

# Current-Voltage Tester

## ANALYST PRO

Manual

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### References marked on instrument or in instruction manual:

- ⚠ Warning of a potential danger, follow with instruction manual.
- ⚠ Reference! Please use utmost attention.
- ⚠ Caution! Dangerous voltage. Danger of electrical shock.
- ⚠ Continuous double or reinforced insulation category II IEC 536 / DIN EN 61140:2016
- ⚠ Equipment for working under live voltage.

Conformity symbol, the instrument complies with the valid directives. It complies with the EMV Directive (2014/30/EU), Standard EN 61326-1:2021 are fulfilled. It also complies with the Low Voltage Directive (2014/35/EU), Standard EN61243-3:2014 is fulfilled.

- ⚠ Tester complies with the standard (2012/19/EU) WEEE.
- ⚠ The instruction manual contains information and references, necessary for safe operation and maintenance of the tester.

Prior to using the tester (commissioning/ assembly) the user is kindly requested to thoroughly read the instruction manual and comply with it in all sections.

⚠ Failure to read the tester manual or to comply with the warnings and references contained herein can result in serious bodily injury or tester damage.

The respective accident prevention regulations established by the professional associations are to be strictly enforced at all times.

⚠ Voltage tester is not a measurement device, it is only allowed to use for testing purposes.

### 1.0 Introduction / Product Package

Analyst Pro is an universal applicable tester for voltage, current, continuity and rotary field testing and various additional features. The tester is constructed according to the latest safety regulations and guarantee safe and reliable working.

It complies with the standard for two pole voltage testers EN61243-3:2014.

Analyst Pro is characterized by the following features:

- Designed to meet international safety standards. EN61243-3:2014
- Measurement Category CAT IV / 600 V
- Measurement Category CAT III / 1000 V
- AC and DC voltage test up to 1000 V with LEDs
- Current test up to 200 A
- AC voltage test up to 1000 V and DC voltage test up to 1500 V with LCD
- Cable break tests by Non Contact Voltage detection
- Polarity indication
- Single-pole phase test
- Phase rotation test and Continuity test
- Resistance measurement
- Frequency measurement
- Vibration motor
- Auto-power ON / OFF
- Torch light and IP64 protection

### After unpacking, check that the instrument is undamaged.

#### The product package comprises:

- 1 pc Tester Analyst Pro
- 1 pc removable test lead/probe set
- 1 pc removable solar MC4 lead set
- 2 pcs 4mm test tip adapters
- 2 pcs GS38 rubber caps
- 2 pcs batteries 1.5V, IEC LR03
- 1 pc operating instructions

### 2.0 Safety Measures

⚠ The testers have been constructed and tested in accordance with the safety regulations for voltage testers and have left the factory in a safe and perfect condition.

⚠ The operating instructions contain information and references required for safe operation and use of the tester. Before using the tester, read the operating instructions carefully and follow them in all respects.

⚠ Depending on the internal impedance of the voltage tester 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 tester of relatively low internal impedance, compared to the reference value of 100 kΩ, 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 tester may discharge temporarily the interference voltage to a level below the ELV, but it will be back to the original value when the voltage tester is removed.

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

⚠ A voltage tester of relatively high internal impedance, compared to the reference value of 100 kΩ, 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 tester, 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 tester 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.

### 3.0 Danger of electric shock and other dangers

⚠ To avoid an electric shock, observe the precautions when working with voltages exceeding 120 V (60 V) DC or 50 V (25 V) eff AC. In accordance with DIN VDE these values represent the threshold contact voltages (values in brackets refer to limited ranges, e.g. in agricultural areas).

⚠ The tester must not be used with the battery compartment open

⚠ Before using the tester, ensure that the test lead and device are in perfect working order. Look out e.g. for broken cables or leaking batteries.

⚠ Hold the tester and accessories by the designated grip areas only, the display elements must not be covered. Never touch the test probes.

⚠ The tester may be used only within the specified measurement ranges and in low-voltage installations up to 1000VAC and 1500VDC.

⚠ The tester may be used only in the measuring circuit category it has been designed for.

⚠ Before and after use, always check that the tester is in perfect working order (e.g. on a known voltage source).

⚠ Make sure that the cables tested for current are double insulated.

⚠ The tester must no longer be used if one or more functions fail or if no functionality is indicated.

⚠ It is not permitted to use the tester during rain or precipitation.

⚠ A perfect display is guaranteed only within a temperature range of -15°C to +55°C at relative air humidity less than 85%.

⚠ If the safety of the user cannot be guaranteed, the tester must be switched off and secured against unintentional use.

⚠ Safety is no longer guaranteed e.g. in the following cases:

- obvious damage
- broken housing, cracks in housing
- if the tester can no longer perform the required measurements/ tests
- stored for too long in unfavorable conditions
- damaged during transport
- leaking batteries

⚠ The tester complies with all EMC regulations. Nevertheless it can happen in rare cases that electric devices are disturbed by the electrical field of the tester or the tester is disturbed by electrical devices.

⚠ Never use the tester in explosive environment

⚠ Tester must be operated by trained users only

⚠ Operational safety is no longer guaranteed if the tester is modified or altered.

⚠ The tester may be opened by an authorized service technician only.

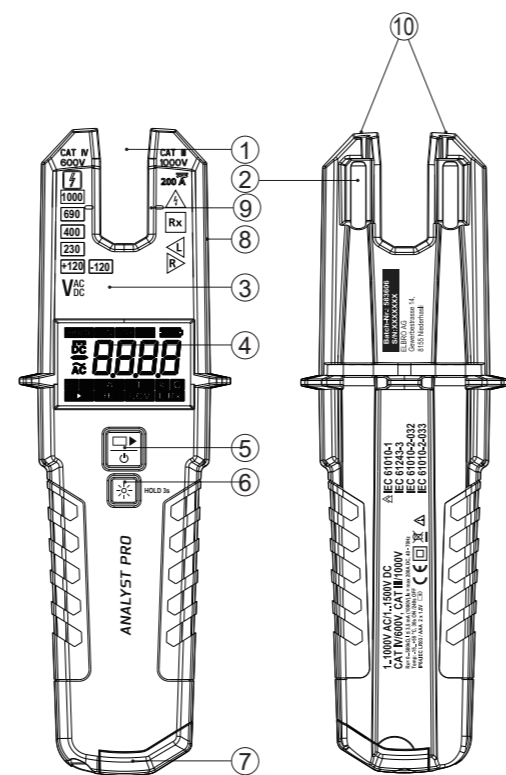
⚠ The current test may only be performed on double insulated cables.

### 4.0 Intended Use

The tester may be used only under the conditions and for the purposes for which it was designed. Therefore, observe in particular the safety instructions, the technical data including environmental conditions.

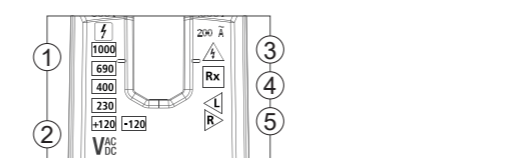
### 5.0 Testers Information

1. Opening for current measurement
2. Test leads (on back side)
3. LED display
4. LCD display
5. On/Off and function button
6. Torchlight and hold button
7. Battery compartment
8. Sensor for cable break detection, NCV
9. Marking middle position of measured cable
10. Test lead positions to ensure 19mm distance between test leads for socket testing



### LED Display information

1. Voltage indication
2. Polarity indication (120V LEDs)
3. ELV / Single pole indication
4. Continuity indication
5. Rotary field indication



### LCD Display information

1. HOLD, MIN, MAX, DUTY CYCLE symbols
2. AC/ DC and polarity symbols
3. Function symbols (from left to right, upper row: low voltage test, voltage test, current test, temperature test, resistance test; lower row: diode test, frequency test, cable break detected by NCV, continuity test.
4. Low battery indication
5. 4 digit 7 segment display



### 6.0 Preparation for tests

**6.1 Auto-power-on/ switching on**

• The tester switches on when it detects an AC or DC voltage above approx. 6 V or a live phase on L2+ (single pole test).

• It can be switched on with a button.

### 6.2. Auto-power off

• Tester is automatically powered off after approx.30 sec when there is no signal contacted to the probes.

• The torch light automatically switches off after approx. 30 sec.

### 7.0 Conducting Tests

#### 7.1 Voltage test

- Connect both probes to the object under test.
- The voltage is indicated by LEDs if >120 V.
- The buzzer and vibration function turn on if the voltage is higher than 50 V AC or 120 V DC.
- Voltage polarity is indicated in following manner on LCD.
  - ▶ AC: AC symbol is on
  - ▶ +DC: DC symbol is on
  - ▶ -DC: - symbol and DC symbol is on
- Above 120 V, the polarity is shown on the LED display as well.
  - ▶ AC: both 120 V LEDs are on
  - ▶ +DC: left 120 V LED is on
  - ▶ -DC: right 120 V LED is on
- Once when tester is power on, it will automatically measure voltage in range 6V-1000VAC/1500VDC.

⚠ When the L2 probe + is the positive (negative) potential, the Polarity indication LED indicates "+DC" ("DC").

⚠ During voltage test, L or R LED/Symbol may light up.

⚠ In case of empty batteries, only the ELV LED lights up >50 V.

⚠ When the L2 probe + is the positive (negative) potential, the Polarity indication LED indicates "+DC" ("DC").

⚠ During voltage test, L or R LED/Symbol may light up.

⚠ In case of empty batteries, only the ELV LED lights up >50 V.

#### 7.1.1 Low Voltage mode – 1V-1000VAC/1500VDC

• Press On/Off/Function button repeated until LCD shows <10V symbol.

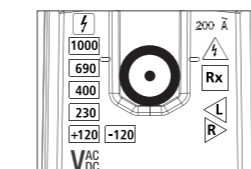
- In Low Voltage mode it is possible to measure AC and DC voltage from 1V.
- Connect both probes to the object under test.
- Voltage display is as in 7.1 described.
- ⚠ Continuity mode is disabled in Low Voltage Mode.

### 7.2 Current test

- Press On/Off / Function button repeated until LCD shows A symbol.
- In current test mode, currents between 0.1 A and 200 A can be tested.

• Cable needs to be positioned at the bottom of the opening.

- Make sure that only double insulated cables are measured.
- Store test probes safely to avoid any unintended connection.
- Positive current direction is defined as shown in the picture.



• **Zeroing function:** In the current test mode, keep the tester away from any current carrying conductors and magnetic fields, press the both buttons (5+6) for 2 seconds until the LCD shows "ZERO" and wait until the "ZERO" sign is off.

⚠ Current test accuracy depends of cable position in opening and stray fields around the tester. Best results are achieved if the measured cable is at the bottom of the fork and the tester remains at least 1-2 hours at the stable environment temperature. A lowest accurately measurable current (Im) in a presence of stray current carrying conductors outside the fork depends on the stray currents (Is) and the distance (d) between the stray conductors the fork e.g.:  
 $Im(Is=1A@d=0mm)=1.3A$   
 $Im(Is=1A@d=10mm)=0.3A$   
 $Im(Is=1A@d=20mm)=0.16A$

### 7.3 Single-pole phase test

⚠ Function of this test may not be fully achieved if the insulation condition/ grounding conditions of user or of the equipment under test aren't good enough. Verification of live-circuit shouldn't be dependent on this Single-pole phase test only, but on the voltage test.

• Hold the tester good in your hand. Connect the "L2 +" probe to the object under test. Live circuit LED lights up and buzzer sounds when a voltage of approx. 100 V AC or more exists in the object under test. (Pol≥100 V AC).

• Indication of Single Pole is via LED.

### 7.4 Phase rotation test

• L LED (symbol) and R LED (symbol) for Phase rotation test may operate on various wiring systems, but effective testing result can be obtained only on three-phase 4-wire system.

• Hold the tester good in your hand and connect both probes to the object under test.

• Phase-to-phase voltage is indicated by Voltage LEDs and LCD.

• R LED lights up for Right rotary field.

• L LED lights up for Left rotary field.

• Measurement principle: The instrument detects the phase rising order regarding the user as earth.

⚠ Function of this test may not be fully achieved if the insulation condition/ grounding conditions of user or of the equipment under test is not good enough.

### 7.5 Continuity test L Rx

⚠ Make sure the object under test isn't live.

• Connect both test probes to the object under test.

• Continuity is shown by light up of the LED and a sound if resistance is below 500 kOhm.

• If a lower threshold for continuity is preferred, low continuity mode can be selected.

- Press Torchlight-function button repeated until LCD shows LRx symbol is shown on LCD.
- Continuity is shown by light up of LED and sound if resistance is below 35 Ohm.

▶ Continuity test performed automatically in all modes except in Low Voltage and Resistance mode.

▶ Tester switch to voltage measurement if voltage is detected during continuity testing >6 V.

### 7.6 Diode test

⚠ Make sure the object under test isn't live.

• Switch into diode testing mode by short pressing On/Off-function button repeated until  $\rightarrow$  symbol is shown on LCD. Connect both test probes to the diode under test.

▶ The continuity LED lights and the buzzer sounds when L1 is connected to the anode and L2 is connected to the cathode.

▶ Continuity indication will be off if L1 tip is connected on Cathode of diode and L2 tip on Anode.

▶ Tester switch to voltage measurement if voltage >6 V or Single pole is detected during diode testing.

### 7.7 Resistance test

⚠ Make sure the object under test isn't live.

• Switch into resistance measurement by pressing On/Off-function button repeated kΩ symbol is shown on LCD. Connect both test probes to the object under test. Resistance up to 100 kΩ can be shown on LCD. For resistance less than ~35 Ω buzzer sounds continuously to indicate low continuity.

There is a hysteresis for the stable autoranging of the voltage, current and resistance measuring.

Tester switch to voltage measurement if voltage >30 V or Single Pole is detected.

### 7.8 Frequency test

• Switch into frequency measurement by short pressing On/Off-function button repeated until Hz symbol is shown on LCD. Connect both test probes to the AC voltage under test. Frequency from 1 Hz to 800 Hz can be shown on LCD.

Frequency measurement is possible for voltages >10V AC.

⚠ The level of voltage will be shown only on bar graph for voltages >120 V. ELV diode will indicate voltages >50 V AC and >120 V DC.

### 7.9 Cable break detection by NCV

• Switch into NCV mode by pressing On/Off-Function button repeated. LCD will show NCV symbol.

• The NCV function is used to find e.g. after a cable breaks.

• Hold the voltage tester with the sensor against the wire or cable. The voltage tester indicates the strength of the signal digitally on the LCD screen.

• Store test probes safely to avoid any unintended connection.

• Tester switch to voltage measurement if voltage >6 V or single pole is detected between probes.

### 7.10 Temperature test

• Press the On/Off/Function button repeatedly until the LCD shows the T symbol.

• The environment temperature in °C will be shown on the LCD.

• The tester will work properly only if the temperature is within the specified range -15..55°C.

### 7.11 Torch light

• Press the "torchlight" button to turn on the light and after approx. 30 s it will turn itself off.

### 7.12 Self test

• LEDs and all LCD segments and vibration motor, torch light, ELV indication and buzzer are turned on for a second after battery replacement.

Selftest can be activated:

- ▶ Shorting L1(-) and L2(+) probe tips and pressing the 'On/Off/Function' button while device is turned OFF – leave device OFF for 30 seconds before shortening tips or turn off using the 'On/Off/Function' button.

### 7.13 HOLD, MIN, MAX, DUTY CYCLE function

• Press the torchlight/hold button for 2 seconds. The **HOLD** symbol will be shown on the LCD and the display value is frozen.

• By short pressing the On/Off/Function button toggle between the hold, minimum, maximum, and the duty cycle (25...100%) function. The following symbols will be shown on the LCD respectively: **HOLD**, **MIN**, **MAX**, **DUTY %**.

• To reset the particular function, reactivate it by shortly pressing the On/Off/Function button 4 times.

• To leave the "hold", "minimum", "maximum", "duty cycle" menu, press the torchlight/hold button for 2 seconds.

### 7.14 Backlight

• White Backlight is turned on when torch light is turned on.

### 8.0 Battery Replacement

⚠ Remove the probes from any testing point, when opening the battery case. Batteries are dead when the continuity test with both test probes connected cannot be done anymore and the low battery symbol is shown in the LCD.

**Follow the procedure below and replace batteries with new ones (type IEC LR03 1.5 V).**

• Unscrew the battery door

• Pull out the battery door and replace the batteries. Insert new batteries according to the engraving on the battery door.

• Re-assemble battery door.

⚠ Confirm that the battery door case is properly locked prior to measurements.

### 9.0 Technical Data

Test Leads Voltage	Active Function	New Function
V>0	V	Hz
V<0	V-MIN	V-MAX
V<0	V-MAX	V-DUTY
V<0	V-DUTY	V-HOLD
V<0	<10V-HOLD	<10V-MIN
V<0	<10V-MIN	<10V-MAX
V<0	<10V-MAX	<10V-DUTY
V<0	<10V-DUTY	<10V-HOLD
V<0	OFF	V
V<0	<10V	A
V<0	A	T
V<0	A-HOLD	A-MIN
V<0	A-MIN	A-MAX
V<0	A-MAX	A-DUTY
V<0	A-DUTY	A-HOLD
V<0	T	Rx
V<0	T-HOLD	T-MIN
V<0	T-MIN	T-MAX
V<0	T-MAX	T-HOLD
V<0	Rx	Diode
V<0	Rx-HOLD	Rx-MIN
V<0	Rx-MIN	Rx-MAX
V<0	Rx-MAX	Rx-HOLD
V<0	Diode	Hz
V<0	Hz-HOLD	Hz-MIN
V<0	Hz-MIN	Hz-MAX
V<0	Hz-MAX	Hz-HOLD
V<0	NCV	LRx
V<0	LRx	V
V<0	A	A-Zeroed
V<0	any function	Switch OFF
V<0	any function	torch toggle 0
V<0	V	V-HOLD
V<0	<10V	<10V-HOLD
V<0	A	A-HOLD
V<0	T	T-HOLD
V<0	Rx	Rx-HOLD
V<0	Hz-HOLD	Hz-HOLD
V<0	Y-HOLD	V
V<0	V-MIN	V
V<0	V-MAX	V
V<0	V-DUTY	V
V<0	<10V-HOLD	<10V
V<0	<10V-MIN	<10V
V<0	<10V-MAX	<10V
V<0	<10V-DUTY	<10V
V<0	A-HOLD	A