Operating Instruction

AX-T903N Voltage Tester

Please read this manual before switching the unit on.

Important safety information inside.

1. Safety

1.1. International Safety Symbols

	Warning of a potential danger, comply with instruction manual
	Caution! Dangerous voltage, danger of electrical shock
	Double insulation
	Important information, consult the instruction sheet
	Hazardous Voltage
	Suitable for live working
	This product complies with the WEEE Directive (2012/19/EU)
	Conforms to European Union Directives
	TÜV Association for Electrical, Electronic & Information Technologies; following rules of “Geprüfte Sicherheit”
CAT III	Measurement Category III is applicable to test and measuring circuits connected to the distribution part of the building’s low voltage mains installation
CAT IV	Measurement Category IV is applicable to test and measuring circuits connected at the source of the building’s low voltage mains installation

1.2. Safety Notes

Reference: Please use utmost attention, all relevant statutory regulations must be adhered to when using this instrument.

• Do not exceed the maximum allowable input range of any function.

• Insulated personnel body protective equipment up to 1000V.

• The unauthorized persons are not to be allowed to disassemble the voltage detector.

 **WARNINGS**

• In order to avoid electrical shock, the valid safety and VDE regulations regarding excessive contact voltages must receive utmost attention, when working with voltages exceeding 120V (60V) DC or 50V (25V) RMS AC, the

values in brackets are valid for limited ranges (As for example medicine and agriculture).

• Prior to measurement ensure that the test leads and the test instrument are in perfect condition.

• When using this instrument only the handles of the probes may be touched, do not touch the probe tips.

• This instrument may only be used within the ranges specified and within low voltage systems up to 1000V.

• Prior to usage ensure perfect instrument function (e.g. on known voltage source).

• The voltage detector is not to be used, if the battery box is open.

• The voltage detectors have to be kept dry and clean.

• The voltage testers may no longer be used if one or several functions fail or if no functionality is indicated.

• Do not use this instrument under damp conditions.

• Perfect display I sonly guaranteed within a temperature range of -10 up to 55°C, at relative humidity question <85%.

• If the operator's safety cannot be guaranteed, the instrument must be removed from service and protected against use.

The safety can no longer be insured if the instrument:

• Shows obvious damage.

• does not carry out the desired measurements.

• has been stored for too long under unfavorable conditions.

• has been subjected to mechanical stress during transport.

1.3. Safety Advices

• Depending on the internal impedance of the voltage detector there will be a different capability of indicating the presence or absence of operating voltage in case of the presence of interference voltage.

• A voltage detector of relatively low internal impedance, compared to the reference value of 100kΩ, will not indicate all interference voltages having an original voltage value above the ELV level, when in contact with the parts to be tested, the voltage detector may discharge temporarily the interference voltage to a level below the ELV, but it will be back to the original value when the voltage detector is removed.

• When the indication "Voltage present" does not appear, it is highly recommended installing earthing equipment before work.

• A voltage detector of relatively high internal impedance, compared to the reference value of 100kΩ, may not permit to clearly indicate the absence of operating voltage in case of presence of interference voltage.

• When the indication "Voltage present" appears on a part that is expected to be disconnected of the installation, it is highly recommended confirming by another means (e.g. use of an adequate voltage detector, visual check of the disconnecting point of the electric circuit, etc.) that there is no operating voltage on the part to be tested and to conclude that the voltage indicated by the voltage detector is an interference voltage.

• A voltage detector declaring two values of internal impedance has passed a performance test of managing interference voltages and is (within technical limits) able to distinguish operating voltage from interference voltage and has a means to directly or indirectly indicate which type of voltage is present.

1.4. Appropriate Usage

• The instrument may only be used under those conditions and for those purposes for which it was conceived, for this reason, in particular the safety references, the technical data including environmental conditions and the usage in dry environments must be followed.

• When modifying or changing the instrument, the operational safety is no longer ensured.

• The instrument may only be opened by an authorized service technician.

• The voltage detectors are designed to be used by skilled persons and in accordance with safe methods of work.

• Before using a voltage detector with audible indicator at locations with a high back ground noise level, it has to be determined whether the audible signal is perceptible.

2. Description

1-Handle Test Probe "–" (L1)

2-Instrument Test Probe "+" (L2)

3-Measurement Point Lighting

4-LED for Warning Voltage

5-1999 Counts LCD Display

6-Low Impedance Switch (L2)

7-Measurement Point Lighting/Resistance Button

8-Data Hold/Backlight Button

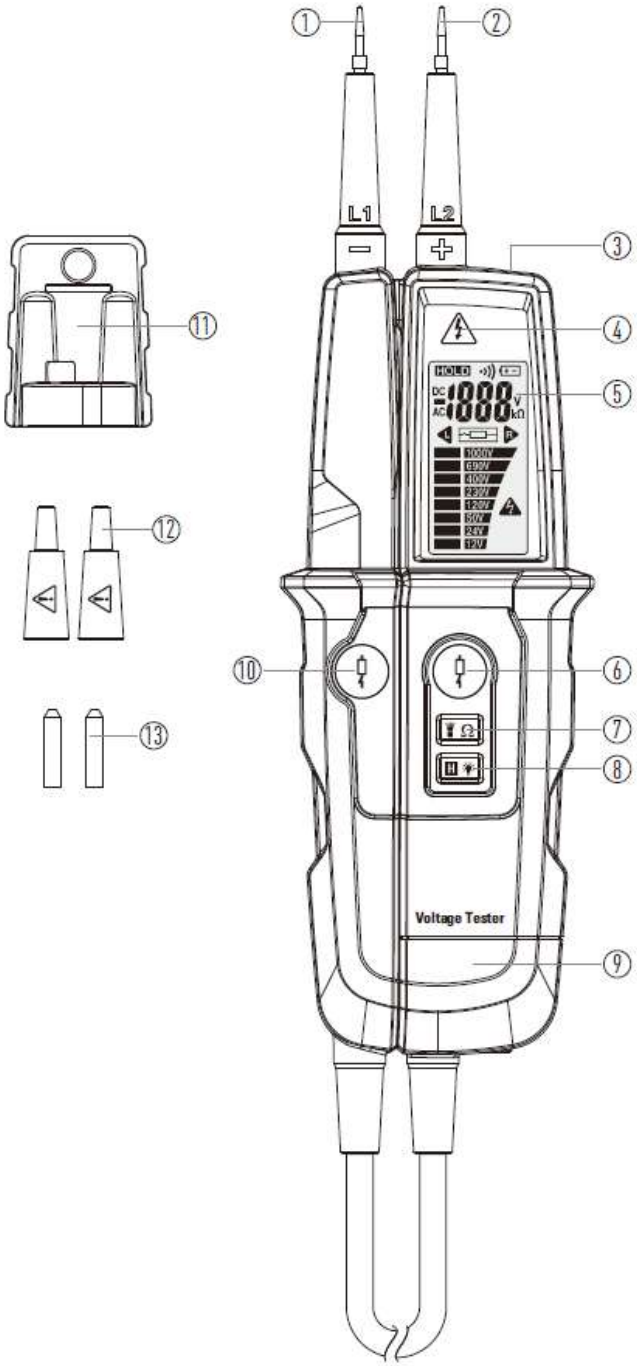
9-Battery Case

10-Low Impedance Switch (L1)

11-Probe Tip Protective Cap (with storage compartments for probe tip cover and probe tip extension)

12-Probe Tip Cover

13-Probe Tip Extension (Diameter 4mm, screw-on)



3. Specifications

Voltage Test	
Voltage Range	6V to 1000V AC/DC
Resolution	1V AC/DC
Tolerances	±3.0% of reading ±5 digit
Frequency Range	0/40Hz to 400Hz
Response Time	≤1 second
Auto Power On	≥6V AC/DC
Range Detection	Automatic
Polarity Detection	Full range
Voltage Detection	Automatic
Internal Basic Load	Maximum 3.5mA at 1000V
Impedance Peak Current	350kΩ/Is <3.5mA (No RCD tripping)
Operation Time	30 seconds
Recovery Time	240 seconds
Switchable Load	~7kΩ
Peak Current	Is (Load)=150mA
RCD Tripping	~30mA at 230V
Continuity Test	
Range	0 to 400kΩ
Accuracy	Nominal resistance ±50%
Test Current	≤5µA
Resistance Measurement	
Range	0 to 1999Ω
Resolution	1Ω
Tolerance	±(5% rdg+10 digits) at 20°C
Temperature Coefficient	±5 digits/10K
Test Current	≤30µA
Single-Pole Phase Test	
Range	100V to 1000V AC
Frequency Range	50Hz to 400Hz
Rotary Field Indication	
Voltage Range	100…1000V
Frequency Range	50/60Hz
General Specifications	
LCD Display	1999 counts ($3^{1/2}$ digit) LCD display with bargraph & backlight
Measurement Principle	Double-pole and contact electrode
Safety Standards	EN61243-3: 2014
Agency Approvals	TÜV-GS
Overvoltage Protection	1000V AC/DC
Measurement Category	CAT III 1000V/CAT IV 600V
Protection Degree	IP64
Power Supply	2x1.5V “AAA” Batteries (batteries not included in the set)
Power Consumption	Max. 30mA/Approx. 250mW
Temperature Range	-10°C up to 55°C
Humidity	Max. 85% relative humidity

4. Operation

4.1. Preparing the Test

Note: Prior to every test, please ensure that the instrument is in perfect condition:

• For example, keep an eye out for a broken housing or leaking batteries.

• Always carry out a function test before using the voltage tester, see below.

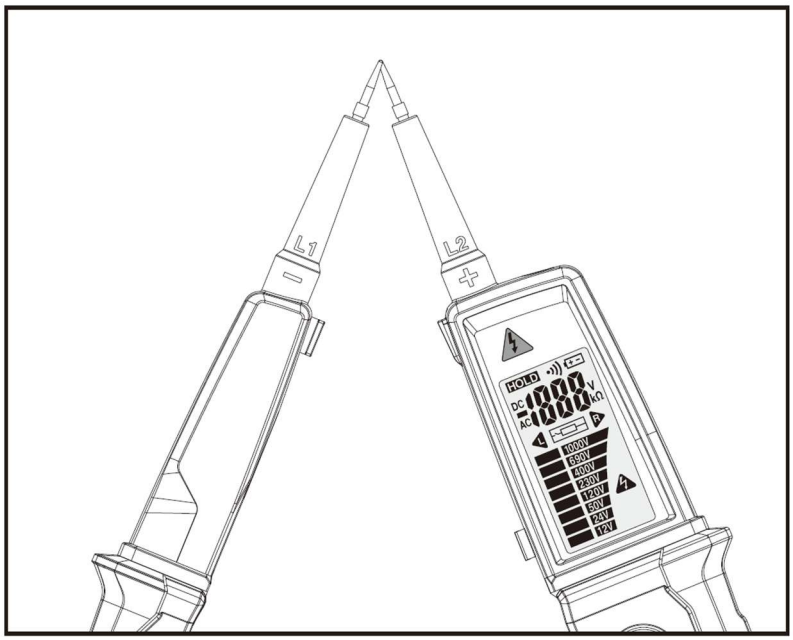
• Check that the instrument is functioning properly (For example at a known voltage source) before and after every test.

• If the safety of the user can not be guaranteed, switch off the instrument and secure it to prevent unintentional usage.

4.2. Carrying Out a Function Test

• Connect the voltage tester probe tips for 4 to 10 seconds and then disconnect.

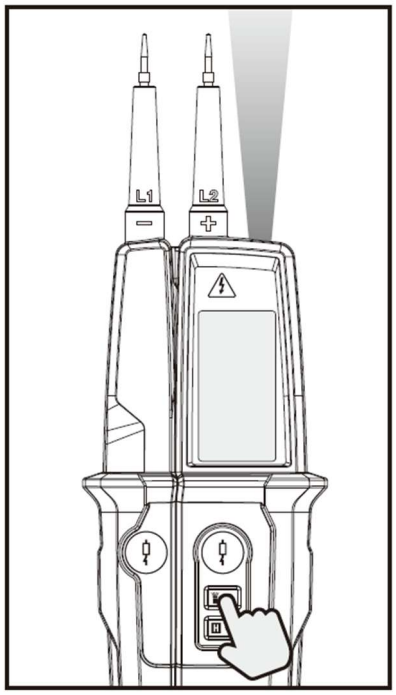
• LED for Warning Voltage should light up, all segments are illuminated on the LCD display.



4.3. Measurement Point Illumination

• Voltage testers are equipped with a measurement point illumination feature, thus working under bad lighting conditions (e.g. division switch cabinets) is made easier.

• Press the button for Measurement Point Illumination on instrument rear.



4.4. Voltage Test

WARNINGS: Always hold the voltage tester by the handles designed for this purpose, never touch the device beyond the handle ends.

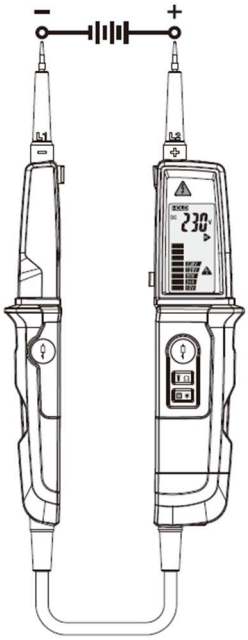
• Connect both test probes with power source.

• As from a voltage of >6V the voltage tester switches on automatically, the voltage is shown on the LCD display.

• In the case of DC voltage, the polarity of the indicated voltage relates to the voltage tester probe tip.

• Once the safety extra-low voltage (50V AC/120V DC) is reached or exceeded, the Warning Voltage " " is illuminated, in the event of no battery power or main circuit failure, and an acoustic signal is emitted.

• Once voltage is applied to the measuring instrument, press the "**HOLD**" Button, the LCD display shows the recoarded reading, to delete the recorded value, press the "**HOLD**" Button once again, the LCD display once again indicates the voltage currently being applied to the probe tips.



4.5. Single-Pole Phase Test

WARNINGS: Always hold the voltage tester by the handles designed for this purpose, never touch the device beyond the handle ends.

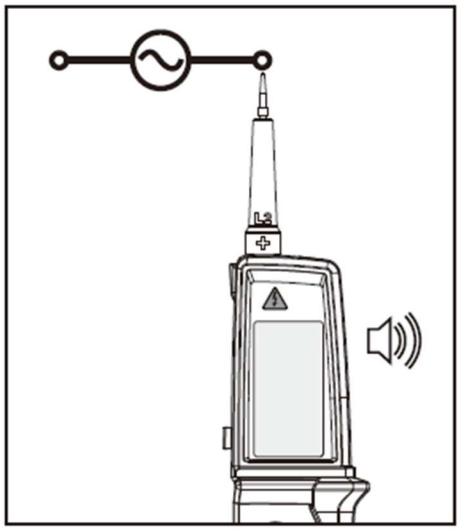
Note: The single-pole phase test is only possible when batteries are installed and in good condition.

• The single-pole phase test starts at an AC voltage of approx. 100V (Pole>100V AC).

• When using single-pole phase tests to determine external conductors the display function may be impaired under certain conditions (e.g. for insulating body protective equipment on insulation locations).

• The single-pole phase testing is not appropriate to determine whether a line is live or not, for this purpose, the double-pole voltage test is always required.

• Connect both test probes with power source, the " ⚠ " LED is illuminated in the display, a signal sound indicates the phase.



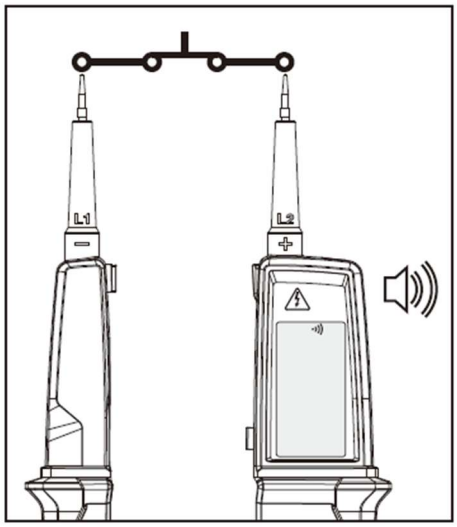
4.6. Continuity Test

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

• The continuity test is only possible when batteries are installed and in good condition.

• Touch the test probe tips to the circuit or wire you wish to check.

• A signal sound is audible for continuity and the LCD display will show the " •))) " symbol and icon.



4.7. Voltage Test with Switched Load, RCD Trip Test

WARNINGS: Always hold the voltage tester by the handles designed for this purpose, never touch the device beyond the handle ends.

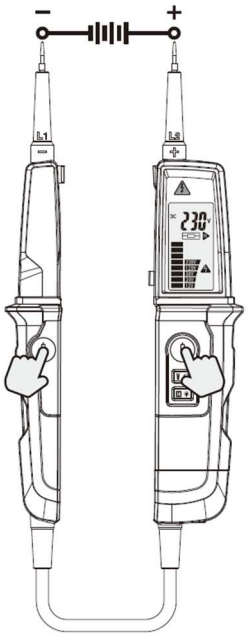
• During voltage tests, you can decrease the interference voltages from inductive or capacitive coupling by loading the UUT with a lower impedance than the Tester has in normal mode.

• In systems with RCD circuit breakers, you can trip an RCD switch with the same low impedance as when you measure voltage between L and PE.

• To do an RCD trip test during voltage measurement, push the two Low Impedance buttons at the same time, if you have 10mA or 30mA RCDs between L and PE in a 230V system, it will trip.

• During load current, the low impedance LED is the indication for the flowing load current, this indication is not to be used for voltage test or measurement.

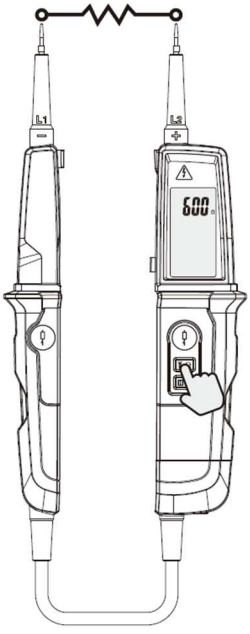
• If the two pushbuttons are not used, the RCDs will not trip, even in measurements between L and PE.



4.8. Resistance Test

WARNING: To avoid electric shock, disconnect power to the unit under WARNING: test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

- The Tester measures Low Ohm Resistances between 1Ω and 1999Ω at a resolution of 1Ω.
- Do a Voltage test to make sure the UUT (unit under test) is not live.
- Push and hold the " Ω" Button for 2 seconds.
- Connect the two test probes with the UUT and read value on the display.
- Push and hold the " Ω " Button for 2 seconds to turn the function off.
- To save battery power the function automatically.



4.9. Rotary Field Indication

WARNINGS: Always hold the voltage tester by the handles designed for this purpose, never touch the device beyond the handle ends.

• The voltage testers are equipped with a double-pole rotary field indicator.

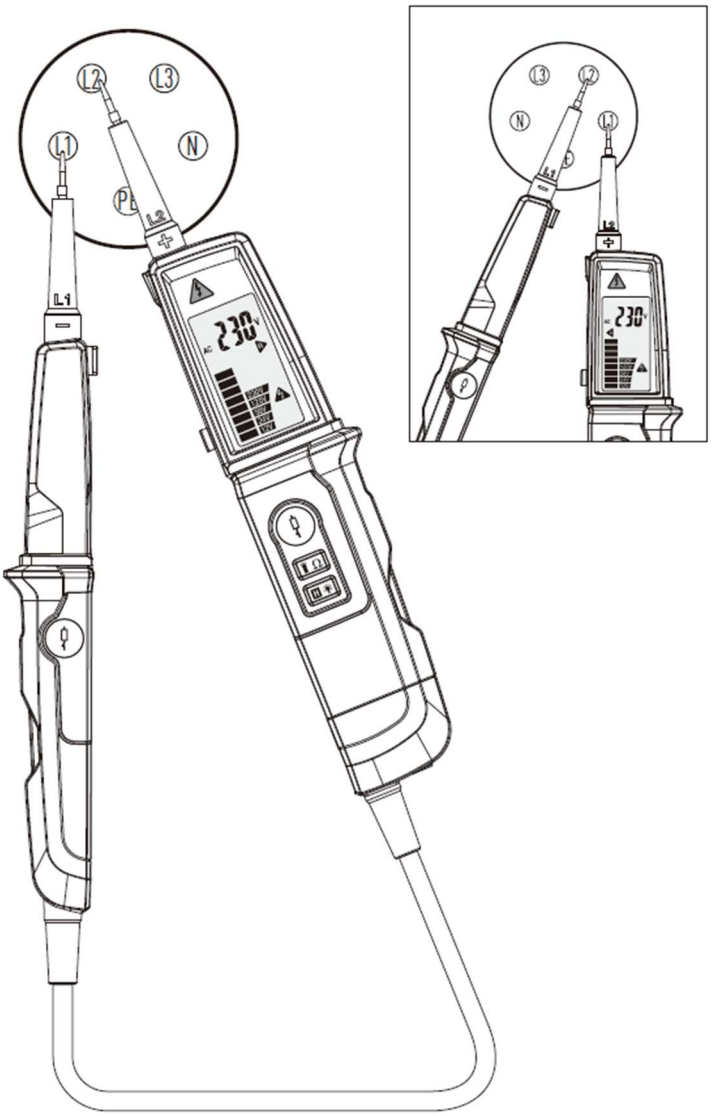
• The rotary phase indication is always active, the symbols "**R**" or "**L**" are always displayed, however the rotary direction can only be determined within a Three-Phase system, here the instrument indicates the voltage between two external conductors.

• Connect the instrument test probe with the supposed phase L2 and the handle test probe with the supposed phase L1, the voltage and the rotary field direction are displayed.

• The "**R**" signifies that the supposed phase L1 is the actual phase L1 and the supposed phase L2 is the actual phase L2.

• The "**L**" signifies that the supposed phase L1 is the actual phase L2 and the supposed phase L2 is the actual phase L1.

Note: When retesting with an swapped test probe, the opposite symbol must be illuminated.



5. Battery Replacement

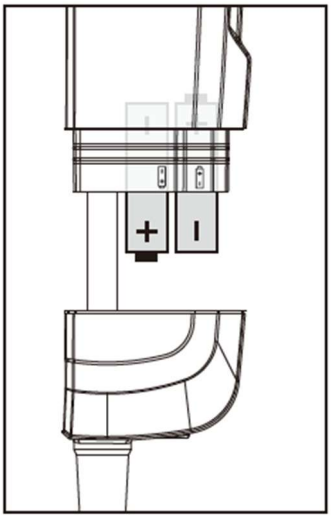
• If no signal sound is audible when short-circuiting the test probes, or the auto test shows that the battery voltage is too low, proceed with the battery replacement.

• Completely disconnect voltage tester from the measurement circuit.

• Remove discharged screw , battery cover and batteries.

• Replace by new batteries, two type “AAA” by respecting correct polarity.

• Close the battery cover and re-screw the screw.



6. Maintenance

• When using voltage testers in compliance with the instruction manual, no particular maintenance is required.

• If functional errors occur during normal operating, our service department will check your instrument without delay.

7. Cleaning

• Prior to cleaning, remove voltage test from all measurement circuits.

• If the instruments are dirty after daily usage, it is advisable clean them by using a damp cloth and a mild household detergent, never use acid detergents or dissolvents for cleaning.

• After cleaning, do not use the voltage tester for a period of approx. 5 hours.