

# PORTABLE APPLIANCE TESTERS

## PAT-820/815/810

**NEW!**



TOUCH  
SCREEN

FLASH TEST  
HIGH VOLTAGE  
PAT-820

QR CODE  
SYSTEM

IEC  
61557

WiFi

PAT-8XX digital meters series are used to measure the parameters of portable electrical equipment (power tools, white goods, etc.) which determine their safety: **resistance of protective conductors, insulation resistance, continuity of connections, leakage current, RCD devices, power.** Also PAT-820 meter allows flash test / high voltage test.

Meters can be used to test the equipment performed in accordance with standards:

- **EN 60745-1** Hand-held motor-operated electric tools. Safety. General requirements
- **EN 61029** Safety of transportable motor-operated electric tools - General requirements
- **EN 60335-1** Household and similar electrical appliances -Safety -Part 1: General requirements
- **EN 60950** Safety of information technology equipment (IT Equipment)
- **AS/NZS 3760:2010** In-service safety inspection and testing of electrical equipment
- **VDE 0404-1** Prüf - und Messeinrichtungen zum Prüfen der elektrischen Sicherheit von elektrischen Geräten. Teil 1: Allgemeine Anforderungen
- **VDE 0404-2** Prüf - und Messeinrichtungen zum Prüfen der elektrischen Sicherheit von elektrischen Geräten. Teil 2: Prüfeinrichtungen für Prüfungen nach Instandsetzung, Änderung oder für Wiederholungsprüfungen
- **VDE 0701-0702** Prüfung nach Instandsetzung, Änderung elektrischer Geräte. Wiederholungsprüfung elektrischer Geräte. Allgemeine Anforderungen für die elektrische Sicherheit

Functionality of the meter:

- intuitive user interface,
- manual tests and auto tests, the ability to describe auto test with standards or any name,
- flash test / high voltage test (only PAT-820),
- typing with QWERTY keyboard on the touch screen,
- description of test equipment, measurement location, customer data, assigning the serial number of the device under test and the index can be stored in meter memory, ability to write notes about the device under the test
- base of the appliances, customers, description of the equipment and damage.
- the results can be printed (also automatically after every measurement), reports (works with the printer), two labels can be printed after a single test (for the device and a removable wire)
- support for barcode reader (including 2D), readings of the original serial numbers for the appliances and registration codes and auto test codes,
- automatic measurement of RCD parameters
- built-in help with instructions how to connect test equipment and how to perform measurement,
- ability to create many user accounts with log-in function (as an option),
- supports USB flash drive;
- communication with PC via USB and WiFi;
- works with the program Sonel PAT Reader and Sonel PAT; measurement and settings configuration from the meter and also from PC, data analysis.

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## Basic functions:

- measurement of earth bond/continuity resistance with the currents: 200 mA (PAT-810/815/820), 10 A and 25 A (only PAT-815/820) (protection class I),
- measurement of insulation resistance – three measurement voltages: 100 V and 250 V (only PAT-815/820), 500 V (PAT-810/815/820),
- measurement of substitute leakage current,
- measurement of differential leakage current,
- measurement of touch leakage current,
- measurement of power,
- measurement of current consumption,
- IEC lead test,
- check of the L-N circuit test,
- measurement of mains voltage and frequency,
- RCD testing,
- flash test / high voltage test (only PAT-820).

## Other:

- automatic measurement range selection,
- professional software for data processing and reporting,
- cooperation with a barcode reader and printer,
- supports pendrive flash memory,
- large and clear touch display,
- ergonomic operation.

## Measurement of continuity resistance $I=200$ mA (protection class I)

Display range	Resolution	Accuracy
0,00...0,99 $\Omega$	0,01 $\Omega$	$\pm(4\% \text{ m.v.} + 2 \text{ digits})$
1,00...19,99 $\Omega$		$\pm(4\% \text{ m.v.} + 3 \text{ digits})$

- test current:  $I_{200}$  mA for  $R = 0,2...1,99 \Omega$
- adjustable limit
- adjustable measurement time

## Measurement of earth bond $I=10$ A (protection class I)

Display range	Resolution	Accuracy
0...999 m $\Omega$	1 m $\Omega$	$\pm(3\% \text{ m.v.} + 4 \text{ digits})$
1,00...1,99 $\Omega$	0,01 $\Omega$	

- technical method
- test current:  $I_{10}$  A for  $R \leq 0,5 \Omega$
- adjustable limit
- adjustable measurement time

## Measurement of earth bond $I=25$ A (protection class I)

Display range	Resolution	Accuracy
0...999 m $\Omega$	1 m $\Omega$	$\pm(3\% \text{ m.v.} + 4 \text{ digits})$
1,00...1,99 $\Omega$	0,01 $\Omega$	

- technical method
- test current:  $I_{25}$  A for  $R \leq 0,2 \Omega$
- adjustable limit
- adjustable measurement time

## Measurement of insulation resistance

Measurement range according to IEC 61557-2 for:

$U_n=100$  V: 100 k $\Omega$ ...99,9 M $\Omega$

$U_n=250$  V: 250 k $\Omega$ ...199,9 M $\Omega$

$U_n=500$  V: 500 k $\Omega$ ...599,9 M $\Omega$

$U_n$	Range	Resolution	Accuracy
100V	0...1999 k $\Omega$	1 k $\Omega$	$\pm(5\% \text{ m.v.} + 8 \text{ digits})$
	2,0...19,99 M $\Omega$	0,01 M $\Omega$	
	20,0...99,9 M $\Omega$	0,1 M $\Omega$	
250V	0...1999 k $\Omega$	1 k $\Omega$	
	2,00...19,99 M $\Omega$	0,01 M $\Omega$	
	20,0...199,9 M $\Omega$	0,1 M $\Omega$	
500V	0...1999 k $\Omega$	1 k $\Omega$	
	2...19,99 M $\Omega$	0,01 M $\Omega$	
	20,0...599,9 M $\Omega$	0,1 M $\Omega$	

- adjustable limit
- adjustable measurement time
- automatic discharge of the capacity of the tested device after measurement
- protection against measuring live devices

## Measurement of differential leakage current:

Display range	Resolution	Accuracy
0,00...3,99 mA	0,01 mA	$\pm(5\% \text{ m.v.} + 2 \text{ digits})$
4,0...19,9 mA	0,1 mA	

- adjustable limit
- adjustable measurement time

## Measurement of substitute leakage current:

Display range	Resolution	Accuracy
0,00...3,99 mA	0,01 mA	$\pm(5\% \text{ m.v.} + 2 \text{ digits})$
4,0...19,9 mA	0,1 mA	

- adjustable limit
- adjustable measurement time
- open circuit voltage 25...50 V

## Measurement of touch leakage current:

Display range	Resolution	Accuracy
0,00...4,999 mA	0,001 mA	$\pm(5\% \text{ m.v.} + 3 \text{ digits})$

- adjustable limit
- adjustable measurement time

## Measurements of RCD parameters

RCD trip time test  $t_a$

Test range according to IEC 61557: 0 ms ... to the upper limit of displayed value

RCD type	Factor	Range	Resolution	Accuracy
General	$0,5 \cdot I_{Dn}$	0...300 ms	1 ms	$\pm(2\% \text{ m.v.} + 2 \text{ digits})^1$
	$1 \cdot I_{Dn}$			
	$2 \cdot I_{Dn}$	0...150 ms		
	$5 \cdot I_{Dn}$	0...40 ms		

<sup>1)</sup> - accuracy of differential leakage current  $I_{Dn} = 10$  mA  $I_{Dn}$ :  $\pm 2\% \text{ m.v.} \pm 3 \text{ digits}$

## Measurement of RCD disconnection current $I_A$ for sinusoidal differential current

Test range according to IEC 61557:  $(0,3...1,0)I_{A,n}$

Selected nominal current of RCD	Test range	Resolution	Test current	Basic uncertainty
10 mA	3,3...10,0 mA	0,1 mA	$0,3 \times I_{Dn} ... 1,0 \times I_{Dn}$	$\pm 5\% I_{Dn}$
15 mA	4,5...15,0 mA			
30 mA	9,0...30,0 mA			

- it is possible to start the measurement from the positive of the negative half of forced leakage current
- test current passage time max. 3200 ms
- automatic measurement of RCD disconnection time ( $t_A$ ) and disconnection current
- measurement for:  $0,5I_{A,n}$ ,  $1I_{A,n}$ ,  $2I_{A,n}$  i  $5I_{A,n}$ ,

## Measurement of power S:

Display range	Resolution	Accuracy
0...999 VA	1 VA	$\pm(5\% \text{ m.v.} + 3 \text{ digits})$
1,00 k...3,99 kVA	0,01 kVA	

## Measurement of power P

Display range	Resolution	Accuracy
0...999 W	1 W	$\pm(5\% \text{ m.v.} + 3 \text{ digits})$
1,00 k...3,99 kW	0,01 kW	

## Power factor PF

Display range	Resolution	Accuracy
0,00...1,00	0,01	$\pm(10\% \text{ m.v.} + 5 \text{ digits})$

## Measurement of current consumption:

Display range	Resolution	Accuracy
0,00...15,99 A	0,01 A	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$




## Voltage measurement:




Display range	Resolution	Accuracy
195,0...265,0 V	0,01 V	$\pm(2\% \text{ m.v.} + 2 \text{ digits})$



Innovative, intuitive touch interface:




2014/07/29 5:45:45 Admin  $U_{NPE} = 2.4 \text{ V}$   $U_{LN} = 233.1 \text{ V}$   $f = 50.0 \text{ Hz}$

**Perform test**

 Rpe
  Isub
  Power test

 Riso
  Ipe
  RCD

 ID
  IEC

 Visual check
  IT
  Flash test

2014/07/29 5:48:26 Admin  $U_{NPE} = 1.7 \text{ V}$   $U_{LN} = 234.6 \text{ V}$   $f = 50.1 \text{ Hz}$

**\Sonel\Office\Printer**

Evidence No	123/14		2014/07/29 5:48:09 Admin SONEL PAT-820 (SN.:BJ0014)
LabelName	Printer	✓	
Producer		✓	2014/07/29 5:47:19 Admin SONEL PAT-820 (SN.:BJ0014)
Model		✓	
Serial No			
Year of production	0		
Class			
Cycle	6		

Date of retest: 2015/01/29

2014/07/29 5:45:24 Admin  $U_{NPE} = 2.5 \text{ V}$   $U_{LN} = 232.2 \text{ V}$   $f = 50.0 \text{ Hz}$

**Sonel\Office**

Objects	Devices
Office	123/14 Printer
Service	123/15 Computer

2014/07/29 5:48:46 Admin  $U_{NPE} = 1.6 \text{ V}$   $U_{LN} = 232.9 \text{ V}$   $f = 50.1 \text{ Hz}$

**Printer:Test history 1/2**

**Visual check**

2014/07/29 5:47:36

- ✓ Plug
- ✓ Case
- ✓ Safety Features
- ✓ Lead
- ✓ Mechanical

**RPE**

2014/07/29 5:47:57

✓  $R_{PE} = 0.04 \Omega$   $R_{PE} \text{Limit} = 1.0 \Omega$   $I_n = 0.2 \text{ A}$

**RISO**

2014/07/29 5:48:09

✓  $R_{ISO} > 599.9 \text{ M}\Omega$   $R_{ISO} \text{Limit} = 1.00 \text{ M}\Omega$   $U_n = 500 \text{ V}$

2014/07/29 5:46:41 Admin

**RISO - Insulation resistance**

TEST IN PROGRESS

$I_{ISO} = 0.00 \text{ mA}$

$U_{ISO} = 105 \text{ V}$

$R_{ISO} > 99.9 \text{ M}\Omega$

2014/07/29 5:46:42

$R_{ISO} \text{MIN} > 99.9 \text{ M}\Omega$

3 s

Test voltage $U_{iso}$	Test duration $t$	Limit	Test method
100 V	5 s	1.00 MΩ	Probe-socket

Conforms to the EMC requirements according to EN 61326-1:2013 and EN 61326-2-2:2013.

Electrical safety:

- measurement category II 300V acc.to EN 61010-1
- enclosure protection rating acc. to EN 60529: IP40 (IP67 with lid closed)

Other technical specification:

- power supply 195 V...265V, 50Hz
- load current max. 16A (230V)
- data transmission to PC USB 2.0
- dimensions: 330 x 235 x 120 mm
- weight approx. 6,2 kg
- operating temperature: -10'...+50'C
- storage temperature: -20'...+70'C
- humidity 20...80%
- display TFT 7" 800x480

#### Standard accessories:

- power supply cord
- test lead 1,8 m; SP-4 plug, orange
- test lead with banana plug; 1.8 m; 5 kV; red (only PAT-820 - 2 pcs)
- pin probe 5kV with banana connector - red (only PAT-820 - 2 pcs.)
- USB cable
- fuse 0314 015.VXP 15 A 250 VAC 6.3x32 mm Littlefuse 2 pcs
- instruction manual
- warranty card

WAPRZAS1  
WAPRZ1X8ORKS  
WAPRZ1X8REBB  
WASONREOGB2  
WAPRZUB  
WAPRZUB15PAT

#### Additional accessories:

- adapter IEC 60320 C6 Plug to IEC 60320 C13 Connector Block
- current clamp C-3 (only for PAT-820/815)
- three phase socket adapter 16A
- three phase socket adapter 16A switchable
- three phase socket adapter 32A
- three phase socket adapter 32A switchable
- adapter for industrial sockets 16A
- adapter for industrial sockets 32A
- cable - adapter Shuko / IEC (for testing extensions)
- Sonel PAT+ software
- USB barcode reader
- portable USB report/bar code printer

WAADAPATIEC1  
WACEGC30KR  
WAADAPAT16P  
WAADAPAT16PR  
WAADAPAT32P  
WAADAPAT32PR  
WAADAPAT16F1  
WAADAPAT32F1  
WAADAPATIEC2  
WAPROSONPAT2  
WAADACK2D  
WAADAD2

2014/07/29 5:53:53 Admin

**RPE - PE continuity**

READY!

✓  $R_{PE} = 0.23 \Omega$

2014/07/29 5:53:51

Positive test result

Test current $I$	Test duration $t$	Limit	Test method
0.2 A	35 s	0.5 Ω	Probe-socket