

# 9269, 9269-10

## DC BIAS CURRENT UNIT

### Instruction Manual

Aug. 2018 Revised edition 7 Printed in Japan  
9269A980-07 18-08H

EN

#### Warranty

Warranty malfunctions occurring under conditions of normal use in conformity with the Instruction Manual and Product Precautionary Markings will be repaired free of charge. This warranty is valid for a period of three (3) years from the date of purchase. Please contact the distributor in which you purchased the product for further information on warranty provisions.

#### Introduction

Thank you for purchasing the HIOKI Model 9269, 9269-10 DC BIAS CURRENT UNIT. To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

### Overview

The HIOKI 9269 DC BIAS CURRENT UNIT is an optional unit, which can be connected between a HIOKI LCR, Z HiTESTER and fixture. The 9269-10 DC BIAS CURRENT UNIT is an optional unit, which can be connected between a HIOKI IM Series (LCR Meters, Impedance Analyzers) and the fixture, to allow a DC bias current to be applied to an inductor or transducer.

The internal circuits of 9269 and 9269-10 are all different. Please use the correct circuit specified by the tester to be connected.

### Specifications

Measurement frequency range	42 Hz to 100 kHz (9269-10: 40 Hz to 2 MHz)
Maximum apply voltage	Between the terminals of H-L and external DC bias apply terminal : $\pm 40$ VDC
Maximum apply current	Between the external DC bias apply terminal : $\pm 2$ ADC
Maximum voltage to earth	Between the H terminal and chassis, external DC bias terminal and chassis : $\pm 40$ VDC Between the L terminal and chassis : $\pm 0.5$ VDC
Residual parameters reference value)	Residual impedance : $50 \text{ m}\Omega + 2 \times \pi \times \text{Frequency} \times 50 \text{ nH}$ Internal inductance : $3 \text{ mH}$ (1 kHz) (9269-10: $300 \text{ }\mu\text{H}$ (1 kHz))
Dimensions and Mass	Approx. $116\text{W} \times 45\text{H} \times 55\text{D}$ mm ( $4.57\text{W} \times 1.77\text{H} \times 2.17\text{D}$ ) (excluding protrusions) 9269: Approx. 300 g (10.6 oz.) 9269-10: Approx. 280 g (9.9 oz.)

Operating temperature and humidity range	0 to 40°C (32 to 104°F), 80%RH or less (with no condensation)
Storage temperature and humidity range	-10°C to 55°C (14 to 131°F), 80%RH or less (with no condensation)
Operating environment	Indoors, Pollution Degree 2 altitude up to 2000 m (6562-ft.)
Applicable Standards	EN61010
Accessory	Instruction Manual
Product warranty period	3 years

Please check a HIOKI catalog for instruments to which this product can be connected.

## Inspection and Maintenance

### Initial Inspection

When you receive the product, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or HIOKI representative.

### Preliminary Checks

- Before using the product the first time, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.

### Maintenance and Service

- To clean the product, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- If the product seems to be malfunctioning, contact your dealer or Hioki representative. Pack the product carefully so that it will not be damaged during shipment, and include a detailed written description of the problem. Hioki cannot be responsible for damage that occurs during shipment.




## Safety

This manual contains information and warnings essential for safe operation of the product and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.



### WARNING

Mishandling during use could result in injury or death, as well as damage to the product. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from product defects.

### Safety Symbol

	In the manual, the  symbol indicates particularly important information that the user should read before using the product.
	Indicates DC (Direct Current).

The following symbols in this manual indicate the relative importance of cautions and warnings.

-  **WARNING** Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
-  **CAUTION** Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.
- NOTE** Advisory items related to performance or correct operation of the product.



Indicates that the product conforms to regulations set out by the EU Directive.

## Operating Precautions

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

### CAUTION

- Do not store or use the product where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the product may be damaged and insulation may deteriorate so that it no longer meets specifications.
- Do not use the product where it may be exposed to corrosive or combustible gases. The product may be damaged.
- This product is not designed to be entirely water- or dust-proof. To avoid damage, do not use it in a wet or dusty environment.
- To avoid damage to the product, protect it from vibration or shock during transport and handling, and be especially careful to avoid dropping.
- If the fixture has gotten seriously wet, oily, or dusty, stop using it and send it for service at an approved HIOKI service facility.
- For using the tester to which the test fixture is connected and fixture, refer to Instruction Manual of them.
- When the DC bias unit is attached to the tester, be careful not to put any weight on it. This could lead to damage both to the tester and to the DC bias unit.
- The maximum DC bias current which can be supplied to the 9269, 9269-10 is 2 ADC. If a DC bias current greater than this limit is supplied continuously, the units may be damaged.
- Do not apply the DC bias current more than rated current of sample. Doing so may damage the sample and testers.
- In order to avoid electric shock accident, be absolutely sure not to touch the test terminals while the DC bias current is being supplied to them.
- Do not short circuit of the fixture with the DC bias current still being supplied. Doing so may damage the fixtures or cause a short circuit accident.
- Be careful about the polarity when connecting together, the sample to be tested, and the external DC bias power supply.
- After testing is completed, drop the output current of the external DC bias power supply to zero ampere, and remove the sample under test from the probes. If not done properly, it could lead to damage to the tester.
- When using with Model 3522 or 3522-50 turn OFF the EXT.DC BIAS setting. Switching the EXT.DC BIAS setting ON can cause the LCR meter to malfunction.
- When using with IM Series, press the SET EXT button in the DC bias setting of the IM Series.
- When connecting or disconnecting this product from the connected device, plugging it straight to the measurement terminal of the connected device. If the connection is incorrect, connecting terminal is deformed and may affect the measurement.

## Connecting the DC Bias Current Unit and Test Fixture

### DC bias current unit.

Plug the fixture into the measurement terminals (UNKNOWN) of the tester, with the product name up. Fasten it in place with the left and right fixing levers.

### Test fixture

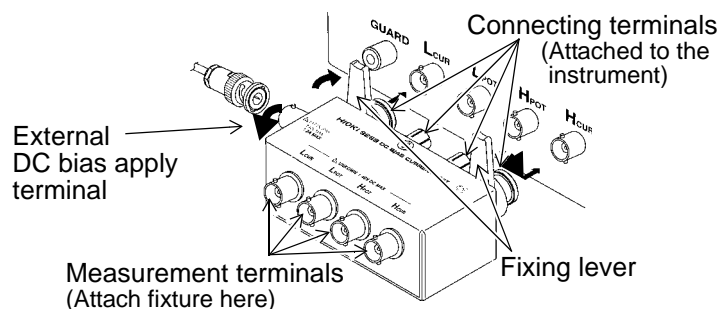
Connect the test fixture (or measurement probe) to the measurement terminals (UNKNOWN) of the tester, so that the H and L terminals match. For fixing sample, refer to the Instruction Manual of the fixture.

### External DC bias power supply

Make sure that the external DC bias power supply is turned off, and then plug the cable into the external DC bias apply terminals (BNC terminal) of the 9269, 9269-10 to connect.

### NOTE

- A separate external power supply for the DC bias current is also required.
- The DC bias power supply cannot be controlled by the main unit of the LCR HiTester.

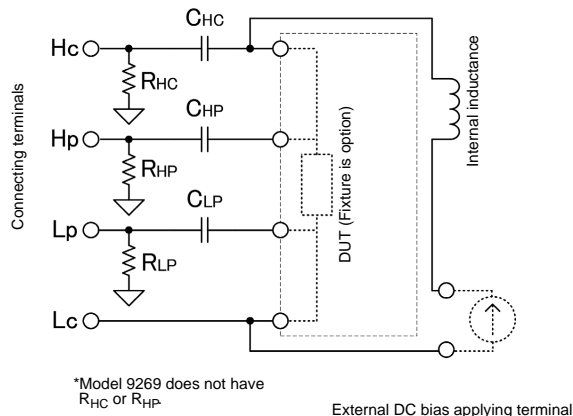


For safety reason, follows the procedure carefully.  
Before measurement, always read the operating precautions.

- To eliminate measurement errors due to the internal circuit of the DC bias unit, before carrying out measurement, always carry out open-circuit compensation and short-circuit compensation. Carry out the open-circuit compensation and short-circuit compensation with the 9269 (or 9269-10) and fixture (or measurement probe) connected, and with the bias application cable not connected. For details on compensation, refer to Instruction Manuals of the tester and fixture.
- Fix the sample in the fixture.
- Set the output current of the external DC bias supply to 0 A, then apply the current. Next, increase the output current setting progressively to reach the required setting.
- Measure the DC bias characteristics of the sample.
- Gradually decrease the output current of the external DC bias supply until it reaches 0 A.
- Remove the sample from the fixture.

### NOTE

- Since the IM3570 is not be able to compensate the short-circuit while it is connected to the DC bias unit, residual impedance of the specification will be added as an error.
- When carrying out open-circuit compensation or short-circuit compensation using DC bias unit connected to IM Series, turn OFF the DC setting of the correction range of IM Series.
- DC bias unit is not a four-terminal pair structure. When it is in combination with the test fixture probes that is four-terminal pair structure, measurement error increases or the measurement results may be affected by the placement of the probe.
- When the DC bias unit is used connected to IM3570, and switching between the ON and OFF of low-Z high precision mode, stabilization time of about 5 seconds is required.
- Depending on the connected external DC bias power supply, it may increase the chance of measurement inaccuracy.
- It takes a little time for the DC current which is being supplied to the sample under test to reach the set current, so you should wait for a certain stabilization time period before performing testing. Be careful, because if you perform testing before this stabilization time period has elapsed, the results will not be reliable.



\*Model 9269 does not have  $R_{HC}$  or  $R_{HP}$ .

Since the series circuit of the external DC bias power supply and the internal inductance is connected in parallel between the terminals H and L of the measurement terminals (between measurement samples), measurement error occurs when the impedance value of the sample is not sufficiently small.