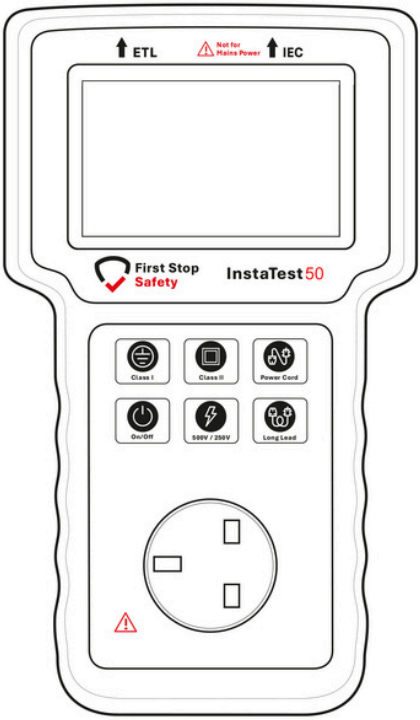
InstaTest50 PAT Tester (IT50)

User Manual



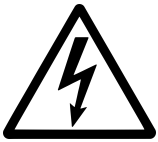
Version 1.0

Index

1. Important Information 3
   a. Recycling
   b. Warranty
   c. Limited Warranty & Limitation of Liability
   d. Lifetime Warranty
   e. Equipment Supplied
   f. Accessories and Consumables
2. Product Overview 5
   a. Introduction
   b. Powering Up the Unit
   c. Test Overview
3. Testing 11
   a. Class I Equipment
   b. Class II Equipment
   c. Power Cords and Extension Leads
4. Battery and Charging 24
5. Maintenance 26
6. Troubleshooting 26
   a. Error Codes
7. Service and Calibration 28
8. Specification 29
9. Accessories and Consumables 31

1. Important Information

This product is intended for use by adequately trained persons. Please ensure that all safety warnings in this manual are adhered to, otherwise there may be a risk of electric shock or danger. Hazards are indicated in this manual by the following symbols:



Caution, risk of electric shock.
Instructions must be followed to prevent electric shock hazard to users.

Caution, risk of danger.
Instructions must be followed to prevent the risk of danger to users.

Before use, always check that the equipment is clean, dry and undamaged. Check all test leads for signs of wear or damage, especially to insulation. Replace if necessary.

a. Recycling

When this product reaches the end of its life, please dispose of it in an environmentally-friendly manner. Please contact your local council for details of recycling schemes in your area.

b. Warranty

Please register your warranty when you receive your new PAT tester. We will send you a reminder when your equipment is due for calibration each year. You can register your warranty at www.firststopsafety.co.uk/lifetime-warranty-registration.

c. Limited Warranty & Limitation of Liability

First Stop Safety guarantees this product and accessories to be free from defects in material and workmanship under normal use and service for a period of 1 year from the date of delivery.

d. Lifetime Warranty

First Stop Safety offers a free Lifetime Warranty on all First Stop Safety PAT testers, provided that the product is returned annually to First Stop Safety for calibration. The product must have a valid certificate of calibration issued by First Stop Safety and must not have been repaired or modified by a third party.

Full details are available on our website at www.firststopsafety.co.uk/terms-conditions.

e. Equipment Supplied

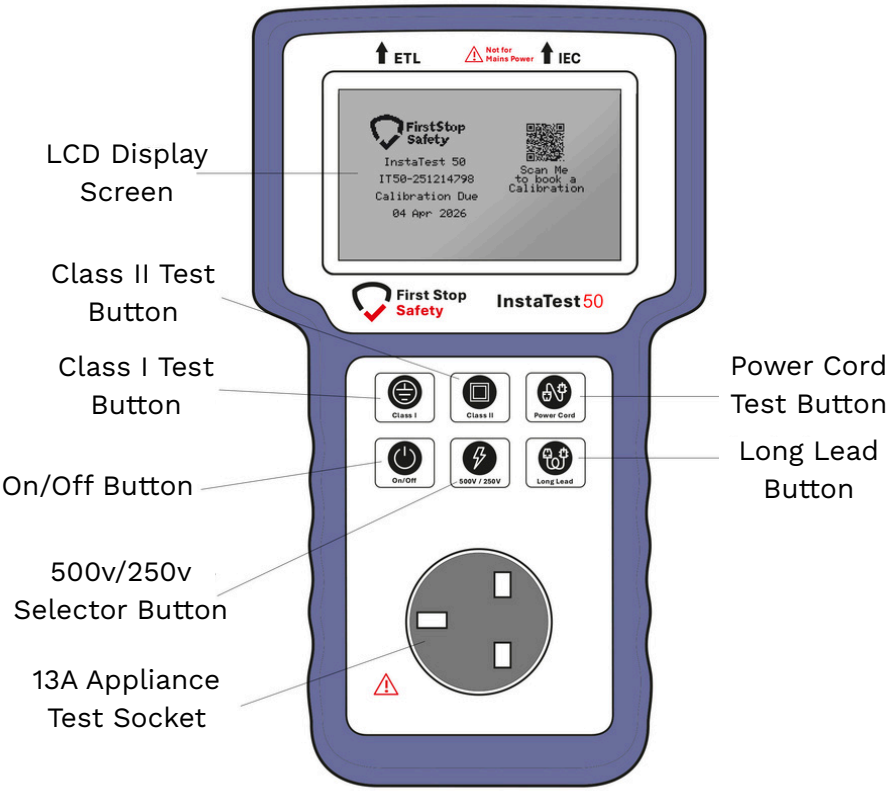
The IT50 is supplied with the following accessories:

- Earth Test Lead (ETL) with a probe tip and a plug-in crocodile clip
- Short IEC lead
- USB Lead and Mains charger
- Carry case

f. Accessories and Consumables

Additional accessories for testing single phase 16A and 32A, 240v and 120v equipment, 3-phase equipment, and a range of pass and fail labels are included in section 9 of this manual, or available on the First Stop Safety website at www.firststopsafety.co.uk/pat-tester-accessories.

2. Product Overview



Caution!
Never apply mains voltage to any sockets on the tester.

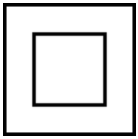
ETL Test Socket
(Earth Test Lead)
IEC Lead
Test Socket

USB Charging
Socket

a. Introduction

The IT150 is a portable, handheld PAT testing unit powered by a rechargeable battery. It is used to carry out routine electrical safety tests on a range of appliances. The tester has three main classes of test:

1. Class I (appliances with a protective Earth connection)



2. Class II (double insulated appliances which do not require a protective Earth connection) - denoted by this symbol on the rating plate of the appliance.

Note that the 5th Edition IET Code of Practice introduces a new class of equipment, known as Class II FE. This is a device with Class II insulation but also having a functional Earth connection.

The purpose of the functional Earth connection is typically to provide filtering to meet EMC emissions standards, and many examples can be found in IT equipment such as laptop chargers and monitors. The Code of Practice states that these devices should be tested and inspected as Class II devices.

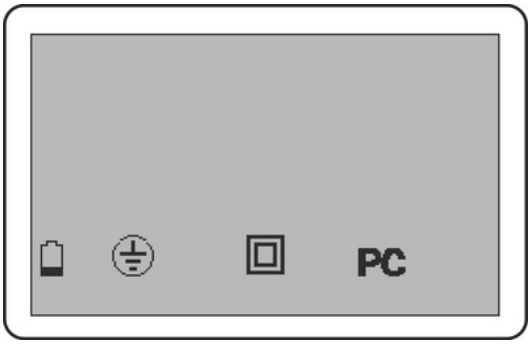
3. Power cord testing for IEC cables, extension leads, multiway adaptors and PAT adaptors.

b. Powering Up the Unit

Press and hold the On/Off button for 2 seconds. The device will turn on and display the following welcome screen:

The screen shows the model and serial number. If the product has been calibrated with us previously, it will also show the calibration date.

We recommend that the unit is calibrated every year to ensure that everything is working correctly and accurately. If you require the unit to be calibrated, please use the QR code shown on the screen to visit our website and book your calibration, or visit www.firststopsafety.co.uk/our-calibration-service.
Press any key to clear the display and begin testing. The screen will now show the following:



Please note: The IT50 will automatically power down if left idle for more than three minutes.

c. Test Overview

The IT50 carries out three basic test functions and gives results in a simple Pass/Fail. Not all tests are applicable to all types of equipment. The tests are described below:

Earth Continuity

The tester uses a constant current of 180mA, passed through the Earth wiring and chassis of the equipment under test in order to check the Earth Continuity resistance. In addition to this, the IT50 also has a Spike or zap circuit which gives a very brief, 1ms, high current pulse which has the benefit of making a good electrical connection between any tarnished surfaces on plugs and sockets resulting in a more accurate and repeatable test measurement.

Insulation Resistance

The tester connects the Live and Neutral inputs of the appliance together and then applies either 500v dc or 250v dc between this point and the Earth connection. The current passing through the Earth connection is measured and the insulation resistance can then be calculated. The purpose of this test is to check that the insulation of the appliance can withstand the specified voltage. The 250v test is the default setting which will give a correct reading when testing equipment containing surge suppressors which can be triggered by 500v and would otherwise give a falsely low resistance reading. The higher voltage 500v range can be selected by pressing the 500v/250v selector button. The voltage selection returns back to the default 250v setting after the test and would need to be selected again to carry out a subsequent 500v test. The voltage selection is indicated on the screen.

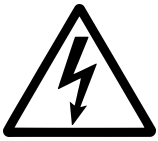
Polarity Test

The tester applies a low voltage, constant current source to the Live pin of the extension lead or power cord under test. It then looks for this signal appearing at the Live input of the IEC test socket and also checks the Neutral pin of the IEC test socket. The same test is then repeated using the Neutral pin of the lead under test. The tester can then determine if the lead is wired correctly without any open circuit, short circuit, or broken connections. This is indicated by a Pass or Fail reading on the screen.

3. Testing

a. Class I Equipment

The Class I test is for all appliances which rely on an Earth connection to protect the user from electric shock in the event of a fault.



Always carry out a visual inspection of the appliance and power cord to check for damage before carrying out any electrical tests.

Always ensure that the equipment under test is disconnected from the Mains supply.

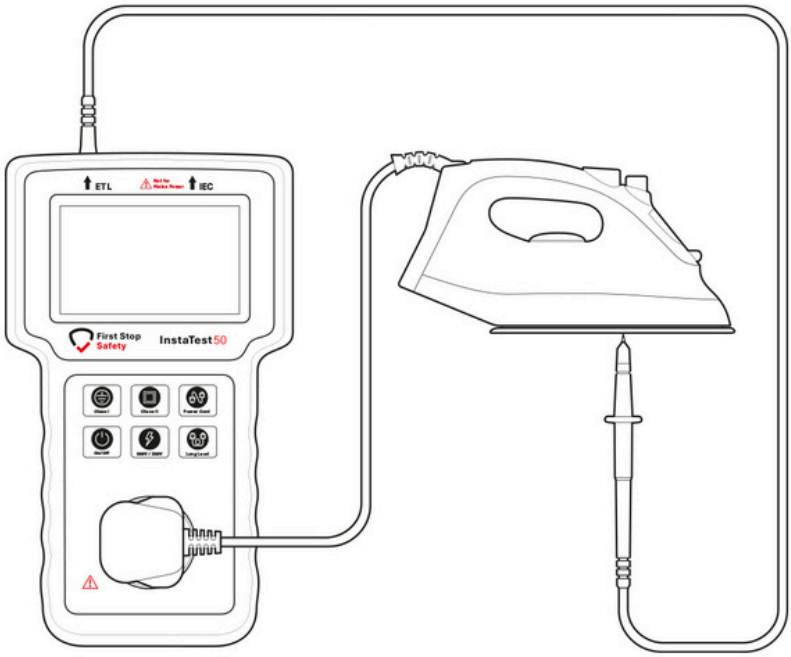
Warning: If the appliance fails the visual inspection, do not carry out any electrical tests until the fault(s) have been rectified.

Connect the Earth Test Lead (ETL) to the socket on the top panel of the IT50. Use the probe tip or fit the crocodile clip if required.

Connect the ETL to any accessible metalwork on the outside of the appliance. You may need to try several different areas in order to obtain a good connection.

Plug the appliance into the Mains Test socket on the front of the IT50.

Example of a Class I test:



If the appliance has an On/Off switch, make sure the switch is in the On position.

Select the Insulation Test Voltage for this test. The default setting is 250v in order to prevent any surge protection devices from operating and giving a false resistance reading. Use the 500v/250v button to increase the test voltage to 500v if required. This will be displayed on the screen. The voltage selection will return to the default setting of 250v after the test has completed.

Press the Class I button to begin the test.

The IT50 will first check that the appliance is not connected to the Mains supply. The following warning will be shown if it detects an abnormal voltage on the Mains Test socket or IEC test socket.

Assuming that no Mains voltages are present, the IT50 will begin its tests by first checking that the appliance is switched on. If it is unable to detect that the appliance is switched on, the IT50 will display the following animated warning:

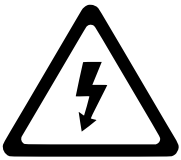
Switch on the appliance to continue the test or press and hold the Class I button again to override the warning. In some cases, such as testing toasters, the pop-up lever will need to be held down for the duration of the test as this acts as the on/off switch for the toaster.

The IT50 will first carry out an Earth Continuity test. This will measure the resistance between the Earth terminal of the Mains plug on the appliance and the exposed metal parts on the outside of the appliance, via the Earth Test Lead.

The Pass/Fail threshold for this test is set at 250mΩ. Readings below this level will be indicated by a tick; readings above this level will be indicated by a cross.

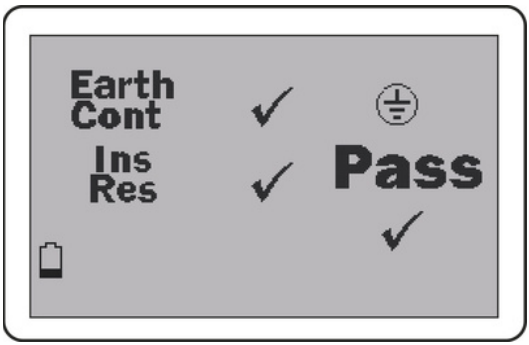
If the reading is above the Fail level, the following tests will be invalid as a good Earth connection is required for the following parts of the test.

The IT50 will then continue with the Insulation Resistance test.



The IT50 will apply 250v or 500v to the appliance to measure the insulation resistance of the appliance. **Do not touch the appliance during the test.**

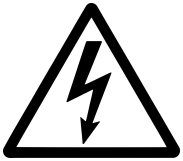
The Pass/Fail threshold for this test is set at 2.0MΩ A tick or cross will show whether the reading is within acceptable limits or not. The IET recommended limit for a Class I test is only 1MΩ but the IT50 adds in a safety margin, so that any equipment that is very close to the Fail limit and is only just passing will be shown as a Fail.



b. Class II Equipment

The Class II test is for all appliances which do not have an Earth connection and rely on double, or reinforced, insulation for protection. These are indicated by a double square symbol on the appliance rating plate. This test also applies to Class II FE appliances.

Always carry out a visual inspection of the appliance and power cord to check for damage before carrying out any electrical tests.

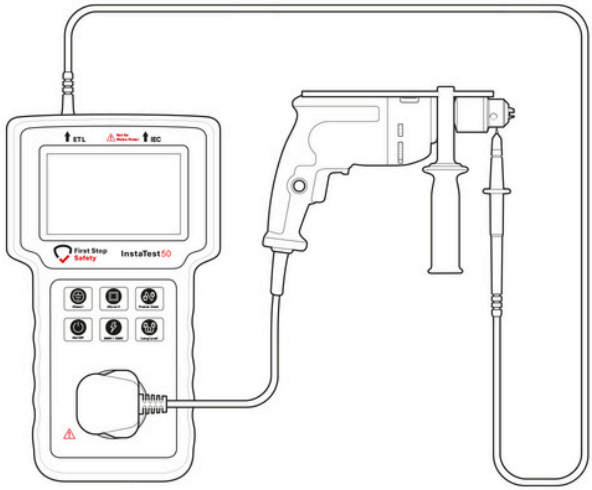


Always ensure that the equipment under test is disconnected from the Mains supply.
If the appliance fails the visual inspection, do not carry out any electrical tests until the fault(s) have been rectified.

Connect the Earth Test Lead (ETL) to the socket on the top panel of the IT50. Use the probe tip or fit the crocodile clip if required. Connect the ETL to any accessible metalwork on the outside of the appliance.

Plug the appliance into the Mains Test socket on the front of the IT50.

Example of a Class II test:



If the appliance has an On/Off switch, make sure the switch is in the On position.

Select the Insulation Test Voltage for this test. The default setting is 250v in order to prevent any surge protection devices from operating and giving a false resistance reading. Use the 500v/250v button to increase the test voltage to 500v if required. This will be displayed on the screen. The voltage selection will return to the default setting of 250v after the test has completed.

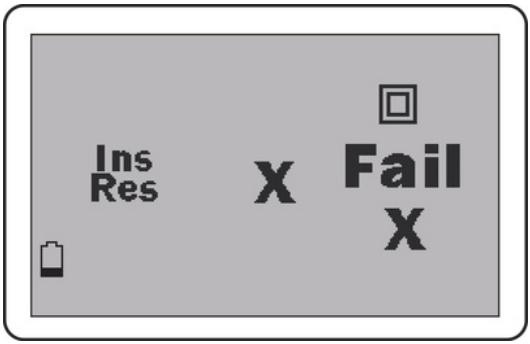
Press the Class II button to begin the test.

The IT50 will first check that the appliance is not connected to the Mains supply. A warning will be shown if it detects an abnormal voltage on the Mains Test socket or IEC test socket.

Assuming that no Mains voltages are present, the IT50 will begin its tests by first checking that the appliance is switched on. The IT50 will display the following animated warning if it is unable to detect that the appliance is switched on.

Switch on the appliance to continue the test or press and hold the Class II button again to override the warning.

The IT50 will apply 250v or 500v to the appliance to measure the insulation resistance of the appliance. **Do not touch the appliance during the test. Note the warning triangle that appears on the screen when the high voltage generator is active.**



The Pass/Fail threshold for this test is set at 4.0MΩ A tick or cross will show whether the reading is within acceptable limits or not. The IET recommended limit for a Class II test is only 2MΩ but the IT50 adds in a safety margin, so that any equipment that is very close to the Fail limit and is only just passing will be shown as a Fail.

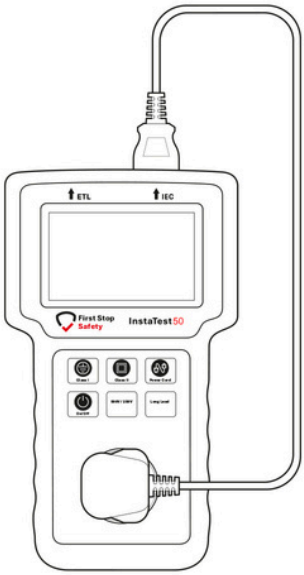
c. Power Cords and Extension Leads

This test is used for testing power cords such as IEC type leads found on many appliances and for testing mains extension leads and multi-way adaptors.

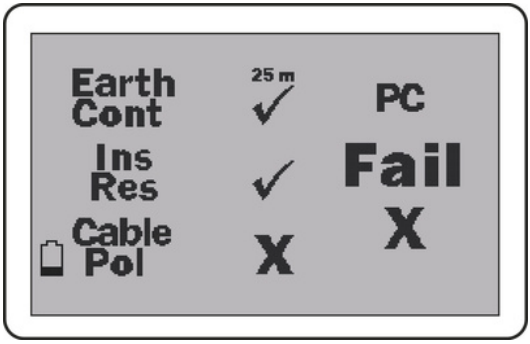
The IEC test socket on the IT50 is not designed to be connected to Mains voltages. Ensure that all test leads are disconnected from the Mains supply before connecting to the IT50.

Carry out a thorough visual inspection before performing any electrical tests. Check that the correct fuse is fitted for the size of cable and that all cable clamps and strain relief devices are in place. Always uncoil long extension leads and check the whole cable length for signs of damage. When testing multi-way adaptors, test each individual socket.

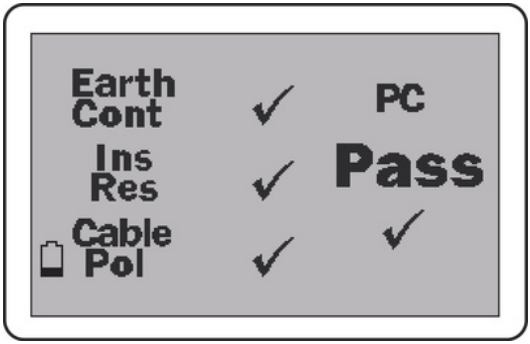
Example of an IEC test:



The Earth Continuity resistance will be influenced by the length of the cable. A longer cable will have a higher resistance than a shorter cable. This can be factored into the test results by using the Long Lead button. The default limit is set for a 10m cable length. Press the Long Lead button to increase the cable length to 25m or 45m. The Fail limit will increase accordingly.

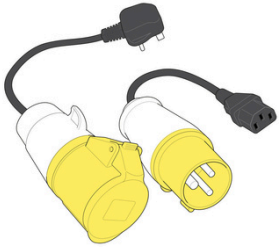


Connect the Mains plug of the power cord or extension lead to the test socket on the front of the IT50. If you are testing an IEC cable, plug the IEC end into the IEC socket on the rear of the IT50. When testing an extension lead, use the short IEC lead to connect from the extension lead back to the IEC socket on the rear of the IT50.

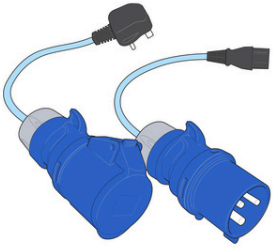


A range of test adaptors are available for testing 110v, 230v and 415v high current leads. These can be purchased directly from First Stop Safety at www.firststopsafety.co.uk/pat-testing-adaptors. A full range of accessories and consumables is included in section 9 of this manual.

Connect the Mains plug of the power cord or extension lead to the test socket on the front of the IT50. If you are testing an IEC cable, plug the IEC end into the IEC socket on the top of the IT50. When testing an extension lead, use the short IEC lead to connect from the extension lead back to the IEC socket on the top of the IT50.



110v PAT testing adaptor



230v PAT testing adaptor

415v PAT testing adaptor

Select the Insulation Test voltage using the 500v/250v button. The default setting of the lower voltage will be required for any extension leads fitted with surge protection devices as the 500v test will trigger the surge protection and give a false resistance reading.

Press the Power Cord button to begin the tests.
The IT50 will first check that the power cord is not connected to the Mains supply. A warning will be shown if it detects an abnormal voltage on the Mains Test socket or IEC test socket.

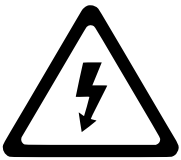
Assuming that no Mains voltages are present, the IT50 will begin its tests.

The IT50 will first carry out an Earth Continuity test. This will measure the resistance between the Earth terminal of the Mains plug through the extension lead or power cable to the socket on the end of the lead, via the Short IEC Lead, or directly into the IEC socket of the IT50.

The display will show a tick or cross to indicate a Pass or Fail. The Pass / Fail limit will be determined by the Long Lead setting or will be set to the default of 250mΩ. Readings below this level will be indicated by a tick; readings above this level will be indicated by a cross.

If the reading is above the Pass level, the following tests will be invalid as a good Earth connection is required for the following parts of the test.

The IT50 will then continue with the Insulation Resistance test.



The IT50 will apply 500v or 250v to the power cord to measure the insulation resistance of the lead. Do not touch the leads during the test.

The display will show the resistance reading. A tick or cross will show whether the reading is within acceptable limits or not.
A low reading when testing on the 500v range may be caused by the extension lead having a surge protection device or a neon indicator lamp. Switch to the default 250v range and repeat the test if this is the case. If you are still in any doubt about the validity of the results, please consult a suitably qualified person.

The IT50 will then check the wiring of the power cord to ensure that the Live connection at the plug is connected to the Live connection at the socket, and the same for the Neutral connection. The tester will indicate a Fail if either connection is open circuit, crossed over or short circuit.

4. Battery and Charging

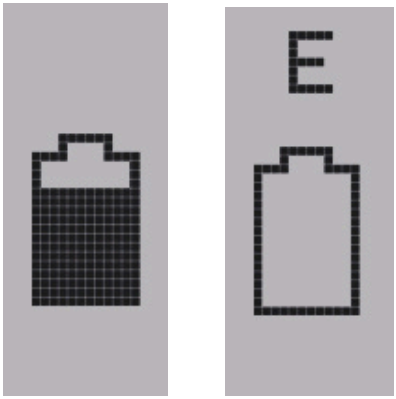
The IT50 is a battery powered device and contains a 3.6v rechargeable lithium battery. The unit features several safety devices to protect the user and battery from misuse, but the following precautions must be observed.

Do not expose the unit to temperatures above 40°c or below 0°c.

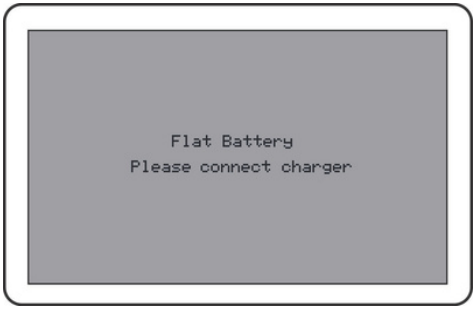
Do not allow liquids to enter the unit.

Do not leave the unit charging unattended overnight.

The battery level is shown by the meter on the lower left corner of the screen. The level goes down as the battery charge drops. When the battery is almost flat, an E symbol will appear above the battery symbol to show that it is almost empty. Recharge the battery at this point.



Eventually, the IT50 will display a flat battery warning and will power down to prevent over-discharge of the battery.



Connect the IT50 to the supplied USB lead and charger. The screen will show that the battery is charging. Due to the large capacity of the battery, a full charge may take many hours to complete, although it is not necessary to fully charge the battery before use.

The IT50 may be used while charging is taking place, although extensive use may discharge the battery faster than the charger can replenish it. The screen will show a full battery symbol when charging is complete. Disconnect from the charger when finished.

The IT50 will not allow charging to take place if the temperature is below 0°c or above 40°c. This will be indicated by the thermometer icon on the screen as shown. The unit will not operate if the temperature is outside these limits.

Constant exposure to temperatures outside the 0°c to 40°c range will harm the battery and may cause premature failure. Ensure that the IT50 is not exposed to extreme temperatures such as being left near a window in strong sunlight, inside a vehicle in hot weather or on or near to a heating source such as a radiator or fire.

5. Maintenance

Clean the exterior of the unit with a dry cloth. Do not use any solvents or abrasive materials. Do not use any liquids which may penetrate inside the casing.

Visually inspect all test leads for signs of wear and tear or damage. Replace any defective leads before using the tester again. Replacement parts and additional adaptors may be bought from our website, www.firststopsafety.co.uk.

6. Troubleshooting

The IT50 conducts a number of internal checks to ensure that each test function is working correctly. Any unexpected errors will be displayed as an error code on the screen, followed by a brief description of the fault. The unit will then power down after a short delay.

In all cases, we recommend that you first try testing a known good appliance to verify that the fault is still present and not being caused by trying to test a faulty appliance.

Under no circumstances should you attempt to open or remove the covers to gain access to the internal circuitry. The IT50 generates high voltages which will cause electric shock and injury.

Error Codes

1. **HV Generator too high**

   The internal high voltage generator used for testing Insulation Resistance is producing too much voltage.

2. **HV Generator too low**

   The internal high voltage generator used for testing Insulation Resistance is not producing enough voltage. This may be due to trying to test a faulty appliance with a short circuit or very low insulation resistance. In this case, the high voltage generator will not be able to source enough power to provide the required test voltage. Check a known working appliance to verify the fault.

3. & 4. **CC Generator too high/too low**

   The constant current generator that produces the test current for the Earth Continuity test is not producing the correct current.

5. **Battery Temperature**

   The battery temperature is outside the safe working limit of 0°c to 40°c. Ensure that the unit is at room temperature and is not being exposed to extreme temperatures such as being left inside a vehicle on a hot day or being left in direct sunlight or close to a heat source. If the unit is at room temperature but the battery temperature error still exists, please contact First Stop Safety for advice.

6. **Spike Voltage too low**

   The unit generates an internal voltage to produce the brief current spike during the Earth Continuity test. This error indicates a fault with the circuit. Please contact First Stop Safety to arrange to have your product repaired.

For further advice or support with your product, please email First Stop Safety at sales@firststopsafety.co.uk, or call us on (+44) 01904 791050.

7. Service and Calibration

The IET recommend that all measuring devices are checked and calibrated at regular intervals to ensure that they are operating correctly and within specifications.

First Stop Safety provide a calibration service for all of their products, including the IT50, and also PAT testers made by other manufacturers, including Seaward, Kewtech, Martindale and Megger.

The calibration service involves checking for accuracy of all measurement functions and providing any necessary firmware or hardware upgrades where required (note that upgrades only apply to equipment built by First Stop Safety). A calibration certificate is issued at the end of the calibration and test results are recorded on our systems.

We recommend that our PAT testers are calibrated annually. For full details, please scan the QR code on the IT50 screen or visit www.firststopsafety.co.uk/our-calibration-service.

8. Specification

- **Earth Continuity**
  - Accuracy 5%
  - Test Current 180mA
  - O/C Voltage 3.6v
- **Insulation Resistance**
  - Accuracy 5%
  - Test Voltage 500v 10% or 250v 10%
  - Max. Load 300kΩ
- **Power On Check**
  - Test Voltage 30v rms, 50Hz
- **Polarity Test**
  - Test Current 1.25mA
  - O/C Voltage 30v
  - Check for Live and Neutral Open Circuit, Live and Neutral Crossed, Live and Neutral Short Circuit.
- **Battery and Charging**
  - Lithium Ion 3.6v 2600mAh
  - Charging 5v USB 500mA max.

- **Preset Pass/Fail Limits**

	Class I	Class II	Power Cord
Earth Continuity	250 mΩ*	N/A	250mΩ*
Insulation Resistance	2.0 MΩ	4.0 MΩ	2.0 MΩ

*Default setting for 1m lead length. See table below for Long Lead settings.

Lead Length (m)	Threshold (mΩ)
1	250
25	600
45	1000

9. Accessories & Consumables

All of the accessories and consumables listed are available to purchase via the First Stop Safety website, you can access this via the QR code or by the following web address:
www.firststopsafety.co.uk/home

FirstPrint Bluetooth PAT Tester Label Printer

Print PAT Test labels quickly and easily with the FirstPrint Label Printer.
This printer connects to your phone via Bluetooth, giving you easy access to our prepared label template and allowing you to print labels in bulk.

InstaTest50 USB Charger and USB cable

In the event of loss, replacement cables and chargers are available on the First Stop Safety website.

Earth Test Lead (ETL) Probe with Crocodile Clip

In the event of loss or damage, replacement ETLs and crocodile clips are available on the First Stop Safety website.

IEC Test Leads & Adaptors

First Stop Safety provides a range of IEC leads and adaptors, available to purchase on their website.

Pass Labels

PAT Testing pass labels are available to purchase from the First Stop Safety website. Available types include:

- Pass labels (to be handwritten)
- FirstPrint Label Printer refills (to be printed)

Fail Labels

Used to mark appliances that have failed visual inspection or testing.

Mixed Fuse Labels

To show unauthorised opening of plugs following formal visual inspection. Pack of 500 available from the First Stop Safety website. Contains:

- 3 amp x100
- 5 amp x100
- 13 amp x300

www.firststopsafety.co.uk
sales@firststopsafety.co.uk
01904 791050

First Stop Safety,
11 Glaisdale Road,
Northminster Business Park,
York,
North Yorkshire,
YO26 6QT

First Stop Safety is a Trading Division of TeleProducts Ltd.