Mitutoyo

ABS Digimatic Caliper

IP67 ABS Coolant Proof Caliper with Nib-style Jaws (C type)

IP67 ABS Coolant Proof Caliper with Nib-style & Standard Jaws (CN type)

IP67 ABS Coolant Proof Caliper Dedicated Models

User's Manual

No. 99MAD031A Date of publication: July 1, 2021 (1)

Safety Precautions

To ensure operator safety, use this product according to the directions, functions and specifications given in this User's Manual. Use under other conditions may compromise safetv.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

- Always keep batteries out of reach of children, and if swallowed, consult a physician immediately.
- Batteries should never be short-circuited, disassembled, deformed or come in contact with extreme heat or flames.
- If alkaline liquid contained in the battery does come in contact with your eyes, flush them immediately with plenty of clean water and consult a physician. If the liquid adheres to the skin or clothes, immediately flush it with plenty of clean water.
- Do not measure the workpiece if it is rotating. There is a risk of injury due to being caught in the machine, etc.



CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

- The outside and inside measuring jaws of this caliper have sharp edges. Handle it with great care to avoid injury.
- Conventions and wording indicating prohibited and mandatory actions



Indicates concrete information about prohibited actions.



Indicates concrete information about mandatory actions.

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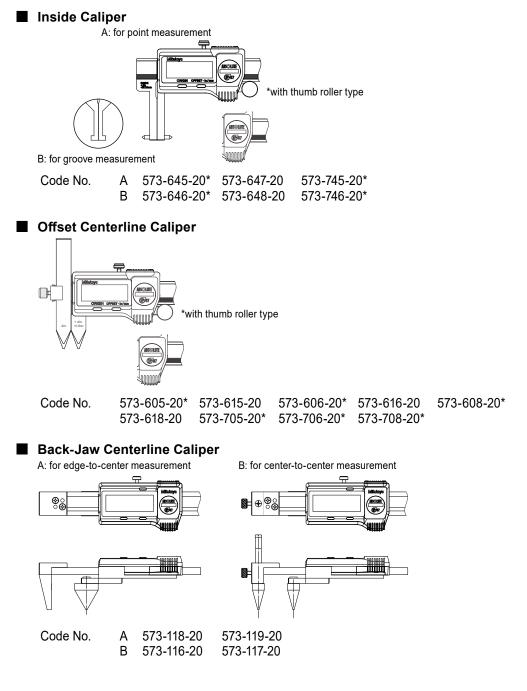
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Type and Code Number

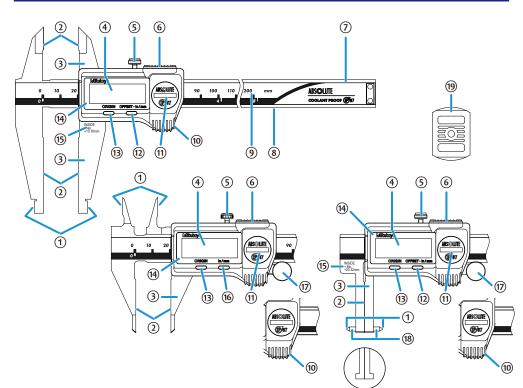
With Nib-style Jaws (C Type): without thumb roller 100 110 200 ABSOLUTE 0 10 mm Code No. 550-301-20 550-331-20 550-311-20 550-341-20 With Nib-style & Standard Jaws (CN Type): without thumb roller ANSOUTE 0 10 Gin Code No. 551-301-20 551-331-20 551-311-20 551-341-20 Point Caliper MOINT *with thumb roller type

Code No. 573-625-20* 573-626-20 573-725-20*

En

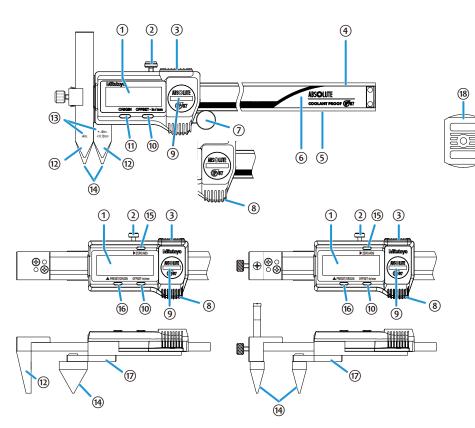


2. Names of Components



- 1 Inside measuring surface
- 0 Outside measuring surface
- 3 Slider
- ④ LCD part
- (5) Slider clamp screw
- Connector cap (only for the model with the output function)
- ⑦ Beam
- (8) Sliding surface (reference surface)
- Scale
- 10 Thumb rest

- (1) Battery lid
- (12) [OFFSET•in/mm] switch
- (3) [ORIGIN] switch
- Module part
- (5) Offset value
- [in/mm] switch (only for the model using inches)
- Thumb roller (only for the type with the thrum roller)
- 18 Stylus
- 19 Battery lid key



- 1 LCD part
- Slider clamp screw
- (3) Connector cap (only for the model with the output function)
- ④ Beam
- (5) Sliding surface (reference surface)
- 6 Scale
- Thumb roller (only for the type with the thrum roller)
- (8) Thumb rest
- Battery lid
- (i) [OFFSET•in/mm] switch

- (1) [ORIGIN] switch
- (12) Jaw
- Offset value
- (1) Hole center measuring surface
- ⓑ [►ZERO/ABS] switch
- ⑥ [▲PRESET/ORIGIN] switch
- 17 Slider
- 18 Battery lid key

3

3. Precautions for Use

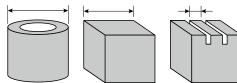
NOT	IICE Indicates a potentially hazardous situation which, if not avoided, may result in property damage.
0	 Do not use an electric engraver to put marks on the product such as numbers. Do not drop the product or apply excessive force to it.
	Do not scratch the main scale surface.
	 Keep the operation temperature and storage temperature. After use, take corrosion prevention measures. Corrosion can cause the product to malfunction. If the product will not be used for more than three months, remove the battery from and store it properly. Otherwise, liquid may leak from the battery and damage the product.

- For protecting the detection/display module from dust and water sufficiently, tighten the setscrews to secure the battery compartment lid. Also do not remove the packing seal.
- Before using this product for the first time, wipe the rust preventive oil from the product with a soft cloth soaked with cleaning oil, and install the supplied battery.
- If rust preventive oil is dried, the product might not operate smoothly. Wipe a sliding surface with a cloth and then apply a little oil to use the product. This can make the product operate smoothly.

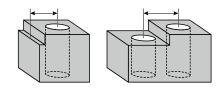
4. Product Applications

Outside measurement

C type, CN type, point caliper

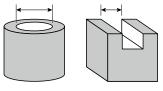


Edge/center-to-center measurement Offset centerline. back-iaw centerline calibers



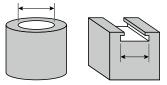
Inside measurement

Point caliper



Inside measurement (offset)

C type, CN type, inside caliper



5. Basic Usage

Using the caliper

Grasp the beam lightly with your right hand, put your right thumb on the thumb rest, and move the slider horizontally to measure.

Fixing the slider

The measurement value readings are usually taken with the workpiece clamped (or in close contact). However, depending on the measuring location, the orientation during measurement and so on, it may be difficult to get a reading in this position. In this case, tighten the slider clamp screw, move the caliper carefully away from the workpiece, and read the display.

Using the thumb roller

The thumb roller is a fine feeding device, and not a constant-force device. Measuring force tends to be large when measuring with the thumb roller. Carefully apply an appropriate and even measuring force when using the thumb roller.

Using the switch (about Icons)



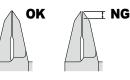
6. Confirmation before Measurement

Confirming Slider Movement

- Confirm that there is no irregular slider movement and that the slider moves smoothly throughout the measurement range.
- Confirm that there is no play of the slider in the vertical direction against the sliding surface.

Confirming Clearance (Wear) between Measuring surfaces

• When the outside measuring jaws are closed and held to the light, confirm that there is no slit observed between the jaws against the light, or that a faint light is uniformly visible. As well, confirm that the jaw tips are not deformed.



• When the inside measuring jaws are closed and held to the light, observing the jaws obliquely, confirm that a light is uniformly visible, and that the tips are not deformed.



7. Installing the Battery and Setting the Origin

NOTICE

Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

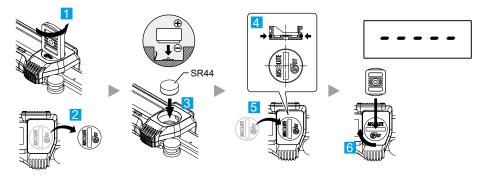
- Be sure to use SR44 (a silver oxide battery). The supplied battery is used to check functions and performance. Therefore, it might not provide the specified life.
- · Be careful not to damage battery terminals when installing the battery.



When disposing the battery, comply with ordinances and regulations.

7.1 Setting the battery

- **1** Insert the supplied battery lid key into the groove on the battery lid, press and rotate counterclockwise until the groove becomes vertical.
- **2** Remove the battery lid loosen.
- Install the battery (SR44) with its positive side facing upward.
- 4 Make sure that the packing is attached in place on the battery lid without kinks.
- **5** Put the battery lid on with its groove vertical as shown in the figure.
- Insert the battery lid key into the groove on the battery lid, press and rotate clockwise until the groove becomes horizontal.
 - » "-----" blinks immediately. Continue to set the origin.

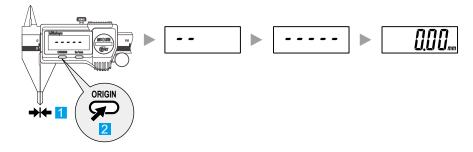


Tips

Be sure to set the origin after installing the battery.

7.2 Setting the origin

- **1** Make sure that the outside measuring surface is closed.
- 2 Hold down the [ORIGIN] switch for one second or more.
 - » "0.00" appears indicating that the origin has been set.



Tips

- When the battery has been installed, do not move the slider until "0.00" appears as the origin. Otherwise, the product might not count values correctly.
- If the origin (zero point) setting is performed with the OFFSET function effective, the compensation value will be displayed.

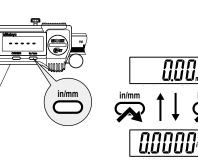
Auto-sleep, Auto-on Function

The LCD automatically goes off after approximately 20 minutes of idle time. (However, the origin point will be stored.) Move the slider to activate the LCD

3. In/mm Conversion *only for using inches

Press the [in/mm] switch.

» Every time it is pressed, the display switches between "in" and "mm."



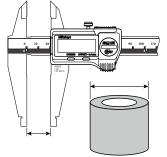
9. Measurement Method

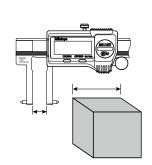


Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

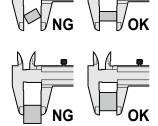
Do not measure the workpiece with the caliper if it is rotating, etc. Measuring surfaces will be worn out.

Outside measurement



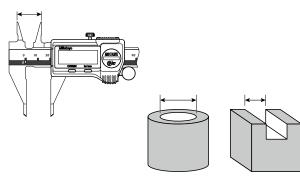


- Do not apply excessive force to the workpiece. Excessive measuring force will cause measurement error because of the positional deviations of the jaws.
- Do not clamp the workpiece diagonally. Measurement error will ensue if tilted.
- Clamp the workpiece as close to the sliding surface as possible. Measurement error is more likely to increase if clamped near the outside measuring jaw tips.

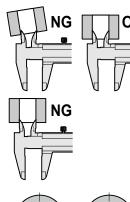


- Insert the workpiece into the outside measuring jaws and bring jaws into close contact with the workpiece, using appropriate and uniform measuring force.
- 2 Read the display while keeping the outside measuring surfaces in close contact.

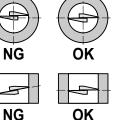
Inside measurement



 Insert the inside measuring jaws as deeply as possible into the workpiece.



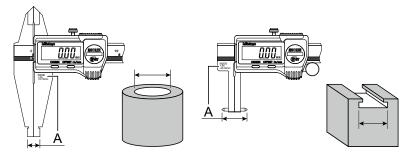
• For inner diameter measurement, bring the inside measuring surfaces into close contact, and read the display when it is maximum: a direct line between the measuring surfaces passes through the center of the cross-section.



- For groove width measurement, bring the inside measuring surfaces into close contact, and read the display when it is minimum: a direct line between the faces is perpendicular to the groove inner wall.
- Insert the inside measuring jaws into the workpiece, and bring jaws into close contact with the workpiece interior using appropriate and uniform measuring force.
- **2** Read the display while keeping the inside measuring surfaces in close contact.

■ Inside measurement (offset)

cross-section.



NG OK

NG

∃-Ð

OK

OFFSET .in/m

 \sim

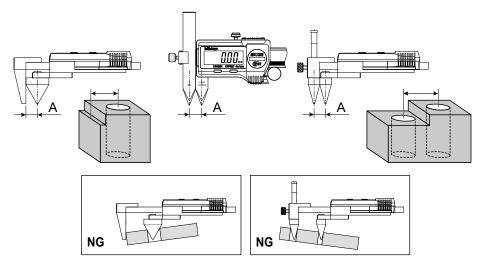
• For groove width measurement, bring the inside measuring surfaces into close contact, and read the display when it is minimum: a direct line between the faces is perpendicular to the groove inner wall.

 For inner diameter measurement, bring the inside measuring surfaces into close contact, and read the display when it is maximum: a direct line between the measuring surfaces passes through the center of the

- **1** Press [OFFSET] or [OFFSET in/mm] switch.
 - » "≪≫" appears and the offset value inscribed on the slider will be added to the indication. The offset value added differs, depending on the models. For details, see "11. Specifications".
- Insert the inside measuring jaws into the workpiece, and bring jaws into close contact with the workpiece interior using appropriate and uniform measuring force.
- 3 Read the display while keeping the inside measuring surfaces in close contact.
- Press [OFFSET] or [OFFSET in/mm] switch again.
 - » "≪≫" disappears and return to the initial state. If the switching of the offset function is performed with inch models, do not press the [OFFSET] switch for 1 second or more. The in/mm switching function will be activated.



Edge-to-center and center-to-center measurement (offset)



Press [OFFSET] or [OFFSET in/mm] switch.

» "≪≫" or "I←>I" appears and the offset value inscribed on the slider will be added to the indication.

The offset value added differs, depending on the models. For details, see "11. Specifications".

	OFFSET -in/r
«»	10.00,,,,,,

- Insert the inside measuring jaws into the workpiece, and bring jaws into close contact with the workpiece interior using appropriate and uniform measuring force.
- 3 Read the display while keeping the inside measuring surfaces in close contact.
- Press [OFFSET] or [OFFSET in/mm] switch again.
 - » "≪≫" or "₩→" disappears and return to the initial state. If the switching of the offset function is performed with inch models, do not press the [OFFSET] switch for 1 second or more. The in/mm switching function will be activated.





Reference setting (presetting)

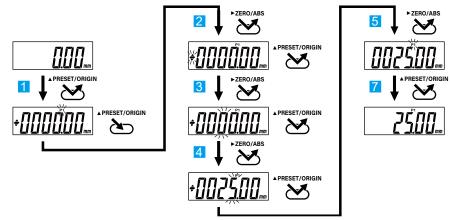
This product allows the reference to be set (preset) at any value to any arbitrary point. Up to two references can be preset. As an example, this section describes how to set the preset value to [P1] (preset 1) using a 25 mm gauge block.

Tips

- The set preset value is retained even when the power is turned off. However, the preset value will be cleared if the battery is replaced, and will be need to be set again.
- To exit the presetting (P1/P2 display), press the [OFFSET] switch.
- **1** Press the [▲PRESET/ORIGIN] switch.
 - The previous preset value is displayed, and [P1]* blinks on the upper right of the LCD. To set the displayed value as the reference, proceed to step 7.
 *Pressing the [▲PRESET/ORIGIN] switch for more than 1 sec switches between [P1] and [P2] on the display.
- **2** Press the [►ZERO/ABS] switch.
 - » [+] blinks. When [-] is blinking, press the [▲PRESET/ORIGIN] switch to change to [+] blinking.
- Press the [►ZERO/ABS] switch repeatedly until the number in the tens place blinks. And then press the [▲PRESET/ORIGIN] switch repeatedly until the number in the tens place reads "2"*.

*The number will switch from 0 through 1, 2...8, 9, and then back to 0, so press it twice.

- Use the same procedure in step 3 to change the number in the ones place to "5".
- 5 Press the [►ZERO/ABS] switch repeatedly until [P1] blinks.
- 6 Measure the 25 mm gauge block.
- Press the [APRESET/ORIGIN] switch.
 - » [P1] lights up (prsetting is complete).



10. Errors and Countermeasures

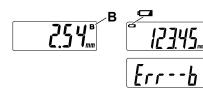
Minimum digit "E" display



This digit appears if the surface of the scale is dirty to an immeasurable degree. Clean the surface of the scale cover.

If "E" still appears even after the surface of the scale cover is cleaned, reinstall the battery. Nevertheless, if it does not disappear, remove the battery, and then contact your distributor or sales office.

■ "B", "**⊏**I" and "Err--b" display



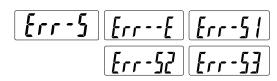
"B" indicates the voltage drop of the battery. Replace the battery immediately. (For instructions on replacing the battery, see "8.").

If all five digits have the same number, or if "H" blinks



Remove the battery temporarily, and then reinstall it.

Other errors



If the error shown in the figure occurs, set the origin again.

11. Precautions after Use

- If there is dirt on the measuring surface, reference surfaces, sliding surface, etc., wipe it away with a dry cloth or a cloth slightly moistened with alcohol.
- For long-term disuse, wipe away any dirt carefully and apply a light coating of rust preventive oil before storage.
- Do not store in locations with high temperatures, low temperatures, high humidity, or exposure to direct sunlight.

12. Specifications

Resolution	0.01 mm
Maximum permissible error E_{MPE} (outside measurement) S_{MPE} (inside measurement)	E See "MPE (Емре, Sмре)".
Protection level	 IP67* *IP67 protection level (See IEC 60529 for details.) Protection against foreign matter (level 6): Foreign matter does not enter Protection against water (level 7): The module is protected against water damage to a depth of one meter for 30 minutes.
Maximum response speed	No limit (no miscount caused by speed)
Power supply	SR44 (silver oxide battery) 1 pc
Battery life*	A continuous use of about 18,000 hours, A typical use of about 5 years (C type and CN type: approx. 3.5 years) *The battery life depends on how many times and in which ways it is used. Remember that the above values are a guideline. The value of the typical use has been calculated assuming that the product is used for about five hours per day.
Operating temperature	0 °C to 40 °C
Storage temperature	-10 °C to 60 °C

The display of this product may flicker or turn off due to electromagnetic interference by electrostatic charge, but it returns to the normal state after the electromagnetic interference is cleared.

Offset value

+10 mm			+20 mm	
550-301-20	573-116-20	573-615-20	573-646-20	
550-331-20	573-118-20	573-616-20		
551-301-20	573-605-20	573-618-20		
551-331-20	573-606-20	573-645-20		
	573-608-20	573-648-20		
+10 mm/0.4	in	+20 mm/0.8 ir	1	
550-311-20	573-117-20		573-647-20	
550-341-20	573-119-20			
551-311-20	573-705-20			
551-341-20	573-706-20			
	573-708-20			

13. Standard Accessories

- SR44 silver oxide battery (No. 938882, 1 pc)
- Phillips screwdriver (No. 05CZA619, 1 pc)
- Warranty (1 copy)
- User's Manual (No. 99MAD030M, 1 copy)

14. Optional Accessories *only for the type with the output function

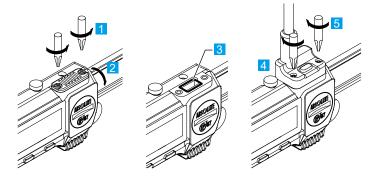
Connection cable (with the output switch) No. 05CZA624 (1 m), No.05CZA625 (2 m)

• Setting the connection cable

Set the connection cable by following the procedure below.

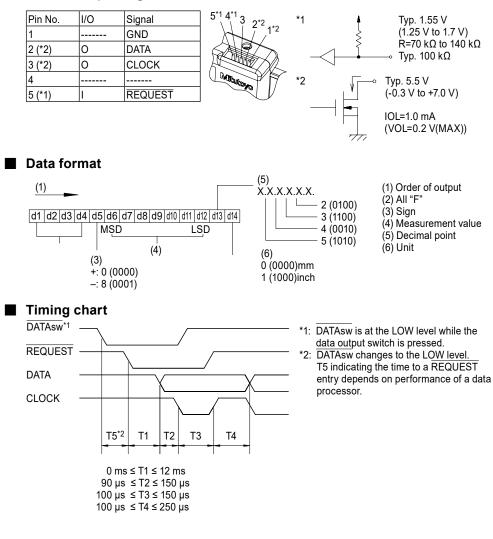
To fasten or remove screws, use the supplied screwdriver (No. 05CZA619) (recommended) or a commercial No. 0 screwdriver with a 5 to 8 N•cm tightening torque. Excessive tightening may degrade performance.

- Remove the connector cover mount screws (M1.7 x 0.35 x 2.5/No. 09GAA376) with the above screwdriver.
- **2** Remove the connector cover.
- **3** Make sure that the packing is attached in place (Do not remove it).
- **4** Connect the connection cable.
- **5** Tighten the plug of the connection cable with the mount screws by holding down it with your fingers.



15. Output Specifications *only for the type with the output function

Connector pin alignment



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Printed in Japan

MPE (EMPE, SMPE)

550 Sereis

0.01 mm: 550-301-20, 550-331-20

*L (mm)	<i>Е</i> мре (mm)	Smpe (mm)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02
50 < L ≤ 200	±0.03	±0.03
200 < L ≤ 300	±0.04	±0.04

0.01 mm / 0.0005 in: 550-311-20, 550-341-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)	*L (inch)	<i>Е</i> мре (inch)	SMPE (inch)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02	0.404 (0) ≤ L ≤ 2	±0.0010	±0.0010
50 < L ≤ 200	±0.03	±0.03	2 < L ≤ 8	±0.0015	±0.0015
200 < L ≤ 300	±0.04	±0.04	8 < L ≤ 12	±0.0020	±0.0020

551 Sereis

0.01 mm: 551-301-20, 551-331-20

*L (mm)	<i>Е</i> мре (mm)	Smpe (mm)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02
50 < L ≤ 200	±0.03	±0.03
200 < L ≤ 300	±0.04	±0.04

0.01 mm / 0.0005 in: 551-311-20, 551-341-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02	0.404 (0) ≤ L ≤ 8	±0.0010	±0.0010
50 < L ≤ 200	±0.03	±0.03	8 < L ≤ 12	±0.0020	±0.0020
200 < L ≤ 300	±0.04	±0.04			

573 Sereis

0.01 mm: 573-601-20, 573-602-20, 573-604-20, 573-612-20, 573-614-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)
0 ≤ L ≤ 200	±0.02	±0.04**
200 < L ≤ 300	±0.03	±0.05**

0.01 mm / 0.0005 in: 573-701-20, 720-20, 573-704-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
$0 \le L \le 200$	±0.02	±0.04**	0 ≤ L ≤ 8	±0.0010	±0.0020**
200 < L ≤ 300	±0.03	±0.05**	8 < L ≤ 12	±0.0015	±0.0025**

0.01 mm: 573-605-20, 573-606-20, 573-608-20, 573-615-20, 573-616-20, 573-618-20

*L (mm)	EMPE (mm)	SMPE (mm)
10.1 (0) ≤ L ≤ 200		±0.03
200 < L ≤ 300		±0.04

0.01 mm / 0.0005 in: 573-705-20, 573-706-20, 573-708-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	<i>Е</i> мре (inch)	SMPE (inch)
10.1 (0) ≤ L ≤ 200		±0.03	0.404 (0) ≤ L ≤ 12		±0.0015
200 < L ≤ 300		±0.04			

0.01 mm: 573-716-20, 573-717-20, 573-718-20, 573-719-20

*L (mm)	EMPE (mm)	SMPE (mm)
10.1 (0) ≤ L ≤ 200		±0.10
200 < L ≤ 300		±0.15

0.01 mm: 573-621-20, 573-622-20, 573-625-20, 573-626-20, 573-634-20, 573-635-20

*L (mm)	<i>Е</i> мре (mm)	Smpe (mm)
0 ≤ L ≤ 150	±0.02	±0.04

0.01 mm / 0.0005 in: 573-721-20, 573-725-20, 573-734-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
0 ≤ L ≤ 150	±0.02	±0.04	0 ≤ L ≤ 6	±0.0010	±0.0020

0.01 mm: 573-642-20, 573-643-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)
10 (0) ≤ L ≤ 200		±0.05

0.01 mm / 0.0005 in: 573-742-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
10 (0) ≤ L ≤ 200		±0.05	0.4 (0)[≤ L ≤ 8		±0.0025

0.01 mm: 573-645-20, 573-647-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)
10.1 (0) ≤ L ≤ 150		±0.05

0.01 mm / 0.0005 in: 573-745-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	<i>Е</i> мре (inch)	SMPE (inch)
10.1 (0) ≤ L ≤ 150		±0.05	0.404 (0) ≤ L ≤ 6		±0.0025

0.01 mm: 573-646-20, 573-648-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)
20.1 (0) ≤ L ≤ 150		±0.03

0.01 mm / 0.0005 in: 573-746-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
20.1 (0) ≤ L ≤ 150		±0.03	0.804 (0) ≤ L ≤ 6		±0.0015

0.01 mm: 573-651-20, 573-652-20, 573-653-20, 573-654-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)		
0 ≤ L ≤ 150	±0.03			

0.01 mm / 0.0005 in: 573-751-20, 573-752-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
0 ≤ L ≤ 150	±0.03		0 ≤ L ≤ 6	±0.0015	

0.01 mm: 573-661-20, 573-662-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)
0 ≤ L ≤ 150	±0.05	

0.01 mm / 0.0005 in: 573-761-20

*L (mm)	EMPE (mm)	SMPE (mm)	*L (inch)	EMPE (inch)	SMPE (inch)
0 ≤ L ≤ 150	±0.05		0 ≤ L ≤ 6	±0.0025	

0.01 mm: 573-676-20, 573-677-20, 573-679-20

*L (mm)	<i>Е</i> мре (mm)	SMPE (mm)	
0 ≤ L ≤ 200	±0.02	±0.04	
200 < L ≤ 300	±0.03	±0.05	

*L

jp	測定長さ	sv	Mätlängd	zh-CN
en	Measruing length	pt	Comprimento de medição	zh-TW
de	Messlänge	CS	Měřená délka	th
es	Longitud de medición	pl	Długość pomiaru	vi
fr	Longueur de mesure	ru	Длина измерения	ms
nl	Meetlengte	tr	Ölçme uzunluğu	id
it	Lunghezza di massima	ko	대 측정 길이	

**SMPE

- 段差測定は含まれません。 jp
- Step measurement is not included. en
- de Schrittmessung ist nicht enthalten.
- La medición de pasos no está incluida. es
- La mesure de pas n'est pas incluse. fr
- nl Stapmeting is niet inbegrepen.
- it La misurazione del passo non è inclusa.
- sv Stegmätning ingår inte.
- A medição do passo não está incluída. pt
- Krokové měření není zahrnuto. CS

- 量測長度 ความขาวในการวัดสูงสุด Độ dài đo lường
 - Panjang pengukuran

测量长度

- Panjang pengukuran
- Pomiar kroku nie jest wliczony w cenę.
- Шаговое измерение не включено. ru
- Adım ölçümü dahil değildir. tr
- ko 단차 측정은 포함되어 있지 않습니다.
- zh-CN 不包括步长测量。
- zh-TW 不包括步長測量。

pl

- th ไม่รวมการวัดขั้นตอน
- Đo bước không được bao gồm. vi
- Pengukuran langkah tidak termasuk. ms
- Pengukuran langkah tidak termasuk. id

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