ROBIN

PORTABLE APPLIANCE TESTER

SmartPAT 5500

User Manual

Portable Appliance Tester

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INTRODUCTION

Thank you for purchasing Robin Portable Appliance Tester. Please ensure you read and understand these instructions fully before starting any testing.

The SmartPAT 5500 is a State of the Art Portable Appliance Tester (PAT) with automatic testing capability. It is capable of performing preset earth bonding, insulation, fuse continuity, run/leakage and flash voltage tests. The equipment is contained in a high impact carrying case, see Figure 1. When opened access is provided to the operating panel, secured into the base of the case, this panel carries all the operating switches, connectors, serial port, floppy disc drive and the results display. The lid of the case provides a storage space for the cables associated with the appliance tester.

WARNINGS AND CAUTIONS

Although the equipment has been built to meet the requirements of the IEC publication 1010, Safety Requirements for Electronic Measuring Apparatus, the following warnings and cautions must be adhered to:

WARNINGS

LETHAL VOLTAGES. THE SmartPAT 5500 CONTAINS HAZARDOUS VOLTAGES, CORRECT HIGH VOLTAGE HANDLING PRECAUTIONS, AS LAID DOWN IN THE ELECTRICITY AT WORK REGULATIONS 1989, MUST BE OBSERVED AT ALL TIMES.

CAUTIONS

EQUIPMENT DAMAGE.
The equipment has been set for a nominal 230V/110V operation, it must never be connected to a higher voltage.

EQUIPMENT DAMAGE.
The mains supply is never to be connected to the IEC lead test connection.

ABRASIVE MATERIALS.
Routine Maintenance. Do not use abrasive materials, metal polish or furniture polish during cleaning procedures.

TEMPERATURE CONTROL.
Operating and Storage Temperatures below -10°C may cause permanent damage to the equipment.

DATA STORAGE.
This equipment has the ability to store test records within an onboard memory. The data within the memory should not be left to accumulate over a period of time but should be downloaded frequently (daily during normal testing) to a secure storage medium e.g. PC hard drive or floppy disc. Robin Electronics accepts no responsibility for lost of stored data due to misuse of the appliance tester or non-compliance with the operating instructions.

Technical Specifications

The technical specifications of the SmartPAT 5500 are as follows:

Mains Input Supply

Voltage	100 V to 120 V rms at 50/60 Hz ±10% 207 V to 253 V rms at 50/60 Hz ±10%
Power Consumption	30 W maximum (quiescent)
Earth Leakage Current	3 mA maximum

Display

Type	2-line, 20-characters-per-line Liquid Crystal Display (LCD)
Character Height	5.5 mm
Character Width	3 mm
Viewing Angle	'6 0'clock'
Contrast Adjustment	Fixed

Communications

Format	Serial
Data Rate	1200 to 9600 bps (user selectable)
Interface	RS232/V24, support for IRDA adapter, IBM keyboard (through adapter), HP Smartwand and a Panasonic scanner

Environmental

Storage Temperature	-10 to 70°C
Operating Temperature	0 to 40°C (results within calibrated limits) -10 to 60°C (results may be outside calibrated limits)
Humidity	0 to 90% R-H non condensing
Pollution level	II
IP Rating	IP51 case closed, IP30 case open

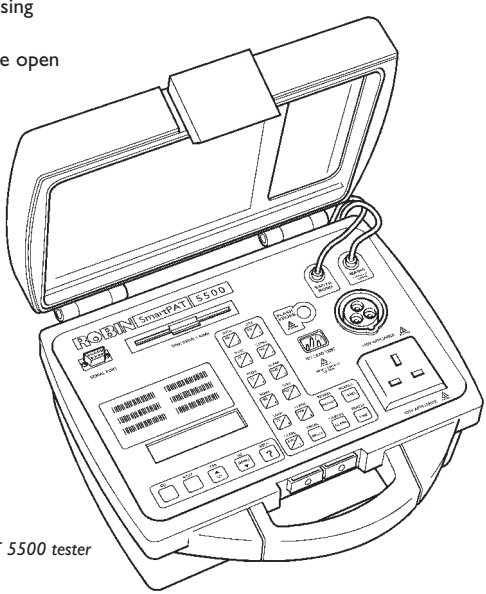


Figure 1 SmartPAT 5500 tester

The technical specifications of the tests performed by the SmartPAT 5500 are as follows:

Earth Bond

The earth bonding specifications are taken at a nominal mains input supply of 110 V or 235 V rms, unless otherwise stated.

High Current

Open Circuit Voltage	3 V rms ±10%
Test Current	5 A, 8 A or 26 A ±15% into 0.1 ohm load (in-built intelligent current limit)
Display Resolution	0.01 ohm to 19.99 ohm, then shows >20 ohm
Display Accuracy	±(3% + 4 digits)
Test Duration	10 s or 15 s to 1 minute, dependent on time test button held down

Business Equipment

Open Circuit Voltage	3 V rms ±10%
Test Current	10 mA +20%, -0% at 230 V rms into 0.5 ohm
Display Resolution	0.01 ohm to 19.99 ohm, then shows >20 ohm
Display Accuracy	±(3% + 4 digits)
Test Duration	10 s or 15 s to 1 minute, dependent on time test button held down
Pass Threshold	0.1 ohm steps up to 5 ohm then 0.5 ohm steps to 19.99 ohm (user selectable)

Insulation Test

The test is made between the Earth pin of the appliance cable plug, or the earth bond crocodile clip attached to the appliance, and the Live and Neutral pins connected together.

Open Circuit Voltage	530 V dc ±5% at nominal mains
Short Circuit Current	3.5 mA ±10%
Current into 500k	1.0 mA minimum
Display Resolution	0 1 to 99.9 Mohm, then 1 to 299 Mohm, >300 Mohm
Display Accuracy	±(5% + 4 digits)
Test Duration	10 s or 15 s to 1 minute, dependent on time test button held down
Pass Threshold	0.1 Mohm steps to 0.9 Mohm 1 Mohm steps from 1 to 9 Mohm 10 Mohm steps from 10 to 300 Mohm (user selectable)

Fuse/Load/Leakage Test

Fuse

Open Circuit Voltage	530 V dc ±5% at nominal mains voltage
Short Circuit Current	1.5 mA ±10% at nominal mains input
Pass Threshold	250 k ±20%
Test Time	10 s maximum

Leak

Earth Leakage Current	0.1 mA to 14.9 mA
Display Resolution	0.1 mA
Display Accuracy	±(5% + 4 digits), capacitive/resistive leakage
Display Threshold	0.5 to 10 mA in 0.5 mA steps
Display on Leakage	> 15 mA

Load

Load Measurement	0 VA to 999 VA, 1.0 kVA to 3.0 kVA
Display Resolution	1 VA up 999 VA, 1.0 kVA above 1.0 kVA
Display Accuracy	±(5% + 4 digits), resistive or reactive load
Abort on Surge	> 60 A exponential, time constant 50 ms
Abort on Run Current	> 13 A (235 V), > 16 A (110 V)
Test Duration	5 s to 60 s in 5s steps, terminating immediately when STOP button pressed.

Flash Test

Open Circuit Voltage	1500 V rms ±8% (Class I), 3000 V rms ±8% (Class II) at nominal mains input
Short Circuit Current	5 mA ±10% at nominal mains input
Display Resolution	0.1mA
Display Accuracy	±(5% + 4 digits)

Test Summary

The following statements provide a brief summary of the tests performed by the SmartPat 5500.

Earth bond

Checks the resistance between the Earth pin of the appliance under test and any exposed metalwork on the appliance.

Insulation

Checks the resistance of the insulation between the Earth pin of the appliance under test cable plug or the earth bond crocodile clip, to the Live and Neutral pins of the appliance (pins are connected together within the SmartPAT 5500 for this test).

Fuse/Load/Leakage

A low dc fuse test is performed first to check the continuity of the fuse in the appliance under test, by checking the resistance between the Live and Neutral pins of the appliance cable plug. On completion of the fuse test an earth leakage test and a VoltAmpere test is performed with the appliance under test being powered up.

Flash

A 1.5kV rms voltage is applied between the earth and live/neutral pins of a class I appliance and 3 kV rms voltage between the flash probe and the live/neutral pins of a class II appliance.

Controls and Accessories

The cables, connectors, controls and indicators of the SmartPAT 5500 are shown in Figure 2 and listed below, together with a brief functional description:

Cables

Mains	Captive mains cable to connect to the mains supply with either a 13A, 230V or a 16A, 110V plug (via adaptor). (See Figure 2 (6))
Earth Bond	Captive cable, fitted with heavy duty crocodile clip, to connect to appliance under test. (See Figure 2 (5))

Connectors

110 V Appliance	Provides a socket to connect a 110 V appliance to the test set for testing. (See Figure 2 (8))
230 V Appliance	Provides a socket to connect a 230 V appliance to the test set for testing. (See Figure 2 (7))
IEC Lead Test	Enables IEC leads to be tested, used in conjunction with the 230 V Appliance Input socket. (See Figure 2 (3))
Serial Port	Allows an external computer/printer or any serial interface data collector device to be connected to the Portable Appliance Tester. (See Figure 2 (1))
Flash Probe	Enables a probe to be inserted into the Portable Appliance Tester, to allow high voltage insulation tests to be carried out. (See Figure 2 (4))

Disk Drive

Disk Drive 1.44Mb	A 3½" floppy disk drive to provide a means of storing the records so that later they can be downloaded to a computer. (See Figure 2 (2))

WARNING
When transferring data to a floppy disk it is essential that the data is either transferred to a computer or printed before the data is deleted from the tester.

Controls
The controls are all in the form of keys, there are two distinct sections:
Main executing keys
Test function and setting keys

Main Executing Keys

GO	Initiates tests and confirms selections.
STOP	Terminates tests and selections, when pressed returns display to show main menu, see setting up section.
YES	Allows a positive decision to be made, the key is also the up arrow for use when scrolling through messages or lists.
NO	Allows a negative decision to be made, the key is also the down arrow for use when scrolling through messages or lists.
HELP	When pressed will display a help message on the subject the SmartPAT 5500 is currently employed in carrying out.

Test function and setting keys
These keys perform various functions, the alpha-numeric keys, half black and half yellow, provide the keyboard function for the PAT together with the space key. The use of these keys is detailed in the Installation section under setting up. The other four keys provide a means of amending the test parameters, ie alter current used or time duration of test.

All the 16 keys have a black legend above them, these are the function which that key will control. A brief description of the action controlled by each key is as follows:

AUTO	Enables any autotest programmed in the SmartPAT 5500 to be selected and run.
SITE	Allows a code for each site testing is carried out at to be entered into the PAT memory for storing on the records.
DATE	Enables the date and time to be set in the PAT, this is automatically updated by the PAT.
STORE	Allows a test result to be stored in the PAT.
PROG	Initiates the programming mode of the PAT, For some of the major modes the access code is required. (For Access Code details see Programming section)
CLEAR	Enables results to be erased from the memory.
BOND	When pressed this key will initiate an earth bond test.
INSU	When pressed this key will initiate an insulation test.
LOAD	When pressed this key will initiate a load/leakage test.
FLASH	When pressed this key will initiate a flash test.
LEADS	When pressed this key will initiate an IEC lead test.
VISUAL	When pressed will allow the results of a visual test to be entered into the records.
REVIEW	Enables the results of an auto test to be viewed before they are stored, or any stored result may be viewed.
SEARCH	Enables a search of the records to be carried out.
REPEAT	Allows a search to be repeated.
PRINT/PC	Enables the data on the display to be printed or data to be downloaded to PC or disk. It also enables a disk to be formatted.

Indicators

Bleeper (internal) Sounds to indicate that a test has been completed or failed (double bleep).

Display Dot matrix Liquid Crystal Display, displays up to 40 characters at a time, in two lines, to show the following:

- Test type selected
- Test in progress messages
- Test results
- Warning messages.
- Help messages

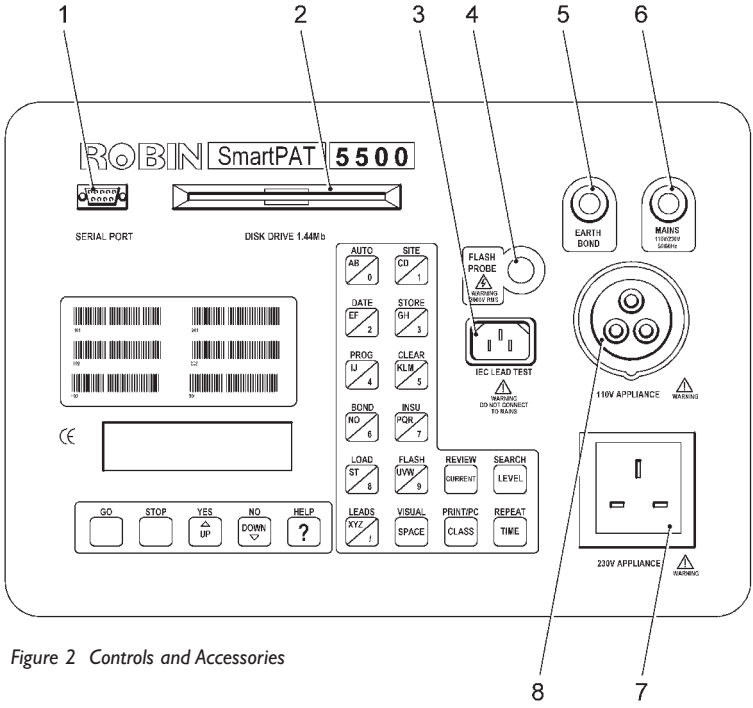


Figure 2 Controls and Accessories

Results

The test results are displayed on the display screen, showing the actual measured values, or when necessary the reason for failure, eg Fuse Blown. The result may also be stored internally in a non-volatile memory, this data is instantly available for review, printing or data transfers if required. The displayed or stored results may be printed out by an external printer. The records will contain the site, date and appliance being tested as well as the type of test performed. The results may also be recorded in other mediums, by entering them in a Portable Appliance Test Log Book (Robin Manual IRPI) or downloading the results into a computer with a compatable PAT database management software such as Robin PowerPAT Plus Data Management software. Both the IRPI log book and PowerPAT Plus software are available as optional accessories from Robin Electronics.

INSTALLATION

Power Requirements

WARNING
LETHAL VOLTAGES. THE SmartPAT 5500 CONTAINS HAZARDOUS VOLTAGES, CORRECT HIGH VOLTAGE HANDLING PRECAUTIONS MUST BE OBSERVED AT ALL TIMES.

The power requirements of the SmartPAT 5500 are detailed under the Technical Specifications.

The Appliance Tester is dispatched from the factory with a mains lead carrying a 230V plug. To power the Test Set from 110V requires the use of an adaptor. The adaptor is available from Robin as:

AD 110V 110V Adaptor.

Connections
WARNING
ELECTRIC SHOCK. TO AVOID ELECTRIC SHOCK, ENSURE THAT ALL POWER IS OFF AND ALL DEVICES ARE UNPLUGGED BEFORE CONNECTING OR REMOVING ANY OF THE TEST CABLES.

CAUTIONS
EQUIPMENT DAMAGE. The equipment has been set for a nominal 230V/110V operation, it must never be connected to a higher voltage.

EQUIPMENT DAMAGE. The mains supply is never to be connected to the IEC lead test connector.

The only connection to be made prior to commencing testing is to plug the SmartPAT 5500 into the correct power source.

Setting Up
The only requirement to set up the Test Set, is to find a suitable place to conduct the testing, adjacent to the correct power source,(230V/110V 50Hz).

The Appliance Tester has no **ON/OFF** switch, it is ready for testing equipment as soon as power is applied to it.

When the Tester is plugged in and power applied the Tester performs a short test of the mains supply voltage and displays the version of the software within the unit. The following screens are displayed in quick succession:

Robin SmartPAT 5500	
Self Test	VI.17

Robin SmartPAT 5500
230V Operation

A quick self test is then performed to check the functioning of the Test Set, on completion of which the following message is displayed:

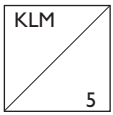
Site ABC	
19/08/1999	08:35:24

This screen is the main screen from which all operations are initiated.

NOTE
During any operation of the SmartPAT 5500, pressing the STOP button will automatically revert to the above screen

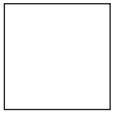
Use of Alpha Numeric Keypad
The SmartPAT 5500 is accessed and controlled via the alpha numeric keypad. Therefore before installing the equipment in the test position it is necessary to have a complete understanding of how to use the keypad.

The following example shows how to enter alpha or numeric characters



To enter the numeric 5 press key once, character K press key twice, for L press key three times and for M press key four times. If the data to be entered is numeric, ie. Date and time, then the alpha function is inhibited.

DATE



When the function is required that is shown above a key, with the exception of the five Executing keys, pressing the key will call up that function, unless the equipment is in a mode that inhibits that function. The sixteen function keys are shown on Figure 2 and listed on page 8.

The keys that have a word, with the exception of SPACE, enable alterations in the test instructions to be inserted. The four keys are:

CURRENT Allows the different current ratings to be set in a test 5A, 8A or 26A.
LEVEL Enables the user to change the Pass/Fail Level of selected tests
CLASS Selects the class of the equipment under test, Class 1/Class11
TIME Enables the time duration of each phase of a test to be amended

The keys and buttons are detailed in the Control and Accessories section

Setting the Date/Time
The date set will be the date recorded on all the result records. Once set the date and time is automatically incremented, but should be checked on switch on before commencing any tests. To adjust the date and time:

Press **DATE** button, the following is displayed:

```
Enter date,    press  GO
19/08/1999       08:40:25
```

If no change is required press GO button, display will return to the main screen

The cursor will be highlighting the first character of the date. If a change is required enter the date, followed by the time in the following format, using the keypad.

dd/mm/yy hh:mm

On completion of the operation press **GO** button, display will return to the main screen.

Setting the Site
This allows a site to be identified and subsequent tests to be recorded for/under the site. A recognition code is entered, so that the place of testing (site) is registered on all result records. Failure to set the site recognition code will result in the code entered for the last site being recorded on all the result records. Once a site as been allocated to a record it is not possible to amend the record, only to delete it.

If no change is required remain with the main screen, no further action is necessary. To set a new site code:

Press **SITE** button, the following is displayed:

```
Enter site,    press  GO
……….
```

The cursor will be highlighting the first character of the code. Enter required site code using buttons on the keypad as detailed in **Use of Alpha Numeric Keypad** at the start of the **Installation** section

On completion of the operation press GO button, display will return to the main screen

The SmartPAT 5500 is now ready to commence testing the appliances.

OPERATING INSTRUCTIONS

Prior to performing any test the following information is required.
The class of equipment to be tested, see Table 1;

Table 1

Class	Typical Appliances
I (Normal)	Electric heaters, Fans, kitchen appliances, kettles etc.
I (Business)	Business machines - Fax machines, printers, personal computers etc.
II	Double insulated appliances - Power tools, table lamps etc.

Business equipment usually contains electronic components and are therefore are susceptible to damage from high current and voltage. For this reason the Earth Bond tests are carried out using the 100mA test current

Fuse Continuity tests are valid for the more common conventional electrical equipment, but certain appliances contain circuitry that is unlikely to give a positive reading eg; High input impedance of solid state devices etc. Examples of the type of equipment which would indicate a failed test, even when the equipment fuse is good are:

Personal computers
Monitors (VDU)
Fax machines
Photocopiers
Motor driven hand tools with electronic control.

WARNING

Before commencing any testing the user is strongly advised to make reference to the Electricity at Work Regulations 1989 and any relevant publications from the Health and Safety Executive. It is important that the user fully understands the various tests required and how they should be performed. The user should also make reference to the Code of Practice for In Service Inspection and Testing of Electrical Equipment, which is available from the Institute of Electrical Engineers. Robin Electronics also produce a useful video guide to PAT testing. (Robin model RV20)

TESTING

NOTE

If during any operational actions further information on the test or action is required, pressing the HELP control key will display a number of hints to assist in the correct operational procedure.

Visual Check

1 Check state of flex, ie. No cuts, cracks or any physical damage to the outer insulation layer.
2 Check state of the plug, cable securely attached, no signs of overheating and that the correct value of fuse is fitted.
3 Check the equipment to be tested for any signs of damage, and that any mains or control switches will physically switch on and off.
4 Check any sockets for signs of overheating or physical damage.

Auto testing

The list of tests pre-programmed into the SmartPAT 5500 are given in table 2 together with the limits and time duration of each phase of the test.

The procedure to carry out an autotest is detailed after table 2, with a example of the type of display and actions required to perform the tests.

Table 2 Automatic Tests

Test No	Tests	Time	Pass/Fail point
101	Visual check		
	26A earth bond test	10s	0.1ohm
	Insulation, Class I	10s	2.0Mohm
	Load: load	10s	3kVA
	leakage		1.0mA
102	Visual check		
	26A earth bond test	10s	0.1ohm
	Insulation, Class I	10s	2.0Mohm
	Flash	10s	1.0mA
	Load: load	10s	3kVA
	leakage		1.0mA
103	Visual check		
	100mA earth bond test	10s	0.1ohm
	Insulation, Class I	10s	2.0Mohm
	Load: load	10s	3kVA
	leakage		1.0mA
201	Visual check		
	Insulation, Class II	10s	7.0Mohm
	Load: load	10s	3kVA
	leakage	10s	1.0mA
202	Visual check		
	Insulation, Class II	10s	7.0Mohm
	Flash	10s	1.0mA
	Load: load	10s	3kVA
	leakage	10s	1.0mA
301	Visual check		
	8A earth bond test		0.1ohm
	Insulation test		7.0Mohm

Note

The results shown in the following tests have typical values for example purposes.

To perform an auto test the procedure is as follows:

Press AUTO key, the following is displayed:

```
Enter the Autotest
Number, press  GO
```

After 2 seconds the display changes:

```
Autotest
Autotest number:    101
```

Press the key for the first number of the autotest, eg 1, the number on display will be removed and the 1 just entered will be displayed. Enter the next two numbers.
On completion press **GO** key

Check case exterior,
Cable and plug

After a few seconds the display changes to:

Visual inspection
YES/NO for PASS/FAIL

Check the appliance under test for any visible damage as detailed under the Visual Check heading. If no damage found press **YES** key for PASS. If damage found press **NO** key for FAIL. The Visual inspection screen will be redisplayed with either PASS result or FAIL result displayed.

After a few seconds the display changes to:

Earth bond	26A
Attach earth clip	

After a few seconds the display changes to:

Earth bond	26A
Press GO to start	

Press GO key, the following screen is displayed:

Earth bond	26A
Test in progress	10

The test is of 10 seconds duration, this is counted down by the numeric counter in the right hand corner of display. The result of the test is then displayed:

Earth bond	26A
Resistance	>0.08Ω

If the resistance is too high then the screen will show **FAIL** indicated by a double bleep and after a few seconds the screen below is displayed.

Earth bond	26A
Re-test?	Yes/No

Fig 1

This allows you to perform a re-test of the earth bond. Press **YES** key to re-test. You can perform a re-test as many times as you wish but if the earth bond still fails or the **NO** key is pressed the tester will not allow you to proceed with a subsequent test on the appliance as there is clearly a safety fault. In this case the tester will ask you to review or store the failed fault.

If the resistance is low enough then PASS is displayed and the next screen, the Insulation test is displayed:

Insulation Class I
Remove earth clip

After a few seconds the screen changes to:

Insulation Class I
Press GO to start

Press **GO** key, the following screen is displayed:

```
Insulation Class  I
Test in progress        10
```

The test is of 10 seconds duration, this is counted down by the numeric counter in the display. The result of the test is then displayed. If the test fails you will then see a message similar to *Fig 1*.

```
Insulation Class  I
Resistance        >300MΩ
```

After a few seconds the test changes as shown on screen:

```
Load/Leakage          230V
Press GO to start
```

Press **GO** key to continue the following screen is displayed:

```
Load/Leakage          230V
Testing Fuse
```

If the fuse is OK the screen will display:

```
Fuse Intact
Press GO to continue
```

If the fuse is not OK the screen will display:

```
Fuse Appears Blown
or Low Load Rating
```

And after a few seconds the screen will display:

```
Continue? Or Re-Test Fuse?
GO/YES/NO
```

If the **GO** is pressed the unit will proceed to a Load/Leakage Test. This will flag the fuse test as a pass and must only be done after the fuse has been checked manually. If the **YES** (UP) Key is pressed the unit will re-test the fuse. If the **NO** key is pressed the unit will record the Load/Leakage Test as a fail result. The above procedure allows you the option of checking or replacing the fuse if the tester identifies a problem with the fuse. Any problem must be corrected prior to continuation of any testing if a fail result is to be avoided.

While the test is in progress for the 10 seconds, the 230V displayed is alternated with a WARNING sign. Press **GO** key to continue. The unit will proceed to a Load/Leakage Test.

The user should exercise caution with the equipment as the appliance under test will power up during the test sequence. On completion of the test the results are displayed:

```
Load/Leakage
VoltAmp               838VA
```

After a few seconds the screen changes to show the leakage current:

```
Load/Leakage
Leakage               0.0mA
```

After a few seconds the display changes to the screen below. If the test fails you will then see a message similar to *Fig 1*.

```
Autotest complete
Use REVIEW or STORE
```

Reviewing
To review the results of the test the procedure is as follows:

Press the **REVIEW** key, the display shows:

> Reviewing autotest
> results. Use REVIEW

Press **REVIEW** key, display then shows a series of screens running through the test just performed. The first screen displays the result of the first part of the test being reviewed, to view the remainder of the test results, press **REVIEW** key for each screen until all the tests have been reviewed. If the stop key is pressed during the review process the screen will revert to the main menu and the results will be lost.

Storing
To store the results of the test:

Press **STORE** key, the display will show:

> Use the Keypad, then press
> GO, or use the wand

After a few seconds the screen changes to show:

> Enter the appliance num:
> ……..….

Enter the appliance reference number using the keypad. This number is normally a unique reference number for the appliance under test, typically the serial number. If you are using PowerPAT Plus this is where the optional dummy test code would be entered. If available the code may be entered using the barcode wand, see manual for instructions in the use of the barcode wand. On completion press **GO**

The following screen will be displayed:

> Use Keypad, then GO
> or just GO to skip

The screen then changes to display the following:

> Enter a note
> ……..

If required a note on the tests may be entered into the records at this stage. (At this point users that are using the tester in conjunction with Robin's PowerPAT Plus Software can enter the relevant appliance description and location code. On completion, or if no note is required press **GO**.

The display shows:

> Results stored in
> record 2

On completion press **STOP** to return to main menu.

Storage Type
To print a record, download a record or format a disk the procedure is as follows:

Press the **PRINT/PC** key the following is displayed:

> Print results
> YES/NO ?

To select anything other than a print out on a printer requires the selection of **NO**. To print out on a printer press **YES**. The screen displays:

Fig 2

First result	1

Use the up/down arrow keys to select the first record number that is to be printed, then press GO. The screen displays:

Fig 2a

Last result	10

Use the up/down arrow keys to select the last result number that is to be printed, then press **GO**. The selected records can then be printed out and the screen displays:

Print Complete

Press stop to revert to the main menu.
If **NO** is selected at the **PRINT/PC** screen the following is displayed:

Download to floppy
YES/NO

Selecting **YES** displays the following:

Please wait
Reading disk

After a short wait, if no disk has been inserted it will display **insert a disk** and press **GO**, the reading disk screen is redisplayed. After a wait for the disk to be read the following screen is displayed

Enter File name, Go
Robin.rob

The unit will download from memory all the test results to a file called Robin.rob. If you wish to use your own file name, press **NO** key and use the alphanumeric keys to set up your own file name. On completion press **GO**, the screen displays: **Note: PowerPAT Plus will only recognise files named Robin.rob.**

Please wait
Downloading to disk

After a short wait the following is displayed:

Downloading complete

Press **STOP** and return to main menu.

When **NO** is selected at the Download to Floppy screen the following screen is displayed:

Download to Robin
PowerPAT Plus YES/NO

A screen similar to *Fig 2* and *Fig 2a* will be displayed.
Selecting **YES** displays the following:

Please wait
Downloading

After a short wait the following is displayed:

Downloading complete

Press **STOP** and return to main menu.

When **NO** is selected at the Robin PowerPAT Plus screen the following screen is displayed:

Download to Robin PAT Test 5000
YES/NO

A screen similar to *Fig 1* and *Fig 2* will be displayed. Selecting **YES** displays the following:

Please wait
Downloading

After a short wait the following is displayed:

Downloading complete

Press **STOP** and return to main menu.

If **NO** was selected at the PAT Test 5000 screen the following is displayed:

Download to PC database
YES/NO

Selecting **YES** displays the following:

Please wait
Downloading

After a short wait the following is displayed:

Downloading complete

Press **STOP** and return to main menu.

If **NO** was selected at the download to PC database screen the following is displayed:

Downloading as industry
standard? YES/NO

Selecting **YES** displays the following:

Please wait
Downloading

After a short while the following is displayed:

Downloading complete

Press **STOP** and return to main menu.

If **NO** was selected at the download to Industry Standard the following is displayed:

Print Auto-Test
Sequences? YES/NO

Selecting **YES** allows the printing of newly programmed Auto-Test Sequences if a printer is connected.

If **NO** was selected at the print Auto-Test Sequences Screen the following is displayed:

> Format a disk
> YES/NO

If **YES** is selected then the following screen is displayed:

> Please wait
> Formatting a disk

On completion the following is displayed:

> Formatting complete

Press **STOP** and return to main menu.

Press **NO** at the Format a Disk screen and the screen returns to the opening print results screen.

Clearing or Reviewing Stored Records

The stored test records can be reviewed by pressing the review button the screen displays:

> Use UP/DOWN to select
> a record

The UP/DOWN key can be pressed to select a record which can then be reviewed by subsequent pressing of the review button.

Press **STOP** to return to the main menu.

Stored test records can be deleted individually or all at once. To delete records press the clear button, the screen displays:

> Select record with UP/DOWN
> Press GO to

and then:

> Clear record. Hold GO
> down to clear all

Note: Once deleted, records cannot be retrieved.

Programming

The programme mode has a number of functions, the major functions require the entry of an access code before the tester will allow that function to be actioned.

The access code is set at the factory to 9999.

Press the **PROG** key, the following screen is displayed:

> Enter or change an autotest? YES/NO

To select the programming mode required or to view the selection of modes available press NO. At each screen as it is displayed press **NO** to view the next mode.

> Set communications speed ? YES/NO

> Set floppy storage format ? YES/NO

> Set up Professional/ Normal mode ? YES/NO

> Set up Diagnostic test lockout ? YES/NO

> Change access code ? YES/NO

Selecting **NO** at the last choice reverts to programming mode opening screen

Autotest

> Enter or change an autotest? YES/NO

Press YES to perform this function.

> Enter access code ….

Enter access code, then press **GO**, the following is displayed:

> Enter a new autotest number to edit or

the message continues on the second screen.

> An existing autotest number to copy

After a few seconds the following screen is displayed:

> Autotest number: …

If the number entered is not of the correct format the screen will flash with the message **Invalid autotest.** On completion press **GO**. The unit will now ask you to assign a copied autotest sequence a new number, eg 107. On completion press **GO**.

A new autotest may now be programmed or an existing test edited to suit the testing requirements, it will be assigned the new autotest number, eg 107. Use the up/down arrow keys to run through the various test parameters. The screen will display steps to be taken to select or skip parameters to be included or omitted from the new autotest number.

The values within each parameter test sequence, for example if you wish to include an Earth Bond Test you can change the value of that current, the pass level and the test time duration by using the **CURRENT, LEVEL, CLASS** and **TIME** keys

On completion the screen displays:

```
Use Review/Store to
Review/Save Autotest
```

Pressing the **REVIEW** key will allow you to scroll through the test sequence you have selected. If all the details are correct press **STORE**, the screen will display:

```
Autotest Stored
In Number.....……..107
```

This new autotest can now be selected in future tests using autotest code 107.

Communication Speed

```
Set communications
speed ?          YES/NO
```

Press **YES** to perform this function.

```
Use UP/DOWN then GO
Speed:              9600bps
```

Use the **UP/DOWN** controls to select the speed required for the interface. The range is:

1200bps
2400bps
4800bps
9600bps

On completion press **GO**, the following is displayed to confirm the speed has been set:

```
Speed:              4800bps
```

Press **STOP** to return to main menu

Storage format

```
Set floppy storage
format ?        YES/NO
```

Press **YES** to perform this function.

```
Use UP/DOWN then GO
Format: Print
```

Use the **UP/DOWN** controls to select the storage format required. The selection is:

Print	Robin.txt = Text document
PC database	Robin.csv = Comma separated variable file
PowerPAT Plus	Robin.rob = PowerPAT Plus document
Industry Std	Robin.ind = Industrial file

Note: If you are using Robin PowerPAT Plus software **or** Robin PATEST 5000 software select "PowerPAT Plus"

On completion press **GO**, the following is displayed to confirm the selection as been set:

```
Format: Print
```

Press **STOP** to return to main menu

Professional/Normal

The Tester can be selected for operation in the Professional or Normal mode.

In the Professional mode the messages displayed to the user during the test sessions are reduced along with the test duration times. This allows a user who is familiar with the test sequences and the actions the test performs to reduce the testing time and increase the speed of work.

In the Normal mode all messages are displayed and the tester guides the user through each individual action. It is recommended that Normal mode is selected until the user is fully practised in using the tester and understands the functions of each test,

Professional Mode is only for experienced and competent users.

```
Set up Professional/
Normal mode ?   YES/NO
```

Press **YES** to perform this function.

```
Enter access code
                ....
```

Enter access code, then press **GO**, the following is displayed:

```
Code accepted
```

After a few seconds the following screen is displayed:

```
YES for Professional
or NO for Normal
```

Press the required control to select the required mode

The display will show which mode is selected:

Professional mode selected

Press **STOP** to return to main menu.

Diagnostic test Lockout

This function allows the user to 'LOCKOUT' or prevent the selection of manual tests. Only the autotests are available when this function is selected. This is essentially a safety feature and prevents inadvertent selection of a manual test when performing auto sequence testing by accidental operation of the keypad.

Set up Diagnostic test lockout ? YES/NO

Press **YES** to perform this function.

Enter access code ....

Enter access code, then press **GO**, the following is displayed:

Code accepted

After a few seconds the following screen is displayed:

YES lock out, NO to allow Diagnostics

Press the required control to select the required mode

The display will show the selected mode, locked out or enabled:

Diagnostic tests are locked out

Press **STOP** to return to main menu.

Change Access Code

Change access code ? YES/NO

Press **YES** to perform this function.

Enter access code ....

Enter access code, then press **GO**, the following is displayed:

Now enter new code ....

On completion press **GO**. the following is displayed

Re-enter new code ....

Re-enter new access code, then press GO, the following is displayed:

Code accepted

Press **STOP** to return to main menu

IEC Lead Test
Plug the lead to be tested between the IEC LEAD TEST socket and the 230V APPLIANCE socket on the SmartPAT 5500.

Press the LEADS key, the following screen will be displayed:

Lead test: Bond 5A
Press GO to start

The current may be set to the required level by using the CURRENT key. The range allowed is:

5A
8A
26A

When ready to test lead press **GO**, the SmartPAT 5500 will then cycle through an Earth Bond test, an Insulation Resistance test and a Polarity/Fuse test, the results are displayed sequentially until the **STOP** control is pressed. If the results are required to be stored then the STORE key must be pressed before the **STOP**. When the **STORE** key is pressed the results can be stored in accordance with the procedure detailed in this manual under the heading 'Storing'.

Manual Testing
Individual Manual tests may be carried out at any time on an appliance by pressing the appropriate key and following the on screen instructions. The tests are as follows:

Earth Bond	**BOND**
Insulation	**INSU**
Load/Leakage	**LOAD**
Flash	**FLASH**
Visual Inspection	**VISUAL**

The results can be stored, reviewed, printed or downloaded as required. To stop any manual test the only action required is to press **STOP.**

When performing a manual Earth Bond test, the test current can be selected as 100mA, 5A, 8A or 26A using the **CURRENT** key.

When performing a manual Insulation Resistance test, the Class of the equipment under test can be selected for Class I or Class II using the **CLASS** key.

When performing a manual Flash test, a flash voltage of 1500 V for Class I appliances or a flash voltage of 3000 V for Class II appliances can be selected using the **CLASS** key

FAULT FINDING AND REPAIR

Should any faults develop on the SmartPAT 5500, the equipment is to be returned to ROBIN. There are no user facilities to repair the test set, due to the technical nature of the equipment. In the event of a fault developing return the equipment to the Service Department at the following address:

ROBIN
52 Hurricane Way,
Norwich,
NR6 6JB

Calibration
To ensure the accuracy of the equipment is maintained at a high level, it is recommended that the Portable Appliance Tester be returned to the above address for calibration at least once every 12 months. If the results at any time give rise to doubt the equipment should be returned straight away for safety reasons. Always state clearly what the reason for return is

Basic Maintenance
The SmartPAT 5500 test set has a fused moulded mains plug fitted. The only user maintenance on this is the changing of the fuse. However if the plug is damaged then the moulded plug must be cut off and a new 3 pin fused plug fitted by a qualified electrician

GENERAL ENQUIRES

Robin Electronics operate a technical helpline to assist customers in the use of Robin products. A selection of the most common enquires received regarding portable appliance testing together with the answers are given below:

My PN fuse test fails?
The objective of this test is to check to see if the appliance fuse is fitted. An appliance will fail the fuse test if the fuse is not fitted or has failed. Some appliances are electronically controlled, i.e. they may have semi-conductor devices in the supply path. This will give a high input resistance to the appliance and may cause the equipment to fail the test. When a fail is shown on the tester pressing **GO** will assign a pass to the fuse test. This must only be done after the fuse is checked manually.

How do I program an auto test ?
Refer to the Programming mode section of this manual. Simply step through the test sequence as detailed and define your own specific auto test as required. The factory setting for the access code is 9999.

How do I skip a test ?
To skip a specific test, you can either test manually or programme a new test in the auto mode. If you want to programme a new test refer to the Programming mode section of this manual. Go into auto mode, set a new test sequence and define a new test code for the specific sequence. Omit any particular test you do not wish to be included in the auto sequence as detailed in the manual.

How do I test my extension lead for the Earth, Insulation and Load tests?
Earth tests and Insulation tests on extension leads can easily be undertaken using a special ROBIN Extension lead test adaptor (catalogue code EL 100). A load test is not applicable to an extension lead and is therefore not required.

What tests should I do?
For a comprehensive overview of portable appliance testing and specific tests that should be performed, it is suggested that reference is made to the Code of Practice for In-Service Inspection and Testing of Electrical Equipment. This document has been prepared by the Institution of Electrical Engineers and is available direct from them. The IEE can be contacted on 01438 313311.

What is meant by class I, II and III?
There are a number of basic equipment constructions that are referred to in all standards for electrical equipment. They are important because they determine how the user is protected against electric shock and what tests are appropriate when assessing safety.

Class I equipment is where protection against electric shock is achieved by using basic insulation and providing a means of connecting to the protective earthing conductor in the fixed installation wiring any conductive parts (eg. metal) that could otherwise assume hazardous voltages if the basic insulation failed. Consequently Class I equipment relies for its safety upon a satisfactory earth in the fixed wiring installation and an adequate connection usually via a flexible cable to it.

Class II equipment is where the protection against electric shock is provided by a basic insulation and a secondary level of insulation, such as a double insulation or reinforced insulation. There is no provision for protective earthing or reliance upon installation earthing. Class II equipment should be identified with the Class II construction mark, which is essentially a square within a square.

Class III equipment relies for protection against electric shock from an SELV source (separated extra low voltage). The Class III construction mark should be found on such appliances and is Roman numeral III inside a rhombus. SELV voltages will not exceed 50V. Class III equipment must be supplied from a safety isolating transformer to BS3535.

How do I find the class of an appliance?
It is sometimes difficult to actually define the class of a piece of equipment. It is suggested that reference be made to the appliance rating plate or look for specific construction marks for Class II and Class III appliance which may be found adjacent to the manufacturers details on the appliance.

How do I change the pass/fail threshold?
The pass/fail threshold of any particular test should only be adjusted by persons competent in performing the various tests with full understanding of the interpretation of the test thresholds. If you wish to change the pass/fail threshold, refer to the Programming mode section of this manual and follow the instructions detailed.

What are the pre-programmed pass/fail threshold?
Pre-programmed pass/fail thresholds are listed in the manual where applicable. A list of all thresholds can be obtained from the ROBIN sales office.

Can the SmartPAT download to other software packages?
Yes, the SmartPat can download to other packages. It can download to any derivative software produced by Shire Safety Systems. It is also compatible with the Metrotest Downloader 4 Plus System. For further information on compatibility with other manufactures software, please contact ROBIN Electronics.

Can my SmartPAT test business equipment?
For the specific test requirements on typical office equipment reference should be made to the code of practice as defined earlier in these enquires. Two basic tests are required, insulation and earthing, however, earthing tests must be done at low current.

My 110V drill does not power up on load test?
When using the SmartPAT all tests on 110V and 240V appliances can be done at 240V with the exception of the load test. When conducting load tests, the power up voltage on the SmartPAT must be the same as the rating of the appliance. For example, if you are using a 110V drill and you want to conduct a load test, the SmartPAT must be connected to a 110V power supply.

How do I test three phase equipment?
Three phase equipment can only be tested one phase at a time. It is not possible to test all three phases simultaneously.

Does SmartPAT read any barcode labels ?
The ROBIN SnartPAT 5500 will read any barcode up to 10 digits. The only criteria is that the barcode must be written in code 39 format, (this is a barcode standard format).

How do I clear stored records?
Refer to Results section of this manual and step through the menu until you arrive at Clear Stored Records. Follow detailed instructions to clear records.

How often should I calibrate my PAT tester?
Under normal operating conditions it is recommended that your PAT tester is calibrated annually. Your PAT tester should be returned to ROBIN for all calibration requirements as ROBIN have purpose built facilities and the equipment necessary to undertake the correct calibration procedures.

What rules/regulations does the law require?
Legislation that has specific relevance to electrical portable appliance testing and maintenance is the Health & Safety at Work Act, the Management of Health & Safety at Work Regulations, the Electricity at Work Regulations, and the Provision and Use of Work Equipment Regulations.

My PAT tester display has gone blank?
If this occurs you should check the incoming electricity supply to the PAT tester, check the fuse has not blown, if these are both correct, then there may be a problem with the PAT unit and it should be returned immediately to ROBIN Electronics for investigation.

Why do I need to do a Flash test?
You do not always have to undertake a flash test when testing portable equipment. However, a flash test is recommended particularly when major repairs have been undertaken on the appliance under test and it may have been stripped down to its component parts and reassembled. In this case a flash test is a useful test to perform to ensure that the integrity of the insulation following the reconstruction of the appliance is at least as good as when originally manufactured. Care should be taken when performing flash tests, as to perform them incorrectly, may result in damage to the appliance under test.

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