PAT320
Portable Appliance Tester



- **Simple manual or automatic testing**
- **120 V 60 Hz operation**
- **User-selectable PASS/FAIL limits**
- **Fast test times selectable from 1 s**
- **Ground bond testing at 25 A, 10 A and 200 mA**
- **Differential, touch and substitute ground leakage testing**
- **Tests power cords**
- **Full color QVGA display**

DESCRIPTION

The PAT320 is a portable bench-top appliance tester for testing the safety of electrical equipment by performing a ground bond test, an insulation test, specific ground leakage tests and operational VA tests to international standards. It is a fully featured tester designed for customers who do not need the complexity of a fully configurable database of clients and results within the tester but require a complete range of functions to allow automatic or manual testing of the widest range of electrical equipment.

Simple push-button operation makes the PAT320 fast and intuitive to use. All regulatory test requirements are supported: Class I (grounded) and Class II (non-grounded) equipment, IEC power cords and extension leads. An automatic mode is available for Class I and Class II testing. In automatic mode, the tests proceed sequentially through bond, insulation and operation (VA), indicating a pass or fail at each test. If a fail occurs, testing is stopped. When manual testing, each test is preceded by a selection screen where the test parameters are chosen, such as bond test current, insulation test voltage or leakage test type. These diagnostic buttons provide direct access to any test individually, allowing single tests to be performed following repair or a suspect result.

APPLICATIONS

The PAT320 is used on the production line for final verification of electrical safety prior to general sale, or export to the EU. When exporting to Europe, it is the European importer's responsibility to ensure imported items are safe to European standards. However, any testing performed at the destination can prove very costly for the US manufacturer when faults are found.

Testing at the manufacturing plant ensures electrical safety and provides the opportunity to fix faults and problems prior to shipping and export. For example, a poor ground connection would not normally be picked up during operational testing, and the PAT320 provides an excellent means of simple safety verification.
The PAT320 is also suitable for use in the repair shop. Equipment can be checked on receipt in the shop before the technician powers it up, so ensuring he remains safe – the equipment could be in repair for any reason. Additionally, it can (and perhaps should) be checked prior to despatch to make sure the ground bond remains good, and the phase connections remain isolated from the chassis following repair. This maintains full integrity of the repaired item before the customer receives it back.



FEATURES AND BENEFITS

- Simple push-button operation allows for direct access to tests via the keypad; no hidden menu functions.
- User selectable PASS/FAIL limits quickens test and simplifies results.
- Fast test times selectable from 1 second
- Combined bond and insulation lead thus reducing test time.
- High and low current bond testing (25 A, 10 A and 200 mA) is selectable either by default or individually per test
- Instant restart minimizes boot-up time when moving locations.
- Individual test mode keys allows for performance of any test by itself.
- Efficient bond transformer with heat dissipation increases productivity without overheating under heavy use.
- Test lead null enables the use of extended test leads without affecting the pass/fail limits or manually accounting for the added lead resistance.

TYPE OF TESTS

Earth Bond and Continuity Tests

To verify the integrity of exposed metalwork on grounded appliance (Class I). 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 equipment conductors are isolated from Earth - 500 V dc. The live and neutral conductors are linked, and the test voltage is applied between this link and the earth 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 PAT320 provides alternative methods of verifying insulation integrity. A lower voltage of 250 V dc is selectable, or alternatives such as a Touch-Current 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.

A 50 Hz a.c. voltage (nominal 40 V) is applied and the leakage current measured. As this is at 50 Hz, 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 as 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 Leads

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

SPECIFICATIONS

Electrical supply range
120 V a.c. ±10%

Supply measurement
Voltage: ±2% ±1 V
Frequency: ±1% ± 0.1 Hz

Bond test
Open circuit voltage: 9 V a.c. ± 10% ± 0.1 V
10 A bond test current: 10 A rms ±25% ± 0.5 A into 0.1 Ω
25 A bond test current: 25 A rms ± 20% ± 0.5 A into 0.1 Ω
Earth bond resistance accuracy: ±5% ±3 digits (0 to 0.49 Ω)
±5% ±5 digits 0.5 to 1.99 Ω)
Earth bond resistance resolution: 10 mΩ (0 to 1.99 Ω)
Display range: 0 to 1.99 Ω
Bond test nulling: Up to 1.00 Ω
Adjustable test duration: User selectable from 1 sec to 20 sec

Continuity test
Note: The continuity test is a DC test performed automatically in both positive and negative directions. The average of the two results is shown.
Continuity test voltage: 4.0 V d.c. -0% +10% (open circuit)
Continuity test current: 200 mA -0% +10% ±5 mA
(into 2 Ω load)
Continuity resistance accuracy: ±5% ±3 digits (0 to 0.49 Ω)
±5% ±5 digits 0.5 to 19.99 Ω)
Continuity resistance resolution: 10 mΩ (1 to 19.99 Ω)
Display range: 0 to 19.99 Ω
Continuity test nulling: up to 9.99 Ω
Test duration: User selectable from 1 sec to 20 sec

Insulation test
Insulation test voltage: 250 V d.c. –0%/+25% open circuit
500 V d.c. –0%/+25% open circuit
(500 V d.c. across 0.5 MΩ)
Insulation resistance accuracy: ±2% ±5 digits (0 to 19.99 MΩ)
±5% ±10 digits (20 to 99.99 MΩ)
Insulation resistance resolution: 0.01 MΩ (0.10 to 99.99 MΩ)
Display range: 0 to 99.99 MΩ
Test duration: User selectable from 1 sec to 1 minute

Substitute leakage test
Test voltage: 40 V a.c. ±10%
Test frequency: Nominal mains 50/60 Hz
Leakage current accuracy: ±5% ±5 digits
Leakage current resolution: 0.01 mA
Display range: 0 to 19.99 mA
Test duration: User selectable from 1 sec to 1 minute
Reading corrected to 120 V + 10% a.c.

Differential leakage current
Test voltage: Nominal mains 120 V a.c.
Test frequency: Nominal mains 60 Hz
Accuracy: ±5% ±5 digits
Resolution: 0.01 mA
Display range: 0 to 19.99 mA
Reading corrected to 120 V +10% a.c.

Touch current test
Test voltage: Nominal mains 120 V a.c.
Test frequency: Nominal mains 60 Hz
Touch current accuracy: ±5% ±5 digits
Touch current resolution: 0.01 mA
Display range: 0 to 10 mA
Test duration: User selectable from 1 sec to 5 sec
Reading corrected to 120 V + 10% a.c.

Operational test
Test voltage: Nominal mains 120 V a.c.
Accuracy: ±5% ±10 digits (0 to 99 VA)
±5% ±50 digits (100 VA - 999 VA)
±5% ±100 digits (1000 VA - 1800 VA)
Resolution: 1 VA (0 to 1800 VA)
Display range: 0 to 3.99 KVA
Reading corrected to 120 V a.c. Results show load VA

Extension lead test
Test includes insulation and bond tests.
Polarity test voltage: 12 V
Polarity: Lead OK
Live neutral S/C
Live neutral reversed
Live/neutral O/C

Fuse test
Test voltage: 3.3 V
Warning: Audible beep if fuse is OK

Safety
Meets the requirements of IEC 61010-1: 2001
Test leads meet the requirements of IEC 61010-031: 2002
Creepage and clearances for 300 V to Earth Category II

Environmental
Operating temperature: 50° to 122° F (10° to 50° C)
Storage Temperature: -4° to +140° F (-20° to +60° C)
Humidity: 90% RH @ 14° to 86° F (-10° to +30° C)
75% RH @ 86° to 122° F(+30° to +50° C)

Weight
10 lb (4.5 kg)

Dimensions
Instrument only: 7 in. H x 13 in. D x 10 in. W
(175 mm H x 320 mm D x 250 mm W)
With case: 7.5 in. W x 16 in. D x 11 in. W
(190 mm H x 400 mm D x 290 mm W)

Megger

ORDERING INFORMATION

Item	Cat. No.
PAT320-US	1001-366
Included accessories	
Continuity/earth bond lead	2000-870
Storage/carry case w/ lead and document pouch	2000-962
Extension lead adaptor (ELA) 120V US	2001-290

Item	Cat. No.
Optional accessories	
Plug adaptor IEC C6 - C13 (3way 5A PSU)	2000-551
Roll of 1000 PASS test labels	1000-971
Roll of 1000 FAIL test labels	1001-227
PAT accessory pouch (attaches to side of case)	2001-044

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