KEWTECH

Kewtech KT77

Portable Appliance Tester

Instruction Manual

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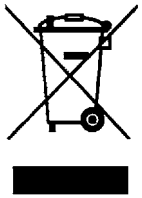
Disposal of Old Product



This product has been designed and manufactured with high quality materials and components that can be recycled and reused.

When the crossed out wheelie bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.

Please familiarise yourself with the appropriate local separate collection system for electrical and electronic products.

Please dispose of this product according to local regulations. Do not dispose of this product along with normal waste material. The correct disposal of this product will help prevent potential negative consequences for the environment and human health.

Declaration of Conformity

For the

Kewtech KT77 Portable Appliance Tester

Statement of Conformity

Based on test results using appropriate standards, the product is in conformity with Electromagnetic Compatibility Directive 89/336/EEC and Low Voltage Directive 73/23/EEC and bears a CE mark in accordance with directive 93/68/EEC.

Standards used:

BS EN61010-1 (2001) Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

BS EN61326-1 (2006) Electrical equipment for measurement, control and laboratory use – EMC requirements

The tests have been performed in a typical configuration.

This Conformity is indicated by the symbol CE, i.e. “Conformité Européenne

Before Starting

1. Check that all the component parts are present:-
    - Kewtech KT77 Tester
    - Earth bond lead
    - Mains cord
    - Instruction Manual
2. Read the operating instructions fully before conducting any tests.
3. Contact Kewtech if you need information on training for Portable Appliance Testing.
4. Data may be lost or altered in virtually any electronic memory under certain circumstances. Therefore Kewtech assumes no responsibility for financial losses or claims due to data lost or otherwise rendered unusable whether as a result of abuse, improper use, defects, disregard of operating instructions or procedures, or any other allied causes.
5. Kewtech reserve the right to update the software in instruments returned to themselves for repair or otherwise, without notifying the customer previously. Kewtech can be contacted at:

The Service Department
Kewtech Corporation Ltd
Unit 2, Shaw Wood Business Park
Shaw Wood Way
Doncaster
DN2 5TB

Tel: 01302 761044
Fax: 01302 321993
Email: sales@kewtechcorp.com

Safety

Note

Please read the following Safety Instructions before use !

Safety Precautions

The manual contains specific warning and caution statements where they apply.

A Warning will identify the conditions and actions that pose a hazard(s) to the user.

A caution will identify the conditions and actions that may damage the Tester.

Symbols used within this manual and on the Tester are shown below:

	Risk of electric shock
	Warning of potential hazard
	Conformité Européenne

Use of the instrument in a manner not specified may impair safety. Read the following safety information carefully before attempting to operate the instrument.

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Warning

Due to the potential hazards associated with any electrical circuit it is important that the user is familiar with the instructions covering the capabilities and operation of this instrument. The user should ensure that all reasonable safety precautions are followed and if any doubt exists should seek advice before proceeding.

This product is designed for use by suitably trained competent personnel and should be operated strictly in accordance with the instructions supplied.

Failure to comply with these instructions may expose the user to an electrical hazard.

This Tester performs a number of electrical tests which involve high voltages and high currents. Never touch the appliance being tested, or the test leads, whilst a test is in progress.

Always check all test leads for signs of damage prior to use. Never use damaged or defective leads.

Always ensure the mains supply to the Tester provides an adequate earth.

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

Should the Tester behave abnormally do not continue with the testing. Disconnect immediately and contact Kewtech for servicing (see Chapter 5 - Maintaining the Tester).

Chapter 1

INTRODUCING THE TESTER

Introduction

The Kewtech KT77 Portable Appliance Tester is a powerful tool to assist in the analysis of the safety of portable electrical and electronic equipment. A range of tests are provided, with innovative features to aid difficult test situations, which allow testing of a wide variety of equipment.

The Tester is designed to be easy to use, and also includes the following innovative features:-

- Stores up to 2400 results including appliances, location, site, date and time in non-volatile flash memory
- Accurate earth bond and leakage measurement even when multiple earth paths exist
- Full QWERTY keyboard with fast keys.
- Full graphics display, Real-time clock
- Connects to PC, Barcode reader and USB flash drive
- Software adjusts the user interface to differing levels of expertise
- Auto testcode generation
- Fast Start-up
- Super fast download up to 10 times quicker than existing testers

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Included in the box:

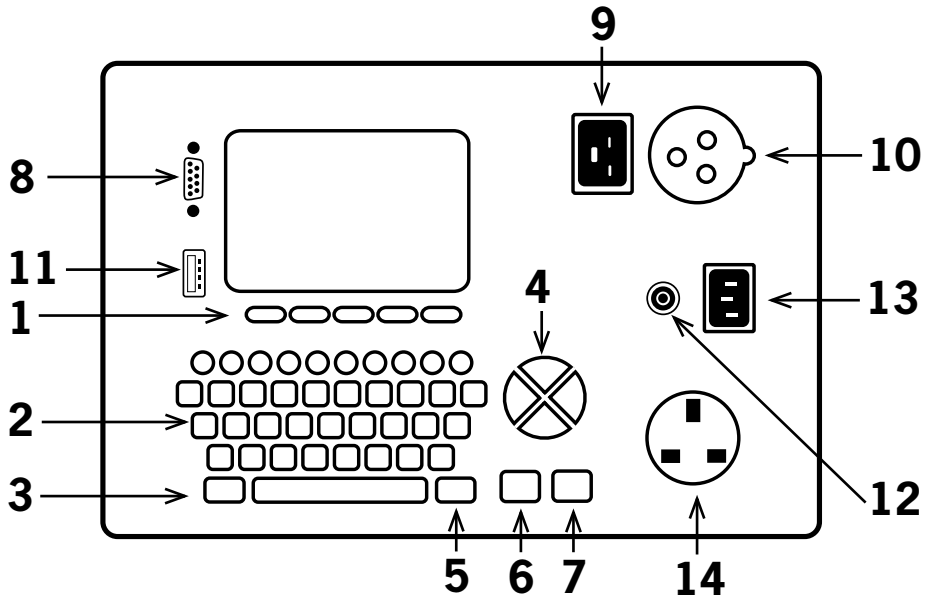
Kewtech KT77

Mains Cord

Earth Bond Lead

KEYBOARD AND PANEL

Item Number	Part
1	Fast Keys
2	Alpha-numeric Keyboard
3	Delete and Space Keys
4	Cursor Keys
5	Enter Key
6	Red / No / Abort Key / stop
7	Green / Yes / Go / Enter Key / start



Item Number	Part
14	Mains socket for appliance to be tested
10	110V Socket
13	IEC Lead Connector
8	RS232 for Scanners and Download Lead
12	Earth Bond Lead Connector
9	Mains Supply Lead
11	USB Port

The user is provided with a 320 x 240 1/4 VGA Graphical Liquid Crystal Display (LCD). The keyboard consists of an alphanumeric keyboard, together with specific function keys. To the bottom of the screen are five function keys, which allow the user fast access to options displayed on the Display

There are four cursor keys used to navigate the menus.

To the bottom of the keyboard are the two main function keys, which perform, execute and cancel function as well as Start and Stop.

The Kewtech KT77 also has the ability to use non-standard characters which can be displayed by pressing the 'Symbols' key during text entry. Simply use the cursor keys to highlight the required character and press the Green button. You can also use numeric keys 1-9 to move you to extreme points of the symbol matrix.

The Shift can also be used when editing text

Shift and	Result
Left key	Go to start of line
Right key	Go to end of line
Up key	Go to start of text
Down key	Go to end of text
Delete key	Delete character under cursor

DEFINITIONS

Equipment Under Test	The electrical / electronic apparatus (EUT) which is the subject of testing.
Powered Tests -	The EUT is supplied with mains voltage, with measurement being taken of leakage currents.
Fast keys -	The five keys directly under the screen.These are used to select menu options displayed on the screen.
Tester -	The Kewtech KT77 Portable Appliance Tester
Un-powered Tests -	The EUT is the subject of electrical tests using stimuli generated within the Tester. The EUT is not provided with mains power.
User -	The test technician using the Tester to perform tests on a EUT

QUICK REFERENCE

Editing the date in all modes
On delivery of the Kewtech KT77 it is necessary to ensure that the correct date and time are stored. Once stored the date/time is retained in memory and does not need to be entered again. To edit the date: from the MAIN MENU select SETUP, select, CHANGE DATE/TIME, use the cursor keys to highlight the digit to be changed. To store the changed time/date setting, return to the MAIN MENU. The unit will then display the message STORING SYSTEM DATA.

Entering a User Name
On delivery of Kewtech KT77 it is necessary to ensure that a user name(s) is stored. To edit the user list: from the MAIN MENU select SETUP, select EDIT USER LIST / OPTIONS, use the cursor keys and select a name. Press the Green button to display the "EDIT USER SETTINGS" screen. Press the Green button to edit the NAME, use the keyboard to type in the desired name and press the Green button to enable the OK Fast key. To save the changes and return to the previous menu select the OK fast key.

Working with PC Software
The Kewtech KT77 can download data in two formats, Simply Pats and SSS. Simply Pats is used for Kewtech's Pat Manager and SSS is used for Seaward software and Robin / Fluke Power Pat Plus software.

Note: When using Pat Manager the location and site fields are limited to 10 characters. If more are entered then only the first 10 characters are used in Pat Manager

Storing Appliance Test Results in Automatic mode
The Appliance Test Results will not be stored until you leave the COMMENTS screen after a test. Select the OK fast key to leave the COMMENTS screen. When storing results the message STORING RESULTS is displayed.

Storing Appliance Test Results in Manual mode
The Appliance Test Results will not be stored until a Manual Appliance Sequence has been completed. To do this first press the letter A on the key pad, this will prompt you for an Appliance number, enter this and press the Green button twice (if the Site and Location do not require to be changed). Perform the tests required then press the letter C on the key pad, this will prompt you to enter COMMENTS, select the OK Fast key to store the results. When storing results the message STORING RESULTS is displayed.

Storing System Data
System Data consists of everything changed from within the SETUP MENU. To store the System Data return to the MAIN MENU from the SETUP MENU. The unit will then display the message STORING SYSTEM DATA. This will only be done if changes have been made, if no changes have been made then the system data will not be updated.

Using Symbols in Text Fields
Although there is an option to use non-ASCII symbols for Appliance numbers, Site names, Location names, User names and Comments there is no guarantee that your computer software will support them. If you are unsure avoid using symbols.

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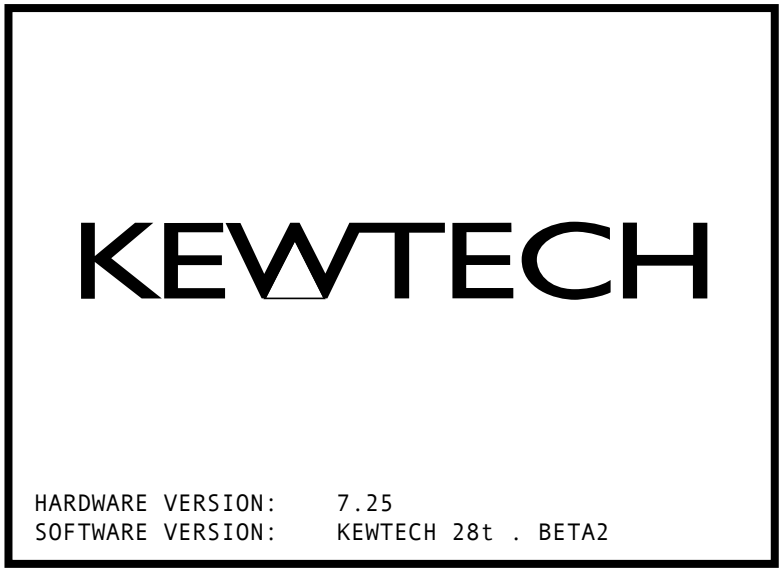
Chapter 2

CONNECTING THE TESTER

The Tester must be powered by a 230V supply.

The supply must include an earth connection via a 3 pin mains plug.

When switched on, the Tester will carry out a short self-test procedure (approximately 2 seconds). During this test, the following screen will appear:



Note

Current revision numbers are shown at the bottom of the screen.

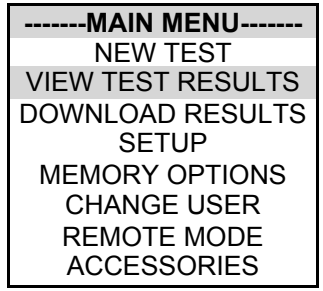
The Tester will then display the Main Menu.

Chapter 3

USING THE TESTER

Introduction

Once the start-up procedure of the Tester has been completed, the following screen will appear: -



USER : John

Thursday 4 March 2011 09:03

Navigation through the menus is by dedicated keys: -

Key	Function
←	Cursor Left
↑	Cursor Up
→	Cursor Right
↓	Cursor Down
Red Button	Stop
Green Button	Start

There are also the five Fast keys down below the display whose action will change depending on the function of the Tester at any particular point.

To select an option from the Main Menu, use the cursor keys. The selected option will be displayed in inverse video. The highlighted option is selected by pressing the Green button or Return key.

FAST KEY MENUS

To facilitate a fast access to commonly used options on the menus, use the 'fast' keys on the keyboard. These are located below the display. These correspond to the key name on the bottom of the screen.

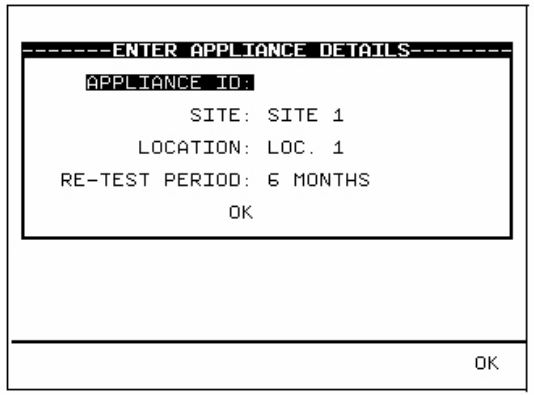
How to....

The remainder of this chapter has been sub-divided into sections describing the Tester in terms of the essential functions to be performed. A summary is shown below: -

- How to perform Automatic tests
- How to use the Meter display
- How to view test results
- How to perform Manual tests
- How to download Data
- How to print Barcode Labels
- How to use Setup
- How to use the memory
- How to change the user
- How to use Help

HOW TO PERFORM AUTOMATIC TESTS

To perform automatic tests, use the cursor keys to highlight the New Test option on the Main Menu and press Enter to display the following menus: -

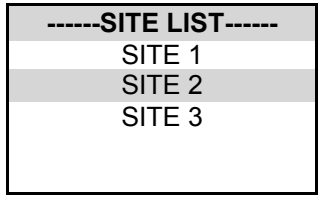


Use the keyboard or a compatible Barcode Reader to enter an Appliance Number.

Note

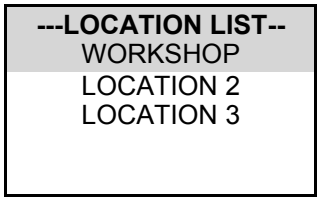
See Chapter 4 for tips on using barcodes.

If you need to change the current Site use the cursor keys to highlight SITE and press Enter to change the Site Name.



Use the cursor keys to highlight a site name and press enter to select the desired option.

If you need to change the current Location use the cursor keys to highlight LOCATION and press Enter to change the Location Name



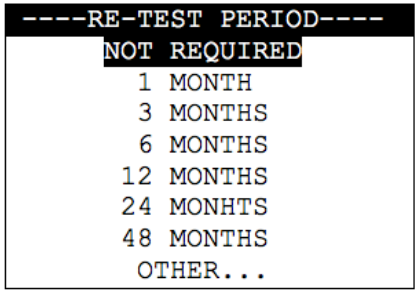
Use the cursor keys to highlight a location name and press enter to select the desired option.

Note

Default settings for Sites and Test Sequences are pre-loaded into the Tester. See 'How to use Setup' to change these settings.

Re –Test Period

Use the cursor keys to select RE-TEST PERIOD and then press the ENTER key to choose a re-test period.



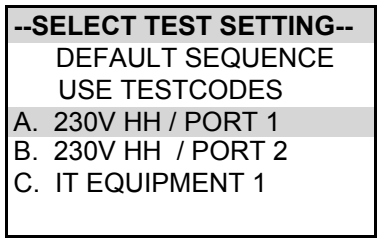
Complete the rest of ENTER APPLIANCE DETAILS as normal and move on to the next stage in the test process.

Note for PATGuard Users

Re-test periods are downloaded with test results and are compared with re-test periods of existing Assets on PATGuard or used as the re-test period for new Assets. This is to ensure that re-test periods are 'synchronized' across the PAT system.

For Pat Manager Users re-test periods are downloaded and appear in the test sheet reports as entered in the KT77

Test Settings



The user has the ability to:-

- Set a specific test sequence by selecting DEFAULT SEQUENCE
- Allow Testcodes to determine the test to be carried out
- Use preprogrammed sequences for specific EUTS, e.g. IT Equipment.

Selecting either of the first two options allows settings to be altered. Selecting any of the remaining options allows the user to commence immediately with that test.

Press the keyboard shortcut or use the cursor keys to highlight a Test Sequence and press Enter to select the desired sequence.

Default Sequence

When you first enter this menu all of the previous values are displayed and one of the field descriptions is highlighted.

----------DEFAULT SEQUENCE EDITOR----------

	OUTPUT	LIMIT	DUR	NUM
SOCKET	230V			
VISUAL		YES		1
EARTH BOND	4A	0.10Ω	5	1
INSULATION	500V	0.50MΩ	5	1
SUB LEAKAGE		SKIP		
LEAKAGE		SKIP		
TOUCH LEAKAGE		SKIP		
POLARITY		SKIP		

PERFORM TEST

Use the cursor keys to highlight a field to be changed and press Enter to select the desired option.

Test Parameter Fields

By selecting one of the test parameter fields from the Default Sequence, a list of options for that field will be displayed: -

----------LEAKAGE----------

OUTPUT	LIMIT	DURATION	NUMBER
230V~	SKIP	2s	1
	0.25mA	5s	2
	0.50mA	10s	3
	0.75mA	30s	4
	1.50mA	60s	5
	2.25mA	120s	10
	2.50mA	180s	15
	3.00mA	UL	20
	3.50mA		25
	9.90mA		30

Use the cursor left and right keys to highlight the description, then use the cursor up and down keys to highlight the required setting. Use the cursor left and right keys to change the highlighted field.

Use the Enter key or OK Fast key to save the settings and return to the Default Sequence Editor. Repeat this process for each field as appropriate.

Press the red button to abort changes made to the settings and return to the Default Sequence Editor.

Press the red button to abort changes made to the settings and return to the Default Sequence Editor.

Earth Bond Limit Calculator

Earth Bond tests have an additional Fast Key; LIMIT CALC. Selecting this enables the User to set an accurate Earth Bond Test limit by specifying the cable parameters.

To start the test sequence, select PERFORM TEST.

Isolated Test

This is a normal Earth Bond Test where the EUT is plugged into the Tester power socket and the Earth Bond lead is connected to the EUT. This is the default test.

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Use Testcodes

This option bypasses the need to edit a specific test sequence, allowing direct entry of a Testcode through the keyboard or a barcode scanner.

----------ENTER TESTCODES----------

	OUTPUT	LIMIT	DUR	NUM
SOCKET	230V			
VISUAL		YES		1
EARTH BOND	4A	0.10Ω	5	1
INSULATION	500V	0.50MΩ	5	1
SUB LEAKAGE		SKIP		
LEAKAGE		SKIP		
TOUCH LEAKAGE		SKIP		
POLARITY		SKIP		

TESTCODE 1: I2F8008032
TESTCODE 2: R222111111

PERFORM TEST

Use the cursor keys to highlight the Testcode to be changed. Press Enter to select that digit. Use the keyboard to change the value of the digit. Press Enter to confirm the change. Press the Red button to abort changes to the selected Testcode.

Use a barcode scanner to enter a Testcode

Use the cursor keys to highlight the PERFORM TEST option and press Enter to commence the test sequence.

Press the Red button to return to the previous menu.

Perform Test

Use the cursor keys to highlight the Perform Test option and press Enter to perform the test. Pressing the Red Button will return to the previous menu.

The screen will change to the Meter Display (see separate section - How to use the Meter Display for an explanation).

Visual Test

If a visual test is included as part of the test sequence, the following screen will be displayed:

VISUAL INSPECTION	RESULT
COVER / CASE	
POWER CORD	
PLUG	

The first inspection (COVER / CASE) will be pre-selected on entering this screen. Users can also navigate up and down the columns. Hitting the Fast key marked PASS will cause a Pass to be entered for the selected VISUAL INSPECTION and the next inspection to be selected. Hitting the Fast key marked FAIL will cause a Fail to be entered for the selected VISUAL INSPECTION and the next inspection to be selected. Hitting the fast key marked N/A (Not Applicable) will cause N/A to be entered for the selected VISUAL INSPECTION and the next inspection to be selected. Only when all tests have a result will the RH Fast key display and allow an OK. Enter/ Green key will cause an OK action if all results are filled.

Once the table has been completed then a large tick or cross will appear depending on the overall result (any X will cause an overall Fail).
The Overall Pass Fast key will set a Pass for every VISUAL INSPECTION.

After the visual tests, the test sequence will continue into the first actual electrical test of the test sequence.

Note

Help screens may be displayed depending on the User Level set.
It is possible to stop these appearing by altering the User Level.
See EDIT USER LIST / OPTIONS.

If an Insulation test has been selected, then once the test has commenced, a screen similar to the following will be displayed

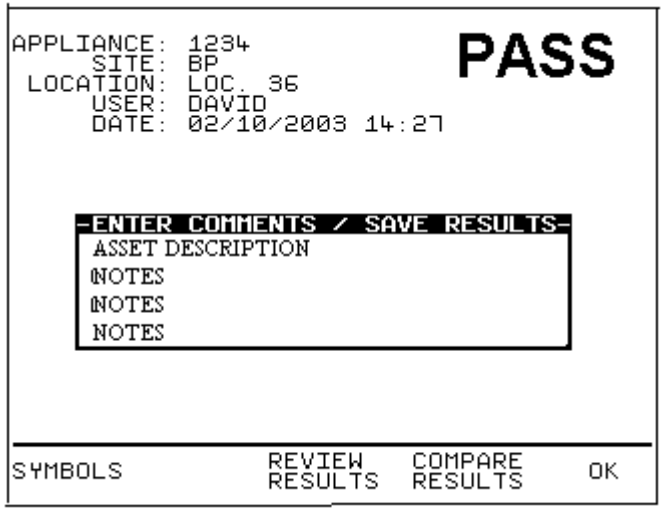
If an external connection e.g. a probe is required, the display will flash the connection icon. The user needs to connect the probe. The test can then proceed when the Green or Enter button is pressed. At the end of each test in the test sequence, the display will indicate the result.

Isolated Test

This is a normal Earth Bond Test where the EUT is plugged into the Tester power socket and the Earth Bond lead is connected to the EUT. This is the default test.

If any test in the test sequence fails, then the test sequence is aborted and a fail is displayed. A Failure Menu may be shown if the option is selected (see SYSTEM CONFIGURATION Options.)

Add Comments



When you have completed testing the EUT you can enter comments.

The Test Results can be reviewed before entering any comments by selecting the REVIEW RESULTS Fast key.

It is also possible to compare the new Test Results with any previous Test Results stored in memory for the same Appliance at the same Site.

To compare the new Test Results with previous Test Results select the COMPARE RESULTS Fast key.

Note

If there are more than one set of Test Results found in memory, the Results Comparison will be with the latest chronological Test Results.

To enter comments, use the keyboard and enter comments into the box. Press Enter for a new line. To store the comments press the OK Fast key. Your results and comments will now be stored.

The inverse video descriptions are Comments Designators. These are used to remind the user what to enter into each comment line. The Asset Description should be entered into Comment Line 1. To change Comment Designators see SYSTEM CONFIGURATION found in the SETUP menu.

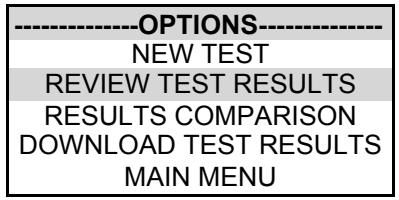
Note

PATGuard software expects the first line of the comments to contain the Asset Description. Whatever is typed into the first line will appear as an Asset description in PATGuard. If nothing is entered then PATGuard will use the Appliance as an Asset Description.

Pat Manager software expects the first line of comments to be the Appliance description and will appear in the appliance description field. It does not recognize the further two lines of Notes

Options after Test

The options menu is displayed when an Automatic sequence has been completed.



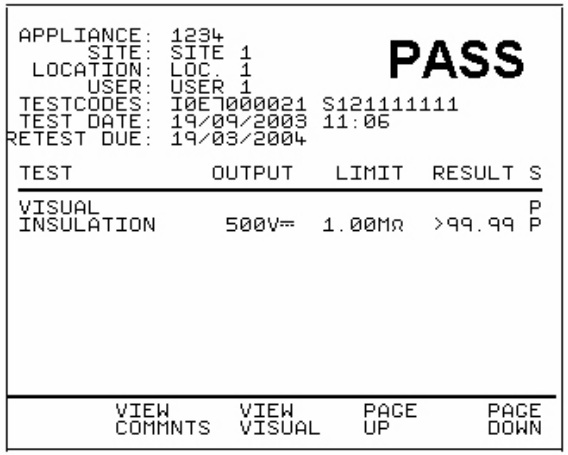
Use the cursor keys to highlight an option after test and press Enter to select the desired option.

New Test

Perform a new test

Review Test Results

Display the results from the test in tabular form:



A fast key is available to VIEW COMMENTS. Use the Red button to return to the previous menu.

Results Comparison

Selecting this option will cause the tester to search memory for a previously stored test result for the same Appliance and Site. If there is one the display will show a comparison of the two test results. If there is more than one, the latest result will be compared.

Download Test Results

This option allows previous test results to be downloaded to a printer, PC or USB flash drive. The printer option allows a Pass/Fail label to be printed on a compatible printer - see Chapter 6. On selecting this option the DOWNLOAD OPTIONS menu is displayed.

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Main Menu
Return to the Main Menu.

Abort Actions
During an Automatic test, pressing the Red Button immediately stops the test in progress and displays the following menu:-

-------ABORT OPTIONS-------
RESTART TEST
RESTART APPLIANCE
ABORT TEST
ABORT APPLIANCE

Use the cursor keys to highlight an action following abort and press Enter to select the desired option.

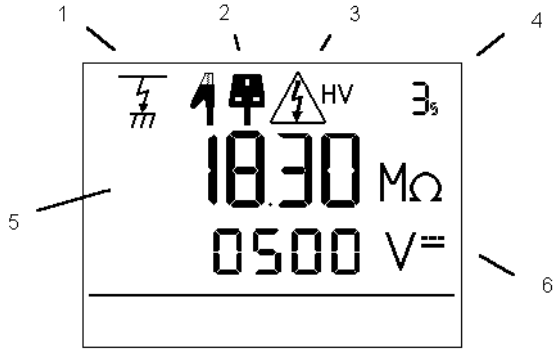
Restart Test
Restart the current test.

Restart Appliance
Restart the first test in the test sequence for the current appliance.

Abort Test
Abort the test without storing a test result and select the next test.

Abort Appliance
Abort the test sequence and select a new appliance.

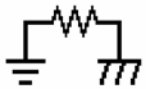
HOW TO USE THE METER DISPLAY
The following screen is displayed prior to tests commencing in both Manual Mode and Automatic Mode:-



Ref. Number	Function
1	Test Icon
2	Connection Icon
3	Test in Progress Icon
4	Test Duration Counter
5	Primary Display
6	Secondary Display

Test Icon
Indicates the test selected.


Visual


Earth Bond


Insulation

Substitute Leakage


Flash


Leakage & Load


Touch Leakage


Polarity

Connection Icon
Indicates connection required for external probes.


Earth Bond


No Probe


IEC Lead

Test in Progress Icon

Indicates test in progress with voltage warning.

Low Voltage

High Voltage

Applying Power

Test Duration Counter
Indicates duration of test. This will count down, when the counter reaches zero if the Tester is still taking a measurement the counter will flash.

Primary Display
Indicates test result or pass/fail limit.

Secondary Display
Indicates test output e.g. voltage or current.

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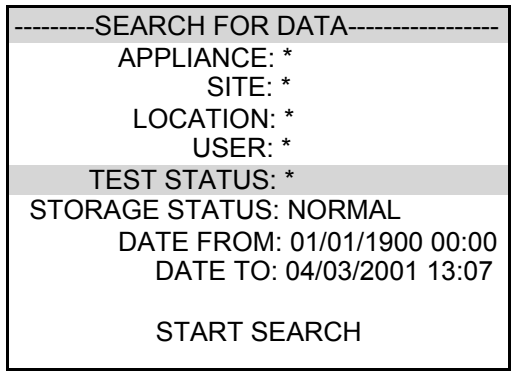
HOW TO VIEW TEST RESULTS

To view test results stored in memory, use the cursor keys to highlight the VIEW TEST RESULTS option on the Main Menu and press Enter to display the following menu: -

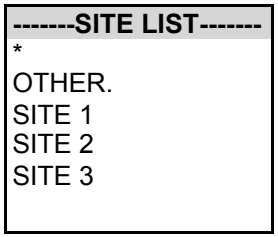


Use the cursor keys to highlight the required search parameters and press Enter to select the desired option.

Appliance Number

Enter an Appliance number to search for specific results. If the Appliance number field is left blank then the character ✻ will be inserted, indicating a search for all appliances.

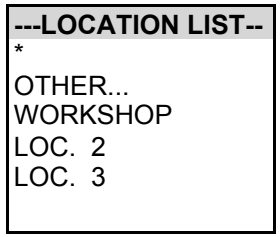
Site Name



Use the cursor keys to highlight a Site name and press Enter to select the desired option.

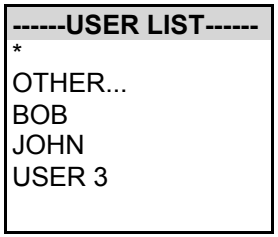
Select ✻ if you wish your search to include all of the sites. Select 'Other' to search for a Site not in the list (this can happen if a Site Name has been modified after testing). If you select 'OTHER...' you are prompted to enter a Site name.

Location Name



Use the cursor keys to highlight a Location name and press Enter to select the desired option. Select ✻ if you wish your search to include all of the names. Select 'Other' to search for a Location not in the list (this can happen if a Location name has been modified after testing). If you select 'OTHER...' then you are prompted to enter a Location name.

User Name



Use the cursor keys to highlight a User name and press Enter to select the desired option. Select ✻ if you wish your search to include all of the names. Select 'Other' to search for a User not in the list (this can happen if a User name has been modified after testing). If you select 'OTHER...' then you are prompted to enter a User name.

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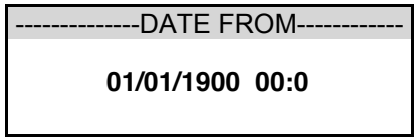
Test Status
When Test Status is highlighted use the Enter button to select the option required, every time you press the Enter button a different option will be displayed. This can be PASS, FAIL or ❊ which indicates both.

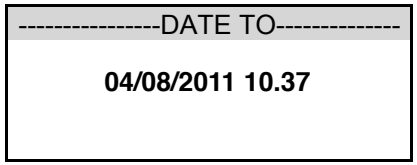
Storage Status
When Storage Status is highlighted use the Enter button to select the option required, every time you press the Enter button a different option will be displayed. This can be NORMAL, DELETED or ❊ which indicates both.

Date From



This option allows the user to search for test results before the selected date. Use the cursor keys to highlight the digit to be changed. Use the cursor keys to change the value or enter the digits directly using the keypad. Select OK to store the settings or CANCEL to abort them.

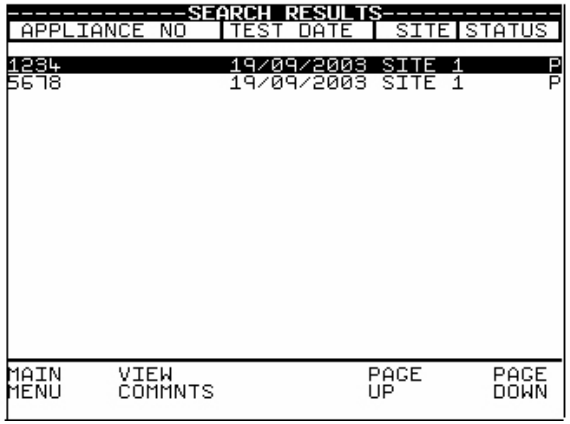
Date To



This option allows the user to search for test results before the selected date. Use the cursor keys to highlight the digit to be changed. Use the cursor keys to change the value or enter the digits directly using the keypad. Select OK to store the settings or CANCEL to abort them.

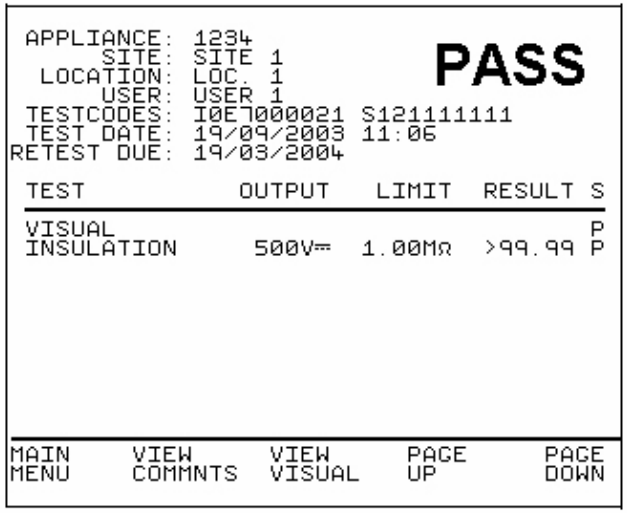
Search
After all the search parameters have been set, highlight START SEARCH & press the Green or Enter button to search.

Search Result
When you select Start Search the following screen will be displayed. This screen displays the appliances that match the search criteria.



Appliance Test Results

It is possible to view the results obtained for a certain appliance by highlighting the appliance number and pressing the Enter button.



A fast key is available to VIEW COMMENTS.
Use the Red button to return to the previous menu.

HOW TO PERFORM MANUAL TESTS

Manual mode provides the user with direct access to the tests. In this mode individual tests can be selected and performed. Appliance number, site, location, user can still be assigned to appliances if it is required to store the result.

Entering Manual Mode

Use the Fast key to select Manual Mode from the Main Menu.

Note

To store tests in memory from Manual mode you must first select Create Appliance No., perform the tests required for the EUT. When you have completed the required tests select Enter Comments/Save Results, upon leaving this option the Tester will now store the results. Note that Enter Comments option is not displayed until there is something to store.

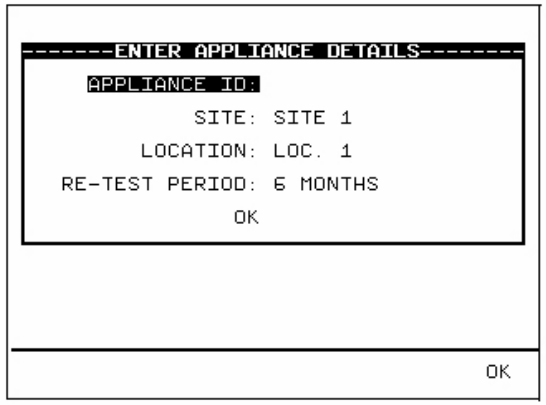
The manual tests and other options available are shown in the table below: -

----------MANUAL TEST SELECTION----------
A..CREATE APPLIANCE NO.
S..CHANGE 230V/115V OP SOCKET
1..VISUAL CHECK
2..EARTH BOND TEST
3..INSULATION TEST
4..SUB LEAKAGE TEST
5..LEAKAGE TEST
6..FLASH TEST
7..TOUCH LEKAGE TEST
8..POLARITY TEST
C.ENTER COMMENTS & STORE RESULTS

Press the appropriate key to select a test or option.

Create Appliance Number

This allows all manual tests performed to be stored against the appliance number until the appliance number is changed.



Use the keyboard or compatible Barcode Reader to enter an Appliance Number.

Note

See Chapter 4 for tips on using barcodes.

------SELECT SITE------
SITE 1
SITE 2
SITE 3

For Pat Manager PC software users the 'SITE' and 'LOCATION' descriptions should only be entered as 10 characters

If you need to change the current Site use the cursor keys to highlight SITE and press Enter to select another Site name.

Use the cursor keys to highlight a Site name and press Enter to select the desired option.

If you need to change the current Location use the cursor keys to highlight LOCATION and press Enter to change the Location name.

--SELECT LOCATION--
WORKSHOP
LOC. 2
LOC. 3

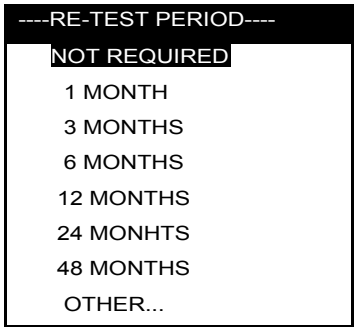
Use the cursor keys to highlight a Location name and press Enter to select the desired option.

Note

Default settings for Sites and Test Sequences are pre-loaded into the Tester. See 'How to use Setup' to change these settings.

Re –Test Period

Use the cursor keys to select RE-TEST PERIOD and then press the ENTER key to choose a re-test period.



Complete the rest of ENTER APPLIANCE DETAILS as normal and move on to the next stage in the test process.

Note for PATGuard Users

Re-test periods are downloaded with test results and are compared with re-test periods of existing Assets on PATGuard or used as the re-test period for new Assets. This is to ensure that re-test periods are 'synchronized' across the PAT system.

For Pat Manager Users re-test periods are downloaded and appear in the test sheet reports as entered in the KT77

Select Manual Test

Use the appropriate number key from the table to select a specific test or use the cursor to highlight the desired option.

Performing a Manual Test

After selecting the appropriate test the tester displays a screen from which you can set test parameters.

The user can change an individual setting when the parameter is shown in inverse video. Use the left and right cursor keys to highlight a field on the display. Then use the up & down cursor keys to change the variable in the selected field.

Isolated Test

This is a normal Earth Bond Test where the EUT is plugged into the Tester power socket and the Earth Bond lead is connected to the EUT. This is the default test.

During this stage of the test a large icon showing the earth bond probe attached to a mains power appliance will be displayed.

Earth Bond Limit Calculator

Earth Bond tests have an additional Fast Key; LIMIT CALC. Selecting this enables the User to set an accurate Earth Bond Test limit by specifying the cable parameters.

In – Situ Touch Leakage Test

The Touch Leakage Test can be performed without powering down the EUT and plugging it into the tester power socket. The only connection the User is required to make is to connect the Earth Bond Test lead to the exposed metal work of the EUT and then perform the test.

Note

When the connection icon is flashing you cannot change any settings. The settings cannot be changed for a test if you have performed that test from within an appliance sequence. For example after selecting Create Appliance No you can only change the Earth Bond settings on the first Earth Bond test, all subsequent Earth Bond test will conform to the same settings.

Press the Enter button to start the test.

Press the Red button to abort the test at any time.

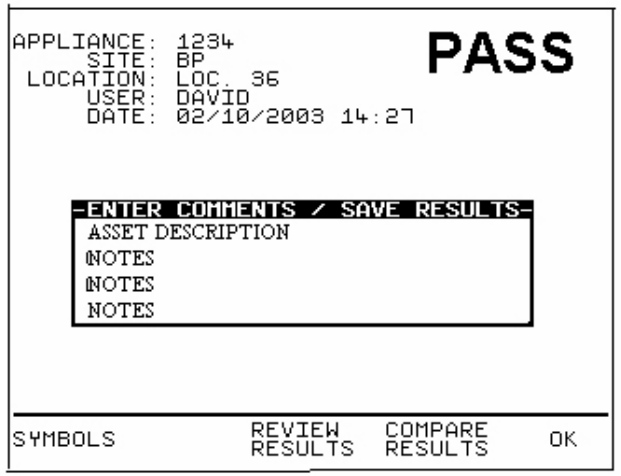
Note

In manual mode you will not get Abort Options, the test will simply stop the test and revert to the Meter display. The aborted test will not be stored.

If an Appliance Number has been created, the test result will be stored under the entered Appliance number. To store tests to memory select COMMENTS / SAVE RESULTS from the MANUAL TEST SELECTION screen

Enter Comments/Save Results

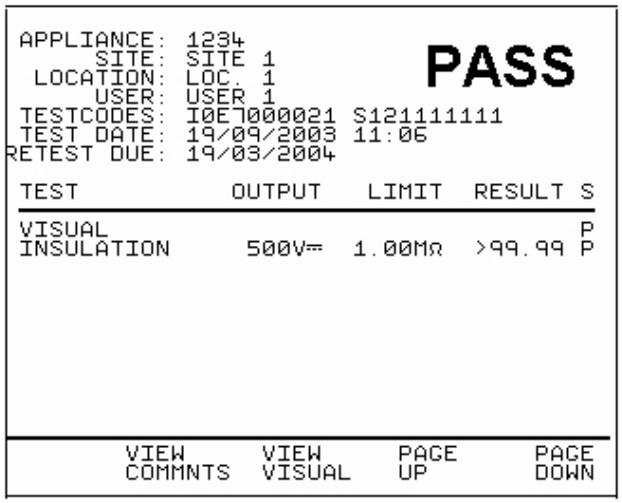
When you have completed testing the EUT, you can enter comments.



Other Fast keys are available for use before entering Comments and storing results.

Review Results

Display the results from the test in tabular form: -



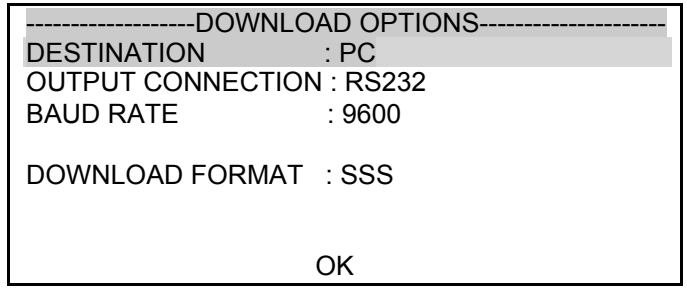
A fast key is available to VIEW COMMENTS. Use the Red button to return to the previous menu.

Results Comparison

Selecting this option will cause the tester to search memory for a previously stored test result for the same Appliance and Site. If there is one the display will show a comparison of the two test results. If there is more than one, the latest result will be compared.

How to download Data

To download results stored in memory, use the cursor keys to highlight the Download Results option from the Main Menu and press Enter to display the following menu:-



Use the cursor keys to highlight the required parameters. Use repeated presses of the enter button to show the desired options for destination, output connection and baud rate.

Destination

This option selects the device to send the test results to, the available options are:

PC

Download the test results to a computer with a compatible software package. Select this option to download to PAT software.

GENERIC PRINTER

Download the test results to a compatible serial printer.

ROLL PRINTER

Download the results to a compatible Roll Printer.

USB FLASH DRIVE

Download the results to a compatible memory stick.

Output Connection

Selects the tester output connection to which the results are to be sent, available options are:

RS232

This sends the data to the RS232 serial port (9 way D connection on the tester) for connection using a compatible serial cable. Select this option for downloading to PAT software.

USB

This sends the data to the USB port on the front of the tester for connection to a compatible memory stick.

Baud Rate

If available this option selects to the Baud Rate at which the data is sent, possible values are 9600, 19200 or 28800. Leave default set to 9600 for downloading to PAT software.

Download Format

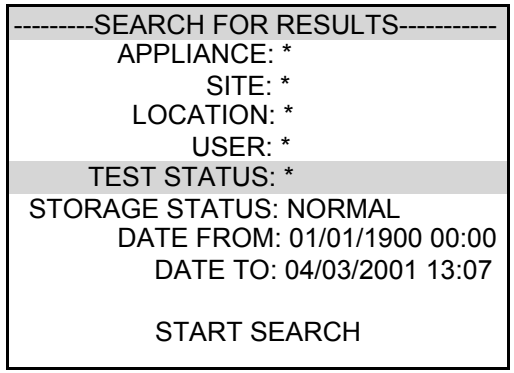
This field shows the format choices available depending upon the destination selected.

For downloading to a PC the user has the option of sending data in a SIMPLY PATS format, compatible with Kewtech PAT Manager software, SSS format - Seaward Super String, compatible with Seaward PAT software and Robin / Fluke's Power Pat Plus, Certificate - downloads results in non-ASCII certificate format, Summary - downloads a summary of results.

For downloading to a generic A4 printer the user has the option of sending data as a certificate, or a list, or as pass/fail labels. In the certificate format the user has the option to produce one certificate per page or to produce continuous printouts.

For downloading to a roll printer, including 'till roll' and thermal printers the user has the option of sending data as a continuous list, a certificate, a summary or as pass/fail labels. When using a compatible thermal roll printer the pass/fail labels will produce appliance numbers in a number and barcode format. However, the restrictions of paper width means that appliance numbers representing more than 12 characters cannot be printed and a numbered label will print instead. Testcodes are accommodated since these are displayed as two lines of 10 characters each.
Use repeated presses of the enter button to show desired settings for download format. If appropriate the option field will illuminate. Use repeated presses of the Enter button to show desired settings.

When the download options are set highlight the OK field and press the enter button or select the OK Fast key to display the following menu:-



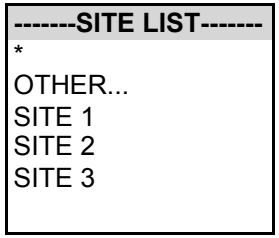
Use the cursor keys to highlight the required search parameters and press Enter to select the desired option.

Appliance Number

Enter an Appliance number to search for specific results. If the Appliance number field is left blank then the character * will be inserted, indicating to search for all of the appliances.

Site Name

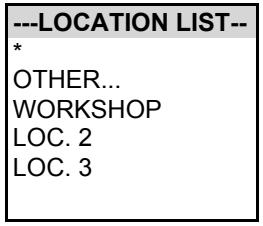
Use the cursor keys to highlight a Site name and press Enter to select the desired option. Select ✻ if you wish your search to include all of the sites. Select 'Other' to search for a Site not in the list (this can happen if a Site Name has been modified after testing). If you select 'other' you are required to enter a Site name. Use the cursor keys to highlight a Site name from the list and press Enter to select the desired option.



Note

If the list contains more sites than the unit can display then use the cursor keys to scroll through the list.

Location Name

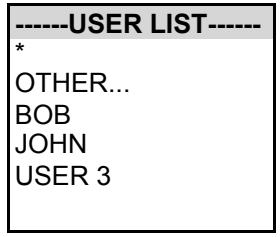


Use the cursor keys to highlight a Location name and press Enter to select the desired option. Select ✻ if you wish your search to include all of the names. Select 'Other' to search for a Location not in the list (this can happen if a Location name has been modified after testing). If you select 'OTHER...' then you are prompted to enter a Location name.

Note

If the list contains more locations than the unit can display then use the cursor keys to scroll through the list.

User Name



Use the cursor keys to highlight a User name and press Enter to select the desired option. Select ✻ if you wish your search to include all of the names. Select 'Other' to search for a User not in the list (this can happen if a User name has been modified after testing). If you select 'OTHER...' then you are prompted to enter a User name.

Note

If the list contains more users than the unit can display then use the cursor keys to scroll through the list.

Test Status

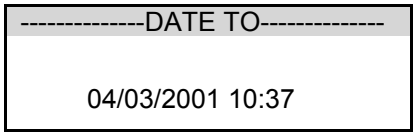
When Test Status is highlighted use the Enter button to select the option required, every time you press the Enter button a different option will be displayed. This can be PASS, FAIL or ✻ which indicates both.

Storage Status

When Storage Status is highlighted use the Enter button to select the option required, every time you press the Enter button a different option will be displayed. This can be NORMAL, DELETED or ✻ which indicates both.

Date From

This option allows the user to search for test results after the selected date. Use the cursor keys to highlight the digit to be changed. Use the (up or down) cursor keys to change the value or enter the digits directly using the keypad. Select OK to set the date or press the red key to cancel any changes.



This option allows the user to search for test results before the selected date. Use the cursor keys to highlight the digit to be changed. Use the cursor keys to change the value or enter the digits directly fusing the keypad. Select OK to set the date or press the red key to cancel any changes.

Search

After all the search parameters have been set, connect the appropriate printer or device. Highlight START SEARCH and press the ENTER BUTTON to search and download.

On completion of successful downloading, the tester returns to the search for results menu. The user can then conduct other search or press the red button to return to the main menu.

Press the red button to return to the search menu.

HOW TO PRINT BARCODE LABELS AND TESTCODES

The Kewtech KT77 is capable of printing barcode labels in conjunction with a compatible thermal printer (see chapter 6).

To Print Barcode Pass/Fail Labels

To print barcode pass/fail labels it is necessary to carry out an actual test (see how to perform automatic tests). After a test is complete and the results stored in memory it is possible to download results to a thermal printer (see how to download results) and print pass/fail labels.

To Print Barcode Testcodes

To print barcode test codes select SETUP from the Main Menu and select EDIT TEST SETTINGS from the SETUP menu. From the SELECT TEST SETTINGS menu chose the desired test e.g. 230V HH / PORT 1. Attach the compatible printer to the port and from the TEST SETTINGS EDITOR highlight the PRINT TESTCODE option and press enter.

Note

The restrictions of paper width means that appliance numbers representing more than 12 characters cannot be printed and a numbered label will print instead. Testcodes are accommodated since these are displayed as two lines of 10 characters.

How to use Setup

To set up the Tester, use the cursor keys to highlight the Setup option on the Main Menu and press Enter to display the following menu: -

----------SETUP----------
EDIT TEST SETTINGS
EDIT USER LIST / OPTIONS
EDIT SITE LIST
EDIT LOCATION LIST
EDIT APPLIANCE DESCRIPTION LIST
CHANGE DATE/TIME
SET LANGUAGE
SYSTEM CONFIGURATION
CHANGE PASSWORD
SET BRIGHTNESS
FACTORY SETTINGS

From this menu you can change the way the Tester will operate and also change User levels and Sites. Use the cursor keys to highlight a function and press Enter to select the desired option.

Edit Test Settings

This allows the user to add, modify, remove or confirm test settings that can then be selected during automatic testing.

SELECT TEST SETTING
A. 230V HH / PORT 1
B. 230V HH / PORT 2
C. IT EQUIPMENT 1
D. IT EQUIPMENT 2
E. 230V MOV / STAT 1

Use the cursor keys to highlight a Test Setting and press Enter to enter the TEST SETTING EDITOR.

Test Settings Editor

The TEST SETTINGS EDITOR allows the test sequence for the selected test to be examined and changed if required.

----------TEST SETTINGS EDITOR----------

	OUTPUT	LIMIT	DUR	NUM
SOCKET	230V			
VISUAL		YES		1
EARTH BOND	25A~	0.10Ω	5s	1
INSULATION	500V=	1.00MΩ	5s	1
SUB LEAKAGE		SKIP		
LEAKAGE	230V~	0.75mA	5s	1
TOUCH LEAKAGE		SKIP		
POLARITY		SKIP		

TESTCODE 1: I1C700321
TESTCODE 2: S121111111

NAME: 230V HH / PORT 1

PRINT TESTCODES
OK

Use the cursor keys to highlight a field to be changed and press Enter to select the desired option.

Name

Each test sequence is given a name. This is to help the user when selecting test sequences during automatic testing. When Name is highlighted press the Enter button, then use the keyboard to enter a new name for the Test Sequence (of up to 15 characters) and press Enter to confirm.

Test Parameter Fields

By selecting one of the test parameter fields from the TEST SETTINGS EDITOR, a list of options for that field will be displayed INSULATION Test for example: -

----------INSULATION----------			
O/P	LIMIT	DUR	REP
250V	SKIP	2s	0
500V	0.50MΩ	5s	1
	1.00MΩ	10s	2
	2.00MΩ	30s	4
	4.00MΩ		5
	7.00MΩ		10
	10.00MΩ		15
	50.00MΩ		20
			25
			30
			UL

When you first enter this menu all of the previous values and one of the Test Parameter columns are highlighted. Use the cursor left and right keys to highlight the Test Parameter to be changed and then use the cursor up and down keys to highlight the required setting. Use this process for each Test Parameter.

Use the Enter button or OK Fast key to save the settings and return to the TEST SETTINGS EDITOR. Press the Red button to abort changes made to the settings and return to the TEST SETTINGS EDITOR.

Earth Bond Limit Calculator

Earth Bond tests have an additional Fast Key; LIMIT CALC. Selecting this enables the User to set an accurate Earth Bond Test limit by specifying the cable parameters.

Testcodes

Selections made in the Test Parameter Fields will automatically set the correct Testcode. Alternatively entering a Testcode will automatically set the correct Test Parameters for that Testcode.

Store Settings

Use the cursor keys to highlight the OK and press Enter or select the OK Fast key to save the settings and return to the previous menu. Pressing the Red Button will abort all of the changes made and return to the previous menu.

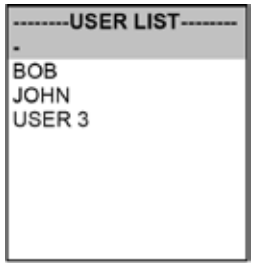
Print Testcodes

The Testcodes can be printed (using a compatible printer - see Chapter 6). Use the cursor keys to highlight PRINT TESTCODES then press the Enter button to start the print. The following message will be displayed:-

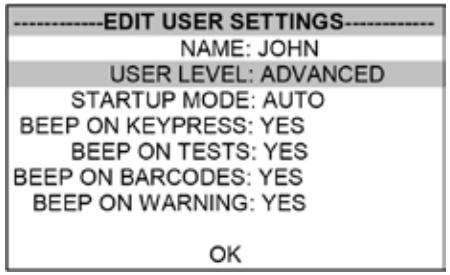
On completion of printing, the TEST SETTINGS EDITOR menu is displayed. Press the Red Button to return to the TEST SETTINGS EDITOR menu.

PRINTING TESTCODES
PRESS THE RED BUTTON TO ABORT

Edit User List / Options



Use the cursor keys to highlight a User name and press Enter to select the desired option: -



To change the user name highlight NAME and press the Enter button.

Note

If you change the name of the user during testing all of the previous tests will still be referenced to the old user name, this gives unlimited amounts of users within the test results memory.

Use the cursor keys to highlight options that can be selected for each User and press Enter to select the desired option.

User Level

Use the cursor keys to highlight a USER LEVEL and press Enter to select the desired option.

Novice User

Selects the User level as a NOVICE user. This will cause Help screens to be displayed prior to every test.

Advanced User

Selects the user level as an ADVANCED user. No Help will be displayed before each test automatically. Help is still available from the Help fast key

Startup Mode

Use the cursor keys to highlight a test mode on startup and press Enter to select the desired option.

Automatic Mode

The Tester will start up in Automatic Mode, with the Tester displaying the Main Menu.

Manual Mode

The Tester will start up in Manual Mode, with the Tester displaying the Manual Test Selection Menu.

Beep on Key Press

Use the cursor keys to highlight the option and press Enter to select the desired option.

This option will cause a beep every time a key is pressed.

Beep on Tests

Use the cursor keys to highlight the option and press Enter to select the desired option.

This option will cause beep whenever the High Voltage Test in Progress icon is displayed or a test has failed.

Beep on Barcodes

Use the cursor keys to highlight the option and press Enter to select the desired option.

This option will cause a beep whenever a barcode has been received.

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Beep on Warning

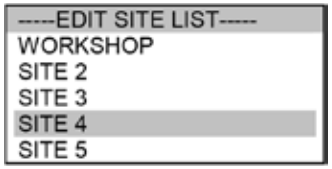
Use the cursor keys to highlight the option and press Enter to select the desired option.

This option will cause a beep whenever a warning message is displayed or a test fails.

Saving User Settings

In the EDIT USER SETTINGS, highlight OK and press the Enter button or select the OK Fast key. The user settings will then be saved.

Edit Site List



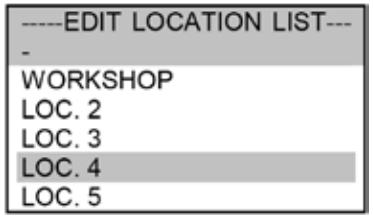
Use the cursor keys to highlight a Site name and press Enter to select the desired option.

Note

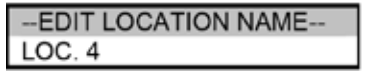
If you change the name of the Site during testing all of the previous tests will still be referenced to the old Site name, this gives unlimited amounts of Sites within the test results memory.

Use the keyboard to edit the name of the Site and press Enter to save and return to the previous menu. Press the Red button to return to the previous menu without saving changes.

Edit Location List



Use the cursor keys to highlight a Location name and press Enter to select the desired option.



Note

If you change the name of the Location during testing all of the previous tests will still be referenced to the old Location name, this gives unlimited amounts of Locations within the test results memory.

When choosing to edit a Location the name of the Location will be shown in the box. Use the keyboard to edit the name of the Location and press Enter to save and return to the previous menu. Press the Red button to return to the previous menu without saving changes

Change Date / Time

```
-SET TIME AND DATE-
01/08/2002    15.30
```

This option allows the user to change the Date and Time. Use the left and right cursor keys to highlight the digit to be changed. Use the up and down cursor keys to change the value or enter the digits directly using the keypad. Select the OK Fast key to store the settings or press the Red button to cancel any changes.

Edit Appliance Description List

On selecting EDIT APPLIANCE DESCRIPTION LIST the User is presented with an APPLIANCE DESCRIPTION LIST. This list has 36 slots, 0 – 9, then A - Z. Each slot has a unique appliance description.

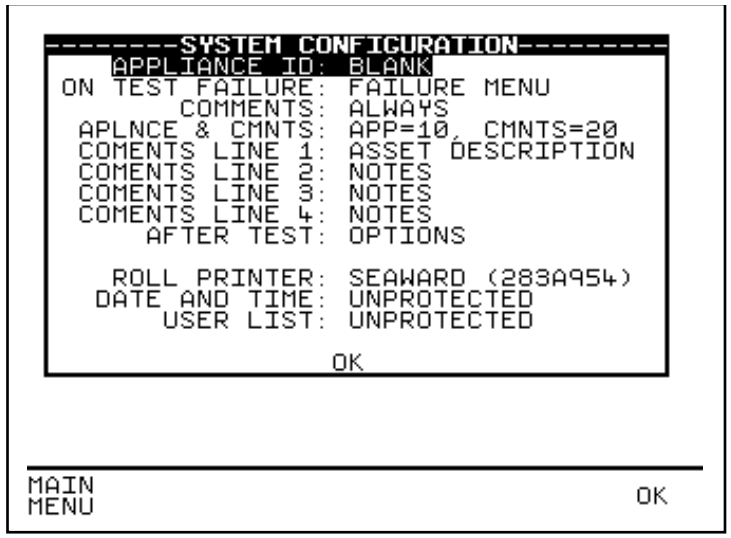
```
-APPLIANCE DESCRIPTION LIST-
0.  IEC Lead
1.  Kettle
2.  Fridge
3.  Microwave
4.  PC
```

Use the cursor keys to highlight an Appliance name and press Enter or press EDIT DESCRIPTION fast key.

```
-EDIT APPLIANCE DESCRIPTION-
3.  Microwave
```

Use the keyboard to edit the name of the appliance description and press the Start (green) key to save and return to the previous menu. Press the Stop (red) button to return to the previous menu without saving changes.

System Configuration



The SYSTEM CONFIGURATION settings cover the range of system settings available to the User.

APPLIANCE ID

This option allows the User to predetermine the Appliance Number. Options are: BLANK, REPEAT LAST, INCREMENT LAST.
BLANK – Each time the appliance number field is displayed, it will be blank.
REPEAT LAST – Each time the Appliance Number field is displayed, it will be a repeat of the last number.
INCREMENT LAST – The least significant number will be incremented by one each time the Appliance Number field is displayed.
Default is BLANK.

ON TEST FAILURE

This gives the User the option of having a menu for a failure within an automatic sequence. This menu will give you the option of retrying a failed test or appliance.
Default is FAIL MENU.

COMMENTS

This option allows the User to determine if the Comments field will be available at the end of a test.
ALWAYS – Comments always available at the end of test
ON PASS – Comments only available if the Appliance passed the test.
ON FAILURE - Comments only available if the Appliance failed the test.
NEVER – Comments will not be available at the end of the test.

Default is ALWAYS

APLNCE & CMNTS

This allows the user to set the number of characters available for the appliance number and comments.

Options are:

APP = 10, CMNTS = 20
APP = 15, CMNTS = 20
APP = 10, CMMTS = 10
Default is APP = 10, CMNTS = 20

COMENTS LINE 1 – 4

These options allow the User to designate each Comment line as a specific field for use with PATGuard Plus software. Options are: ASSET DESCRIPTION, ASSET GROUP, MAKE, MODEL, SERIAL NUMBER, NOTES.

These should be set to correspond to the settings in PATGuard Plus.

Default is COMENTS LINE 1 – ASSET DESCRIPTION,
COMENTS LINE 2 – NOTES,
COMENTS LINE 3 – NOTES,
COMENTS LINE 4 – NOTES.

These correspond with the default settings in the PATGuard software.

PAT manager software only recognises LINE1 – ASSET DESCRIPTION. This should be used for the appliance description.

AFTER TEST

The options set here determine the next action all the test results are saved to memory. Options are: OPTIONS – Displays the OPTIONS menu giving the User further choices.

NEW TEST – Will display the ENTER APPLIANCE DETAILS screen to immediately commence the next test.

DOWNLOAD, NEW TEST – Will Download the test results with out further prompting and display the ENTER APPLIANCE DETAILS screen to immediately commence the next test. When this option is chosen a further option is required to CONFIGURE the Download.

Default is OPTIONS.

DATE AND TIME

This allows the user to password protect the date and time. An existing password must be setup before this option will become effective.

USER LIST

This allows the user to password protect the USER LIST. An existing password must be setup before this option will become effective.

Change Password

It is possible to Password protect the TEST SEQUENCE EDITOR and the SYSTEM CONFIGURATION

If you currently do not have password protection you will be asked to enter a new password twice, once for confirmation.

If you currently do have password protection then you will be asked for the old password before entering a new one, again you will be asked for the new password twice.

To clear the password protection simply press Enter when asked for the new password. Or set the field to 'blank' (i.e. all spaces) if a password was previously set.

Set Brightness

You can set the Brightness of the display. Use the cursor keys to change the Brightness, once the Brightness is set press the Green button to accept the changes. Press the Red button to abort any changes made.

Factory Settings

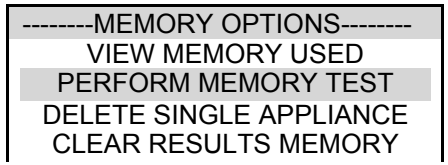
It is possible to reset the Kewtech KT77 to the settings which were configured from new. This option will first ask you if you are sure, select Yes to reset or No to abort.

Caution

This will restore all lists to default settings including SITE LIST, LOCATION LIST, USER LIST and TEST SETTINGS

How to use the Memory

To use the memory tests and functions, use the cursor keys to highlight the MEMORY OPTIONS on the Main Menu and press Enter to display the following menu:-

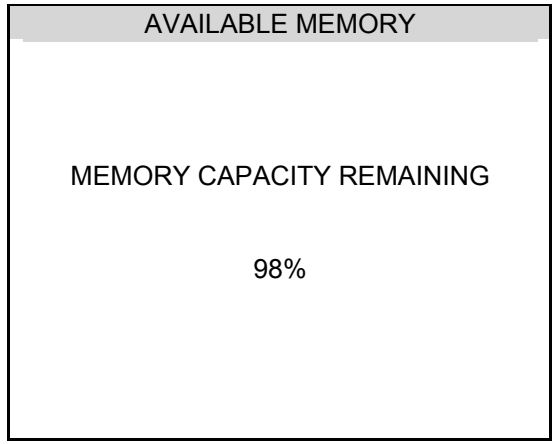


Use the cursor keys to highlight a test or function and press Enter to select the desired option.

View Memory Used

The Tester allows the user to see how much of the results memory is being used. The following bar graph of the memory remaining is displayed:-

Perform Memory Test



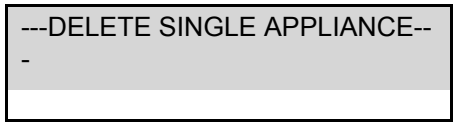
Once the PERFORM MEMORY TEST option is highlighted press the enter button.

The memory test checks all of the appliance results against their checksums. If the test passes then no action is taken. If the test fails then the Memory checksum requires updating. Use the cursor keys and press Enter to choose an action if corrupted tests are found.

Note

The memory checksum is the sum of all of the memory excluding display data, registers and deleted tests.

Delete Single Appliance



Enter the Appliance number to delete a single appliance and press Enter.

A warning 'Are You Sure?' prompt will appear. Press the No Fast key to return to the previous menu or press the Yes Fast key to perform the delete operation and return to the previous menu.

Note

Deleting Appliances in this way will delete all of the matched appliances across all Sites and Locations.

When a single appliance is deleted it is not removed from memory but hidden from the user. This test is still resident in memory and is taking up memory space, this test can be reviewed / downloaded at a later date. Since the test is still resident in memory the View Memory Capacity indicates there are results stored. In this situation to remove all resident tests select clear results memory.

Clear Results Memory

This option will delete all of the appliances currently stored in memory and should be used carefully!

Note

Users will be asked whether they are sure about performing this action.

A warning 'Are You Sure?' prompt will appear. Press the No fast key to return to the previous menu or press the Yes fast key to perform the clear operation and return to the previous menu.

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How to change the User

To change the User, use the cursor keys to highlight the CHANGE USER option on the Main Menu and press Enter to display the following menu:-

------SELECT USER-------
BOB
JOHN
USER 3
USER 4
USER 5

Use the cursor keys to highlight the User and press Enter to select the desired option.

How to use Help

The Tester is provided with an on-line help function which can be called up when the test screens are displayed, by pressing the HELP Fast key.
Each test will have three or four help pages depending on information content.

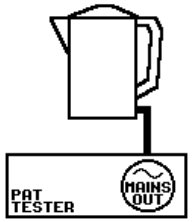
Help Provided to the User
The Help function provides the following information:-

Description of Test

The first help page shown contains information on the particular test, including its icon and a description of the purpose of the test.

How to Perform Tests

The second page of information describes how the Tester performs the test. A diagram showing how to connect to the Tester to the EUT is included. An example for the Insulation test is shown below:-



A description of how to connect the test leads and perform the test is provided in a step-by-step format.

Note:

This topic will cover one or two pages depending on the connection options available (Insulation can be Class 1 or Class 2). Each connection option will have a new page of information.

Why tests fail

The final page of information provides guidance on why a test may fail e.g. connection problems. This includes a step by step check list to ensure all of the connections are correct and secure.

The effect of User Levels during Test Sequences

There are two possible user levels: NOVICE, and ADVANCED.

Novice User Level

When the user level is set to NOVICE Level, the help information is displayed before every test

Press the Enter key to continue the test sequence.

Advanced User Level

When the user level is set to ADVANCED Level, no help information will be shown before a test. Use the HELP fast key to display help information before a test.

Chapter 4

TIPS & TROUBLESHOOTING

Power-On Self tests:

When the tester is powered on, a number of messages can possibly appear as the Tester performs safety tests on itself and the mains power supply.

If a voltage greater than 30V is detected on the neutral input line or the earth is missing then the following message will be displayed.

```
----------WARNING----------
LIVE AND NEUTRAL REVERSED.

PRESS ANY KEY TO CONTINUE
```


Check for incorrect wiring on supply.

The next test will check for an earth connection. If there is no Earth connection, the following message will appear.

```
----------WARNING----------
POSSIBLE DISCONNECTED, FLOATING
OR ISOLATED EARTH.
CHECK INPUT EARTH BEFORE
PROCEEDING.
PROCEED ONLY IF YOU KNOW THE
INPUT EARTH IS ISOLATED.
PROCEEDING WITH AN INCORRECT
EARTH MAY GIVE INCORRECT TEST
RESULTS.
```

Check for incorrect wiring on supply.

The Tester will fail the earth check if it is being supplied with a balanced supply (e.g. isolating transformer) since it will detect phase voltage on both L and N supply connections. Only continue if certain that the supply is balanced and the earth on the Tester connection is secure.

If all the above is checked OK then the Kewtech KT77 may be faulty. Contact your Kewtech Agent for repair.

The unit then completes an internal check. If any faults are found then the following message will be displayed:-

```
----------WARNING----------
INTERNAL RELAY FAULT.

CANNOT PROCEED.
```


If this message is displayed then the Kewtech KT77 is faulty and should be returned to you Kewtech Agent for Repair

Sequence Warning Faults

If you enter a testcode which includes tests the Kewtech KT77 cannot perform then you may see one of the following warnings.

```
----------WARNING----------
THE SELECTED TESTCODES SPECIFY
THAT A FLASH TEST SHOULD BE
PERFORMED.
THIS IS NOT POSSIBLE ON THE KT77.
THE FLASH TEST WILL BE SKIPPED.
PRESS THE START KEY TO CONTINUE.
```

Safety Tests during operation

The Tester performs self-tests during normal operation. An internal earth bond test and a low voltage test are performed prior to applying mains power to any EUT (including Leakage tests). If the internal earth bond test failed, the following message will be displayed:-

```
----------WARNING----------

INTERNAL RELAY FAULT.

CANNOT PROCEED.
```

If this message appears, the Kewtech KT77 is faulty and requires repair. Contact your Kewtech Agent for repair.

If the low voltage test fails, then either of the following warnings will be displayed:-

```
----------WARNING----------
APPLIANCE MAY BE SHORT CIRCUIT
PRESS THE ENTER BUTTON IF SAFE
PRESS THE RED BUTTON TO ABORT
```

```
----------WARNING----------
FUSE MAY BE OPEN CIRCUIT OR
PRESS THE ENTER BUTTON IF SAFE
PRESS THE RED BUTTON TO ABORT
```

These messages mean that the EUT is switched off or the fuse may be open circuit, or it maybe possible that the EUT will draw more than 18A and could damage the Tester. User discretion is required. If in doubt abort the test and seek advice.

Temperature monitoring

The tester is provided with internal temperature monitors to ensure sensitive components are not overheated. High rates of testing may cause this situation, especially with long duration Earth Bond tests. Setting Earth Bond test duration to 2 secs will increase operating time. If the following message appears, leave the tester to cool down before pressing Enter to continue testing.

WARNING

THE TEST HAS BEEN ABORTED BECAUSE THE APPLIANCE TESTER BECAME TOO HOT. ALLOW THE UNIT TO COOL BEFORE STARTING PRESS ENTER BUTTON TO CONTINUE

Multiple Earth connections:

In general, multiple earth connections to a EUT (e.g. water pipe connections to a water heater) can cause difficulties in measurement. This has previously needed the additional earth connections to be isolated.

The Kewtech KT77 tester is capable of testing earth connections in the presence of additional earth paths. This is done automatically by performing a point to point measurement of the earth connection, and measurement of the differential leakage current, rather than the earth lead current. Measurements are thus assured without special precautions.

Barcodes

Barcode Scanner Specification

The Kewtech KT77 Tester can be used with barcodes and barcode scanners, readers or wands compatible with other Kewtech PAT testers These connect to the serial (RS232) connector The required barcode reader / scanner configuration is as follows:-

Baud Rate:	9600
Start Bits:	2
Data Bits	8
Stop Bits:	2
Parity:	None
Inter-character Delay:	20ms

When to use a Barcode Scanner

- Barcodes can be scanned at the following points:-
- Entering a Testcode as part of an Automatic Test in the ENTER TESTCODES screen
- Entering a Testcode in the TEST SETTINGS EDITOR
- Entering an Appliance number in the ENTER APPLIANCE DETAILS screen.

Interfacing

The Tester provides an I/O port that allows connection to a Barcode Scanner, a PC or a Printer.

To avoid any problems during download, ensure that leads are undamaged and correct for the application.

Downloading to Computer Software

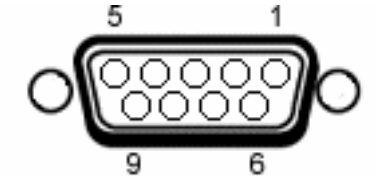
The Kewtech KT77 can be setup to be compatible with various software packages. The APLNCE & CNMTS option can be found in SYSTEM CONFIGURATION in the SETUP menu this may need to be set for 10 DIGIT RESTRICTION for non Seaward software. Check with your software supplier.

For Pat Manager and other non Seaward and Fluke PowerPat Plus software programs always select SIMPLY PATS as the DOWNLOAD FORMAT on the DOWNLOAD OPTIONS screen prior to Download.

For Seaward PAT and Power Pat Plus software programs always select SSS as the DOWNLOAD FORMAT on the DOWNLOAD OPTIONS screen prior to Download.

Serial Port

The serial port uses a standard 9-way D-type connector



Pin	Description
1.	N.C.
2.	RX
3.	TX
4.	DTR
5.	0V
6.	N.C.
7.	0V
8.	N.C.
9.	+5V

Baud Rate:	9600, 19200, 28800 (selectable)
Start Bits:	2
Data Bits	8
Stop Bits:	2
Parity:	None
Inter-character Delay:	20ms

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CHAPTER 5 MAINTAINING THE TESTER

Cleaning the Tester

The Tester case can be cleaned with a damp cloth, with if necessary, a small amount of mild detergent. Prevent excessive moisture around the socket panel or in the lead storage area.

Do not allow liquid inside the Tester, or near the sockets panel. Do not use abrasives, solvents, or alcohol.

If any liquid is spilt into the Tester case, the Tester should be returned for repair, stating the cause of the defect.

User Maintenance

The Tester is a rugged quality instrument. However, care should always be taken when using, transporting and storing this type of equipment. Failure to treat the product with care will reduce both the life of the instrument and its reliability.

If the Tester is subject to condensation, allow the Tester to completely dry before use.

- Always check the Tester and all test leads for signs of damage and wear before use.
- Do not open the Tester under any circumstances.
- Keep the instrument clean and dry.
- Avoid testing in conditions of high electrostatic or electromagnetic fields.
- Maintenance should only be performed by authorised personnel.
- There are no user replaceable parts in the Tester.
- The unit should be regularly calibrated (at least annually).
- For repair or calibration return the instrument to Kewtech at:-

The Service Department
Kewtech Corporation Ltd
Unit 2, Shaw Wood Business Park
Shaw Wood Way
Doncaster
DN2 5TB

Tel: 01302 761044
Fax: 01302 321993
Email: sales@kewtechcorp.com

Chapter 6 Accessories

A series of standard and optional accessories are available for the Kewtech KT77 Tester. The standard accessories are supplied with the Tester.

Refer to **www.kewtechcorp.com** for latest option and prices

Chapter 7 Specifications

Earth Bond Test

Test Voltage * ..... 6V nominal (no load)
Test Current * .....10A, 25A selectable (into s/c load)
Range ..... 40mΩ - 19.99Ω
Resolution.....0.01Ω
Accuracy +/- 5% of reading, +/- 2 digits
Pass Levels.....selectable

Earth Screen Test

Test Voltage * ..... 100mV nominal (no load)
Test Current * .....100mA (into s/c load)
Range.....40mΩ - 19.99Ω
Resolution.....0.01Ω
Accuracy .....+/- 5% of reading, +/- 2 digits up to 5.00Ω
Pass Levels..... selectable

Insulation Test

Test Voltage * ..... 500V d.c. or 250V d.c. nominal (0.5MΩ load)
Short Circuit Current..... 2mA d.c. maximum
Range ..... 0.10MΩ - 19.99 MΩ
Resolution.....0.01 MΩ (<100 MΩ)
Accuracy .....+/- 5% of reading, +/- 2 digits (100kΩ - 20MΩ)
Pass Levels 0.5MΩ, 1MΩ, 2MΩ, 4MΩ, 7MΩ, 10MΩ, 50MΩ

Substitute Leakage Test

Test Voltage ..... *40V a.c. o/c
Display Range ..... 0.1 - 20.0 mA a.c.
Resolution..... 0.01mA
Accuracy ..... +/- 10% of reading, +/- 2 digits 1.00 - 20mA
Pass Levels..... 0.25mA, 0.5mA, 0.75mA, 2.5mA, 3.5mA
..... 7.0mA, 9.9mA, 15.0mA

Leakage

Range. .....0.1mA - 10.0mA
Resolution 0.01mA
Accuracy ..... +/- 5% of reading, +/- 2 digits
Pass Levels 0.25mA, 0.5mA, 0.75mA, 1.5mA, 2.25mA
.....2.5mA, 3.0mA, 3.5mA, 9.9mA

Touch Leakage

Range ..... 0.1mA - 2.0mA
Resolution 0.01mA
Accuracy ..... +/- 10% of reading, +/- 2 digits
Pass Levels 0.25mA, 0.5mA, 1.0mA

Power Tests

Socket .....Selectable 115V BS4343, BS546 / 230V BS 1363 socket.
Measured Voltage .....90 - 300V
Indication only.
Measured Load..... 0 - 4kVA
Indication only.

IEC Lead Test

Test Voltage * 40Vac
Detects .....Open, Short, Good, Reversed

* - Test stimulus based on mains supply of 230V, varies with supply voltage.

Mechanical

Size ..... 450mm x 410mm x 155mm
Weight..... 3.5kg

ENVIRONMENTAL

Operating ..... 0ºC to 40ºC (non condensing)
Storage ..... -10ºC to 50ºC (non condensing)
Maximum R.H. 90%
Supply Rating 230V 50/60Hz
Max Output Current 16A
Fuses (Internal) ..... not user replaceable
Maximum Barometric Elevation for making Measurements 2000m
IP Rating IP40

Appendix A Purpose of Tests

Earth Bond Test

This test is to ensure that the connection between the earth pin in the mains plug of the appliance and the metal casing of the appliance is satisfactory and of sufficiently low resistance.

A selectable test current is applied between the earth pin of the mains supply plug and the earth bond test lead clip.

A high current is normally used to stress the connection under fault conditions. The length of the test should be limited to prevent damage due to overheating.

Earth Screen Test

This test is to check the earth screen connection using a current which will prevent damage that may be caused by testing using high currents. This is often required by sensitive electronics such as computers and other Information Technology (IT) equipment.

A low voltage of approximately 100mV AC RMS is applied between the earth pin of the mains supply plug and the Earth Bond test lead clip. A current of 100mA is allowed to flow for the duration of the test.

Insulation Test

Warning

500 V / 250V d.c. test voltage

This test is used to verify that adequate insulation exists between the mains supply pins and earth.

During the insulation test, a 500V DC voltage is applied between the earth pin and both the live and neutral pins of the appliance mains supply plug. The Tester displays the resistance measured and allows the user to confirm sufficient insulation exists.

For Class 2 appliances, the Earth Bond Test clip can be used for an earth return lead.

For appliances which incorporate over-voltage protection, a 250V DC test voltage is provided to allow a reading to be taken without the protection devices generating a false failure.

Substitute Leakage Test

The substitute leakage test applies a nominal voltage of 40V AC RMS to the appliance and is applied between the earth pin and both the live and neutral pins of the supply plug. For Class II appliances, connect the Earth Bond test clip to the appliance as a substitute for the Earth.

The Tester measures the current that flows and scales the result to display a guide to the current that would flow if the test voltage had been the nominal mains supply voltage, scaled for the applicable socket.

Please note that values for Substitute Leakage may differ substantially from that of conventional Earth Leakage tests because of the way that the test is performed (e.g. it will be affected by the presence of Neutral-to-Earth suppression capacitors).

This test can prove useful in situations where neither conventional Insulation nor Flash tests are acceptable methods of testing the insulation of the appliance.

IEC Lead Test

This test confirms the electrical safety of 230V IEC leads.

The IEC test performs a continuity and polarity check on the Live and Neutral conductors and confirming that there are no breaks or cross wiring in these conductors.

Powered Tests

Warning

Mains voltage applied to appliance

The following powered tests differ from the previous tests in that they apply mains supply voltage to the appliance to perform their functions:-

- Leakage Test
- Touch Leakage Test
- Load Test

The Tester performs an initial low voltage test to establish that the appliance can be safely powered.

Warning

It is important that the user verifies that an appliance with moving parts (e.g. an electric drill) is safely mounted to allow movement without causing damage to equipment or personnel.

If the potential load current is too high, a warning message appears, allowing the user to continue. If a Live to Neutral short exists, this message will appear, and if tests are continued the fuses will blow. If the potential load current is low, a warning message appears to allow the user to check that the appliance is switched on, and all fuses are intact. The Tester also performs a safety test to verify that internal relays are properly set before applying full mains supply to the appliance.

Power to the appliance will remain until the Red Button is pressed. This allows the user to switch between the three powered tests without removing power from the appliance.

Leakage Test

Warning
Mains voltage applied to appliance

The Leakage Test shows the current being lost through Leakage as the difference in the currents flowing in the Live and the Neutral conductors. This difference is the total leakage away from the appliance, and is generally equivalent to the current flow through the earth lead of the appliance, and displays the result in milliamps (mA).

This differential method of determining leakage will show the full leakage of an appliance in-situ, so if the appliance has an extra earth point, i.e. water pipe, then the Tester will show the full and true appliance leakage. This is also known as Enclosure or Differential Leakage.

Touch Leakage Test

Warning
Mains voltage applied to appliance

The Touch Test displays the current that would flow if the appliance was touched by a person. This is based on a 'body model' of 2kΩ.

The Tester detects any current flowing in the Earth Bond Lead (attached to an appropriate point on the appliance) and indicates the potential leakage through a metal panel. The Tester displays the result in milliamps (mA).

Load Test

Warning
Mains voltage applied to appliance

The Tester measures the power used by the appliance and displays the reading in kVA. There is no test duration limit on the Power tests. Once supplied with power, the appliance will be supplied until the test is cancelled. This will allow appliances with slow start-up speeds the time to ramp up to their working state.

Appendix B Reference Information

Factory-set Test Sequences

Name	Earth Bond	Insulation	Leakage	Touch Leakage	Flash
230V HH/PORT 1	0.1Ω	1.0MΩ	0.75mA	SKIP	SKIP
230V HH/PORT 2	SKIP	2.0MΩ	0.25mA	SKIP	SKIP
IT EQUIPMENT 1	0.1Ω	1.MΩ	SKIP	SKIP	SKIP
IT EQUIPMENT 2	SKIP	2.0MΩ	SKIP	SKIP	SKIP
230V MOV/STAT 1	0.1Ω	1.0MΩ	3.5mA	SKIP	SKIP
230V MOV/STAT 2	SKIP	2.0MΩ	SKIP	0.25mA	SKIP
230VLEAD (3M)	0.08Ω	1.0MΩ	SKIP	SKIP	SKIP
230V LEAD (6M)	0.2Ω	1.0MΩ	SKIP	SKIP	SKIP
230V LEAD (12M)	0.3Ω	1.0MΩ	SKIP	SKIP	SKIP
230V HH/PORT NI 1	0.1Ω	SKIP	0.75mA	SKIP	SKIP
230V HH/PORT NI 2	SKIP	SKIP	SKIP	0.25mA	SKIP
110V HH/PORT 1	0.1Ω	1.0MΩ	0.75mA	SKIP	SKIP
110V HH/PORT 2	SKIP	2.0MΩ	SKIP	0.25mA	SKIP
110V MOV/STAT 1	0.1Ω	1.0MΩ	3.5mA	SKIP	SKIP
110V MOV/STAT 2	SKIP	2.0MΩ	SKIP	0.25mA	SKIP
110V LEAD (3M)	0.08Ω	1MΩ	SKIP	SKIP	SKIP
110V LEAD (6M)	0.2Ω	1MΩ	SKIP	SKIP	SKIP
110V LEAD (12M)	0.3	1MΩ	SKIP	SKIP	SKIP

All tests have visual test included
Extension lead tests include a Polarity check

Testcode Tables

The test sequence code is split into two 10-digit testcodes, this Appendix describes how the two testcodes are broken down.

First Testcode:

Digit 1	Visual Inspection/ Polarity	Voltage
H	No Visual Inspection No Polarity Test	230V
I	No Visual Inspection No Polarity Test	230V
J	No Visual Inspection Polarity Test	230V
K	No Visual Inspection Polarity Test	230V
L	No Visual Inspection No Polarity Test	115V
M	No Visual Inspection No Polarity Test	115V
N	No Visual Inspection Polarity Test	115V
O	No Visual Inspection Polarity Test	115V

Digit 2	Earth Bond
0	Skip Earth Bond
1-9	Earth Bond Fault Limit (mΩ)
A	1.5 mΩ
B	2.5 mΩ
C	3.5 mΩ
D	4.5 mΩ
E	5.5 mΩ
F	6.5 mΩ
G	7.5 mΩ
H	8.5 mΩ
I	9.5 mΩ

Digit 3	Earth Bond Multiplier	Current
1	x1	4A
2	x10	4A
3	x100	4A
4	x1000	4A
5	x1	10A
6	x10	10A
7	x100	10A
8	x1000	10A
A	x1	25A
B	x10	25A
C	x100	25A
D	x1000	25A
E	x1	100mA a.c.
F	x10	100mA a.c.
G	x100	100mA a.c.
H	x1000	100mA a.c.
I	x1	+200mA
J	x10	+200mA
K	x100	+200mA
L	x1000	+200mA
M	x1	-200mA
N	x10	-200mA
O	x100	-200mA
P	x1000	-200mA
Q	x1	+ - 200mA
R	x10	+ - 200mA
S	x100	+ - 200mA
T	x1000	+ - 200mA
U	Reserved	
V	Reserved	
W	Reserved	
X	Reserved	

Digit 4	Insulation	Voltage
0	Skip	
1	0.5MΩ	250V d.c.
2	1.0MΩ	250V d.c.
3	2.0MΩ	250V d.c.
4	4.0MΩ	250V d.c.
5	7.0MΩ	250V d.c.
6	0.5MΩ	500V d.c.
7	1.0MΩ	500V d.c.
8	2.0MΩ	500V d.c.
9	4.0MΩ	500V d.c.
A	7.0MΩ	500V d.c.
B	10.0MΩ	250V d.c.
C	50.0MΩ	250V d.c.
D	10.0MΩ	500V d.c.
E	50.0MΩ	500V d.c.

Digit 5	Sub-Leakage
0	Skip
1	0.25mA
2	0.50mA
3	0.75mA
4	2.50mA
5	3.50mA
6	7.00mA
7	9.90mA
8	15.0mA
9	1.00mA

Digit 6[1]	Not used (Set to 0)
0	Reserved
1	Reserved
2	Reserved
3	Reserved
4	Reserved

Digit 7	Leakage
0	Skip
1	0.25mA
2	0.50mA
3	0.75mA
4	1.50mA
5	2.25mA
6	2.50mA
7	3.00mA
8	3.50mA
9	9.90mA
A	1.00mA

Digit 8	Touch Leakage
0	Skip
1	0.25mA
2	0.50mA
3	1.00mA

Digit 9	Earth Bond Test Duration
1	2s : add 0.0 to the earth bond limit
2	5s : add 0.0 to the earth bond limit
3	10s : add 0.0 to the earth bond limit
4	30s : add 0.0 to the earth bond limit
5	2s : add 0.1 to the earth bond limit
6	5s : add 0.1 to the earth bond limit
7	10s : add 0.1 to the earth bond limit
8	30s : add 0.1 to the earth bond limit
9	2s : add 0.2 to the earth bond limit
A	5s : add 0.2 to the earth bond limit
B	10s : add 0.2 to the earth bond limit
C	30s : add 0.2 to the earth bond limit
D	2s : add 0.3 to the earth bond limit
E	5s : add 0.3 to the earth bond limit
F	10s : add 0.3 to the earth bond limit
G	30s : add 0.3 to the earth bond limit
H	2s : add 0.4 to the earth bond limit
I	5s : add 0.4 to the earth bond limit
J	10s : add 0.4 to the earth bond limit
K	30s : add 0.4 to the earth bond limit

Digit 10	Insulation Test Duration
1	2s
2	5s
3	10s
4	30s

Digit 1	Sub-Leakage Test Duration
Q	2s
R	5s
S	10s
T	30s

Digit 2[1]	Not used (set to 0)
1	Reserved
2	Reserved
3	Reserved
4	Reserved

Digit 3	Leakage/Load Test Duration
1	2s
2	5s
3	10s
4	30s
5	60s
6	120s
7	180s
8	Unlimited

Digit 4	Touch Leakage Test Duration
1	2s
2	5s
3	10s
4	30s
5	60s
6	120s
7	180s
8	Unlimited

Digit 5	Number of Earth Bond Tests
0	1
1	1
2	2
3	3
4	4
5	5
6	10
7	15
8	20
9	25
A	30
B	Unlimited

Digit 6	Number of Insulation Tests
0	1
1	1
2	2
3	3
4	4
5	5
6	10
7	15
8	20
9	25
A	30
B	Unlimited

Digit 7	Number of Substitute Leakage Tests
0	1
1	1
2	2
3	3
4	4
5	5
6	10
7	15
8	20
9	25
A	30
B	Unlimited

Digit 8	Not used (set to 0)
0	Reserved
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	Reserved
A	Reserved
B	Reserved

Digit 9	Number of Load/Leakage Tests
0	1
1	1
2	2
3	3
4	4
5	5
6	10
7	15
8	20
9	25
A	30

Digit 10	Number of Touch Leakage Tests
0	1
1	1
2	2
3	3
4	4
5	5
6	10
7	15
8	20
9	25
A	30

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