

# PE-425

Test Equipment Depot - 800.517.8431 - 99 Washington Street Melrose, MA 02176  
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## ***ELECTRICAL MULTIFUNCTION NETWORK ANALYZER (LOOP, PSC and EARTH TESTER)***



## **SAFETY NOTES**

*Read the user's manual before using the equipment, mainly " SAFETY RULES " paragraph.*

The symbol  on the equipment means "SEE USER'S MANUAL". In this manual may also appear as a Caution or Warning symbol.

*Warning and Caution statements may appear in this manual to avoid injury hazard or damage to this product or other property.*

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## ***PE-425***

### **1. GENERAL**

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#### **1.1 Features**

- Built-In Earth Tester.
- Built-In Loop/Psc Tester. 0.03-2000  $\Omega$  (Software Ctrl).
- Built-In Voltmeter.
- Built-In Wiring Checker.
- Correct wiring indicators.
- Display L-N and L-E voltages. 50 to 275 V AC (Sine).
- Display Line Path Impedance. 0.03-2000  $\Omega$  (Software Ctrl).
- Display Earth Path impedance. 0.03-2000  $\Omega$  (Software Ctrl).
- Display Neutral Path impedance. 0.03-2000  $\Omega$  (Software Ctrl).
- Display PSC Line to Neutral. 6kA for 230 Vac supply.
- Display PSC Line to Earth. 6kA for 230 Vac supply.
- Re-scroll through previous results.
- Bat. OK / Low battery indicator.
- Auto-off function (disconnection time: 5 minutes).
- Color coded test leads.
- Rugged Case
- Ultra low power consumption.

## 1.2 Specifications

<b>Loops / Earth / Wires</b>	0.03 – 2000 $\Omega$ auto-ranging
<b>Prospective Short Circuit</b>	0 – 6 kA for 230 V AC
<b>Operating Voltage</b>	50-275 V AC (50 Hz only)
<b>Best Performance at Rated Voltage</b>	230 V AC $\pm$ 20% Max 10A
<b>Accuracy of Voltages</b>	$\pm$ 1% (210-250V) $\pm$ 3% otherwise
<b>Accuracy Loops / Earth and Wires impedances</b>	> 2%
<b>Power supply</b>	9 V DC (6 x 1.5 V type R6)
<b>Dimensions</b>	90 W x 205 H x 55 D (mm.)
<b>Weight</b>	535 g with batteries (426 without batteries)

**NOTE:** Equipment specifications are set in the following environmental operating conditions. Operation outside these specifications are also possible. Please check with us if you have specific requirements.

### Operating environmental conditions

<b>Altitude</b>	Up to 2000 m
<b>Temperature range</b>	From 0 to 40 °C
<b>Max. relative humidity</b>	85%
<b>Storage Temperature</b>	20 °C to -60 °C

<b>Included accessoires</b>	<b>PP011</b> Set of three safety clamp-banana cables User's manual Transport suitcase
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### RECOMMENDATIONS ABOUT THE PACKING

It is recommended to keep all the packing material in order to return the equipment, if necessary, to the Technical Service.

## 2. SAFETY RULES

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### 2.1 Generals

- \* This equipment can be used in **Overvoltage Category II** installations and **Pollution Degree 2** environments (see 2.2).

- \* When using some of the following accessories **use only the specified ones** to ensure safety.

Test leads

- \* Check **test leads integrity** before using them.
- \* Observe all **specified ratings** both of supply and measurement.
- \* Remember that voltages higher than **60 V DC** or **30 V AC rms** are dangerous.
- \* Use this instrument under the **specified environmental conditions**.
- \* **The user is only authorised to** carry out the following maintenance operations:

Battery replacement

On the Maintenance paragraph the proper instructions are given.

Any other change on the equipment should be carried out by qualified personnel.

- \* Follow the **cleaning instructions** described in the Maintenance paragraph.

\* Symbols related with safety:

	DIRECT CURRENT		ON (Supply)
	ALTERNATING CURRENT		OFF (Supply)
	DIRECT AND ALTERNATING		DOUBLE INSULATION (Class II protection)
	GROUND TERMINAL		CAUTION (Risk of electric shock)
	PROTECTIVE CONDUCTOR		CAUTION REFER TO MANUAL
	FRAME TERMINAL		FUSE
	EQUIPOTENTIALITY		EQUIPMENT OR COMPONENT TO BE RECYCLED
			

## 2.2 Descriptive Examples of Over-Voltage Categories

- Cat I**      Low voltage installations isolated from the mains.
- Cat II**     Portable domestic installations.
- Cat III**    Fixed domestic installations.
- Cat IV**    Industrial installations.

## 3. PRODUCT LAYOUT AND OPERATING

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### 3.1 Description

The Electrical Network Analyser consist of two internal current injection devices, current and voltage measurement circuits and a microprocessor connected to a display. Once the user depress the button, power is applied to the tester's circuit. The **PE-425** is a new type of Multifunction Instrument which test and report on all important components of a basic electrical network.

Conventionally, when you had to analyze an electrical network or find a fault quickly, the electrical engineer had to buy many bulky and expensive test instruments. This latest release of the **PROMAX** Electrical Network Analyzer, model **PE-425** solves that problem. The **PE-425** has a built-in LED *wiring check* which checks the correctness of the wiring under test. This microprocessor controlled, superb piece of equipment that has *one "Smart" push button* -does it all- type.

Press it to turn the instrument "ON", press it to TEST, press it to SCROLL through the results, press it to scroll through PREVIOUS results or press it to START an other test.

The **PE-425** is so *simple to use* that you can focus on solving rapidly the electrical problem instead of having to study the instruction manual.

This Electrical Network Analyser uses "*multiple paths high current injection*" for its test so that the measured values are well above network noise and high current injection is closer to reality. Once the integrity of the wiring has been verified, the "Smart" button can be depressed. The instrument will first measure the *voltage of the electricity supplier* (utility company) at the source. ( $V_G$ ). A *high current* is then injected between Line and Neutral from the point where the test is performed.

All the results (voltages and currents) from this measurement are stored in a RAM inside the microprocessor. Then, a high current is injected between Line and Earth from the same test point (fully automated, the user's has nothing to do), currents and voltages are again measured and stored. From now, the microprocessor has enough information to compute all the necessary results to display. The "Smart" button can be depressed to scroll through the relevant information and results.

With the **PE-425**, the electrical technician can quickly ascertain if the network is healthy or if a problem is present in the Line, Neutral or Earth path of the network.

The Earth path is measured and calculated without the need for poles or long wires.

The Earth path shown on the instrument is exactly what the earth current will be going through. Prospective Short Circuit Current and Loop Impedance between Line-Neutral and Line-Earth and all their components are shown.

The **PE-425** is the first portable real electrical network analyser. It has a built-in Earth tester which does not require the use of poles or long wires. This instrument is useful for fault-finding or commissioning of electrical installations. Differentiating between the Line (hot), Neutral and Earth(ground) path by reading their values has never been easier. Bad contacts, old wiring or bad earth path are quickly identified. Faulty electrical network can be resolved in a fraction of the time normally required using conventional equipment. Down time due to a faulty electrical network is minimal as the fault can be identified and diagnosed quickly. Find which wire needs to be attended to and why (find those old wires with high impedance before a fire starts and replace them). The complete electrical network can be analyzed by scrolling through the results. Of course, it has a built-in Loop Impedance and Prospective Short Circuit tester as well as a Voltmeter.

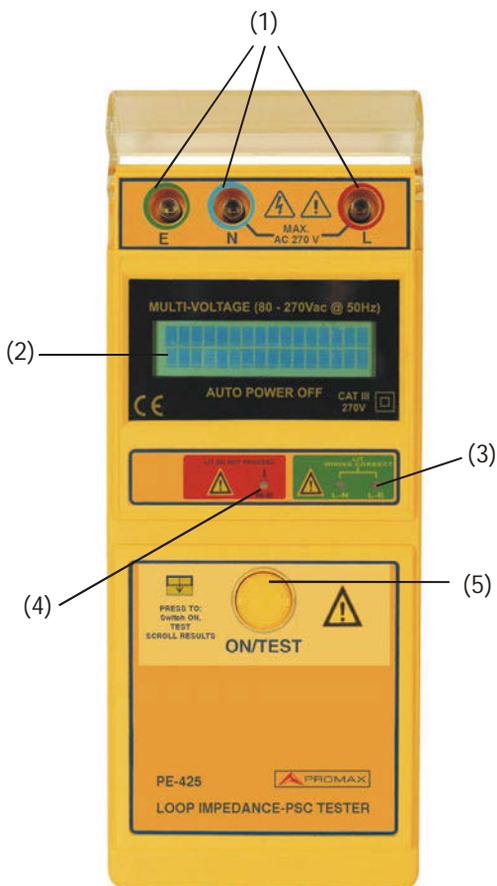


Figure 1.- Layout description

1. Connectors.
2. LCD.
3. Wiring correct indicator (LED).
4. Wiring not correct indicator (LED).
5. On, Test, Scroll, menu., (SMART BUTTON)

## 3.2 Connections

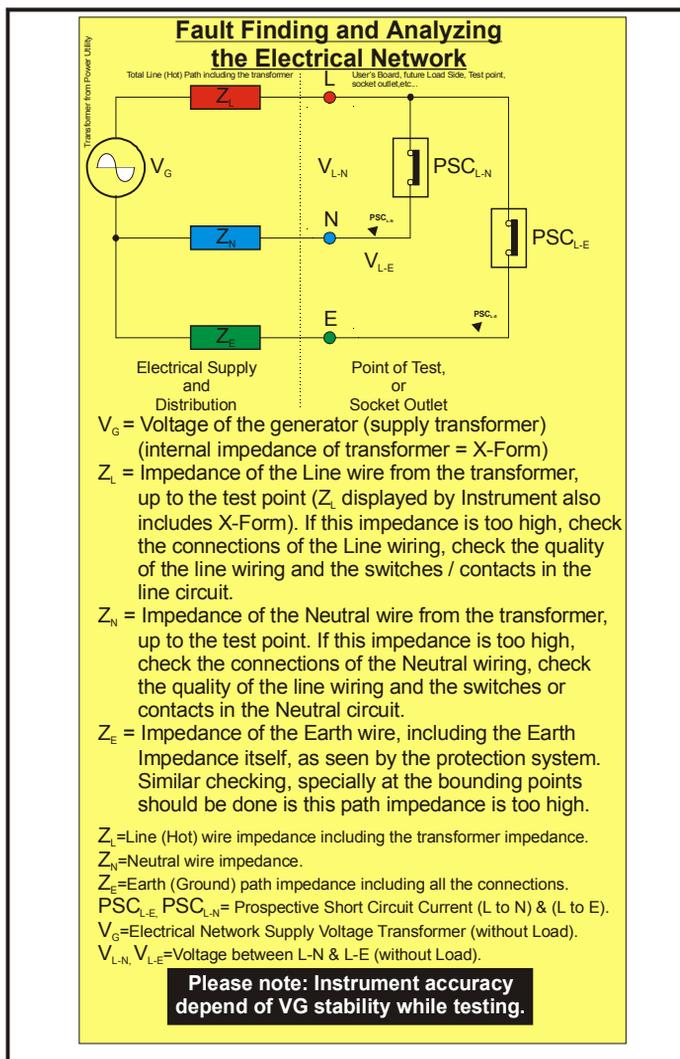


Figure 2.- Electrical Network scheme

The tester Measures:

- Line - Earth AC Voltage.
- Line - Earth Loop Impedance.
- Prospective Short Circuit Current L-E.  
(This is the current which will flows between Line and Earth, should a short circuit be made between Line and Earth)
- Line - Neutral AC Voltage.
- Line - Neutral Impedance
- Prospective Short Circuit Current L-N.  
(This is the current which will flows between Line and Neutral, should a short circuit be made between Line and Neutral)
- Earth Spike Impedance (Earth Wire).
- Line + Transformer Impedance (X-Form).
- Neutral Wire Impedance.
- Wiring Integrity.

The tester report :

- Low battery indication.
- Bad wiring.
- No line.
- Over-Temperature.

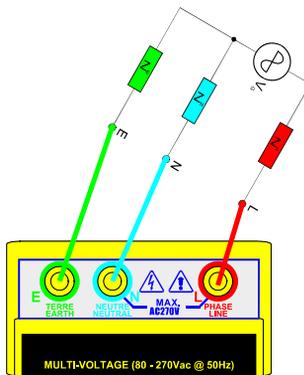


Figure 3.- Connecting the instrument.

### 3.3 Preparation for use

- When unpacked, the tester should be inspected for any visible signs of damage. The test leads should be inspected for cracks, continuity or damages. Do not proceed with damaged leads. Press the **ON** button and make sure the batteries are in good condition (low battery will be indicated on the display and **BAT OK** led will not lit if batteries need to be replaced).

BEFORE INITIATING A TEST THE FOLLOWING POINTS MUST BE VERIFIED:

- All the Residual Current Devices (RCD) must be bypassed during the duration of the test.

**ATTENTION:** By safety, make sure that there is no personnel without authorisation using the installation.

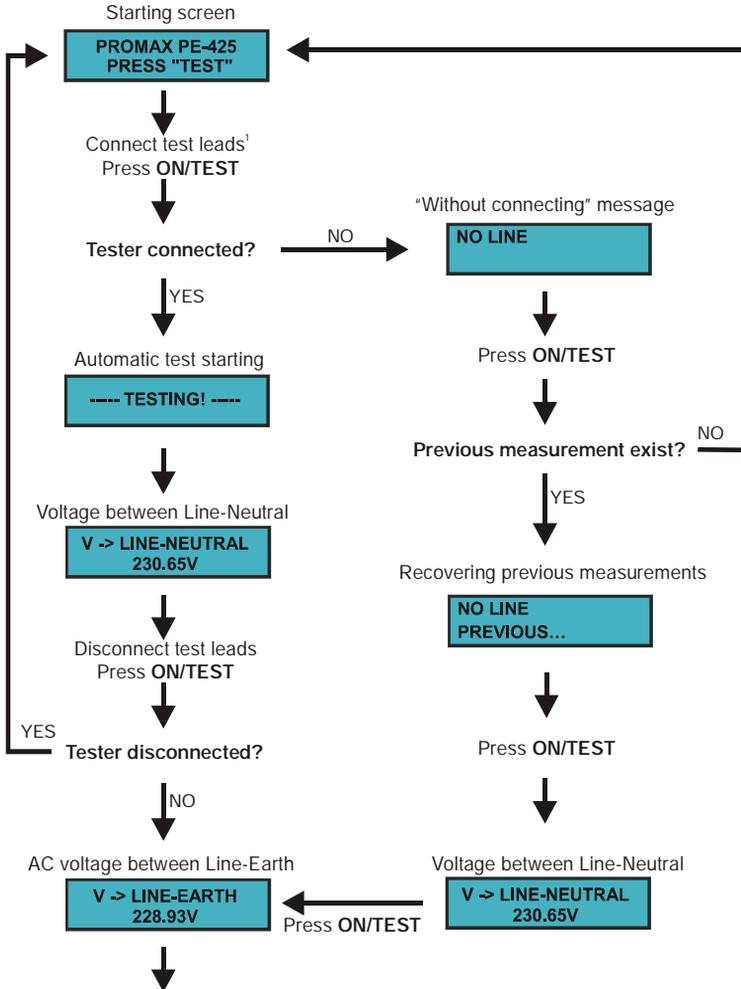
**ATENCIÓN:** Once the test is completed, afresh reconnect the RCDs to avoid leaving the installation without electrical protection.

- In order to avoid wrong measurements and posible failures, it is necessary to disconnect all the load equipment from the installation.
- Draw a quick scheme about the installation in order to verify that obtained results correspond to the actual installation.

### 3.4 Analysing Electrical Network and the Fault

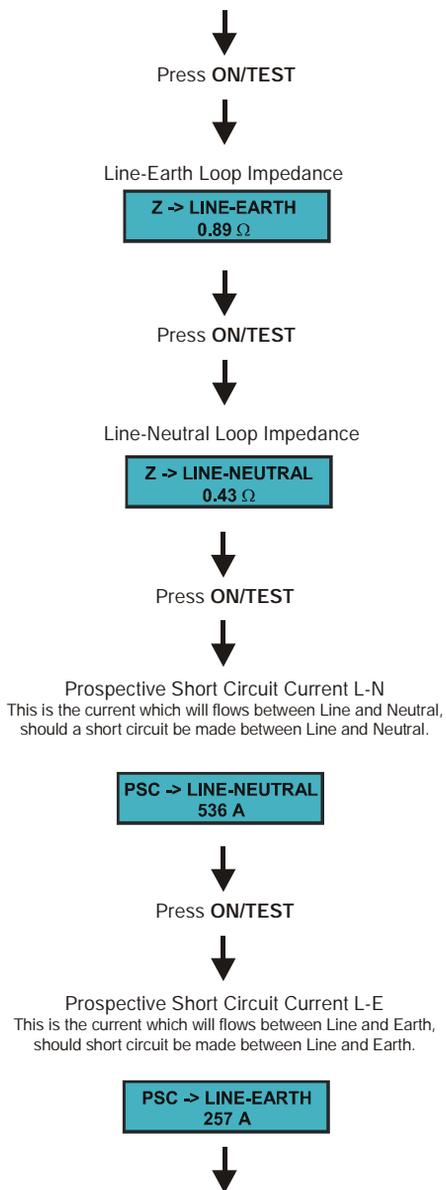
#### Connecting the meter:

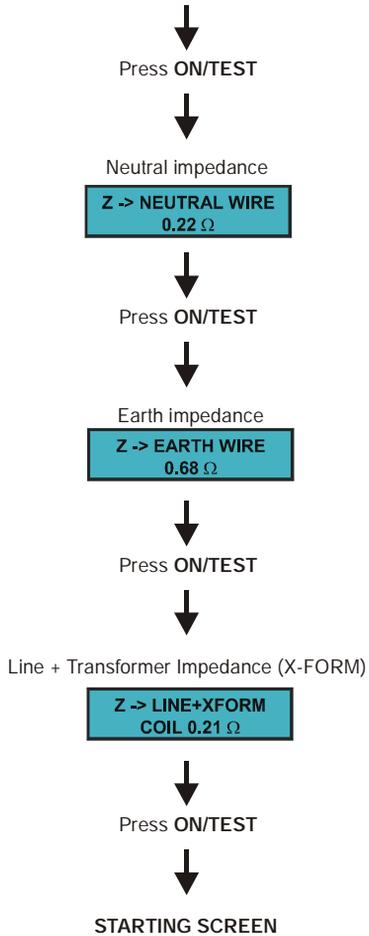
After connecting the test leads to the circuit under test and before starting the reading, verify on the instrument that the connections are correct checking that red LED N-E is unlit and green indicators LEDs L-N, and L-E are lit.



<sup>1</sup> NOTE: If you desire to visualise the results of a previous test, do not connect the test leads to the circuit under test.

English





English



## 4. MAINTENANCE

### 4.1 Battery replacement

The Tester continuously monitors the battery voltage and indicates when the battery need to be replaced.

The tester's batteries are situated under the tester.

**ATTENTION:** Disconnect all the test leads before opening the cover to change the batteries.

1. Remove the battery cover and the batteries.
2. Replace with six 1.5 V R6 (AA) batteries, taking care to observe correct polarity.
3. Replace the battery cover.

### 4.2 Cleaning and Storage

**WARNING:** To avoid electrical shock or damage to the meter, do not get water inside the case.

Periodically, wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

If meter is not to be used for periods longer than 60 days, remove the batteries and store them separately.



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PROMAX ELECTRONICA, S. L.