

5.5 AUTO - carrying out an automatic test sequence

The AUTO function allows you to carry out test sequences that have been pre-programmed in SmartPAT's memory. SmartPAT has 6 factory set auto test sequences suitable for carrying out the majority of tests for various portable appliances. The user can also program new test sequences (see section 5.8).

	PASS / FAIL POINT	PASS / FAIL POINT
101 - class 1 appliances Visual check 26A earth bond test P-N Fuse continuity test Insulation test	0.10 ohm 39 k ohms appx. 2 Mohms	Load test Earth leakage test 3.2 k VA 1.0 mA
102 - class 1 appliances Visual check 26A earth bond test P-N Fuse continuity test Insulation test	0.10 ohm 39 k ohms appx. 2 Mohms	Flash test Load test Earth leakage test 1.0 mA 3.2 k VA 1.0 mA
103 - class 1 appliances Visual check 100mA earth bond test P-N Fuse continuity test Insulation test	0.10 ohm 39 k ohms appx. 2 Mohms	Load test Earth leakage test 3.2 k VA 1.0 mA
201 - class 2 appliances Visual check P-N Fuse continuity test Insulation test	39 k ohms appx. 7 Mohms	Load test Earth leakage test 3.2 k VA 1.0 mA
202 - class 2 appliances Visual check P-N Fuse continuity test Insulation test Flash test	39 k ohms appx. 7 Mohms 1.0 mA	Load test Earth leakage test 3.2 k VA 1.0 mA
301 - IEC Lead Test Visual check 26A earth bond test P-N Fuse continuity test Insulation test	0.10 ohm 39 k ohms appx. 7 Mohms	

For your convenience the above automatic test sequences are repeated in the lid of SmartPAT and can be accessed by either entering them manually or automatically using the SmartWand barcode or SP Scan 10 readers.

Carrying out an automatic test sequence

From the main menu press the AUTO key

SmartPAT display

Enter appliance number.....

Enter the appliance number and press the YES key

SmartPAT display

Enter test code

Enter the required AUTO code and press the YES key - you must enter either a factory set test code or a custom test code previously loaded. See section 5.8.

SmartPAT will then ask you to verify that the information entered is correct, press YES if you wish to continue (to amend the details if they appear incorrect press NO, this will return you to the first screen).

SmartPAT will automatically begin the test sequence selected.

SmartPAT display

Visual check. Plug O.K

You must respond Yes or NO

SmartPAT display

Visual check. Lead O.K

Press YES or NO

SmartPAT will then continue to guide you through each test. Before SmartPAT begins the load test, a warning will appear and the GO key will need to be pressed before it applies power to the appliance under test. The appliance will be energised and will therefore operate - be careful. This warning will also appear during the flash test as high test voltages are present (3000V a.c. or 15000V a.c. depending on the test selected).

After the test sequence is complete you can select SmartPAT to store the test results. SmartPAT can store upto 999 test results in its memory

SmartPAT display

Store test results

Press YES to store data

SmartPAT display

Enter note if req

At this point SmartPAT will allow you to record a note against the appliance tested. Enter note or leave blank then press YES to continue. SmartPAT will store the results and indicate the amount of memory left. Press YES to move back to the first display and to continue with the next appliance.

Should the appliance fail any of the tests SmartPAT will ask you whether you wish to repeat the test, press NO if you do not wish to repeat the test. After failing a test SmartPAT will skip the remaining tests and take you to the end of the test sequence and ask whether you wish to store the result.

If at any point you wish to abort the test press ESC or RESET (red key).

On completion of testing, press the RESET KEY to return to the main menu.

5.6 RESULT - displaying and downloading results

The result function allows you to review a set of results in 1 of 3 ways:

- Display - this will allow you to review selected test results on the LCD.
- Print - using Robin's mini printer this function can be used to generate printed test results.
- Download - selected records can be downloaded to Robin's PATest 5000 data management software.

- Display, press the RESULT key from the main menu

SmartPAT display

Display stored records

Press the YES key

SmartPAT display

Enter the appliance number

If you wish to display the results record for one appliance only,* key in the appliance number and press the YES key, SmartPAT will display the record number and site name, if this is the correct appliance, press YES to continue.

*To view more than 1 record press the NO key at the point where SmartPAT requests you enter the appliance number.

SmartPAT display

Start at record ...1

Enter the 1st record you wish to view and press YES

SmartPAT display

End at record .10

Enter the last record you wish to view and press YES The display will prompt you with the first and last record.

5.2 Power Up

Using the mains input lead connect SmartPAT to either a 110V or 240Va.c. supply*. On power up SmartPAT will go through a self check procedure and automatically calibrate itself to the input voltage.

Following the self check procedure SmartPAT will display the main menu

Main menu

Select a FUNCTION or use the HELP key

To return to the main menu at any point during the operation press RESET.

From the main menu it is possible to select 1 of 6 functions

DATE	SITE
RESULT	PROG
AUTO	MAN

*110V to 240V a.c. Adaptor available from Robin Cat. No. AD110V.

5.3 DATE - setting the date

This function will allow the user to program the date and must be selected at the start of each new day. Once set, all results stored in SmartPAT's memory will be recorded against the set date.

To set, press DATE key:

SmartPAT display

ENTER DATE dd/mm/yy

Enter the date in the format requested. Press the yes key to continue.

Note: You must set the correct date every day, as the date does not increment itself.

5.4 SITE - entering the site name

This function allocates the site name to which all test results are assigned. This data must be set prior to testing on a new site. If no new site is set, then all subsequent results will be stored in the last site entered - note it is not possible to change the site name for results that have been previously stored. It is the responsibility of the person conducting tests to ensure the correct site reference has been entered if results are to be stored correctly.

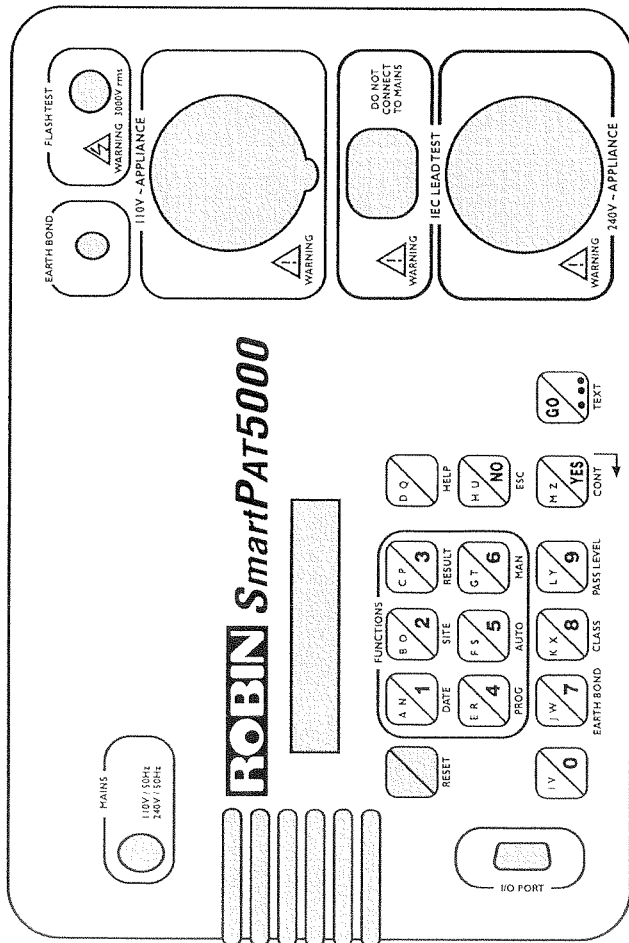
To set, press the SITE key:

SmartPAT display

Enter site ref

Enter the site reference number. This can also be entered using the barcode wand. Press the yes key to continue.

5.0 How to use SmartPAT



5.1 Using the Alpha Numeric Keypad

All of the SmartPAT's controls and functions are accessed by using the alpha numeric keypad. Test codes and appliance numbers can be made up from any combination of letters and numbers to a maximum of 10 characters.

To enter the required letter press the GO key once for red letters or twice for yellow letters then the letter. This sequence must be followed for each letter entered. For number entry simply press the number.

Alternatively a bar code wand or scanner can scan these details via a bar code label.

SmartPAT display

Press GO to start

SmartPAT will display the test number and the date performed. Press YES repeatedly to scroll through the recorded data. When the end of the data is reached SmartPAT will return to the [Display stored data] message. From this point you can repeat this procedure to review more results. If you have finished reviewing the results press RESET to return to the main menu.

ii) To Print, press the result key from the main menu.

Connect your printer to the I/O port of the SmartPAT (make sure your printer is ON LINE).

SmartPAT display

Display stored records

Press the NO key

SmartPAT display

Print stored records

Press the YES key

SmartPAT display

Enter the appliance number

Key in the appliance number *and press the YES key. SmartPAT will display the record number and site name, press YES continue.

*To print more than 1 record press the NO key at the point where SmartPAT requests you enter the appliance number.

SmartPAT display

Start at record ...1

Enter the 1st record you wish to print and press YES

SmartPAT display

End at record ..10

Enter the last record you wish to print and press YES

SmartPAT display

Press GO to start

When the end of the data is reached SmartPAT will return to the [Print stored data] message. From this point you can repeat this procedure to print more results. If you have finished printing the results press RESET to return to the main menu.

iii) To Download, press the RESULT key from the main menu.

SmartPAT display

Display stored records

Press the NO key

SmartPAT display

Print stored records

Press the NO key

SmartPAT display

Download records to computer

Press the YES key

SmartPAT will ask you whether you are using Robin's PATEST 5000 software. Press YES or NO to continue. SmartPAT will then ask you for the rate of data transfer. If you press NO SmartPAT will assume you are downloading to Safety 1st software.

SmartPAT display

Slow speed data transfer?

Press YES for 1200 baud or NO for 9600 baud. (1200 = slow speed, 9600 = fast speed)

SmartPAT display

Enter the appliance number

Key in the appliance number* and press the YES key. SmartPAT will display the record number and site name, press YES continue.

*To download more than 1 record press the NO key at the point where SmartPAT requests you enter the appliance number.

SmartPAT display

Start of record ...1

Enter the 1st record you wish to download and press YES

SmartPAT display

End of record ...10

Enter the last record you wish to download and press YES

SmartPAT display

Press GO to start

Connect your computer to the I/O port of the SmartPAT and press GO after first following your software instructions to set it up to receive data from the SmartPAT. When the end of the data is reached SmartPAT will return to the [Download stored data] message. From this point you can repeat this procedure to download more results. If you have finished downloading the results press RESET to return to the main menu. Do not clear the stored records in your SmartPAT until the downloaded data has been checked first.

5.7 MAN - manual test mode

For the vast majority of testing the manual function need not be used. The manual function allows you to carry out any test in any order and is designed for applications where the sequence of tests continually changes, or where one particular test must be repeated several times in a row.

4.0 Available Tests

P-N Fuse Continuity

SmartPAT 5000 will verify the fuse and lead continuity by applying a low voltage signal across the appliances phase and neutral pins. The pass/fail point is set at approximately 39kOhm. This test must be conducted with the appliance switch in the ON position. Appliances with a phase-neutral resistance above this value may fail this test although they are not faulty. Such appliances include those with electronically controlled on/off switches (e.g. some types of drill), appliances with an inductance (since the test is conducted with a low ac voltage) and low power soldering irons. For these appliances the fuse test is not appropriate and should be omitted. The fuse continuity may be checked by powering the appliance up during a run test.

Note: The purpose of the fuse test is to check that the fuse is not blown or phase/neutral conductors are not open circuit as this may not be evident from a visual inspection.

Insulation

The insulation test will establish the value of the appliance's insulation. The insulation test is conducted at 500V d.c. which is applied between the appliance's earth pin and phase & neutral pins for class I appliances and between PN and earth clip for class II.

Selectable pass levels

0.2, 0.5, 1, 2, 3, 4, 5, 6 and 7M ohms

Flash Test

The soundness of insulation can be verified by applying a high voltage - 3kV for class II appliances - between the outer casing and the P+N Pins of the appliance. For class I appliances voltage is applied between P+N and E at the socket and is set at 1.5 kV.

Pass level

1, 2 or 3mA

Run/Leakage Test (also called a load test)

During the run/leakage test full mains voltage is applied for a short period to determine the kVA rating of the appliance is within its specification. SmartPAT will then further test the insulation by measuring the earth leakage current. This test is carried out to test for insulation faults which may not have been apparent during passive testing.

During a run test before full mains voltage is applied a pretest is conducted at low ac voltage to determine whether an excess current will flow if full mains is applied. This is a safety check. However, some appliances with an inductance (e.g. large motor vacuum cleaners) may fail the pretest because the pretest voltage sees a low phase-neutral impedance. If you are sure the appliance powers up okay then under these conditions you may bypass the pretest - IF IN DOUBT DO NOT BYPASS THE PRETEST.

Note: It is not recommended that the run/leakage test is performed on computers. This is because the SmartPAT performs the test for a 10 second period which will not be sufficient time for a computer to fully boot up.

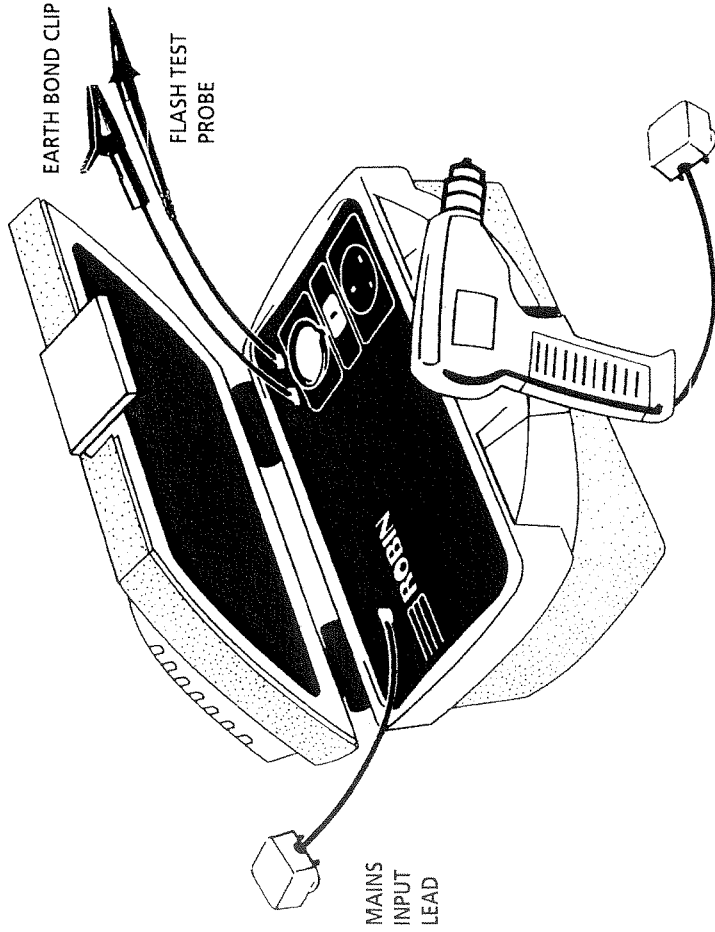
Pass level - Run test

0.5, 1, 1.5, 1.8, 2.0, 2.5, 3.2 or 3.4kVA

Pass level - Leakage test

0.3, 0.8, 1, 2, 3 or 9mA

4.0 Available Tests



Listed are the full range of tests which your SmartPAT is capable of undertaking.

Visual

The visual check will determine whether the appliance is of a sound construction and not obviously physically damaged. The SmartPAT 5000 will prompt the user to check critical areas of the appliance's construction - its case, cable and plug.

Earth Bond Test

The earth bond test will verify that the earth's point of connection to the appliance's chassis is sound. The test can be performed at 100mA, 8A or 26A depending on the type of equipment under test - e.g. 100mA for business equipment.

During the test SmartPAT 5000 applies a low voltage signal between the earth pin and the chassis of the appliance.

Selectable pass levels

0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 2 ohms

This function should only be used by competent persons who are familiar with the requirements of the type of tests suitable for portable appliances.



WARNING

It is potentially hazardous for both user and appliance should the wrong type of tests be undertaken or if testing is carried out in an incorrect sequence.

Carrying out a manual test

Connect the appliance to the relevant socket on SmartPAT's front panel. From the main menu press the MAN key.

SmartPAT display

Earth bond (1) 26A Pass if <0.10hm

Press the EARTH BOND key to change the test current and press the PASS LEVEL key to change the pass level. Press the YES key to carry out the test and follow the on-screen instructions to complete the test. After completing the test press the NO key to move onto the next test.

If you do not wish to carry out the test, press the NO key to continue to the next test.

SmartPAT display

Fuse Test

Press the YES key to carry out the test and follow the on-screen instructions to complete the test. After completing the test press the NO key to move onto the next test.

If you do not wish to carry out the test, press the NO key to continue to the next test.

SmartPAT display

Insulation (1) CI Pass if >3MOhm

Press the CLASS key to change the appliance insulation type and press the PASS LEVEL key to change the pass level. Press the YES key to carry out the test and follow the on-screen instructions to complete the test. After completing the test press the NO key to move onto the next test.

If you do not wish to carry out the test, press the NO key to continue.

SmartPAT display

Flash (1) CI Pass if <3mA

Press the CLASS key to change the appliance insulation type and press the PASS LEVEL key to change the pass level. Press the YES key to carry out the test and follow the on-screen instructions to complete the test. After completing the test press the NO key to move onto the next test.

If you do not wish to carry out the test, press the NO key to continue to the next test.

SmartPAT display

Run/Leakage (1) Pass if < 3.2kVA/3mA

Press the PASS LEVEL key to change the power pass level. Press the YES key to display leakage current, press the PASS LEVEL key to alter the value. To begin the test press the YES key and follow the on-screen instructions to complete the test. After completing the test press the NO key to move onto the next test.

If you do not wish to carry out the test, press the NO key to continue to the next test.

SmartPAT display

Store test results

Press YES to store results. The SmartPAT will store only the last result taken for each manual test.

SmartPAT display

Enter note if req.....

At this point SmartPAT will allow you to record a note against the appliance tested. Enter note or leave blank then press YES to continue. SmartPAT will store the results and indicate the amount of memory left. ALWAYS press YES to move back to the first display and to continue with the next appliance.



WARNING
In the manual mode, if an appliance fails any of the tests SmartPAT will allow you to continue to carry out further tests. Robin advise all users that in the event of an appliance failing a test, corrective action should be taken before proceeding with further tests.

5.8 PROG - programming mode

This powerful function allows you to program an automatic test sequence. Once programmed the new custom test sequence can be recalled in the same way as other SmartPAT auto test sequences via the AUTO function.

The PROG function is protected by a user access code to prevent unauthorised changes.



WARNING
This function should only be used by competent persons who are familiar with the requirements of the type of tests suitable for portable appliances.

Programming or modifying an automatic test sequence

Press the PROG key from the main menu. The programme mode allows you to erase programmed test sequences, change the user access code, printout test sequences and programme new test sequences. If you answer "NO" to the screen messages you can scroll through the main headings for these tests. To programme a test sequence the procedure below should be followed.

SmartPAT display

Display/Modify/Set Test

Press YES if you wish to modify an existing test sequence, otherwise press NO.

3.3 Help Facility

A dedicated help facility is provided for the users convenience. At any given point the help function can be selected by pressing the help button. The help message will inform the user of the options available at the point when help was selected. To view the complete message, the enter button should be repeatedly pressed until the message 'end of help' is displayed. To exit help at any point press the ESC button.

3.4 Bar Code Reader (optional)

The optional bar code reader 'SmartWand' (pen type) or a wide head type scanner model SP Scan 10 simply connects to the serial port and can be used to read Robin portable appliance bar codes. The bar codes can automatically inform SmartPAT 5000 of the appliance number, and the automatic test sequence to be performed.

3.5 Software (optional)

SmartPAT 5000 will download directly to a PC that has been pre-loaded with Robin's PATest 5000 data management software. PATest 5000 has been designed for users who are carrying out large volumes of testing.

PATest 5000 features include

- Automatic test recall
- Full test certificate printout facility
- Customer invoicing
- Multiple site facility
- Test result printouts

SmartPAT 5000 can also be used in conjunction with the Safety 1st or Safety 1st Plus software available from Shire Systems.

3.6 Printer (optional)

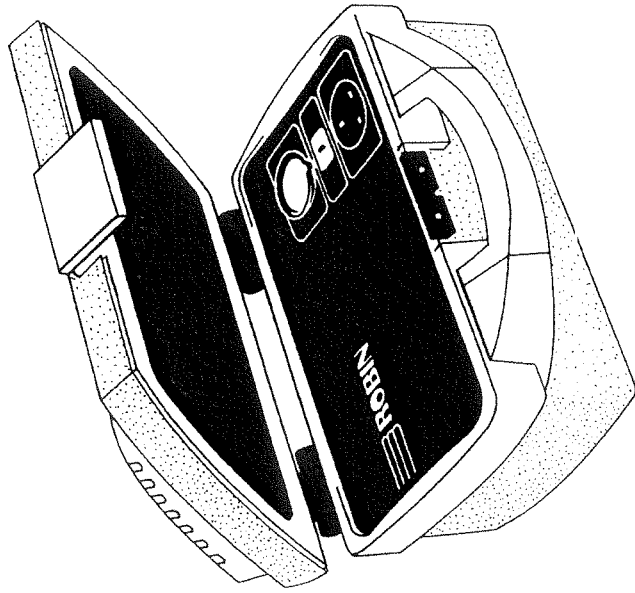
Stored results can be downloaded directly to Robin's mini printer model SP212 FD or other compatible serial printers via SmartPAT's serial interface. This can give an instant printout of test results and work carried out.

3.7 Labels (optional)

A comprehensive range of appliance labels are available from Robin for use in conjunction with the SmartPAT 5000.

- Product code labels. Barcode type numbered 0-1000. Cat No. APP1000
- Product code labels. Barcode type numbered 1001-2000. Cat No. APP2000
- Test code labels. Cat No. Auto 200
- Pass labels (pack of 500) Cat. No. Pass 500
- Pass labels (pack of 250) designed for fixing to flexible cords. Cat No. Pass 250
- Fail labels (pack of 100) Cat. No. Fail 100

3.0 Features



3.1 Alpha Numeric Keypad

SmartPAT 5000 is equipped with a user friendly alpha numeric keypad. The keypad is used to access the SmartPAT's functions and test sequences.

3.2 Dual Voltage Operation

The SmartPAT 5000 will accept either a 110V or 240V 50Hz mains input.

Note: The SmartPAT 5000 will conduct a runleakage test at the power up mains voltage. Therefore, to perform a run test on a 110V appliance (e.g. 110V drills) the SmartPAT 5000 must be powered up from a 110V mains supply (or centre tapped transformer). All other tests may be performed at either power up mains voltage (i.e. only run (also called the load test) test is affected).

When powered up from 240V, only the 240V socket is energised at 240V during the run test. When powered up from 110V only the 110V socket is energised at 110V during the run test.



Ensure that the correct voltage source and socket are being used before carrying out a run test to avoid possibility of damage to the appliance.

WARNING

SmartPAT display

Press YES to load test type.

SmartPAT display

Enter any existing test type using the keypad or barcode scanner.

Press YES to continue

SmartPAT display

Press YES to continue

SmartPAT display

Press the No. 7 key to switch the test on (1) or off (5) then press YES to continue

SmartPAT display

Earth bond (1) 26A Pass if <0.10hm

Press the No. 7 key to switch the test on or off, press the EARTH BOND key to change the test current and press the PASS LEVEL key to change the pass level. Press the YES key to continue.
(1) = YES 1 test (5) = SKIP TEST (3) = YES 3 tests

SmartPAT display

Press the No. 7 key to switch the test on (1) or off (5) then press YES to continue

SmartPAT display

Insulation (1) CI Pass if >3MOhm

Press the No. 7 key to switch the test on or off, press the CLASS key to change the appliance insulation type and press the PASS LEVEL key to change the pass level. Press the YES key to continue.

SmartPAT display

Flash (1) CI Pass if <3mA

Press the No. 7 key to switch the test on or off, press the CLASS key to change the appliance class type and press the PASS LEVEL key to change the leakage current pass level. Press the YES key to continue.

SmartPAT display

Run/Leakage (1) CI Pass if<3.2kVA/3 mA

Press the No. 7 key to switch the test on or off, press the EARTH BOND key to change the leakage pass level and press the PASS LEVEL key to change the load value. Press the YES key to continue.

SmartPAT display

Store test?

Press YES to store test.

SmartPAT display

Enter access code.....

Enter access code and press YES to continue. The access code is factory set at 0000.

SmartPAT display

Enter type for test

Enter required test code and press YES to continue. If you enter an existing test type it will be erased and replaced by the test you have just set up, be careful!

SmartPAT display

Stored test type

Press yes to store test code.

SmartPAT will return you to the 1st screen for further programming. Alternatively press the RESET key to return to the main menu.

Reviewing a test sequence

The program mode can be used for reviewing the contents of an automatic test sequence. Following the programming sequence, enter the test code you wish to review at the point where SmartPAT requests [Enter type to load]. Continue to scroll through the tests - as described in the programming mode - to the end when SmartPAT will ask you whether you wish to store the results, at which point press the NO key.

Erasing a test sequence

To erase a test sequence press the PROG key from the main menu and press NO.

SmartPAT display

ERASE test?

Press YES to erase test sequence

SmartPAT display

Enter test type.....

Enter the test number you wish to delete, using the keypad or bar code scanner.

SmartPAT display

Enter access code

Enter access code and press GO to complete the procedure - the test will not be erased until the access code is entered. Press the RESET button to return to the main menu.

Setting the access code

You should change the factory set access code (0000) to prevent unauthorised personnel changing programmed values. Keep a safe record of your personal access code. From the main menu press the PROG key. Press the NO key repeatedly until the 'change access code' message is displayed. Enter the new code and press YES to continue. SmartPAT will ask you to enter the existing code to complete the change code sequence.

1.0 Introduction

Under the 1989 Electricity at Work Regulations employers are required to maintain the portable appliances in use on their premises. Your SmartPAT 5000 portable appliance tester - to be referred to as SmartPAT throughout this manual - has been designed to help you carry out and record all the necessary tests.

SmartPAT is a dual voltage instrument which will self calibrate itself to either 240V or 110V a.c 50HZ.

SmartPAT has a number of unique features including the ability to be programmed to recognise any 10 digit barcode. Microprocessor driven, SmartPAT has the capacity to store up to 999 test results in its on-board memory which can be later downloaded to PATest 5000 data management software. It is also compatible with Safety 1st and Safety 1st Plus software from Shire Systems Ltd.

2.0 Safety

SmartPAT has been designed to the requirements of the IEC publication 1010, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory use.

This manual contains information and warnings which must be heeded to ensure user safety during operation. It is therefore important that this manual is read before proceeding with any tests.

SmartPAT 5000 carries out a number of electrical tests which could be potentially hazardous to the user. These tests must be performed by suitably trained personnel.

To ensure repeatable accuracy, your SmartPAT should be returned to Robin on a regular basis for calibration. If the SmartPAT behaves abnormally (e.g. faulty display) do not use and contact Robin Electronics for servicing.

This instrument should be operated strictly in accordance with the instructions supplied. Robin Electronics Limited shall not be held responsible for any losses as a result of misuse in the course of operation.

Robin Electronics Limited runs regular training courses covering all aspects of Portable Appliance Testing. Please contact Robin for further information.



WARNING • There are no serviceable parts contained within SmartPAT and under no circumstances should you attempt any repair or modification.

- Do not touch the appliance whilst carrying out insulation or flash tests.
- Ensure the earth clip is securely connected to the appliance during the earth bond test.
- Ensure the appliance is suitably positioned during the load test when the appliance will be energised. For example drills will operate during load/leakage tests.
- If in any doubt regarding the tests requirements for the appliance always refer back to the manufacturer of the appliance under inspection/test.
- To ensure continued correct operation, the SmartPAT 5000 should be periodically calibrated.
- For flash test, use only the flash probe provided.
- Always download results stored in the SmartPAT memory on a daily basis to your printer or your software. The downloaded results should be checked before clearing the SmartPAT memory. If downloading to software a printout of the downloaded results should be provided for reference before reviewing the results.
- Do not connect SmartPat to the mains supply via the IEC lead connection.

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5.9 IEC Lead Test

The IEC lead test is a pre-programmed automatic test sequence.

To test, plug the IEC leads male and female connectors into the plug and socket arrangement on SmartPAT's front panel. From the main menu press the AUTO key

SmartPAT display

Enter appliance number.....

Enter the appliance number and press the YES key

SmartPAT display

Use last test type?

Press YES if you wish to use the last test type as displayed. Press NO if you wish to enter a new test type.

SmartPAT display

Enter test type.....

Enter the IEC lead test code and press the YES key

SmartPAT will then ask you to verify that the information entered is correct, press YES if you wish to continue (to amend the details if they appear incorrect press NO, this will return you to the first screen). SmartPAT will automatically begin the test sequence selected.

SmartPAT display

Visual check. Plug O.K

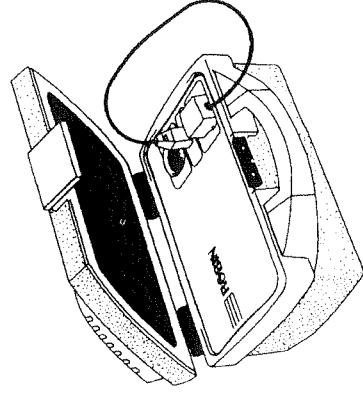
You must respond Yes or NO

SmartPAT display

Visual check. Lead O.K

Press YES or NO

SmartPAT will continue to guide you through each test. After the test sequence is complete you can select SmartPAT to store the test results in the same way as detailed in section 5.3 of this manual.



WARNING - NEVER CONNECT SMARTPAT TO THE MAINS VIA THE IEC LEAD SOCKET.

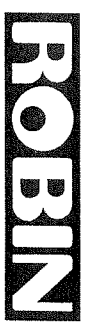
Technical Specification

Earth Bond O/C volts Current into 0.10 ohms Displayed values Accuracy Pass/Fail level Test time	7.5V rms 26A, 8A 0.00-1.99 ohms >2 ohms $\pm 10\%/rdg + 2 \text{ digits}$ 0.1 - 0.9 ohms, 2 ohms 10.1 ohms steps 5s
Earth Bond Business Equipment O/C volts Current into s/c Displayed values Accuracy Pass/Fail level Test time	100mV 100mA 0.00-1.99 ohms >2 ohms $\pm 10\%/rdg + 2 \text{ digits}$ 0.1-0.9 ohms, 2 ohms 10.1 ohms steps 5s
Fuse Continuity O/C volts Current into s/c Displayed values Pass/Fail level Test time	7.5V ac rms 20mA pass/fail 39 kohms 5s
PN-E Insulation Test volts Displayed values Accuracy Pass/Fail level Test time	500V dc 0.1-19.9 Mohms >20 Mohms $\pm 15\%/rdg + 2 \text{ digits}$ 0.2, 0.5, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0 Mohms 5s - 30s

All values are nominal

Run/Leakage Pretest: o/c volts Pass/Fail level Run/leakage Pass/Fail level (load) Displayed values Accuracy Pass/Fail level (leak) Displayed values Accuracy Test time	7.5V rms 240V, 8 KVA P-N 110V, 3.6 KVA P-N 0.5, 1.0, 1.5, 1.8, 2.0, 2.5, 3.2, 3.4KVA 0.1-3.99 KVA, >4 KVA $\pm 5\% \pm 2 \text{ digits}$ 0.3, 0.8, 1.0, 2.0, 3.0, 9.0mA 0.1-9.9 mA, >10mA $\pm 10\%/rdg + 2 \text{ digits}$ 10s
Flash Test o/c volts Current into s/c Displayed values Accuracy Pass/Fail level Test time	1500V rms (class II) 3000V rms (class III) 3mA 0.1-2.9mA >3mA $\pm 15\%/rdg + 2 \text{ digits}$ 1, 2, 3mA 10s

Communication lead configuration
SmartPAT to serial printer
SmartPAT (9 pin) printer (25 pin)
2 _____ 20
3 _____ 3
5 _____ 7
SmartPAT to computer (25pin D connector)
SmartPAT (9 pin) computer (25 pin)
2 _____ 6, 5, 20
3 _____ 3
5 _____ 7
SmartPAT to computer (9pin D connector)
SmartPAT (9 pin) computer (9 pin)
2 _____ 8, 6, 4
3 _____ 2
5 _____ 5



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