

HIOKI

3480-21 3481-21 3481-22

VOLTAGE DETECTOR

INSTRUCTION MANUAL

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Detect Voltage with Red LED and BUZZER

Auto Power OFF

Model 3480-21, 3481-21
Ideal for 200 V to 240 V installations.
Model 3481-22
Ideal for 100 V to 120 V installations.



Green or White Light = Good Battery

Compact and durable

Introduction

Thank you for purchasing the HIOKI "Model 3480-21, 3481-21 and 3481-22 VOLTAGE DETECTOR." To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

Overview

This noncontact type of voltage detector unit enables the hot-line state of AC voltage to be checked through the wire or cable covering.

Initial Inspection

When you receive the instrument, 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 instrument, 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 instrument seems to be malfunctioning, confirm that the batteries are not discharged, before contacting your dealer or Hioki representative.

Safety

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

⚠ DANGER

This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. 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 instrument defects.

Safety Symbol

	In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument.
	The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.
	Indicates a double-insulated device.
	Indicates AC (Alternating Current).
	Indicates DC (Direct Current).

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

	DANGER Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
	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 device.
	NOTE Indicates advisory items related to performance or correct operation of the instrument.

Measurement categories (Overvoltage categories)

This instrument complies with CAT IV (600 V) safety requirements. To ensure safe operation of measurement instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.

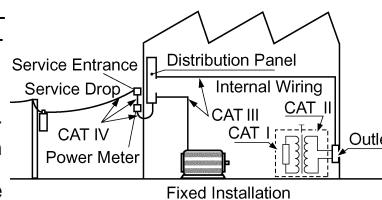
CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)

CAT III: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.

CAT IV: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy. So a measurement device designed for CAT III environments can endure greater momentary energy than a device designed for CAT II.

Using a measurement instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided. Never use a CAT I measuring instrument in CAT II, III, or IV environments. The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.



Usage Notes

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

⚠ CAUTION

- This instrument is designed for use indoors. It can be operated at temperatures between 0 and 40°C without degrading safety.
- This instrument is not designed to be entirely water- or dust-proof. Do not use it in an especially dusty environment, nor where it might be splashed with liquid. This may cause damage.
- To avoid damage to the instrument, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.
- Do not look directly into the penlight nor shine the light at another person's eye. Doing so may cause damage to the eye.

NOTE

A weak green light indicates dead battery. Replace the batteries immediately.

Detection

Performance Check and Voltage Detection

⚠ DANGER

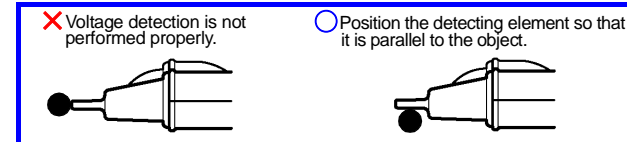
The maximum rated voltage between input terminals and ground is 600 VAC. Attempting to measure voltages exceeding 600 V with respect to ground could damage the instrument and result in personal injury.

⚠ WARNING

This product **MUST** be tested on a known live source before and after use. An absence of voltage detection does not mean the circuit under test is dead.

NOTE

- The green LED (model 3480-21), the white LED (model 3481-21, 3481-22) indicates battery consumption but is not a guarantee of the performance of the instrument. Be sure to check its performance using a known power source (e.g., AC outlet) prior to use.
- The instrument voltage detector works using a live AC circuit. It will not work using an earthed wire or neutral point. If there are several lines, such as 2-phase wires and 3-phase wires, perform voltage detection on each line separately.
- The instrument cannot perform voltage detection on a shielded wire.
- Make sure the detecting element properly contacts the object to be measured. (See the below figure.)
- Be sure to grip the instrument firmly during measurement. But, do not touch the portion beyond the barrier. It will not produce any detection.



Performance Check

Be sure to check the following before and after use to avoid electrical shock.

1. Inspect the instrument carefully to ensure that no damage.	
There is no damage.	The instrument is damaged.

OK

NG

Contact your dealer or Hioki representative.

2. Turn the switch ON.

Switch

The green LED lights up.	The green LED does not light up or is dim.
--------------------------	--

OK

NG

The batteries are running low. Replace the batteries.

3. Grip the instrument firmly and apply the detecting element to a known power supply (e.g., AC outlet) in order to check the performance.

The red LED flashes and the buzzer sounds.	The red LED and buzzer sound are getting off.	The red LED does not flash or the buzzer does not sound.
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OK

NG

NG

The instrument is operating properly. It can be used.

The batteries are running low. Replace the batteries.

The instrument may be malfunctioning. Do not use it.

Detection

Turn on the switch. In the state that the green LED (model 3480-21), the white LED (model 3481-21, 3481-22) is lighting up, apply the detecting element to the object to be measured. If there are several wires, conduct a voltage check of each wire separately. (Check some points for bundle of wires.)

The red LED flash and the buzzer sounds.	The green LED or the white LED is still lighting up.
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The object is live.

The object cannot perform voltage detection. (It is not live or the earth potential is below the Operating-voltage range)

VOLTAGE DETECTOR	Object to be Measured
(Model 3480-21) The red LED flashes and the buzzer sounds.	Live.
(Model 3481-21, 3481-22) The white LED still lighting up, and the red LED flashes and the buzzer sounds.	
(Model 3480-21) Only the green LED lights up.	Not live or below the Operating-voltage range.
(Model 3481-21, 3481-22) Only the white LED lights up.	

Specifications

Basic Specifications

Function	Detection
Operating Voltage Range	(3480-21) 90 to 600 VAC Ideal for 200 V to 240 V installations.
	(3481-21) 180 to 600 VAC Ideal for 200 V to 240 V installations.
	(3481-22) 90 to 600 VAC Ideal for 100 V to 120 V installations.
Voltage Sensitivity	(3480-21) Detects from 70 VAC/50Hz (when in contact with an IV2mm ² or equivalent insulated wire.)
	(3481-21) Detects from 70 VAC/50Hz (when in contact with an IV2mm ² or equivalent insulated wire.)
	(3481-22) Detects from 42 VAC/50Hz (when in contact with an IV2mm ² or equivalent insulated wire.)
Operating frequency	50/60 Hz
Pilot light	The red LED flashes and the buzzer sounds when the wire is live.
Additional Functions	(3480-21) Battery check (The green LED is dim or out when the batteries are low.)
	(3481-21/3481-22) Light Battery check (The white LED is dim or out when the batteries are low.)
Power supply	(3480-21) Two LR44 button alkaline batteries.
	(3481-21/3481-22) Three LR44 button alkaline batteries.
Dimensions	Approx. 126H × 20W × 15D mm (4.96"H × 0.79"W × 0.59"D)(excluding projections)
Mass	(3480-21) Approx. 25 g (0.9oz.) (including two LR44 button alkaline batteries)
	(3481-21/3481-22) Approx. 30 g (1.1oz.) (including three LR44 button alkaline batteries)
Operating environment	Indoors, altitude up to 2000 m (6562-ft.)
Operating temperature and humidity range	0 to 40°C (32 to 104°F), 80%RH max. (with no condensation)
Storage temperature and humidity range	-20 to 60°C (68 to 140°F), 80%RH max. (with no condensation)
Accessories	(3480-21) Instruction manual Two LR44 button alkaline batteries (For monitor built into the main unit)
	(3481-21/3481-22) Instruction manual Three LR44 button alkaline batteries (For monitor built into the main unit)
Standards applying	Safety EN61010, Pollution degree 2, Measurement category IV 600 V (anticipated transient overvoltage 8000 V)
	EMC EN61326

Electrical Specifications

Maximum rated voltage to earth	600 V
Dielectric strength	6.88 kVrms
	(3480-21) 1.5 VDC × 2
Rated supply voltage	(3481-21/3481-22) 1.5 VDC × 3
	(3480-21) From 3.3 V to the voltage at which the green LED goes out (central value: 2.1 V)
Operating supply-voltage range	(3481-21/3481-22) From 4.95 V to the voltage at which the white LED goes out (central value: 3.6 V)
	(3480-21) 200 mVA (Max)
Maximum rated power	(3481-21/3481-22) 550 mVA (Max)
	(3480-21) Approx. 15 hours (Power ON Standby state)
Continuous operating time	(3481-21/3481-22) Approx. 5 hours (Power ON Standby state)
	The power will be turned off automatically if the instrument remains idle for 3 minutes after the power is turned on. To reset, turn the power on again using the Power ON switch.
Auto power off	

Replacing the batteries

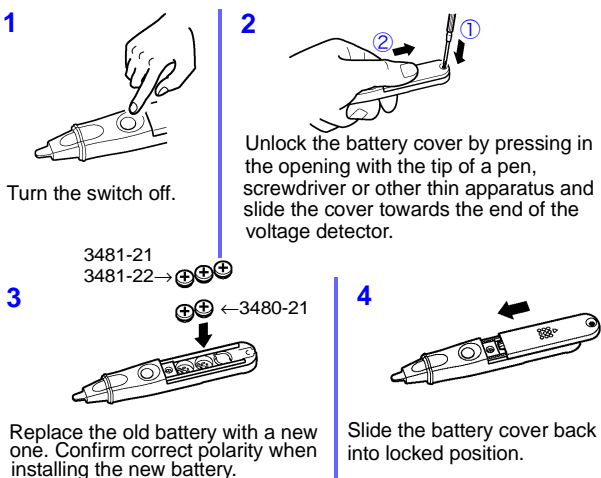
WARNING

- Do not mix old and new batteries, or different types of batteries. Also, be careful to observe battery polarity during installation. Otherwise, poor performance or damage from battery leakage could result.
- After replacing the batteries, replace the switch section before using the instrument.
- Battery may explode if mistreated. Do not short-circuit, recharge, disassemble or dispose of in fire.
- Handle and dispose of batteries in accordance with local regulations.
- Keep batteries away from children to prevent accidental swallowing.

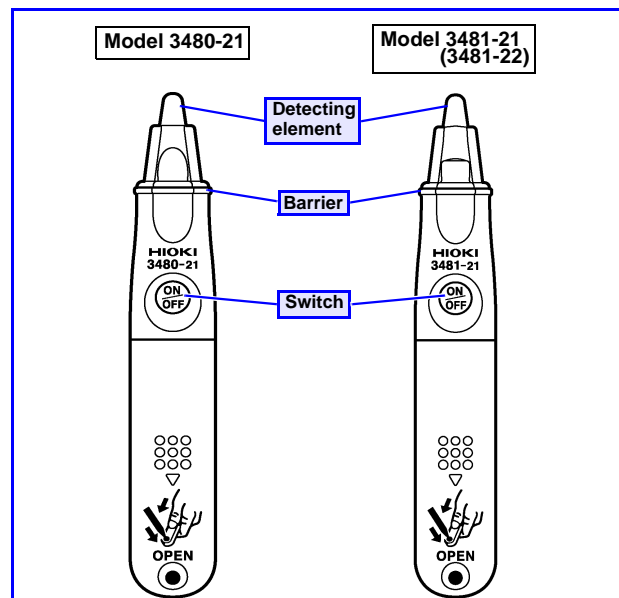
NOTE

- Use LR44 button alkaline battery.
- After use, always turn OFF the power.

Replaying the batteries



Name of Parts



HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION
 Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan
 Product Name: VOLTAGE DETECTOR
 Model Number: 3480-21, 3481-21, 3481-22

The above mentioned product conforms to the following product specifications:

Safety: EN61010-1:2001
 EMC: EN61326-2-2:2006
 Class B equipment
 Portable test, measuring and monitoring equipment used in low-voltage distribution systems

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

8 November 2007

Mitsuyoshi Tanaka
 Director of Quality Assurance
 3480B999-01