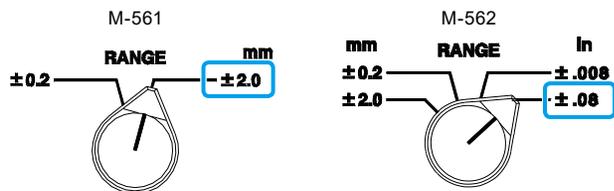
- When measuring with an indication range of ± 2.0 mm, prepare two gauge blocks with a length difference of 2.0 mm. (For example, blocks of size 20 mm and 22 mm.)
- Likewise, when measuring with an indication range of ± 0.2 mm, prepare two gauge blocks with the length difference of 0.2 mm. (For example, blocks of size 1 mm and 1.2 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, 2.0 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

- 4 Set the indication range switch at ± 2.0 (mm) (for coarse adjustment).



Tips

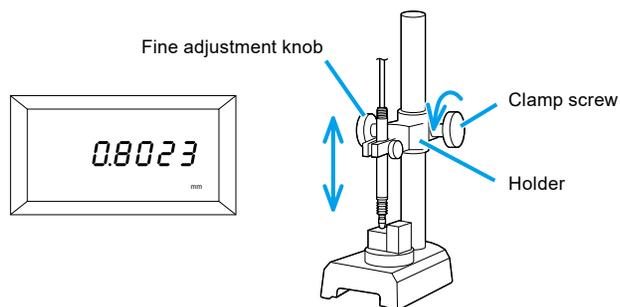
For information about how to select the indication range, see the column on the right.

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

Tips

If [OF] or [-OF] is displayed, refer to the column on the right.

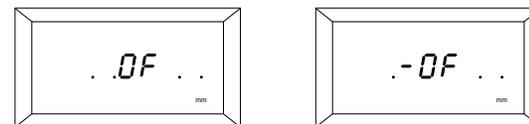
- 8 Bring the display value even closer to zero by turning the fine adjustment knob.



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 ± 0.2 mm, select ± 0.2 mm. If the variation between workpieces is expected to exceed 0 ± 0.2 mm, select ± 2.0 mm.

If [OF] or [-OF] is displayed



[OF]: The probe position has moved over the indication range in the positive direction.

- Switch the indication range to ± 2.0 (mm).
- Adjust the probe position toward the negative direction.

[-OF]: The probe position has moved over the indication range in the negative direction.

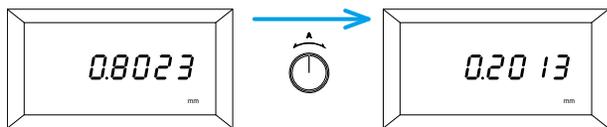
- Switch the indication range to ± 2.0 (mm).
- Adjust the probe position toward the positive direction.



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

4 Gain Adjustment

- 9 Bring the display value close to zero by turning the zero point adjustment knob.



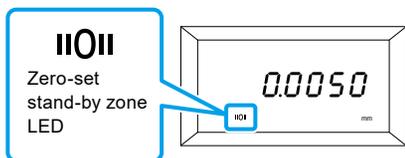
Tips

If the display value 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 display value gets even closer to zero.

- 10 Switch to the indication range to be applied for measurement, and repeat step 9.

- 11 Bring the display value close to zero in the indication range to be applied for measurement (less than 0 ± 0.68 mm).

» The zero-set stand-by zone LED turns on.



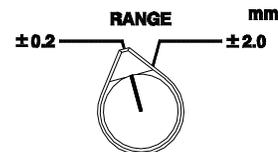
Tips

- If the display value falls within a range less than 0 ± 0.68 mm, you can perform instant zero-setting in CMP mode.
- Performing zero point setting in CMP mode will affect the display range. For information about the offset of the display range after performing zero point setting, see the column on the right.
- If you switch to CMP mode and press the zero-set switch while the zero-set stand-by zone LED is not lit, the display will blink three times, indicating that the zero point setting cannot be done. In this case, switch the measurement mode to ABS mode, and then repeat the procedure from step 5.
- For information about the relationship between the indication range and minimum reading, see the column on the right.

Continue to zero point setting in CMP mode.

Relationship between the indication range and minimum reading

See the following table.



M-561		M-562			
Range	Resolution	Range	Resolution	Range	Resolution
±2.0 mm	0.001 mm	±2.0 mm	0.001 mm	±.08 inch	.00005 inch
±0.2 mm	0.0001 mm	±0.2 mm	0.0001 mm	±.008 inch	.000005 inch

Offset of the display range after performing zero point setting

For this explanation, we assume you performed the zero point setting after switching to CMP mode, with the indication range set to ± 0.2 mm and a display value of 0.1000 mm.

You set "0.1000 mm" as zero point, so the offset would be "-0.1000 mm".

This offset value is also applied to the display range of the indication range, so the display range will change as follows after you perform zero point setting (after offset).

- Before offset: -0.2 mm through +0.2 mm
- After offset: -0.3 mm through +0.1 mm

The display cannot display a measured value that exceeds the display range, so a value over +0.1 mm cannot be displayed after the offset, and [OF] (overflow) will appear on the display.

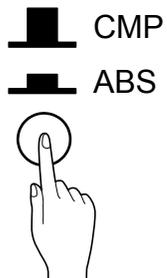
It is recommended that zero point setting be performed when the value is zero or close to zero.

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.

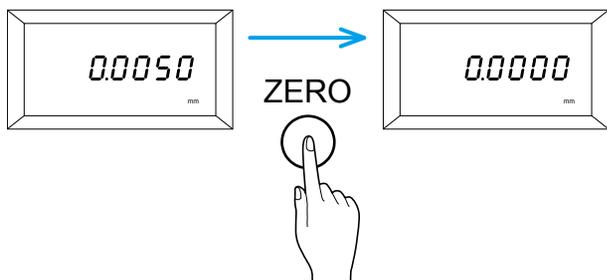
- 1 Set the measuring mode switch (ABS/CMP switch) to CMP mode (extended position).



» The zero-set stand-by zone LED turns off.

- 2 Press the zero-set switch.

» The display value will be zero (zero point setting is complete).

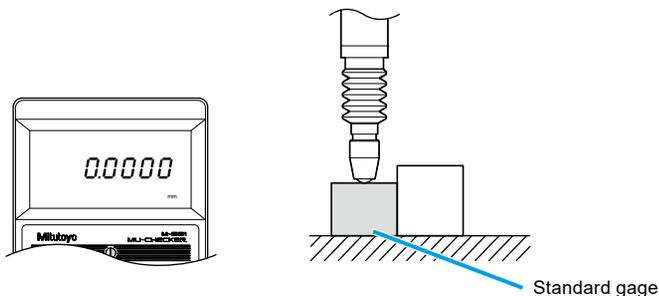


4 Gain Adjustment

4.2.3 Adjusting a Gain

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

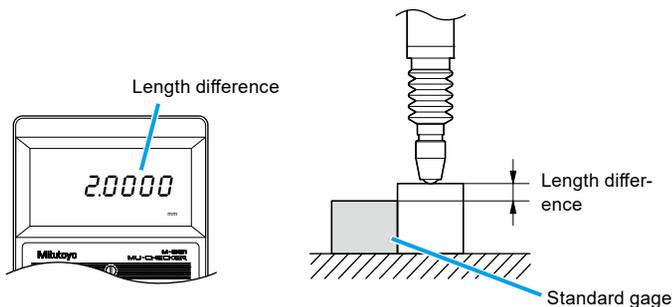
- 1 Check that the indication range switch is set to the indication range to be used in measuring.
- 2 Check that the contact point of the probe is set on the standard gage and that the display value is zero.



- 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.

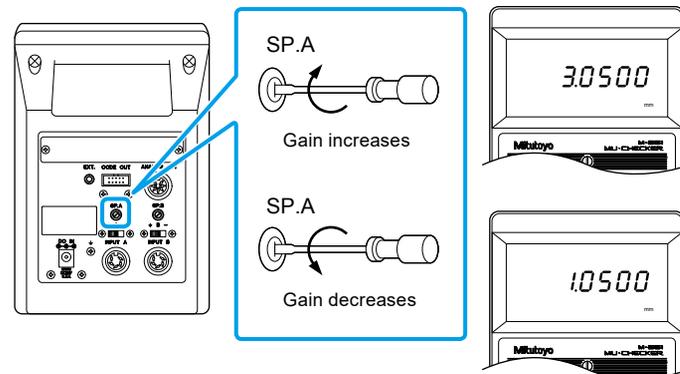


- 4 Check that the display value is correctly indicating the length difference.

Tips

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

For probe A



- 5 Set the contact point back on the standard gage, and then check that the display value is zero.

Tips

If the display value is not 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, 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 display value becomes stable.

5.1 Measuring with One Probe

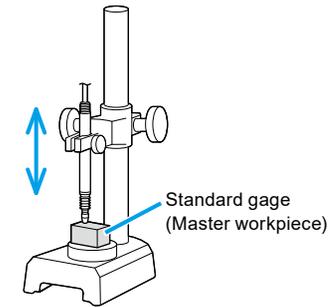
Basic measurement

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 display value close to zero.

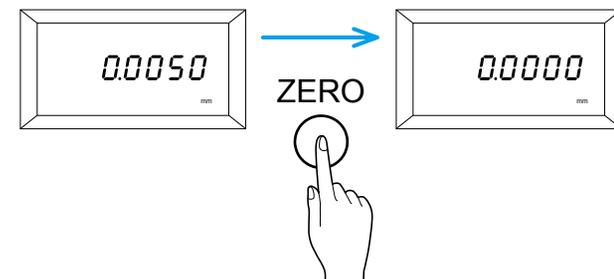
Tips

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 display value to zero.

Tips

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

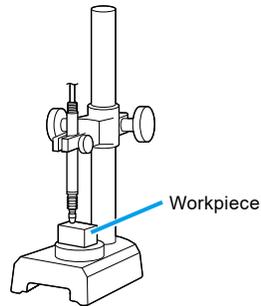


Continued on the next page

5 Measuring

2 Measuring the workpiece

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



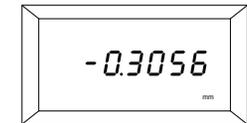
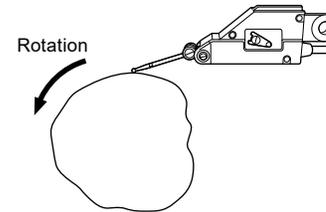
Other types of measurement

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.

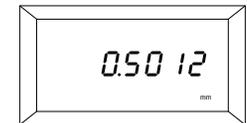
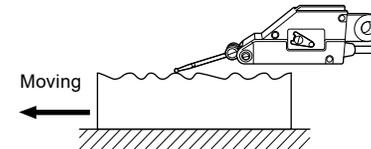
Tips

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

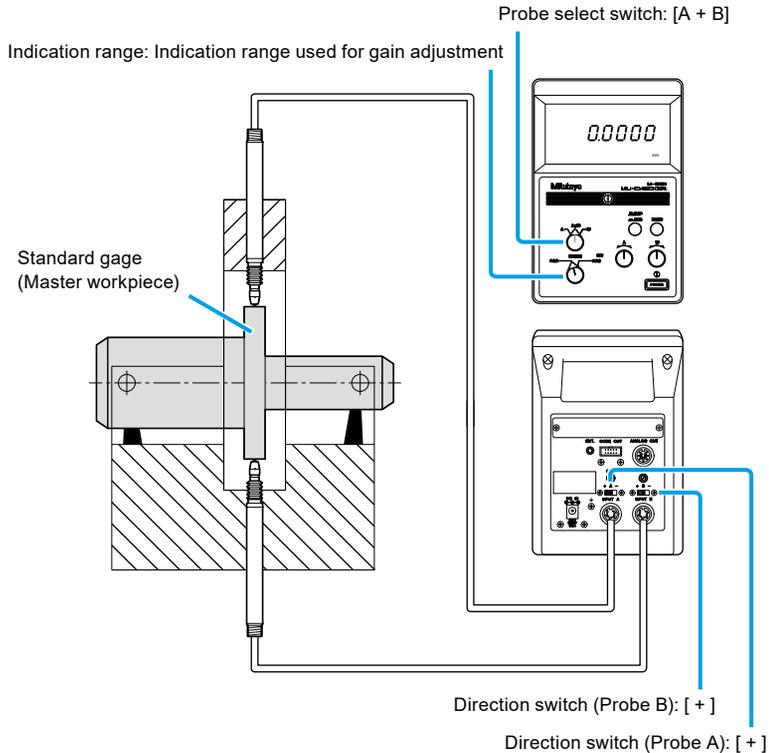


Example of measuring displacement on a flat surface



5.2 Measuring with Two Probes

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



Basic measurement

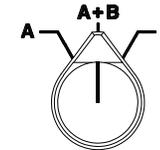
Perform comparison measurement (difference in diameter) between the workpiece and the standard gage (master workpiece) using a jig. Begin measuring with the following procedure after completing gain adjustment for both probes in the indication range to be used for measurement.

Tips

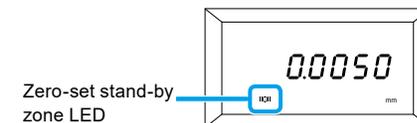
When mounting the probes on the jig, set the standard gage, and then adjust the position of each probe so that the display value of each probe comes close to the zero point in the indication range to be used for measurement.

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 display value close to zero by turning the zero point adjustment knob (probe A) (less than 0 ± 0.68 mm).
 - » The zero-set stand-by zone LED turns on.
- 5 Switch the probe select switch to [B].
- 6 Bring the display value close to zero by turning the zero point adjustment knob (probe B) (less than 0 ± 0.68 mm).
 - » The zero-set stand-by zone LED turns on.
- 7 Switch the probe select switch to [A + B].



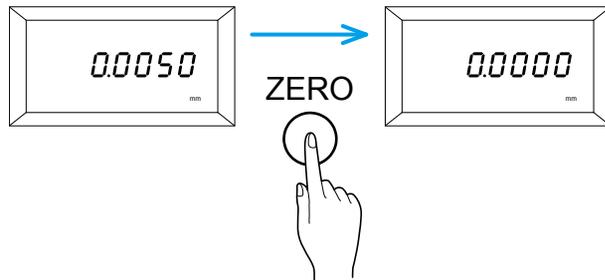
- » The zero-set stand-by zone LED turns on.



Continued on the next page

5 Measuring

- 8 Press the measuring mode switch (ABS/CMP switch) to set CMP mode (extended position).
 - » The zero-set stand-by zone LED turns off.
- 9 Press the zero-set switch.
 - » The display value will be zero.

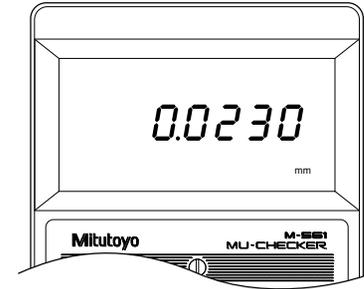


Tips

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

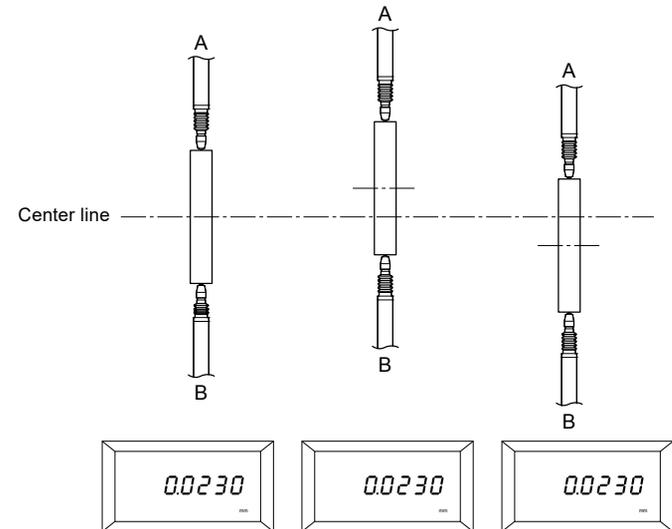
2 Measuring the workpiece

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



Tips

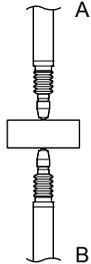
In the case of the measurement below (sum or difference calculation with two probes), the measurement result will not be affected even if the workpiece set position is shifted along the measuring direction.



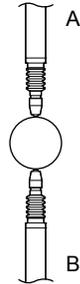
■ Other types of measurement

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.

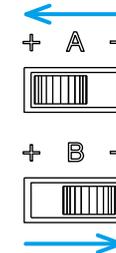
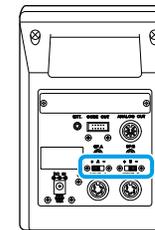
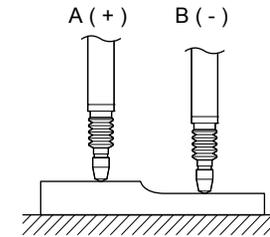
- The probes should be perpendicular to the measuring surface.
- The two probes should be aligned coaxially.

■ 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 (-).

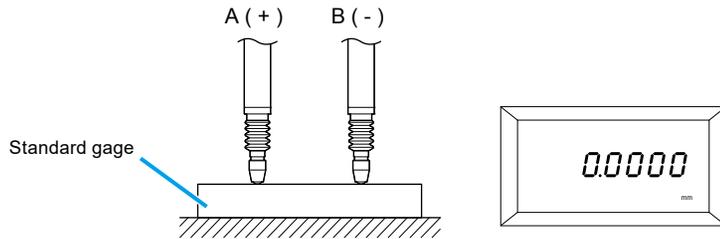


Continued on the next page

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

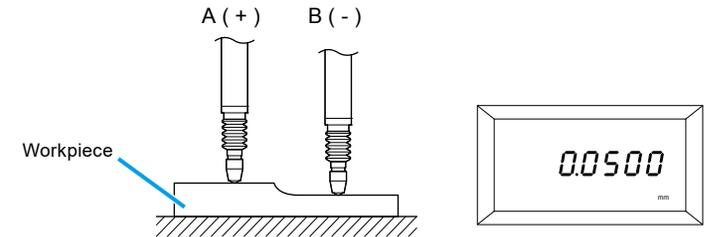
- 2 Check that the polarity of probe A is (+) and that the polarity of probe B is (-).
- 3 Press the measuring mode switch (ABS/CMP switch) to set ABS mode (pressed-in position).
- 4 Switch the probe select switch to [A].
- 5 Bring the display value close to zero by turning the zero point adjustment knob (probe A) (less than 0 ± 0.68 mm).
 - » The zero-set stand-by zone LED turns on.
- 6 Switch the probe select switch to [B].
- 7 Bring the display value close to zero by turning the zero point adjustment knob (probe B) (less than 0 ± 0.68 mm).
 - » The zero-set stand-by zone LED turns on.
- 8 Switch the probe select switch to [A + B].
- 9 Press the measuring mode switch (ABS/CMP switch) to set CMP mode (extended position).
 - » The zero-set stand-by zone LED turns off.
- 10 Press the zero-set switch.
 - » The display value will be 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 length difference between probe A's part and probe B's part will be displayed.

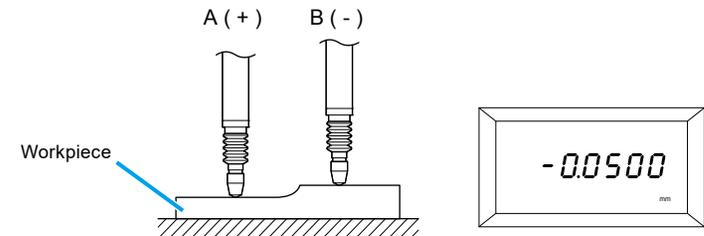


Tips

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.



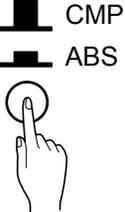
Take care when setting the polarity.



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
Instant zero-setting cannot be performed.	You switched to CMP mode (instant zero-setting enabled) and pressed the zero-set switch while the zero-set stand-by zone LED is not lit in ABS mode (instant zero-setting disabled).	Switch to CMP mode after the zero-set stand-by zone LED lights in ABS mode, and then press the zero-set switch.  "4.2.2 Zero Point Setting" (page 10)
After changing the indication range, the indicated value shifts widely. (The zero position is shifted 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, switch to CMP mode when the display value comes as close as possible to zero, and then perform instant zero-setting.  "Offset of the display range after performing zero point setting" (page 13) Perform gain adjustment using the correct procedure.  "4.2.3 Adjusting a Gain" (page 15)

Problem	Cause	Countermeasure
The analog output value is different from the display value.	<ul style="list-style-type: none"> You performed a measurement after setting the zero point in CMP mode. 	<ul style="list-style-type: none"> In CMP mode, the display value and the analog output value will differ. Check the display value in ABS mode. (Instant zero-setting is not applicable to analog output.) 
[OF] or [-OF] appears on the display.	The probe is positioned beyond the display range.	<ul style="list-style-type: none"> The analog-to-digital conversion introduces an error between the display value and the analog output. An error that falls within ± 10 mV is acceptable. ($\pm 1/100$ of ± 1.0 V/FS^{*1}) *1 FS: full scale (the maximum range of the indication range) <p>If [OF] appears, turn the zero point adjustment knob to adjust the position of the probe toward the negative value direction. If [-OF] appears, turn the zero point adjustment knob to adjust the position of the probe toward the positive value direction.</p>

6 Troubleshooting

Problem	Cause	Countermeasure
An error occurs in Digimatic output.	The position of the decimal point changed after you changed the indication range. (In this case, the connected Digimatic device will consider it an error data and print the error.)	You can recover from the error by pressing the clear switch ([CL] switch, etc.) on the Digimatic device to clear all data. "User's Manual for Digimatic Device"
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 performing measurements with two probes connected, the displacement from one probe affects that from the other probe.	$\pm 0.1\%$ / FS (excluding the linearity of probe)	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 display value constantly fluctuates 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)

Problem	Cause	Countermeasure
The display turns off.	There was a short power failure. (In this case, the power to the main body may be interrupted.)	Turn off the display unit, and then turn it on again.
After turning the display unit on, the display value does not change or nothing appears 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. 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. "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 display lights and a numerical value appears), the probe is malfunctioning. If the power does not turn on (the display 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>

6 Troubleshooting

Problem	Cause	Countermeasure
<p>The accuracy is poor when using a lever head probe.</p>	<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.  "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.  "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 display lights and a numerical value appears), the probe is malfunctioning. – If the power does not turn on (the display 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>
<p>The appropriate indication range has been set, but the display value fluctuates unsteadily, and then it becomes zero.</p>	<p>There may be a problem with an external reset signal.</p>	<p>Please contact a sales representative at the Mitutoyo service center for repair.</p>

7 Technical Data

7.1 Specification

Model number	M-561	M-562
Code No.	519-561	519-562
Number of connectable probes	Two probes	
Probe switchover	A, B, A + B ^{*1}	
Indication range (resolution)	±2.000 mm (0.001 mm)	
	±0.2000 mm (0.0001 mm)	
	—	±.08 inch (.00005 inch)
	—	±.008 inch (.000005 inch)
Indication accuracy	Linearity: ±3 digits±1 (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	
Instant zero-setting	Applicable mode: CMP mode (Disabled in ABS mode)	
	Setting error: ±0.2 % / FS ^{*2}	
	Zero-set stand-by zone LED: ±0.68 mm	
	Restriction: Change the indication range after zero point setting Not applicable to analog output	
Mass (main body)	2.0 kg	
External dimensions (W × D × H)	134 mm × 183 mm × 208 mm	

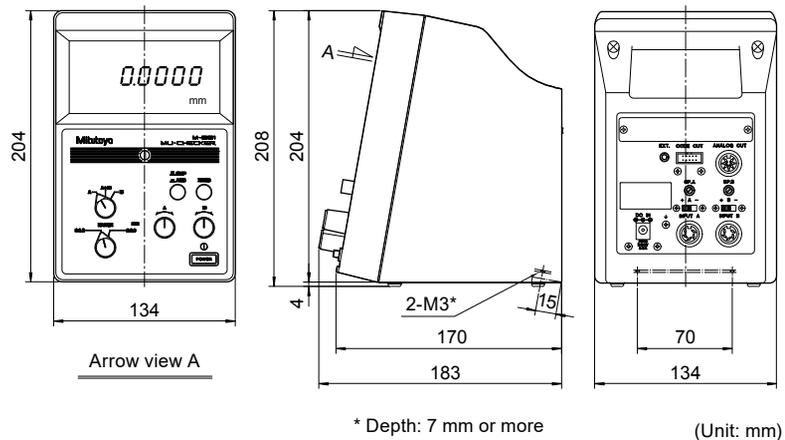
Model number	M-561	M-562
Code No.	519-561	519-562
Power	Main body: DC 9 V 0.5 A (4.5 W) AC adapter: AC 100 V through 240 V, 50 Hz / 60 Hz	
Operating environment	Temperature: 0 °C through 40 °C Humidity: 80 % RH or below (without condensation)	
Storage environment	Temperature: -10 °C through 50 °C Humidity: 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 (the maximum range of the indication range)

■ Diagram of external dimensions

External dimensions are the same for all models.



7.2 I/O Connector (Female)

Outputs the voltage or digital signal corresponding to the display value.

7.2.1 Analog Output Connector (Female)

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

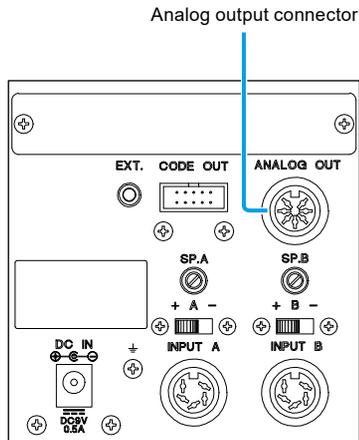


For analog output, connect an analog output code A (option) to an external output connector.

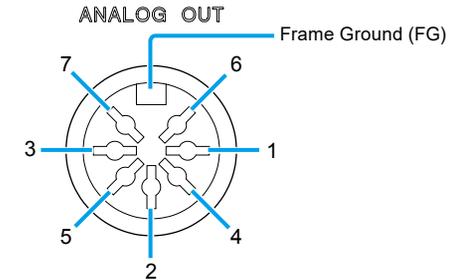
For details about the analog output code A, see "7.3 Options" (page 30).

Tips

Instant zero-setting is not applicable in CMP mode. Also, when you perform analog output in CMP mode, the display value and the analog output value will differ.



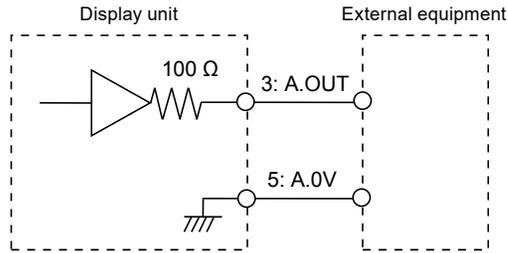
■ Analog output pins



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).

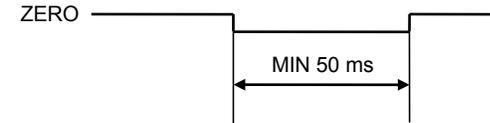


Specification	Details
Gain	$\pm 1.0 \text{ V} / \text{FS}^{*1}$
Load	300 k Ω or more (protection resistance: 100 Ω)
Accuracy	$\pm 0.1 \% / \text{FS}^{*1}$ (excluding the linearity of probe)

*1 FS: full scale (the maximum range of the indication range)

■ Zeraset 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).

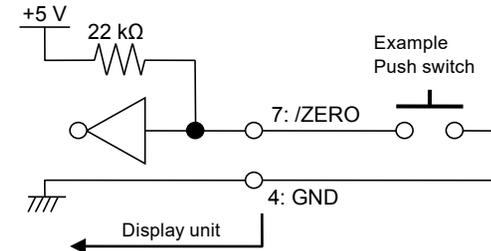


Connect the push switch as shown in the following figure.

NOTICE



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



Tips

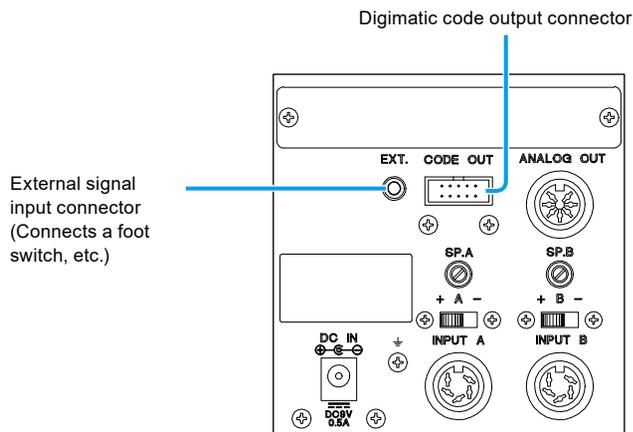
For non-contact input: LOW (MAX): 1.0 V (0.3 mA)

7.2.2 Digimatic code input/output connector (Female)

Outputs the digital signal corresponding to the display value (Digimatic output). You can print the measurement data or display it on a PC screen by connecting any type of Digimatic device, such as Digimatic Mini-Processor (DP-1VR), Input Tool, or U-WAVE.

Tips

- For information about how to use Digimatic devices, see the User's Manual supplied with each product.
- To connect a Digimatic device, the Digimatic connection cable (option) is required. For details about the Digimatic connection cable, see  "7.3 Options" (page 30).



■ Digimatic code output connector

● Output range and minimum reading

Range	Output range	Minimum reading
± 2.000 mm	± 2.047 mm	0.001 mm
± 0.2000 mm	± 0.2047 mm	0.0001 mm

● How to output data

Data can be output through either of the following two methods.

Method 1: Sending a request from a Digimatic device to the display unit for data output.

Send a request for data output by pressing the DATA switch of the Digimatic device or the foot switch.

Method 2: Sending a request from the display unit to a Digimatic device for data reception.

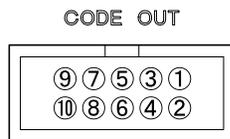
Send a request for data reception to the Digimatic device by pressing the foot switch connected to the Digimatic code input connector.

Tips

- The Digimatic Mini-Processor prints the measured value, and the Input Tool displays the measured value on the screen of a PC.
- If the decimal point position changes after you change the indication range, the Digimatic device will consider data whose decimal point position has changed to be an error and print the error. In this case, clear all data. For details, see  "User's Manual for Digimatic Device".

7 Technical Data

● Pin assignments

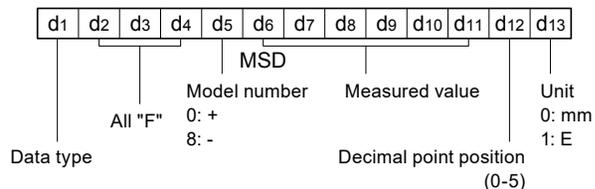


Pin No.	Signal name	Function
1	GND	Ground for signal (0 V)
2	DATA	Transmitted data*1
3	CK	Clock
4	NC	Unconnected
5	/REQ	Request for transmission
6–10	NC	Unconnected

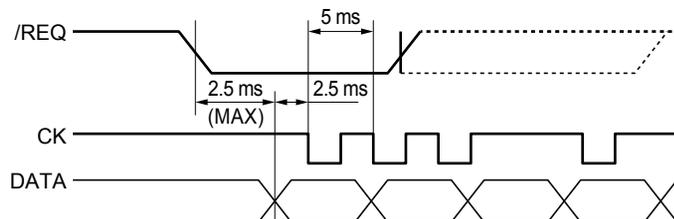
*1 This will be output in the Mitutoyo Digimatic code output format.

● Mitutoyo Digimatic code output format

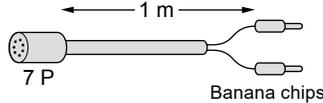
A data string consists of 13 digits (d1–d13), assigning 4 bits to 1 digit. Four data strings are output as one set via serial communication.



● Timing chart

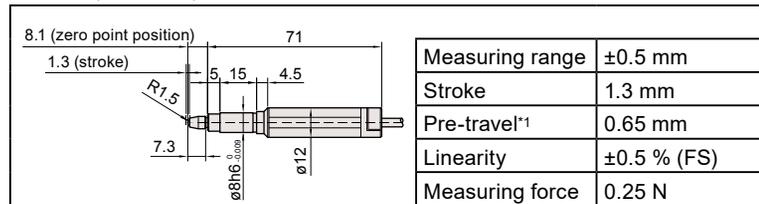


7.3 Options

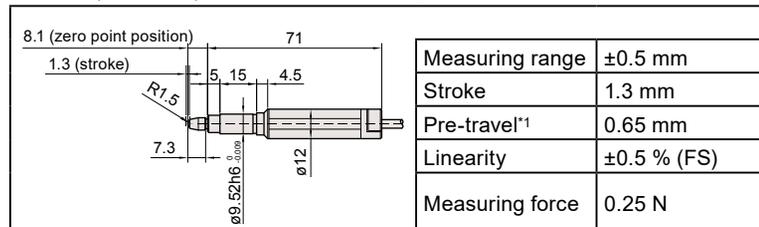
Part name	Overview / Appearance	Part No.
Analog output code A	Can be connected to an external recorder, etc. 	934795
External output connector	Used for output to an external recorder, a sequencer, etc.	529035
Extension cord A	For using the probe far away from the display unit (Length: 5 m)	934386
Digimatic connection cable	Used for output to a Digimatic device.	936937
Foot switch	Outputs the data from the display unit to a PC or a Digimatic device by connecting it to the Input Tool or a Digimatic device.	937179T

■ Cartridge head probe

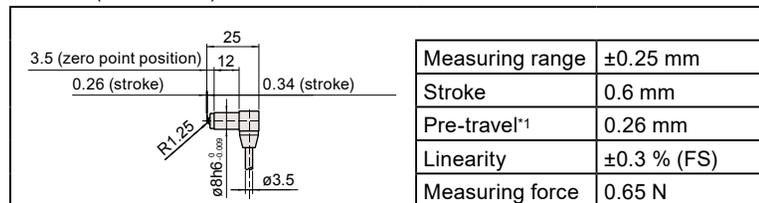
519-331 (MCH-331)



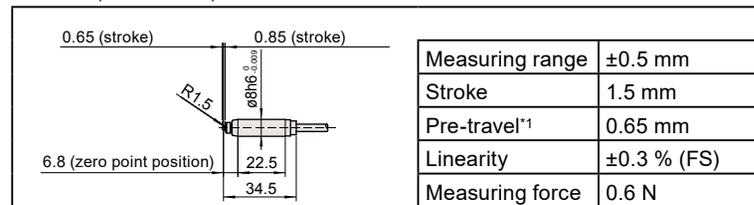
519-332 (MCH-332)



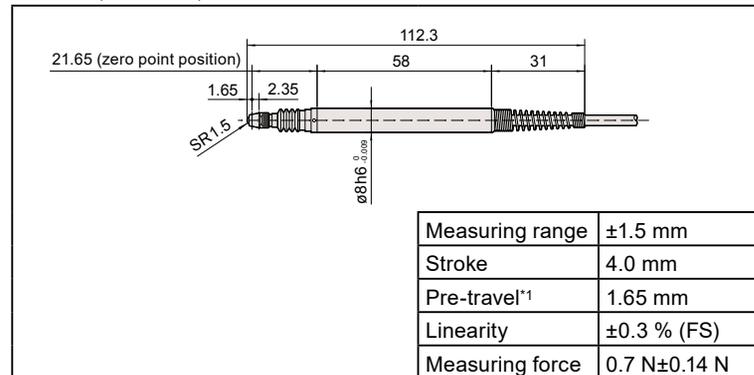
519-346 (MCHS-346)



519-347 (MCHS-347)



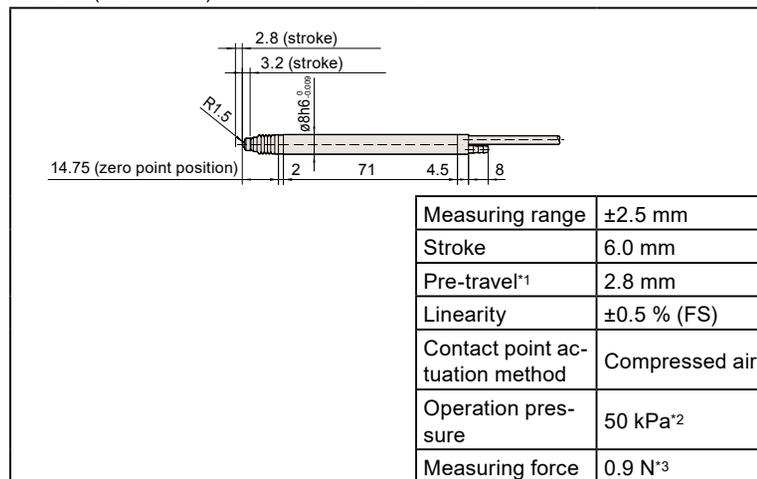
519-385 (MCH-385)



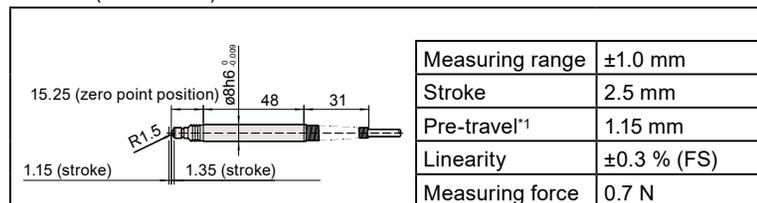
*1 Push-in amount of the contact point of the probe from the free position (no push-in amount) to a point at which the display value is zero.

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 display value is 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



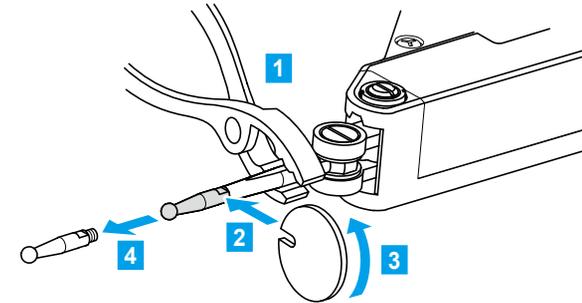
Do not fix the probe body in place while changing the contact point. If the probe body is fixed in place when you rotate the contact point, the fulcrum part of the stem will twist, and the bearing may be damaged. Damage to the bearing will adversely affect the stem swing and also may cause large errors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

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

Tips

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

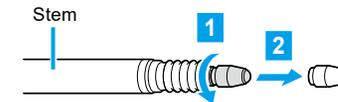
- 2 Fit the opening of the supplied spanner on the notch of the contact point.
- 3 Rotate the spanner counterclockwise to loosen the contact point.
- 4 Remove the contact point.
- 5 Attach a new contact point by the reversing the removal procedure.



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.

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*As of February 2021

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