

## **PAT100 SERIES** **Handheld portable appliance testers**



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

### **DESCRIPTION**

The PAT100 series of hand-held portable appliance testers enable simple, fast safety testing in all environments including offices, shops and business units. It is ideally suited to training organisations with a very short learning curve and tough, reliable functionality. With rubber armoured cases and fitted with 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 maintain the necessary test voltage down to 0.5 Mohms.

An additional 250 V dc insulation test is available on all models for use on IT equipment, on devices or extension leads that are fitted with surge protection, or simply where it may be considered undesirable to use a 500 V test.

### 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 & 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 & PAT150 operates from AA Alkaline or NiMH cells. Battery life is typically 4 days, based on 120 assets per day.

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

| Product selection table:                    | UK     |        |         |
|---|--------|--------|---------|
|   | PAT120 | PAT150 | PAT150R |
| <b>Connector Interfaces</b>                 |        |        |         |
| Mains test socket                           | BS1363 |        |         |
| <b>Power supply</b>                         |        |        |         |
| AA alkaline/NiMH                            | ■      | ■      | ■       |
| Rechargeable (PAT150R)*                     |        |        | ■       |
| <b>Testing</b>                              |        |        |         |
| Protective Earth Resistance                 | ■      | ■      | ■       |
| 250 V 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>                 |        |        |         |
| 4mm plug lead probe + croc clip             | 1      | 2      | 2       |
| Extension lead adaptor                      | BS1363 |        |         |
| AC Charger Adaptor                          |        |        | ■       |
| Mains Supply Cord                           |        | ■      | ■       |
| Carry case                                  | ■      | ■      | ■       |

## SPECIFICATIONS

### ENVIRONMENTAL CONDITION:

|                          |                  |
|--------------------------|------------------|
| <b>Operating ambient</b> | 20°C             |
| <b>Humidity</b>          | Nominal humidity |

### CONTINUITY TEST

|                                |  |
|--------------------------------|--|
| <b>Test voltage</b>            | Compliance Voltage: +4V dc<br>-0 % /+10 % (open circuit)               |
| <b>Test current</b>            | Bi-directional +200mA<br>-0% + 50mA (into 2Ω load)                     |
| <b>Continuity accuracy</b>     | Resistance: ± 5% ± 3 digits (0 to 19.99 Ω)                             |
| <b>Resistance resolution</b>   | 10 mΩ  |
| <b>Display range</b>           | 0.01 to 19.99Ω   |
| <b>Continuity test nulling</b> | up to 9.99 Ω   |
| <b>Test time</b>               | User selectable from 2 sec to 20 sec or selected during test to 180sec |

### INSULATION TEST

|                                     |   |
|-------------------------------------|---|
| <b>Insulation test</b>              | 250V dc -0 % /+25 % open circuit<br>500V dc -0 % /+25 % open circuit<br>≥ 500V 0% dc across 0.5 MΩ load |
| <b>Short circuit/charge current</b> | < 2mA dc  |
| <b>Insulation accuracy</b>          | ±3% ±10 digits (0 to 19.99 MΩ)  |
| <b>Resolution</b>                   | 0.01 MΩ   |
| <b>Display range</b>                | 0.10 MΩ to 99.99 MΩ   |
| <b>Test duration</b>                | User selectable from 2 sec to 20 sec or selected during test to 180sec                                  |

### SUBSTITUTE LEAKAGE TEST

|                        |   |
|------------------------|---|
| <b>Leakage current</b> | Accuracy ± 5% ± 3 digits                |
| <b>Test frequency</b>  | Nominal mains frequency 50Hz            |
| <b>Test voltage</b>    | < 50V ac                                |
| <b>Resolution</b>      | 0.01mA                                  |
| <b>Display range</b>   | 0.10 to 19.99mA                         |
| <b>Test duration</b>   | User selectable from 2 sec to 5 seconds |

### Reading corrected to 230V 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>  | ±5% ±3d ±3uA/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 sec to 5 seconds |

### TOUCH CURRENT TEST

|                       |                                     |
|-----------------------|-------------------------------------|
| <b>Test voltage</b>   | Nominal mains 230 V ac              |
| <b>Test frequency</b> | Nominal mains 50 Hz                 |
| <b>Test accuracy</b>  | ± 5% ± 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 sec to 5 sec |

### SELV DEVICE TEST

|                             |                 |
|-----------------------------|-----------------|
| <b>Test voltage</b>         | 0 to 300 V ac   |
| <b>Measurement accuracy</b> | ± 3% ± 3 digits |
| <b>Resolution</b>           | 0.1 V ac        |
| <b>Display range</b>        | 0.1 to 300 V ac |

### EXTENSION LEAD TEST

#### Test includes Insulation and Bond tests.

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

### PORTABLE RCD TEST

|                              |   |
|------------------------------|---|
| <b>Test voltage</b>          | Nominal mains 230 V                     |
| <b>Test frequency</b>        | 50Hz                                    |
| <b>Test current accuracy</b> | +2% to +8% (1 x I, 5 x I)               |
| <b>Trip time accuracy</b>    | ±1% ± 1ms                               |
| <b>Trip time resolution</b>  | 0.01ms                                  |
| <b>Display range</b>         | 0 to 200ms (1 x I)<br>0 to 40ms (5 x I) |

### MAINS SUPPLY TEST

|                                    |                 |
|------------------------------------|-----------------|
| <b>Frequency measurement range</b> | 50 Hz           |
| <b>Test voltage</b>                | 40 to 300V ac   |
| <b>Accuracy</b>                    | ± 3% ± 3 digits |
| <b>Resolution</b>                  | 0.1Vac          |
| <b>Display range</b>               | 40 to 300V ac   |

### CIRCUIT TEST

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

|                       |                       |
|-----------------------|-----------------------|
| <b>Test voltage</b>   | 5V                    |
| <b>Test frequency</b> | Nominal Mains 50 Hz   |
| <b>Test current</b>   | < 100mA short circuit |

### Safety

**Instrument designed to IEC 61010-1: 2012**  
**Test leads designed to IEC 61010-031: 2005**  
**300 volts to Earth Category II**  
**Mains fuse protection to 250 volts rms ac**

## EMC

**Design to meet IEC 61326-1: 2006 and IEC 61326-2-2: 2005.**

## Fuse

(user replaceable)  
UK variants has mains plug fuse  
One F 100 mA 250 V 5 x 20 mm HBC fuse.

## ENVIRONMENTAL

**Operating temperature range** 0°C to +40°C

**Storage temperature range** -20°C to +60°C

**Humidity** 90%RH @ +10°C +30°C  
75%RH @ +30°C to +40°C

**Maximum altitude** 2,000m to full safety spec.

**IP rating** IP40 (with front cover closed)

## MECHANICAL

### BATTERIES

**Battery life** 3 days based on 120 tests/  
day using 2000 mAh Alkaline  
batteries

**Battery type** Supply voltage  
12 Vdc (Alkaline AA LR6)  
9.6 Vdc (NiMH AA LR6)

## WEIGHT

PAT120 (instrument only): 1150 g  
Shipping weight: 2370g

PAT150 (instrument only): 1300 g  
Shipping weight: 2795g

PAT150R (instrument only): 1300 g  
Shipping weight: 2975

## DIMENSIONS

**Dimensions (instrument and case)** 203mm (L) x 148mm (W) x 78mm (H)

**Dimensions (instrument and packaging)** 456mm(L) x 178mm (W) x 89mm (H)

## ORDERING INFORMATION

| Description                                     | Order Code |
|---|------------|
| PAT120-UK PORTABLE APPLIANCE TESTER             | 1003-062   |
| PAT150-UK PORTABLE APPLIANCE TESTER             | 1003-064   |
| PAT150R-UK PORTABLE APPLIANCE TESTER            | 1003-428   |
| <b>Included accessories for PAT120</b>          |            |
| Extension lead adaptor BS1363                   | 1001-234   |
| Continuity/earth bond lead                      | 1001-233   |
| Carry case                                      | 1005-075   |
| <b>Included accessories for PAT150</b>          |            |
| Continuity/earth bond lead                      | 1001-233   |
| SELV/mains voltage test lead Red x1             | 1005-077   |
| Extension lead adaptor BS1363                   | 1001-234   |
| Mains plug test lead                            | 6231-601   |
| 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                       | 2000-551   |
| Roll of 1000 PASS test labels                   | 1000-971   |
| PAT test certificate book                       | 1001-299   |
| PTDVD - DVD covering Portable Appliance Testing | 1002-384   |

**UK**  
Archcliffe Road Dover  
CT17 9EN England  
T +44 (0) 1304 502101  
F +44 (0) 1304 207342  
UKsales@megger.com

**UNITED STATES**  
4271 Bronze Way  
Dallas TX 75237-1019 USA  
T 800 723 2861 (USA only)  
T +1 214 333 3201  
F +1 214 331 7399  
USsales@megger.com

**OTHER TECHNICAL SALES OFFICES**  
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