Order code	Manufacturer code	Description
85-2697	MAREPAT1600	EASYPAT 1600 MANUAL PAT TESTER RE

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- Thermometers
- Motor Maintenance Equipment

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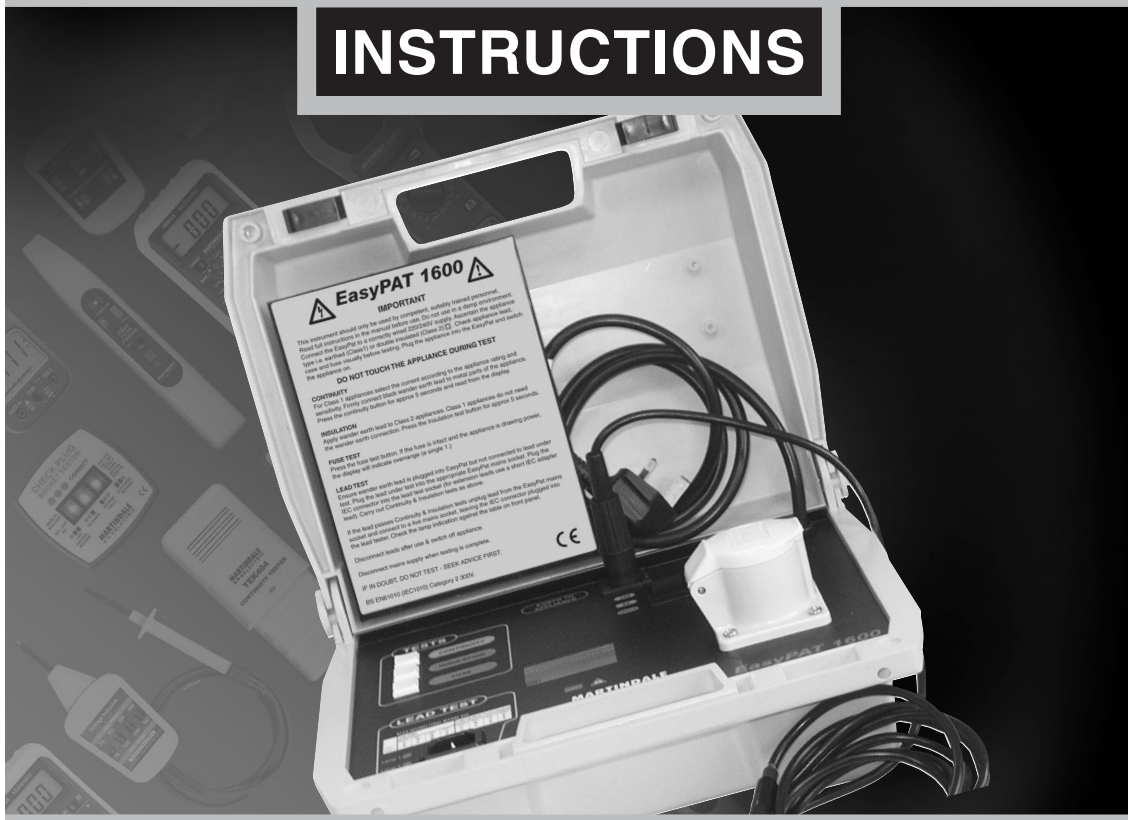
INSTRUCTIONS



EASYPAT 1600 PAT TESTER

MARTINDALE ELECTRIC

Trusted by professionals

SAFETY INFORMATION: Always read before proceeding.

WARNING

These instructions contain information and warnings that are necessary for safe operation and maintenance of the EasyPat. It is recommended that you read the instructions carefully and ensure the contents are understood. Failure to understand the instructions and comply with warnings and instructions herein can result in serious injury, damage or even death.

In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding 30V AC rms, 42V AC peak or 60V DC. Never exceed the maximum allowable input level for each function and range. Refer to the specifications for maximum inputs. Never touch exposed wiring, connections or live circuits.

The EasyPat must only be used in conditions and for the purpose which it has been constructed. Attention should be paid to safety instructions, technical specifications and use of the EastPat in dry surroundings.

Always inspect your meter, test leads and accessories for any sign of damage before use. If any abnormal conditions exist (e.g: broken test leads, cracked case, display not reading, etc.), do not attempt to use it. Do not expose it to direct sunlight, excessive temperature or moisture.

Keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk

SYMBOLS:


Equipment complies with relevant EU Directives


AC (Alternating Current)


Ground


Direct Current


Equipment protected by Double Insulation (Class II)


Caution - refer to accompanying documents


Caution - risk of electric shock

USER NOTES

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1. INTRODUCTION

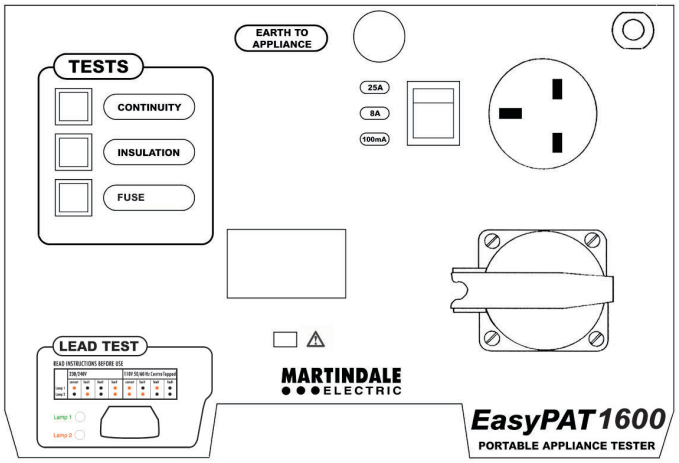


Fig. 1

1.1 Description

The Martindale EasyPat 1600 is an LCD indicating portable appliance tester, which is housed in a rugged injection moulded case with a removable lid. The base of the case contains the complete power and electronic circuitry. Basic safety instructions are presented on the inside of the lid.

Operation of the Martindale EasyPat 1600 is straightforward. The 3 main tests, continuity, insulation, and fuse, provided by this instrument are selected by depressing one of 3 push-button switches on the front panel. A three position rocker switch selects a test current of 100mA DC, 8A AC or 25A AC for the continuity test. While the button is depressed the relevant measurement is displayed on the large, custom LCD Display.

An IEC lead test facility is also included and can with the appropriate adaptors enable extension leads to be tested.

The Martindale EasyPat 1600 allows fast, simple testing on all tools, appliances and IT equipment in accordance with the recommendations of the Electricity At Work Act, the Health And Safety Executive, the Electronic And Business Equipment Association and the IEE. It should be noted that Class I equipment is earthed whereas Class II equipment is not earthed (double-insulated), usually denoted by the symbol □.

4. MAINTENANCE

4.1 Cleaning

Maintenance consists of periodic cleaning.

The exterior of the instrument can be cleaned with a dry clean cloth to remove any oil, grease or grime. Never use liquid solvents or detergents.

Repairs or servicing not covered in this manual should only be performed by qualified personnel.

4.2 Calibration

The recommended calibration interval is 12 months.
Martindale Electric will carry out routine calibration (on a chargeable basis) if the instrument is returned, carriage paid, to the address on the final page of this document. Alternatively, a chargeable collection and return service is available.

4.3 Repair & Service

There are no user serviceable parts in this unit. Return to Martindale Electric if faulty. Our service department will promptly quote to repair any faults that occur outside the warranty period.

4.4 Storage Conditions

The EasyPat should be kept in warm, dry conditions away from direct sources of heat or sunlight and in such a manner as to preserve the working life of the instrument.

4.5 Warranty

Faults in manufacture and materials are fully guaranteed for 12 months from date of invoice and will be rectified by us free of charge, provided the unit has not been tampered with and is returned to us with its housing unopened. Damage due to dropping, abuse or misuse is not covered by the guarantee. Nothing in these instructions reduces your statutory rights.

3.5 Lead Test

Ensure the earth wander lead is connected to the EasyPat. The crocodile clip however should not be used and must not be connected to the lead under test nor any earth path.

For IEC Leads
Plug the lead into the appropriate EasyPat mains socket. Plug the IEC connector into the EasyPat IEC socket.

For Extension Leads
Plug the lead into the appropriate EasyPat mains socket. Use the short 230V IEC lead EX-332 (or optional 110V LEAD EX-331) to connect the extension lead outlet to the EasyPat IEC socket.

Perform earth continuity and insulation tests as 3.1 & 3.3.

If earth and insulation tests have successfully passed, unplug the lead under test from the EasyPat 1600 mains socket, leaving the IEC connector plugged into the lead tester. Connect the lead under test to a live mains socket. Check the illumination of Lamp 1 & Lamp 2 against the table printed on the EasyPat front panel.

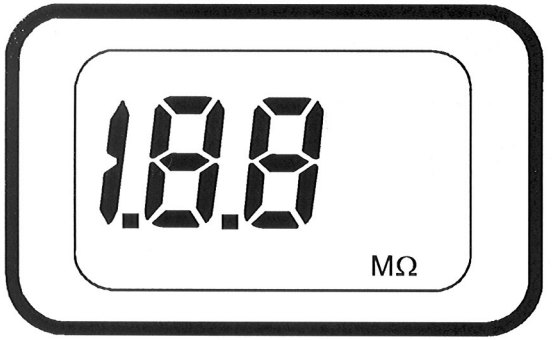


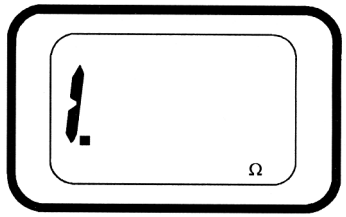
Fig . 2

The instrument can be connected to a 230V supply and can test 230V or 110V appliances.

Appliances to be tested should be connected into the appropriate test socket. If the appliance has an on/off switch, it should be set to the on position to ensure that the appliance is fully tested.

If the value for the measured parameter is outside the range of the EasyPat 1600 then the display will show overrange. This is indicated on the display by a single 1. with no following zeros. Fig. 3 shows the earth continuity display if the measured value is greater than 1.99Ω.

Fig. 3



Overrange indication on the earth continuity test is a failure. Overrange indication on the insulation test is a pass.

A red light which is located below the display illuminates if the instrument overheats during a continuity test sequence. All test functions are disabled for as long as this indicator is illuminated and will only be restored after the instrument has cooled and the red indicator has turned off. See Fig. 2.

1.2 Earth Continuity (8A and 25A)
For this test a voltage of 6V AC is applied between the earth pin of the plug of the appliance being tested and its exposed metal work, via the wander earth lead. The magnitude of the test current is either 8A or 25A selected by the three position rocker switch. The high current applied in this test verifies that the protective earth path will carry the fault current in the event of an insulation breakdown within the appliance.

1.3 Earth Continuity (100mA)
The test is similar to that described in 1.2 except that a constant current of 100mA DC is applied. This reduced current is required to test some IT equipment whose earth path could be damaged by the higher currents.

1.4 Insulation
500V DC is applied between the appliance phase and neutral joined together and earth to ensure that this insulation is at an acceptable level.

1.5 Fuse
The appliance under test is powered with a low AC voltage and the current to it is monitored but not measured. This verifies the fuse is intact (if fitted) and the appliance was correctly switched on during earth and insulation tests.

Maximum cable length for 0.5mm^2 on 0.1. limit = 2 metres
Maximum cable length for 0.5mm^2 on 0.2. limit = (0.2 /0.1) x 2 = 4 metres

NOTE: During this test high currents are generated by the EasyPat which will cause a rapid increase in the temperature within the instrument.
A thermal trip has been incorporated into the instrument to protect against over heating. When triggered it will inhibit all test functions and illuminate the red indicator which is located below the display. When the internal temperature returns within acceptable limits normal operation of the instrument will be restored and the red indicator will extinguish.

3.2 Earth Continuity (100mA)
This test is only required for earthed (Class I) appliances whose exposed metal work is solely for screening RF Radiation. Such metalwork could be damaged by the 25A or 8A test currents, and so the test current is limited to 100mA. The method of testing is similar to 3.1 except that the rocker switch is set to its 100mA position.

3.3 Insulation
The integrity of the insulation of the appliance is tested by applying 500V DC between phase/neutral linked together and earth. The measured insulation resistance is displayed.

Fit the wander earth clip to any exposed metal on the appliance. If there is no exposed metalwork on the appliance, metal foil should be wrapped around the appliance and the wander lead clip attached to the foil. If there are several separate metal parts which from a visual inspection are apparently electrical isolated, each should be tested.

Press and hold the ‘INSULATION’ button. The display will show the measured insulation value for as long as the button is held depressed. If filter components are fitted to the appliance being tested these may cause erroneous readings during the first few seconds of the test. To ensure a valid reading allow a few seconds before noting the displayed result.

NOTE: It is important to test the earth continuity in a Class I appliance prior to this test. Otherwise, this test may not be valid.

3.4 Fuse Test
Press the ‘FUSE TEST’ button. If the fuse is intact and the appliance is drawing power the display will normally indicate overrange (a single 1. see figure 3 page 5). Low power appliances drawing only a few mA (such as mobile phone chargers) will give a reading on the display (e.g. 3.7). If the display reads zero (0.0) the appliance is either switched off, has a blown fuse or is otherwise faulty.

3. OPERATING INSTRUCTIONS

The appliance under test should have a full visual inspection before any electrical tests are performed.

The wander earth lead is a three-wire lead that forms part of the measuring circuitry: It is important that the wander earth lead is plugged into the front plate of the EasyPat 1600 whenever the EasyPat is in use.

Connect the EasyPat 1600 to a suitable supply.

Plug the appliance under test into the appropriate socket provided on the EasyPat 1600. Ensure that the appliance is switched on and that it is suitably mounted.

The following tests can be carried out and should be performed in this sequence:

3.1 Earth Continuity (8A and 25A)

This test is only required for earthed (Class I) appliances.

The resistance of the earth circuit in the appliance and associated mains wire and plug is displayed.

Select the required test current, 8A or 25A, with the three position rocker switch.

Carefully clip the wander earth lead to any exposed earthed metal on the appliance then press and hold the 'CONTINUITY' button. The display will show the measured continuity value for the appliance for as long as the key is held down. To prevent overheating of the EasyPat and the earth circuit of the appliance this test should be as short as possible.

With appliances having 0.5mm^2 cable this should not be longer than 2-3 seconds and in any case the 'CONTINUITY' button should not be held down for more than 5 seconds for any one reading.

The following table gives a guide to the maximum cable length for a 0.1Ω pass limit.

Cross Section	**Max length**	**Cable rating**
0.5 mm^2	2 metres	3 amp
0.75mm^2	3 metres	6 amps
1.0 mm^2	4 metres	10 amps
1.5 mm^2	6 metres	15 amps
2.5 mm^2	10metres	20 amps

To establish the maximum cable lengths permissible for other limits of earth continuity divide the new limit by 0.1 and multiply by length for 0.1Ω, e.g.

Though all tests can be performed in any desired sequence, it is recommended that the earth continuity test is always carried out first on Class I appliances and if this results in a fail no further tests should be carried out on the appliance until the fault in its protective earthing has been rectified.

The results of the tests are displayed on a high contrast 2½ digit LCD which also indicates the parameter being tested (Ω, MΩ,) See Fig. 2.

1.6 Unpacking & Inspection

Before unpacking the EasyPat, examine the shipping carton for any sign of damage. Unpack and inspect the EasyPat for any damage. If there is any damage then consult your distributor immediately.

1.7 Spares & Accessories

Wander Earth Lead TL66 *
IEC Adaptor 230V: 230V 13A plug to IEC320 connector MAREX332 *
IEC Adaptor 110V: 110V BS4343 plug (yellow) to IEC320 connector MAREX331

Full range of appliance labels:	Small Pass Labels LAB1	
	Pass Labels POLY1	
	Pass Labels LAB2	
	Fail Labels FAIL1	
	Mark & Seal Labels MS1	
	Appliance Labels MARBAR1	
	Appliance Pass Labels MARBAR2	
3 Phase Adaptors	16A, 4 pin	MARTL151
	16A, 5 pin	MARTL152
	32A, 4 pin	MARTL153
	32A, 5 pin	MARTL154

* Included with EasyPat 1600

2. SPECIFICATIONS

2.1 Electrical Specification

Supply Voltage: 230V±10% 50/60Hz

Power Consumption: 10/220VA

EARTH CONTINUITY TEST (8A & 25A)

Test Voltage:	6V AC nominal with no load
Test Current:	25A AC nom @ 0.1Ω (25A) 8A AC nom @ 0.1Ω (8A)
Display Range:	0 - 1.99Ω
Accuracy of Indication:	±10% of reading ±2 digits

EARTH CONTINUITY TEST (100mA)

Test Voltage:	130mV DC nominal open circuit
Test Current:	100mA DC nominal constant current
Range:	0 - 1.99Ω
Accuracy of Indication:	±10% of reading ±2 digit

INSULATION TEST

Test Voltage:	500V DC -0% +20% at 0.5MΩ
Short Circuit Current:	1.5mA DC nominal
Display Range:	0 - 19.9MΩ
Accuracy Of Indication:	±5% ±1 digit of reading

FUSE TEST

Test Voltage:	6V AC nominal
Over range threshold:	10kΩ nominal
Zero range threshold:	800kΩ nominal

LEADS

Mains:	1.7M fixed lead, with a 13A moulded plug
Earth Continuity:	3M long, detachable lead, heavy duty crocodile/alligator clip.
230V IEC Adaptor:	13A BS1363 plug to IEC320 connector, 230mm long.

SOCKETS

Mains:	230V 13A to BS 1363 110V 16A to BS4343
Leadtest:	IEC320

LAMPS

Over Temperature:	Red light emitting diode which illuminates when the temperature limit for the instruments has been exceeded.
Lamp 1/ Lamp 2:	RED LED's which illuminate to indicate lead 'polarity'

FUSES

Plug:	13A 1"HBC (Ceramic)
Internal:	3.15A (F) 5x20mm, HBC (Ceramic) Internal fuse is not user replaceable.

SAFETY

EMC:	Meets BS EN 50081-1 BS EN 50082-1
LVD:	Meets BS EN 61010-1

2.2 Mechanical Specification

CASE

Size:	330x263x144mm
Material:	ABS/Polycarbonate
Colour:	Yellow/Clear
Weight:	4kg nominal

2.3 Environmental Specification

TEMPERATURE

Operating:	0 °C to 35°C
Storage:	-10 °C to 50°C

This instrument has been designed to be used in a clean dry environment.
Do not use the instrument outdoors in wet conditions.