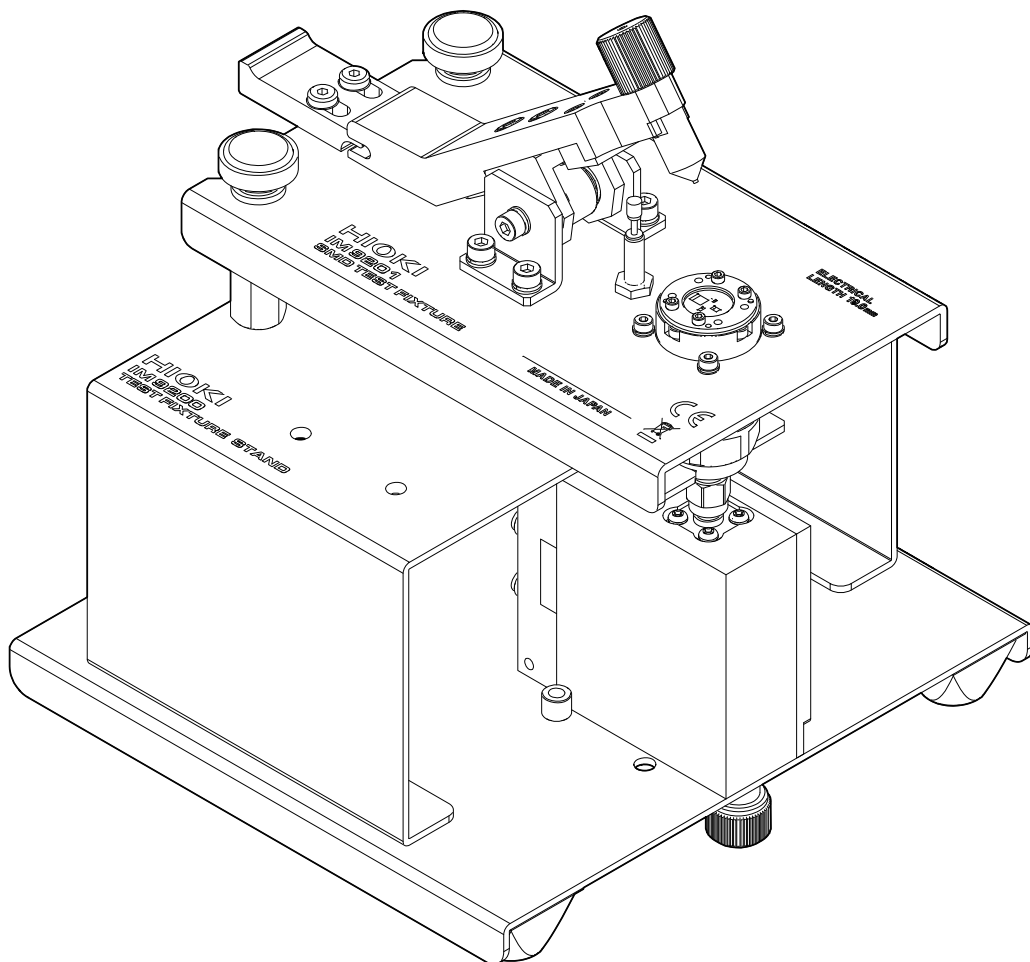


HIOKI

IM9201

Instruction Manual

SMD TEST FIXTURE



EN



Introduction

Thank you for purchasing the Hioki IM9021 SMD Test Fixture. To obtain maximum performance from the device, please read this manual first, and keep it handy for future reference.

This device is used by connecting to the impedance analyzer. Before using the impedance analyzer, read the instruction manual of the impedance analyzer carefully.

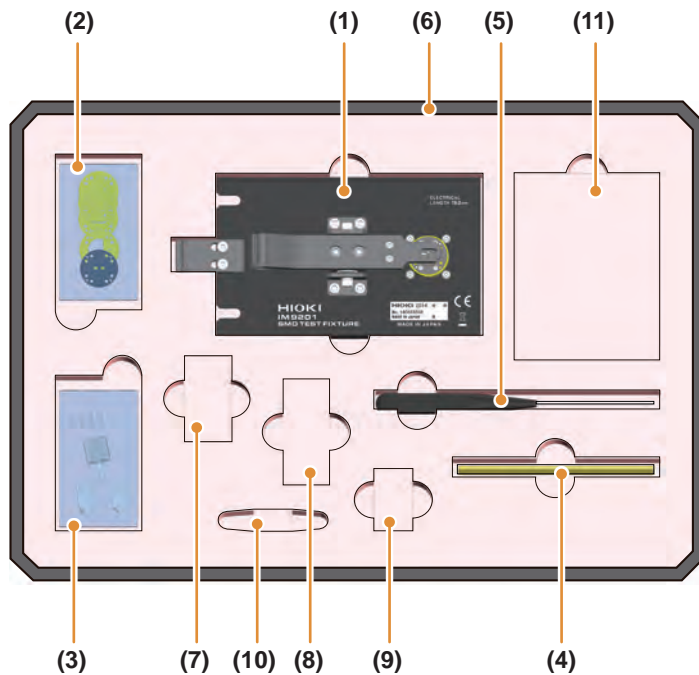
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Verifying Package Contents

When you receive the device, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the accessories. If damage is evident, or if it fails to operate according to the specifications, contact your authorized Hioki distributor or reseller.

Confirm that the following items are provided.



- Model IM9201 SMD Test Fixture x 1(1)
- Short plate x 5(2)
GND plate x 1
Device guide x 1
- Hexagon socket head bolts (spare, M1.4 x 4 mm) x 4.....(3)
Knob (for fixing tip pin) x 1
Tip pin x 2
- Brush for cleaning x 1(4)
- Hex driver x 1(5)
- Carrying case x 1(6)
- Instruction Manual x 1

GND plate and device guide for the sizes 1005 (0402), 1608 (0603), 2012 (0805), 3216 (1206), 3225 (1210) are installed in the device. Refer to "Tip pins, device guides, and plates for each DUT size" (p.5).

Options (sold separately)

- Model IM9906 Adapter (3.5 mm/7 mm)(7)
- Model IM9905 Calibration Kit (LOAD)(8)
- Model IM9905 Calibration Kit (OPEN).....(9)
- Model IM9905 Calibration Kit (SHORT)(10)
- Magnifying glass (Model IM9200 Test Fixture Stand accessory)(11)
- Model IM9200 Test Fixture Stand

Options (sold separately) can be stored inside (7) to (11) of the carrying case. Please store them after removing the packed sponge at the time of unpacking.

Safety Information

Before using the device, be certain to carefully read the following safety notes.





CAUTION





- Mishandling during use could result in damage to the device. Be certain that you understand the instructions and precautions in the manual before use.
- Individuals using an electrical measuring device for the first time should be supervised by a technician who has experience in electrical measurement.

Notation

In this document, the risk seriousness and the hazard levels are classified as follows.

 WARNING	Indicates a potentially hazardous situation that may result in death or serious injury to the operator.
 CAUTION	Indicates a potentially hazardous situation that may result in minor or moderate injury to the operator or damage to the device or malfunction of the device.
IMPORTANT	Indicates information related to the operation of the device or maintenance tasks with which the operators must be fully familiar.
	Indicates prohibited action.
	Indicates the action which must be performed.

Symbols for standards

	Indicates the Waste Electrical and Electronic Equipment Directive (WEEE Directive) in EU member states.
	Indicates that the product conforms to regulations set out by the EC Directive.

Operating Precautions

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

Installation Environment

WARNING

Installing the device in inappropriate locations may cause malfunctions or may give rise to accidents. Avoid the following locations:



- Exposed to direct sunlight or high temperature
- Exposed to corrosive or combustible gases
- Exposed to strong electromagnetic fields or electrostatic charges
- Near induction heating systems (such as high-frequency induction heating systems and IH cooking equipment)
- Susceptible to mechanical vibration
- Exposed to water, oil, chemicals, or solvents
- Exposed to high humidity and condensation
- Exposed to high quantities of dust particles

Handling the Device

CAUTION



- Do not press the tip pin in the electrode when the DUT is not attached.
- While pressing the tip pin into the DUT, the DUT may pop out. To avoid injuries, lower the pusher slowly and press the tip pin into the DUT.



- To avoid damage to the device, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.
- To prevent damage to the device, use the bolts included in the factory shipment for securing the pusher and plate. If you have lost any bolts or find any damaged bolts, please contact your authorized Hioki distributor or reseller for a replacement.

Measurements

CAUTION



- Do not input a voltage in excess of the maximum applied voltage listed in the specifications. It may cause damage to the device or connecting equipments.
- To avoid damage, do not connect the charged capacitor to the device.

Precautions during shipment

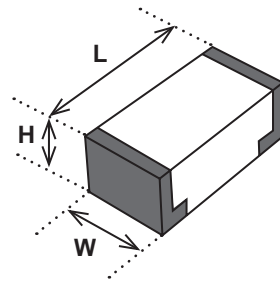
During shipment of the device, handle it carefully so that it is not damaged due to a vibration or shock.

Product Overview

This device is the test fixture for SMD (Surface Mount Device) to be used by connecting to the impedance analyzer of Hioki. It measures the 2 terminals of SMD.

Measurable DUT size

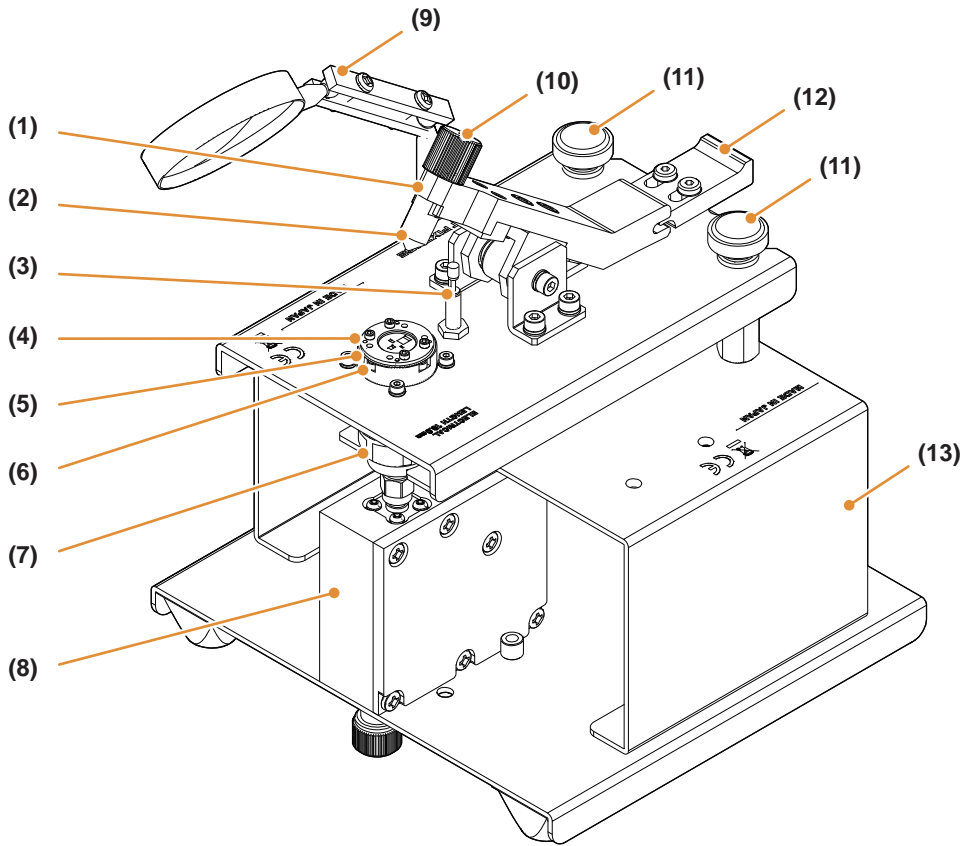
Nominal size [mm] JIS (EIA)	Dimensions	
	L x W [mm]	H [mm]
0603 (0201)	$(0.6\pm 0.03) \times (0.3\pm 0.03)$	$H \geq 0.25$
1005 (0402)	$(1.0\pm 0.1) \times (0.5\pm 0.1)$	$H \geq 0.4$
1608 (0603)	$(1.6\pm 0.15) \times (0.8\pm 0.15)$	$H \geq 0.4$
2012 (0805)	$(2.0\pm 0.15) \times (1.2\pm 0.15)$	$H \geq 0.4$
3216 (1206)	$(3.2\pm 0.15) \times (1.6\pm 0.15)$	$H \geq 0.4$
3225 (1210)	$(3.2\pm 0.15) \times (2.5\pm 0.15)$	$H \geq 0.4$



Tip pins, device guides, and plates for each DUT size

DUT size JIS (EIA)	0603 (0201)	1005 (0402)	1608 (0603)	2012 (0805)	3216 (1206) 3225 (1210)
Accessories					
Tip pin		(Common)			
Device guide		(Common)			
Short plate (At the time of short correction)					
GND plate (At the time of open correction and measurement)		(Common)			

Names and Functions of Parts



(1)	Pusher	Presses and fixes the DUT.
(2)	Tip pin	The tip of the pusher. Replaced according to the DUT to be measured.
(3)	Shock absorber	Absorbs the shock when the pusher comes down.
(4)	Device guide	Placed on the top of the GND plate or short plate for use.
(5)	Short plate or GND plate	Short plate is used at the time of short correction. GND plate is used at the time of open correction and measurement.
(6)	Electrode section	The measurement unit of the device. Measures by placing the GND plate and DUT on top of the electrode.
(7)	Model IM9906 Adapter (3.5 mm/7 mm)	The exclusive adapter for connecting the device to the test head of the impedance analyzer side.
(8)	Test head	The test head is provided with the impedance analyzer.
(9)	Loupe	The magnifying glass provided with the model IM9200 Test Fixture Stand (option). It is used by installing to the model IM9200.
(10)	Knob	The knob is loosened to move the tip pin to the DUT location. Then the knob is tightened to fix it.
(11)	Stand fixing knob	The knob fixes the device to the model IM9200 Test Fixture Stand.
(12)	Stopper	Locks the pusher so that it does not come down.
(13)	Model IM9200 Test Fixture Stand	The exclusive stand for fixing the test head of the impedance analyzer and the device.

Measuring Method

Measurement Procedure

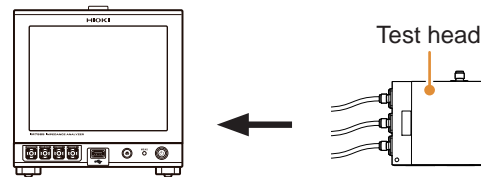
You will need (besides the device and accessories):

- Model IM7580 series Impedance Analyzer × 1
- Model IM9200 Test Fixture Stand × 1
- Model IM9906 Adapter × 1
- 3.5 mm Connector torque wrench × 1 (This is not provided with the device.)
- Tweezers × 1 (This is not provided with the device. Tweezers which are thinner than the DUT size, clean, and not magnetized are recommended.)

1 Connect the test head to the impedance analyzer.

See the instruction manual of the impedance analyzer.

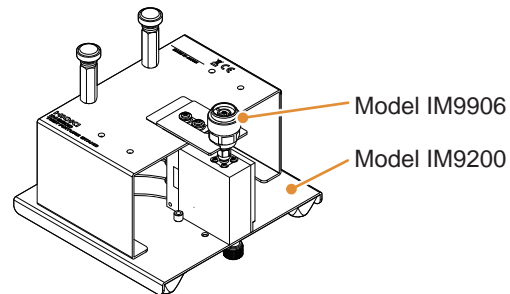
Connect the cable of the test head to the impedance analyzer.



2 Attach the test head and adapter to the stand.

(p.9)

Attach the test head and model IM9906 Adapter to the model IM9200 Test Fixture Stand.



3 Execute the calibration.

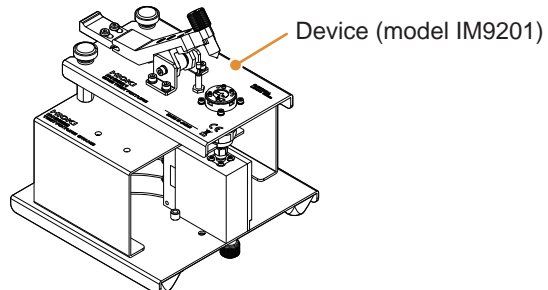
(p.10)

Execute the open calibration, short calibration, and load calibration.

4 Attach the device.

(p.13)

Attach the device to the model IM9200 Test Fixture Stand.



5 Execute the correction.

(From p.14)

Execute the electrical length correction, short correction, and open correction.

6 Start the measurement.

(p.20)

Connect the DUT to the measurement location of the device guide and start the measurement by the impedance analyzer.

Inspection Before Use

Before using the device, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hioki distributor or reseller.

Inspection item	Solution
Is the short plate worn?	Compare the resistance value with the new or a non-defective short plate. Replace with new short plate if the resistance value is high.
Is the tip pin deformed?	If the tip pin is deformed, contact your authorized Hioki distributor or reseller.
Is the device damaged?	If the device is damaged, send it for repair.
Is the GND plate damaged or worn?	If there are significant scratches and deformation, replace it with the new GND plate.

Attaching the Test Head and the Adapter

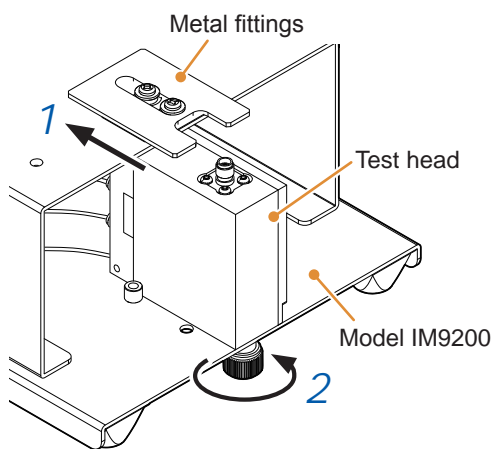
Attach the test head and model IM9906 Adapter to the model IM9200 Test Fixture Stand.

IMPORTANT

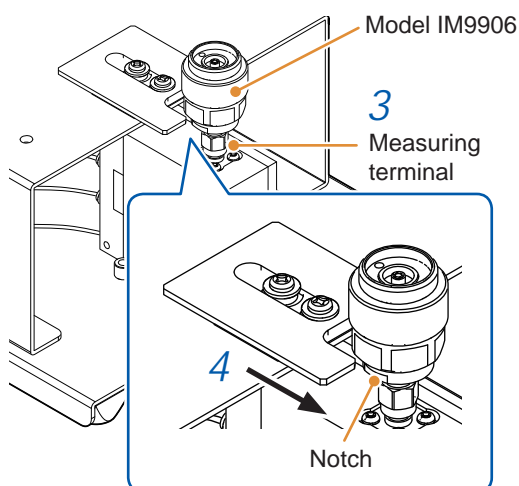
The impedance analyzer, test head, and measurement cable are adjusted together at the time of shipment. Use the test head and measurement cable included along with the impedance analyzer. Confirm that the serial no. of the impedance analyzer and test head is same.

You will need:

- Test head × 1
- Model IM9200 Test Fixture Stand × 1
- Model IM9906 Adapter × 1
- 3.5 mm Connector torque wrench × 1 (This is not provided with the device.)

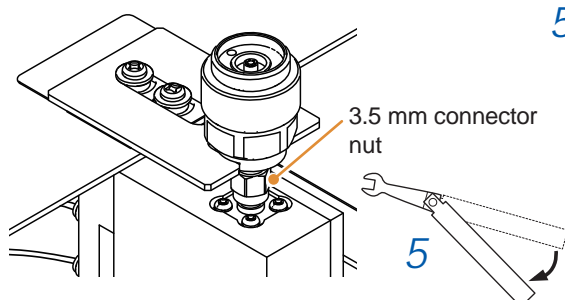


- 1 Pull the metal fittings to the model IM9200 Test Fixture Stand side.**
- 2 Place the test head on the stand and tighten the knob.**



- 3 Place the notch of the model IM9906 Adapter parallel to the metal fittings, then install onto the measurement terminal of the test head.**
At this time it is stopped temporarily. Position the notch of the model IM9906 Adapter where the metal fittings can slide.

- 4 Fix the notch of model IM9906 adapter by sliding the metal fittings.**



- 5 Tighten the nut of the 3.5 mm connector by using a torque wrench.**

Recommended torque: 0.9 N·m
Tightening the nut until the handle of the wrench bends slightly is sufficient. Do not over tighten.

Calibration

Connect the three standard units, open, short, and load of the model IM9905 Calibration Kit to the reference surface (terminal) of model IM9906 Adapter one by one, and measure the respective calibration data. This reference surface is referred to as the “calibration reference surface”. The cause of errors between the impedance analyzer itself and the calibration reference surface is eliminated.

The defined value differs according to the calibration kit to be used. See the instruction manual of the impedance analyzer for the input method of the defined value to the impedance analyzer.

CAUTION



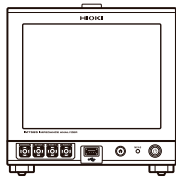
While attaching and detaching the calibration kit, make sure that the internal conductor of the calibration kit does not rotate. If the internal conductor rotates, it may cause damage to the electrode.

When the calibration cannot be executed:

- Confirm that the calibration kit and model IM9906 Adapter are connected properly.
- Check that the DC measurement limit value of the impedance analyzer is appropriate.
- Connect the model IM9906 adapter, calibration kit and this device with a 7 mm connector. Recommended torque for the 7 mm connector is 1.35 N·m.

You will need:

Model IM9905 Calibration Kit (OPEN, SHORT, and LOAD) × 1 of each



For model IM9905 Calibration Kit
Defined values:

OPEN	G: 0 S, Cp: 82 fF
SHORT	Rs: 0 Ω, Ls: 0 H
LOAD	Rs: 50 Ω, Ls: 0 H

Offset delay:

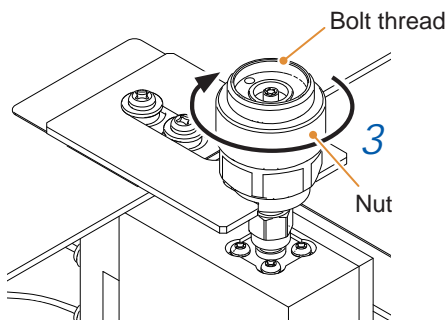
OPEN	0 s
SHORT	0 s
LOAD	0 s

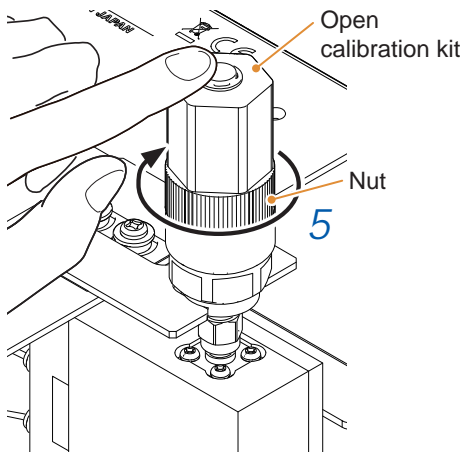
1 Set the measurement conditions like frequency, measurement signal level, and measurement speed in the impedance analyzer.

2 Set the defined values of the calibration kit and offset delay in the impedance analyzer.

The initial values of the impedance analyzer are set to the values of the left-side table.

3 Raise the bolt thread by turning the nut of model IM9906 Adapter.

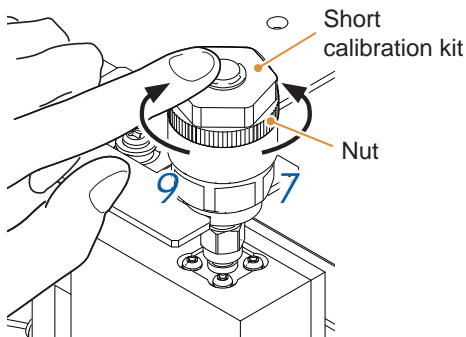
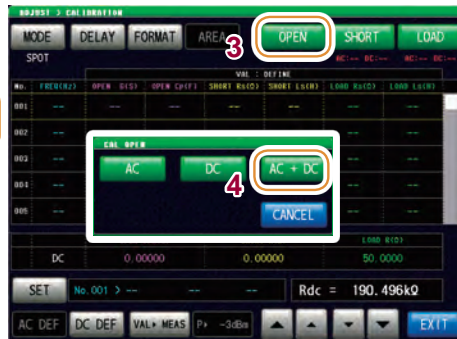




- 4 Place the open calibration kit on the reference surface.
- 5 As shown in figure, connect by turning only the nut of open calibration kit while pressing the convex portion on the top part of the open calibration kit.

The convex part of the open calibration kit is connected with the internal conductor. If the calibration kit is rotated without pressing the convex part, the internal conductors of calibration kit and adapter may graze each other, and the calibration kit and adapter may get damaged.

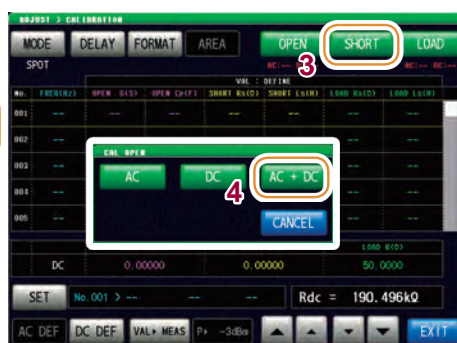
- 6 Execute open calibration by using the impedance analyzer.

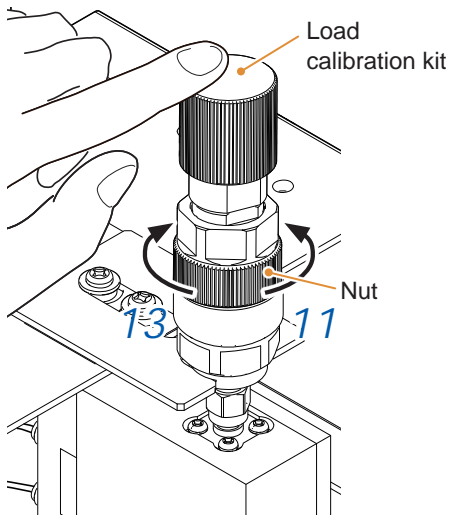


- 7 Remove the open calibration kit by turning the nut of the open calibration kit.
- 8 Place the short calibration kit on the reference surface.
- 9 As shown in figure, connect by turning only the nut of short calibration kit while pressing the convex portion on the top part of the short calibration kit.

The convex part of the short calibration kit is connected with the internal conductor. If the calibration kit is rotated without pressing the convex part, the internal conductors of calibration kit and adapter may graze each other, and the calibration kit and adapter may get damaged.

- 10 Execute short calibration by using the impedance analyzer.





11 Remove the short calibration kit by turning the nut of the open calibration kit.

12 Place the load calibration kit on the reference surface.

13 As shown in figure, connect by turning only the nut of load calibration kit while pressing the top part of the load calibration kit.

If the top part of the load calibration kit is rotated, the internal conductors of the calibration kit and adapter may graze each other, and the calibration kit and adapter may get damaged.

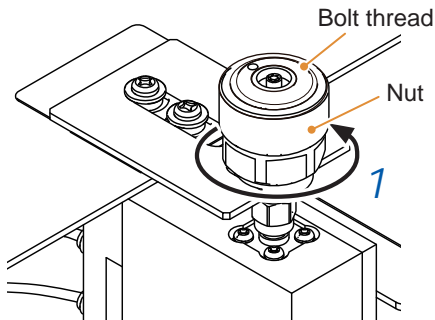
14 Execute load calibration by using the impedance analyzer.



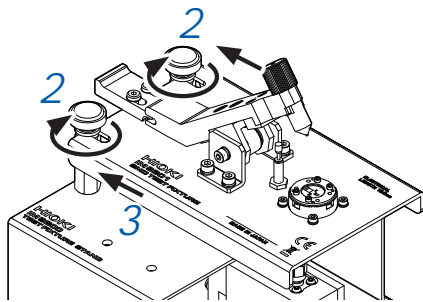
15 Remove the load calibration kit by turning the nut of the load calibration kit.

Attaching the Device

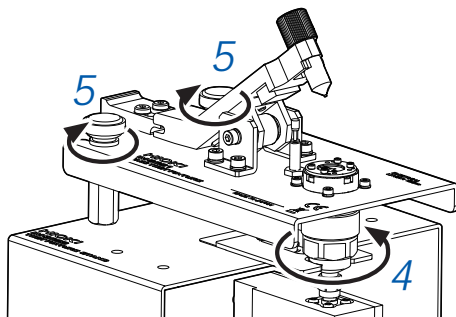
Attach the device to the model IM9200 Test Fixture Stand and adapter.



- 1 Lower the bolt thread by turning the nut of model IM9906 Adapter.



- 2 Loosen the stand fixing knob.
- 3 Place the device on the model IM9200 Test Fixture Stand.
As shown in figure, slide the notch part.

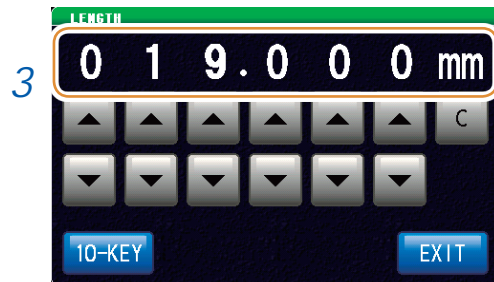


- 4 Turn the nut of model IM9906 Adapter and connect to the device.
- 5 Tighten the stand fixing knob.

Electrical Length Correction

The error, caused by the phase shift occurring between the calibration reference surface and the measurement DUT's connection surface is compensated.

Set the electrical length correction to 19 mm in the impedance analyzer.



Short Correction

Short correction is executed to reduce errors. The short plate is used.

CAUTION



- To avoid damage to the device and DUT, while pressing the tip pin into the DUT, move the tip pin slowly so that shock is not applied.
- To avoid damage to the bolt fixing the plates, insert the bolt vertically and tighten it with appropriate force.
- To avoid injury, make sure that your hand is not in-between the pusher and tip pin.

IMPORTANT

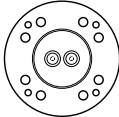
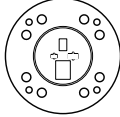
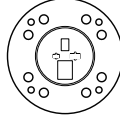
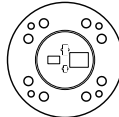
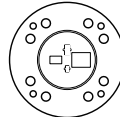
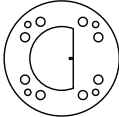
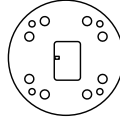
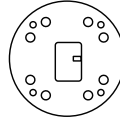
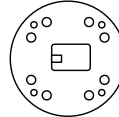
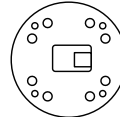
Do not scratch the electrode, GND plate, and short plate of the device or touch them directly with your hand. It may affect the measurement accuracy and reproducibility.

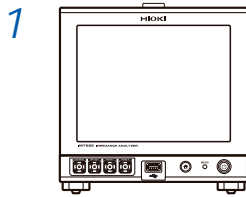
You will need:

- Hex driver × 1
- Tweezers × 1 (This is not provided with the device. Tweezers which are thinner than the DUT size, clean, and not magnetized are recommended.)
- Device guide and short plate × 1 each

Device guides and short plates for each DUT size

The set direction as viewed from the front (position from where the model name IM9201 can be read).

DUT size JIS (EIA)	0603 (0201)	1005 (0402)	1608 (0603)	2012 (0805)	3225 (1210) 3216 (1206)
Accessories					
Device guide					
Short plate (At the time of short correction)					



For this device

OPEN	G: 0 Ω , Cp: 0 F
SHORT	Rs: 0 Ω , Ls: 0 H

1 Set the reference value of correction (COMPEN) in the impedance analyzer.

The initial values of the impedance analyzer are set to the values of the left-side table.

When measuring very small inductors, the short plate's inductance may affect measured values.

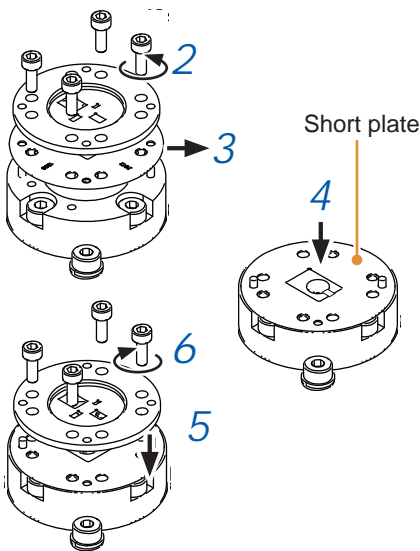
In such cases, enter the short plate's inductance as the short correction reference value.

Residual parameters (representative values)

Short plate's inductance (at 3 GHz)

0603 (0201): 0.7 nH, 1005 (0402): 0.5 nH, 1608 (0603): 0.7 nH, 2012 (0805): 0.5 nH, 3225 (1210): 0.5 nH

By performing this correction process, you can eliminate the inductance of the short plate from measurement results. However, measurement error may increase due to variability in the short plate's inductance.



2 Remove four bolts by using the hex driver.

3 Remove the device guide and GND plate.

The plate might be deformed if it is removed forcibly. Keep the plate leveled so that load is not applied over it.

4 Place the central convex part of the short plate of the DUT size to be measured facing upwards, then match it with the measurement position and install it in the electrode.

Cross-section diagram of short plate



5 Attach the device guide.

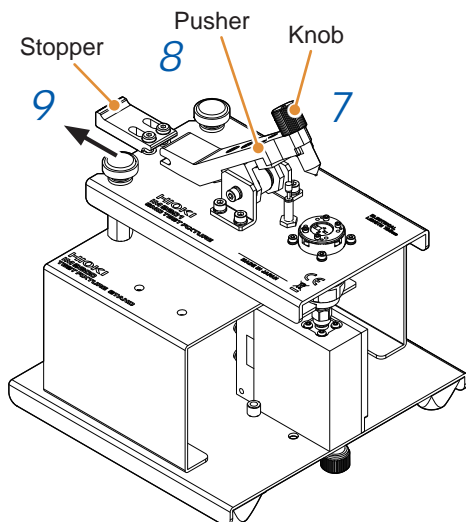
Match the frame of the DUT size to be measured with the measurement location.

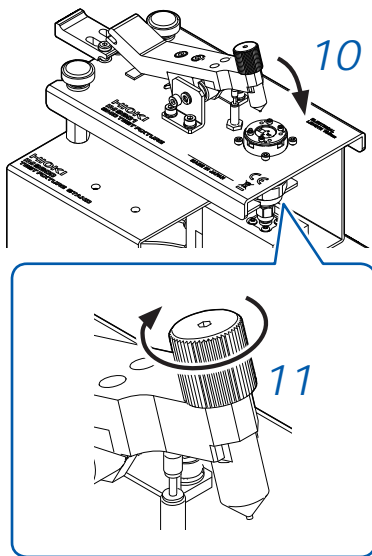
6 Tighten four bolts by using the hex driver.

7 Loosen the knob, insert the tip pin according to the DUT size into the tip of the pusher and tighten the knob lightly.

8 Hold the pusher of the stopper side tightly.

9 Pull the stopper slowly.





10 Lower the pusher slowly. Then turn the knob to adjust the position of the tip pin to a position which can be fixed by the DUT.

11 When the location of tip pin is finalized, fix it by turning the knob and lower the pusher.

12 Execute short correction by using the impedance analyzer.

When the correction cannot be executed:

- Confirm that the short calibration kit and model IM9906 Adapter are connected properly.
- Check that the DC measurement limit value of the impedance analyzer is appropriate.



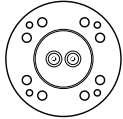
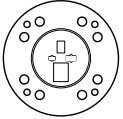
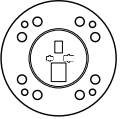
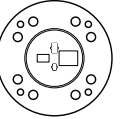
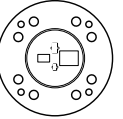
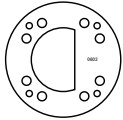
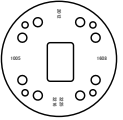
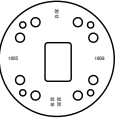
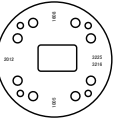
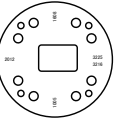
Open Correction

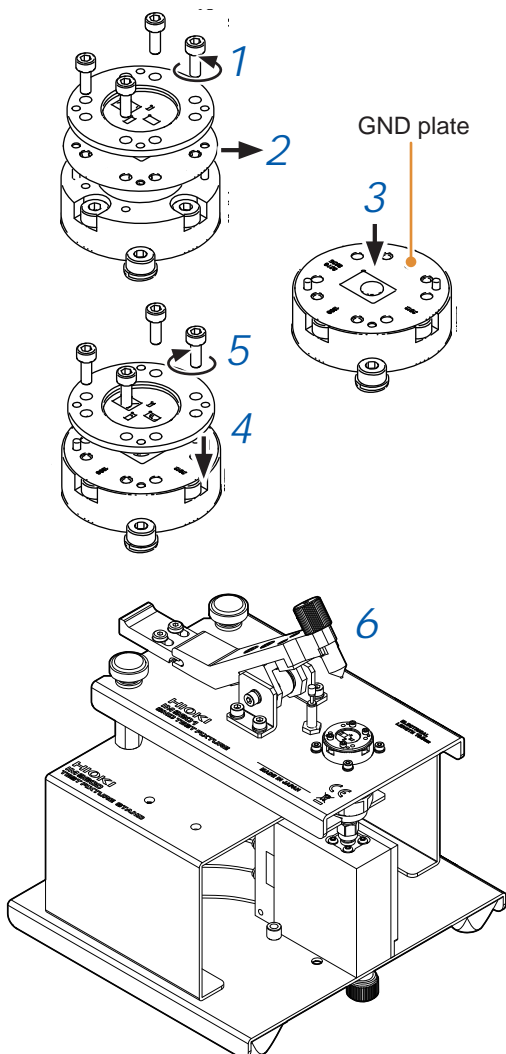
Open correction is executed to reduce errors. The GND plate is used.

You will need:

- Hex driver × 1
- Tweezers × 1 (This is not provided with the device. Tweezers which are thinner than the DUT size, clean, and not magnetized are recommended.)
- Device guide and GND plate × 1 of each

Device guides and GND plates for each DUT size

DUT size JIS (EIA)	0603 (0201)	1005 (0402)	1608 (0603)	2012 (0805)	3225 (1210) 3216 (1206)
Accessories					
Device guide					
GND plate (At the time of open correction and measurement)					



- 1 Remove four bolts by using the hex driver.**
- 2 Remove the device guide and short plate.**
The plate might get deformed if it is removed forcibly. Keep the plate leveled so that load is not applied over it.
- 3 Attach the GND plate to the electrode.**
The frame of DUT size to be measured should fit the measurement position.
- 4 Attach the device guide.**
The frame of DUT size to be measured should fit the measurement position.
- 5 Tighten four bolts by using the hex driver.**
- 6 Keep the pusher in a raised state.**

7 Start the open correction in the impedance analyzer.



When correction cannot be executed, check that the DC measurement limit value of the impedance analyzer is appropriate.

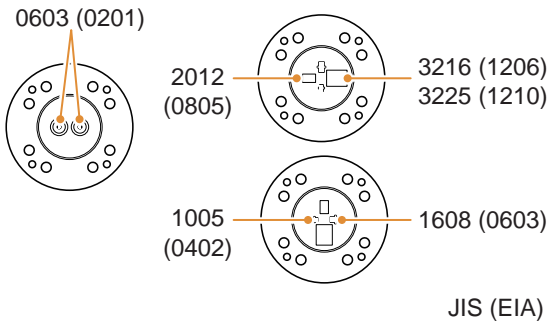
Starting the Measurement

Place the DUT in the measurement location of the device guide, lower the pusher and start the measurement.

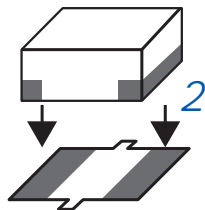
You will need:

- Tweezers × 1 (This is not provided with the device. Tweezers which are thinner than the DUT size, clean and not magnetized are recommended.)
- DUT × 1

Measurement location of device guide

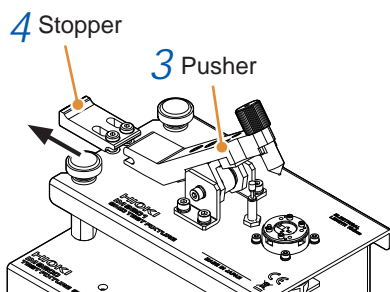


1 If there is a DUT in the measurement location, remove it.



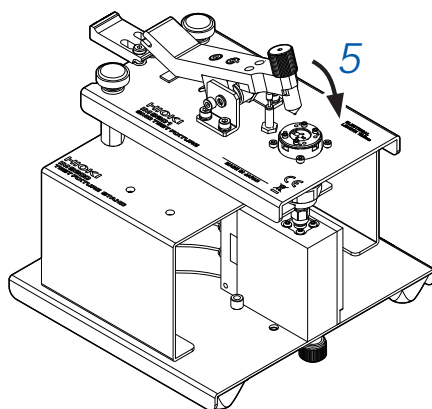
2 Pick up the DUT with tweezers and set it to the measurement location of device guide.

Keep the surface with electrode facing down. Set the DUT perpendicular to the frame of the device guide such that the DUT and electrode come in contact with each other.



3 Hold the pusher of the stopper side tightly.

4 Pull the stopper slowly.



5 Lower the pusher slowly and press the DUT with the tip pin.

If the DUT pops out

- If there is a deviation in the setting of the DUT or position of the tip pin, reset the DUT and adjust the position of the tip pin.
- If the pusher suddenly drops down, then lower the pusher slowly next time.

6 Start the measurement using the impedance analyzer.

Specifications

General specifications

Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562 ft.)
Operating temperature and humidity	According to the operating temperature and humidity, and accuracy guarantee for temperature and humidity of connectable measuring equipment.
Storage temperature and humidity	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Dimensions	Approx. 135W × 82H × 53D mm (5.31"W × 3.23"H × 2.09"D) Without including the projections of W direction D direction has the dimensional change according to the shape and tip pin at the time of DUT measurement.
Mass	Approx. 200 g (7.1 oz.)
Product warranty period	1 year
Accessories and options	p.2

Measurement specifications

Basic specifications

Connectable measurement devices	Models IM7580, IM7580A, IM7581, IM7583, IM7585 (as of July, 2016) For updated information, please contact your authorized Hioki distributor or reseller.		
Connecting part to the DUT	Bottom surface contact due to 2 terminals structure		
Dimensions of measurable DUT	JIS (EIA):	L × W mm	H mm
	0603 (0201):	(0.6±0.03) × (0.3±0.03) mm	H ≥ 0.25 mm
	1005 (0402):	(1.0±0.1) × (0.5±0.1) mm	H ≥ 0.4 mm
	1608 (0603):	(1.6±0.15) × (0.8±0.1) mm	H ≥ 0.4 mm
	2012 (0805):	(2.0±0.15) × (1.25±0.15) mm	H ≥ 0.4 mm
	3216 (1206)*:	(3.2±0.15) × (1.6±0.15) mm	H ≥ 0.4 mm
	3225 (1210):	(3.2±0.15) × (2.5±0.15) mm	H ≥ 0.4 mm
	* The measurement unit of size 3225 (1210) is used for size 3216 (1206).		
Used frequency range	DC to 3 GHz		
Maximum applied voltage	±42 V peak		
Electrical length	19 mm		
Connector	7 mm connector		

Additional error (representative values)

Applied conditions for additional errors	<ul style="list-style-type: none"> • According to the guaranteed conditions for the accuracy of the connectable measurement devices. • Connectable measuring devices execute open calibration, short calibration, and load calibration on the 7 mm connector surface through the Model IM9906 Adapter (3.5 mm/7 mm). • Set the electrical length the 19 mm on the connectable measurement device. • Connect this device to the connectable measurement device through the adapter and execute open correction and short correction.
Additional error (Errors added to the accuracy specifications of the connectable measurement devices)	Impedance: $\pm Z_e$ [%] Phase: $\theta_e = \pm 0.58 \times Z_e$ [°] $Z_e = A_e + (Z_{se} / Z_x + Y_{oe} \times Z_x) \times 100$ Z_x : Impedance measurement value [Ω] A_e : $4 \times f^2$ [%] Z_{se} : $(100 + 500 \times f) / 1000$ [Ω] Y_{oe} : $(10 + 100 \times f) / 1000000$ [s] f [GHz]

Residual parameters (representative values)

Short plate's inductance (at 3 GHz)	0603 (0201): 0.7 nH, 1005 (0402): 0.5 nH, 1608 (0603): 0.7 nH, 2012 (0805): 0.5 nH, 3225 (1210): 0.5 nH
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Maintenance and Service

Storage

If you do not intend to use the device for an extended period, store it in the carrying case.

Cleaning

To clean the device, wipe it gently with a soft cloth moistened with water or mild detergent.

- The measurement accuracy and reproducibility of the device's central electrode, device guide, GND plate, and short plate may decrease due to dirt or deformation. If dirt sticks to the device, remove it by using the provided cleaning brush.
- After removing the device guide, GND plate, and short plate, lightly brush the device's central electrode and contact areas of the DUT and GND plate.

Replaceable parts

The characteristics of some of the parts used in the product may deteriorate with extended use. To ensure the product can be used over the long term, it is recommended to replace these parts on a periodic basis. When replacing parts, please contact your authorized Hioki distributor or reseller.

Troubleshooting

If the device seems to be malfunctioning, contact your authorized Hioki distributor or reseller.

Transportation

Be sure to observe the following precautions:

- To avoid damage to the device, remove the short plates, tip pins, and knobs and store it in the carrying case with the pusher in a lowered position. Keep the removed accessories in the original packing materials in which it was shipped, and store in the carrying case. Moreover, be sure to pack in a double carton. Damage that occurs during transportation is not covered by the warranty.
- When sending the device for repair, be sure to include details of the problem.

Warranty Certificate

HIOKI

Model	Serial No.	Warranty period One (1) year from date of purchase (___ / ___)
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This product passed a rigorous inspection process at Hioki before being shipped.

In the unlikely event that you experience an issue during use, please contact the distributor from which you purchased the product, which will be repaired free of charge subject to the provisions of this Warranty Certificate. This warranty is valid for a period of one (1) year from the date of purchase. If the date of purchase is unknown, the warranty is considered valid for a period of one (1) year from the product's date of manufacture. Please present this Warranty Certificate when contacting the distributor.

Accuracy is guaranteed for the duration of the separately indicated guaranteed accuracy period.

1. Malfunctions occurring during the warranty period under conditions of normal use in conformity with the Instruction Manual, product labeling (including stamped markings), and other precautionary information will be repaired free of charge, up to the original purchase price. Hioki reserves the right to decline to offer repair, calibration, and other services for reasons that include, but are not limited to, passage of time since the product's manufacture, discontinuation of production of parts, or unforeseen circumstances.
2. Malfunctions that are determined by Hioki to have occurred under one or more of the following conditions are considered to be outside the scope of warranty coverage, even if the event in question occurs during the warranty period:
 - a. Damage to objects under measurement or other secondary or tertiary damage caused by use of the product or its measurement results
 - b. Malfunctions caused by improper handling or use of the product in a manner that does not conform with the provisions of the Instruction Manual
 - c. Malfunctions or damage caused by repair, adjustment, or modification of the product by a company, organization, or individual not approved by Hioki
 - d. Consumption of product parts, including as described in the Instruction Manual
 - e. Malfunctions or damage caused by transport, dropping, or other handling of the product after purchase
 - f. Changes in the product's appearance (scratches on its enclosure, etc.)
 - g. Malfunctions or damage caused by fire, wind or flood damage, earthquakes, lightning, power supply anomalies (including voltage, frequency, etc.), war or civil disturbances, radioactive contamination, or other acts of God
 - h. Damage caused by connecting the product to a network
 - i. Failure to present this Warranty Certificate
 - j. Failure to notify Hioki in advance if used in special embedded applications (space equipment, aviation equipment, nuclear power equipment, life-critical medical equipment or vehicle control equipment, etc.)
 - k. Other malfunctions for which Hioki is not deemed to be responsible

***Requests**

- Hioki is not able to reissue this Warranty Certificate, so please store it carefully.
- Please fill in the model, serial number, and date of purchase on this form.

16-01 EN

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- Please visit our website at www.hioki.com for the following:
 - Regional contact information
 - The latest revisions of instruction manuals and manuals in other languages.
 - Declarations of Conformity for instruments that comply with CE mark requirements.
- All reasonable care has been taken in the production of this manual, but if you find any points which are unclear or in error, please contact your supplier or the International Sales and Marketing Department at Hioki headquarters.
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