

# **PAT450**

## **Portable Appliance Tester**



- **10,000-record on-board memory**
- **Large 5.7 in. ¼ VGA backlit full color screen**
- **200 mA; 10 A and 25 A bond test with high duty cycle**
- **Selectable PASS/FAIL limits**
- **Works with standard barcode scanners**

### **DESCRIPTION**

Operators of electric tools and other electrical equipment must be protected from potentially dangerous flaws in workmanship or wear and tear. The PAT450 is designed to test portable electrical equipment for safe operation. The tests conform to the latest editions of European regulations and standards including VDE0701-0702 and the Code of Practice for the In-Service Inspection and Testing of Electrical Equipment in the UK.

The PAT450 has a memory capacity for storing up to 10,000 test results, and also 10 A and 25 A earth bond testing. The unit also includes 1.5 kV and 3 kV flash testing, ideal for tool rental outlets and service workshops where flash testing is routine. It has a high duty cycle, with the design tailored to fast testing, easy operation, and all-day use.

The PAT450 features a unique restart, so that when moving the tester from one room to another, it restarts instantly from the same menu where it was unplugged. This is a significant timesaver, allowing more tests per day.

USB communication provides convenient download to a standard USB memory stick. An on-board 10,000 record memory provides interruption-free testing for improved efficiency, with a large QWERTY keypad for fast data entry. The instrument is capable of working with standard barcode scanners and a thermal transfer barcode label printer operating directly from the USB port. Thermal transfer labels are highly resistant, stable and easily available.

Five soft-keys give direct access to frequently-used functions, accelerating navigation through menus and increasing productivity. Both standard and customer configurable test groups are available for fast, flexible asset testing.

Accessories supplied include a combined earth-bond and insulation test lead, an adapter for testing 120 V extension leads, a laptop power supply adapter, and a carry case for convenient product and lead storage. All instruments also include download manager software, to enable data to be converted into a CSV format which can be read directly on a PC using Microsoft® Excel.

### **TYPE OF TESTS**

#### **Earth Bond and Continuity Tests**

To verify the integrity of exposed metalwork on grounded (Class I) appliances. Test current of 25 A is passed via a remote probe, returning through the Ground pin of the power plug.

Test currents of 10 A and 25 A are available for bond testing. Where sensitive electronic equipment may be damaged by high currents, 200 mA is selectable.

#### **Insulation Test**

To check that equipment conductors are isolated from ground - 500 V dc; the live and neutral conductors are linked; and the test voltage is applied between this link and the ground pin. Where an appliance does not have an earth connection (Class II), the remote probe is used to contact anywhere on the external case of the equipment.

Where 500 V may damage sensitive equipment, the PAT450 provides alternative methods of verifying insulation integrity. A lower voltage of 250 V dc is selectable, or alternatives such as a touch current test or substitute leakage test can be performed.

**Touch Current Test**

This test powers the asset at the supply voltage as if it were in use. The current passing down the earth conductor is displayed. For Class II, the remote probe is used to contact any accessible conductive parts.

**Differential Leakage Test**

Similar to the touch current test, during operation the difference in current between the live and neutral conductor is measured.

**Substitute/Alternative Leakage Test**

This test is performed in the same method as the insulation test, i.e. between the earth conductor and linked live/neutral. For Class II, the remote probe is used to contact any accessible conductive parts of the asset.

An ac voltage (nominal 40 V at supply frequency) is applied and the leakage current measured. As this is at the same frequency as the supply, the impedance of any leakage path is the same as that when the asset is in operation.

**Functional Load Test**

Operational test to ensure that the asset works as it should. Supply voltage is applied to the asset when in use.

Simultaneously, the VA value is displayed as an additional check that the current drawn by the asset is as expected.

**Extension and IEC Power Cords**

Standard insulation and earth-bond tests are performed, with an additional polarity test, to ensure that the lead is wired correctly.

**Hi-pot/Flash Test**

Where the application requires a hi-pot/flash test, a high voltage is applied to any exposed conductive parts via a probe. The leakage current between the linked live/neutral conductors and the probe is monitored, and any electrical breakdown indicated. For Class I, the test voltage is 1.5 kV ac; for Class II it is 3 kV ac.

**FEATURES AND BENEFITS**

- Large 5.7" ¼ VGA backlit color screen for clear results
- 200mA; 10A and 25A bond test with high duty cycle for repetitive testing
- 250V and 500V insulation tests protect sensitive electronics
- Selectable PASS/FAIL limits provide instant indication of a faulty asset
- 120 V 60 Hz operation for industrial, commercial and residential applications
- Simplified menus for easy intuitive operation
- Instant restart for faster testing across multiple rooms
- Adjustable test times allow faster testing
- Tests for standard and anti-surge extension leads
- Operational test including VA display for a complete testing range

**APPLICATIONS**

While the USA does not have the level of regulation found in the UK, we are far more litigious. Implementing a regular inspection program that includes PAT testing of electrical equipment and appliances will help protect personnel from shock hazards, facilities from electrically induced fires and businesses from litigation. For businesses that manufacture and ship electrical products to the European Union, PAT testing at the factory will ensure that products shipped will pass import testing and not become a costly problem.

Ideal for portable appliance testing in locations like service workshops, hotels, schools, hospitals, prisons, long term care facilities, construction sites, offices, restaurants and sport facilities, the PAT450 can store up to 10,000 test results. It features 10 A and 25 A bond tests with high duty-cycle designed for fast testing, easy operation and all-day use. The PAT's 250 V and 500 V insulation tests protect sensitive electronics.

## SPECIFICATIONS

### Electrical supply range

120 V  $\pm$  10%

### Bond test (10 A and 25 A)

Open circuit voltage: 9 V a.c.  $\pm$  10%  $\pm$  0.1 V  
(Supply: 120 V 60 Hz)

Earth bond resistance accuracy:  $\pm$ 5%  $\pm$ 3 digits (0 to 0.49  $\Omega$ )  
 $\pm$ 5%  $\pm$ 5 digits (0.5 to .99  $\Omega$ )

Earth bond resistance resolution: 10 m $\Omega$  (0 to 1.99  $\Omega$ )

Display range: 0 to 1.99  $\Omega$

### Continuity test (200 mA)

Continuity test voltage: 4.0 V d.c. -0% +10%

Continuity resistance accuracy:  $\pm$ 5%  $\pm$ 3 digits (0 to 0.49  $\Omega$ )  
 $\pm$ 5%  $\pm$ 5 digits (0.5 to .99  $\Omega$ )

Continuity resistance resolution: 10 m $\Omega$  (1 to 19.99  $\Omega$ )

Display range: 0 to 19.99  $\Omega$

### Insulation resistance test (250 V and 500 V)

Accuracy (120 V):  $\pm$ 2%  $\pm$ 5 digits (0 to 19.99 M $\Omega$ )  
 $\pm$ 5%  $\pm$ 10 digits (20 to 99.99 M $\Omega$ )

Resolution: 0.01 M $\Omega$

Display range: 0 to 99.99 M $\Omega$

### Substitute leakage test

Test voltage and frequency: 40 V ac  $\pm$ 10% nominal mains frequency

Leakage current accuracy:  $\pm$ 5%  $\pm$ 5 digits

Leakage current resolution: 0.01 mA

Display range: 0 to 19.99 mA

### Differential leakage current

Test voltage and frequency: Nominal mains supply

Accuracy:  $\pm$ 5%  $\pm$ 5 digits

Resolution: 0.01 mA

Display range: 0 to 19.99 mA

### Touch current test

Test voltage and frequency: Nominal mains supply

Accuracy:  $\pm$ 5%  $\pm$ 5 digits

Resolution: 0.01 mA

Display range: 0 to 10 mA

### Operational test

Test voltage and frequency: Nominal mains supply

VA rating: 110 V 1800 VA

VA accuracy:  $\pm$ 5%  $\pm$ 10 digits (0 - 99 VA)  
 $\pm$ 5%  $\pm$ 50 digits (100 VA - 999 VA)  
 $\pm$ 5%  $\pm$ 100 digits (1000 VA - 1800 VA)

Resolution: 1 VA (0 to 1800 VA)

Display range: 0 to 1800 VA

### Extension lead test

Tests performed: Bond, insulation and polarity

Polarity test voltage: 12 V

Polarity checks: Lead OK

Live neutral S/C  
Live neutral reversed  
Live/neutral O/C

### Hi-pot/Flash test

Voltage: 1500 V ac. nominal for Class 1  
3000 V ac nominal for Class 2

Current: <3.5 mA short circuit @ 253 V primary supply voltage

Breakdown current accuracy:  $\pm$ 5%  $\pm$ 5 digits

Breakdown current resolution: 0.01 mA

Display range: 0 to 3.0 mA

### Fuse test

Test voltage: 3.3 V

Warning: Audible beep if fuse is OK

### Environmental

Operating temperature: -10 to +50  $^{\circ}$ C (+14  $^{\circ}$ F to +122  $^{\circ}$ F)

Storage temperature: -20 to +60  $^{\circ}$ C (-4  $^{\circ}$ F to +140  $^{\circ}$ F)

Humidity: 90% RH @ -10 to +30  $^{\circ}$ C  
(14  $^{\circ}$ F to 86  $^{\circ}$ F)  
75% RH @ +30 to +50  $^{\circ}$ C  
(86  $^{\circ}$ F to 122  $^{\circ}$ F)

Maximum altitude: 2000 m

Ingress protection: IP40

### Weight

5.0 kg (11 lb)

### Dimensions

Instrument: 180 (H) x 255 (W) x 320 (L) mm  
7 (H) x 10 (W) x 12.5 (L) in.

Packaging: 210 (H) x 280 (W) x 390 (L) mm  
8.2 (H) x 11 (W) x 15.3 (L) in.

### Safety

IEC 61010-1: CAT II 300 V

### EMC

IEC 61326-1: 2006  
IEC 61326-2-2: 2005

### ORDERING INFORMATION

Item	Cat. No.	Item	Cat. No.
PAT450-US	1000-956	<b>Optional Accessories</b>	
<b>Included Accessories</b>		Appliance bar-code labels (1-1000)	6121-483
Printed quick start guide		Roll of 1000 FAIL test labels	1001-227
Full user guide on CD		Roll of 1000 PASS test labels	1000-971
Calibration Certificate		PAT accessory pouch	2001-044
Continuity / earth bond lead + probe (black)	2000-870	PAT test certificate book	1001-299
Extension lead adapter	2001-290	Screen protector (2)	1002-572
Flash lead 3.0 KV 3.5 mA (red)	5310-401		
Carry case with lead/document pouch	2000-962	NOTE: The PAT450 will work with a Brother™ P-touch® printer, 2430PC.	
Plug adapter IEC C6 - C13 (3 way 5 A PSU)	2000-551		
Screen protector			