



# Rectangular Gauge Block Accessories for Gauge Blocks over 100 mm

**BMX-S1**



Tài liệu được tổng hợp bởi đội ngũ kỹ thuật của **NPOWER**  
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## User's Manual

- Instructions for use -

Read this User's Manual thoroughly before operating the instrument. After reading, retain it close at hand for future reference.

No. 99MAK600B1

Date of publication: May 1, 2019 (2)



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## ■ Correspondence of product names and model numbers

<b>Product name</b>	<b>Model number</b>
Rectangular Gauge Block Accessories for Gauge Blocks over 100 mm	BMX-S1

## ■ Notice regarding this document

- Mitutoyo Corporation assumes no responsibilities for any damage to the instrument, caused by its use not conforming to the procedure described in this User's Manual.
- Upon loan or transfer of this product, be sure to attach this User's Manual to the product.
- In the event of loss or damage to this manual, immediately contact a Mitutoyo sales office or your dealer.
- Thoroughly read this manual to comprehend its contents before using this product.
- Particularly, for full understanding of information, carefully read "Safety Precautions" and "Precautions for Use" at the outset of this manual before using the instrument.
- The contents in this document are based on the information current as of May, 2019.
- No part or whole of this manual may be transmitted or reproduced by any means without prior written permission of Mitutoyo Corporation.
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## CONVENTIONS USED IN MANUALS

Conventions used in Mitutoyo's User's Manual are roughly divided into three types (safety reminders, prohibited and mandatory actions, and referential information and locations). Moreover, these conventions include general warnings and specific warnings. Specific warning symbols are provided with concrete pictograms inside of them.

### ■ Safety reminder conventions and wording warning against potential hazards

 <b>DANGER</b>	Indicates an immediately hazardous situation which, if not avoided, will result in serious injury or death.
 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury.
<b>NOTICE</b>	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.
	Alerts the user to a specific hazardous situation that means "Caution, risk of electric shock".

### ■ Conventions and wording indicating prohibited and mandatory actions

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

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## ■ Conventions and wording indicating referential information or referential locations

**Tips** Indicates referential information such as that for when the operating methods and procedures which are printed in these sentences are to be applied to specific conditions.



Indicates referential locations if there is information that should be referred to in this document or an extraneous manual.

Example: For details about xxx, see  "2 Accessory Applications" (page 3).

## Safety Precautions

Read these "Safety Precautions" thoroughly before operating the system to use it properly.

These safety precautions include such information as to prevent an injury to the operator and other persons or damage to property. Be sure to observe the precautions.

### **WARNING**

This product has sharp ends and other sharp parts that can cause injury or loss of eyesight. It must be carefully handled.

### **NOTICE**

Do not exert external forces to this product. Doing so may cause malfunction or breakage.



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## Precautions for Use

### ■ Product applications and handling

- This product is an accessory set for rectangular gauge blocks over 100 mm. Do not use it for any purposes other than its prescribed uses such as measuring and precision scribing.
- This product is precision equipment. It must be carefully handled. Be careful not to apply excessive shock or force to any of the parts during storage or use.
- Before use, use a soft cloth soaked in solvent, etc., to wipe off any rust-preventive oil or dirt. Do not use organic solvents such as thinner or benzine.

### ■ Operating environment

Only use this product in the following environments.

- Areas free of dirt and dust
- Areas free of vibrations
- Areas in the recommended temperature of 20 °C or so with minimal temperature change

#### **Tips**

When using this product, be sure to perform sufficient thermal stabilization.

- On the surface plate (recommended)

Avoid using the product in the following environments.

- Areas directly subject to drafts of hot air, cool air, or air conditioning

### ■ Disassembly or modification of the holder and base

#### **CAUTION**

Do not disassemble or modify the holder or the base.  
Doing so may cause an injury.

### ■ Maintenance

After use, wipe dirt off the product with a soft cloth soaked in solvent, etc., and then apply anti-rust oil in a thin layer (for rust prevention). Do not use organic solvents such as thinner or benzine.

#### **Tips**

- Recommended solvent: Normal heptane
- Recommended anti-rust oil: MOLYKOTE SUPERGLISS (Dow Corning Toray Co.,Ltd.)

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## 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 the Export Trade Control Order or under Category 16 of the Appended Table of Foreign Exchange Control Order, based on the 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-provision of the technology (including program), you are obligated to 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 and/or List-Control Technology (including Programs) under Category 1 - 15 of Appended Table 1 of the Export Trade Control Order or under Category 1 - 15 of the 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-provision of the technology (including program), you are obligated to observe the regulations of your country. Please contact Mitutoyo in advance.

## Notes on Export to EU Member Countries

When you intend export of this product to any of the EU member countries, you may be required to provide User's Manual(s) in English and EU Declaration of Conformity in English (under certain circumstances, User's Manual(s) in the destination country's official language and EU Declaration of Conformity in the destination country's official language). For detailed information, please contact Mitutoyo in advance.

## Disposal of Products outside the European Union and Other European Countries

Please follow the official instruction in each community and country.



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## Warranty

In the event that this product should prove defective in workmanship or material, within one year from the date of original purchase for use, it will be repaired or replaced, at Mitutoyo's option, free of charge upon its prepaid return to Mitutoyo, without prejudice to the 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 instrument 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 instrument is properly installed and operated in conformance with the instructions in this manual 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 all responsibility for all results arising out of its selection of this product to achieve its intended results.

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

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# About This Document

- Positioning of this document in document map

In addition to this document, a manual for the gauge blocks is available.

- For accessories

Rectangular Gauge Block Accessories  
for Gauge Blocks over 100 mm  
User's Manual (this document)

- For gauge blocks

Gauge Blocks/CERA Blocks  
User's Manual

- Intended readers and purpose of this document

- Intended readers

This document is intended for those who have experience using gauge blocks. They are also assumed to be able to understand usage methods of general measuring instruments.

- Purpose

The purpose of this document is to help you understand the basic knowledge, basic work procedures, and various functions of the Rectangular Gauge Block Accessories for Gauge Blocks over 100 mm.

## ■ How to read this document

**4 Examples of Typical Usage**

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■ **Assembly**

**1** Wring one of the plain jaws (or half round jaws) together with one of the end faces of the Long Gauge Block, and the other jaw together with the other end face.

**Tips**

- When using an assembly of gauge blocks, wring them together in advance.
- For details about wringing, see **3.2 Wringing** (page 12).

**2** Connect the assembly with the holder.

**Tips**

- For details about the usage of the holder, see **3.1 Usage of the Holder** (page 7).
- The holes of the Long Gauge Block are not used.

**1** Place one clamping adapter on the outside of each plain jaw (or half round jaw).

**NOTICE**

Place the surface for wringing of the clamping adapter toward the plain jaw (or half round jaw).

**2** Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the clamping adapters, and then tighten the fixing screw to fix its position.

**3** Insert the clamping pins (adjustable, tightening) into the holes of the clamping adapters.

**4** Tighten the clamping screw of the holder to secure the assembly so it does not move.

**Tips**

When tightening the clamping screw, hold the holder and the assembly with your finger so they do not separate.

This completes assembly.

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**21** No. 99MAK600B

Indicates an operating procedure to be performed or its outline.

Indicates the referential location.

Indicates specific work procedures.

Indicates supplementary information.

## ■ Representation of brackets or marks

The meanings of brackets or marks 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.

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# 1 Overview

## ■ Overview of Rectangular Gauge Block Accessories for Gauge Blocks over 100 mm

This product is an accessory set to better-effectively use Rectangular Gauge Blocks (nominal size of 125 mm or more, hereafter called Long Gauge Block). Long Gauge Blocks are precisely machined end standards that have a rectangular cross section with "coupling holes". They are provided in different sizes to obtain accurate dimensions directly.

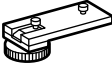
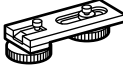
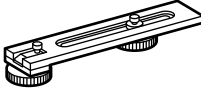

These products can be used with both steel Long Gauge Blocks and ceramic Long Gauge Blocks (CERA Blocks).

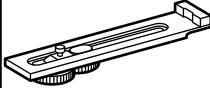
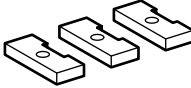
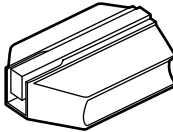
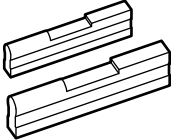
A broad line-up of accessories is available to provide the greatest benefits of Long Gauge Blocks. Accessories may also be purchased individually based on the purpose of usage.

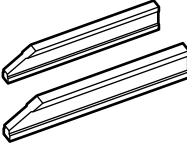

## 1 Overview

### ■ Included items in the set

The following accessories are included in the storage case.

Holder A	Holder B	Holder C	Holder D
			
No. 619031: 1 pc	No. 619032: 1 pc	No. 619033: 1 pc	No. 619034: 1 pc

Holder E	Clamping adapter	Base	Half round jaws
			
No. 619035: 1 pc	No. 619036: 3 pc	No. 619009: 35 mm, 1 pc	No. 619013: 12 mm, 2 pc set

Plain jaws (B type)	Scriber point
	
No. 619018: 2 pc set	No. 619019: 1 pc




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## 2 Accessory Applications

This section explains the application of each accessory.

For examples of accessory usage, see  "4 Examples of Typical Usage" (page 15).

### ■ Half round jaws

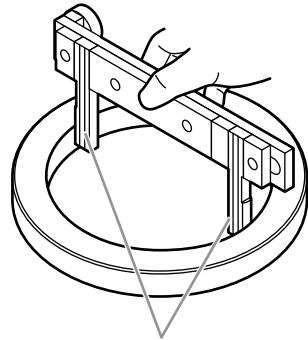
Primary application: Limit gage for inside diameters/Reference gage for inside measurement

The limit gage for inside diameters is made by connecting the half round jaws and gauge block with the holder. It can perform GO/NG judgment for a large number of parts effectively.

Furthermore, the inner surfaces (surfaces for wringing) of the jaws can be used as a reference gage that is used for the zero setting for inside micrometers and bore gages or checking the accuracy of the inside of calipers.

#### Tips

The nominal size of the jaws are marked on them.



Half round jaws (12 mm)

### ■ Plain jaws (B type)

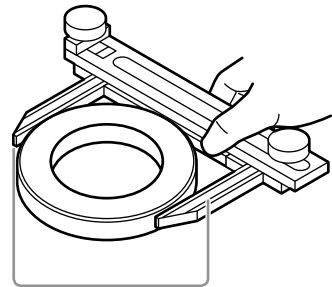
Primary application: Limit gage for outside diameters/Reference gage

The limit gage for outside diameters is made by connecting the plain jaws and gauge block with the holder. It can perform GO/NG judgment for a large number of parts effectively.

Furthermore, the jaws can be used as a reference gage that is used for the zero setting for inside micrometers and bore gages or checking the accuracy of the inside of calipers.

#### Tips

The jaw length of 160 is marked on the sides of the surfaces for wringing.



Plain jaws (B type)

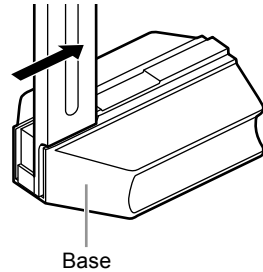
## 2 Accessory Applications

### ■ Base

Primary application: Base for using the holder in a vertical orientation

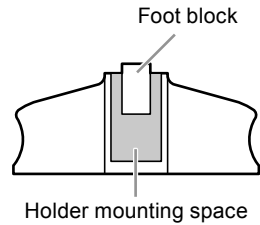
The base is used with the holder D or E inserted vertically.

When removing the holder, take it out in the opposite direction of the arrow in the right figure.



### Tips

- The nominal size of the base is marked on it.
- The gray area in the right figure is the holder mounting space. The holder should be inserted fully into the base to set it in place.
- The holder can be inserted from either side of the foot block.

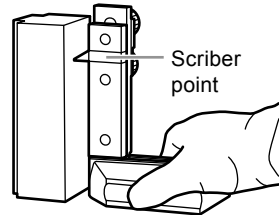


### ■ Scriber point

Primary application: High accuracy scribing

The scriber point and gauge block are connected with the holder to use as the scriber.

The tip position of the scriber point assembled becomes at the same position (height) as the surface for wringing to allow for high accuracy scribing.



### ⚠ CAUTION

The tip is sharp, so be careful to avoid injury.



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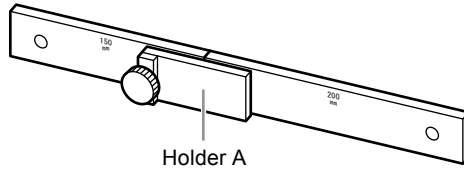
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## 2 Accessory Applications

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### ■ Holder A

Primary application: Connecting two Long Gauge Blocks



### Tips

The length cannot be adjusted by inserting a gauge block between the Long Gauge Blocks.


### ■ Holder B, C

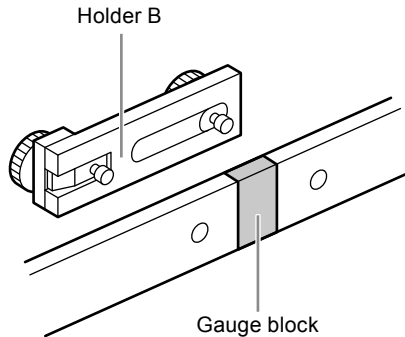
Primary application: Connecting two Long Gauge Blocks with another gauge block (including long-size) inserted between them.

The length can be adjusted by inserting a gauge block between the Long Gauge Blocks.

The clamping adapter can be used to insert half round jaws, etc.

### Tips

For details about the dimensions of the gauge blocks that can be inserted with Holder B or C, see  "6 Specifications" (page 29).



## 2 Accessory Applications

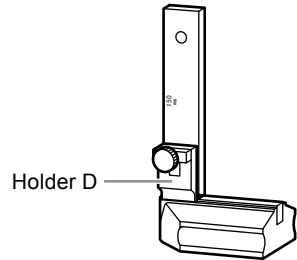
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### ■ Holder D

Primary application: Connecting a Long Gauge Block to a base

#### **Tips**

The length cannot be adjusted by inserting a gauge block between the Long Gauge Block and base.




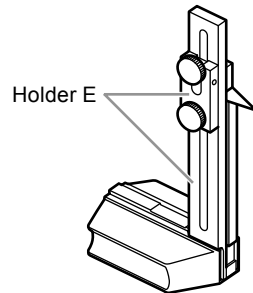
### ■ Holder E

Primary application: Connecting a Long Gauge Block and its combination products to the base

The length can be adjusted by inserting a gauge block between the Long Gauge Block and base. The clamping adapter can be used to insert a scriber point, etc.

#### **Tips**

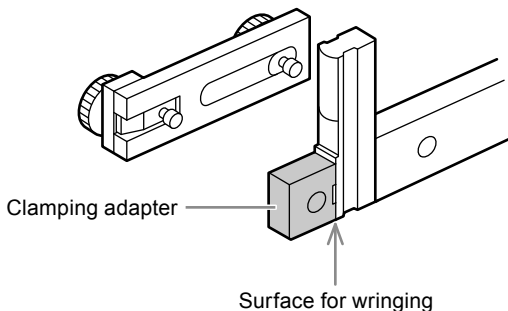
For details about the dimensions of the gauge blocks that can be inserted with the holder E, see  "6 Specifications" (page 29).



### ■ Clamping adapter

Primary application: Attaching a half round jaw, etc., to the end face of a Long Gauge Block

It can be used for the holder B, C, and E.



# 3 Cautions for Assembly

## 3.1 Usage of the Holder

### CAUTION

- Do not disassemble or modify the holder. Doing so may cause an injury.
- Be careful when attaching or removing half round jaws, etc., from the holder so as not to pinch or strike the fingers. Doing so may cause an injury.

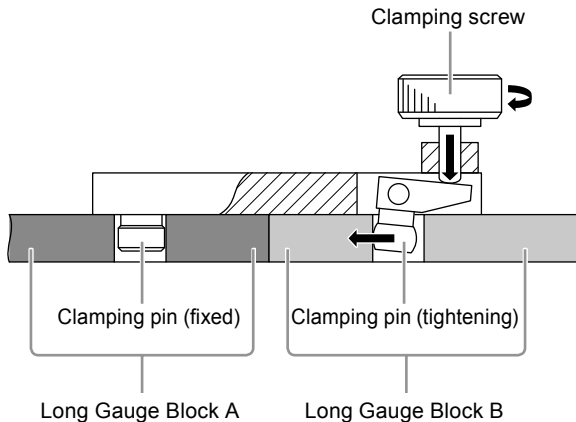
### NOTICE

Do not apply excessive force (such as dropping or impacts) to the holder. Doing so may cause malfunction or breakage.

### ■ Construction of the holder

Tightening the clamping screw moves the clamping pin (tightening) in the direction of the arrow. As a result, the Long Gauge Block B is pressed against the Long Gauge Block A, in which the clamping pin (fixed) is inserted, to secure both gauge blocks.

Example: Holder A

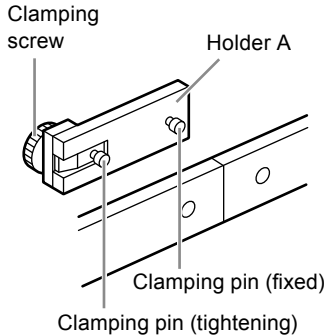


### 3 Cautions for Assembly

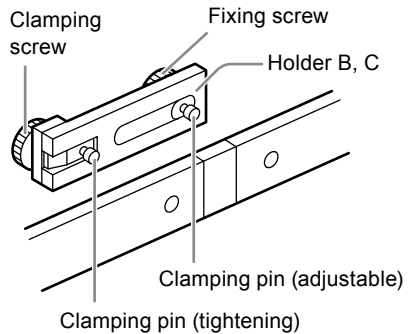
#### ■ Connection method of holders

#### ● Connecting gauge blocks: Holder A, B, and C

When connecting two Long Gauge Blocks directly



When inserting other gauge blocks between Long Gauge Blocks



#### Tips

Loosen the clamping screw before connection.

1 Wipe the surfaces for wringing of the gauge blocks with lens cleaning paper soaked in solvent (such as normal heptane).

2 Wring both gauge blocks.

#### Tips

For details about wringing, see "3.2 Wringing" (page 12).

3 Insert the clamping pins (fixed/adjustable, tightening) into the holes of the Long Gauge Blocks.

#### Tips

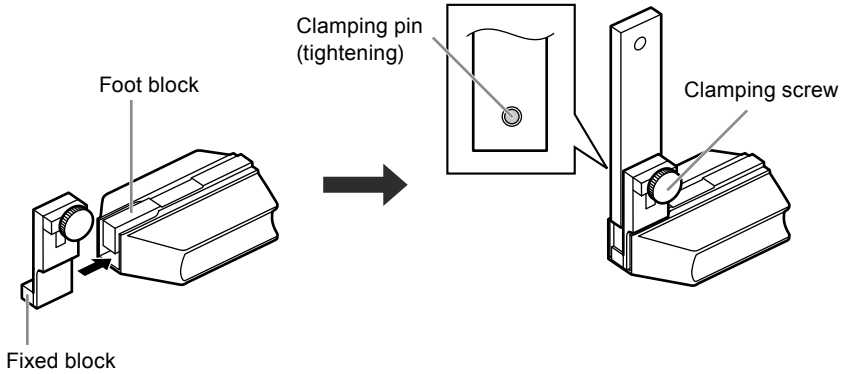
- The clamping pin (fixed) cannot be moved because it is fixed to the holder main body.
- For Holder B or C, follow the below items to connect them.
  - Adjust the length by inserting gauge blocks between the Long Gauge Blocks as required.For details about the maximum clampable length, see "6 Specifications" (page 29).
- Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the assembled Long Gauge Blocks, and then tighten the fixing screw to fix its position.

4 Tighten the clamping screw to secure the assembly so it does not move.

### 3 Cautions for Assembly

#### ● Connecting a base to a gauge block: Holder D, E

##### When using the holder D



#### Tips


Loosen the clamping screw before connection.

- 1 Insert the fixed block of the holder D below the foot block of the base.

#### NOTICE

Be careful not to let any dust, etc. enter between the base (foot block) and the Long Gauge Block. Wipe the surface for wringing of the base with lens cleaning paper soaked in solvent (such as normal heptane) before insertion.

#### Tips

For details about the holder mounting space of the base, see  "■ Base" (page 4).

- 2 Insert the clamping pin (tightening) into the hole of the Long Gauge Block while it is set onto the foot block.
- 3 Tighten the clamping screw to secure the gauge block so it does not move.



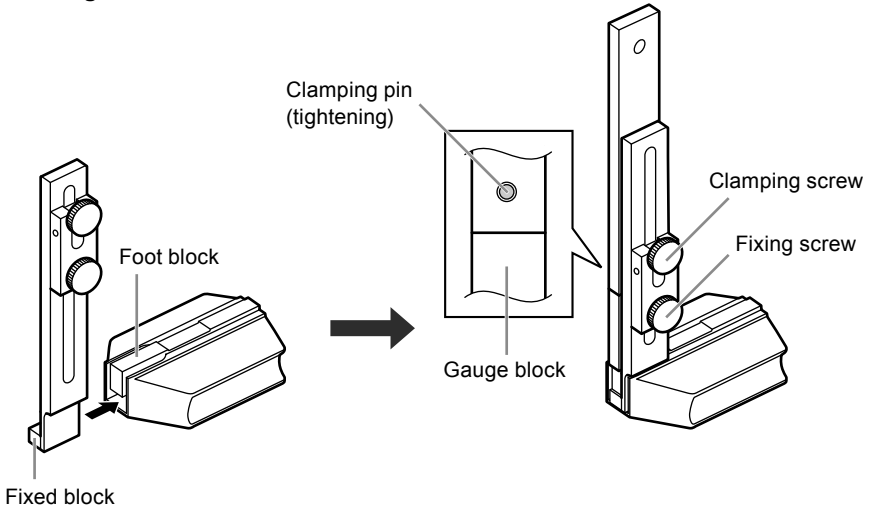
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### 3 Cautions for Assembly

#### When using holder E



#### Tips


Loosen the clamping screw before connection.

- 1 Insert the fixed block of the holder E below the foot block of the base.

#### NOTICE


Be careful not to let any dust, etc. enter between the base (foot block) and the Long Gauge Block. Wipe the surface for wringing of the base with lens cleaning paper soaked in solvent (such as normal heptane) before insertion.

#### Tips

For details about the holder mounting space of the base, see  "■ Base" (page 4).

- 2 Wring the Long Gauge Block together with the gauge block.
- 3 Adjust the position of the clamping pin (tightening) so that it aligns with the hole of the Long Gauge Block, and then tighten the fixing screw to fix its position.
- 4 Insert the clamping pin (tightening) into the hole of the wrung Long Gauge Block while the assembly is set onto the foot block.
- 5 Tighten the clamping screw to secure the assembly so it does not move.

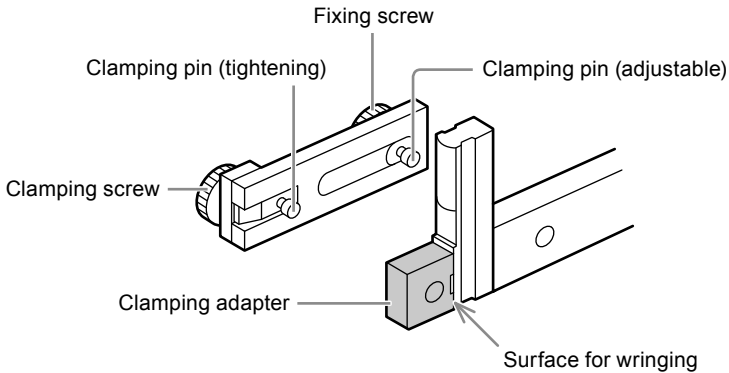
#### Tips

For details about the maximum clampable length of the holder E, see  "6 Specifications" (page 29).

### 3 Cautions for Assembly

---

- Using the clamping adapter to connect: Holder B, C, and E



#### Tips

- Loosen the clamping screw before connection.
- When connecting a Long Gauge Block and two clamping adapters using Holder C, the holes of the Long Gauge Block are not used.
- Holder E does not have a clamping pin (adjustable).


- 1 Set a clamping adapter on the outside of the half round jaw.

#### NOTICE

Place the surface for wringing of the clamping adapter toward the half round jaw.

- 2 Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the Long Gauge Block and the clamping adapter, and then tighten the fixing screw to fix its position.
- 3 Insert the clamping pins (tightening, adjustable) into the holes of the Long Gauge Block and the clamping adapter.
- 4 Tighten the clamping screw to secure the assembly so it does not move.

#### Tips

For details about the maximum clampable length of the holder B, C and E, see  "6 Specifications" (page 29).


## 3.2 Wringing

The process of firmly setting gauge blocks together or firmly setting gauge blocks against half round jaws, etc., is called "wringing". Steel and ceramic gauge blocks can also be wrung together.

### NOTICE

When handling gauge blocks and accessories, wear gloves for precision work. If handled with bare hands, the resulting heat conduction can alter the block's dimensions. For steel gauge blocks and accessories, oils and sweat can cause rusting to occur.

### Tips

- For wringing both Long Gauge Blocks, use the holder.
- For details about the usage of the holder, see  "3.1 Usage of the Holder" (page 7).

- 1 Wipe wringing surfaces with lens cleaning paper soaked in solvent (such as normal heptane), and then finally wipe the surface dry with a dry portion of the paper.

### NOTICE

If small dirt or grease is left on surfaces for wringing, dimensions after wringing may increase, or the gauge blocks or half round jaws, etc., may be scratched.

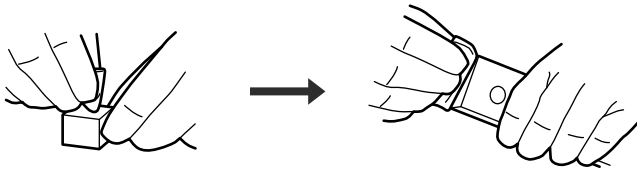
### Tips

For wiping, use lens cleaning paper or other material which does not leave paper fibers.

- 2 Slightly spread Vaseline or grease onto the surfaces for wringing before wiping.

### Tips

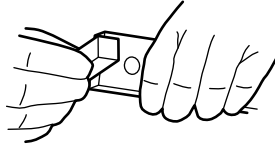
Wipe until the oil layer is almost completely gone.



### 3 Cautions for Assembly

---

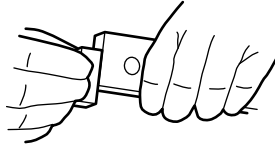
- 3** Cross the gauge blocks at the center of each measurement surface at 90°.



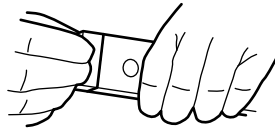
- 4** While slightly applying force, rotate one gauge block 90° until both measurement surfaces are aligned with each other.

#### Tips

It will feel like the blocks are sticking together while you are sliding the blocks.

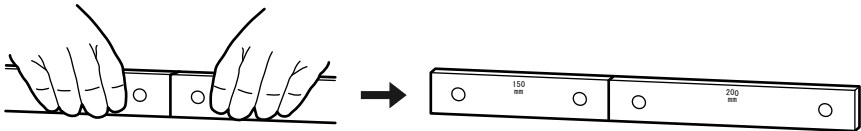


- 5** Align the measurement surfaces with each other.



#### Tips

When Long Gauge Blocks cannot be wrung together as described in steps **3** through **5**, mutually press their measurement surfaces together to adhere them, and then align their edges.



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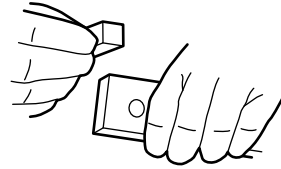
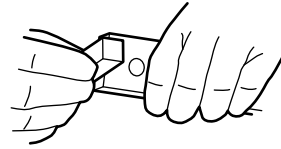
### 3 Cautions for Assembly

---

#### ■ Disassembly


##### 1 Disengaging the wringing

- 1 Rotate the wrung gauge blocks until they form a cross shape.
- 2 Slide the gauge blocks to detach them.



##### 2 Wipe any dirt off the gauge blocks.

#### Tips

For details about cleaning, see  "■ Cleaning" (page 27).



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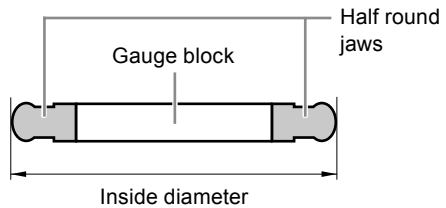
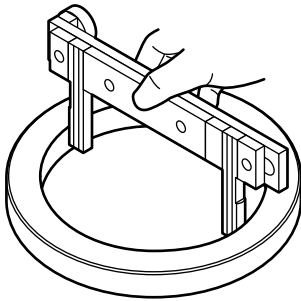
# 4 Examples of Typical Usage

This section explains parts configurations and assembly procedures for examples of typical usage.

## 4.1 Reference Gage for Inside Measurements / Limit Gage for Inside Diameters (Using Half Round Jaws)

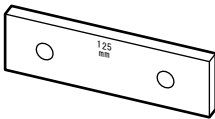
This section explains how to assemble a limit gage for checking of inside diameters.

This limit gage can be used for checking the accuracy of the inside of calipers. As an example, this procedure explains the assembly of a limit gage for checking a 149 mm inside diameter.

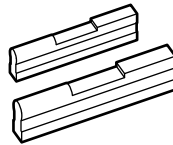


### ■ Preparation

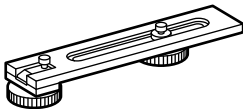
Required Long Gauge Block and accessories



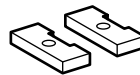
Long Gauge Block 125 mm



Half round jaw 12 mm x 2



Holder C




Clamping adapter x 2

## 4 Examples of Typical Usage

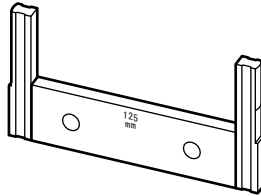
---

### Tips


- Inside diameter = Half round jaw + Long Gauge Block + Half round jaw  
= 12 mm + 125 mm + 12 mm = 149 mm
- When a 125 mm Long Gauge Block is not available, wring together two gauge blocks, such as a 75 mm and a 50 mm Rectangular Gauge Block.
- For details about the maximum clampable length of the holder C, see  "6 Specifications" (page 29).

### ■ Assembly

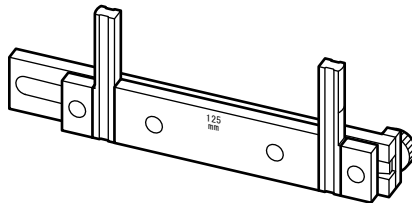
- 1 Wring one of the half round jaws together with one of the end faces of the Long Gauge Block, and the other jaw together with the other end face.




### Tips

- When using an assembly of gauge blocks, wring them together in advance.
- For details about wringing, see  "3.2 Wringing" (page 12).

- 2 Connect the assembly with the holder.



### Tips

- For details about the usage of the holder, see  "3.1 Usage of the Holder" (page 7).
- The holes of the Long Gauge Block are not used.

- 1 Place one clamping adapter on the outside of each half round jaw.

### NOTICE

Place the surface for wringing of the clamping adapter toward the half round jaw.

## 4 Examples of Typical Usage

---

- 2 Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the clamping adapters, and then tighten the fixing screw to fix its position.
- 3 Insert the clamping pins (tightening, adjustable) of the holder into the clamping adapters.
- 4 Tighten the clamping screw of the holder to secure the assembly so it does not move.

### Tips

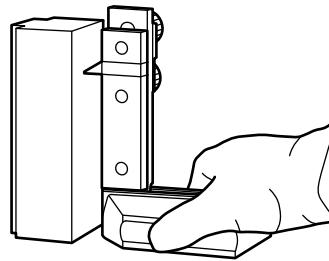
When tightening the clamping screw, hold the holder and the assembly with your finger so they do not separate.

This completes assembly.

## 4.2 Precision Scribing (Using the Base and Scriber Point)

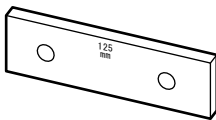
This assembly is for performing precision scribing at a specific height.

This section explains how to perform scribing at a height of 160 mm as an example.



### ■ Preparation

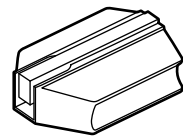
Required Long Gauge Block and accessories



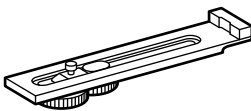
Long Gauge Block  
125 mm



Scriber point



Base  
(height: 35 mm)



Holder E




Clamping adapter

## 4 Examples of Typical Usage

---

### Tips

- Scribing height = Base + Long Gauge Block = 35 mm + 125 mm = 160 mm
- When a 125 mm Long Gauge Block is not available, wring together two gauge blocks, such as a 75 mm and a 50 mm Rectangular Gauge Block.
- For details about the maximum clampable length of the holder E, see  "6 Specifications" (page 29).

## ■ Assembly

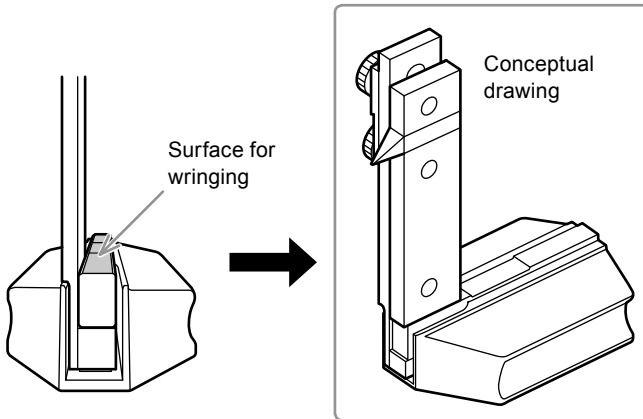
### Tips

Loosen the clamping screw before connection.


- 1 Insert the fixed block of the holder E below the foot block of the base.

### NOTICE

Be careful not to let any dust, etc. enter between the base (foot block) and the Long Gauge Block. Wipe the surface for wringing of the base with lens cleaning paper soaked in solvent (such as normal heptane) before insertion.



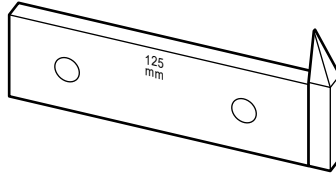
### Tips

For details about the holder mounting space of the base, see  "■ Base" (page 4).

## 4 Examples of Typical Usage

---


- 2 Wring the scriber point and Long Gauge Block together.



### CAUTION

The tip of the scriber point is sharp, so be careful to avoid injury.

### Tips

- When using an assembly of gauge blocks, wring them together in advance.
- For details about wringing, see  "3.2 Wringing" (page 12).

- 3 Set the clamping adapter on top, and then adjust the position of the clamping pin (tightening) so that it aligns with the hole of the clamping adapter, and then tighten the fixing screw to fix its position.

### NOTICE

Place the surface for wringing of the clamping adapter toward the scriber point.

- 4 Insert the clamping pin (tightening) into the hole of the clamping adapter while the assembly is set onto the foot block.
- 5 Tighten the clamping screw of the holder to secure the assembly so it does not move.

### Tips

When tightening the clamping screw, hold the holder and the assembly with your finger so they do not separate.

This completes assembly.

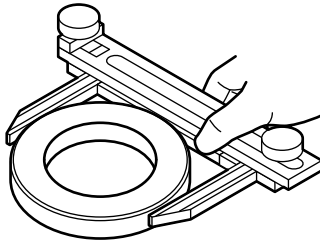
While supporting the base, slide it across the surface plate to perform precision scribing of objects.

## 4.3 Limit Gage for Outside Diameters (Using Plain Jaws or Half Round Jaws)

This section explains how to assemble a limit gage for checking of outside diameters.

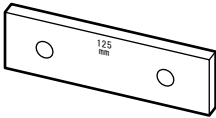
Assembling two limit gages with different sizes, they can be used as GO and NO-GO gages.

As an example, this procedure explains the assembly of a limit gage for checking a 125 mm outside diameter.

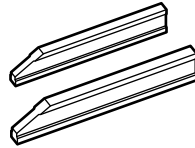


### ■ Preparation

Required Long Gauge Block and accessories

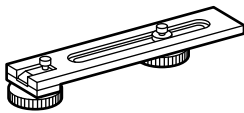


Long Gauge Block 125 mm

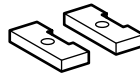


Plain jaw (B type)\* × 2

\* Half round jaws can also be used.




Holder C



Clamping adapter × 2

### Tips

- Outside diameter = Long Gauge Block = 125 mm
- When a 125 mm Long Gauge Block is not available, wring together two gauge blocks, such as a 75 mm and a 50 mm Rectangular Gauge Block.
- For details about the maximum clampable length of the holder C, see  "6 Specifications" (page 29).


## 4 Examples of Typical Usage

---

### ■ Assembly


- 1 Wring one of the plain jaws (or half round jaws) together with one of the end faces of the Long Gauge Block, and the other jaw together with the other end face.

#### Tips

- When using an assembly of gauge blocks, wring them together in advance.
- For details about wringing, see  "3.2 Wringing" (page 12).

- 2 Connect the assembly with the holder.

#### Tips

- For details about the usage of the holder, see  "3.1 Usage of the Holder" (page 7).
- The holes of the Long Gauge Block are not used.

- 1 Place one clamping adapter on the outside of each plain jaw (or half round jaw).

#### NOTICE

Place the surface for wringing of the clamping adapter toward the plain jaw (or half round jaw).

- 2 Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the clamping adapters, and then tighten the fixing screw to fix its position.
- 3 Insert the clamping pins (adjustable, tightening) into the holes of the clamping adapters.
- 4 Tighten the clamping screw of the holder to secure the assembly so it does not move.

#### Tips

When tightening the clamping screw, hold the holder and the assembly with your finger so they do not separate.

This completes assembly.



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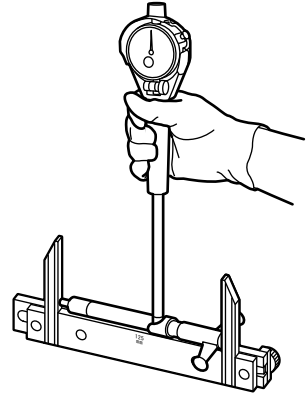
## 4.4 Reference Gage for Measuring Tools (Using Plain Jaws or Half Round Jaws)

This section explains how to assemble a reference gage for measuring tools.

As an example, this procedure explains the assembly of a 125 mm length reference gage for bore gages.

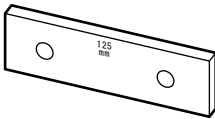
### Tips

Select appropriate plain jaws or half round jaws for the bore gage being used.

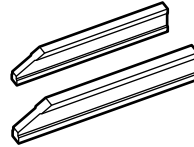


### ■ Preparation

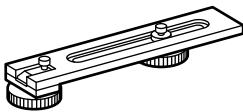
Required Long Gauge Block and accessories



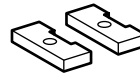
Long Gauge Block 125 mm



Plain jaw (B type)\* × 2  
\* Half round jaws can also be used.



Holder C



Clamping adapter × 2

### Tips

- Length of reference gage = Long Gauge Block = 125 mm
- When a 125 mm Long Gauge Block is not available, wring together two gauge blocks, such as a 75 mm and a 50 mm Rectangular Gauge Block.
- For details about the maximum clampable length of the holder C, see "6 Specifications" (page 29).


## 4 Examples of Typical Usage

---

### ■ Assembly


- 1 Wring one of the plain jaws (or half round jaws) together with one of the end faces of the Long Gauge Block, and the other jaw together with the other end face.

#### Tips

- When using an assembly of gauge blocks, wring them together in advance.
- For details about wringing, see  "3.2 Wringing" (page 12).

- 2 Connect the assembly with the holder.

#### Tips

- For details about the usage of the holder, see  "3.1 Usage of the Holder" (page 7).
- The holes of the Long Gauge Block are not used.

- 1 Place one clamping adapter on the outside of each plain jaw (or half round jaw).

#### NOTICE

Place the surface for wringing of the clamping adapter toward the plain jaw (or half round jaw).

- 2 Adjust the position of the clamping pin (adjustable) so that the clamping pins align with the holes of the clamping adapters, and then tighten the fixing screw to fix its position.
- 3 Insert the clamping pins (adjustable, tightening) into the holes of the clamping adapters.
- 4 Tighten the clamping screw of the holder to secure the assembly so it does not move.

#### Tips

When tightening the clamping screw, hold the holder and the assembly with your finger so they do not separate.

This completes assembly.



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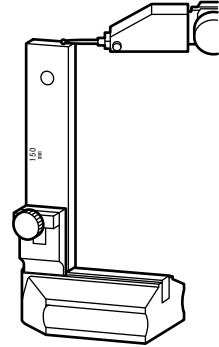
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## 4.5 Other Usage Examples

### 4.5.1 Height Reference Gage

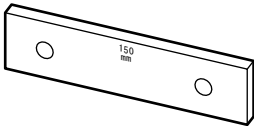
This section explains how to assemble the height reference gage as a reference for comparative measurement that uses indicators such as electric micrometers and test indicators.

As an example, this procedure explains the assembly of a 185 mm height reference gage.

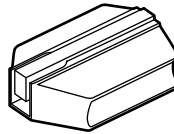


#### ■ Preparation

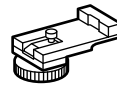
Required Long Gauge Block and accessories



Long Gauge Block  
150 mm



Base  
(height: 35 mm)




Holder D

#### Tips

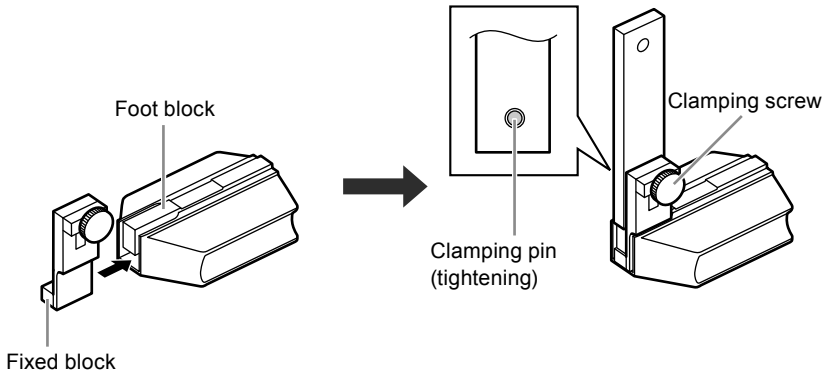
- Height reference = Base + Long Gauge Block = 35 mm + 150 mm = 185 mm
- When a 150 mm Long Gauge Block is not available, wring together two gauge blocks, such as a 125 mm Long Gauge Block and a 25 mm Rectangular Gauge Block.

When using a Rectangular Gauge Block, use the holder E and the clamping adapter instead of the holder D.

- For details about the maximum clampable length of the holder E, see  "6 Specifications" (page 29).

## 4 Examples of Typical Usage

### ■ Assembly



#### Tips


Loosen the clamping screw before connection.

- 1 Insert the fixed block of the holder D below the foot block of the base.

#### NOTICE

Be careful not to let any dust, etc. enter between the base (foot block) and the Long Gauge Block. Wipe the surface for wringing of the base with lens cleaning paper soaked in solvent (such as normal heptane) before insertion.

#### Tips

For details about the holder mounting space of the base, see  "■ Base" (page 4).

- 2 Insert the clamping pin (tightening) into the hole of the Long Gauge Block while it is set onto the foot block.
- 3 Tighten the clamping screw of the holder to secure the gauge block so it does not move.



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**MEMO**

# 5 Maintenance

This section explains the regular inspection and cleaning of this product.

In order to use this product with sufficient performance safely and for a long period, follow the below items to perform maintenance and inspection.

### ■ Regular inspection

Check the appearance for dirt/dust, scratches, wear, or reduction.

To check for surface for wringing wear, use a tool such as an optical flat to check for interference fringes.

If there are any burrs or nicks, use a Ceraston\* as with gauge blocks to remove them.

To maintain the quality of the accessories, we recommend periodically using the calibration/inspection service provided by Mitutoyo.

\* Ceraston: Part No. 601644 or No. 601645

### ■ Cleaning

After use, wipe dirt off the product with a soft cloth soaked in solvent, etc., and then apply anti-rust oil in a thin layer before housing and storing it in a safe place (for rust prevention). Do not use organic solvents such as thinner or benzene.

#### Tips

- Recommended solvent: Normal heptane
- Recommended anti-rust oil: MOLYKOTE SUPERGLISS (Dow Corning Toray Co.,Ltd.)
- Placing evaporative anti-rust paper into the storage case provides more effective storage.



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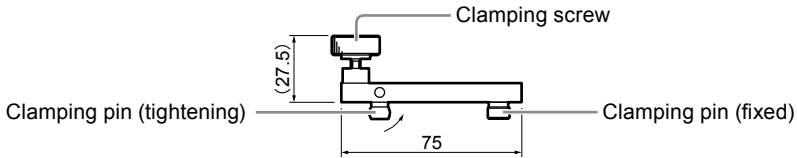
[www.npower.com.vn](http://www.npower.com.vn)

**MEMO**

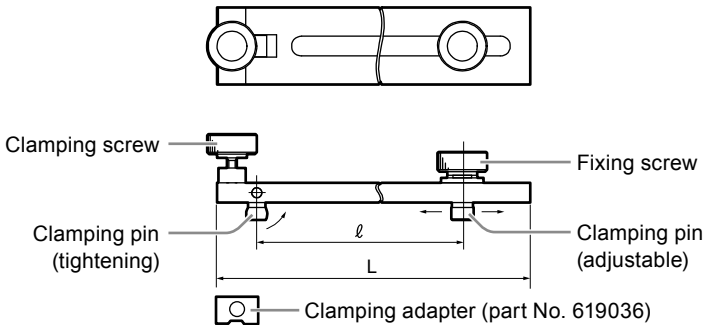
# 6 Specifications

## ■ Specifications

- Rectangular Gauge Block Accessories for Gauge Blocks over 100 mm (Code No. 516-605)
- Holder A (Part No. 619031): Connecting Long Gauge Blocks



- Holder B, C: Connecting Long Gauge Blocks



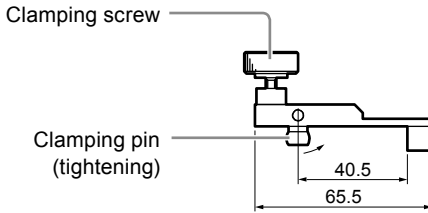
	Part No.	$l$ (mm)	L (mm)	Maximum clampable length (mm)		
				Not using clamping adapters	Using one clamping adapter <sup>*2</sup>	Using two clamping adapters <sup>*2</sup>
Holder B	619032	Maximum 90	126	40	50	65
Holder C	619033	Maximum 200	236	150 <sup>*1</sup>	155	170

\*1 Gauge blocks within 100 mm with no holes and various jaws can be connected. For a detailed description of usage, see "■ Holder B, C" (page 5).

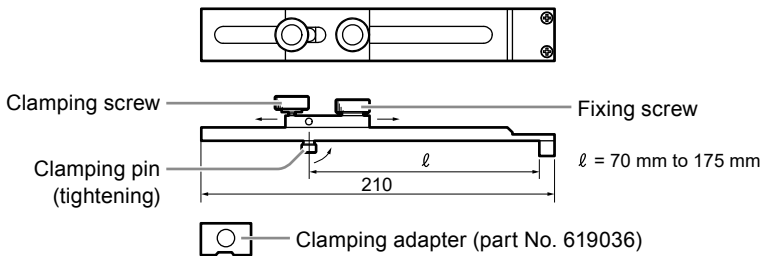
\*2 Various jaws can be attached to both ends of a Long Gauge Block by using two clamping adapters. For a detailed description of usage, see "■ Clamping adapter" (page 6).

## 6 Specifications

### ● Holder D (Part No. 619034): Connecting the base



### ● Holder E (Part No. 619035): Connecting the base



	Part No.	$l$ (mm)	Maximum clampable length (mm)	
			Not using clamping adapters	Using one clamping adapter*
Holder E	619035	67 to 155	110	125

\* Various jaws can be attached to the end of a Long Gauge Block by using a clamping adapter. For a detailed description of usage, see "■ Clamping adapter" (page 6).



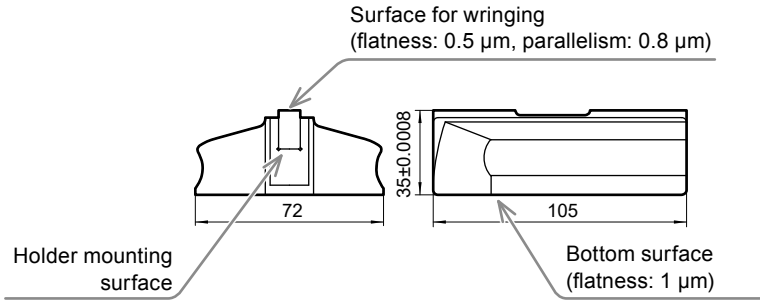
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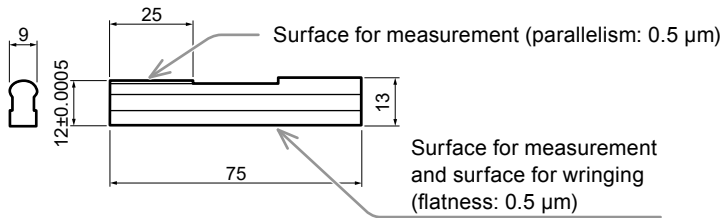
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## 6 Specifications

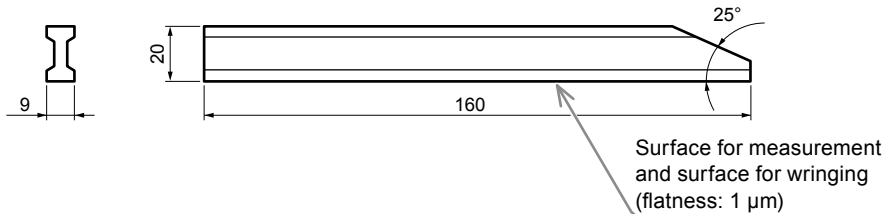
### ● Base (Part No. 619009)



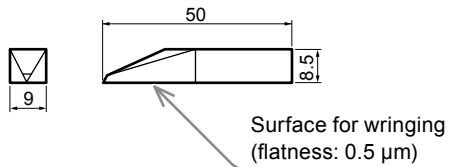
### ● Half round jaw (Part No. 619013)



### ● Plain jaw (B type) (Part No. 619018)



### ● Scriber point (Part No. 619019)



## 6 Specifications

### ■ Number of accessories required for assembly

When inspecting an inside and outside measurement from 300 mm through 1000 mm (every 100 mm), select the Rectangular Gauge Blocks and the combination of accessories in the table below.

Product name		Part No.	300 mm		400 mm		500 mm		600 mm	
			Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement
Rectangular Gauge Blocks (nominal size)	200 mm	611682							1	1
	300 mm	611683	1	1						
	400 mm	611684			1	1			1	1
	500 mm	611685					1	1		
Accessory	Holder A	619031							1	1
	Holder B	619032	2		2		2		2	
	Half round jaws (2 pc set)	619013	2		2		2		2	
	Clamping adapter	619036	2		2		2		2	

Product name		Part No.	700 mm		800 mm		900 mm		1000 mm	
			Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement	Inside mea- surement	Outside mea- surement
Rectangular Gauge Blocks (nominal size)	200 mm	611682								
	300 mm	611683	1	1	1	1				
	400 mm	611684	1	1			1	1		
	500 mm	611685			1	1	1	1	2	2
Accessory	Holder A	619031	1	1	1	1	1	1	1	1
	Holder B	619032	2		2		2		2	
	Half round jaws (2 pc set)	619013	2*		2*		2*		2*	
	Clamping adapter	619036	2		2		2		2	

\* Shows the individual numbers to use. Note that part no. 619013 is a two-piece set.

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\*As of January 2019

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# Mitutoyo Corporation



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