

**Megger.**

**PAT4E  
Appliance Tester**

**User Guide**

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### Symbols used on the instrument.



Caution: Refer to accompanying notes



Risk of electric shock.



Equipment complies with relevant EU Directives



## SAFETY WARNINGS

- **Safety Warnings** and **Precautions** must be read and understood before the instrument is used. They **must** be observed during use.
- For safety, **PAT4E** must be properly earthed. Only use a supply socket that has a protective earth contact.
- Test leads, probes and crocodile clips must be in good order, clean and with no broken or cracked insulation.
- For safety, tests are performed in the correct order. If an asset (appliance) fails a test, **PAT4E** will fail the asset and exit the test sequence. The fault causing the failure must be corrected before the appliance is re-tested.
- During testing, ensure that no hazard will exist if the asset operates as a result of normal running, or of a fault condition.
- When performing an Insulation test the asset must not be touched.
- Only perform an Operation test after an  $R_{PE}$  Test (Class 1 only) and Insulation  $R_{ISO}$  Test (Class 1 or Class 2) have been verified.
- The instrument should not be used if any part of it is damaged.
- Replacement fuses must be of the correct type and rating. See 'Specification' section.

**NOTE: THE INSTRUMENT MUST ONLY BE USED BY SUITABLY TRAINED AND COMPETENT PERSON**

## General Description.

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The **PAT4E** Portable Appliance Testers provide significant advances in the ease of use, with comprehensive features designed to speed up the testing of electrical equipment. The instruments meet the testing requirements of the UK Electricity at Work Regulations, IEE Code of Practice for In Service Inspection and Testing of Electrical Equipment, VDE 0701 and NEN 3140 specifications. The instruments may be used stand alone, or for maximum advantage, with PC based software, such as **Form Filler**™ for Windows™ (See Accessories). The integral real time clock “stamps” an accurate time and date on every test. **PAT4E** utilise a unique concept known as Test Groups. This permits very rapid addition and testing of equipment with a minimum of data entry. Once set up, the use of Test Groups will save a great deal of time. Additionally, Test Groups ensure that only the correct tests can be applied to the equipment under test and eliminate the need for complex test codes.

**PAT4E** provides a professional system for the rapid testing of equipment while maintaining the essential traceability of asset test history. The on-board Asset (Appliance) database keeps a record of appliance details, re-test frequency, test and re-test dates, and allows the previous test results to be displayed at the time of test. As well as the easy to use QWERTY keyboard, each field is named, so there is less chance of entering the wrong information. Data entry via optional bar code scanners is also possible. The lithium backed ‘real time’ clock maintains the time and date accurately for over ten years and automatically date and time stamps every asset tested. Data is stored in battery backed, solid state memory that under normal circumstances will be protected for ten years. Such storage media is however susceptible to external influences such as transients and static discharge. These effects may cause data corruption or loss.

**Megger Limited** cannot accept responsibility for any such losses of data. When the **PAT4E** is used with PC software such as **Form Filler**™, employing good working practices, such as the regular downloading of data will substantially reduce the risk.

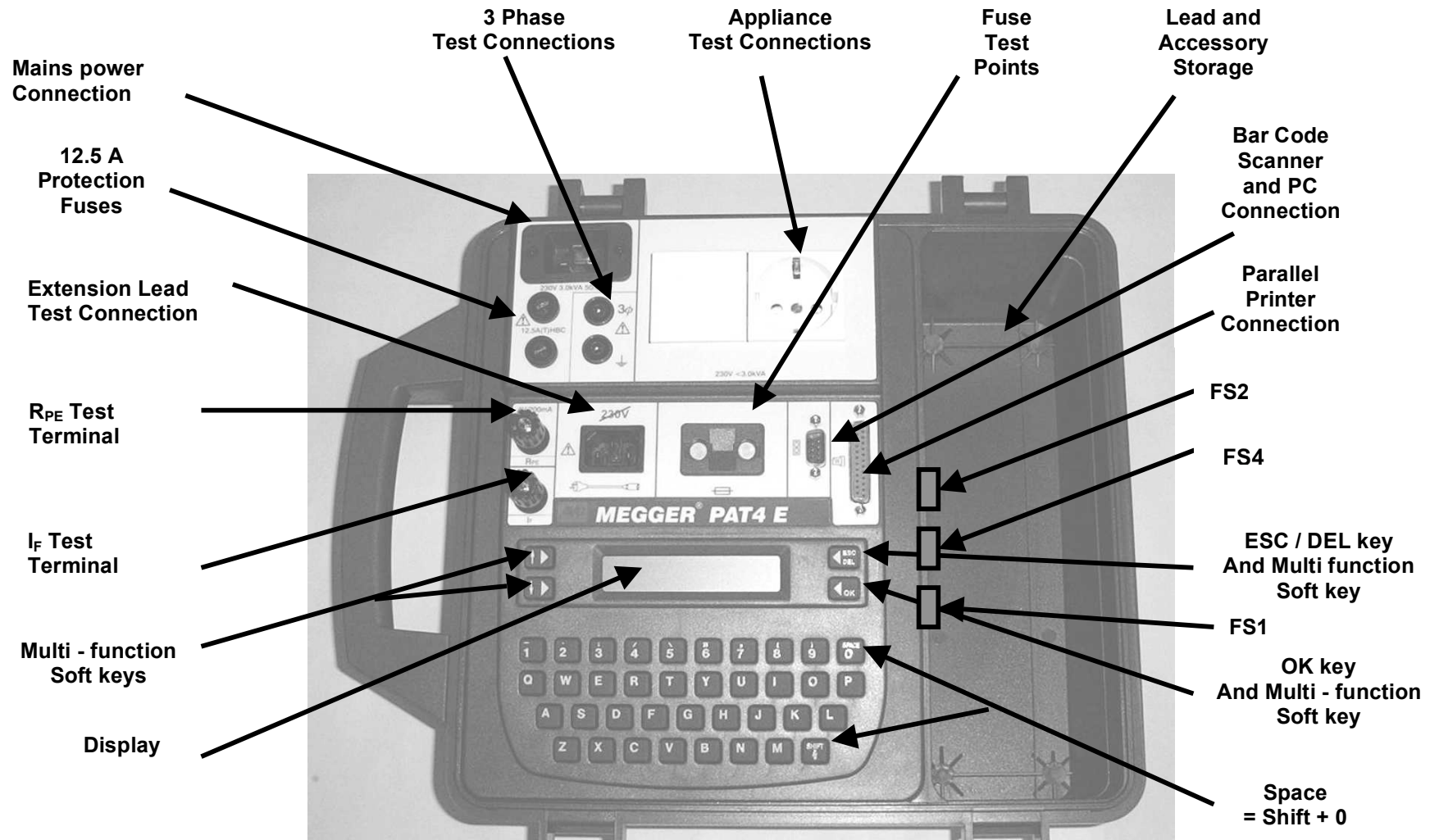
The following information can be stored and accessed directly on the **PAT4E**.

- Assets (Appliances) - total number 1000
- Results (sets of) 1000
- Clients (names and addresses) 10
- Locations (Site details) 20
- Test Groups 50
- Users 10

The instruments can perform the following tests:

- Visual Inspection list
- Fuse Test
- Circuit test (pre-test)
- Earth Continuity test (**R<sub>PE</sub>**)
- Insulation test (**R<sub>ISO</sub>**)
- Operation Test.
- Extension Lead testing.
- Differential Earth Leakage Test. (**I<sub>DIFF</sub>**)
- Touch Current Test (**I<sub>F</sub>**)
- Equivalent Earth Leakage Test (**I<sub>PE</sub>**)

## Features and Controls.



**FUSES** - Due to the often harsh electrical environments in which Portable Appliance Testers are used and the likelihood of testing faulty equipment all Megger Portable Appliance Testers are protected by appropriate internal fuses. This ensures that the instrument is protected from serious damage.

An unfortunate downside to using internal protection fuses is that the PAT4 can be rendered inoperative simply by the failure of such a fuse resulting in frustration and delay for the user. In order to ensure that the instrument can quickly be put back into service without downgrading its protection externally located fuses are now fitted to all new PAT4 models. These may be changed quickly and simply by the user in the event of a failure. For maximum convenience all fuses are of the same value.

Additionally the PAT4 display will now indicate which fuse has failed, unless of course it is main supply fuse in which case the screen will be blank.

Replacement of Fuses

Always disconnect the PAT4 from the main supply before checking fuses. Use correct replacement fuses as printed adjacent to the fuse - Megger Part No. for replacement fuses 25950-014

## Quick Start Guide.

This **Quick Start** guide is intended to show you how to select Clients and Locations and test appliances in the minimum of time. Other features may then be understood and investigated when convenient. In using this guide you will make use of the demonstration data that was loaded onto your instrument at the time of manufacture.

### Connecting to the Power supply

Plug the *PAT4E* into a standard 230 V supply for testing. On connecting to the supply, the *PAT4E* performs a rapid self-test and calibration sequence. If the screen is dim, refer to “Contrast adjust”.

### Multi Function keys.



ESCape back to previous screen or used to **DE**lete typed text.

OK when there is no displayed function

### Changing Languages.

The *PAT4E* can be operated in one of four Languages. To select an alternative Language, the *PAT4E* must be powered up with the “L” key depressed until the language selection screen is displayed. Select from English, French, Dutch or German.

### Quick-Start demonstration

In order to follow this **Quick Start demonstration**, you will need a 230V class 2 (Double insulated) asset (appliance) to test e.g. a hairdryer or a plastic cased power drill, but for the purpose of the **Quick-start** exercise it should be in a known, good condition.

### Logging in to the Unit

*PAT4E* accepts up to ten User names / Pin numbers at any one time, allowing only authorised persons to use the unit, if required. To input User names and their respective pin numbers see ‘Settings’.

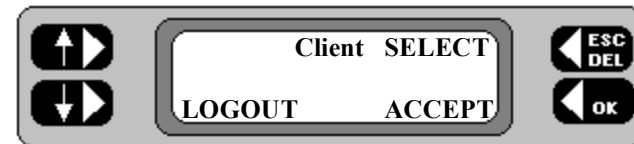
The Login screen is displayed, ready for the USER and PIN insertion.



Login Screen

If you have not used the *PAT4E* before:

1. Type in the name *AVO*. Typing errors can be deleted using the ESC/DEL key. Press the **OK** key.
2. Type in the Pin number *1234* and press the **OK** key. The current Client will be briefly displayed followed by the “Client” screen.



Client Screen

Rather than **ACCEPT** the current client, we will demonstrate the different example Clients that have been loaded into your instrument.


3. Press the **SELECT** key. The Client Selection screen is displayed.




Client Selection screen

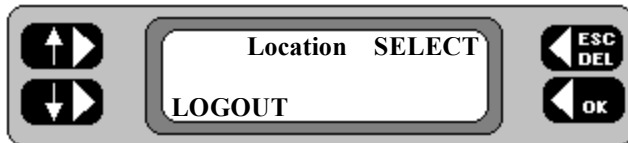
This shows that the first client in the *PAT4E* database is called *AVO INTERNATIONAL*

## Quick Start Guide (Continued).


4. Press the **NEXT**  key repeatedly. Each time the key is pressed, the next Client is displayed. Three specimen clients are included in your demonstration data:


AVO International  
A.N. Other Client  
Yet Another Client

5. When the screen displays A.N. OTHER CLIENT, press the OK  key. This selects A. N. Other Client as the one you are currently using. The Location screen is now displayed.




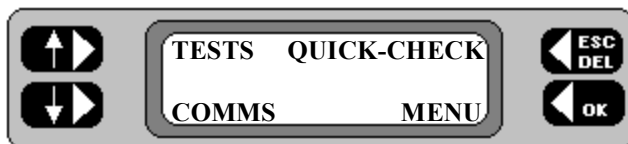
Location screen

6. Press the **SELECT**  key in order to view and choose the site or building location. You will see that the first site location in the database for **A. N. Other Client** is called **Ashford Site**. **PAT4E** can hold up to twenty different Site locations.

7. Press the **NEXT**  key repeatedly. Each time the key is pressed the next location within **A. N. Other Client** is displayed. Three such locations are included in your demonstration data:

Dover Site  
Folkestone Site  
Ashford Site

8. When the screen displays **DOVER SITE**, press the OK  key. This selects **Dover Site** as the site location you are currently using. The **Main** screen is displayed.



Main screen

To summarise you have now selected


**Client = A.N. Other Client**  
**Location = Dover Site**

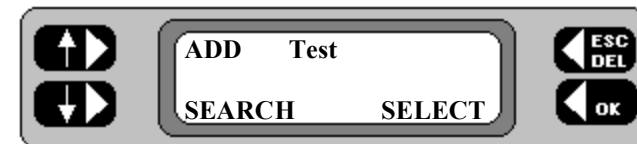
### Auto Restart to Main screen

The Client and Location need be selected only once for any particular site. **PAT4E** will assume the same settings until you deliberately logout from the **Client**. Even if mains power is removed e.g. when moving around a site, if you have not logged out, the **PAT4E** will automatically return to the Main screen. You are now ready to test appliances.

### Test appliances


The use of test Groups, enables assets to be added to the **PAT4E** database, and select tests for the assets to be tested. **PAT4E** allows you to enter many details about the assets, or just an **ID number** and test **Group**. Once details are entered they remain with the appliance record, and never need to be re-entered, even when the appliance is re-tested at a later date. We recommend that full details of each appliance are entered the first time it is tested since this enhances traceability and gives full advantage of the features in **Form Filler**™

9. With the **Main** screen displayed, press the **TESTS**  key. The Test screen is displayed.

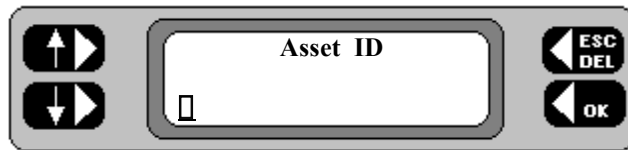


Test screen

Since your asset will not already exist in the **PAT4E** data you must first add it to the database.

10. Press the **ADD**  key. **Asset ID** screen is displayed.

## Quick Start Guide (Continued).



Asset ID screen


You must now give the asset a unique reference number, which may be any combination of characters up to a maximum of ten. Since no appliances exist for the current location you may choose anything you like. e.g. **2468**.

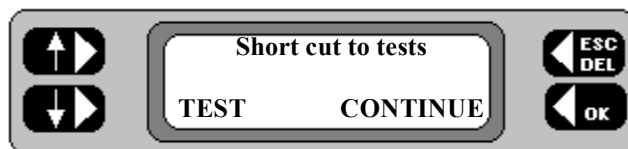
11. Type your chosen ID and press the OK  key. The **Group** screen is displayed.




Group Screen

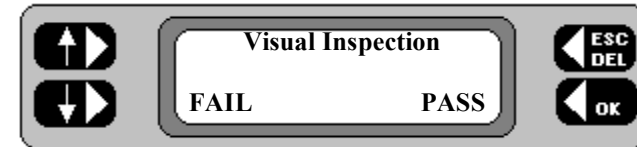
In order to test the asset (and other identical appliances) *PAT4E* needs to know what tests to apply and what Pass / Fail limits are acceptable. This is achieved by allocating a test Group to the asset (50 different test **Groups** may be created on your *PAT4E* each of which can be applied to any number of appliances). Ten examples are included in the demonstration data (see '**Demonstration Data**'). One such group created for typical Class 2 or double insulated equipment has been called **TC2**.

12. With the Group screen displayed, type **TC2** and press the OK  key. The message "**Group TC2 Accepted**" is briefly displayed, followed by the display of:




You may press the **CONTINUE**  key and enter full details for the asset. In this demonstration we will go straight to test the asset.

13. Press the **TEST**  key. The Visual Inspection screen is shown



**Note:** - Initially your *PAT4E* has been configured for *Manual* operation. This means that whilst the tests applied to the appliance are governed by the chosen Group, *PAT4E* allows the user to decide whether each test result is a *Pass* or a *Fail*. This allows greater control over the testing, and for you to proceed one step at a time. It also provides display of the historic data stored on the *PAT4E*. Once familiar with the operation of the in *PAT4E*, you may choose to automate the test sequence to *Pass* or *Fail* each test according to the limits specified for the **Group**. This speeds up testing and is ideal where the operator may be unfamiliar with acceptable limits.

14. The first test specified for Group **TC2** is the Visual inspection. Carry out a full visual inspection of the asset and if acceptable press the **PASS**  key. The next specified test is displayed. If unacceptable, press the **FAIL** key and *PAT4E* will pose a number of questions enabling you to specify the nature of the fault as follows:

**Case OK?**

**Plug OK?**

**Mains Lead OK?**

**On/Off Switch OK?**

**Supply socket OK?**

**Environment OK?** e.g. operational hazards in the vicinity



**Suitability OK?** e.g. used for correct purpose ?

**Everything Else OK?**




## Quick Start Guide (Continued).

**Note:** - If an asset fails a visual inspection, no further tests will be performed and a repair code may be entered (see “*Repair Codes*”).

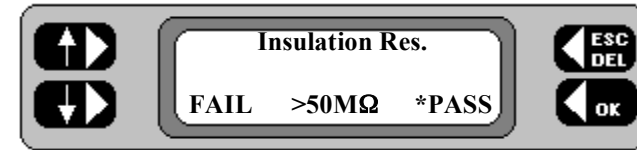
15. Assuming that you have pressed PASS  for the visual inspection, *PAT4E* will prompt you to plug the asset into the tester. Press the YES  key when this has been done.

*PAT4E* will conduct a pre-test to confirm that electrical continuity exists within the appliance i.e. that it has been switched On, and that any fuses are not ruptured. This is important otherwise the test results obtained will be meaningless. If the asset is very high resistance or very low resistance, *PAT4E* will warn you that the asset may accordingly be Open or Short circuit. You have the option to **RETRY** (forgotten to turn the asset on?) **FAIL** or **IGNORE** the warning. Note that some assets containing heating elements, filament lamps or very large motors may exhibit a very low resistance in their de-energised state, causing *PAT4E* to warn of a possible short circuit. In such cases, the warning can be ignored.

**Note:** - If an Operation test is performed on a short circuit asset, *PAT4E* may be damaged. If in doubt **DO NOT PROCEED**. Press the **FAIL** key, suitably label, and remove the asset from service; investigate and rectify the fault, and re-test on completion.


16. *PAT4E* will proceed to the next test specified for group TC2 which is the **Insulation test**, and prompt you to connect the Insulation test lead (from the instrument **I<sub>F</sub>** terminal to any exposed metal or insulated part of the asset). Press the YES key  when this has been done.

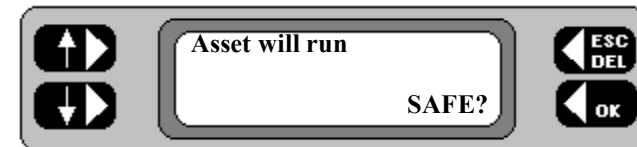
The insulation test will be applied for 5 seconds and the appropriate reading displayed. On completion of the test, *PAT4E* will display the result and allow you to **PASS** or **FAIL** the test.




*PAT4E* automatically compares the result obtained with the limit specified in the group TC2 and places an asterisk \* next to the appropriate **PASS** / **FAIL** key. In this case the lower limit specified in the group TC2 for an insulation test was **7 MΩ**. Therefore a reading of **>50 MΩ** is a pass.

**Note:** If the *PAT4E* had been setup in **AUTOPASS** mode it would have passed the test for you and proceeded to the next test in the sequence (see ‘*Settings*’).

17. Press the PASS  key. *PAT4E* will proceed to the next test (Leakage) specified for Group TC2. The following confirmation screen is displayed:



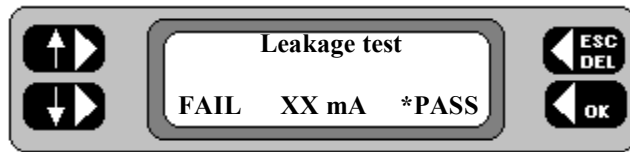
**For an Operation test or Differential Earth Leakage test, ensure that the asset is in a safe condition to run and that no hazards are present.**


18. Confirm that it is safe for the asset to start and press the OK key.   
**To stop the test in emergency, press any key.**

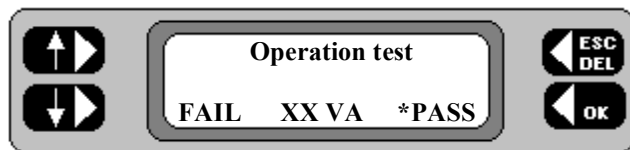
The asset will be operated for five seconds, during which time the differential earth leakage will be measured. (For test duration adjustment refer to “*Settings*”). On completion of the test, *PAT4E* perform a second differential leakage tests, as TC1 group contains



## Quick Start Guide (Continued).


the reversible mains plug option enabled. The result will be displayed allowing you to **PASS** or **FAIL** the test.



19. Press the **PASS**  key. *PAT4E* will perform an operation test and show the test result



20. Press the **\*PASS**  key. This completes the test sequence specified by the group **TC2** so *PAT4E* will display whether the asset has passed or failed then prompt you for an optional repair code (see “**Repair Codes**”). In this instance, simply press the **OK**  key.

21. Press the **ESCape**  key to return to the Main screen. That completes the testing of a single asset. The test results are now held against the asset record in the instrument and will be available for comparison next time you test the appliance.

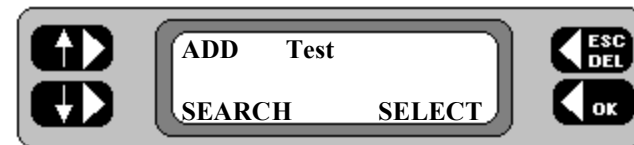
### Historical Data Demonstration.

*PAT4E* incorporates a historic data facility that enables previous test results to be viewed at the time of testing. This powerful feature enables you to spot any dangerous degradation of the appliance since its last test. Whilst previous and current test results may each be considered acceptable in their own rights against the pre-defined limits, there are instances where two very different readings will indicate significant degradation of appliance safety. e.g.

**Insulation test March 1998 = 50 MΩ Pass limit = 7 MΩ**  
**Insulation test March 1999 = 10 MΩ Pass limit = 7 MΩ**

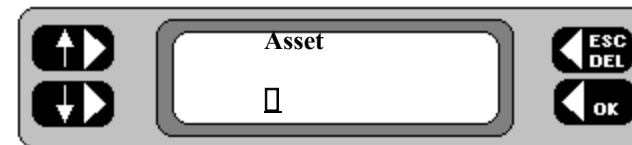
Both readings are clearly a **PASS**, but if the degradation continued it would not be long before the asset insulation fell below the limit of 7 MΩ causing the appliance to fail the pre-set limits.

To demonstrate the historical data facility we will simply re-test your Class 2 asset. Since the asset now exists in the *PAT4E* database you do not need to add it. From the **Main** screen, press the **TESTS** key to display the Test screen.





Test screen

1. Press the **SELECT**  key. The Asset ID screen is displayed.



Asset ID screen


2. Now type your chosen asset ID (eg **2468**) and press the **OK**  key. *PAT4E* will rapidly search its database, retrieve the appliance record, and display the update asset test screen. press the **OK**  key.






## Quick Start Guide (Continued).

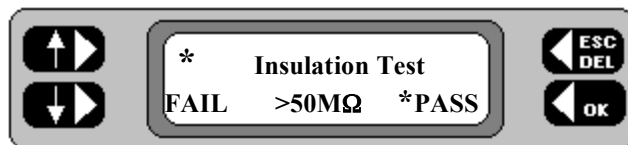
3. The date it was last tested will be displayed.



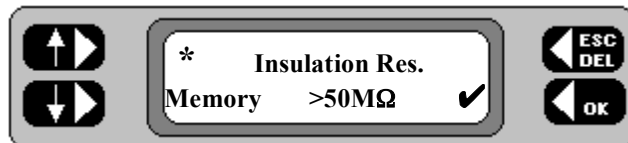
4. Press the OK  key to continue and *PAT4E* will start the test sequence again. The Visual Inspection screen is displayed.



5. Press the PASS  key for the visual inspection. *PAT4E* will prompt you to plug the asset into the tester.
6. Press the YES  key when this has been done to move on to the Pre-test and Insulation tests. *PAT4E* will prompt you to connect the Insulation test lead (from the instrument to any exposed metal or insulated part of the asset).
7. Press the YES  key when this has been done. Note that at the end of the test an asterisk\* is displayed in the test title.



8. This means that historic information is available for this appliance. To view the historic data, press the asterisk \* key.



This example shows that the last insulation test result stored in memory is  $> 50 \text{ M}\Omega$  and the ✓ indicates that this was designated as a **PASS** at the last test. If the asset had previously failed the test an ✗ would be displayed.

9. To revert to the current test result simply press the asterisk \* key again and PASS or FAIL the test. Now complete the test sequence for the appliance as before.

*PAT4E* stores both the current and the previous result for each test. When data is uploaded to *PAT4E* from **Form Filler**™ the historic data will also be transferred. Data will not be transferred if the previous test was not performed using a *PAT4E*.

### Quick Start Summary

If you have followed this guide you should now have an understanding of the basic features of the *PAT4E* from the selection of Clients to the conducting of tests. Your next step should be to familiarise yourself with some of the more advanced features of the instrument such as searching for appliances, entering full appliance information and re-test frequencies, creating your own groups and printing reports and certificates.

The inclusion of demonstration data on the *PAT4E* enables you to explore the available features without having to spend time entering lots of data.

When you are ready to use the instrument for real you will need to create your own Clients and Locations ready to accept new assets. Once you are familiar with operation of the instrument you may if you wish delete the demonstration data (see 'Erase Memory').

## Settings.

### Contrast Adjustment

*PAT4E* has been designed so that contrast adjustment will not normally be required unless working at extremes of temperature.

1. Press and hold the letter 'C' key during the full switch on sequence. The Contrast screen is displayed.



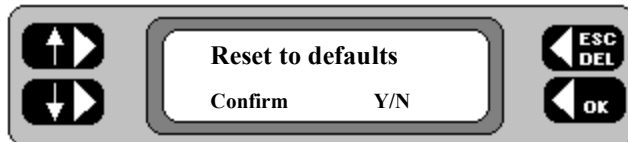
2. Press the left hand keys repeatedly, to adjust the contrast as required and press the OK key.

### Reset to default Settings

If desired, the *PAT4E* can be reset to the factory default settings, and re-instate the demonstration data.

All data and User configurations will be erased.

1. Press and hold the letter 'R' key during the full switch on sequence. The following screen is displayed:



1. Confirm the request using the "Y" key. On completion, you will be returned to the Login screen.
2. Use 'AVO' and '1 2 3 4' as the User / Pin to re-start.

### Shortcut to Comms Upload (from PC)

If there is no useful data stored in *PAT4E*, and it is required to upload new data, this shortcut allows direct access to the "COMMS" "RECEIVE" mode.

1. Press and hold the letter 'U' keyboard key during the full switch on sequence. The **Erase Data Memory ?** screen is displayed.
2. Press **EXIT** to cancel the erasure, or **CONTINUE** to proceed. The 'Are you sure ?' screen is displayed.
3. Press the **YES** key to confirm, or cancel by pressing the **NO** key.

### Language of operation

*PAT4E* contains four language options.

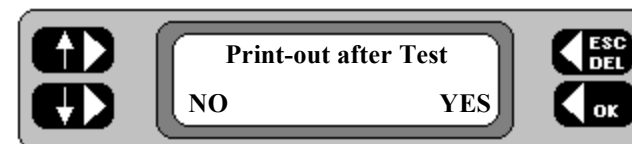
1. Press and hold the letter 'L' key during the full switch on sequence. The Language is displayed.



2. Press the left hand keys repeatedly, to change to the required language.

### Test Result printout.

If a printer is attached to *PAT4E*'s parallel output during the testing of assets, a simple listing of test results can be printed. To enable (or disable) this feature Press and hold the letter 'P' key during the full switch on sequence. Select Yes or No using the respective key



## **Settings (Continued).**

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### **Function setting adjustment**

The parameters used by the *PAT4E* can be set up, deleted or amended as required. These include **Time** and **Date**, **Authorised Users**, **Test Company** details, **Test Times**, and **Memory erasure**

### **User names and Pin numbers**

Names and Pin numbers for up to 10 authorised Users can be entered at any time. Test results are individually credited to the person logged in at the time of testing and downloaded to **Form Filler**<sup>TM</sup> if used.

### **User name and Pin number**

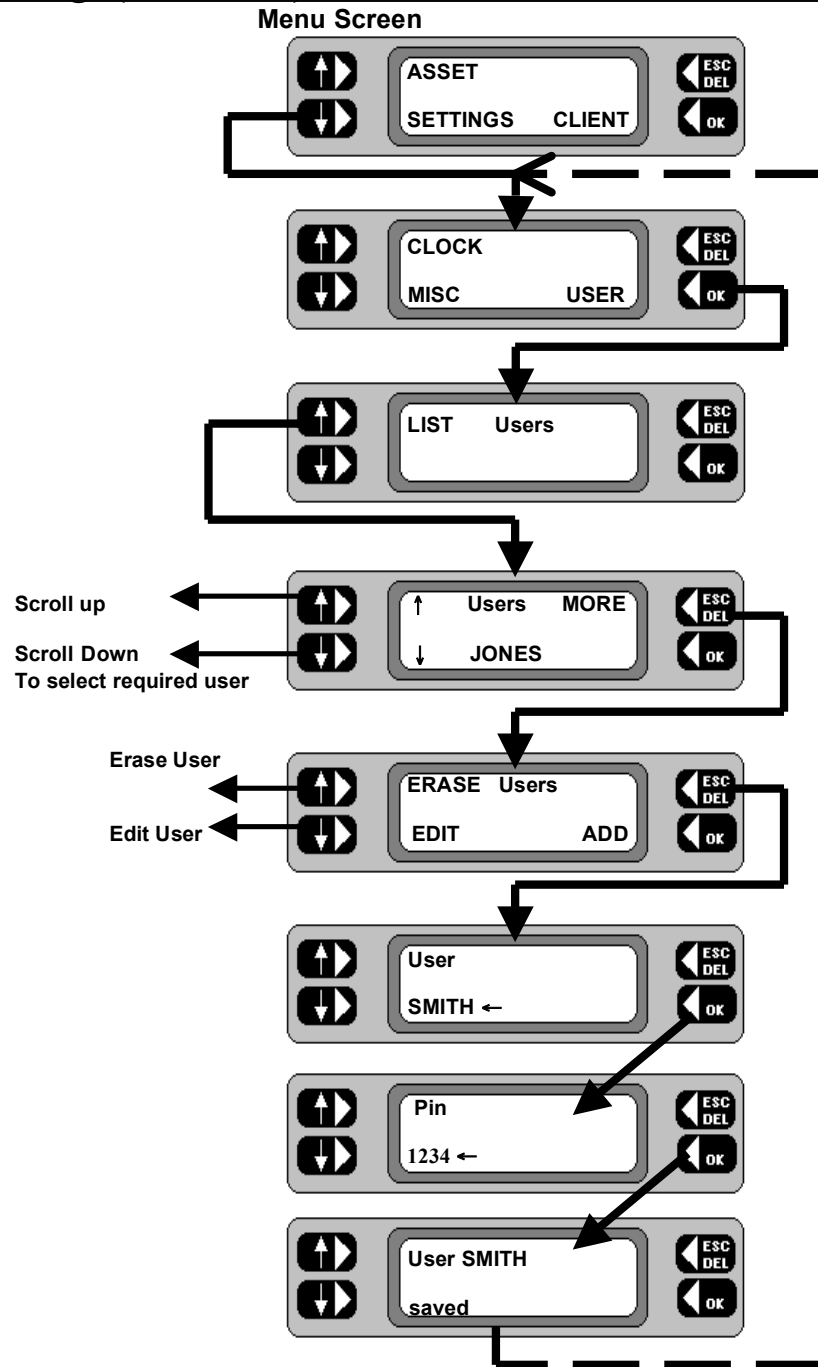
1. Refer to the **Setup User** Flowchart adjacent.
2. From the **Main** screen, press the **MENU** key. The Menu screen is displayed.
3. From the **Menu** screen, press the **SETTINGS** key. The Settings option screen is displayed.
4. Press the **USERS** key. The **Users** screen is displayed. Press the **OK** key.
5. Type in the user name ( $\leq 10$  characters) and press the **OK** key.

**Note:** - If not recognised, the option to add as a new user is displayed. Press the **NO** key to list all users. Press the **LIST** key to step through the list and display the required user, then press the **MORE** key.

6. To check current Users, press the **LIST** key. The screen changes. Use the left hand keys to scroll the current user list. The user who is currently logged in is displayed with an ‘\*’ against the name
7. Press the **MORE** key. The screen changes.
8. Press the **ADD** key. The screen changes.
9. Type in the new User name, remember it, and press the **OK** key. The Pin number screen is displayed.
10. Type in the desired Pin number ( $\leq 4$  digits) press the **OK** key to return to the **Settings option** screen.
11. On completion **Escape** back to the Menu screen.

12. Confirm the new User name and pin number by logging out of the current Client. To log out, press the **LOGOUT** key from the “Client” or “Location” screens. The **Users** screen is displayed.
13. Log back in again. The **AVO / 1234** User / Pin number can be deleted using the **ERASE** key instead of the **ADD** key in step 8.

# Settings (Continued).



## Settings (Continued).

### Setup Manual / Autopass Testing

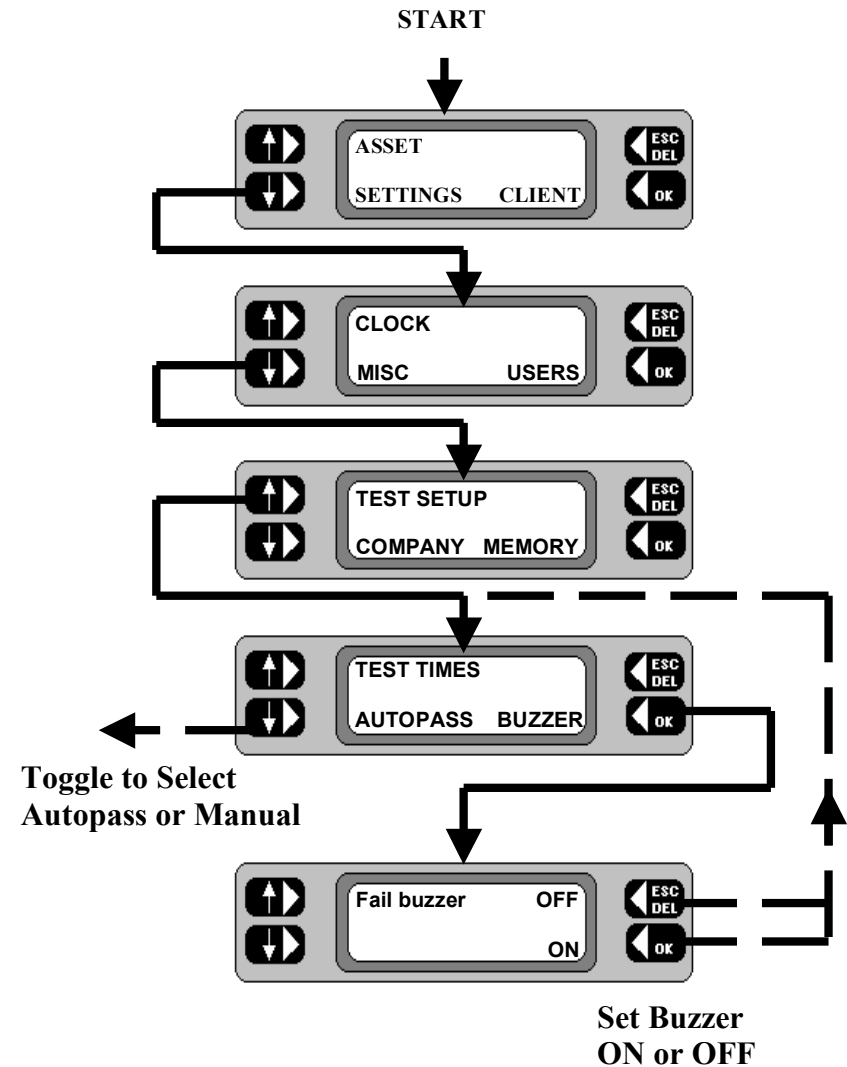
If 'AUTOPASS' is selected, testing will proceed automatically with *PAT4E* determining the pass/fail status according to the pre-selected Group limits. If "MANUAL" is selected, *PAT4E* will pause after each test and display a "Pass" / "Fail" decision prompt.

1. Refer to the **Setup Autopass / Manual** Flowchart adjacent.
2. From the **Main** screen, press the **MENU** key.  
The **Menu** screen is displayed.
3. From the **Menu** screen, press the **SETTINGS** key. The **Settings** screen is displayed.
4. Press the **MISC** key. The **Miscellaneous** screen is displayed.
5. Press the **TEST SETUP** key. The **Test Setup** screen is displayed. The current **Manual / Autopass** setting is shown.
6. Using the lower left key, toggle the **Manual / Autopass** setting as required, and press the **ESC** key to return to the **Miscellaneous** screen.
7. On completion **ESC**ape back to the **Menu** screen.

### Setup Buzzer

The buzzer can be set to sound when a test fails in **Autopass** mode. To mute the buzzer following a failure, press the **OK** key.

1. Refer to the **Setup Buzzer** Flowchart adjacent.
2. From the **Main** screen, press the **MENU** key. The **Menu** screen is displayed .
3. From the **Menu** screen, press the **SETTINGS** key. The **Settings** screen is displayed.
4. Press the **MISC** key. The **Miscellaneous** screen is displayed.
5. Press the **TEST SETUP** key. The **Manual / Autopass** screen is displayed.
6. Press the **BUZZER** key. The **Buzzer Control** screen is displayed. Using the lower right key, switch the buzzer **On** or **Off** as required. The **Miscellaneous** screen is displayed.
7. On completion **ESC**ape back to the **Menu** screen.

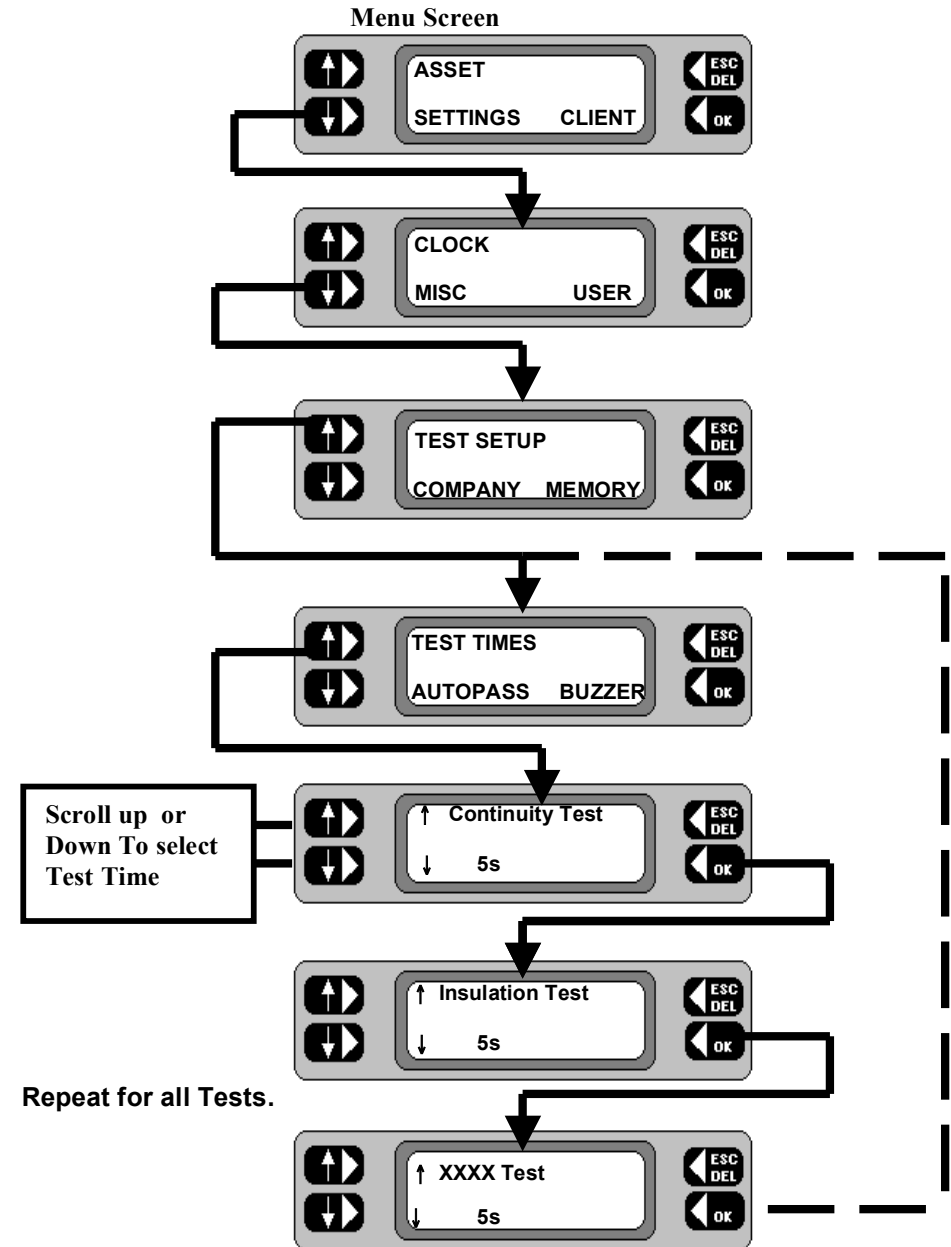


## Settings (Continued).

### Setup Test Times

Each test can be performed for a User definable time of between 1 and 99 seconds This enables specific tests to be set to appropriate lengths of time, perhaps to satisfy a particular standard. Once set, a test time will automatically be applied to all assets using such a test, regardless of the Group, Client or Location.

1. Refer to the **Setup Test Times** Flowchart adjacent.
2. From the **Main** screen, press the **MENU** key. The Menu screen is displayed .
3. From the Menu screen, press the **SETTINGS** key. The **Settings** screen is displayed.
4. Press the **MISC** key. The **Misc** screen is displayed.
5. Press the **TEST SETUP** key. The **Test set up** screen is displayed.
6. Press the **TEST TIMES** key. The first test is displayed with its current time setting.
7. Press the **OK** key to select the required Test.
8. Toggle the left hand keys to adjust the time for the selected test and press the **OK** key.
8. Press the **ESCape** key twice to return back to the **Menu** screen. Menu screen.

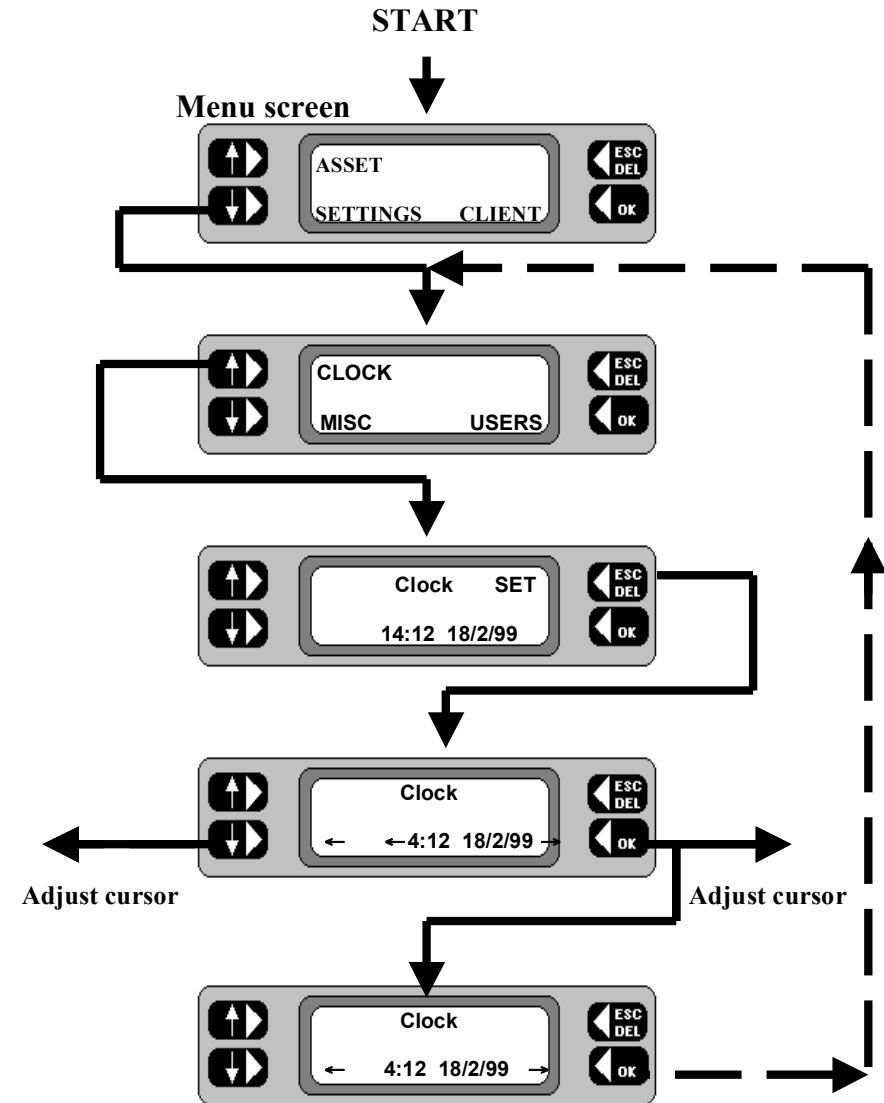




## Settings (Continued).

### Setting the Clock

1. Refer to the Setup Clock Flowchart adjacent.
2. From the **Main** screen, press the **MENU** key. The Menu screen is displayed .
3. From the **Menu** screen, press the **SETTINGS** key. The Settings screen is displayed.
4. Press the **CLOCK** key. The **Clock** screen is displayed showing the set date and time.
5. Press the **SET** key. The **Clock adjustment** screen is displayed, with the cursor flashing on a character.
6. Using the lower keys, move the cursor as appropriate and type in the required settings.
7. On completion of the setting, repeatedly press the **OK** key to move the cursor to the extreme right until it disappears.
8. On completion, press the **OK** key again to return back to the Settings screen.
9. Press the **ESCape** key to return back to the **Menu** screen.



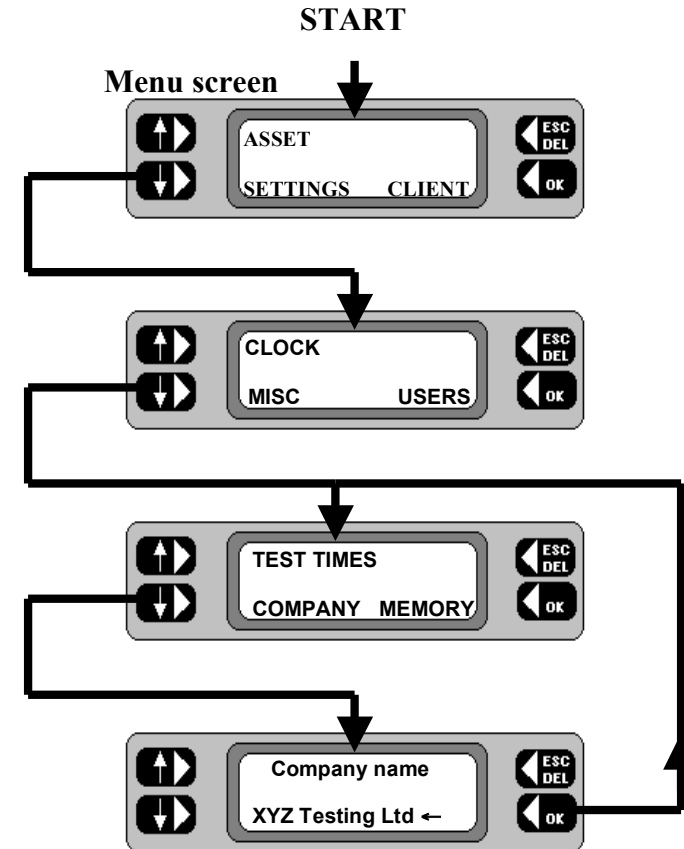
## Settings (Continued).

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### Setting up Test Company Title

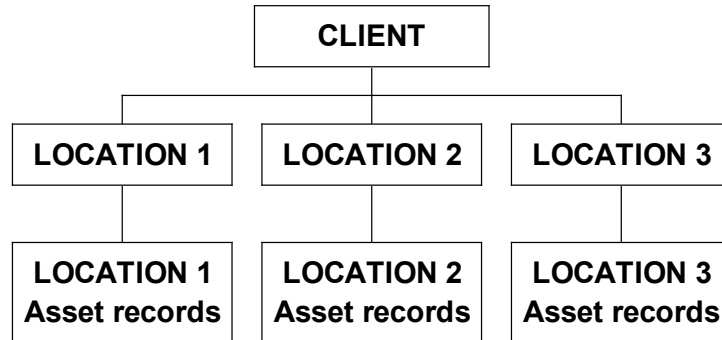
*PAT4E* offers the ability to enter your Test Company title. This setup should not be confused with **Clients** and **Locations**. The Test Company is the name of the organisation operating the *PAT4E*. eg. 'XYZ Testing Ltd.' Once entered, the company title will be printed as the header on the reports available from *PAT4E*.

1. Refer to the **Setup Company Flowchart** adjacent.
2. From the Menu screen, press the **SETTINGS** key. The **Settings** screen is displayed.
3. Press the **MISC** key. The **Miscellaneous** screen is displayed.
4. Press the **COMPANY** key. The **Company** screen is displayed.
5. Type in the title of the testing company ( $\leq 20$  characters). Use the **DEL** key to correct any typing errors.
6. On completion press the **OK** key to return back to the **Miscellaneous** screen.
7. Press the **ESCape** key to return back to the **Menu** screen.



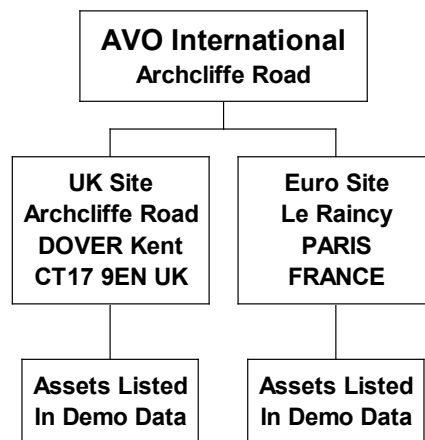
## Clients and Locations.

*PAT4E* maintains separate sets of assets (appliances) testing records by Client. Each Client may be allocated several Locations where different sets of assets may be found. Up to 10 Clients and a total of 20 locations may be stored at any time.



This structure enables *PAT4E* to separate the testing for each location, but maintains the overall traceability to the correct Client. It also permits the same numbering sequences or asset IDs to be used for different Clients.

Where there is only one location, at least the first line of the address must be given; other address details can be omitted. Adding, editing or deleting of Clients and Locations can be performed either directly after **Login**, or from the **Main** screen.



Example of demonstration data loaded to your *PAT4E*.

### Select an existing Client and Location

1. Refer to the **Client and Location** Flowchart.
2. From the **Main** screen, press the **MENU** key. The **Menu** screen is displayed.
3. Press the **CLIENT** key. The current client name is briefly displayed. The screen then changes to the **Client** screen.
4. You may **ACCEPT** the current Client and then **ACCEPT** the current Location, to revert back to the **Main** screen.

**Note:** - If no location exists for the selected client, the program will divert to the *Add location* screen.

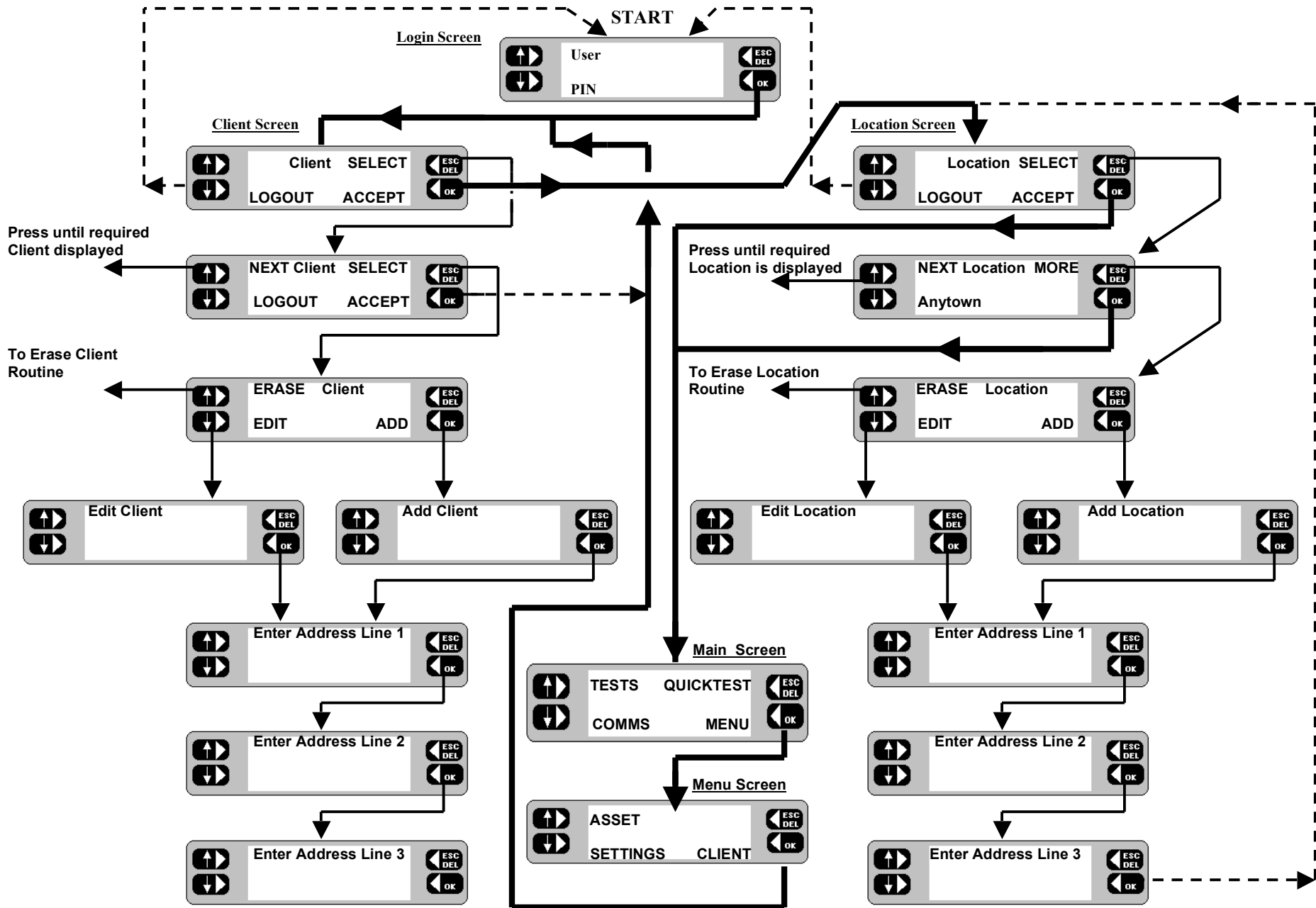
### Select a new Client and Location

1. Refer to the **Client and Location** Flowchart.
2. From the **Menu** screen, press the **CLIENT** key. The current client name is briefly displayed. The screen then changes to the **Client** screen.
3. Press the **SELECT** key. The screen changes.
4. Press the **NEXT** key to scroll through the name list until the required client's name is displayed.
5. Press the **OK** key. The current location is briefly displayed. The screen then changes to the **Location** screen.
6. **ACCEPT** the current **Location**, in which case the display changes to the **Main** screen, or press the **SELECT** key. The screen changes.
7. Press the **NEXT** key to scroll through the list and display the required location.

**Note:** - If no location exists for the selected client, the program will divert to the *Add location* screen.

8. Press the **OK** key. The **Main** screen is displayed.

# Clients and Location Flow Chart.



## **Clients and Locations (Continued).**

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### **Edit Client/Location details**

1. Refer to the **Client and Location Flowchart**.
2. From the **Main** screen, press the **MENU** key. The **Menu** screen is displayed.
3. From the **Menu** screen, press the **CLIENT** key. The current client name is briefly displayed. The screen then changes to the **Client** screen.
4. You may **ACCEPT** the current Client, or press the **SELECT** key. The screen changes. Press the **NEXT** key to scroll through the name list and display the required client.
5. Press the **MORE** key. The screen changes.
6. Press the **EDIT** key. The screen changes.
7. Edit the client name / address as necessary, pressing the **OK** key as each line is completed. The edited Client name is briefly displayed. The **Client** screen is displayed.
8. Press the **ACCEPT** key. The current Location is briefly displayed. The **Location** screen is displayed.

**Note:** - If no location exists for the selected client, the program will divert to the **Add location** screen.

9. You may **ACCEPT** the current Location, or press the **SELECT** key. The screen changes. Press the **NEXT** key to scroll through the list and display the required Location.
10. Press the **MORE** key. The screen changes.
11. Press the **EDIT** key. The screen changes.
12. Edit the Location / name / address as necessary, pressing the **OK** key as each line is completed. The edited Location name is briefly displayed. The amended location now becomes the current location. The **Location** screen is displayed.
13. Press the **ACCEPT** key. The **Main** screen is displayed.

### **Erase Client details**

1. Refer to the **Client and Location Flowchart**.
2. From the **Main** screen, press the **MENU** key. The **Menu** screen is displayed .
3. From the **Menu** screen, press the **CLIENT** key. The current Client name is briefly displayed. The screen then changes to the **Client** screen.
4. Press the **SELECT** key. The screen changes.
5. Press the **NEXT** key to scroll through the name list and display the required client.
6. Press the **MORE** key. The screen changes.
7. Press the **ERASE** key. The screen changes.
8. Press the **OK** key. The selected Client name **along with all of their assets are erased.** The **Client** screen is displayed.

**Note:** - To erase a specific **Location** for a Client, see '**Erase Location details**' on the next page.

9. Press the **SELECT** key to change to another current client to continue.
10. Press the **NEXT** key to scroll through the name list and display the required client.
11. Press the **OK** key. The current location is briefly displayed. The screen then changes to the **Location** screen.
12. **ACCEPT** the current Location, or press the **SELECT** key. The screen changes.
13. Press the **NEXT** key to scroll through the list and display the required location.

**Note:** - If no location exists for the selected client, the program will divert to the **Add location** screen .

14. Press the **ACCEPT** key. The **Main** screen is displayed.

## **Clients and Locations (Continued).**

---

### **Erase Location details**

1. Refer to the **Client and Location Flowchart**.
2. From the **Client** screen, **ACCEPT** the current client name, or press the **SELECT** key. The screen changes.
3. Press the **NEXT** key to scroll through the name list and display the required client.
4. Press the **OK** key. The current location is briefly displayed. The screen then changes to the **Location** screen.
5. Press the **SELECT** key. The screen changes.
6. Press the **NEXT** key to scroll through the list and display the required location.
7. Press the **MORE** key. The screen changes.
8. Press the **ERASE** key. The screen changes.
9. Press the **OK** key. The selected location and all the assets are erased.

**Note:** - If no other location exists for the selected client, the program will divert to the **Add location** screen. Add new location details to continue.

10. If other locations exist for the current Client, the **Location** screen is displayed, enabling other locations to be selected if required. If not required, press the **OK** key to return to the **Main** screen.

## **Clients and Locations (Continued).**

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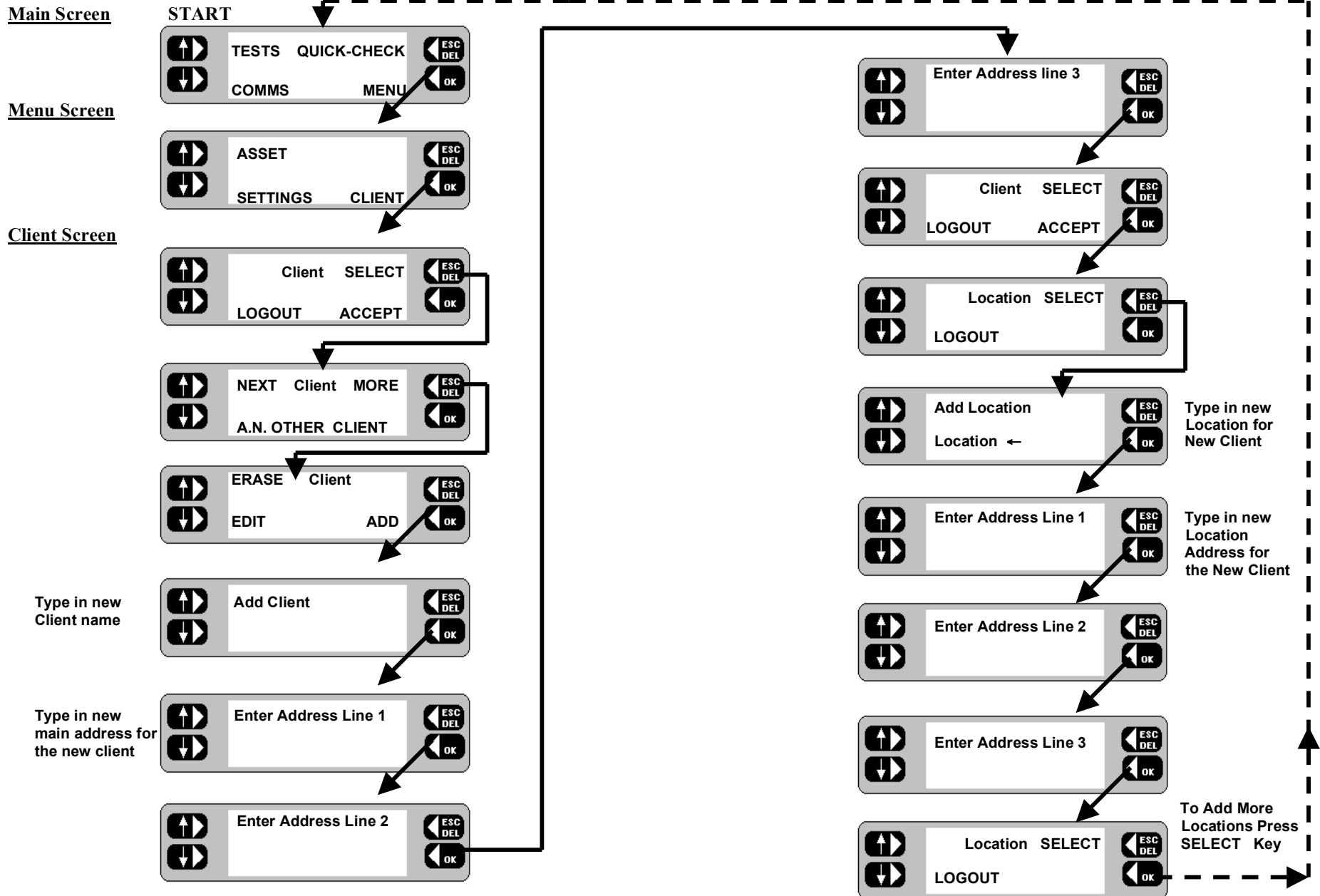
### **Add new Client, main Address and site Location**

1. Refer to the **Add Client / Address / Locations Flowchart**.
2. From the Client screen, press the **SELECT** key. The screen changes.
3. Press the **MORE** key. The screen changes.
4. Press the **ADD** key. The screen changes.
5. Type in the name of the new client and press the **OK** key. The **Address Line 1** screen is displayed.
6. Type in the first line of the Client address and press the **OK** key. The **Address Line 2** screen is displayed.
7. Type in the second line of the Client address and press the **OK** key. The **Address Line 3** screen is displayed.
8. Type in the third line of the Client address and press the **OK** key. The new Client now becomes the current Client. The **Client** screen is displayed.
9. To accept the Client, press the **ACCEPT** key. The **Location** screen is displayed.
10. Press the **SELECT** key. The screen changes.
11. Add the name of the new Site Location and press the **OK** key. The **Address Line 1** screen is displayed.
12. Type in the first line of the Site address and press the **OK** key. The **Address Line 2** screen is displayed.
13. Type in the second line of the Site address and press the **OK** key. The **Address Line 3** screen is displayed.
14. Type in the third line of the Site address and press the **OK** key. The **Location** screen is displayed.
15. Press the **ACCEPT** key. The **Main** screen is displayed.

### **Add new site Location details**

1. Refer to the **Add Client / Address /Locations Flowchart**.
2. From the Client screen press the **SELECT** key. The screen changes.
3. **ACCEPT** the current client, or to add a location to a different client, press the **SELECT** key. The screen changes. Press the **NEXT** key to scroll through the name list and display the required client.
4. Press the **OK** key. The current location is briefly displayed . The screen then changes to the Location screen .
5. Press the **SELECT** key. The screen changes.
6. Press the **MORE** key. The screen changes.
7. Press the **ADD** key. The screen changes.
8. Type in the name of the new site location and press the **OK** key. The **Address Line 1** screen is displayed.
9. Type in the details and press the **OK** key. The **Address Line 2** screen is displayed.
10. Type in the details and press the **OK** key. The **Address Line 3** screen is displayed.
11. Type in the details and press the **OK** key. The new location now becomes the current location. The **Location** screen is displayed.
12. Press the **ACCEPT** key. The Main screen is displayed.

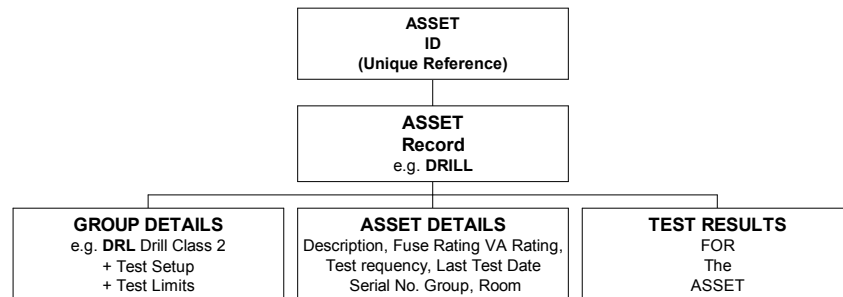
# Add Client / Address / Locations Flowchart.





## Asset Test Groups.

Appliances are referred to as “Assets”. For each asset a complete record is stored under the appropriate Client. Each asset record holds full details of the equipment, i.e. **ID; Description; Serial number; Fuse rating; Test Group, VA Rating, Test frequency, Room, and Test results.**



## Test Groups

A **Test Group** is a set of pre-defined tests with associated pass / fail limits that are suitable for a specified type of asset (appliance). Up to 50 Test Groups may be configured, each of which is identified by a User designated 3-character code. Every asset record contains a **Group PAT4E** should use when the appliance is tested.

Each Group contains the following information: -

<b>Group Code:</b>	e.g. DRL
<b>Group name:</b>	e.g. Drills
<b>Phase:</b>	Single or 3 Phase
<b>Insulation Class:</b>	<b>Class 1</b> = Earthed <b>Class 2</b> = Double insulated.
<b>Reversible mains Plug:</b>	Allows repeat tests for both orientations of reversible mains plugs.
<b>Tests to be applied:</b>	{ Continuity test e.g. { Insulation test { Operation test etc.

When setting up a Group, any of the **PAT4E** tests may be specified by placing a  $\checkmark$  next to the selected tests. For each selected test, **PAT4E** allows one of eight passband options to be selected.

**Continuity:** Pass < 100m $\Omega$ , 300m $\Omega$ , 500m $\Omega$ , 750m $\Omega$ , 1.0 $\Omega$ , 1.5 $\Omega$ , 2.0 $\Omega$ , 5.0 $\Omega$

**Insulation:** Pass > 0.25 M $\Omega$ , 0.3 M $\Omega$ , 0.5 M $\Omega$ , 1.0 M $\Omega$ , 2.0 M $\Omega$ , 7.0 M $\Omega$ , 10M $\Omega$ , 20M $\Omega$

**Operation:** Pass < 50VA, 200VA, 500VA, 1000VA, 1500VA , 2000VA, 2500VA, 3000VA

**Differential Earth Leakage: -**  
Pass < 0.25mA, 0.5mA, 0.75mA, 1.0mA, 3.5mA, 7.0mA, 10mA, and 15mA.

**Substitute Discharge Earth Leakage: -**  
Pass < 0.25mA, 0.5mA, 0.75mA, 1.0mA, 3.5mA, 7.0mA, 10mA, and 15mA.

**Absence of potential Earth Leakage: -**  
Pass < 0.1mA, 0.25mA, 0.5mA, 0.75mA, 1.0mA, 1.5mA, 2.0mA, and 2.5mA.

**Extension lead:**  
Checks for correct polarity, open circuit and short circuit faults. Earth Continuity Test test: Insulation test.

**Note 1:** Once a Group is defined, **every appliance** with the **same group name** will have the **same tests and limits applied**

**Note 2:** **Groups** for 3 Phase assets cannot include an Operation test.

## Asset Test Groups (Continued).

**Example:- Test Group** for kettles as follows:

<b>Group Code:</b>	KET
<b>Group Description:</b>	Kettles
<b>Phase:</b>	Single
<b>Insulation Class:</b>	Class 1
<b>R<sub>PE</sub> Continuity:</b>	Pass < 100 mΩ
<b>R<sub>ISO</sub> Insulation:</b>	Pass > 2 MΩ
<b>Operation:</b>	Pass <2500 VA
<b>I<sub>PE</sub> Earth Leakage:</b>	Pass < 2 mA
<b>Mains Plug Type:</b>	Reversible

**Table of Test Group Combinations: -**

Configuration	Tests					EARTH LEAKAGE METHOD		
	Visual	Insulation Test (R <sub>ISO</sub> )	Run Test	Continuity (R <sub>PE</sub> )	Extension Lead Polarity	Absence of Potential (I <sub>F</sub> )	Differential (I <sub>DIF</sub> )	Substitute Discharge (I <sub>PE</sub> )
230V Appliance Class 1	✓	✓	✓	✓	✗	↔	↔	✓
230V Appliance Class 2	✓	✓	✓	✗	✗	↔	↔	✓
230V Extension Lead Class 1	✓	✓	✗	✓	↔	✗	✗	✗
230V Extension Lead Class 2	✓	✓	✗	✗	↔	✗	✗	✗
3 Phase Appliance Class 1	✓	✓	✗	✓	✗	✓	✗	✓
3 Phase Appliance Class 2	✓	✓	✗	✗	✗	✓	✗	✓

✗ = Not Available. ✓ = Available. ↔ = Available with Mains lead reversal option. Note: - Only one type of Earth leakage test is permitted.





## Asset Test Groups (Continued).

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### Add new Group

1. Refer to the **Add Test Group Flowchart**.
2. From the **Menu** screen, press the **ASSET** key. The screen changes to the **Asset, Groups, Reports** screen.
3. From the **Asset, Groups, Reports** screen press the **GROUPS** key. The screen changes.
4. Type in a 3-character code for the new group and press the **OK** key. If the Group does not already exist, the option to **ADD** the new code is given.


Note: - If the Group code is already stored, the screen will change to offer the options to **ERASE**, **EDIT** or **ADD**.

5. Press the **YES** key. The screen changes.
6. Type in the description of the new group (10 characters max.) e.g. Power Tools, and press the **OK** key. (N.B. This is the description used by **AVO Form Filler<sup>TM</sup>**). The screen changes to the 'Equipment Type selection screen.
7. The Equipment Type screen allows selection of 230Volt assets or 3 Phase Assets by using the  and  Keys. Complete the section using the **OK** key. The screen changes to the Insulation class selection screen which is initially set to Insulation Class 2.
8. Press the  to change to Insulation Class 1. The screen changes to the Test selection screen.
9. Toggle the left hand keys to display optional tests for the group. To include a test for the group, insert a  by pressing the **OK** key. Refer to Table of Test Group Combinations for available tests.



**Note:** - For Class 1 items, a Continuity test (**R<sub>PE</sub>**) can be included, For Class 2 items a Continuity test (**R<sub>PE</sub>**) will not be offered. For 3 Phase options Refer to Table of Test Group Combinations.

10. When all required tests have been included, press the **EXIT** key. You are now prompted with "Reversible plug?" if a reversible mains plug is in use select **YES** otherwise select **NO**.

11. For each test limit screen, toggle the left hand keys until the required setting is displayed, and press the **OK** key on completion of all the necessary passbands. The screen changes to the **Save group to memory** screen.
12. To save the new group to the memory, press the **YES** key. To abort the new group, press the **NO** key. The screen returns to the **List Group** screen.

Note: - If appropriate, only activate the Extension leads test with a  when creating a Group for Lead testing. When activated, you may also specify a polarity check, but will not be able to specify an Operation test.

### Edit a Group

1. Refer to the **Edit/Erase Group Flowchart**.
2. From the **Menu** screen, press the **ASSET** key. The screen changes to the 'Asset, Groups, Reports screen.
3. From the **Asset, Groups, Reports** screen press the **GROUPS** key. The screen changes.
4. Scan in, or type in a 3-character code for the group and press the **OK** key. The screen changes.
5. Press the **EDIT** key. The screen changes to the **Group code** screen.
6. Edit the group code if necessary and press the **OK** key. The screen changes to the **Group name** screen.
7. Edit the group name if necessary and press the **OK** key. The screen changes to the **Equipment Type** screen.
8. Change the **Equipment Type** if necessary by pressing the left-hand keys. The screen changes to the **Insulation class** selection screen.
9. Change the **Insulation Class** as necessary by pressing the left-hand keys. The screen changes to the Test selection screen.
10. Toggle the left-hand keys to select the required tests as necessary. To include a test for the group, insert a  by pressing the **OK** key. To remove a test for the group, erase the  by pressing the **OK** key.

## Asset Test Groups (Continued).

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**Note:** - For Class 1 items the Earth Continuity test (**R<sub>PE</sub>**) can be included. If an expected Continuity test (**R<sub>PE</sub>**) is unavailable, it is likely that Class 2 has been inadvertently selected instead of Class 1.

11. When all required tests have been included, press the **EXIT** key. Tests requiring a passband option will now be successively displayed for setting.
12. For each test limit screen, toggle the left-hand keys until the required setting is displayed. On completion, press the **OK** key. The screen changes to the **Save group** screen.
13. To save the new group to the memory, press the **YES** key. To abort the new group, press the **NO** key. The screen returns to the **List Group** screen.
14. Press the **ESCape** key to return to the **Asset, Groups, Report** screen.

### Erase a Group

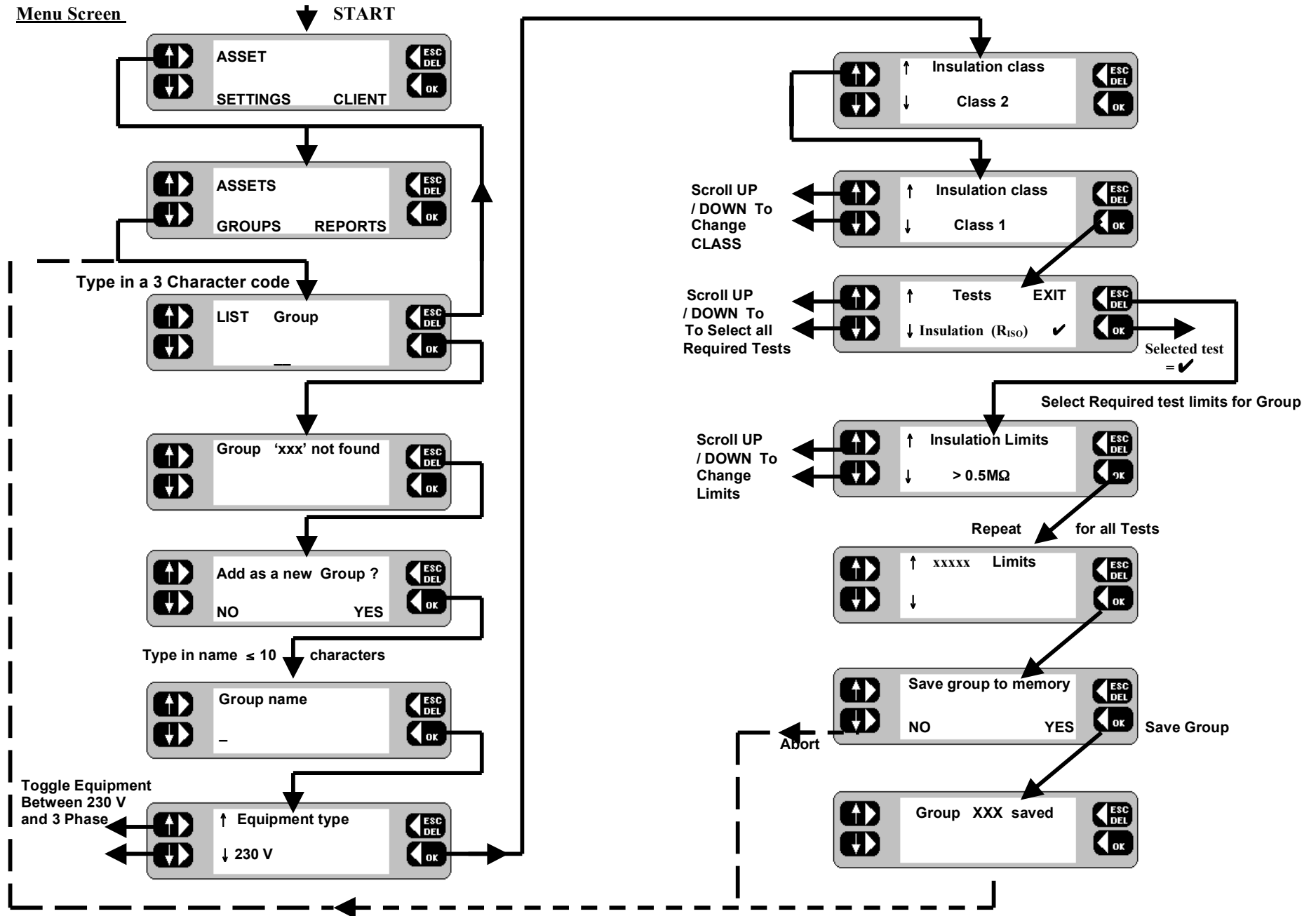
A **Group** can be erased, provided that it does not have assets allocated to it.

1. Refer to the **Edit/Erase Group Flowchart**.
2. From the **Menu** screen, press the **ASSET** key. The screen changes to the **Asset, Groups, Reports** screen.
3. From the **Asset , Groups , Reports** screen press the **GROUPS** key. The screen changes.
4. **Scan in, or type** in a 3-character code for the group and press the **OK** key. The screen changes.
5. Press the **ERASE** key. The screen changes.
6. Press the **OK** key. The selected group is erased.

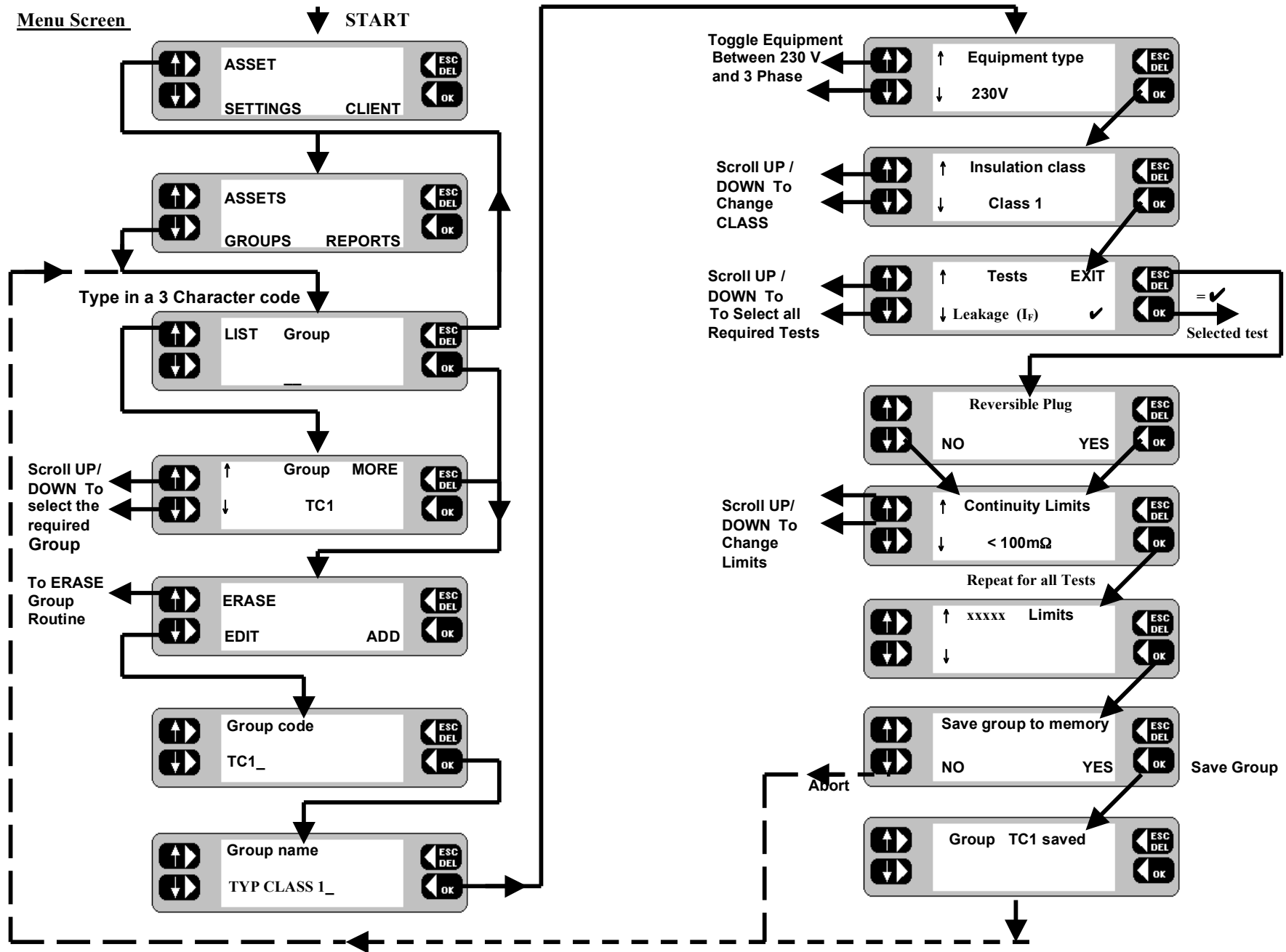
**Note:** - If the Group has assets allocated to it, it cannot be erased, and the message “The group is in use, it cannot be erased” displayed.

7. The screen returns to the **Erase, Edit, Add** screen.

# Add Group Flowchart.



# Edit / Erase Group Flowchart.



## Assets.

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Up to 1000 assets may be stored at any one time in the *PAT4E*, each with their current and previous (Historic) test results. Appropriate asset details may be entered before or during testing. Once the asset record has been set and stored, it never needs to be re-entered. The next time the asset is tested, only the asset ID number needs be entered or scanned, and the *PAT4E* will recall the complete record with the correct Group code and all the asset details. Testing follows automatically. This approach ensures that once set up, there is no chance of the wrong tests being applied to the asset, as is possible with instruments that require a test code to be specified each time that an asset is tested.

### Add an Asset

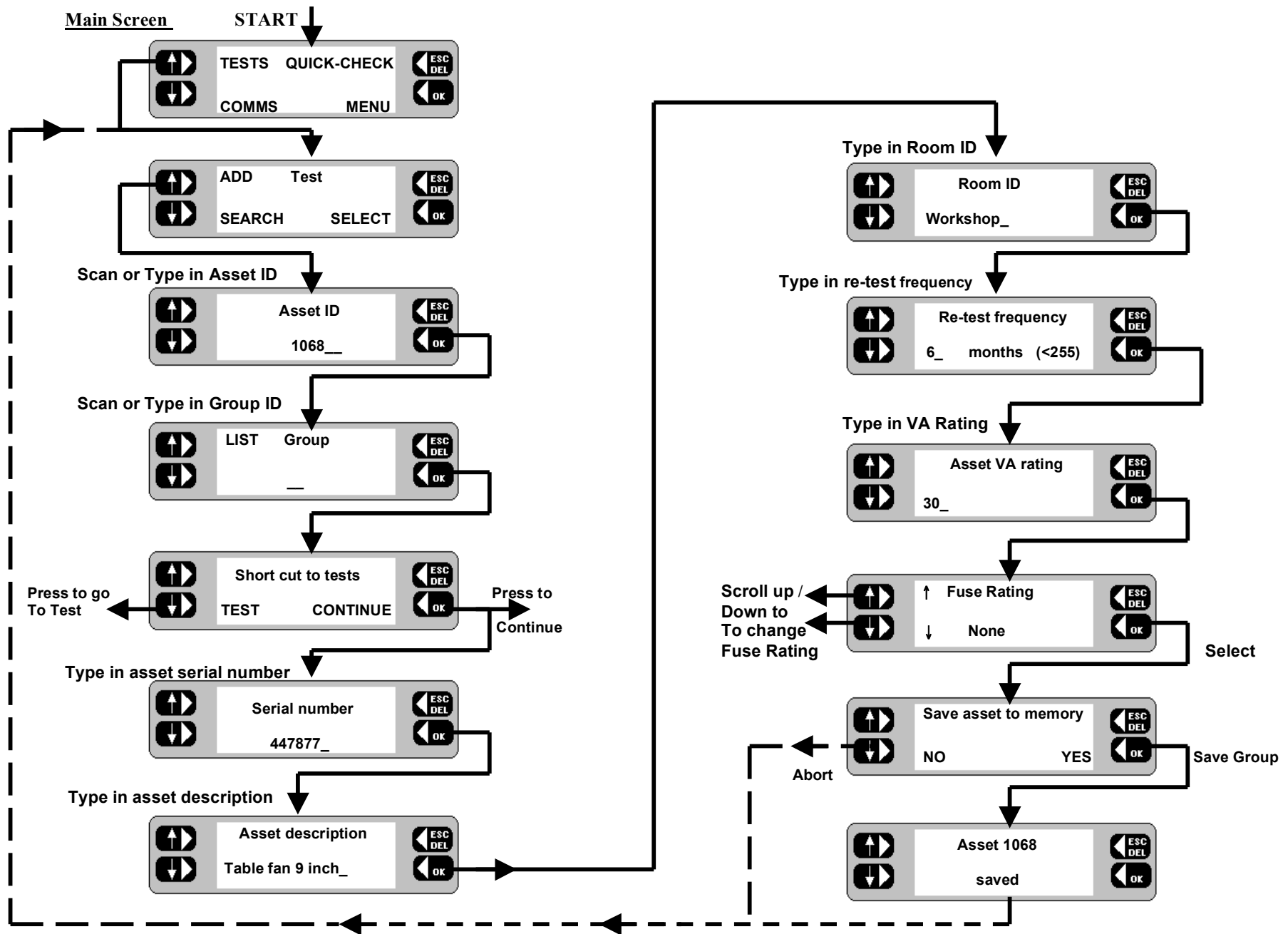
When entering asset details, prompts are displayed, eg, ‘**Asset ID**’, ‘**Description**’, ‘**Serial no.**’, ‘**Fuse rating**’ etc. An ‘**Asset ID**’ of up to 10 characters is typed in on the keyboard, or scanned in using the barcode scanner. (The *PAT4E* scanner will read all standard barcode formats). Other fields maybe left blank by pressing the OK key or by shortcutting to the **TESTS** facility.

1. Refer to the **Add Asset Flowchart**.
2. From the **Main** screen, press the **TESTS** key. The screen changes to the **Test** screen.
- 3 . Press the **ADD** key. The screen changes.
- 4 . Scan in, or type in the asset ID (<10 characters) for the new asset and press the **OK** key. The Group screen is displayed.
5. Scan in, or type in the **Group ID** (< 3 characters) and press the **OK** key. The ‘**Short cut to tests**’ screen is displayed.
- 6 . Press the **CONTINUE** key. The screen changes to the **Serial number** screen.
7. Type in the asset serial number and press the **OK** key. The screen changes to the **Asset description** screen.
8. Scan in, or type in the asset make/model description and press the **OK** key. The screen changes to the **Room ID** screen. The last room ID used for the selected Client is displayed.

9. Accept the displayed room ID, or type in the new room ID name and / or number and press the **OK** key. The screen changes to the **Re-test frequency** screen.
10. Accept the default re-test frequency of 12 months, or type in the specified number of months between tests and press the **OK** key. The screen changes to the asset **Power rating** screen.
11. Type in the **VA** rating for the asset (often indicated as Watts) and press the **OK** key. The screen changes to the Fuse rating screen.
12. Toggle the left-hand keys to display the fuse rating for the asset and press the **OK** key (for assets without fuses, **NONE** may be selected). The screen changes to the **Save asset screen**.
13. To save the new asset to the memory, press the **YES** key. The option to **Test asset now** is given. Press the **YES** key to enter directly into the sequence for the selected Group.
14. To abort the new asset, press the **NO** key. The details are not saved and the screen returns to the **Test** screen.
15. Press the **ESCape** key to return to the **Main** screen.

**Note:-**Instead of pressing the *CONTINUE* key (at step 6) you may prefer to press the *TEST* key. This will by-pass the addition of all the remaining asset details and allows you to perform the test straight away. It is recommended that full details are entered, since these enable other features to operate such as the facility to locate an asset by Room ID.

# Add Assets Flowchart.





## Assets (Continued).

---

### Edit an Asset

1. Refer to the **Edit or Erase an Asset Flowchart**.
2. From the **Menu** screen, press the **ASSET** key. The screen changes to the **Asset, Groups, Reports** screen.
3. From the Asset, Groups, Reports screen press the **ASSETS** key. The screen changes.
4. Scan in, or type in the **ID** for the required asset and press the **OK** key. The screen changes.
5. If the asset **ID** is recognised, the Asset screen with options to **ERASE, EDIT or ADD** is displayed.

**Note:** - If the asset ID is not recognised, the option to add as a new asset is displayed. Press the **NO** key to list all assets. Press the **LIST** key to step through the list and display the required asset, then press the **MORE** key.

6. Press the **EDIT** key. Each subsequent screen allows amendments to be made for the selected asset. Press the **OK** key to sequentially step through the details.
7. To save the amended asset details to the memory, press the **YES** key. The screen returns to the Asset list screen. Press the **ESCape** key to return back to the **Menu** screen.
8. To abort the operation, press the **NO** key. The **Asset** screen is displayed.

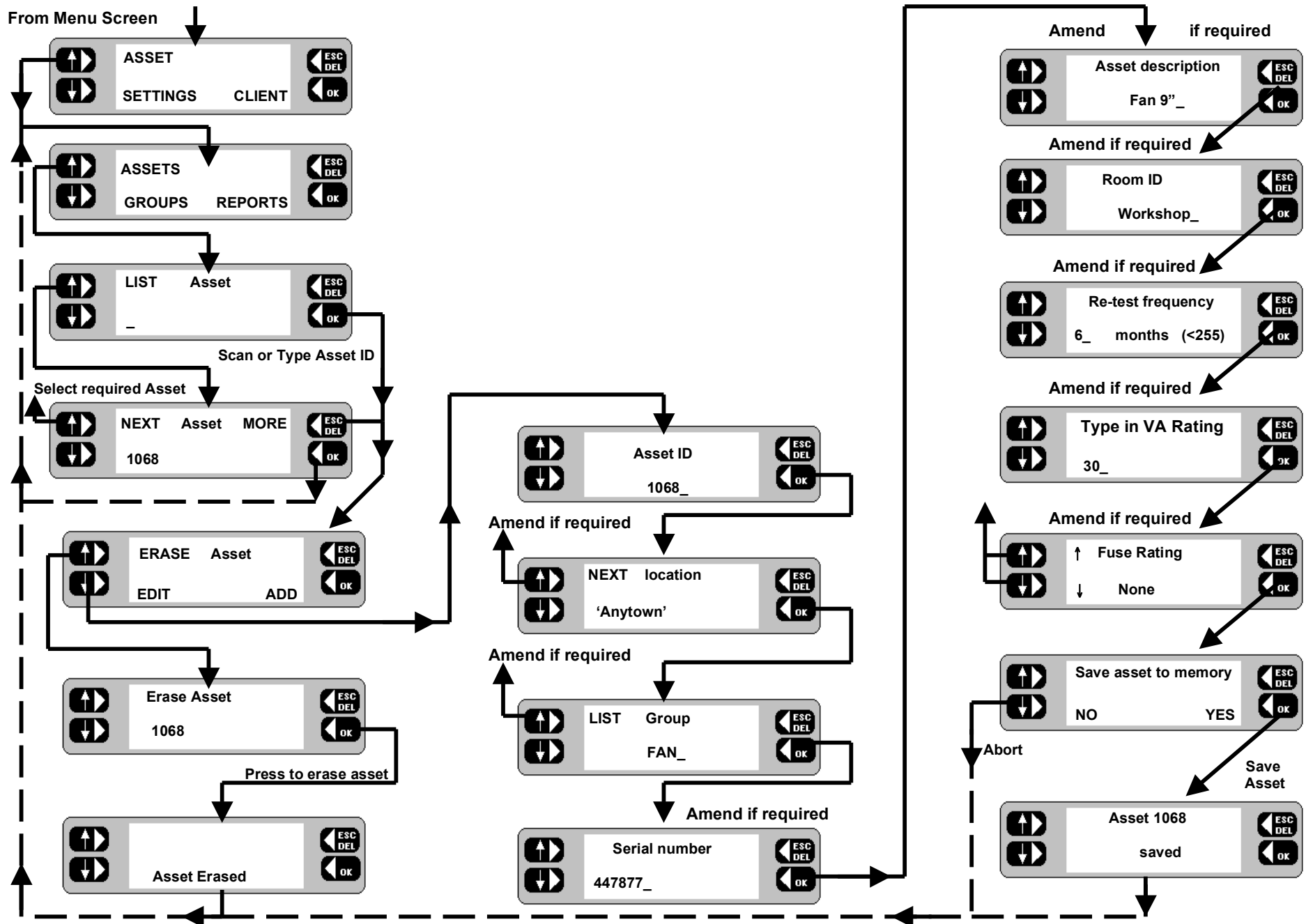
### Erase an Asset

1. Refer to the **Edit or Erase an Asset Flowchart**.
2. From the **Menu** screen, press the **ASSET** key. The screen changes to the **Asset, Groups, Reports** screen.
3. From the Asset, Groups, Reports screen press the **ASSETS** key. The screen changes.
4. Scan in, or type in the **ID** for the required asset and press the **OK** key. The screen changes.
5. If the asset **ID** is recognised, the **Asset** screen with options to **ERASE, EDIT or ADD** is displayed.

**Note:** - If the asset **ID** is not recognised, the option to add as a new asset is displayed. Press the **NO** key to list all assets. Press the **LIST** key to step through the list and display the required asset, then press the **MORE** key.

6. Press the **ERASE** key. The screen changes.
7. Press the **OK** key. The selected asset is erased. The screen returns to the **Asset, Groups, Reports** screen.
8. **ESCape** back to the Menu screen.

# Edit or Erase Asset Flowchart.



## **Assets (Continued).**

---

### **Locate an Asset**

It may be necessary to locate and test an asset (for the current Client) for which only the Location, Test Group, or an approximate retest date is known.

### **Search by Location**

1. Refer to the **Locate an Asset** Flowchart.
2. From the Main screen, press the **TESTS** key. The Test screen is displayed.
3. From the Test screen, press the **SEARCH** key. The Search Selection screen is displayed giving the option to search by **DATE**, **LOCATION** or by **GROUP**.
4. Press the **LOCATION** key. The screen changes.
5. Continue the search by selecting **ROOM** or **LOCATION**. The screen changes.

**Note:** - In order to search by '**Room**', the room ID must be specified in the asset details.

6. If **ROOM** is selected, toggle the **NEXT** key to step through the list of rooms and display the required room. Press the **OK** key. The screen changes.
7. If **LOCATION** is selected, toggle the **NEXT** key to step through the list of locations and display the required location. Press the **OK** key. The screen changes.
8. Toggle the **NEXT** key to step through the list of assets and display the required asset **ID**. Press the **TEST** key. The **Test screen** is displayed.
9. Follow the **Test Asset** routine.

This facility is very useful if you have to test assets in a large organisation, with many different rooms. You may start in any room or location, and call up all the assets for testing before moving on to the next room or location

### **Search by Test Group**

1. Refer to the **Locate an Asset** Flowchart.
2. From the **Search Selection** screen press the **GROUP** key. The screen changes.
3. Type in the 3-character code for the Group and press the **OK** key. The screen changes.

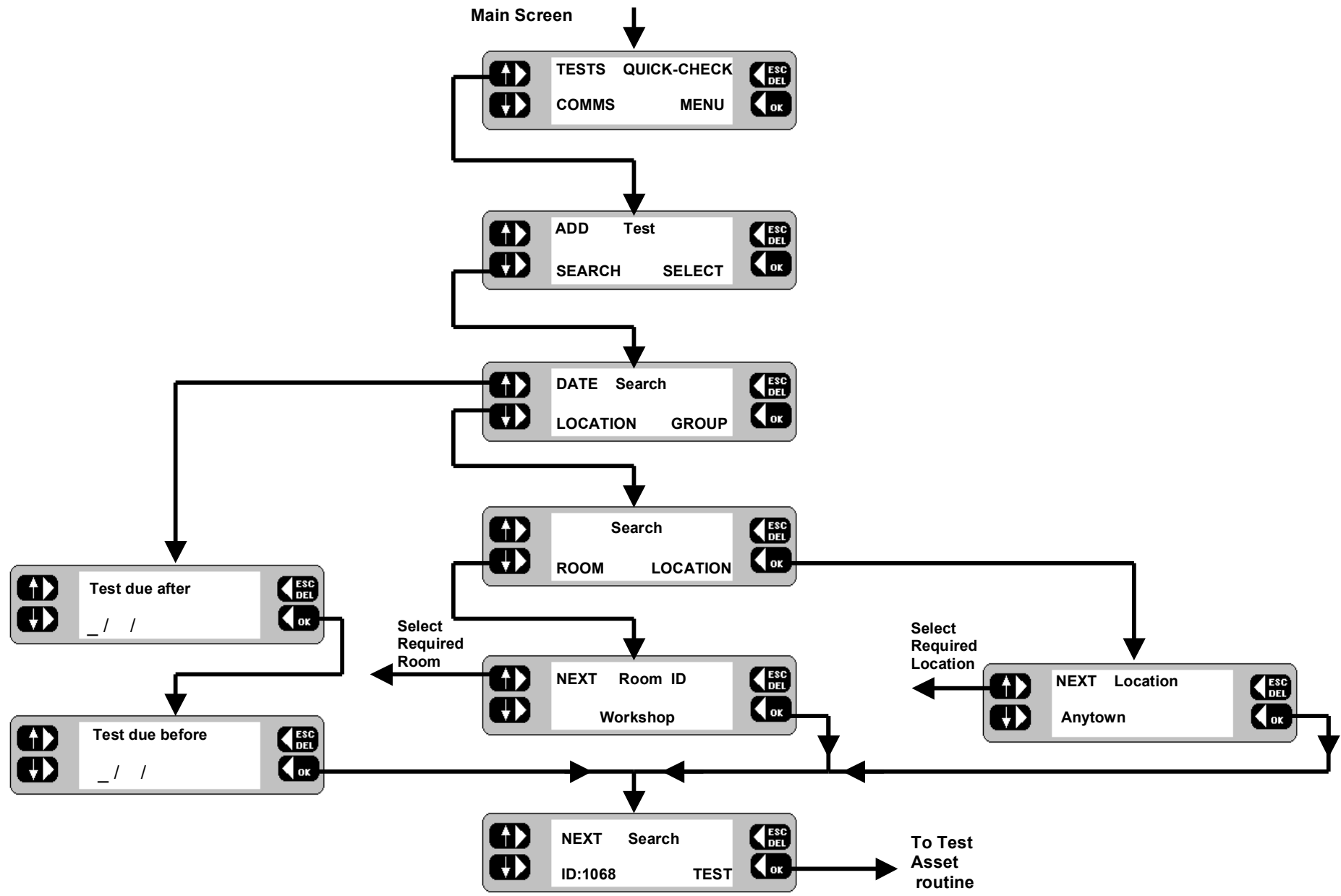
**Note:**-If unsure of the Group code, you can use the left-hand keys to toggle the **NEXT** key to step through the list of Group codes. Then press the **OK** key.

4. Toggle the **NEXT** key to step through the list of assets and display the required asset ID.
5. Press the **TEST** key. The Test screen is displayed.
6. Follow the **Test Asset** routine.

### **Search by Test due date**

1. Refer to the '**Locate an Asset**' Flowchart.
2. From the **Search** screen press the **DATE** key. The **Test due after** screen is displayed.
3. Type in the date **after** which the test becomes due and press the **OK** key. The **Test due before** screen is displayed.
4. Type in the date **before** which the test is due and press the **OK** key. The **Search asset** screen is displayed.
5. Toggle the **NEXT** key to step through the list of assets and display the required asset ID.
6. Press the **TEST** key. The **Test** screen is displayed.
7. Follow the **Test Asset** routine.

# Locate an Asset Flowchart.



## Testing Assets.

### Automated Testing

*PAT4E* will apply each of the allocated tests for the appropriate Group, in the correct sequence. If **AUTOPASS** has been selected under the **SETTINGS** option, testing will proceed automatically with *PAT4E* determining the pass/fail status according to the pre selected Group limits. If **MANUAL** has been selected, *PAT4E* will pause after each test and display a Pass / Fail decision prompt.

*PAT4E* will conduct a pre-test to confirm that electrical continuity exists within the appliance i.e. that it has been switched On, and that any fuses present are not ruptured. If the asset is very high or very low resistance, *PAT4E* will warn that the asset may accordingly be **Open** or **Short Circuit**. You have the option of **RETRY** (asset turned On?) **FAIL**, or **IGNORE** the warning. Some assets containing heating elements, filament lamps or large motors may offer very low resistance in their de-energised state, causing *PAT4E* to warn of a possible short circuit. In such cases, the warning can be ignored. When all required tests have been completed the results may be stored in *PAT4E* memory.

If a printer is attached to *PAT4E*'s parallel output, a simple listing of test results can be printed. If a printer is not attached or this feature has been disabled (See Settings section), *PAT4E* will automatically skip the printing process.

### Test an Asset



**For an Operation test, ensure that the asset is in a safe condition to run and that no hazards are present.**

1. Refer to the **Test an Asset** Flowchart.
2. From the **Main** screen, press the **TESTS** key. The **Test** screen is displayed.
3. Press the **SELECT** key. The screen changes.
4. Scan in, or type in the code for the required asset and press the **OK** key. The screen changes.

5. If the asset is recognised, the option to update the asset data is offered. Press the **YES** key to enter the '**Edit Asset**' routine or the **NO** key to test the asset now.
6. Previous test results are stored, the date **Last tested** is displayed. Press the **OK** key.

**Note:** - If **not** recognised, the option to add as a new asset is displayed. Press the **YES** key to follow the '**Add new asset**' routine, or press the **NO** key to return to the Asset ID screen.

7. If **Visual inspection** has been included in the Group tests, carry out the inspection and press the **PASS** or **FAIL** key.
8. If you **FAIL** the asset, a list of individual visual inspection points are progressively displayed as the respective keys are pressed. Follow the checks and press '**YES**' for all pass conditions or '**NO**' for any failure the failure.



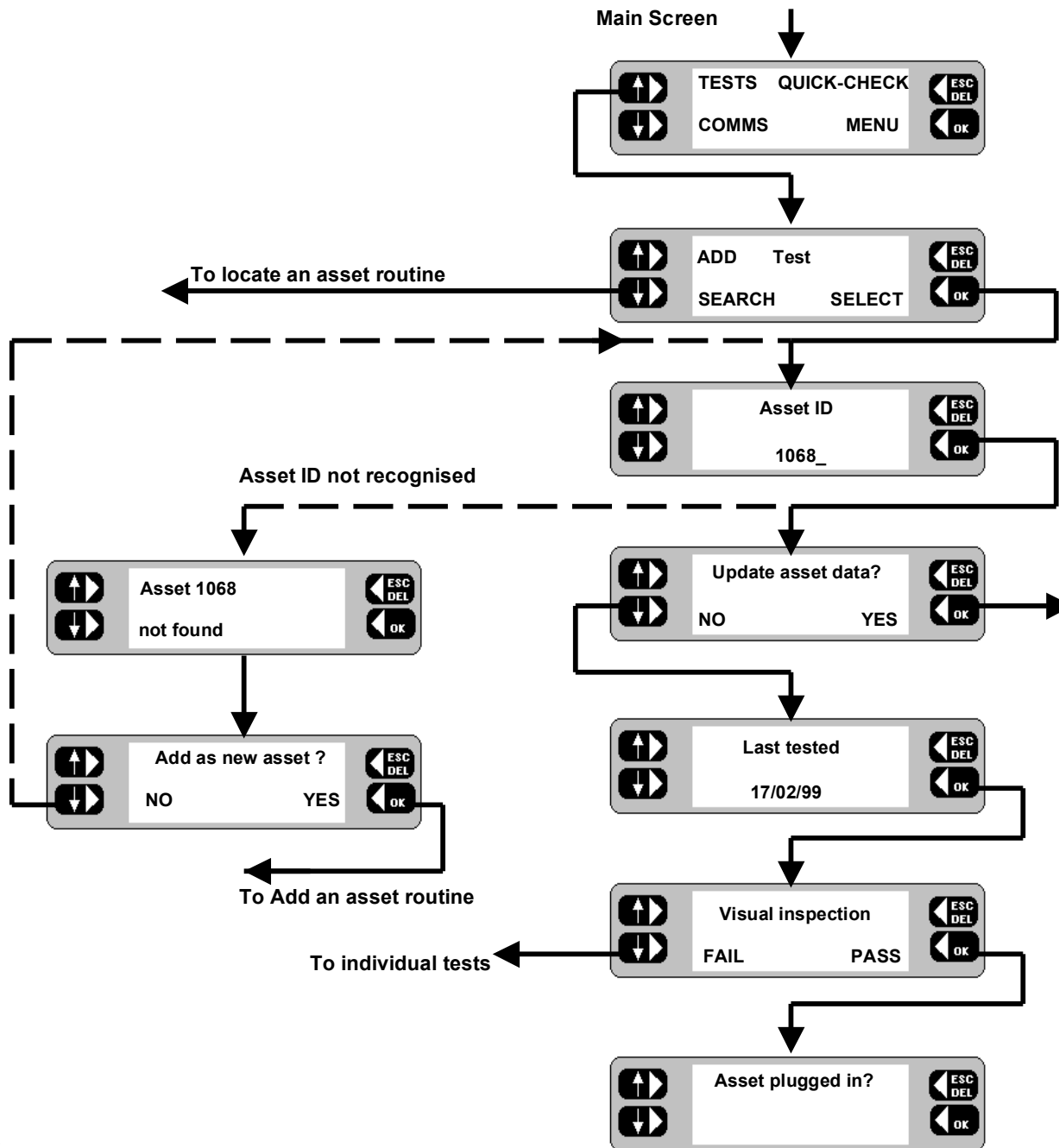
**Ensure that the correct leads and configurations are used for each test. Refer to diagrams located inside the lid of the PAT4E.**

9. If continuing in **AUTOPASS** mode, the test sequence now progresses automatically, with *PAT4E* deciding **PASS** or **FAIL** according to the pre-set limits for the **Group**. Press the **OK** key to step to the next test.
10. If continuing in **MANUAL** mode, **PASS** or **FAIL** each test result to progress to the next test in the sequence.
11. The overall **Pass** or **Fail** result is displayed.
12. If **Fail** is displayed, suitably label, and remove the asset from service; investigate and rectify the fault, and re-test on completion.

**Note:** - A long power supply lead on an asset may cause an **R<sub>PE</sub>** (Protective Earth resistance) test failure, due to the high resistance of the lead. *PAT4E* can include lead length compensation during the test, see '**Description of Tests**'.

# Test an Asset Flowchart.

YES



## Test an Asset Flowchart.

---

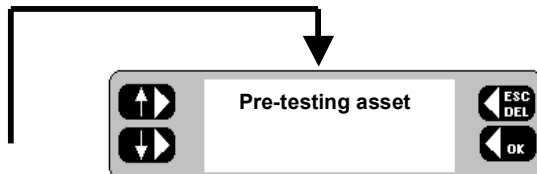
Type in or scan asset ID number

To edit asset routine

### Test modes

'AUTOPASS mode' - The test sequence progresses automatically, with PAT4 E deciding 'Pass or 'Fail according to the pre-set limits for the 'Group'.

'MANUAL mode' - Each test must be 'Passed' or 'Failed' to continue the test sequence.



## Testing Assets (Continued).

### Quick-Check

It is often useful to perform a particular test on an asset in isolation. If for instance an asset had previously failed a particular test and had subsequently been repaired it may be useful to verify the repair before commencing with a full test sequence. Alternatively the test could be used during repair in order to highlight the area at fault.

**Quick-check** enables the selective application of any of the tests that would normally be applied to the asset. The **asset ID** is entered in the normal way, recalling the asset record. The individual tests specified for the asset group will then be displayed, allowing any one to be run independently. In **Quick-check** mode **no results are stored** and the **asset history is not changed**.

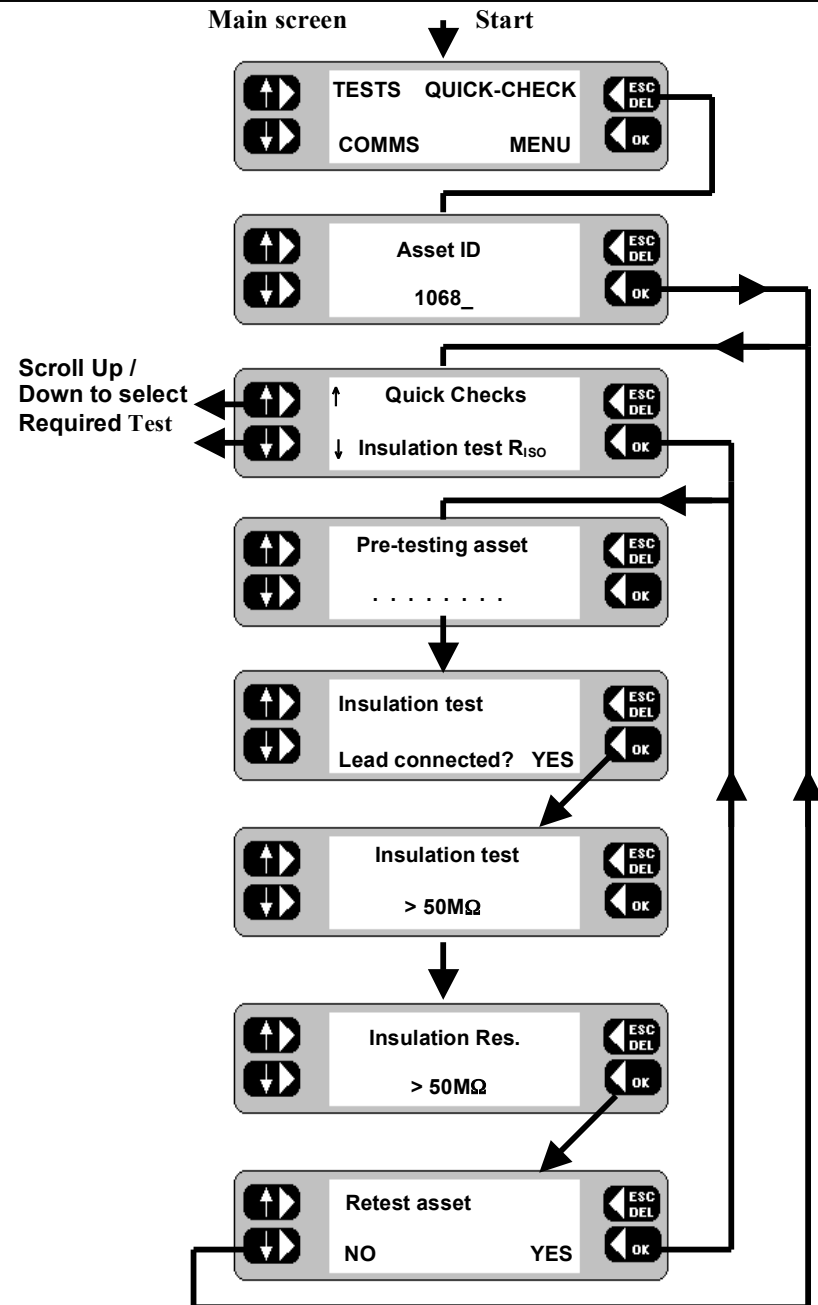
### Run Quick-Check

1. Refer to the **Quick-Check Flow chart** adjacent.
2. From the main screen, press the **Quick-Check** key. The screen changes.
3. Scan or Type in the **Asset ID** and press the **OK** key. The **Quick-Check** selection screen is displayed.
4. Toggle the left-hand keys to display the required test from the list pre-set for the group.



**Ensure that the correct leads and configurations are used for each test. Refer to diagrams located inside the lid of the PAT4E.  
For an Operation test, ensure that the asset is in a safe condition to run and that no hazards are present.**

5. Appropriate on-screen warnings are displayed for the selected test. Comply with all instructions and press the **OK** key to continue.
6. **Quick-Check** results are displayed. Press the **OK** key. The option to re-test the asset is displayed.
7. Press the **YES** key to repeat the same test or press the **NO** key to return back to the **Quick-Check** selection screen.
8. When all **Quick-Checks** are completed, **ESC** back to the **Main** screen.
9. Carry out a full test on the asset.





## Repair Codes.

**Form Filler**<sup>TM</sup> for Windows<sup>TM</sup> has 99 built in codes which you can use when appliance testing to record repair details against tests. With your **PAT4E** at the end of the test, you can enter one of these codes and **Form Filler**<sup>TM</sup> will automatically update the repair information in the unassigned or assigned data maintenance programs.

Within **Form Filler**<sup>TM</sup> you can modify the descriptions and add any charge for the repair. The charges will automatically be used on job costing and invoicing. A full list of repair codes currently included is shown opposite. This list may be copied and fixed inside the lid of the test instrument for easy reference if this feature is to be used. If a repair codes are not required simply press the **ESCape** key when the code is requested at the end of the test.

---

Code	Description
1.	Replace internal fuse.
2.	Refit plug.
3.	Refit socket.
4.	Replace cable
5.	Renew 415V 5 pin 16A
6.	Renew 415V 4 pin 32A
7.	Renew 415V 5 pin 32A
8.	Renew IEC connector 6A
9.	Renew IEC connector 10A
10.	Renew IEC connector 16A
11.	Replace Main Switch.
12.	Replace Fuse Holder.
13.	Replace Missing Screws
14.	Replace Warning Labels
15.	Renew 2core 1.00mm2 flex
16.	Renew 2core 1.50mm2 flex
17.	Renew 2core 2.50mm2 flex
18.	Renew 3core 0.75mm2 flex
19.	Renew 3core 1.00mm2 flex
20.	Renew 3core 1.50mm2 flex
21.	Renew 3core 2.50mm2 flex
22.	Tighten Cord Restraints.
23.	Replace Control Knobs.
24.	Tighten Case fixings.
25.	Replace Indicator Lamps.
26.	Replace case parts

## Erase Memory.

From time to time you may wish to permanently erase all or part of the memory on your *PAT4E*. Options are as follows:-

- Erase **Groups**
- Erase **Clients**
- Erase **Locations**
- Erase **Assets**
- Erase **Results**
- Erase **Setup**
- Erase **ALL**

### Erase Memory

1. Refer to the Erase Memory Flowchart.
2. From the Main screen, press the **MENU** key. The Menu screen is displayed.
3. From the **Menu** screen, press the **SETTINGS** key. The Settings screen is displayed.
4. Press the **MISC** key. The Miscellaneous screen is displayed.
5. Press the **MEMORY** key. The **Erase** screen is displayed with the option to select the items to be erased.
6. Toggle the left-hand keys to display the item to be erased.
7. Press the **OK** key. The selected items are erased.

Scroll UP/ Down  
To select item to  
Be erased

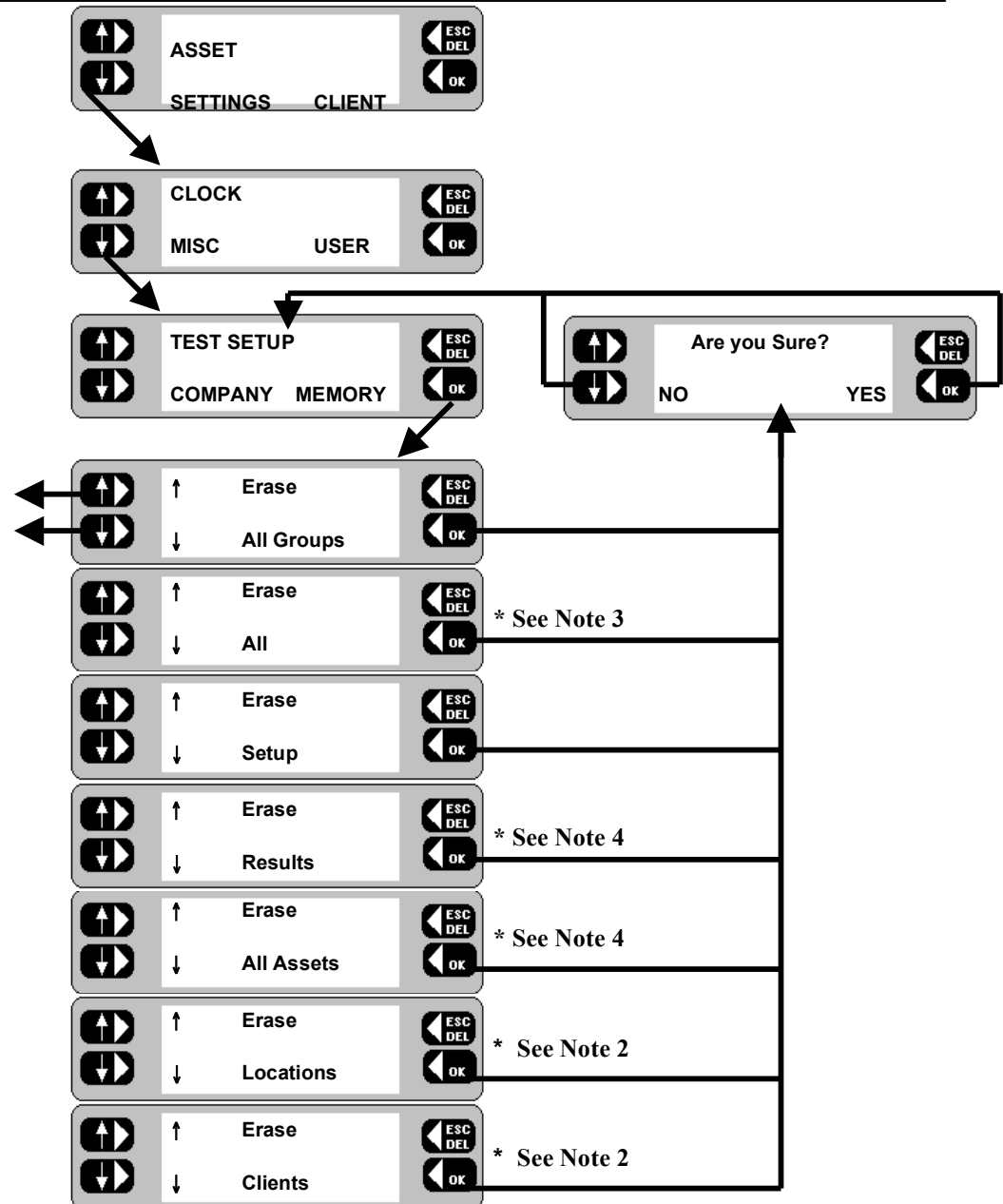
**Note 1:** - Once erased, the data cannot be un-erased.

8. On completion press the **ESCape** key to return back to the Menu screen.

**Note 2:** - \*Erasure of **Clients** or **Locations** will include all related assets, and is pre-empted by a check. **Confirm (OK key)** or **cancel (ESC key)** to continue.

**Note 3:** - \*On completion of the erasure routine, *PAT4E* returns to the **Login** screen for 'Erase All' and to the **Client** screen for 'Erase Locations' and 'Erase Client'.

**Note 4:** - \*Prior to erasing assets or results, *PAT4E* perform a check on the number of assets or results to be erased. Confirm **OK** or cancel (**ESCape** key)



## Communications.

*PAT4E* can communicate with a printer via the parallel port or with a PC running **Download Manager**<sup>™</sup> or **Form Filler**<sup>™</sup> for **Windows**<sup>™</sup> software via the serial port.

A variety of reports are available for printing directly from the *PAT4E* providing the advantages of hard copy output on site. *PAT4E* is designed to be used in conjunction with **Download Manager**<sup>™</sup> or **Form Filler**<sup>™</sup> for **Windows**<sup>™</sup> software which can send and receive fields within its database to form a highly integrated portable appliance testing system. *PAT4E* may be controlled from **Download Manager**<sup>™</sup> or **Form Filler**<sup>™</sup>, providing a centrally administered testing regime. In this way the manipulation of large quantities of data is handled on a PC, each *PAT4E* acting as a slave to receive information on Clients, Locations and assets to be tested. The data and test results can then be downloaded to the PC as convenient.

### Printing Reports and Test Results

*PAT4E* enables the printing of the following range of reports:

- Client List
- Location List
- Plain Asset List †
- Assets with Current Results (Certificate of Test)
- Retro report
- Assets with Due dates for testing †
- Groups

All reports may be printed directly from the *PAT4E* using the parallel printer connector on the front panel.

† The asset and results reports indicated list the assets and results that relate to the current Client and location.

The '**Retro**' report produces a report which is compatible with the data which may be downloaded into "Shire's"<sup>™</sup> 'Safety First', 'Safety First+' packages. However it must be remembered that the

output for this report selection will appear on the parallel output of the *PAT4E*. The above software packages can only receive data via a PC serial port. It will therefore be necessary to pass the data through a parallel to serial converter, if you wish to download from the *PAT4E* to any of these packages. These are readily available at low cost from many sources.

### Print Report

1. Refer to the Print Reports Flowchart.
2. From the Menu screen press the ASSET key. The screen changes.
3. Press the REPORTS key. The Reports screen is displayed with the option to select the specific report to be printed.
4. Toggle the left-hand keys to display the report to be printed.
5. Press the OK key. The selected report is printed.

Connect the Printer to the 25 way female 'D' connector using a suitable lead.  
(Available as an accessory)

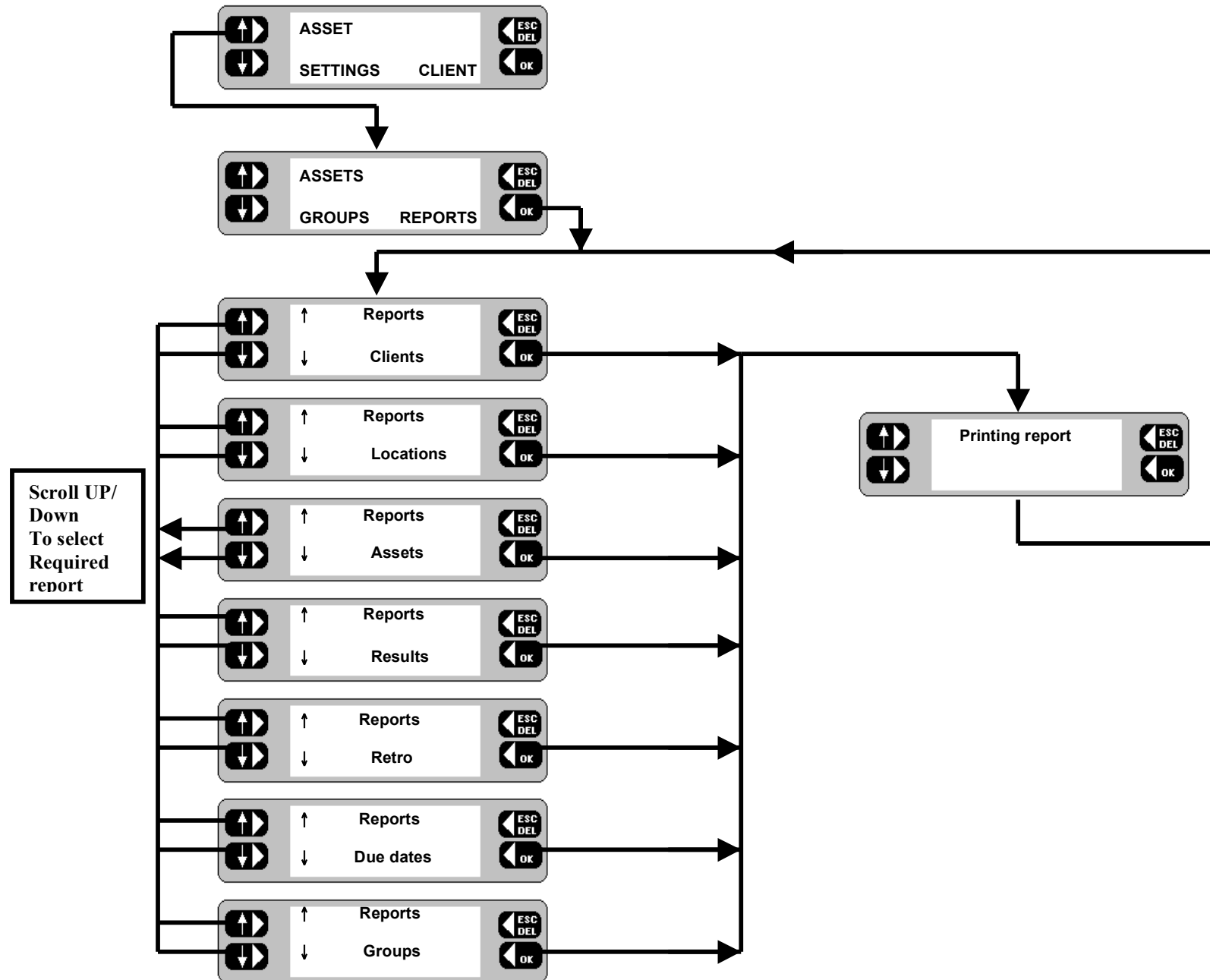
6. On completion ESCape back to the Menu screen.

If a printer is attached to *PAT4E*'s parallel output during the testing of assets, a simple listing of test results will be printed. If a printer is not attached or this *PAT4E* feature has been disabled *PAT4E* will skip the printing process.

Note:-

This feature is disabled on new *PAT4E*'s (See Settings section),

# Print Reports Flowchart.



## Download / Upload Data.

To download and to upload data, the *PAT4E* needs to be connected to a PC running suitable download software. ie **Download Manager**™ or **Form Filler**™ for **Windows**™.

### Form Filler™ for Windows™

This Windows package produces certificates for Portable Appliance Testing. The database stores a wide variety of appliance and customer information, together with a full test history. Test data may be edited, repairs added and power searches and sorts performed.

### Serial Lead Connections

A 9 way lead is supplied with the *PAT4E*. The following table indicates the lead format required. Some PCs require a 25 way connector.

Signal Name	PAT4E Serial Port	Personal Computer port	
		9 way 'D'	25 way 'D'
DCD	1	7	4
RXD	2	3	2
TXD	3	2	3
DTR	4	6/8	5/6
GND	5	5	7
DSR	6	4	20
RTS	7	1	8
CTS	8	4	20
+ 5V	9	9	22

### Download to a Computer

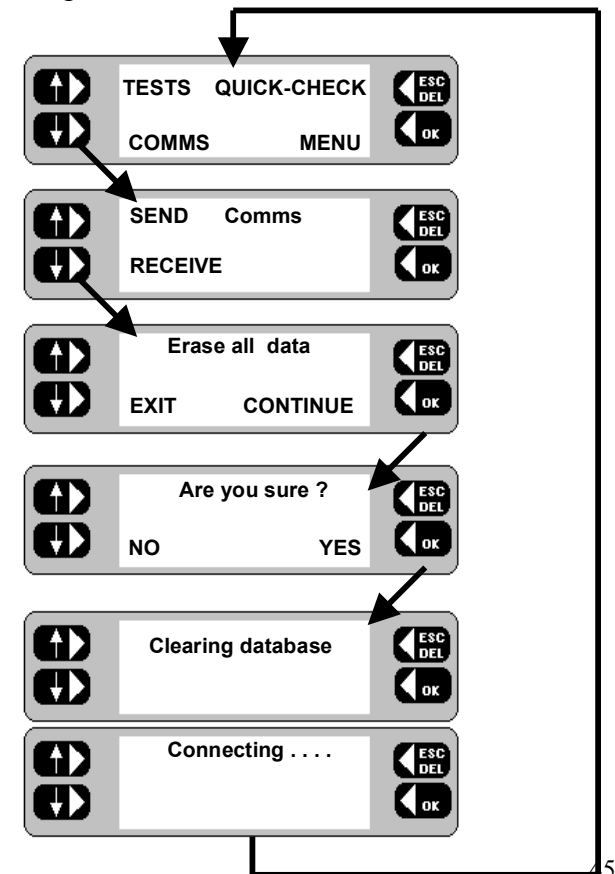
1. Connect the *PAT4E* to the PC, and prepare the PC software to receive the data.
2. From the **Main** screen, press the **COMMS** key. The Comms screen is displayed.
3. Press the **SEND** key. The data is downloaded.
4. On completion, **ESCape** back to the **Main** screen.

### Upload from a Computer

1. Connect the *PAT4E* to the PC and prepare the PC software to send the data.
2. From the **Main** screen, press the **COMMS** key. The Comms screen is displayed.
3. Press the **RECEIVE** key. The Erase all current data message is displayed, and offers the option to **CONTINUE** or **EXIT**.
4. Press the **CONTINUE** key. The "Are you sure" message is displayed, and offers the option of "YES or NO"

**Note:** - This will erase all data. Only proceed if this data has been downloaded first, or is of no further use. The display advises that *PAT4E* is clearing the database, and **Connecting...** to the PC.

5. On completion, **ESCape** back to the **Main** screen



## Description of tests.

**Note:** - Refer to page 26 Table of Test Group Combinations for valid test combinations

### Visual Inspection List.

Check the physical condition of:

Case	damage; tears; cracks
Mains Plug	
Mains Lead	
On/Off Switch	
Supply socket	
Environment	e.g. operational hazards in the vicinity
Suitability	i.e. Used for correct purpose?
Everything Else	

**Note:** - If an asset fails a visual inspection, no further tests will be performed and a repair code may be entered (see '*Repair Codes*').

### Circuit Test. (Pre-Test)

Prior to performing any of the main tests an initial check is performed to indicate an approximate value of appliance loop impedance. Abnormal results from this test displays a message indicating the conditions that may affect the validity of the tests to be performed, or where possible damage to the *PAT4E* may result. When everything is in order, no message is given. Other results obtained from this test may be:

- “**Appliance may be o/c**” (Open circuit) - Check Asset On/Off switch and /or fuse.
- “**Appliance may be s/c**” (Short circuit) - Check asset before continuing.

The test is energised from a low potential / low energy a.c. supply. The open circuit voltage is typically 12 Volts (peak) with a short circuit current of 100 mA.

### Insulation Test ( $R_{ISO}$ )

A 500 Volt D.C. source is used to provide the Insulation test function. Class 1 appliances, are tested by applying 500V between Earth and the two-phase conductors joined together. Class 2 appliances should be tested using the  $I_F$  probe as a return connection. The insulation test voltage is applied to the appliance phase conductors as for Class 1, but any current flow will return to Earth via the  $I_F$  probe which should be connected to the appliance insulation or to any exposed metal parts. The insulation test has been designed to supply 500 V at 1 mA. This test is also available for **three phase** assets via the two front panel sockets. In this case the Red and Black leads supplied should be used to connect to the asset.

### Earth Continuity Test ( $R_{PE}$ )

This test provides a measurement of protective conductor resistance and is therefore applicable to Class 1 assets only.

A low current (D.C.) is passed between the Continuity terminal and the appliance test socket Earth pin. The test current is limited to 200 mA with a maximum open circuit voltage of 4 V. To use this test the  $R_{PE}$  terminal and the black lead should be connected to the appliance exposed metalwork..

If a long appliance supply lead is used it is possible that the test may fail due to the high resistance of the lead. In this case, the **COMP** key on the ‘Fail or retest‘ screen can be used to include compensation for the lead length and cross sectional area. Follow the prompt to enter the lead length and press the **OK** key. Then use the left-hand keys to toggle and select the lead cross sectional area (and current rating) and press the **OK** key. *PAT4E* re calculates the resistance measurement and subtracts it from the original value. Only one opportunity to **COMP**ensate the test result is offered during this sequence.

This test is also available for **three phase** assets. In this case the Red and Black leads supplied should be used to connect to the asset using the  $R_{PE}$  terminal and the three phase  $\perp$  earth socket.

## Description of tests.

---

**On completion of the  $R_{PE}$  test, ensure that the black lead is disconnected from the appliance under test.**

### Operation Test

Operation tests allow the power consumed by the equipment to be checked against the manufacturers rating. The measurement is displayed in Volt Amps (VA) often specified on assets as Watts. During the Operation test the appliance is powered directly from the incoming 230 V mains supply. During the test the *PAT4E* also measures the mains voltage at the time of test. If this is found to vary from the nominal mains value (230 V) *PAT4E* will make a correction and display the consumed power as if the mains voltage had been exactly 230V. This enables a more accurate comparison with the manufacturers figure.

### Differential Earth Leakage Test( $I_{DIFF}$ ).

The differential earth leakage test determines whether any current is flowing to earth. Normally appliances should have no or very little earth leakage current. The *PAT4E* can also detect earth leakage in Class 2 (Double insulated) assets. This enables account to be taken of all leakage paths to earth rather than just that flowing in the earth wire if applicable. e.g. a Class 2 (Double insulated appliance) could exhibit earth leakage through its mountings or by operator contact. During the test the actual mains voltage is also measured at the appliance socket. In order to ensure that the equipment is safe even when the mains supply rises to its maximum permitted value (253V) the *PAT4E* calculates and displays the leakage current that would flow at this value.

### Substitute Discharge Earth Leakage Test. ( $I_{PE}$ ).

This alternative Earth Leakage test is performed at 40Volts ac 50Hz. For this test the Appliance under test has its phase conductors joined together within *PAT4E* and a 40Volt supply is applied between both phase conductors and the Protective conductor connection of the equipment under test in the case of Class 1 equipment. In the case of

Class 2 appliances the **black** lead and probe is connected to the *PAT4E*  $I_F$  terminal. This probe is applied to any conductive parts on the appliance under test. The actual voltage is measured at the appliance socket. From these readings the earth leakage current of the appliance is calculated. This calculated current is automatically scaled to the equivalent figure relevant to operation at exactly 253V.

### “Absence of potential” Earth Leakage Test ( $I_F$ ).

This alternative Earth Leakage test (also known as “Touch current test”) is commonly performed on computer equipment. During this test the appliance under test is powered from its normal mains supply and the **black** lead and probe is connected to the *PAT4E*  $I_F$  terminal. This probe is applied to any conductive parts on the appliance under test. This probe performs a current measurement with respect to earth. This test can also be performed on three phase appliances powered from their own supply.

### Fuse Test

During appliance testing it is often necessary to check the integrity of a fuse. *PAT4E* incorporates an integral fuse tester on the front panel. To test a fuse hold the fuse to be tested onto the two pads, the *PAT4E* will beep if the fuse is intact.

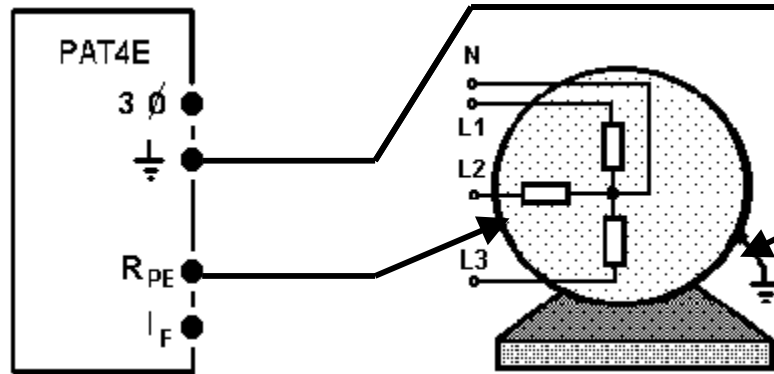
### Extension Lead Testing

Most types of extension leads can be tested. Leads are tested for correct polarity (see Note1) , Insulation resistance, and Earth conductor resistance. A simple visual inspection option is also included. All leads are tested by connecting between the 230 V socket and the Lead test socket on the front panel. Where the lead to be tested is not compatible with the lead test socket a short adapter lead should be used to make the connection. See ‘Accessories’.

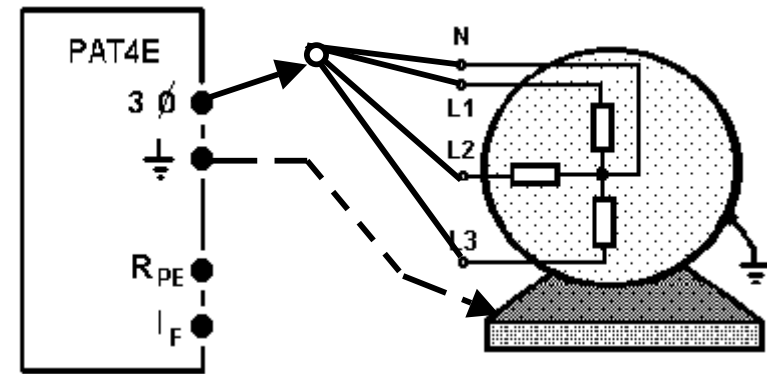
**Note 1:** - Where reversible mains plugs are used the polarity check has no meaning.

**Three phase Testing:- Typical configurations.**

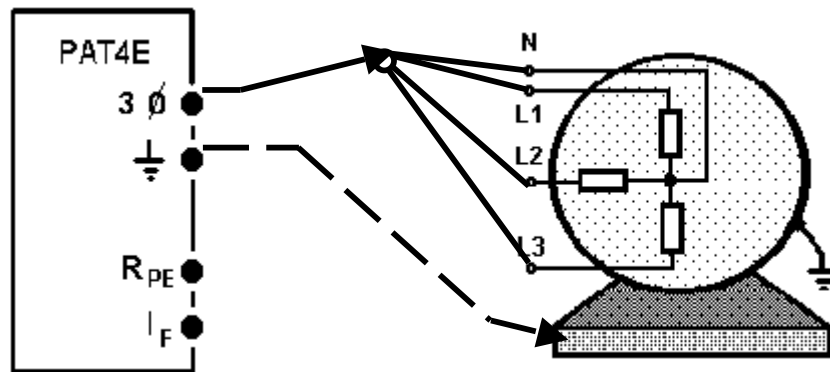
**R<sub>PE</sub> Testing**



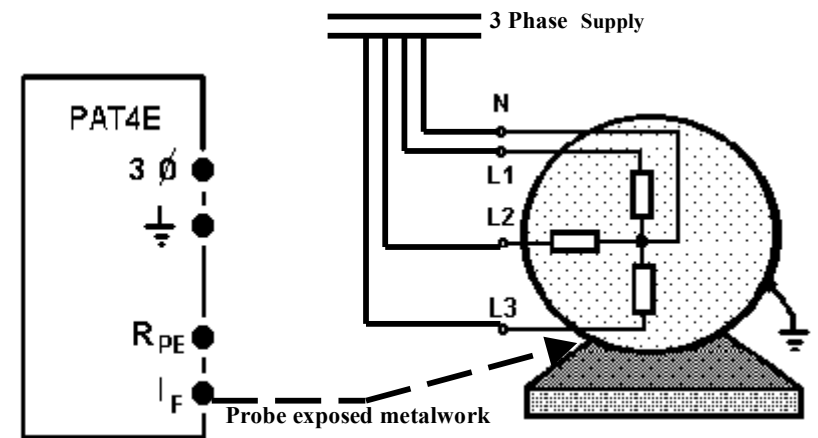
**I<sub>PE</sub> Testing**



**R<sub>ISO</sub> Testing**



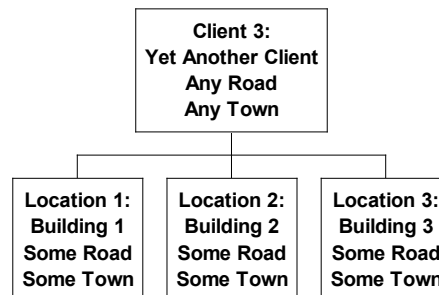
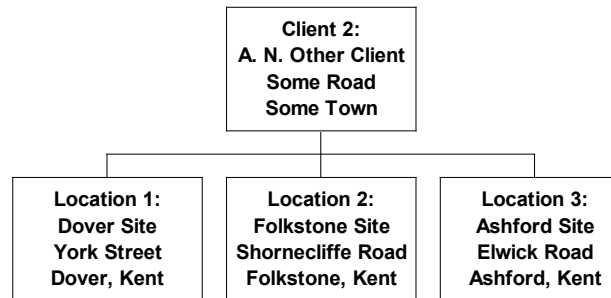
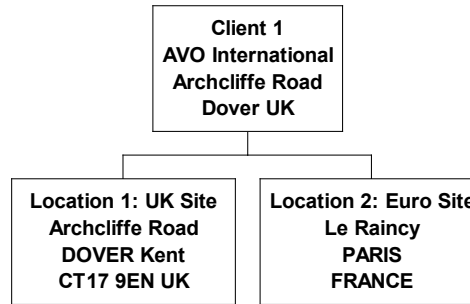
**I<sub>F</sub> Testing**





## Demonstration Data.

To familiarise you with the features of *PAT4E*, sample data has been included on your instrument. In conjunction with the Quick Start Guide you will be able to become proficient with the basic features very quickly. This demonstration data can be restored to your *PAT4E* at any time by powering up with the 'R' key depressed (see settings section). The following data has been loaded onto your instrument:



### Note:-




In this example, the 3 locations are on the same site, and at the same address.

## Demonstration Data (Continued).

### Demonstration Test Groups

To enable you to get started Ten test Groups have been included to cover a variety of equipment types. They may be used, deleted or modified at any time.

Code	Usage	Tests Applied	Reversible Mains Lead	Pass Limits
TC1	Typical Class 1 Earthed Equipment	Visual Inspection $R_{PE}$ $R_{ISO}$ Operation Test $I_{DIFF}$	✓	$< 0.1\Omega$ $> 2.0M\Omega$ $< 3kVA$ $< 3.5mA$
TC2	Typical Class 2 Earthed Equipment	Visual Inspection $R_{ISO}$ Operation Test $I_{DIFF}$	✓	$> 7.0M\Omega$ $< 3kVA$ $< 0.5mA$
3P1	Typical Class 1 Earthed 3 Phase Equipment	Visual Inspection $R_{PE}$ $R_{ISO}$ $I_F$	✗	$< 0.1\Omega$ $> 2.0M\Omega$ $< 3.5mA$
3P2	Alternative Class 2 Earthed 3 Phase Equipment	Visual Inspection $R_{ISO}$ $I_{PE}$	✗	$> 2.0M\Omega$ $< 3.5mA$
EL1	Extension Leads 3 Wire	Visual Inspection $R_{PE}$ $R_{ISO}$ Polarity	✓	$< 0.1\Omega$ $> 2.0M\Omega$ OK
EL2	Extension Leads 2 Wire	Visual Inspection $R_{ISO}$ Polarity	✓	$> 2.0M\Omega$ OK

Code	Usage	Tests Applied	Reversible Mains Lead	Pass Limits
FAN	Desk Fan 	Visual Inspection $R_{ISO}$ Operation Test $I_{DIFF}$	✓	$> 7.0M\Omega$ $< 200VA$ $< 0.5mA$
PC	Personal Computer IT Equipment	Visual Inspection $R_{PE}$ Operation Test $I_F$	✓	$< 0.1\Omega$ $< 200VA$ $< 0.5mA$
DRY	Hair Dryers 	Visual Inspection $R_{ISO}$ Operation Test $I_{DIFF}$	✓	$> 7.0M\Omega$ $< 1.5KVA$ $< 0.5mA$
KET	Kettles 	Visual Inspection $R_{PE}$ $R_{ISO}$ Operation Test $I_{PE}$	✓	$< 0.1\Omega$ $> 2.0M\Omega$ $< 2500VA$ $< 3.5mA$

## **Demonstration Data (Continued).**

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**The following assets have been added for the AVO International Client at the UK Site.**

Appliance ID	Test Group	Serial Number	Description	Room	Re-test frequency	VA	Fuse
F131	FAN	CANA12	Canarm 3 speed	Office	24 Months	60	None
F132	FAN	CANA134	Canarm 3 speed	Office	24 Months	60	None
T1234	TC1	None	Soldering Iron	Workshop	6 Months	75	None
1292-282	TC1	XER-667	Xerox Copier	Sales	12 Months	900	None
T2985	PC	DP-7274594	DELL Pentium	Lab 1	24 Months	500	None
CFR2453	TC2	KP329	Krupps Coffee	Office	12 Months	2000	None
354713	TC2	None	Avery Scales	Stores	12 Months	140	None
LP2345	TC2	None	Desk Lamp	Lab 1	12 Months	60	None

**The following assets have been added for the AVO International Client at the EURO Site.**

Appliance ID	Test Group	Serial Number	Description	Room	Re-test frequency	VA	Fuse
PC1	PC	1237919	DELL P560-L	Support	24 Months	460	None
PC2	PC	029337	SPIRE Pentium 133	Support	24 Months	650	None
PC3	PC	13093029	DAN Pentium 200	Shop	24 Months	975	None
PC4	PC	0939287	DEL Notebook	Sales	12 Months	300	None
PC5	PC	1237183	Network Server	Design	24 Months	890	None
COP1	TC1	SH100-29	SHARP 2000	Shop	12 Months	800	None
KET1	KET	823-368	SWAN Slimline	Old Office	12 Months	2000	None
FAN1	FAN	None	COOLBOY 30	Design	12 Months	75	None
FAN2	FAN	None	VANE 130	Design	12 Months	100	None

## **Demonstration Data (Continued).**

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**The following assets have been added for the A. N. Other Client at the Dover Location.**

**NB:- No other appliances exist for the other sites.**

Appliance ID	Test Group	Serial Number	Description	Room	Re-test frequency	VA	Fuse
PT736	3P1	H637-27	Grinder	Loan Store	3 Months		None
PT874	TC1	H/23EW	Flood Lights	Loan Store	3 Months	1500	None
PT9805	3P2	YT/45	Power Saw	Loan Store	3 Months		None
PT14	TC1	FFR736	0.5" Drill	Loan Store	6 Months	900	None
PT46	TC1	2763737	Sander	Loan Store	6 Months	800	None
ST3880	FAN	None	Desk Fan	Reception	12 Months	90	None
T423	TC1	None	Compressor	Loan Store	6 Months	2500	None
T35	TC2	None	Table Light	Reception	12 Months	60	None
DR36	TC2	None	Table Light	Reception	12 Months	60	None

## Specifications.

### Circuit test

**Test Voltage:** 12 V p - p, 50Hz square wave. (Typical)  
**Max current:** 100 mA (typical)  
**Indications:** Open circuit, OK, Short circuit.

### Insulation test

**Range:** 0 - 50 M $\Omega$   
**Accuracy:** 5.0%  $\pm$  100 k $\Omega$   
**Compliance:** 500 V at 0.5 M $\Omega$   
**Pass Band options:** 0.25 M $\Omega$ , 0.3 M $\Omega$ , 0.5 M $\Omega$ , 1.0 M $\Omega$ , 2.0 M $\Omega$ , 7.0 M $\Omega$ , 10M $\Omega$ , 20M $\Omega$

### Earth Continuity Test

**Range:** 0 - 999 m $\Omega$  Resolution 1 m $\Omega$   
1.00 - 9.99 $\Omega$  Resolution 10 m $\Omega$   
**Accuracy:** 5.0%  $\pm$ 10m $\Omega$   
**Test Voltage:** 4 V d.c. (Typical)  
**Test Current:** 200 mA short circuit (typical)  
**Pass Bands:** 100 m $\Omega$ , 300 m $\Omega$ , 500 m $\Omega$ , 750m $\Omega$ , 1.0  $\Omega$ , 1,5  $\Omega$ , 2.0 $\Omega$ , 5 $\Omega$

### Operation Test

**Range:** 0 - 3.0 kVA.  
**Accuracy:** 0 <VA> 99 VA: 5.0%  $\pm$  5 VA  
100 <VA> 999 VA: 5.0%  $\pm$  10 VA  
1.0 <VA> 3.0kVA: 5.0%  $\pm$  100 VA  
**Reference:** Reading corrected to 230 V  
**Pass Band options:** 50 VA, 200 VA, 500 VA, 1000 VA, 1500VA, 2000 VA, 2500 VA, 3000 VA.

### Differential Earth Leakage Test (I<sub>DIFF</sub>)

**Range:** 0 - 15 mA  
**Accuracy:** 5.0%  $\pm$  100  $\mu$ A  
**Reference:** Reading corrected to 253 V  
**Pass Band options:** 0.25mA, 0.5mA, 0.75mA, 1.0mA, 3.5mA, 7.0mA, 10mA, 15mA

### Earth Leakage by Substitute Discharge method. (I<sub>PE</sub>)

**Range:** 0 - 15 mA  
**Test Voltage:** 40 V rms (50Hz ) (Typical)  
**Accuracy:** 5.0%  $\pm$  100  $\mu$ A  
**Reference:** Reading corrected to 253 V  
**Pass Band options:** 0.25mA, 0.5mA, 0.75mA, 1.0mA, 3.5mA, 7.0mA, 10mA, 15mA

### Earth Leakage Test using Absence of potential method. (I<sub>F</sub>)

**Range:** 0 – 2.5 mA  
**Accuracy:** 5.0%  $\pm$  100  $\mu$ A  
**Pass Band options:** 0.1mA, 0.25mA, 0.5mA, 0.75mA, 1.0mA, 1.5mA, 2.0mA, 2.5mA

### Fuse Test

**Test Voltage:** 5 V d.c. typical  
**Test Current:** 500  $\mu$ A short circuit typical  
**Indication:** Audible using internal bleeper

### Extension Lead test

**Test Voltage:** 5V d.c. typical  
**Test current:** 1 mA short circuit typical  
**Indication:** Lead short circuit (Live to Neutral)  
Lead open circuit (Live or Neutral)  
Live / Neutral transposed  
Lead OK  
**R<sub>PE</sub> test and R<sub>ISO</sub> test follow OK condition.**

### Mains supply

**Operating Voltage:** 230 Volt: 207 - 253 Volts 50Hz.  
**Fusing:** 12.5Amp HBC fitted to both input phase conductors.

### Safety Specifications

Meets the requirements of IEC 1010-1 (1995) EN 61010-1 (1995) phase to earth Installation Category II\*\* for Safety Class 1.

## **Specifications (Continued).**

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**EMC:** Complies with Electromagnetic Compatibility Specifications (Light Industrial Category):  
BS/EN50081-1-1992  
BS/EN50082-1-1992

### **Environmental Specifications**

Designed for indoor use or protected outdoor use.

**Operational Temp Range:** 0° - 40° C at 90% Relative Humidity

**Storage Temp Range:** -20° C to 60°C

**Temperature co-efficient:** 0,2% per °C (Ref temp. 20°C)

### **General features**

- Hard copy of results formatted as a pass / fail list
- On board real time clock module
- On board **AVO Form Filler**<sup>TM</sup> compatible asset database
- On board storage for 1000 test results (max)
- Alphanumeric key pad
- Auto / Manual modes
- Two line LCD text display

### **Communication Connectors**

**9 way male 'D' RS232:** Interface to PC / bar code scanner  
8 bits, no parity, 1 stop bit.  
**PC:** 9600 baud  
**Scanner:** 2400 baud.

**25 way female 'D':** Parallel printer for results.

### **Cleaning**

Disconnect instrument from mains supply. Wipe with a clean cloth dampened with soapy water or Isopropyl Alcohol (IPA).

### **Mechanical Specifications.**

**Weight:** 5 kg

#### **Dimensions:**

Width - 375 mm (inc handle and lid)

Depth - 330 mm (inc hinges)

Height - 200 mm (approx).

## Accessories.

### Included Accessories

Item	Cat.No.
Appliance Tester	PAT4E
User Guide	6172-442
Mains Lead Schuko / 16A	6121-282
Crocodile Clip (red)	6280-283
Crocodile Clip (Black)	6280-284
Test Probe (Red)	6220-529
Test Probe (Black)	6220-530
Test Lead (Red)	6220-569
Test Lead (Black)	6220-570
Test Probe Hook (Red)	6220-582
Test Probe Hook (Black)	6220-573
Serial PC Download Lead	25955-025
Download Manager Software	6111-442

### Optional Accessories

Item	Cat.No.
Bar Code Scanner 72mm	6231-623
PAT Testing Labels	6171-418
Results Printer (please refer to our Megger Applications Department for recommended alternative result printers)	6220-665
Self Adhesive Label roll for 6220-665	25995-016
Plain Paper rolls for 6220-665	10005-265
Parallel Printer Lead	25970-024
Certification software	6111-443

## **Repair and Warranty.**

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The instrument circuit contains static sensitive devices, and care must be taken in handling the printed circuit board. If the protection of an instrument has been impaired it should not be used, and be sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if, for example, the instrument shows visible damage, fails to perform the intended measurements, has been subjected to prolonged storage under unfavourable conditions, or has been exposed to severe transport stresses. New instruments are guaranteed for 1 Year from the Date of Purchase by the User.

Note: Any unauthorised prior repair or adjustment will automatically invalidate the Warranty.

Instrument Repair and Spare Parts

For service requirements for **MEGGER®** Instruments contact:

Megger Limited Archcliffe Road Dover Kent, CT17 9EN England. Tel: +44 (0) 1304 502243 Fax: +44 (0) 1304 207342	Megger Valley Forge Corporate Center 2621 Van Buren Avenue Norristown, PA 19403 USA Tel: +1 (610) 676-8579 Fax: +1 (610) 676-8625
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Or an approved repair company.

### **Approved Repair Companies**

A number of independent instrument repair companies have been approved for repair work on most **MEGGER®** instruments, using genuine **MEGGER®** spare parts. Consult the Appointed Distributor / Agent regarding spare parts, repair facilities and advice on the best course of action to take.

### **Returning an Instrument for Repair**

If returning an instrument to the manufacturer for repair, it should be sent freight pre-paid to the appropriate address. A copy of the Invoice and of the packing note should be sent simultaneously by airmail to expedite clearance through Customs. A repair estimate showing freight return and other charges will be submitted to the sender, if required, before work on the instrument commences.



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