Preliminary Checks

Before using the instrument 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 Hikoki representative.

Safety

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

**DANGER**

This instrument is designed to comply with IEC 61010 Safety, 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 itself. Please read the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

**Warning**

Warranty

Warranty malfunctions occurring under conditions of normal use in conformance with the Instruction Manual and 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 dis- tributor from which you purchased the product for further information on warranty provisions.

Introduction

Thank you for purchasing the HIOKI Model 3490 ANALOG MΩ TESTER. To obtain the maximum protective function from the instrument, please read this manual first, and keep it handy for future reference.

Overview

The 3Ω range of this instrument can be used for both the Continuity Test on protective conductors used in electrical installations of build- ings, and the protective conductor resistance measurement test approved by the EU Directive.

The 30 Ω range is also optimal for the Polarity and Circuit Connection Tests for Indirect Exposure by AS/NZS3017, guidance on tests and inspections on electrical installations in the Oceania region. This instrument is not designed for the production line and is not suitable for that purpose. Please use the ST5050 Insulation Tester for the production line.

Inspection and Maintenance

Initial Inspection

When using 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 Hikoki representative.

To check the instrument 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.

Usage Notes

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

**DANGER**

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

- Indicates precautions and hazards. When the symbol is printed on the instrument, refer to a corresponding topic in the Instruction Manual.
- Indicates that dangerous voltage may be present at this terminal.
- Indicates a double-insulated device.
- Indicates AC (Alternating Current).
- Indicates DC (Direct Current).

The symbols illustrated in this manual are intended to only indicate the relative importance of precautions and warnings. They should not be used as an absolute measure of the importance of precautions and warnings.

**Safety Symbol**

- Indicates a prohibited action.
- Indicates that the product conforms to regulations set out by the EU Directive.

Measurement categories

This instrument complies with CAT II safety requirements.

To ensure safe operation of the instruments, IEC 60664 establishes safety standards for various electrical environments, cate- gorizing them as CAT II or CAT IV, and overvoltage categories. These are defined as follows.

CAT II
- Primary electrical circuits in equipment connected to an AC earthed 3-phase, 4-wire systems (power tools, household appliances, etc.), CAT II covers directly measuring electrical circuits.
- Primary electrical circuits or heavy equipment (fixed installa- tion) 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).

Using a measurement instru- ment or equipment that has not been CAT II certified and CAT IV measurement applications could result in a severe accident, and must be carefully avoided.

**CAUTION**

- Do not use the instrument where it may be exposed to corrosive or combustible gases. The instrument may be damaged or cause an explosion.
- Do not use the instrument where it may be exposed to oil, chemicals, or solvents. Contact with these substances may cause the instrument to overheat or short-circuit.

**Note**

- Indicates that incorrect operation presents an extreme haz- ard that could result in serious injury or death to the user.
- Indicates that incorrect operation presents a significant haz- ard that could result in injury or damage to the instrument.

- Indicates the possibility of injury or damage to the instrument.
- Indicates the possibility of injury or damage to the instrument.

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

Other Symbol

- Indicates a prohibited action.
- Indicates that the product conforms to regulations set out by the EU Directive.

Specifications

**General Specifications**

- Guaranteed accuracy: 1 year
- Protection: Category II
- Operating Temperature & Humidity: 0°C to 40°C (32°F to 104°F), 95% RH or lower (non-condensation)
- Operating Environment: Indoor, Pollution Degree 2, Altitude up to 2000 m (6562-ft.)
- Storage Temperature & Humidity: -10°C to 60°C (14°F to 140°F), 90% RH or lower (non-condensation)
- Degree of protection: IP40
- Maximum rated voltage to terminal: 600 V AC (voltage function)
-guaranteed for one year at 23°C±5°C
- Maximum rated voltage: 1000 V (1 MΩ or larger)
- Meas.
  - Approx. 1500 V
  - Approx. 500 V
- Accessories: L9787 Test Lead, Instruction manual, Shoulder strap, cleaning cloth, Insulation Tester ST5520, 20 mΩ Test Lead, 100 mΩ Test Lead, 1000 mΩ Test Lead, Low-ohm Test Lead, CAT IV Test Lead, Set with Remote Switch
- Standards: Safe EN61010-1
- Measurement equipment for Live voltage distribution system CAT III and IV (3.2 V) to 30 kV (3.2 V) applied to IEC 61326-1
- Subclause 4.3 of Part 4 (Interchangeable test leads) is not suitable for CAT IV use
- Measurement accuracy:
  - CAT I guaranteed for one year (93% to 107% of标定读数)
  - CAT II guaranteed for one year (90% to 103% of标定读数)
  - CAT III guaranteed for one year (90% to 103% of标定读数)

**Insulation Resistance Measurement**

- Rated voltage: 250 VDC, 500 VDC, 1000 VDC
- Effective value
  - 100 MΩ
  - 50 MΩ
- Measurement range
  - 10000 MΩ
  - 10 MΩ
- Effect of position
  - 24% of scale length
- Overload protection
  - 660 VAC (10 sec.)
- 1st effective measurement range
  - 0.05 to 50 MΩ
- 2nd effective measurement range
  - 0.5 to 5000 MΩ
- Optional low resistance measurement range
  - 0.05 MΩ
- Measurement accuracy:
  - 2% of scale length
  - Overload protection: 1 to 1.2 times of rated output voltage
- Measurement accuracy:
  - 2% of scale length
  - Overload protection: 1 to 1.2 times of rated output voltage

**Auto Power Save**

- When the function switch is not OFF, the power will only turn off after six minutes. The measurement will stop after five minutes.
- Live circuit indicator: lights up when voltage is detected between LINE terminal and EARTH terminal, and goes off automatically 15 minutes after the last live circuit measurement.
- LED: illuminated (indicating function light) when go off 3 min- utes after MEASURE button is pressed to OFF when LED is lit.
- CAUTION

- Do not use the instrument in such conditions could cause an electric shock, so contact your dealer or Hikoki representative for replacements.

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Replacing of Batteries and Fuses

1. Attach the strap.
2. Insert the batteries.
3. Connect the black test lead to the EARTH terminal, and the red test lead to the LINE terminal.
4. Make sure the needle points to the zero position before measuring.
5. Tighten the clamping screws.
6. Press the MEASURE key to measure the capacitance.

Measurement Procedures

1. Function switch: Select measurement functions
   - MEASURE key: Press to measure insulation resistance or low resistance.
   - LIGHT key: Press this key to turn on the light
2. Pre-measurement inspection
   - Adjust the needle to point to zero before measuring. With the function switch at OFF, turn the meter movement zero adjuster with a screwdriver until the needle points to the zero position.
   - Voltage: With the function switch at OFF, turn the meter movement zero adjuster with a screwdriver until the needle points to the zero position.
3. Pre-measurement inspection
   - To avoid shock, do not touch the test leads while the instrument is connected to the object.
   - Measure the voltage with the function switch at OFF.
   - To avoid shock, do not touch the test leads while the instrument is connected to the object.
4. AC Voltage measurement
   - Connect the test lead to the source.
   - Set the function switch away from OFF and confirm the effective battery range indicator. Battery power is high when a green light is shown, and the instrument is ready. Battery is drained when no light is shown. Please replace the batteries then.

Low Resistance Measurement

1. Use the function switch to select insulation resistance measurement.
2. Connect the black test lead to the Line terminal and the red test lead to the Earth terminal.
3. Set the function switch to the LOW RESISTANCE position on the test lead.
4. Measure the insulation resistance between the Line and Earth terminals.
5. When measuring insulation resistance, do not touch the test lead to the Line terminal while the insulation resistance measurement is in progress.


table

<table>
<thead>
<tr>
<th>Measurement Options</th>
<th>Description</th>
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<tr>
<td>LTB87-10 Breaker Pin</td>
<td>Pin length 70 mm and 65 mm from the tip has width 2.6 mm.</td>
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