



# MX 531



Earth & 30 mA RCD tester

Measure up

## 1. GENERAL

Thank you for purchasing this earth and 30 mA RCD tester. The MX 531, on a TT network only, displays the connection status of the power socket on an LCD display with a background that changes colour according to the compliance of the installation: blue if the installation is compliant, red if there is a fault or a bad earth. Compatible sockets: sockets type E (polarised: phase and neutral identified) in France and Belgium and sockets type F (not polarised: phase and neutral not identified). If the RE value is correct, (< 100 Ω) the 30 mA test is possible. The instrument, connected to a 2P+T socket on a correctly connected installation (earth present, 230 V network, phase to the right or to the left), displays the voltage and earth impedance (RE) instantaneously in the bottom part of the 2000-point LCD screen.

To keep yourself and property safe:  
- read these operating instructions carefully,  
- comply with the precautions for use.

**WARNING**, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.

The CE marking indicates compliance with the European Low Voltage Directive (2014/35/EU), the Electromagnetic Compatibility Directive (2014/30/EU), and the Directive on the Restriction of Hazardous Substances (RoHS, 2011/65/EU and 2015/863/EU).

The rubbish bin with a line through it means that in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2012/19/UE. This equipment must not be treated as household waste.

Equipment protected by double insulation.

### Definition of measurement categories

- Measurement category IV corresponds to measurements taken at the source of low-voltage installations.  
*Example: power feeders, counters and protection devices.*
- Measurement category III corresponds to measurements on building installations.  
*Example: distribution panel, circuit-breakers, machines or fixed industrial devices.*
- Measurement category II corresponds to measurements taken on circuits directly connected to low-voltage installations.  
*Example: power supply to electro-domestic devices and portable tools.*

## 2. PRECAUTIONS FOR USE

**This tester is compliant with safety standards IEC 61010-2-030 and IEC 61557-1, 3, and 6 for voltages up to 300 V in category III.**

Failure to observe the precautions for use may create a risk of electric shock, fire, explosion, and/or destruction of the instrument and of the installations. The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument. The safety of any system incorporating the instrument is the responsibility of the system integrator. Before each use, check the integrity of the contacts of the socket.

**WARNING**. This tester is not a VAT. Use a suitable instrument for this operation.

## 3. SPECIFICATIONS OF THE MX 531

### Environmental conditions:

Indoor use  
Range of use: -10 to +45°C, 10 to 90 % HR (up to 35°C)  
Storage temperature: -20°C to 70°C  
Altitude: in use, up to 2000 m, in storage, up to 10,000 m.  
Degree of pollution: 2

### Particular reference conditions:

Temperature: 23°C ± 3°C  
Relative humidity: 45 % to 75 %RH  
Electric field: < 0.1 V/m AC

### Environmental conditions:

For the voltage measurement:  
Frequency: 45 to 65 Hz  
Peak factor: 2  
No DC component, sine-wave signal

### For the RE measurement:

UL-N 230 VAC ± 0.5 %  
No harmonics  
UN-PE 0 V  
Frequency: 50/60 Hz ± 0.1 Hz

### RCD test if RE ≤ 100 Ω:

230 VAC ± 0.5 %  
No harmonics  
UL-N ± 1 V - 50/60 Hz ± 0.1 Hz  
UL-PE < 1 V  
IL-N 0 mA

### Influences on measurement:

Quantity of influence	Range of influence	Influence
Temperature	-10 ... +45 °C	± (0.5 % R + 1 D) / 10 °C
Relative humidity	10 ... 90 % HR	± (0.5 % R + 1 D)
Half-wave signal	330 V PEAK	± (1 % R + 1 D)
Frequency	[47.5 ; 52.5 Hz] [57 ; 63 Hz]	± (1 % R + 1 D)

EMC: The device is compliant with standard IEC 61326-1.

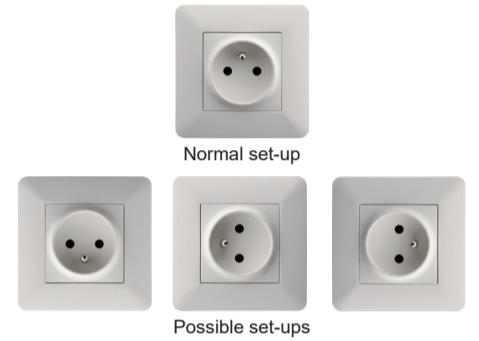
Frequency measurement	From 100 V to 400 V AC
Phase-to-neutral measurement	0 V to 420 V - Frequency 50/60 Hz - OL if > 420 V
Resolution	1 V
Accuracy	+/- (2 % + 1 D)
Measurement of earth resistance RE	3 Ω to 199.9 Ω      180 Ω to 1999 Ω
Resolution	0.1 Ω      1 Ω
Accuracy	+/- (3 % L + 5 D)
30 mA AC RCD	If RE correct
Nominal value	30 mA and time < 200 ms
Conditions	230 V phase and neutral and 0 % and +6% +/- 4 ms

### Mechanical:

Dimensions: 185 x 65 x 53 mm  
Mass: 230 g ± 50 g  
Index of protection: IP4X per IEC 60029 (MX 531 connected)  
Impact rating: IK07 per IEC 62262: 2002

### Testing of the socket:

The plug on the instrument is connected to a CEE 7/7 socket. It is compatible with the type E CEE 7/5 socket and with the Shuko type F CEE 7/3 socket. The plug on the tester turns (-90°, +180°), with 2 intermediate positions (hard spots) at 0°, +90°



The power supply is checked by the socket (electronic protection). A pictogram on the instrument representing the socket shows how the conductors are connected (see below).

## 4. MEASUREMENT PRINCIPLE

The MX531 tester is a directly connected portable TT network power socket tester. It injects a weak current between the phase and the earth (PE) of the installation, but does not control the current present in the installation. The current injected is limited to 12mA DC so as not to trip the 30mA RCD. It is necessary to wait for the measurement to stabilize in order to obtain a value that is as accurate as possible in spite of any disturbances on the phase, neutral, and PE conductors. - Refer to the application notes on our web site for more information about "The cases of use".

I connect the MX 531 in any position in the socket and the measurement is initialized. The socket must be correctly wired for the MX 531 to be able to measure the earth resistance RE of the electrical installation.

## 5. THE EARTH RESISTANCE (RE) MEASUREMENT:

The RE measurement method is compliant with the NFC15-100 and IEC61557-1 and -3 standards. When RE > 100 Ω or/and the phase order is incorrect, the backlighting turns red and displays OL if RE > 2000 Ω. The MX 531 makes a measurement every second, with stabilisation at 10 s, the test current is < 12 mA RMS in the voltage range 230 V ± 10 %.

UL-N: 195 V ... 253 V  
UL-PE: 195 V ... 253 V  
UN-PE: < 50 V  
Connection Normal  
Backlighting: Blue  
Test of socket: earth measurement correct

UL-N: 195 V ... 253 V  
UL-PE: < 50 V  
UN-PE: 195 V ... 253 V  
Connection L and N reversed  
Backlighting: Red  
Symbols: blinking  
Test of socket: Fault, phase-to-neutral, socket incorrectly connected

UL-N: 195 V  
UL-PE: -  
UN-PE: -  
Connection: auxiliary phase  
Backlighting: Red  
Symbols: blinking  
Test of socket: Stop fault

UL-N: 195 V ... 253 V  
UL-PE: UL-N / 2 (92 V ... 127 V)  
UN-PE: UL-N / 2 (92 V ... 127 V)  
Connection: PE not connected  
Backlighting: Red  
Symbols: and blink  
Test of socket: Stop fault  
Fault: Earth not connected

UL-N: > 253 V  
UL-PE: -  
UN-PE: -  
Connection: L2 or L3 to N  
Backlighting: Red  
Symbols: blinking  
Test of socket: Stop fault  
Fault: Phase in the place of the neutral

UL-N: < 50 V  
UL-PE: 195 V ... 253 V  
UN-PE: 195 V ... 253 V  
Connection: L and PE reversed  
Backlighting: Red  
Symbols: and blink  
Test of socket: Stop fault  
Fault: incorrect connection

UL-N: 195 V ... 253 V  
UL-PE: -  
UN-PE: 51 V ... 91 V  
Connection: Fault on PE  
Backlighting: Red  
Symbols: and blink  
Test of socket: Stop fault

UL-N: 195 V ... 253 V  
UL-PE: 51 V ... 91 V  
UN-PE: -  
Connection: Fault on PE  
Backlighting: Red  
Symbols: and blink  
Test of socket: Stop fault

Other cases if the voltage < 230 V or > 230 V (2 phases and no neutral) value displayed on red background - DANGER.

## 6. RCD TEST

The tripping test can be started only if the earth resistance RE < 100 Ω; it is started by pressing the TEST button. If RE > 100 Ω, pressing the TEST button has no effect. In this case, the red background blinks when the TEST button is pressed. The internal temperature must be less than the limit. The test starts after the TEST button has been pressed for more than one second. The current pulse is applied for not more than 200 ms.

During the tripping test of the RCD, the resistance on the earth measurement is deactivated.

1. If the RCD trips, the values displayed are held for 7 seconds, without backlighting, after which the instrument switches itself off.
2. If the RCD is not tripped within the tripping time (200 ms), the symbol blinks. The displayed RE and UL-N values are fixed for 7 seconds. After a few seconds, the instrument returns to the RE measurement. The symbols are erased and the operator can press the TEST button to start another RCD tripping test.

RE test correct  
30 mA RCD test correct

RE test correct  
RCD test NOK

L and N reversed  
RE test correct  
 RCD test OK  
 RCD test failed

RE test correct  
RCD test correct  
but internal temperature too high

Auto Hold: hold time approximately 7 s.

If, after the earth resistance (RE) measurement and the RCD tripping mode measurement, the instrument overheats because of too many measurements at an elevated ambient temperature, the MX 531 displays and blinks. Measurements can no longer be made until the instrument has cooled down.

If, in the course of the measurement, the instrument detects a frequency outside the band from 45 Hz to 65 Hz, it displays .

**WARNING**. We recommend waiting 10 s between two RCD tests.

The leakage current present in the circuit can influence the earth resistance (RE) measurements by as much as 30 %, and the test of the residual current device (RCD).

## 7. MAINTENANCE

Except for the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited.

## 8. WARRANTY

Except as otherwise stated, our warranty is valid for 24 months starting from the date on which the equipment was sold. Extract from our General Conditions of Sale, provided on request.

- The warranty does not apply in the following cases:
- Inappropriate use of the equipment or use with incompatible equipment,
  - Modifications made to the equipment without the explicit permission of the manufacturer's technical,
  - Work done on the device by a person not approved by the manufacturer,
  - Adaptation to a particular application not anticipated in the definition of the equipment or by the user manual,
  - Damage caused by shocks, falls, or floods.



