

**ROBIN**  **AMPROBE®**

**KMP7020 / KMP7021**

**Digital RCD (ELCB) Tester**

**Users Manual**





# **KMP7020**

**Digital RCD (ELCB) Tester  
with Fast Trip**

# **KMP7021**

**Digital RCD (ELCB) Tester  
with Auto Ramp**

## **Users Manual**

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### **Limited Warranty and Limitation of Liability**

Your Amprobe product will be free from defects in material and workmanship for 1 year from the date of purchase, unless local laws require otherwise. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Amprobe's behalf. To obtain service during the warranty period, return the product with proof of purchase to an authorized Amprobe Test Tools Service Center or to an Amprobe dealer or distributor. See Repair Section for details. THIS WARRANTY IS YOUR ONLY REMEDY. ALL OTHER WARRANTIES - WHETHER EXPRESS, IMPLIED OR STATUTORY - INCLUDING IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, ARE HEREBY DISCLAIMED. MANUFACTURER SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

### **Repair**

All test tools returned for warranty or non-warranty repair or for calibration should be accompanied by the following: your name, company's name, address, telephone number, and proof of purchase. Additionally, please include a brief description of the problem or the service requested and include the test leads with the meter. Non-warranty repair or replacement charges should be remitted in the form of a check, a money order, credit card with expiration date, or a purchase order made payable to Amprobe® Test Tools.

### **In-Warranty Repairs and Replacement – All Countries**

Please read the warranty statement and check your battery before requesting repair. During the warranty period any defective test tool can be returned to your Amprobe® Test Tools distributor for an exchange for the same or like product. Please check the "Where to Buy" section on [www.amprobe.com](http://www.amprobe.com) for a list of distributors near you. Additionally, in the United States and Canada In-Warranty repair and replacement units can also be sent to a Amprobe® Test Tools Service Center (see address below).

### **Non-Warranty Repairs and Replacement – US and Canada**

Non-warranty repairs in the United States and Canada should be sent to a Amprobe® Test Tools Service Center. Call Amprobe® Test Tools or inquire at your point of purchase for current repair and replacement rates.

#### **In USA**

Amprobe Test Tools  
Everett, WA 98203  
Tel: 877-AMPROBE (267-7623)

#### **In Canada**

Amprobe Test Tools  
Mississauga, ON L4Z 1X9  
Tel: 905-890-7600

### **Non-Warranty Repairs and Replacement – Europe**

European non-warranty units can be replaced by your Amprobe® Test Tools distributor for a nominal charge. Please check the "Where to Buy" section on [www.amprobe.eu](http://www.amprobe.eu) for a list of distributors near you.

#### **European Correspondence Address\***

Amprobe® Test Tools Europe

Beha-Amprobe GmbH  
In den Engematten 14  
79286 Glotttental, Germany  
Tel.: +49 (0) 7684 8009 - 0

[www.amprobe.eu](http://www.amprobe.eu)

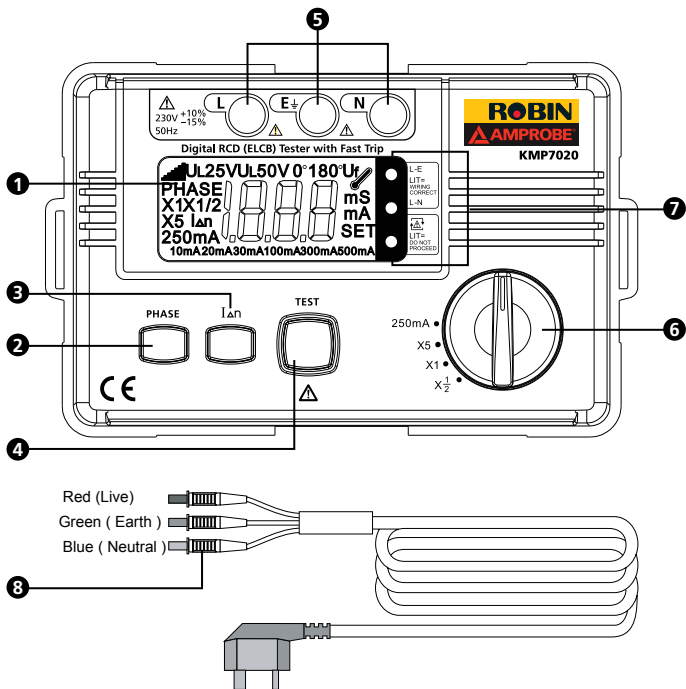
Robin-Amprobe® Test Tools UK

52 Hurricane Way  
Norwich, Norfolk, NR6 6JB  
United Kingdom

Tel.: +44 (0) 1603 25 6662 Fax.: +44 (0) 1603 25 6664

[www.robin-amprobe.co.uk](http://www.robin-amprobe.co.uk)

\*(Correspondence only – no repair or replacement available from this address. European customers please contact your distributor.)








- |                |                                      |
|----------------|--------------------------------------|
| ① LCD Display  | ⑤ Connecting Terminals for Test Lead |
| ② PHASE Button | ⑥ Rotary Mode Switch                 |
| ③ IΔn Button   | ⑦ Indicators for Wiring Connection   |
| ④ TEST Button  | ⑧ Test Lead                          |

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## SYMBOLS

	Double Insulation or Reinforced insulation
	Caution! Risk of electric shock
	Caution! Risk of danger (see Safety Information)
	Complies with European Directives
	Do not dispose of this product as unsorted municipal waste. Contact a qualified recycler for disposal

## UNPACKING AND INSPECTION

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Your shipping carton should include:

- 1 KMP7020 or KMP7021 Digital RCD (ELCB) Tester
- 1 UK Mains Test cord set
- 1 User's Manual
- 1 Carrying Case
- 1 Strap

If any of the items are damaged or missing, return the complete package to the place of purchase for an exchange.

## SAFETY INFORMATION

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This operation manual includes the user guidance and safety instruction when using the tester, please read it before using.

### **⚠ CAUTION**

- *Before using the tester, please read the operating manual.*
- *When using the tester, user must follow the testing procedure as mentioned in the operating manual.*
- *User must follow all safety instructions, otherwise it may cause accidents or damage the tester.*

Safety sign "⚠" has three meaning in this manual, user has to pay the attention to this sign "⚠" for operation.

**⚠ DANGER!**: identifies conditions and actions that most likely pose hazard(s) or death.

**⚠ WARNING!**: identifies conditions and actions that will pose hazard(s) or death.

**⚠ CAUTION!**: identifies conditions and actions that will pose hazard(s) or damage to the Tester.

### **⚠ DANGER!**

- *Do not use the Tester around explosive environment. It may cause fire and explosion.*
- *To avoid possible electric shock or personal injury, do not use the test instrument or test leads if they appear to be damaged or if metal part is exposed, or if test instrument is not operating properly.*
- *Do not touch the cables during testing.*

### **⚠ WARNING**

- *Do not open or disassemble the tester during testing.*
- *If the test instrument appear abnormal ( for example, no completed display, incorrect calculation, housing damage, noise issue during the measurement etc....), please contact our service department for repair.*
- *Do not use the tester if your hands are wet.*
- *Any test and measurement procedures in circuits equipped with residual current devices should only be performed after having consulted the operator terminals (data processing systems, material processing, motors, etc.).*
- *The protective earth must be free of external voltage for the RCD test. However if an extraneous voltage is present (>50V fault voltage), the instrument only indicates  $U_f$  HI having been generated by the measurement. The measurement interruption caused by excess of  $U_f$  is only generated by the actual voltage present between the neutral conductor (N) and the protective earth (E).*



- *Time-delayed residual current devices trip at nominal residual current within 130...500ms, for double nominal fault current within 60...200 ms. Such RCDs are implemented as main residual current protection devices (please refer to IEC 61008-1) and are marked with the symbol " S ".*
- *At a measuring circuit without probe, available voltages between PE and earth can influence the measurement.*
- *Before using the N-conductor as probe check that all neutral points have low ohm resistance to the main neutral line. A available voltage of the N conductor to the earth can influence the measurement.*
- *The measuring function uses the N-conductor as a probe. Check first the connection between the neutral point of the distribution system and earth before the test is started. A possible voltage between the N-conductor and earth may influence the measurements.*
- *Leakage currents in current circuits following the RC circuit breaker may have an influence on the test as well as a voltage between protective conductor or neutral conductor and ground.*
- *Attached loads or operating supplies which contains capacitors or circulating machines can elongate the trip time.*
- *Measurements may be influenced by potential fields of other grounding systems.*
- *Measurements must be carried out in compliance with the respectively valid standards and regulations.*

## FEATURES

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The Robin-Amprobe RCD Tester allows the testing of trip times of standard RCDs and selective RCDs using various residual currents:

- This tester is suitable for use under single phase 230 V / 50 Hz. (Operational Voltage Range: 195 – 253 V, 50Hz)
- It uses a micro-controller with high accuracy, reliability and stability.
- **Wiring check:** 3-LED Lamp signal to check for correct connection.  
**Correct wiring:** L-E & L-N display two green LEDs ON.

- **Phase Selection:** Can select positive (0°) or negative (180°) to initiate a test.
- Over-range display “OL” indication. “OL mS” signal will be displayed on LCD if the testing goes over the time limitation for the test.
- **Fast Trip Fixed:** Current 250mA (MAX: 40mS) (KMP7020 only).
- **AUTO RAMP Test:** AUTO RAMP can test the trip test current. (KMP7021 only).
- **Power Off Buzzer:** Buzzer will sound when the Tester is in idle for 3 minutes
- **Fuse:** Protected by fast blowing fuse to protect the instrument.

## OPERATION

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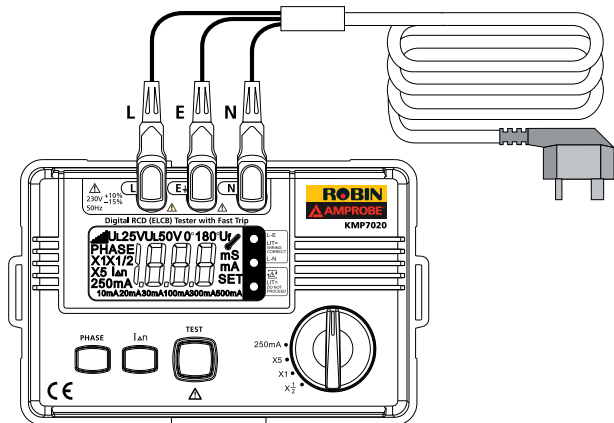
### Before Making Measurement

#### **⚠ WARNING**

- *Check voltage between the protective conductor and earth, a possible voltage will influence the measurements.*
- *Test the connection between the neutral point of the distribution system and earth before the test is started; a possible voltage between the N-conductor and the earth may influence the measurements.*
- *Leakage currents in the circuit following the residual current protection device may influence the measurements.*
- *The earth electrode resistance of a measuring circuit with a probe shall not exceed 5 Ohm.*
- *The potential fields of other earthing installations may influence the measurement.*
- *Special conditions in residual current protective devices of a particular design, for example of S-type (selective and resistance to impulse currents) shall be taken into consideration.*
- *Equipment, which is connected downstream of a residual current protective device (RCD) may cause a considerable extension of the operating time. Examples of such equipment might be connected capacitors or running motors.*

## 1. Test Lead Connection

installation: L to L(Line); N to N(Neutral); E to E(Earthing).



## 2. Check for proper connection

Plug the power cable on a (230V/50Hz voltage adapter). L-E & L-N LEDs ON and RED LED off, the connection is correct. Otherwise, the connection is incorrect, do not proceed the test.. Incorrect connection of L and N terminals may cause leakage current.

### **⚠ Danger**

***If the connection is incorrect, please don't proceed the test. It may cause incorrect measurement and danger to the user.***

## 3. Press IΔn button to set the nominal residual currents (IΔn) of the RCD breakers as the default tripping current value.

**Default Value:** IΔn:30mA ; Phase: 0°

## 4. Measurement Methods

### 4.1 Measurement range

#### **Non-tripping Test**

**X1/2:** Maximum Tripping Time 2000ms

#### **Tripping Test**

**X1:** Maximum Tripping Time 1000ms(Except 500mA)

<b>Tripping Test</b>	<b>X1 (500mA):</b> Maximum Tripping Time 300ms
<b>Fast Tripping Test</b>	<b>X5 (10,20,30mA only):</b> Maximum Tripping Time 40ms
<b>Fast Tripping Test</b>	<b>250 mA:</b> Maximum Measuring Time 40ms (KMP7020 only)
<b>AUTO RAMP TEST</b>	Auto Ramp Test (KMP7021 only). 20%~110% Default nominal residual currents( $I_{\Delta n}$ ). Maximum Tripping time 300ms by 10 steps of residual current.

#### 4.2 Press TEST button

<b>Non-tripping Test</b>	RCD shall not be open.
<b>Tripping Test</b>	RCD shall open.
<b>Fast Tripping Test</b>	RCD shall open.
<b>250mA Fast Tripping Test</b>	RCD shall open. (KMP7020 only)
<b>AUTO RAMP TEST</b>	RCD shall open. Screen will display tripping time and tripping current. (KMP7021 only)

4.3 Press PHASE (0°/180°) button to switch phase to 180° (default setting is phase 0°). Screen will display 180°. Repeat step 4.2 to begin measurement with phase 180°. Press PHASE button again to switch phase to 0°.

The tester will interrupt measurement if a voltage between N conductor and Earth exceeds 50V. The screen will display "Uf HI". Refer to WARNING on page 3.

#### **⚠ WARNING**

- ***Do not use the tester for long hours continuously testing. This may cause the tester to overheating.***
- ***Use the tester by interval period of 5 minutes between each measurement when testing with 300mA/500mA current.***

## SPECIFICATION

At Temperature: 23±5°C; Humidity: 45%~75% RH; Altitude below ≤2000 meter

### KMP7020

Function	Voltage(AC)	Trip Current Setting ( $I_{\Delta n}$ )	Trip Time (MAX)	Accuracy	
				Trip Current	Trip Time
X 1/2	230V (Tolerance: -15%~+10%) Frequency: 50Hz	10 /20 /30 /100 /300 /500mA	2000mS	Tolerance: -10%~0%	±2% rdg +2LSD
X 1		10 /20 /30 /100 /300mA	1000mS	Tolerance: 0%~+10%	
X 5		500mA	300mS		
250mA (Fast Trip)		10 /20 /30mA	40mS		
		250mA (Fixed)	40mS		

### KMP7021

Function	Voltage(AC)	Trip Current Setting ( $I_{\Delta n}$ )	Trip Time (MAX)	Accuracy	
				Trip Current	Trip Time
X 1/2	230V (Tolerance: -15%~+10%) Frequency: 50Hz	10 /20 /30 /100 /300 /500mA	2000mS	Tolerance: -10%~0%	±2% rdg +2LSD
X 1		10 /20 /30 /100 /300mA	1000mS	Tolerance: 0%~+10%	
X 5		500mA	300mS		
Auto Ramp Test		10 /20 /30mA	1000mS		
		10/20/30/100/ 300/500mA	(RAMP increase to 10%) $I_{\Delta n}$ from 20%~110% 300ms by 10 steps	Tolerance: -10%~+10%	

**Note:** Refer to the marking label on the unit for EN 61557 measurement range.

## Measurement Application (Functions)

- x1/2 non-tripping test for RCD sensitivity.
- x1 tripping test of an RCD.
- x5 fast tripping test of  $I_{\Delta n} \times 5$  time.
- 250mA tripping test of an RCD (maximum tripping time 40ms, for KMP7020 only)
- AUTO RAMP TEST tripping test for the current value. (KMP7021 only)

**Application Standard:** EN 61010-1, CAT III 300V, Pollution degree II, EN 61557-1, EN 61557-6  
IP40 as per EN 60529

**Operational Voltage:** 230Vac/50Hz (Operating Range: 195 – 253 V)

**Operating Temperature:** 0°C~40°C(32°F to 104°F)

**Relative Humidity:** ≤80%RH

**Altitude:** ≤2000 meter

**Storage Condition:**

**Temperature:** -20°C~60°C(-4°F to 140°F)

**Relative Humidity:** ≤75%RH

**Product Size (L x W x D):** 160 x 101 x 71mm (6.3 x 2.77 x 3.94 In)

**Product Net Weight:** About 500g(1.1 lb)

## MAINTENANCE AND REPAIR

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If there appears to be a malfunction during the operation of the meter, the following steps should be performed in order to isolate the cause of the problem.

repair of the meter should be performed only by a Factory Authorized Service Center or by other qualified instrument service personnel. The front panel and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow to dry completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.



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