

# HIOKI

## 9465-10

### PIN TYPE LEAD

#### INSTRUCTION MANUAL

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#### Introduction

Thank you for purchasing the HIOKI "Model 9465-10 PIN TYPE LEAD." To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

#### Overview

The 9465-10 PIN TYPE LEAD has a four-terminal structure that can be used in small spaces where there may be difficulty in contacting an object to be measured, such as during emergency battery maintenance. Use of the coaxial pin with a maximum outside diameter of 2.9 mm allows you to perform measurement using a hole for inspection made on a battery connector cover.

#### 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.

##### 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 so that it will not sustain damage during shipping, and include a description of existing damage. We cannot accept responsibility for damage incurred during shipping.

#### 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.

##### **DANGER**

Mishandling this product 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.

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



Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.



Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.



Indicates advisory items related to performance or correct operation of the product.

#### Usage Notes



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



- To avoid electrical shock, be careful to avoid shorting live lines with the Pin type leads.
- The maximum rated voltage between input terminals and ground is 33 Vrms, 46.7 Vp AC and 70 V DC. Attempting to measure voltages exceeding these limits with respect to ground could damage the product and result in personal injury.
- The maximum input current is as follows; 2 A AC/DC. Never exceed this limit, as doing so could result in destruction of the instrument and personal injury or death.
- To avoid shock and short circuits, turn off all power before connecting leads.



- To avoid damage to the product, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.
- To avoid breaking the leads, do not bend or pull them.
- The ends of the leads are sharp. Be careful to avoid injury. Fit the protective pin cap when the product is not in use.

##### NOTE

A cap are placed on pin for protection during transport. Remove the cap before use.

##### Preliminary Checks

Before using the product the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. Points to check include the pin operation and whether the pin and cable lock are loose. As loose screwing of the cable lock and other components can result in damage, be sure to tighten them securely before use. If you find any damage, contact your dealer or Hioki representative.

#### Specifications





Maximum rated voltage to earth	33 Vrms or less, 46.7 Vp AC or less and 70 V DC or less
Maximum input current	AC/DC 2 A continuous
Operating temperature and humidity	0°C to 40°C (32°F to 104°F), 80%RH or less (no condensation)
Storage temperature and humidity	-10°C to 50°C (14°C to 122°C), 80%RH or less (no condensation)
Operating Environment	Altitude up to 2000 m (6562 feet), Indoors
Size&Weight	Approx. 1900 mm (33.86")/ Approx. 180 g (3.9 oz.)
Accessories	Instruction manual
Option	The model 9465-90's pin

#### Procedure



Before using the product, make sure that the insulation on the test leads is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

- Make sure that power of the device to connect the pin type lead to is off.
- Connect the pin type lead to the input terminal of the device.

Plug the  mark on the red lead into the red  marked jack on the instrument, and plug the  mark on the black lead into the black  marked jack on the instrument.



- Perform zero adjustment. Be sure to use a 9454 zero-adjust board. See the instruction manual for details of connectable devices.



- Connect the model 9465-10 to a sample.

##### NOTE

Please cap it when you do not using.

##### Important Measurement values when using four-terminal measurement (Differences in measurement values due to measurement leads used)

Depending on the subject of measurement, such as a lead-acid battery, measurement values may vary due to the measurement lead used. Since these differences in measurement values are due to the shapes and dimensions of the probes used in four-terminal measurement, measurement values taken using any probe represent the true values for that probe only. When judging battery wear using changes in resistance values with time, be sure to use measurement leads having the same dimensions.

Reference example: (measurement of an MSE-200 valve-regulated stationary lead-acid battery)

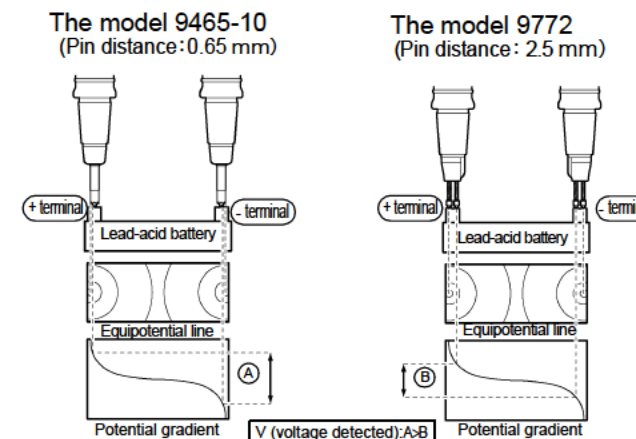
Note: Resistance values vary according to the materials and structure of the terminals of the subject of measurement.

measurement lead (Distance between the current-impression pin and the voltage-measurement pin)	Measurement values using the 3554 Battery HiTESTER
9465-10 PIN TYPE LEAD (0.65 mm)	0.538 mΩ
9772 PIN TYPE LEAD (2.5 mm)	0.490 mΩ

See the 3554 Battery HiTESTER manual for detailed technical descriptions.

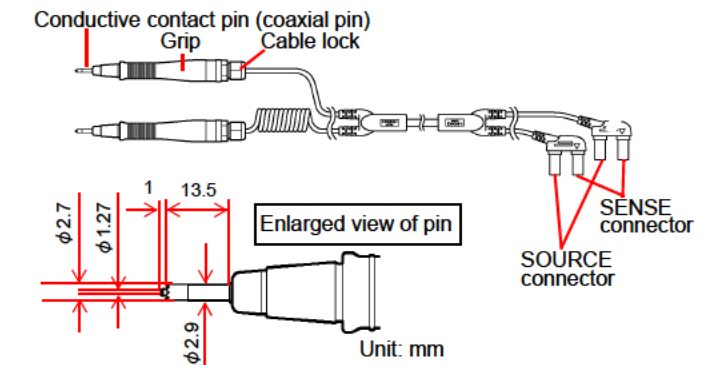
##### — Explanation —

Differences in measurement values are physical phenomena resulting from differences in the distances (dimensions) between current-impression pins and voltage-measurement pins. The greater the battery terminal resistance in comparison to the battery's internal resistance, the more marked these differences become. The following diagram shows how differences in voltage detected result from differences in distance when measuring a lead-acid battery.



#### Parts Names

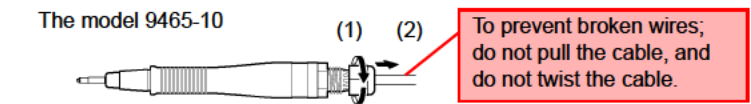
The model 9465-10 PIN TYPE LEAD



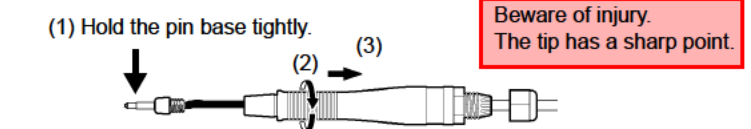
#### Replacing the Pin

The conductive-tip contact pin is replaceable. Replace the pin with a new one if it is broken or worn. One-piece conductive-tip contact pins with a plastic pin base are available separately.

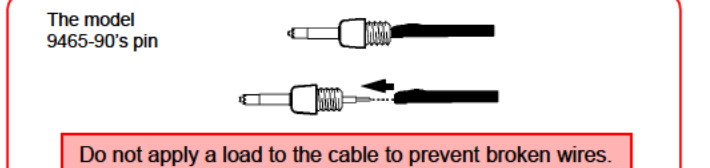
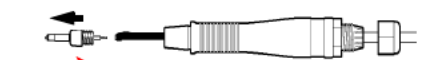
- Turn off the power of the device and remove the cable.
- Unscrew the cable lock to unlock the cable. (The cable is locked by screwing the cable lock.)



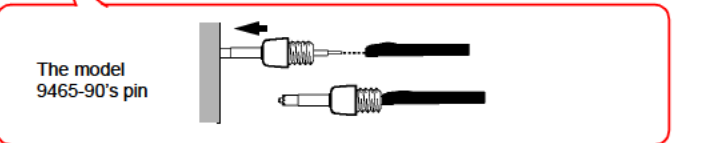
- Hold the pin base so that the cable won't rotate, and then rotate the grip to loosen it.



- Pull off the connector and remove the pin.



- Fasten a new pin. Press the tip of the pin against a hard board so that the pin won't spring out, and push the connector onto the pin.



- Assemble the pin type lead in the reverse order of disassembling. Do not pull or twist the cable.
- To avoid broken wires and contact failures, after tightening the cable lock, gently tug and twist the cable to check it is firmly held.
- Check the performance. Measure an object with a known resistance. Make sure that the measured resistance is correct before using the pin type lead.