

# PAT120, PAT150 and PAT150R

## Handheld portable appliance testers



- **Simple tick or cross, pass or fail indication plus measurement**
- **Battery powered with rechargeable options**
- **Safe 250 V insulation and leakage test for surge-protected and IT equipment**
- **Testing portable and fixed electrical equipment**
- **Substitute leakage testing**
- **10 mA and 30 mA portable RCD lead testing (PAT150)**
- **Adjustable PASS test limits and mains powered leakage testing (PAT150)**
- **Tough, rubber armour with built-in front cover and hardened scratch-proof display**

### DESCRIPTION

The PAT100 series of hand-held portable appliance testers enables simple, fast safety testing in all environments including offices, shops and business units. Its tough, reliable functionality is ideally suited for training organisations with high turnover, intensive courses.

With rubber armoured cases and hardened, scratch-proof glass, the PAT100s are exceptionally tough instruments.

Battery powered operation makes the PAT100s perfect for those locations where an electrical supply is not available, inconvenient or unsafe, especially building sites and warehouses. The PAT100 series conforms to all UK and European requirements for electrical safety testing.

### Test groups

Test groups enable the correct sequence of tests to be performed automatically with minimum intervention by the user. This keeps testing simple, reduces test times to a minimum and helps to prevent testing errors.

### PAT120:

- The PAT120 model has test groups available for Class I, Class II and Extension/Power leads.
- Fixed PASS limits.
- Insulation testing at 500 V (default) or 250 V can be selected at the start of the test.
- Leakage testing uses a "Substitute Leakage" also known as the "Alternative" method to remove the need for a mains supply during test.

### THE PAT150:

- The PAT150 has additional tests available for testing portable RCDs (PRCDs) of 10 mA and 30 mA.
- Separate tests for continuity, insulation, mains powered leakage testing and SELV measurements can be made using the Quick Test (QT) button.
- Test group pass limits and test duration can be configured by the user.
- Bond lead resistance can be nulled to reduce measurement errors.
- Live circuit measurement is available for testing the mains supply and socket polarity or electrical circuit voltage to 300 V ac.
- Can be used for testing fixed appliances.

### Continuity test

Used for measuring the proper bonding of all metal parts of a class I device to the protective conductor.

Tests are performed at 200 mA dc in both polarities to be compliant with international and UK regulation or recommendations. This test is safe to perform on equipment where higher test currents could cause damage.

### Insulation testing

Used for measuring the separation of conductive parts or conductors from earth. This test is usually performed at 500 V dc. The PAT100 series maintains the necessary test voltage down to 0.5 MΩ.

### Substitute leakage testing

Substitute leakage testing enables the measurements of AC leakage currents, which could differ significantly from the DC Insulation test results.

Substitute leakage testing is performed at less than 40 V ac. and does not require a mains supply.

Substitute leakage testing is used for measuring protective conductor current and touch current, in addition to an insulation test, or where it is considered an insulation test may damage equipment.

The Substitute leakage test will not operate equipment and so can be used where the operation of the equipment under test is undesirable.

### Portable RCD testing (PRCD)

Portable RCDs can be tested using the PAT150. There is no need to find a non-RCD protected supply as the PAT150 will not trip external RCDs.

Both 10 mA and 30 mA RCDs can be tested both for disconnection times and the manual test button function.

### Separated Extra Low Voltage (SELV) supplies

SELV supplies should be tested to ensure the output voltage does not exceed maximum limits as defined in the international regulations for Extra Low voltage systems. The PAT150 permits up to 50 V ac measurement, with a PASS or fail indication for SELV.

### Differential Leakage (Protective Conductor Current), Touch Current and operational test

The PAT150 includes the facility for mains powered leakage test. This test has the benefit that equipment under test will function during the test sequence.

### Battery life

The PAT120 and PAT150 operates from AA Alkaline or NiMH cells. Battery life is typically four days, based on one hundred and twenty assets per day.

The PAT150R can be re-charged with NiMH batteries fitted.

## SPECIFICATIONS

### Environmental Condition

<b>Operating ambient</b>	20 °C
<b>Humidity</b>	45% rh $\pm$ 20 points

### Continuity Test

<b>Test voltage</b>	Compliance voltage: +4 V dc -0% +1-% (open circuit)
<b>Test current</b>	Bi-directional +200 mA -0 % + 50 mA (into 2 $\Omega$ load)
<b>Continuity accuracy</b>	Resistance: $\pm$ 5% $\pm$ 3 digits (0 to 19.99 $\Omega$ )
<b>Resolution</b>	Resistance 10 m $\Omega$
<b>Display range</b>	0.01 to 19.99 $\Omega$
<b>Continuity</b>	test nulling up to 9.99 $\Omega$
<b>Test time</b>	User selectable from 2 s to 20 s or selected during test to 180 s

### Insulation Test

<b>Insulation test</b>	250 V dc -0% +25% open circuit 500 V dc -0% +25% open circuit $\geq$ 500 V 0% dc across 0.5 M $\Omega$ load
<b>Short circuit/charge current</b>	< 2mA dc
<b>Insulation accuracy</b>	$\pm$ 3% $\pm$ 10 digits (0 to 19.99 M $\Omega$ )
<b>Resolution</b>	0.01 mA
<b>Display range</b>	0.10 M $\Omega$ to 99.99 M $\Omega$
<b>Test duration</b>	User selectable from 2 s to 20 s or selected during test to 180 s

### Substitute Leakage Test

<b>Leakage current</b>	Accuracy $\pm$ 5% $\pm$ 3 digits
<b>Test frequency</b>	Nominal mains frequency 50 Hz
<b>Test voltage</b>	< 50V ac
<b>Resolution</b>	0.01 mA
<b>Display range</b>	0.10 to 19.99 mA
<b>Test duration</b>	0.01 mA
<b>Display range</b>	User selectable from 2 s to 5 s Reading corrected to 230 V AC

### Differential Leakage Current

<b>Test voltage</b>	Nominal supply voltage 230 V ac
<b>Test frequency</b>	Nominal mains frequency 50 Hz
<b>Test accuracy</b>	$\pm$ 5% $\pm$ 3 digits $\pm$ 3 $\mu$ A/A
<b>Resolution</b>	0.01 mA
<b>Display range</b>	0.10 to 19.99 mA
<b>Test duration</b>	User selectable from 2 s to 5 s

### Touch Current Test

<b>Test voltage</b>	Nominal mains 230 V ac
<b>Test frequency</b>	Nominal mains 50 Hz
<b>Test accuracy</b>	$\pm$ 5% $\pm$ 3 digits
<b>Resolution</b>	0.01 mA
<b>Display range</b>	0.10 to 3.99 mA
<b>Test duration</b>	User selectable from 2 s to 5 s

### SELV Device Test

<b>Test voltage</b>	0 to 300 V ac
<b>Test accuracy</b>	$\pm$ 3% $\pm$ 3 digits
<b>Resolution</b>	0.1 V ac
<b>Display range</b>	0.1 to 300 V ac

### Extension Lead Test

<b>Test voltage</b>	5 V
<b>Polarity</b>	Lead OK Live/neutral shorted Live/neutral reversed Live/neutral open circuit

### Extension Portable RCD Test

Test voltage	Nominal mains 230 V
Test frequency	50 Hz
Test current accuracy	+2 % to +8 % (1 x I, 5 x I)
Test accuracy	Trip time
	± 1 % ± 1 ms
Resolution	Trip time 0.01 ms
Display range	0 to 200 ms (1 x I)
	0 to 40 ms (5 x I)

### Main Supply Test

Frequency measurement range	50 Hz
Test voltage	40 to 300 V ac
Test accuracy	± 3% ± 3 digits
Resolution	0.1 V ac
Display range	40 to 300 V ac

### Circuit Test

**(Carried out automatically, not available to user)**

Test voltage	5 V
Test frequency	Nominal mains 50 Hz
Test current	<100mA short-circuit

### Safety

**Instrument designed to IEC 61010-1: 2012**

**Test leads designed to IEC 61010-031: 2005**

#### PAT150

300 V to Earth Category II  
Mains fuse protection to 250 V rms ac

### EMC

**Design to meet IEC 61326-1: 2012 and IEC 61326-2-2: 2012.**

User replaceable fuse	13 A fused mains plug (PAT150-UK only) One F 100 mA 250 V 5x20 mm HBC
Operating temperature	0 °C to +40 °C
Storage temperature	-20 °C to +60 °C
Humidity	90 % rh @ +10 °C to +30 °C 75 % rh @ +10 °C to +60 °C
Operating altitude	up to 2,000m
IP rating	IP40 (with front cover closed)

### Mechanical

Battery life	Over 1000 full Class 1 tests using 3400 mAh Alkaline battery
Battery type	eight AA LR6 cells 12 V dc (Alkaline cells) 9.6 V dc (NiMH cells)
Weight	
PAT120 (instrument)	1150g (40.4 oz)
(shipping)	2370g (83.6 oz)
PAT150 (instrument)	1300g (45.8 oz)
(shipping)	2975g (104.9 oz)

### Dimensions

Dimensions (instrument and case)	203 mm (L) x 148 mm (W) x 78 mm (H) (8 x 5.7 x 3.2 inches)
Dimensions (instrument and packaging)	456 mm (L) x 178 mm (W) x 89 mm (H) (18 x 7.1 x 3.5 inches)

Product Selection Table:	UK		Germany		Netherlands Spain Belgium		France Belgium Poland		Switzerland		Australia New Zealand
	PAT120	PAT150	PAT120	PAT150	PAT120	PAT150	PAT120	PAT150	PAT120	PAT150	PAT150
<b>Connector Interfaces</b>											
Mains test socket	BS1363		CEE 7/4 Schuko				CEE 7/5 French		Swiss SEV 1011		AS/NZS 3112 (15A)
<b>Power Supply</b>											
AA alkaline/NiMH	■	■	■	■	■	■	■	■	■	■	■
Rechargeable (PAT150R)*		■		■		■		■		■	■
<b>Testing</b>											
Protective Earth Resistance	■	■	■	■	■	■	■	■	■	■	■
250V insulation	■	■	■	■	■	■	■	■	■	■	■
500 V insulation	■	■	■	■	■	■	■	■	■	■	■
Cable test	■	■	■	■	■	■	■	■	■	■	■
Live protective conductor current		■		■		■		■		■	■
Live touch current		■		■		■		■		■	■
Substitute leakage	■	■	■	■	■	■	■	■	■	■	■
Functional test (part of Live leakage test)		■		■		■		■		■	■
10 mA PRCD		■		■		■		■		■	■
30 mA PRCD		■		■		■		■		■	■
SELV voltage		■		■		■		■		■	■
Lead resistance nulling		■		■		■		■		■	■
<b>Function Keys</b>											
Class 1	■	■	■	■	■	■	■	■	■	■	■
Class 2	■	■	■	■	■	■	■	■	■	■	■
Lead/cord	■	■	■	■	■	■	■	■	■	■	■
PRCD		■		■		■		■		■	■
Single test		■		■		■		■		■	■
LCD Backlight	■	■	■	■	■	■	■	■	■	■	■
Setup		■		■		■		■		■	■
On/Off	■	■	■	■	■	■	■	■	■	■	■
<b>Standard Accessories</b>											
4m plug lead probe + croc clip	1	2	1	2	1	2	1	2	1	2	2
Extension lead adaptor	BS1363		IEC 83:1975 Std C 1b						SN SEV 1011		AS/NZS 3112:2000
AC Charger Adaptor * (*PAT150R)											
Mains Supply Cord											
Carry case											

Note: The rechargeable version of the PAT150 has the identifier (R)

**ORDERING INFORMATION**

Description	Order Code	Description	Order Code
PAT120-CH PORTABLE APPLIANCE TESTER	1003-074		
PAT120-DE PORTABLE APPLIANCE TESTER	1003-066		
PAT120-EU PORTABLE APPLIANCE TESTER	1003-070		
PAT120-FR PORTABLE APPLIANCE TESTER	1003-072		
PAT120-UK PORTABLE APPLIANCE TESTER	1003-062		
PAT150-AU PORTABLE APPLIANCE TESTER	1003-077		
PAT150-CH PORTABLE APPLIANCE TESTER	1003-075		
PAT150-DE PORTABLE APPLIANCE TESTER	1003-068		
PAT150-EU PORTABLE APPLIANCE TESTER	1003-071		
PAT150-FR PORTABLE APPLIANCE TESTER	1003-073		
PAT150-UK PORTABLE APPLIANCE TESTER	1003-064		
PAT150R-AU PORTABLE APPLIANCE TESTER	1003-435		
PAT150R-CH PORTABLE APPLIANCE TESTER	1003-434		
PAT150R-DE PORTABLE APPLIANCE TESTER	1003-430		
PAT150R-EU PORTABLE APPLIANCE TESTER	1003-432		
PAT150R-FR PORTABLE APPLIANCE TESTER	1003-433		
PAT150R-UK PORTABLE APPLIANCE TESTER	1003-428		
<b>Included accessories for PAT120</b>		<b>Included accessories for PAT150</b>	
Extension lead adaptor		Extension lead adaptor	
Continuity/earth bond lead	1001-233	Mains plug test lead	
Carry case	1005-075	Continuity/earth bond lead	1001-233
		SELV/mains voltage test lead Red x1	1005-077
		Carry case 1005-075	
		<b>Included accessories for PAT150R</b>	
		AC Mains charger – multi-country	1003-436
		<b>Optional accessories</b>	
		Plug adaptor IEC C6 - C13	1001-232
		110 V Extension lead adaptor	6220-639
		415 V adaptor lead (4-pin) to BS1363 (16 A)	1000-767
		415 V adaptor lead (5 pin) to BS1363 (16 A)	1000-770
		Extension lead adaptor BS1363	1001-234
		Extension lead adaptor Schuko	1001-235
		Extension lead adaptor Australia	1001-236
		Extension lead adaptor Switzerland	1005-081
		Mains plug test lead	6231-601
		Mains plug test lead (CEE 7/7)	1005-078
		Mains plug test lead (AS/NZS 3112)	1005-080

**SALES OFFICE**

Megger Limited  
Archcliffe Road Dover  
CT17 9EN England  
T +44 (0) 1304 502101  
E UKsales@megger.com

**PAT100\_DS\_en\_V06**

www.megger.com  
ISO 9001  
The word 'Megger' is a registered trademark