ETHOS 9700

Downloading PAT Tester



USER MANUAL

LIMITED WARRANTY & LIMITATION OF LIABILITY

ETHOS Test Instruments guarantees this product to be free from defects in material and workmanship under normal use and service for a period of 2 years, provided the instrument is serviced and calibrated by an authorised agent in accordance with the manufacturer's instructions. The period of warranty will be effective at the day of delivery.

Manufacturer does not provide any warranty for the following:

1. Any normal wear and tear.
2. Errors or damage caused by: (I) misuse or not using your product in accordance with the user guide, such as if the product has been exposed to moisture, to dampness or to extreme thermal or environmental conditions or to rapid changes in such conditions, to corrosion, to oxidation, to spillage of food or liquid or to influence from chemical products, (ii) using your product with, or connecting it to, any product, accessory, software, or service not manufactured or supplied by the manufacturer, (iii) any products combined with your product by a third party, (iv) damage or errors caused by hacking, cracking, viruses, or other malware, or by unauthorised access to services, accounts, computer systems or networks; or (v) other acts beyond the manufacturer's reasonable control.

This Warranty is not valid:

- If your product, or the software it runs on, has been (I) opened, modified, or repaired without the Manufacturer's authorisation or
- If you have not installed the latest software updates that are publicly available for your product within a reasonable time of their release; or
- If you refuse to give possession of the product to the manufacturer for repair and investigation.

(c) Copyright 2020

All rights reserved. Nothing from this edition may be multiplied, or made public in any form or manner, either electronically, mechanically, by photocopying, recording, or in any manner, without prior written consent from ETHOS Test Instruments. This also applies to accompanying drawings and diagrams.

Due to a policy of continuous development ETHOS Test Instruments reserves the right to alter the equipment specification and description outlined in this publication without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract.

Contents

1 USER NOTES 6

2 SAFETY NOTES 6

3 ACCESSORIES 8

3.1 Standard Ethos 9700 Contents (What's in the Box) 8

4 GETTING STARTED 10

4.1 Getting to Know Your Ethos 9700 Series 10

4.2 Before Using Your Ethos 9700 Series for the First Time 11

4.3 Powering ON / OFF an Ethos 9700 Series 11

4.4 Ethos 9700 Series Battery Status Indication 11

4.5 Charging the Battery Pack 12

4.6 Replacing the Battery Pack 12

4.7 Getting To Know the User Interface 13

5 USER OPTIONS (PAT SETTINGS) 14

5.1 User Options / PAT Settings - Options Page 1 15

5.2 User Options / PAT Settings - Options Page 2 17

5.3 User Options / PAT Settings - Options Page 3 18

6 SETTING UP YOUR ETHOS 9700 INSTRUMENT 19

6.1 Main Menu Navigation 19

6.2 Main Menu Window - View Data 20

6.3 Main Menu Window - User Setup 23

6.4 Main Menu Window - Connecting Bluetooth Devices 25

6.4.1 How to Setup a Printer with your Ethos 9700 26

6.5 Main Menu Window - Automatic Test Sequence Editor (PAT Edit) 30

6.6 Main Menu Window – Time and Date Setup 33

6.7 Main Menu Window – Memory Options 33

7 DOWNLOADING YOUR ETHOS 9700 35

7.1 Downloading From Your Ethos 9700 Series to PATGuard 3 35
7.2 Downloading Clone Data from the Ethos 9700 36
8 UPLOADING YOUR ETHOS 9700 37
8.1 Uploading from PATGuard 3 to an Ethos 9700 37
8.2 Uploading Printer Logos to an Ethos 9700 38
8.3 Uploading Clone Data to an Ethos 9700 39
8.4 Uploading Background Images to an Ethos 9700 39
8.5 Uploading List Configuration Data to a Ethos 9700 39
9 PERFORMING AN ELECTRICAL SAFETY TEST – AUTO MODE 41
9.1 Auto Mode – Risk Based Retest Period Calculator 43
9.2 Auto Mode – The Visual Inspection 44
9.3 Auto Mode – The Electrical Tests 45
10 PERFORMING AN ELECTRICAL SAFETY TEST – MANUAL MODE 46
11 TEST FUNCTIONS 47
11.1 Earth Continuity 47
11.1.1 Selecting a Test Type..... 48
11.2 Insulation Resistance 49
11.2.1 Selecting a Test Type..... 50
11.3 Protective Earth (PE) Conductor Current (Used on Class 1 Appliances) 50
11.4 Touch Current 51
11.5 RCD Trip Time 51
11.6 IEC Lead / Polarity 52
11.7 Substitute (Alternative) Leakage 52
11.8 External Leakage Adaptors 53
11.9 Socket Test 53
11.10 Checkbox Verification 54
12 UPDATING YOUR FIRMWARE 55
13 ELECTRICAL SPECIFICATION 56
14 USEFUL INFORMATION 58

14.1 Factory Set Test Sequences 58

14.2 Other Information 60

15 ENVIRONMENTAL CONDITIONS 61

16 MAINTENANCE 61

16.1 Securing the Ethos 9700 61

16.2 Cleaning the Ethos 9700 61

17 SERVICE AND CALIBRATION. 61

17.1 Calibration Statement 62

18 ONLINE RESOURCES 63

1 User Notes

This instrument and its operating instructions are intended for use by adequately trained personnel. Appropriate PPE should be worn at all times when using any Ethos 9700 unit. Electrically insulated gloves should be used when performing tasks on live circuits above 50V. Arc-flash PPE selection should be based on an incident energy analysis.

The following symbols are used in these operating instructions.



Warning of electrical danger!
Indicates instructions must be followed to avoid danger to persons.



Important, follow the documentation!
This symbol indicates that the operating instructions must be adhered to in order to avoid danger.

Due to a policy of continuous development ETHOS Test Instruments reserves the right to alter the equipment specification and description outlined in this publication without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract.

2 Safety Notes

This Ethos 9700 unit has been built and tested in accordance with:

BS EN 61010-1.
BS EN 61557 part 1, 2, 4 and 10.

To ensure safe operation of the unit, all notes and warnings in these instructions must be observed at all times.



If the Ethos 9700 is used in a manner not specified by these operating instruction then the protection provided may be impaired



Always ensure that the circuit or appliance under test is electrically isolated.



Do not connect the Ethos 9700 to electrical circuits with nominal voltage greater than CAT II 300 V AC/DC.



The Ethos 9700 and all associated cables and leads must be checked for signs of damage before equipment is operated. Do not use if there are signs of damage. Only use the correct leads supplied with the Ethos 9700.



Do not touch test probes beyond the hand barrier on the test probe.



The Ethos 9700 may apply high voltage or mains power to the appliance under test. Do not touch conductive parts of the appliance while tests are active.



If the Ethos 9700 is being used to determine the presence or absence of hazardous voltages, always prove the operation of voltage measurement function before and after use by means of a known voltage source or proving unit.



Do not operate the Ethos 9700 in an explosive gas or dust environment.



The Ethos 9700 has been designed to make measurements in a dry environment.



The Ethos 9700 includes a rechargeable battery pack which is charged while the Ethos 9700 is connected to a mains supply. Only a Ethos battery pack should be connected into the Ethos 9700 Series. Disconnect the Ethos 9700 from all leads before opening the battery compartment.



Do not open the Ethos 9700, no user serviceable parts.



To avoid losing data or damaging your Ethos 9700, do not connect power intensive devices such as external hard drives, or attempt to charge or transfer data to a mobile phone, camera or similar device via the USB port.

Where safe operation of the Ethos 9700 unit is no longer possible it should be immediately shut down and secured to prevent accidental operation.

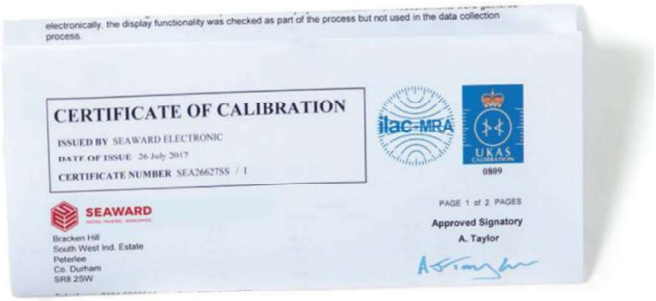
It must be assumed that safe operation is no longer possible:

- If the instrument or leads show visible signs of damage or
- The instrument does not function or
- After long periods of storage under adverse environmental conditions.

3 Accessories

3.1 Standard Ethos 9700 Contents (What's in the Box)



















2.





5.



6.

1. Ethos 9700 Instrument
2. Professional Carry Case
3. Test Lead 1.2m with Alligator Clip, Red
4. Test Lead 1.2m with Alligator Clip, Black
5. IEC Extension Lead, 0.5m
6. Black Mains Lead
7. USB Download Lead
8. Ethos 9700 Check Box
9. Calibration Certificate
10. Quick Start Guide

4 Getting Started

4.1 Getting to Know Your Ethos 9700 Series







1. Test Terminals
2. Screen
3. Function Keys F1 - F5
4. QWERTY Keyboard
5. Power Off / Stop Key
6. Power On / Start Key
7. Arrow Keys
8. EUT Socket
9. IEC Inlet
10. Probe Socket 1
11. Mains Inlet / Probe Socket 2
12. USB B Port
13. Battery Cover

4.2 Before Using Your Ethos 9700 Series for the First Time

Before using your Ethos 9700 Series for the first time, please ensure that you fully charge the instrument using the black power lead plugged into the mains inlet.



(Note: Please ensure the batteries are fully charged before first use.)

4.3 Powering ON / OFF an Ethos 9700 Series

Switch on the Ethos 9700 by pressing and holding, the green ON/START key. After 2-3 seconds the instrument will beep and the display will show a boot up screen.



This is the Power ON button.



This is the Power OFF button

4.4 Ethos 9700 Series Battery Status Indication

While the Ethos 9700 is powered on there are periodic checks of the batteries. The Ethos will show the status of the batteries. (Note: The battery symbols are not displayed in real time and may take a few minutes to update.)



This symbol indicates that the batteries are at 100% capacity.



There are several symbols which will display the current battery voltage. When these icons are displayed the batteries are still good.



This symbol indicates that the batteries are low. Although tests performed with the batteries in this state are still valid, all test types may not complete their intended duration. The batteries should be recharged.



This symbol indicates that the batteries are discharged. The Ethos 9700 will switch itself off after a short period of time. The batteries must be recharged.



This symbol indicates that the Ethos 9700 is bulk charging batteries at the full charge current.



This symbol indicates that the Ethos 9700 is trickle charging the batteries with reduced charge current. This is known as the Top Up Charge.



This symbol indicates that the Ethos 9700 has detected a fault with the battery or battery charger circuit. Unplug the Ethos from the mains supply and wait 2 minutes before reconnecting the mains. If the fault persists then return the Ethos 9700 for service.

4.5 Charging the Battery Pack

The battery pack will be charged whenever the Ethos 9700 is connected to the Mains Supply regardless of whether the instrument is switched ON or OFF.

The typical charging current is set to 500mA but this may vary as the instrument also includes precharge and top up charge modes.

When no tests are being performed the battery pack should be fully recharged after 7 hours.

4.6 Replacing the Battery Pack

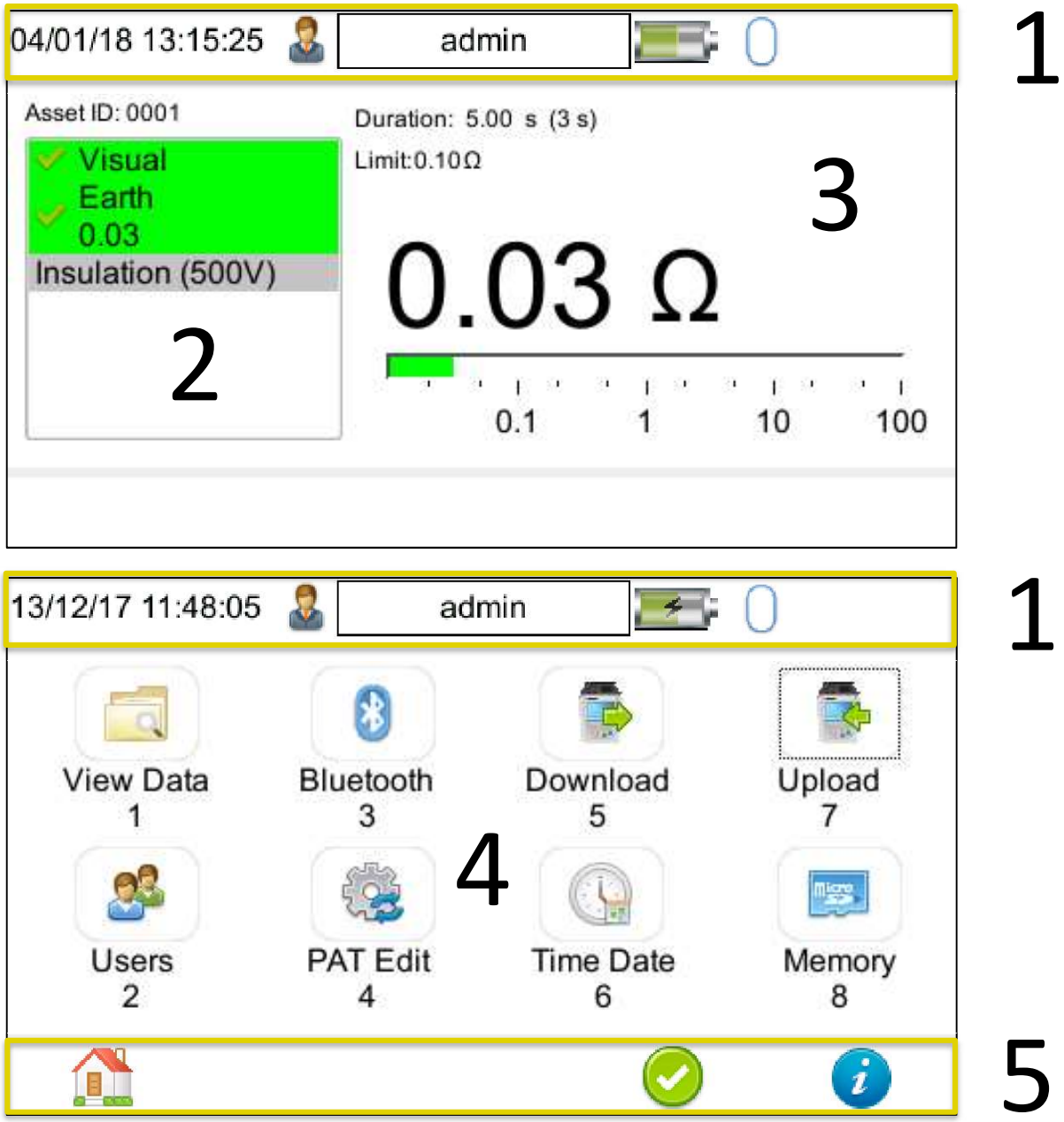


Before opening the Ethos 9700 battery compartment ensure that all test leads and accessories are disconnected.

- Power off the instrument.
- Disconnect all test leads and accessories.
- Position the instrument face down and remove the screw holding the battery compartment cover in place.
- Remove the battery compartment cover.
- Remove the battery pack from the compartment and unplug the multiway connector.
- Connect the multiway connector of the new battery to the connector in the battery compartment; place the new battery pack into the compartment.
- Relocate the battery compartment cover and fasten in position with the battery compartment screw.

ONLY USE A REPLACEMENT BATTERY PACK THAT HAS BEEN SUPPLIED BY ETHOS OR A ETHOS APPROVED DISTRIBUTOR.

4.7 Getting To Know the User Interface



1. Information bar - This area of the screen shows the Date, Time, Current User, Battery Status and connection Status.
2. Test sequence table - This area is only displayed in test mode showing the tests within the selected test sequence. This will also display the results and status of the results that have been performed. Generally, in manual mode, this table will only show one test.
3. Test details - This area is only displayed in test mode showing the details specific to the active test. This includes the measurement, an analogue measurement graph, the duration and limit. Some tests may show more than one measurement.
4. Main area - This area is used to display menu items, text fields or forms.
5. Function key icons - This area of the screen is used to identify the current action assigned to each function key (F1 to F5).

5 User Options (PAT Settings)

PAT Settings is used to setup standard user preferences, such as the options after each test.

User options can be accessed from the **Home Screen**  by selecting PAT (F1) for the **Portable Appliance Testing** window



In the **Portable Appliance Testing** window select the **Tools** function  (F4) to enter the **User Options** / **PAT Settings** window.

The **User Options** or **PAT Settings** window consists of 3 pages and the function keys on these pages correspond to the following:

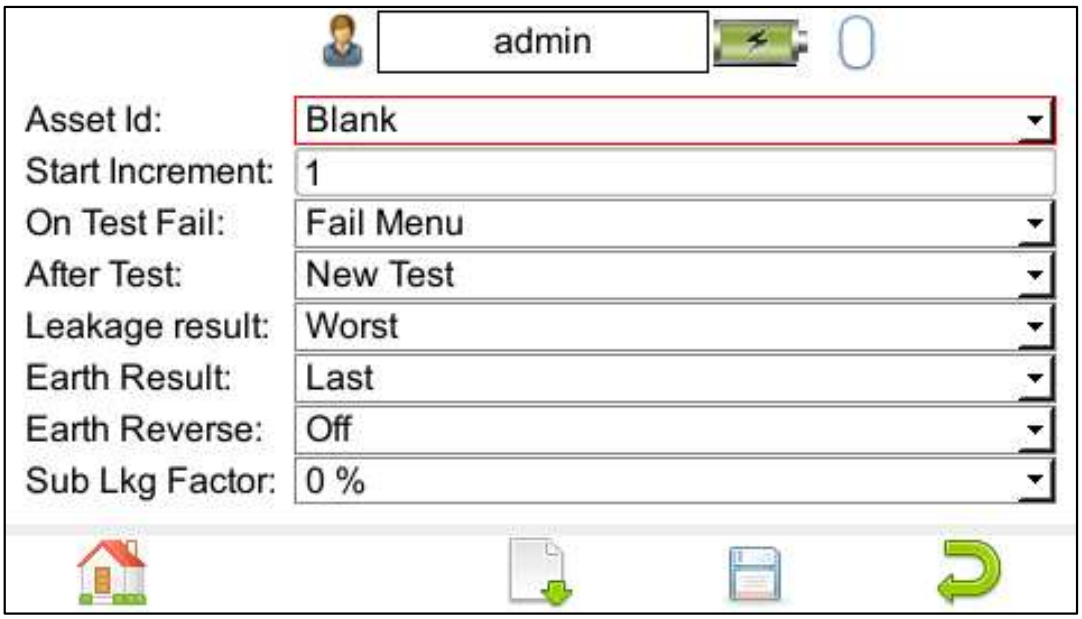
 Use F1 to return to the **Home Screen**, without saving.

 Use F3 to go to the next **User Options** / **PAT Settings** page.

 Use F4 to save changes and return to the **Portable Appliance Testing** Menu.

 Use F5 to return to the **Portable Appliance Testing** Menu, without saving.

5.1 User Options / PAT Settings - Options Page 1



Asset ID:

Blank / Repeat Last / Increment

This can be set to present a blank field, repeat the last Asset ID or automatically increment the Asset ID number for each successive test.

Start Increment:

This field is used to set the starting point for the auto increment feature. The value entered can be numeric or alpha-numeric ending with a numerical value.

Note; if you want data to display in the correct numerical order in PATGuard 3 then, for example, use "0001" instead of "1"

On Test Fail:

End Test / Fail Menu

In the event of a test failure during an automatic sequence, the Ethos can be configured to either End Test, which will terminate the test sequence or present a Fail Menu, which will provide the following list of options:

Restart Test
Skip Test
Restart Test Sequence
Abort Test Sequence (Don't Save Results)
End Test Sequence (Save Results)

Note: Restart Test is useful for coping with situations such as forgetting to connect the earth continuity probe. End Test Sequence will record a Fail result whereas Abort Test Sequence does not record a result.

After Test:

New Test / Print Label / Print Results / Options Menu

There is a choice of 4 actions to be carried out at the end of a test sequence.

New Test will allow data to be saved at the end of a test using  (F4) and then open the Asset Details window ready for a new test.

Print Label will allow data to be saved at the end of a test using  (F4) and then open the Print Label window. When printing is complete, the tester will stay in the Print Label window until printing is complete

or you can return to the Test Details window using  (F5), ready to start the next appliance.

Print Results will display the Print Test Results menu, selecting **Print** (F4) will send this to a connected Bluetooth printer or you can return to the Test Details window using  (F5), ready to start the next appliance.

Options Menu will allow data to be saved at the end of a test using  (F4) and then open the **Test Details** window. Pressing  (F4) will proceed to the **Test Result Options** window with a list of addition options:

View Test Results
View Test Sequence
Information
Print Test Results
Print Label

The **Up / Down** keyboard arrows keys, on the keyboard, can be used to highlight an option which can be selected using  (F4) or you can return to the Test Details window using  (F5), ready to start the next appliance.

Leakage Result:

Last / Worst

This field can set to "**Last**" where the last reading taken during the measurement period is compared with the pass/fail limit or "**Worst**" where the highest reading taken during the measurement period is compared with the pass/fail limit.

Setting the field to "**Worst**" will cause the leakage result to fail if the reading exceeds the limit value at any point during the measurement period.

Earth Result:

Last / Worst

This field can set to "**Last**" where the last reading taken during the measurement period is compared with the pass/fail limit or "**Worst**" where the highest reading taken during the measurement period is compared with the pass/fail limit.

Setting the field to "**Worst**" will cause the earth continuity test to fail if the reading exceeds the limit value at any point during the measurement period, for example if there is a momentary break in the protective conductor when the mains cable is flexed.

Earth Reverse:

Off / On

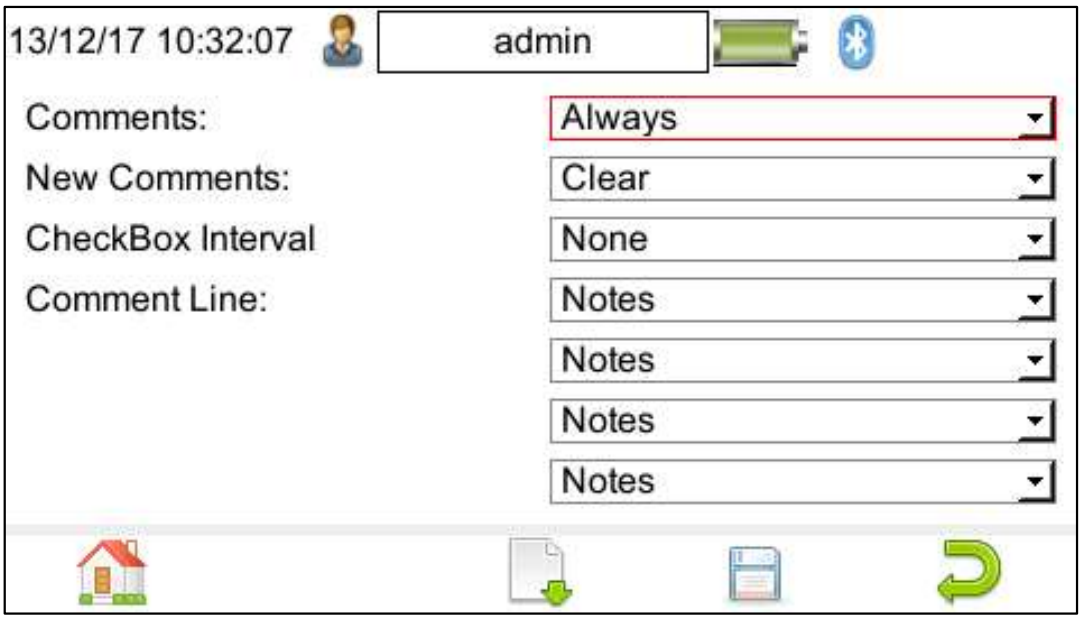
This field is used to enable or disable automatic reversal of the earth continuity test current polarity. "**Off**" sets the earth continuity test current to +200mA and "On" sets the earth continuity test current to +200mA followed by -200mA.

Sub Lkg Factor:

0% / 6% / 10%

This field is used to set the substitute (alternative) leakage scale factor to 0%, 6% or 10%. The substitute (alternative) leakage reading is then calculated for 230V (0%), 244V (6%) or 253V (10%).

5.2 User Options / PAT Settings - Options Page 2



Comments:

Always / On Pass / On Fail / Never

Can be set to open the comment window: **Always** (after every test sequence), if the test result is a **Pass**, if the test result is a **Fail** or **Never**.

New Comments:

Clear / Same as Last

This field can be set to **Clear** where previous comments are removed from the comments fields or **Same as Last** where the previous remain in the comments fields. This can be useful when performing repeated tests on the same type of appliance.

Checkbox Interval:

None / Daily / Weekly / Monthly

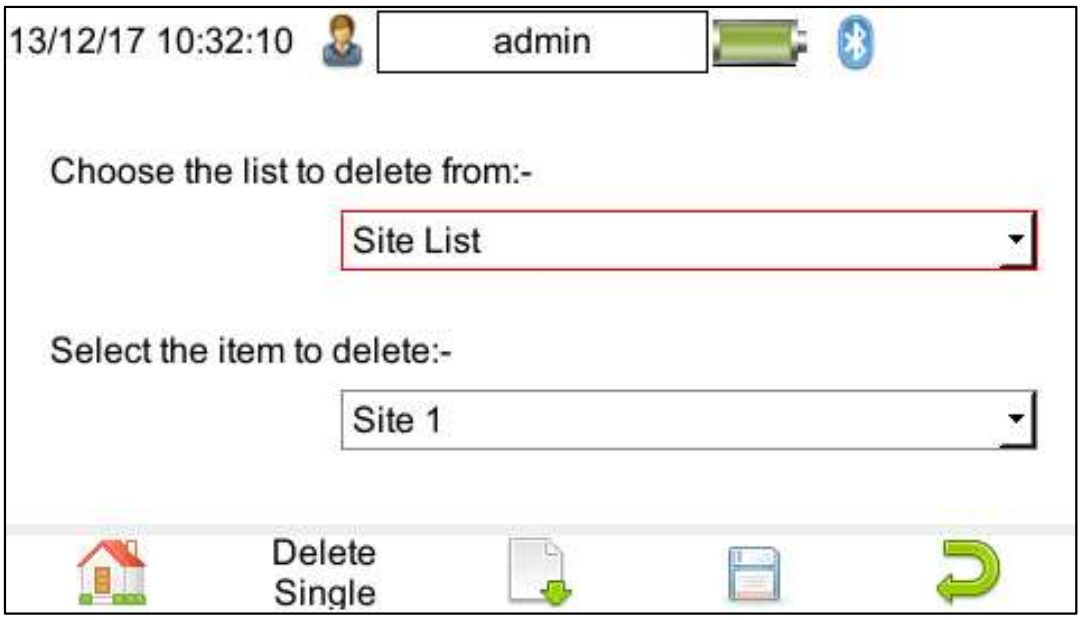
This field is used to set the frequency of the Checkbox reminder to **None**, **Daily**, **Weekly** or **Monthly**.

Comments Line:

Notes / Asset Description / Asset Group / Make / Model / Serial Number / Location / Code / Asset Description (fixed) / Notes (large field) / RFID Data

This allows the field descriptor for each of the four comment lines (text lines) to be changed to show: **Notes, Asset Description, Asset Group, Make, Model, Serial Number, Location, Code, Asset Description (fixed), Notes (large field)** or **RFID Data** as required (note this also needs to be setup in PATGuard).

5.3 User Options / PAT Settings - Options Page 3



Page 3 of the PAT Settings options allows items to be deleted from various lists that exist on the instrument.

Choose the list to delete from:-

Site List / Location List / Comments: Description / Comments: Make / Comments: Model / Comments: Asset Group / Comments: Manufacturer / Custom Test: Test Name / Custom Test: Test Units / Custom Test: Test Results

The keyboard arrow keys, on the instrument, can be used to highlight the list to be deleted, for example "Site List"

Select the item to delete:-

With the correct list highlighted, the item on the list to be deleted can also be highlighted.

To delete the item selected use "Delete Single" (F2), a warning message is displayed confirming the list and item to be deleted.

Note: Default items can be deleted, however, if all items have been deleted the list will revert back to the original default, for example "Site 1".

6 Setting Up Your Ethos 9700 Instrument

6.1 Main Menu Navigation

The **Main Menu** window can be accessed from the **Home Screen**  by selecting  (F4).



There are 8 available options, in the **Main Menu** window, for the Ethos 9700

The functions keys in the **Main Menu** window correspond to the following:

 Use F1 to return to the **Home Screen**.

 Use F4 to accept / select a highlighted option (highlighted using the keyboard arrow keys).

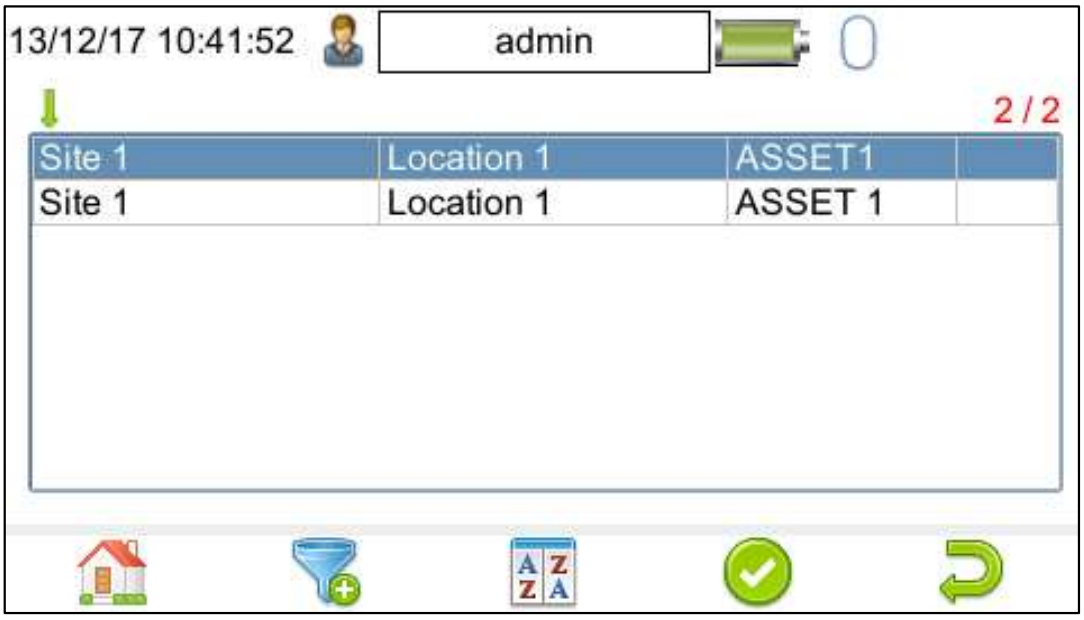
 Use F5 to display support information / firmware version and calibration details.

In addition to using the keyboard arrows keys to highlight an option (and select using F4) options can be selected by pressing the corresponding number on the keyboard. For example, select **1** for "**View Data**".

6.2 Main Menu Window - View Data



By selecting **View Data** (1), in the **Main Menu**, you can view any data that you have saved in the Ethos 9700 by **Site**, **Location** or **Asset ID**.



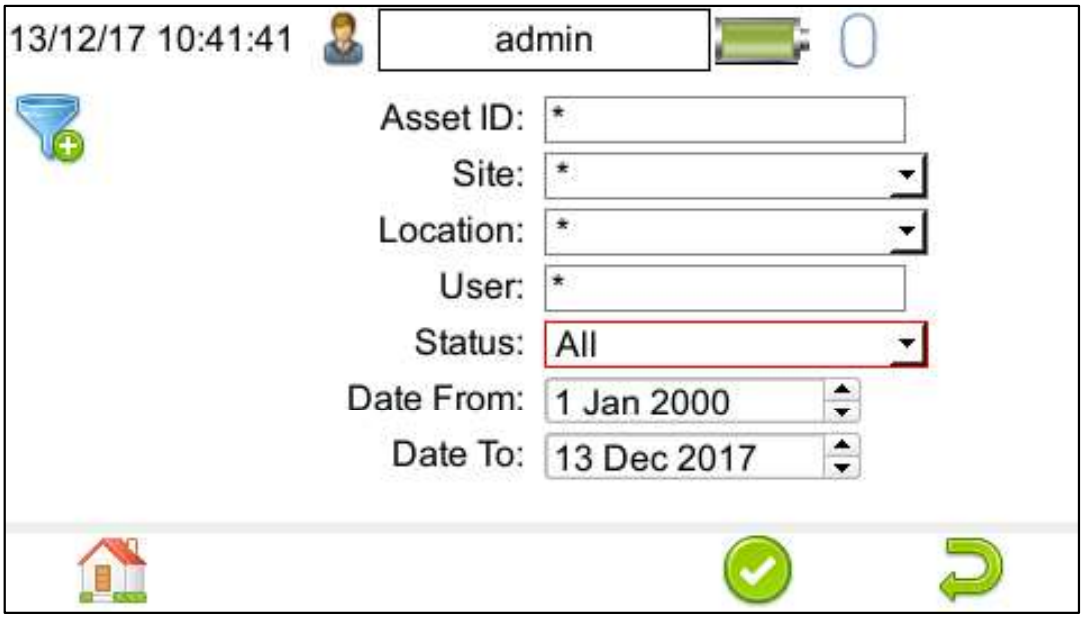
The functions keys in the **View Data** window correspond to the following:



Use F1 to return to the **Home Screen**.

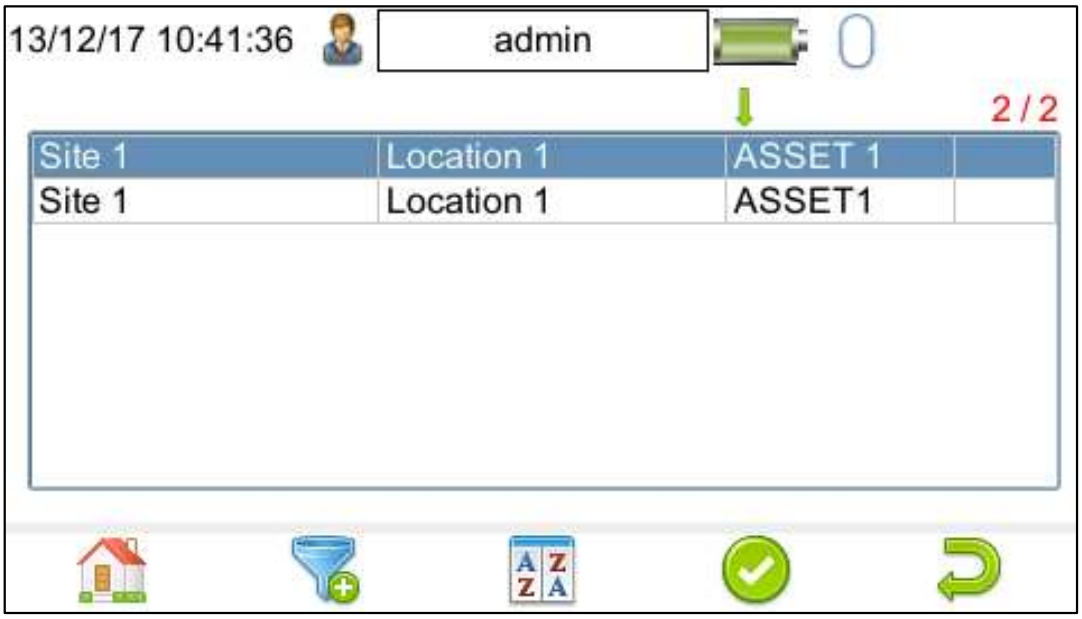


Use F2 to filter records to give a customised view.



Select the filters you wish to apply, using the keyboard arrow keys on the keyboard, and use  (F4) to accept or  (F5) to cancel / return.

Use F3 to sort the records by **Site**, **Location** or **Asset ID** and give a customised view. If the **left** or **right** keyboard arrow keys are selected, in this window, the display will jump **up** or **down** to the next page, respectively.

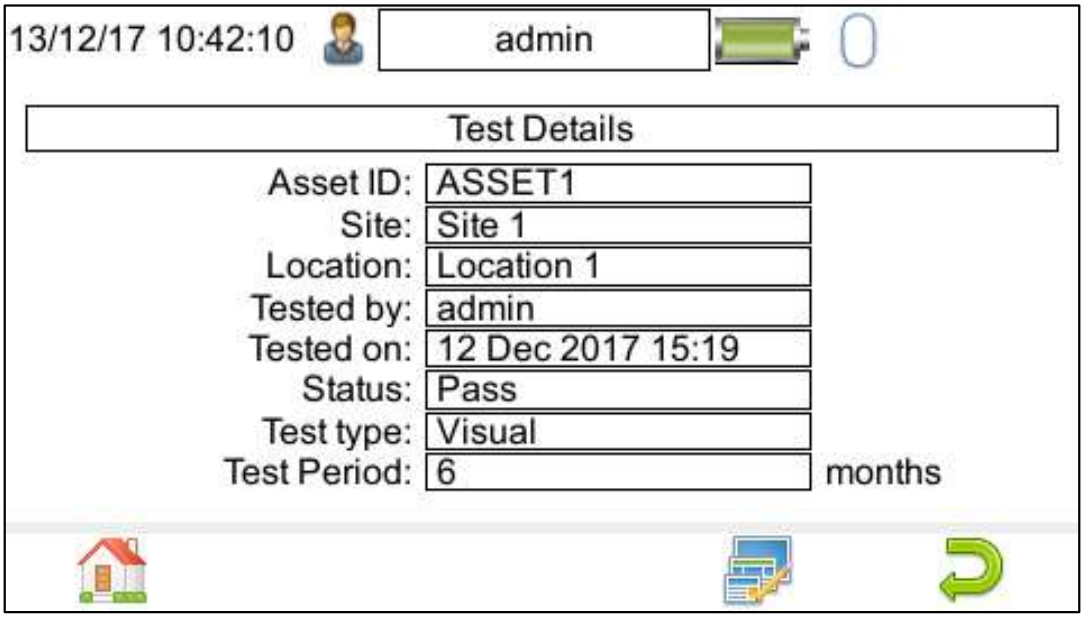


This is the Accept function, use the keyboard arrow keys to highlight an asset and use F4 view any corresponding results.



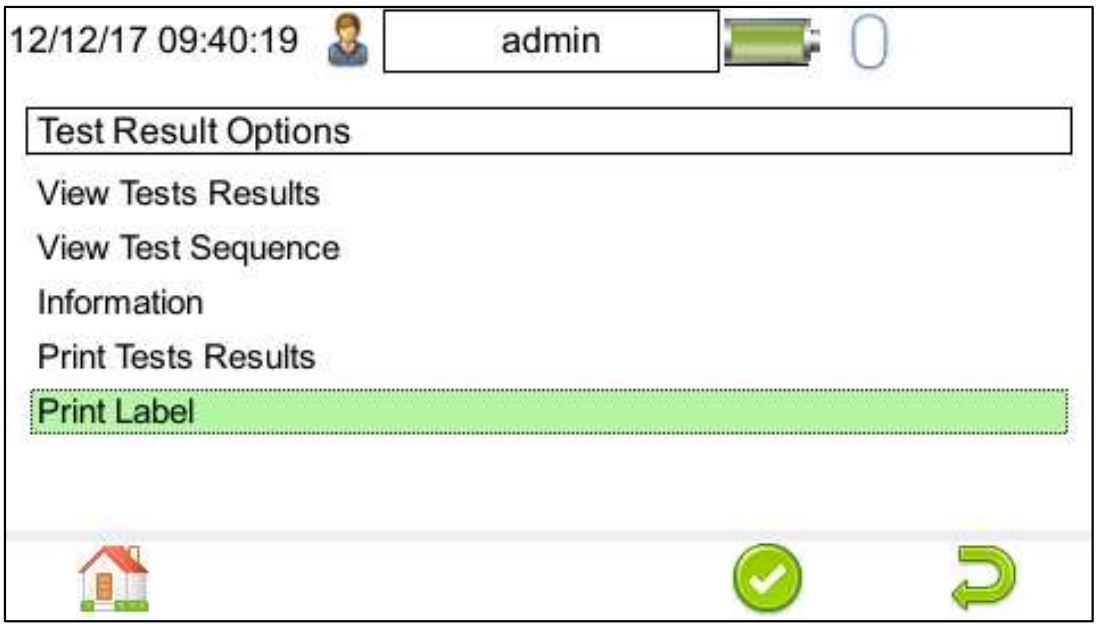
Once in the asset / record you will be given a list of items under that record such as PAT results and JPEG images, depending on what results have been saved against that asset. .

Press (F4), again to open an item. Alternatively, individual items can be deleted using (F3).



When viewing a PAT_results record, use the **Menu** icon  (F4) to access the **Test Results Options** window. In here you will be able to select one of the following:

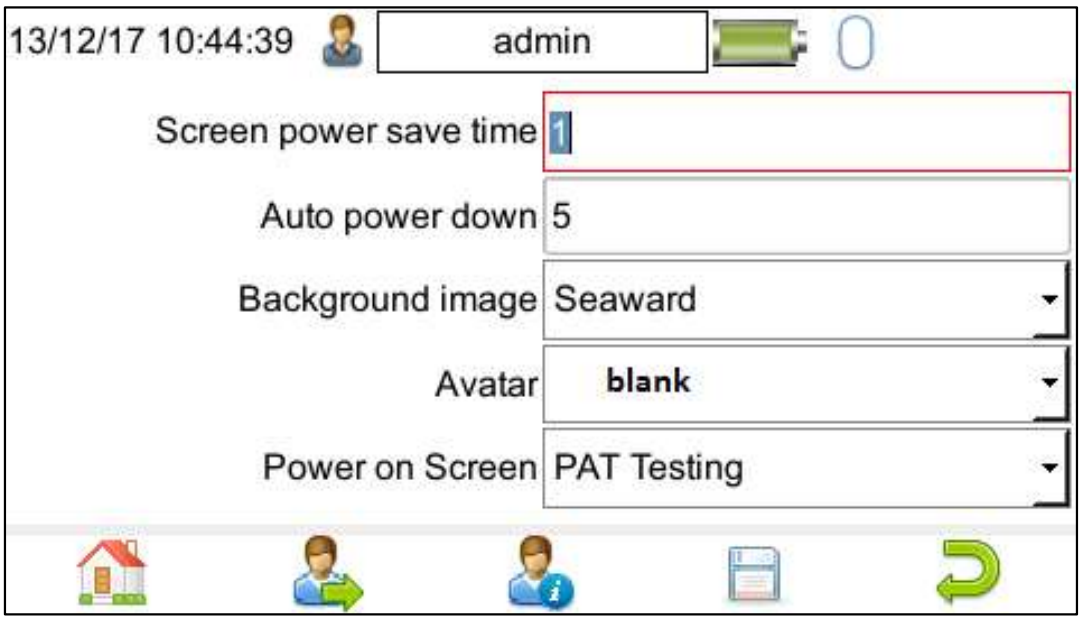
View Test Results	displays the test results on the screen
View Test Sequence	displays the **Test Sequence** used
Information	displays the information in the **Comment Line(s)**
Print Test Results	allows the results to be printed as a list
Print Label	allows the printer to be setup and a label printed



 Use F5 to return to the Main Menu.

6.3 Main Menu Window - User Setup

By selecting **Users** (2), in the **Main Menu**, you can setup new, edit and delete user accounts. Users can alter their own screen power save time, auto power down, background image, avatar (default is **blank**) and power on screen.



The functions keys in the Users window correspond to the following:

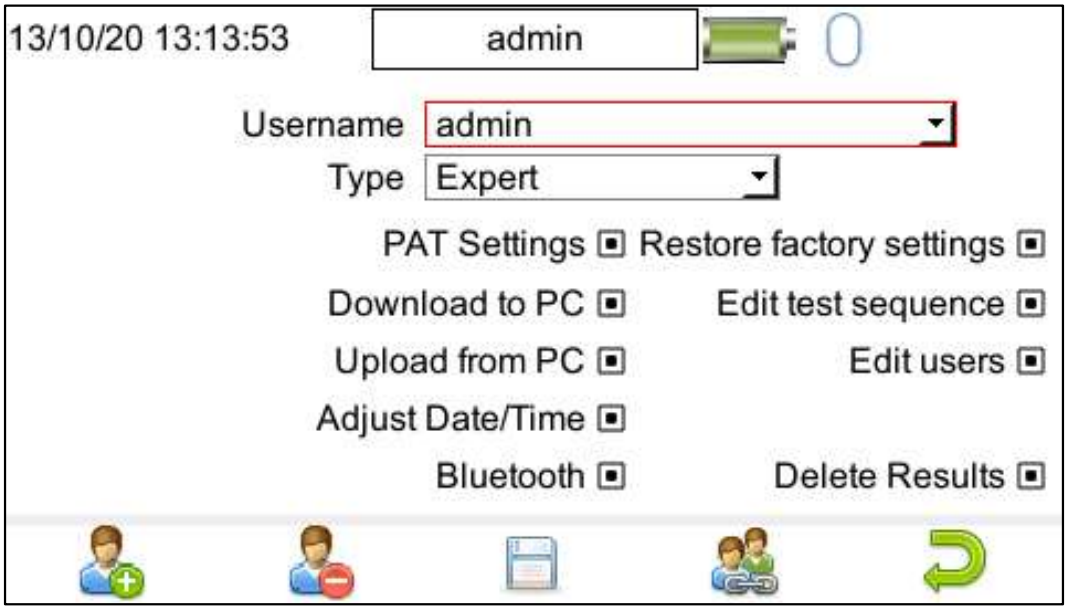
Use F1 to return to the **Home** screen.

Use this button (F2) to **Select a new user**. Select the **User name**, from the dropdown and enter the correct **Password** to change the current user of the tester.



Use this button (F2 in the **Select a new user** window) to change the password for the current user. Enter the **Existing Password**, enter a **New Password** and then **Confirm New Password**.

Use F3 to enter the user privileges menu, this allows users to view their current privileges. Users with the correct privileges will also be able to edit their own and other users privileges by selecting the user they wish to edit from the dropdown.



This is the **New User** button (F1 in **User Privileges** menu). A **New User** can be setup by adding a **Username** and **Password** and selecting **Save** (F3). The **New User** can then be selected in the **Username** field of the **User Privileges** screen. Select the **Type** of user (**Expert** or **Novice**), privileges can be setup by using the Enter Key to check or uncheck, if a privilege is checked, the user has access to that feature or function. To block a feature or function, for example adjusting the Time/Date, uncheck that function before saving (F3). Please note that items not selected, left unchecked, for example adjusting the Time/Date, will be greyed out in certain menus of the instrument.

This is the Delete User button (F2). It will delete whichever **User** is currently selected in the **Username** dropdown. Please note that the admin user cannot be fully deleted.

Press this button (F3) to **Save** changes and return to the previous screen.

This is the **Copy User** function (F4). This will copy the settings and preferences of the current user to a new user account.

Use F5 to return to the **Users** menu.

6.4 Main Menu Window - Connecting Bluetooth Devices



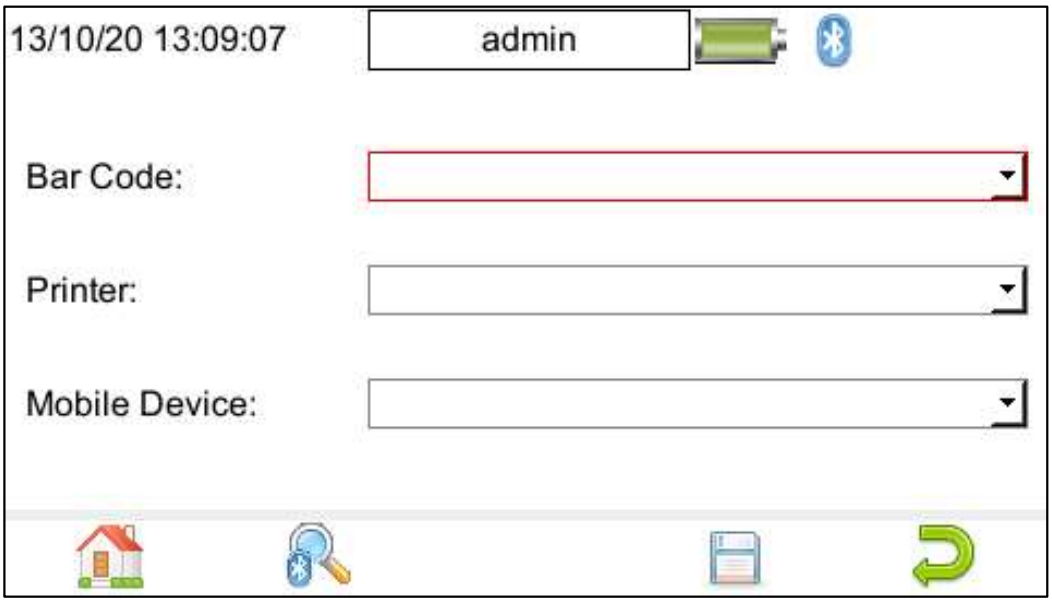
Select this icon (3) to setup your Bluetooth accessories to work with the Ethos 9700. The Ethos 9700 can be connected to Bluetooth accessories including bar code scanners, printers and smart phones

Switch on the Bluetooth device you wish to pair with and ensure it is discoverable.

The functions keys in the Bluetooth window correspond to the following:



Use F1 to return to the **Home** screen.





The Bluetooth Search button (F2) will search the area for Bluetooth discoverable devices and return to the previous menu. You can then use the keyboard arrow keys to select the correct Bluetooth ID from the dropdowns for your **Bar Code** scanner, **Printer** or **Mobile Device**

Select **Bar Code** field and choose your scanner from the list using the keyboard arrow keys.

Select **Printer** field and choose your printer from the list using the keyboard arrow keys.

Select **Mobile Device** field and choose your device from the list using the keyboard arrow keys.

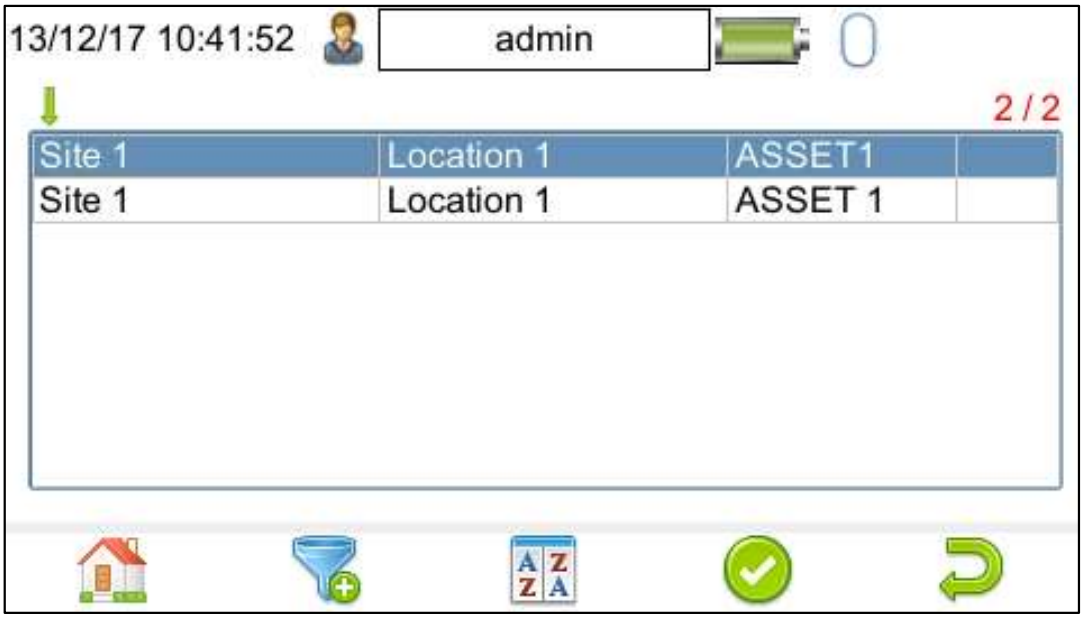


Press this button (F4) to **Save** changes and return to the **Main Menu**.

6.4.1 How to Setup a Printer with your Ethos 9700

(**Note:** You will require PAT test data to be already stored on to the instrument and a printer to have been paired before you attempt the following steps)

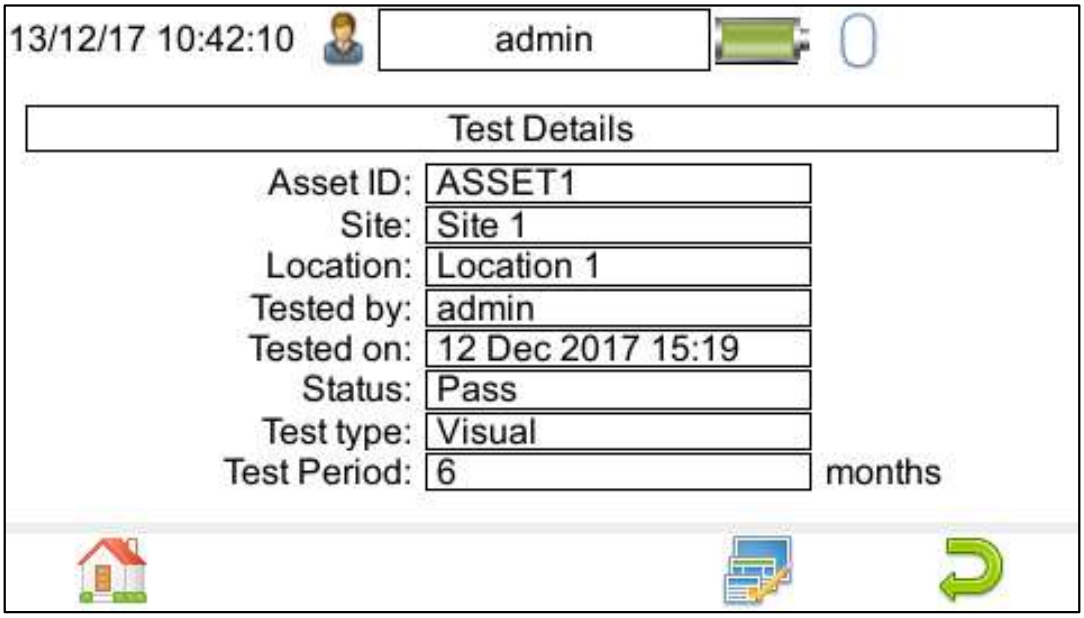
 Select **View Data** (1), in the **Main Menu**, to access previously saved data on the Ethos 9700.



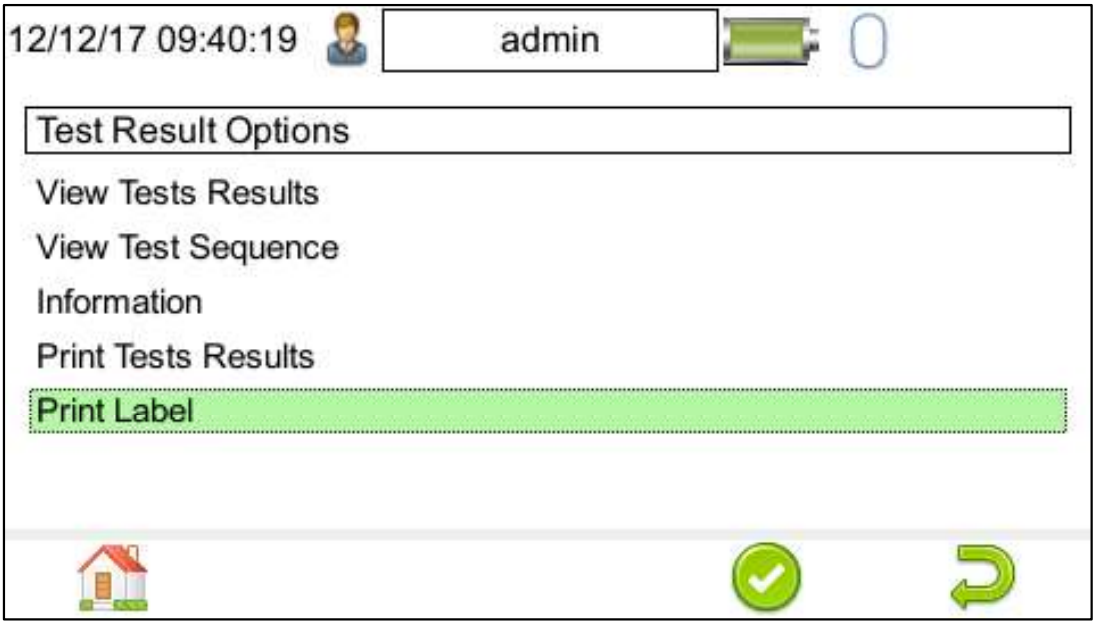
Highlight an asset and use the **Accept** function  (F4) to select this.



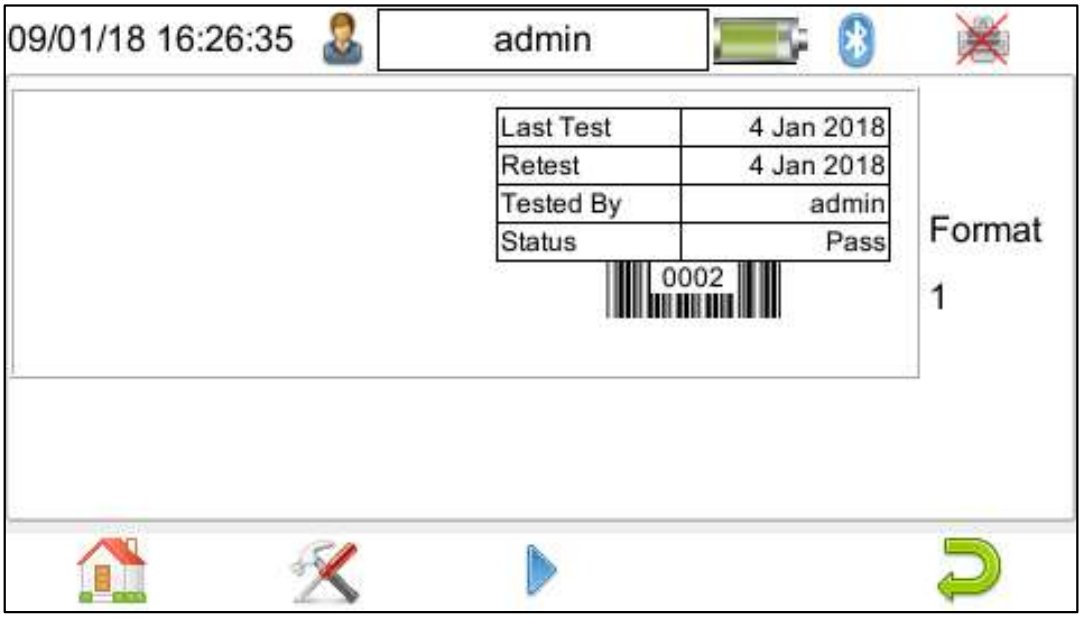
Once in the asset test details page you will be shown a list of items under that record (this could be one or many), highlight a **PAT Results** entry and use  (F4) to **Accept**.



In the **Test Details** window, use the **Menu** icon  (F4) to access the **Test Results Options** window.

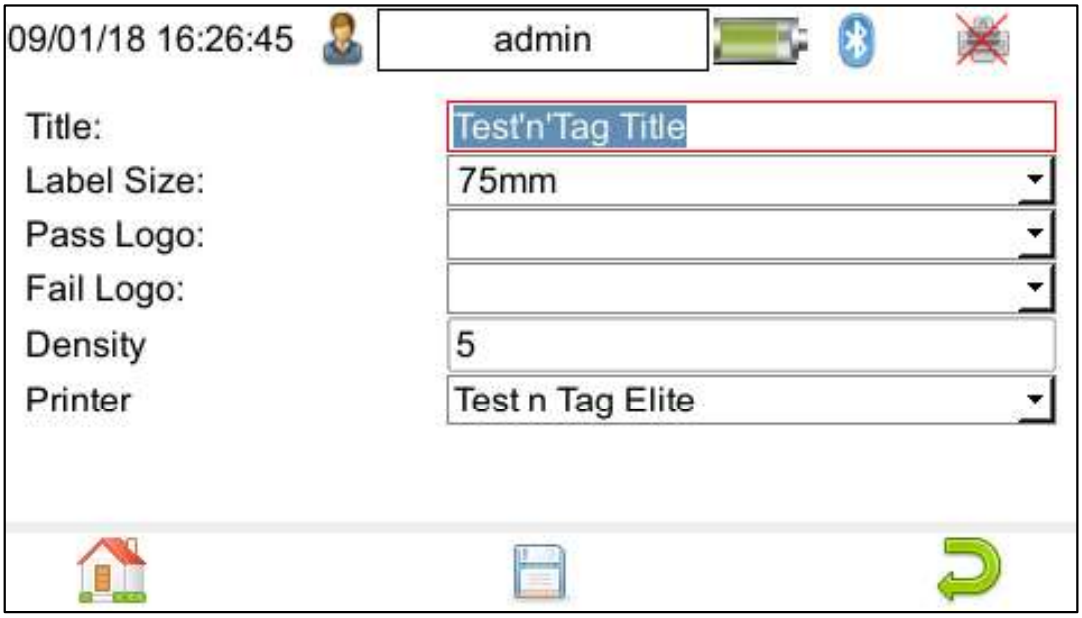


In the **Test Result Options** window, highlight and select **Print Label** using the **Accept** function  (F4), this takes you to a selection window and displays a virtual representation of the label.





To setup the printer and label options select **Tools** (F2), this displays the printer setup menu:



Using the keyboard arrow keys, highlight the bottom field for **Printer** and, from the dropdown, select the Bluetooth printer you paired earlier (**Note:** This will add / remove fields depending upon the selection made)

Using the keyboard arrow keys, select the various options, applicable with the printer / instrument.

Test n Tag Elite 2, options:

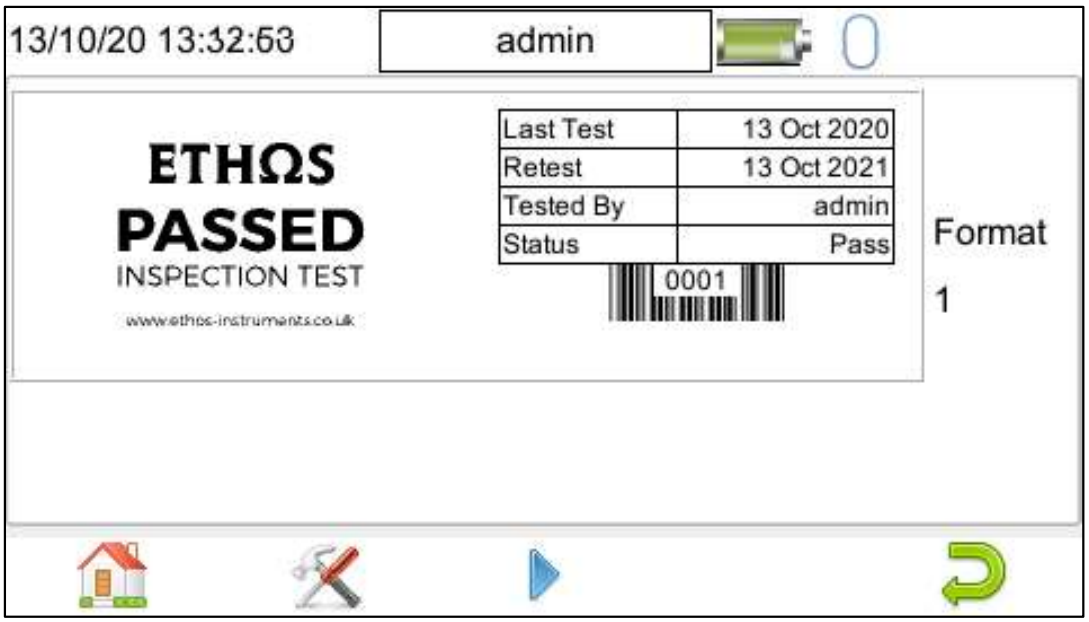
Title:	free text field – to display information on label
Label Size:	75mm
	25mm
	75mm Extra Durable
	25mm Extra Durable
Use QR Code	Choice Yes or No
Pass Logo:	Choice of using the default logo or upload own logo
Fail Logo:	Choice of using the default logo or upload own logo
Density	Print density – default 5
Printer	selection of printer type.

Test n Tag Pro, options:

Title:	free text field – to display information on label
Label Size:	75mm
	25mm
Pass Logo:	Choice of using the default logo or upload own logo
Fail Logo:	Choice of using the default logo or upload own logo
Printer	selection of printer type.

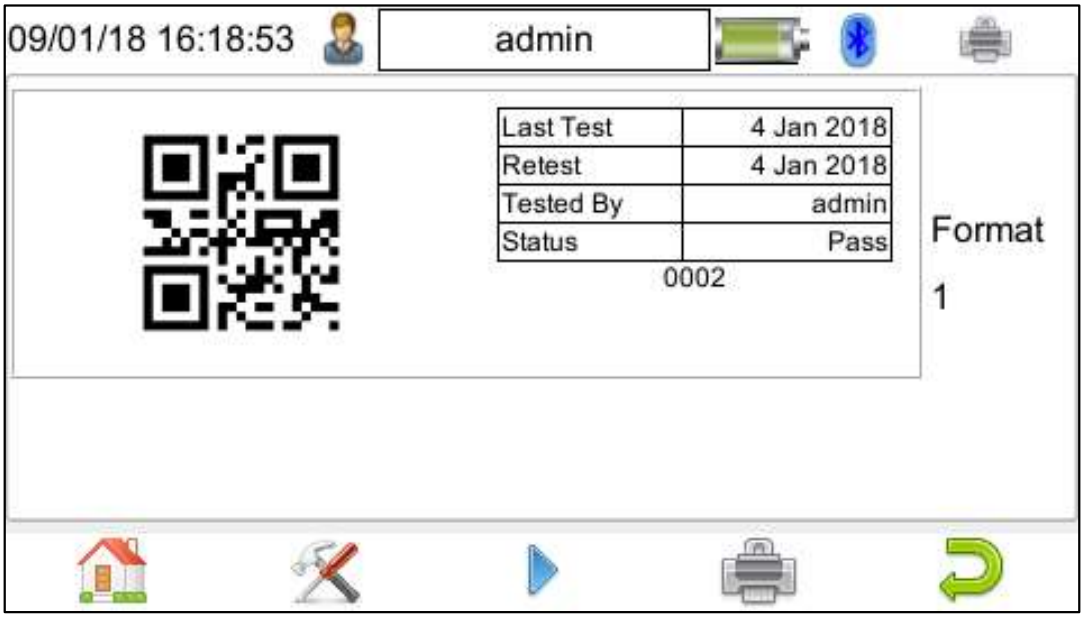
Use  (F3) to **Save** / confirm these changes and return to the virtual printer window or use  (F5) to return to the previous window without saving.

A virtual label image will be displayed, which may show a Company Logo or QR depending upon previous selections, and is now ready to be printed.



Above is an example of virtual label image showing the Ethos example pass logo **example_logo_1.bmp**. Alternative logos can be loaded and used

Alternative versions of the label can be selected using the function key  **F3.**



Above is an example of a virtual label image showing a QR code. Again, alternative versions of the label can be selected using the function key F3.

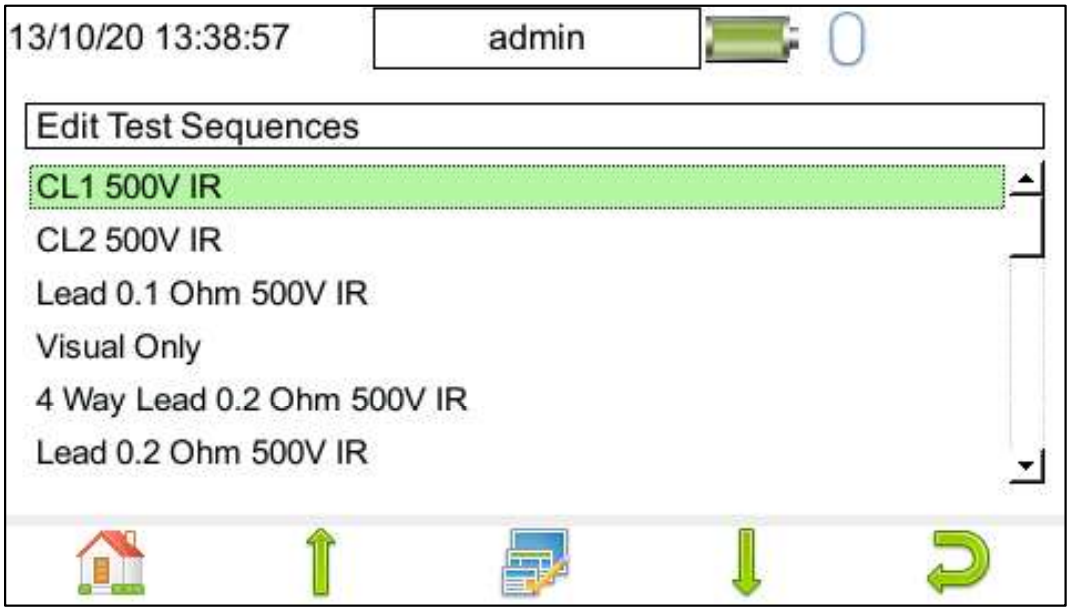
When the Ethos 9700 is connected to the Bluetooth printer it will display a **Printer** icon , using F4 will enable a label to be printed.

6.5 Main Menu Window - Automatic Test Sequence Editor (PAT Edit)

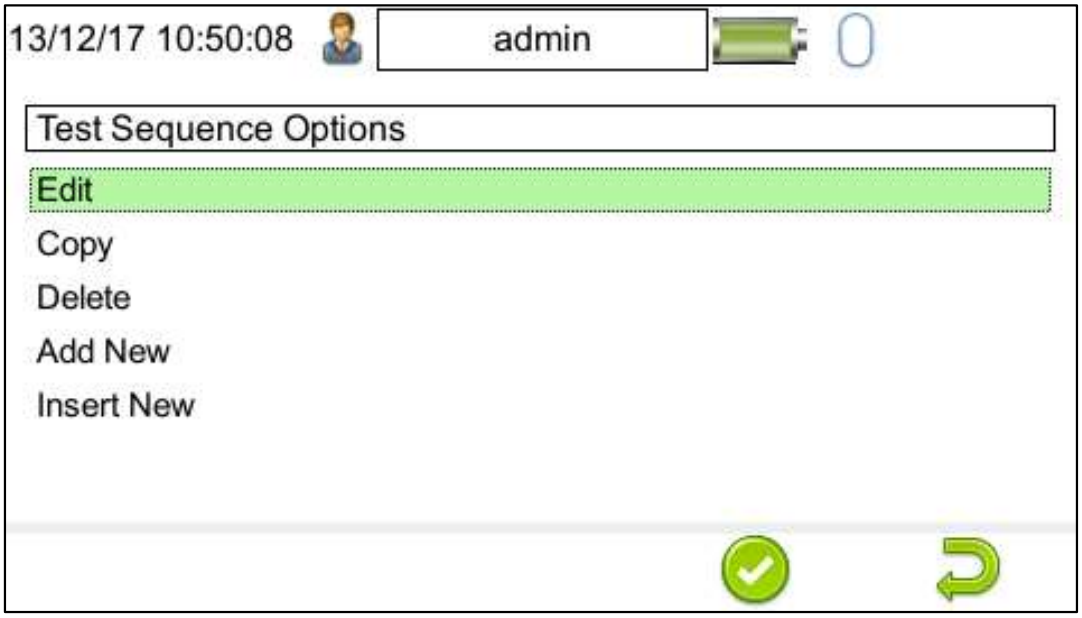
Although the Ethos 9700 comes with a number of pre-defined **Test Sequences** (see section 14.1), you can modify existing or create new test sequences of your own.

Note: the Ethos comes with 25 pre-defined test sequences and the ability to add another 75 custom sequences.

By selecting **PAT Edit** (4), in the **Main Menu**, you can setup new, edit and delete test sequences. This shows a list of all current test sequences.



Altering **Test Sequences**: with a sequence highlighted, press the menu button  (F3) to open the **Test Sequence Options** menu.



Select **Add New** using the keyboard arrow keys and the **Accept** button  (F4). This will add a **New Test Sequence** to the bottom of the test sequence list.

With the **New Test Sequence** highlighted press the menu button  (F3) to open up the **Test Sequence Options** menu.

Edit	edits the highlighted sequence.
Copy	makes a copy of the highlighted test sequence.
Delete	deletes the highlighted test sequence.
Add New	adds a new test sequence to the bottom of the list.
Insert New	adds a new test below the highlighted test sequence.

Select **Edit** using the keyboard arrow keys and the **Accept** button  (F4). This will open up the test sequence for editing.




Add Test function (F2). This will add a new test directly under the currently selected test.


Delete Test function (F3). This will delete the highlighted test from the test sequence.


Edit Test function (F4). This will edit the highlighted test.


Use F5 this to return to the previous window without saving.

To edit the name of the sequence press the **Edit** button  (F4). You can then give it a relevant name and press the save button to store  (F4).

Press the **Add Test** button  (F2) to add a test or inspection to the sequence. Use the keyboard arrow keys to select which test or inspection you would like to add from the list and the pass / fail limits or select the user test option- **Accept** using button  (F4).

Note: If you select the **Custom User Test** option you will then need to give it a name from the dropdown or by free typing into the box. You can then add the units of what you would like to record if relevant and press the save button  (F4) to store.

Repeat until you have added all of the required steps.

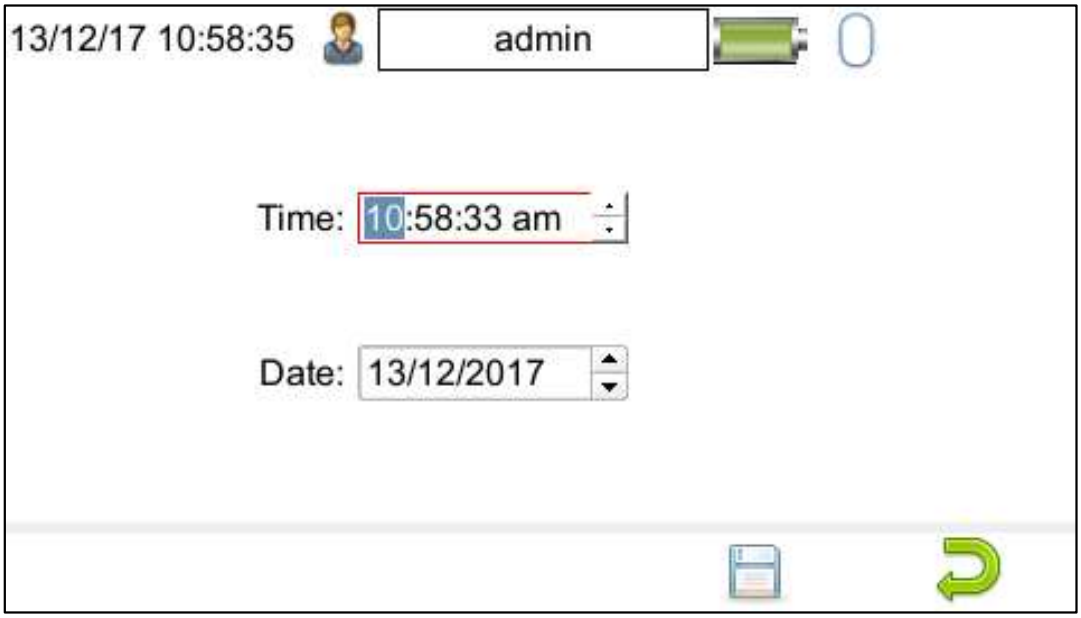
Once complete press the **Back** button  (F5) and then select **Yes** by pressing the **Y** key when asked if you want to save changes.

The newly created **Test Sequence** can be moved up or down using the function keys  (F2) or down  (F4).

Return to the **Home** screen  (F1). Select  (F1) and then Auto test  (F2), your new **Test Sequence** will be available from the dropdown list.

6.6 Main Menu Window – Time and Date Setup

By selecting Time Date (6), in the Main Menu, you can update the time and date stored on the Ethos 9700

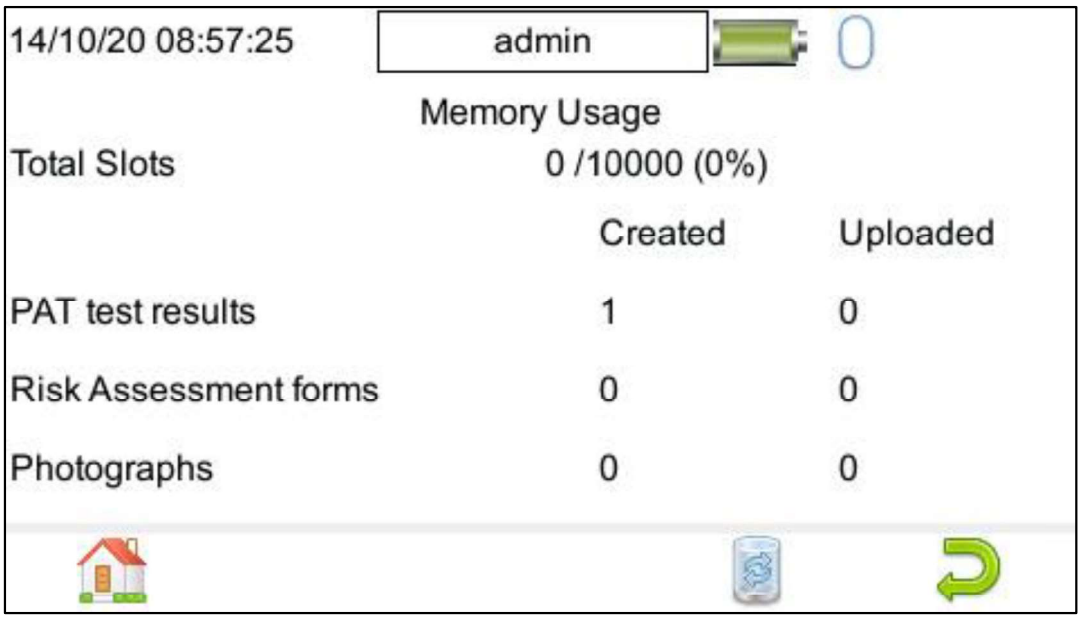


Use the Left / Right keyboard arrow keys to highlight the required parameter and then use the Up / Down keyboard keys to increase or decrease this, respectively.

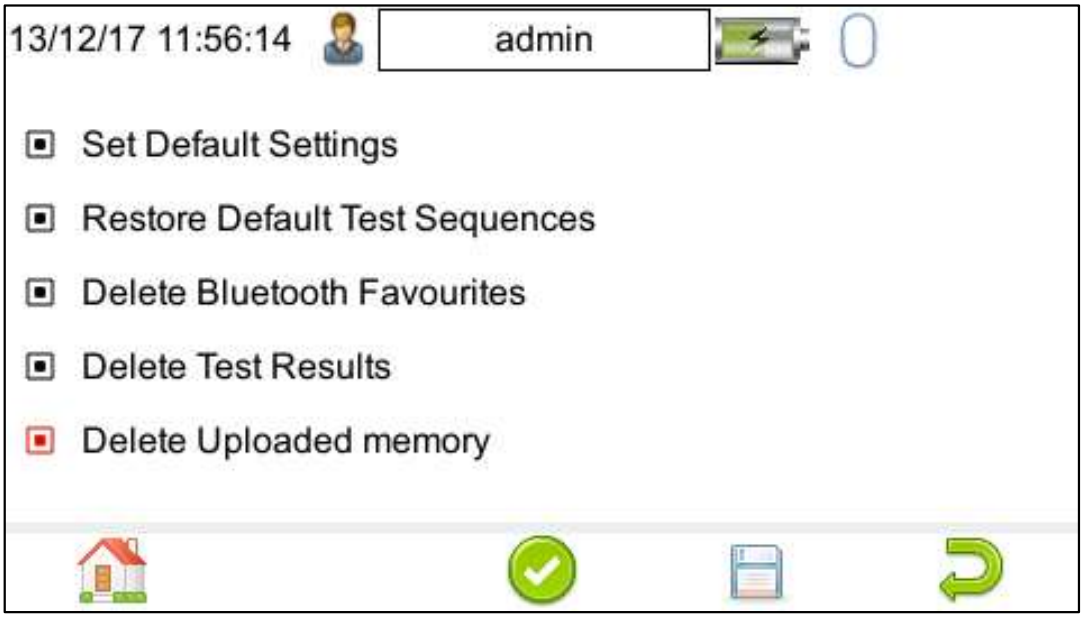
6.7 Main Menu Window – Memory Options

Note: the Memory option can be used to reset factory settings / delete data or clear Bluetooth settings on the Ethos 9700

Select Memory (8 on the Ethos 9700), in the Main Menu to access the Memory Usage window.



Use the function key F4 to access the Memory options window:



The following delete / restore options are available;

Set Default Settings	reset factory User settings
Restore Default Test Sequences	resets factory Test Sequences
Delete Bluetooth Favourites	deletes the Bluetooth favourites
Delete Test Results	deletes tested results
Delete Uploaded Memory	deletes uploaded results

Use the **Up** / **Down** keyboard keys to highlight the red square to the left of the item required to delete / restore.

With the item highlighted now use the **Left** / **Right** keyboard arrow keys to place a smaller square within highlight square.

Alternatively the **Accept** button  (F3) can be used.

When Save  (F4) is selected the following warning message is displayed.



If you are sure you want to continue select Y or use the Return key, finally a confirmation message will be displayed and the delete / restore is complete.

Note: once data has been deleted it **cannot** be recovered.

7 Downloading your Ethos 9700

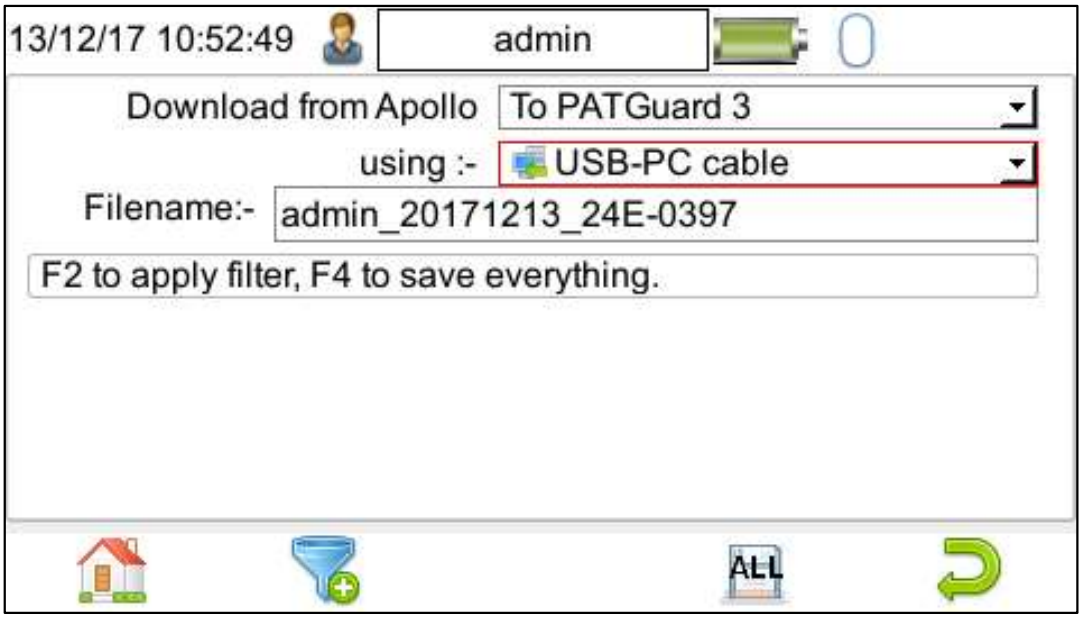
The Ethos 9700 has the ability to download in the following formats:

To PATGuard 3	creates a .gar file for use with PATGuard 3
Clone Data	creates a backup file (.tar) with the current user setting
ASCII	creates a .txt file
To other software	creates a .tar file for use with other software

7.1 Downloading From Your Ethos 9700 Series to PATGuard 3



From the **Main Menu** select **Download** by using the keyboard arrow keys or selecting key number **5**.



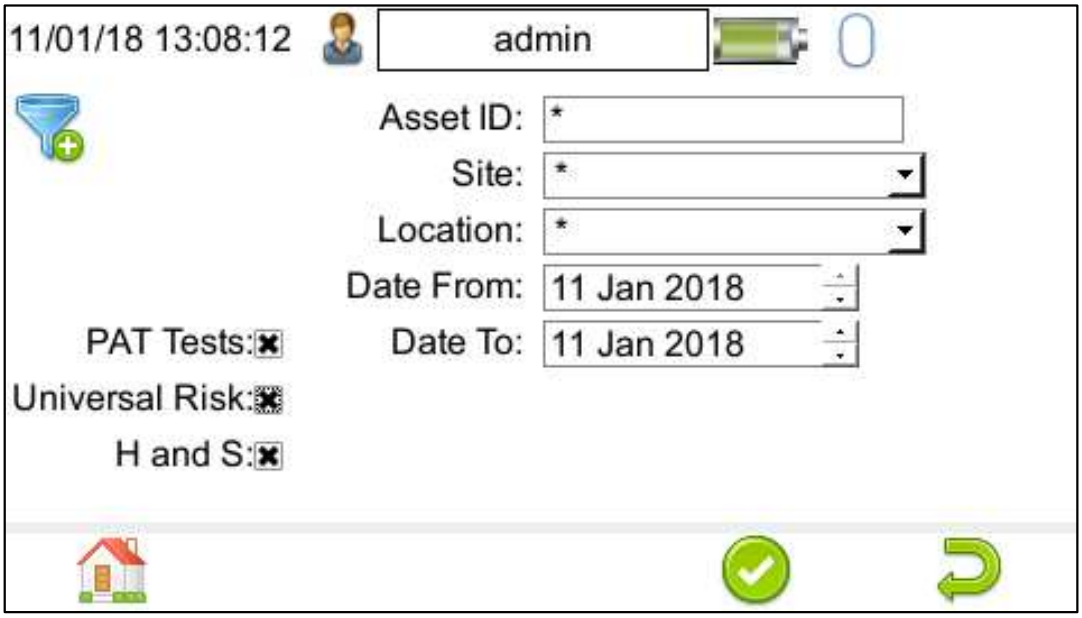
In the **Download from Ethos** field select **To PATGuard 3**, using the keyboard arrow keys to select from the dropdown menu.

In the "using:-" field select "  USB-PC cable"

Add or alter the filename in the **Filename** field.

Connect the USB lead between the PC and Ethos

You now have a choice of either downloading all data  (F4) or to filter by selecting  (F2).



Note: If filtering the data, select the filters you wish to apply using the keyboard arrow keys and when complete press **Accept** using (F4).

The download is complete after the blue bar reaches 100% and either:-

The file appears in an additional Ethos drive (for example Ethos E:) that will now appear on your PC. This can be viewed using **Windows Explorer**

On PATGuard 3 (note, see additional application note / PATGuard 3 help guide for more information**).**

Open PATGuard 3 on your PC. If you already have a database open you are ready to download, if not, you will need to either open a file (database) or create a new database.

In an open PATGuard 3 database select **Instruments** and then **Add a Test Instrument** using the icon – select your instrument name using the dropdown and enter the instrument serial number.

Select **Data Transfer** and **Download from Tester**, if you receive a message **Error: Unable to detect an available com port**, click to accept.

Select your instrument from the dropdown box and

Browse for the *.gar file in the Ethos drive. Select **open**, then **OK** and your downloaded data should appear in the PATGuard 3 database

7.2 Downloading Clone Data from the Ethos 9700

Note: Downloading Clone Data can be used to backup current user settings or to transfer to another Ethos 9700

From the **Main Menu** select **Download** by using the keyboard arrow keys or selecting key number **5**.

In the **Download from Ethos** field select **Clone Data**, using the keyboard arrow keys to select from the dropdown menu.

In the "using:-" field select " USB-PC cable"

Connect to the PC with USB cable or insert USB memory stick when prompted and press save all  (F4).

The Ethos 9700 will beep and display **Data has been saved OK** when the clone file has been transferred.

You will need to save the file to a location on your PC.

8 Uploading your Ethos 9700

The Ethos 9700 has the ability to **Upload** from the following:

From PATGuard 3	uploads a .gar file from PATGuard 3
Printer Logos	uploads custom logo that can be used on the 75mm labels
Clone Data	uploads a backup file (.tar) with the current user setting
Background images	uploads an image that can be used for a background image
List Configuration Data	uploads user defined configuration data

8.1 Uploading from PATGuard 3 to an Ethos 9700

 From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Ethos** field select **From PATGuard 3**, using the keyboard arrow keys to select from the dropdown menu.

In the "using:-" field select "  USB-PC cable". An additional Ethos drive will appear on your PC, as long as a USB cable is connected.

In PATGuard 3, If you have not already, select "Instruments" and "Add Test Instrument" 

In "PAT Testing" 

, select the "Site" or "Location" you wish to upload.

Select the "Data Transfer" tab and "Upload to Tester" 

, select the "Destination" test instrument and correct drive (from the dropdowns –next select the Site & Location you want to upload including the data to be included (where applicable) - press **OK**.

A message saying – "File Saved Successfully" should appear on the PC

On the Ethos the message "Save data to Ethos drive, press F3 when done" – select this using the function key  (F3). The following message will then appear on the Ethos "Valid Data files from PC. Select one of these files and press F4. Select the file containing your uploaded data (*.gar), using the keyboard arrows keys, and save by selecting  (F4)

Note: When selecting one from multiple files please ensure the correct file is highlighted.

A message saying "SSS data uploaded OK" will be shown on the Ethos 9700

Note: The uploaded data is displayed in a different location to the already tested data: From the Ethos 9700 **Home Screen** select **Main Menu** (F4), then select **View Data**, (1) and then the **Filter** button (F2).

In the **Status:** section select **Uploaded** using the keyboard arrow keys and Accept (F4). In this new list all the uploaded data will be displayed.

8.2 Uploading Printer Logos to an Ethos 9700

Note: Create your logo ensuring it is a .bmp (bitmap image), it is black and white (monochrome - 1 bit depth), has maximum image dimensions of 320 pixels by 240 pixels and has a maximum file size of approximately 15,000 Bytes (15KB).

From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Ethos** field select **Printer Logos**, using the keyboard arrow keys to select from the dropdown menu.

Follow a similar method described in the **Uploading from PATGuard 3**

When the file is successfully uploaded **New printer logos installed OK** will appear above the file name.

Return to the **Main Menu** using function key **F5**.

Select **View Data** by selecting number **1**

Note: You will require test data to be already stored on the instrument to do this.

Select an asset using the keyboard arrow keys and **Accept** (F4).

Select a full test result using **F4** again to display the **Test Details** for the asset.

Select menu/options, function key **F4**, to display the **Test Results Option**.

Highlight and select **Print Label** using the keyboard arrow keys and **Accept** (F4).

A virtual image of the current label is shown on the instrument and other label formats can be selected using function key (F3).

To select the logo that was uploaded use the **Tools** function key (F2)

Using the keyboard arrow keys, select either the **Pass Logo**: or **Fail Logo:** field, the uploaded logo should be available for selection. After highlighting the required logo, ensure you select the correct **Printer** and then save this setting by using Save (F3).

Your logo should now appear on the instrument, as a virtual label image, and is ready to be printed. Alternative versions of the label can be selected using the function key (F3).

8.3 Uploading Clone Data to an Ethos 9700

 From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Ethos** field select **Clone Data**, using the keyboard arrow keys to select from the dropdown menu.

Follow a similar method described in the **Uploading from PATGuard 3 to an Ethos 9700**

When the file is successfully uploaded a message stating **Clone Completed OK, now power off** is displayed, switch the Ethos 9700 off and then back on again to complete the upload.

8.4 Uploading Background Images to an Ethos 9700

Note: Create your background image ensuring it is .png format and 478 x 190 pixels (to fill the screen). If you upload a smaller image it will be repeatedly displayed on the screen creating a tiled effect..

 From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Ethos** field select **Background Images**, using the keyboard arrow keys to select from the dropdown menu.

Follow a similar method described in the **Uploading from PATGuard 3**

When the file is successfully uploaded **New Background image installed OK** will appear above the file name.

Return to the **Main Menu** using function key **F5**. 

From the **Main Menu** select **Users**  by selecting number **2**

The current user **Background image** can up changed / updated using the arrow keys to select from the dropdown.

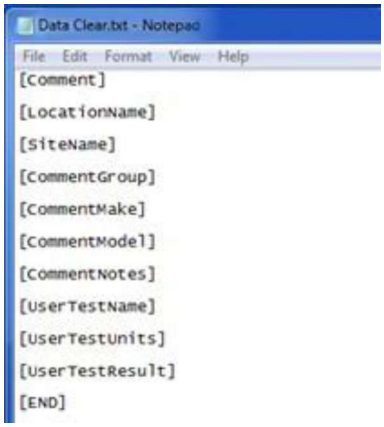
Confirm the **User** changes by selecting **Save**  (F4).

8.5 Uploading List Configuration Data to a Ethos 9700

The Ethos 9700 will allow you to upload a text file containing an updated list of descriptions that can be selected by the instrument. The lists that can be updated are (note; in brackets are the names used by the text file to represent that field and the maximum number of possible entries):

Asset Description	[Comment]	100
Location	[LocationName]	100
Site	[SiteName]	100
Asset Group	[CommentGroup]	100
Make	[CommentMake]	100
Model	[CommentModel]	100
Notes	[CommentNotes]	100
Custom User Test	[UserTestName]	100
Custom User Test Units	[UserTestUnits]	100
Result of Custom User Test	[UserTestResult]	100

The text file used to update the Ethos 9700 must use the names above, and [END] and in the format below (note; this example is shown without data – just the field names). For an example showing data please see below for an example of a populated text file.



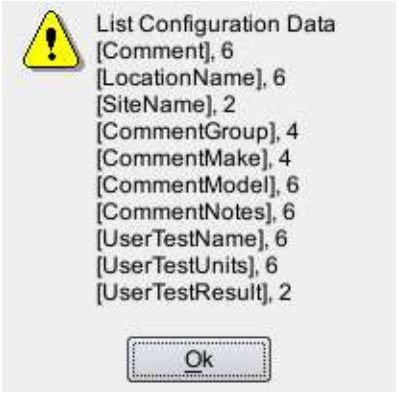


 From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Ethos** field select **List Configuration Data**, using the keyboard arrow keys to select from the dropdown menu.

Follow a similar method described in the **Uploading from PATGuard 3**

The Ethos 9700 will begin the upload and in the **Ethos Configuration Upload** message display the field name and number of each uploaded, for example;



Press **OK** to accept the upload. This uploaded data can then be used from the dropdown selections when setting up / using your Ethos 9700

9 Performing an Electrical Safety Test – Auto Mode

The **Portable Appliance Testing** window can be selected from the **Home Screen**  by selecting PAT (F1).



 Use F1 to return to the **Home Screen.**

 Use F2 to enter the **Automatic PAT** screen.

 Use F3 to enter the **Manual PAT** screen.

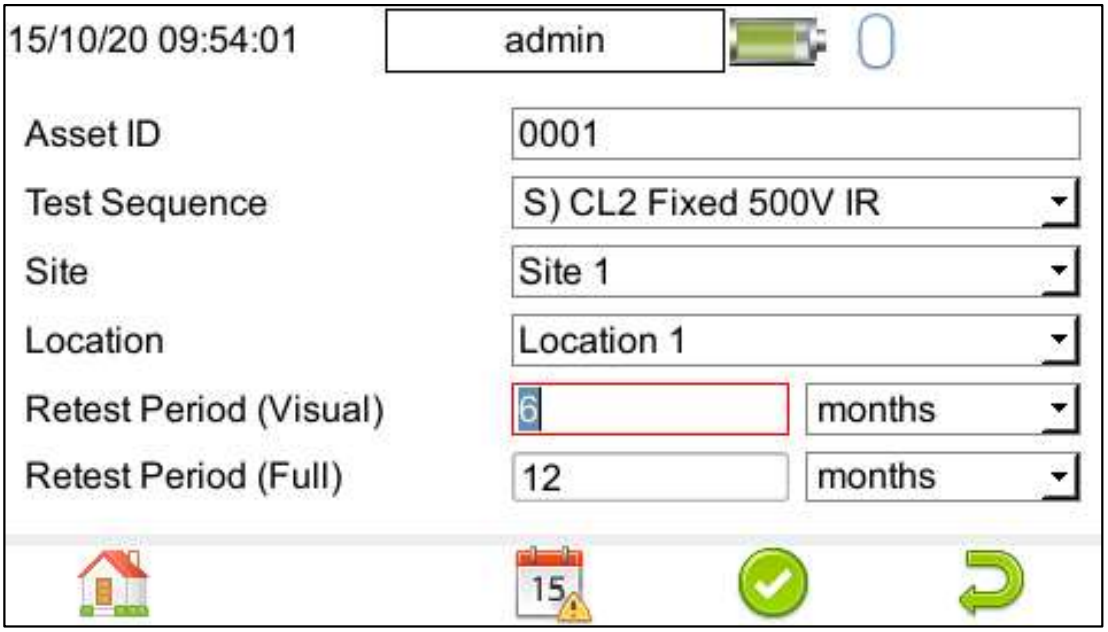
 Use F4 to setup the **User Options** / **PAT Settings** page, see section 6 User Options (PAT Settings)

 F5 is a shortcut to the **View Data** option, use this to view stored **Test Results** or stored **Uploaded Data**, see section 7.2 for more information.

The Ethos 9700 comes with a number of pre-defined **Test Sequences** for details on these see section 17.1). These **Test Sequences** can include any combination of electrical or user defined tests and they are performed on equipment to ensure that it meets the safety requirements outlined in the **IET 5th Edition Code of Practice for In-service Inspection and Testing of Electrical Equipment.**

From the **Home** screen select PAT (F1) to enter the **Portable Appliance Testing** screen.

Select **Auto Mode** by pressing PAT (F2).



Asset ID This is unique identifier for the equipment under test (EUT). This can be entered using the keypad, a barcode scanner (**see section 7.4 on Bluetooth Setup**), QR code scanner or set to automatically increment (**see section 6 PAT Settings**).

Test Sequence This is the name of the pre-defined (or User Defined) **Test Sequence** which will be performed on the equipment. Select the appropriate **Test Sequence** from the dropdown menu using the keyboard arrow keys or by pressing the appropriate letter.

Site This is the **Site** where the equipment is located. You can choose a **Site** from the dropdown using the keyboard arrow keys, enter a new one or use a barcode scanner.

Location This is the **Location** within the site where the equipment is. You can choose a **Location** from the dropdown using the keyboard arrow keys, enter a new one or use a barcode scanner.

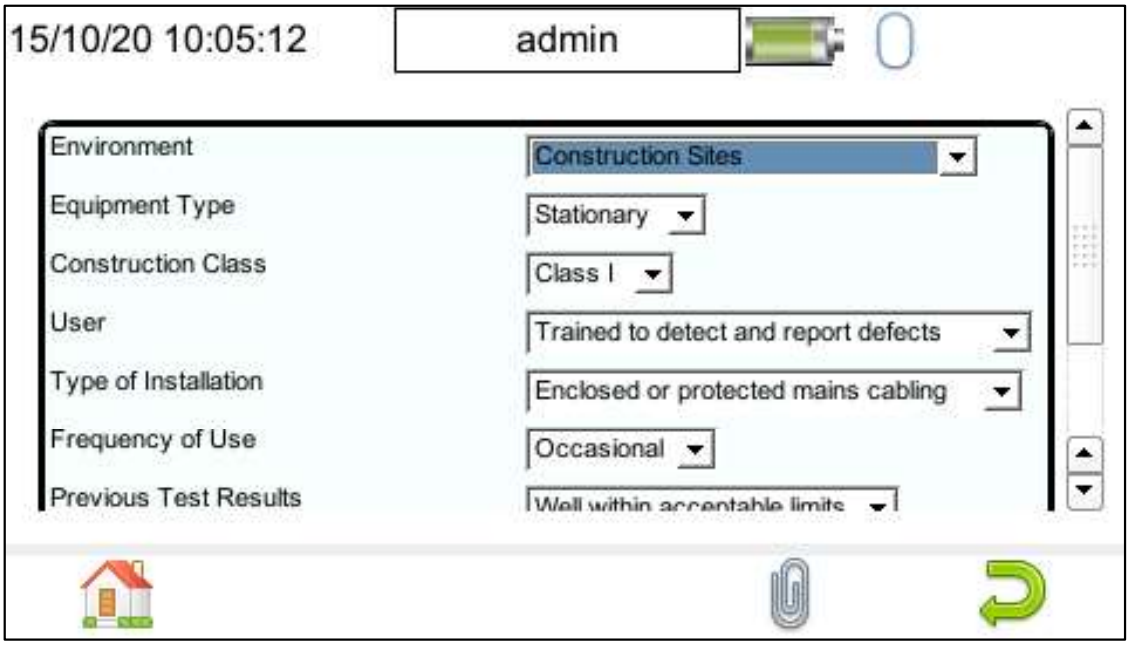
Retest Period (Visual) This is the period, in **months** or **weeks**, in which the equipment should be re-inspected. This can be completed manually or the **Risk Based Retest Period Calculator** can be used.

Retest Period (Full) This is the period, in **months** or **weeks**, in which the equipment should be re-inspected. This can be completed manually or the **Risk Based Retest Period Calculator** can be used.

9.1 Auto Mode – Risk Based Retest Period Calculator

Using the Risk Based Retest Period Calculator.

The **Risk Based Retest Period Calculator** (F3) will allow you to select options, using the keyboard arrow keys, from the dropdowns. It will then determine if the asset is Low or High risk and advise retest periods for Formal Visual and Full Test.



Use F4 to update the Retest Period (Visual) and Retest Period (Full) in **Auto Mode** test window with the **Risk Based Retest Period Calculations.**

Use F5 to return to the **Auto Mode** test window

Once all the all test details such as Asset ID and Test Sequence has been entered and a Risk Assessment has been performed, use **Accept** (F4) to move on to the test and inspection sequence and follow through the on screen instructions.

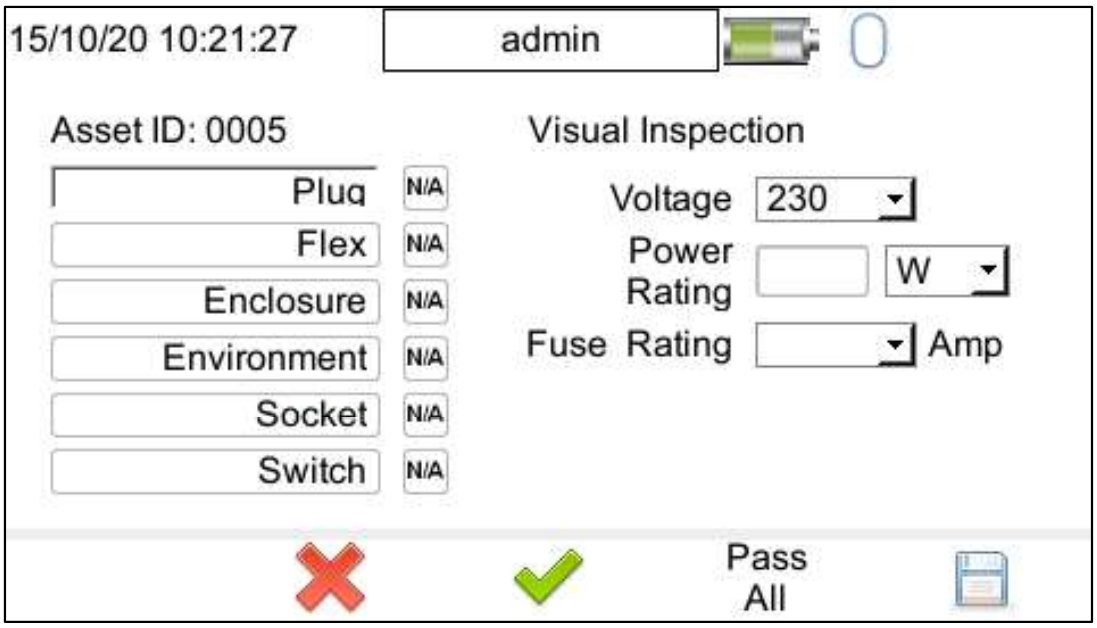
Alternatively, use F5 to return to the **Portable Appliance Testing** window

Once the test is complete you will have the opportunity to enter additional information on the comment text **Line(s)**

Select (F4) to save the record.

9.2 Auto Mode – The Visual Inspection

In general, Auto-Portable Appliance Tests (PAT) will start with a **Visual Inspection**.





This is the **Fail** icon – use the keyboard arrow keys to highlight the parameter and F2 to **Fail** this part of the test.



This is the **Pass** icon – use the keyboard arrow keys to highlight the parameter and F3 to **Pass** this part of the test.

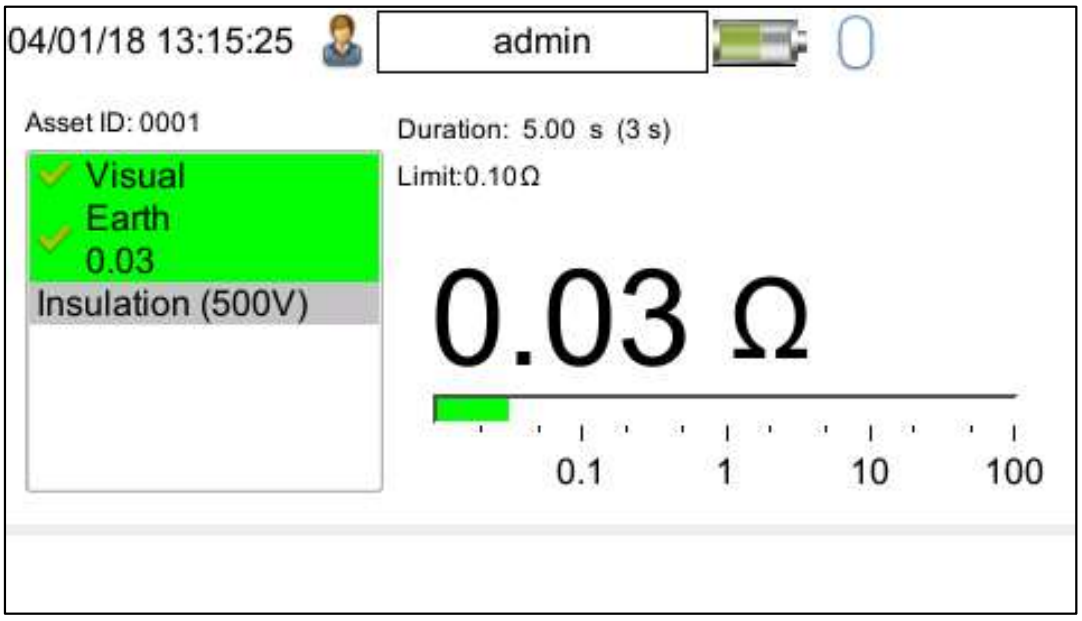
Pass All Use F4 to **Pass All** parameters and move on to the next test in the **Test Sequence**.



Use F5 to **Save** the elements of the **Visual Inspection** performed (using F2 and F3) and move onto the next test in the **Test Sequence**.

9.3 Auto Mode – The Electrical Tests

In general, the second stage of the Auto-Portable Appliance Test (PAT) are the practical electrical tests.



The Ethos has probe detection that will automatically flag up if you do not have the correct probe configuration for the test you are trying to perform.

During the tests you can see the test duration, limit and result on screen, see Getting To Know The User Interface, 4.7.

Should any test with the sequence fail the sequence will be aborted and you will presented with the Notes screen by default but this can be changed, see User Options / PAT Settings, section 5.

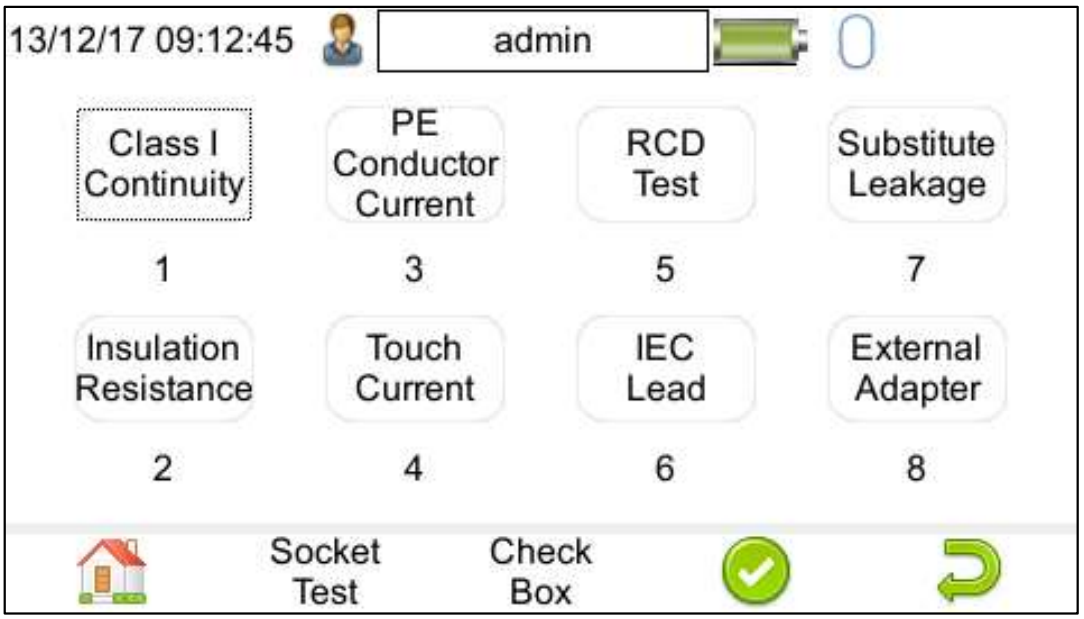
10 Performing an Electrical Safety Test – Manual Mode

The Ethos allows direct access to all of the electrical tests through the **Manual Mode.**

From the **Home** screen select PAT (F1) to enter the **Portable Appliance Testing** screen.

Select **Manual Mode** by pressing PAT (F3).

Select the required test using either the **number keys**, the function keys or the arrow keys and use the **Accept** (F4)



To view / edit / configure the test settings of a **Manual Test**, where appropriate, you can change the test duration, test pass / fail limit or test type / connection. Once the required parameters have been selected use **Tools** (F3) and select **Save** F4.

Ω Null

The test leads can be nulled prior to testing – this applies when performing **Continuity** tests so the resistance of the leads are not included in the final resistance value.

Where appropriate, to perform the test press the green Start button on the instrument.

Always ensure that you have selected the correct test connection method in the test for the probe connections made.

Please refer to **Test Functions**, section 11, for specific information about each test type.

11 Test Functions

11.1 Earth Continuity

Always ensure that the circuit under test is electrically isolated.

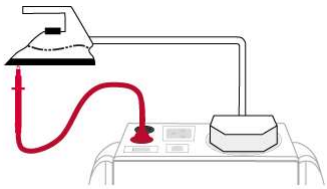
Note that measurements can be adversely affected by parallel resistances of additional circuits or by transient currents.

Connecting a test probe to a hazardous voltage when a point to point measurement is active will result in that voltage being present on the other tests probes.

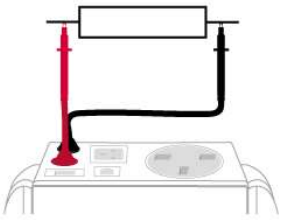
This test is applicable to Class I equipment. This test will measure one of the following:

- resistance between the protective earth terminal in the **Equipment Under Test** (EUT) mains plug and the point at which a single test probe is applied – **CLI EUT Continuity**
- resistance between two test probes – **Point to Point Continuity**
- resistance between the protective earth terminal in an IEC lead mains plug and the protective earth terminal in the IEC connector – **IEC Continuity**

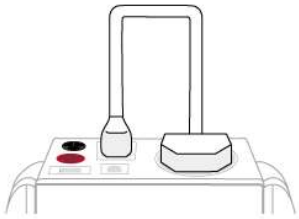
To ensure that the connection is satisfactory and of sufficiently low resistance, the measurement will be displayed in Ohms. There are three possible connection methods for the Earth Continuity test.



CLI EUT Continuity
The test is performed between the red test terminal and the EUT test socket



Point to Point Continuity
This test is performed between the red test terminal and the black test terminal.



IEC Continuity
The test is performed between the EUT test socket and the IEC test socket.

Note that if the Earth continuity is above the pass setting and you choose Restart test you will see a calculator symbol(F3). This opens up the lead length limit calculator, choose the cable size and length from the drop-down menus and it will set a new limit for that test. Accept the new limit F4 and this returns you back to the test screen and the green key restarts the test with the new limit.

Always ensure that you have selected the appropriate test type for the probe connections.

11.1.1 Selecting a Test Type

In **Manual PAT** test mode, the **Earth Continuity** test can be switched between a **Class I EUT continuity** test and a **point to point continuity** test as follows:

Select **Class I Continuity** (1) and press the Tools key  (F3). In the Test Type field, select **EUT Continuity Test** or **Point to Point Continuity Test**.

During automatic sequences, the test type will be as per the test type programmed in the test sequence. Once the correct connections have been made for the selected test type, press the **Start** button. The test will continue until it times out. If we wish to abort the current test press the **Stop** button. Tests on IEC leads, CLI EUTs can be performed using a current of +200mA and/or -200mA. Tests performed in point to point mode are always performed using a current +200mA test. The direction of the test current can be reversed by switching the test probes at the point of connection to the appliance/circuit under test.

Nulling out the Earth Continuity test lead(s) resistance
For a more accurate earth continuity measurement, the resistance of the test lead(s) can be zeroed out. The feature can be used with both the **EUT Continuity** and **Point to Point** measurement modes.

The null facility remains active, even if the Ethos is powered off, until the feature is deactivated by pressing the null key again or the Test Type is changed e.g. if a pair of test leads are nulled for point to point measurement, the null will be deactivated if the Test Type is changed to EUT Continuity test.

Nulling a single test lead
In the manual PAT screen, press the setup key (F3) and change the Test Type to EUT Continuity Test. Press save (F4). Connect the earth continuity test lead to the earth continuity test socket and connect the probe tip to the earth pin of the EUT socket. Press Null (F4) to measure and stored the test lead resistance. When the null feature is active the Null icon will appear on the display.

Nulling both test leads
In the manual PAT screen, press the setup key (F3) and change the **Test Type** to **Point to Point Continuity** Test. Press save (F4). Connect both earth continuity test leads to the earth continuity test sockets and connect the probe tips together using the supplied alligator clips. Press Null (F4) to measure and stored the test lead resistance. When the null feature is active the Null icon will appear on the display.

11.2 Insulation Resistance

Always ensure that the circuit under test is electrically isolated.

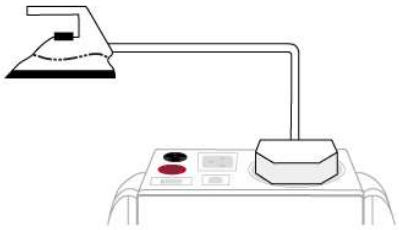
Connecting a test probe to a hazardous voltage when a point to point measurement is active will result in that voltage being present on the other tests probes.

If you receive as message stating there is an error with the insulation resistance test, then this could have occurred during the previous insulation test – this previous test must be repeated.

This test is applicable to **Class I** and **Class II** equipment. This test will measure one of the following:

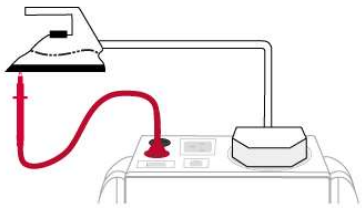
- **Insulation Resistance** between live circuits and the protective earth circuit in the **Equipment Under Test (EUT) – Class I / IEC lead insulation test**
- **Insulation Resistance** between live circuits and a test probe applied to the EUT **– Class II insulation test**
- **Insulation Resistance** between two test probes **– Point to Point Insulation**

To ensure that the test points are adequately insulated from one another, the measurement is displayed in MOhms.
There are three possible connection methods for the Insulation test.

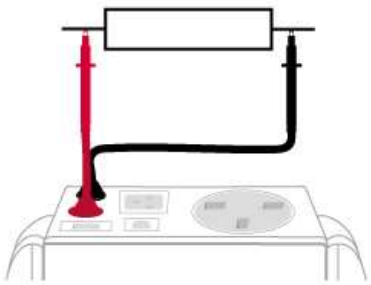


CLI and IEC Insulation Resistance
The test is performed between the EUT test socket live and neutral and the EUT test socket earth pin.

For IEC leads the other end of the lead should be connected into the IEC test socket.



CLII Insulation Resistance
The test is performed between the EUT test socket live and neutral and Red test terminal.



Point to Point Insulation Resistance
The test is performed between the Red and Black test terminals, both the continuity test leads are required for this test.

Always ensure that you have selected the correct test connection method in the test for the probe connections made.

Ensure that the appliance mains switch is in the ON position.

During this test, 250V or 500V D.C. is applied between the two connections points. The 500V D.C. potential will be present across the two probe tips during a Point to Point test.

11.2.1 Selecting a Test Type

In **Manual** PAT test mode, the **Insulation Resistance** test can be switched between a **250V EUT Insulation** test, **500V EUT Insulation** test, **250V Point to Point Insulation** test or **500V Point to Point Insulation** test as follows:

Select **Insulation Resistance** (2) and press the **Tools** key (F3). In the **Test Type** field, select the required test.

During automatic sequences, the test type will be as per the test type programmed in the test sequence.

In **Manual Mode** once the correct connections have been made for the selected test type press the **Start** button, in automatic mode the test will proceed automatically. The test will continue until it times out. If we wish to abort the current test press the **Stop** button. The measurement will be displayed in Mega Ohms.

If a EUT fails the **Insulation Resistance** test then this may be because of internal filtering or an MOV. Retry the test at 250V or substitute the **Insulation Resistance** test with a **Protective Conductor** (class 1) or **Touch Current** test (class 2).

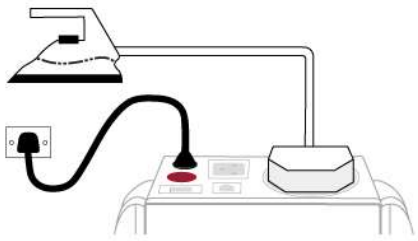
11.3 Protective Earth (PE) Conductor Current (Used on Class 1 Appliances)

Always test the earth continuity and insulation resistance before performing a PE Conductor Current test.

Always check that an appliance with moving parts (e.g. an electric drill) is safely mounted to avoid risk of damage to equipment or personnel.

Avoid prolonged, repeated use at full load (16A) and excessive test duration as this may reduce the life of the unit.

Always ensure that appliance and leads, which include RCD protection, that the RCD is reset at the beginning of the test. Failure to do so may result in incorrect measurements being recorded.



This test is applicable on Class I Equipment.
The Ethos 9700 Series should be connected to a mains supply. The **Equipment Under Test** (EUT) should be connected into the EUT test socket.
In **Manual Mode** once the correct connections have been made for the selected test type press the **Start** button, in Automatic Mode the test will proceed automatically.

The test will continue until it times out. If we wish to abort the current test press the **Stop** button. The measurement will be displayed in mA. Should the test measurement over range then the test will be aborted immediately and a fail will be shown.

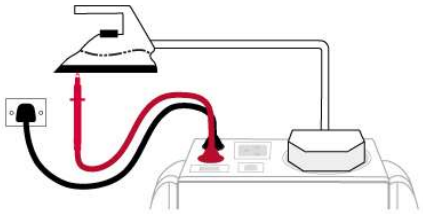
11.4 Touch Current

Warning: Always test the insulation resistance before performing a Touch Current test.

Warning: Always check that an appliance with moving parts (e.g. an electric drill) is safely mounted to avoid risk of damage to equipment or personnel.

Attention: Avoid prolonged, repeated use at full load (16A) and excessive test duration as this may reduce the life of the unit.

Always ensure that appliance and leads, which include RCD protection, that the RCD is reset at the beginning of the test. Failure to do so may result in incorrect measurements being recorded.



This test is applicable on Class I and Class II Equipment.
The Ethos 9700 Series should be connected to a mains supply. The Equipment Under Test (EUT) should be connected into the EUT socket; the red test terminal should be connected to point at which the leakage measurement is required.

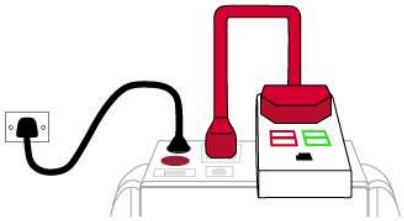
In Manual Mode once the correct connections have been made for the selected test type press the Start button, in automatic mode the test will proceed automatically. The test will continue until it times out. If we wish to abort the current test press the Stop button. The measurement will be displayed in milli Amps.
Should the test measurement over range then the test will be aborted immediately and a fail will be shown

11.5 RCD Trip Time

Voltages between the protective conductor and earth may influence measurements.

Remove all other connections before performing an RCD test.

This test will pass a sinusoidal current of 30mA between the Equipment Under Test (EUT) socket and the IEC socket, and measure the time it takes for the in-line RCD to trip.

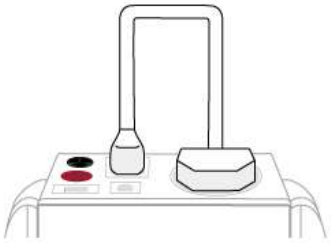


The Ethos 9700 Series should be connected to a mains supply. The RCD should be plugged into the EUT test socket (on the Ethos 9700 Series) and a connection should be made from the RCD mains output to the IEC test socket.

Once the correct connections have been made for the selected test type, press the Start button. The RCD will be powered and you will be prompted to reset the RCD. When you have reset the RCD the Ethos 9700 Series will count down and then perform the RCD test, the RCD trip time will be displayed. The measurement will be displayed in milli seconds.

11.6 IEC Lead / Polarity

The IEC lead input is a test socket and is not intended to be connected directly to mains. Do not connect this input to the mains supply.



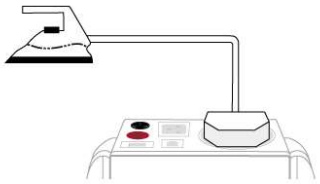
The Polarity test checks the wiring polarity of an IEC lead, the IEC should be plugged into both the **Equipment Under Test** (EUT) socket and IEC test sockets on the Ethos 9700 Series.

This test can be used to test the wiring polarity of extension leads by plugging the supplied test IEC lead into the end of the extension lead to complete the circuit to the IEC tests socket.
In the **Automatic** sequence editor the Polarity can be added to sequence. In the **Manual Mode** the polarity test is already part of a pre-defined test sequence which includes an **Earth Continuity** test, **Insulation resistance** and the **Polarity** test.

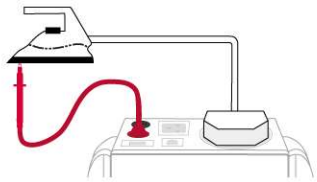
11.7 Substitute (Alternative) Leakage

This test is applicable to **Class I** and **Class II** equipment and it is used to verify that the **Leakage** between the mains conductors of the **Equipment Under Test (EUT)** to the EUT earth pin, or conductive accessible surface of the enclosure, is to a satisfactory low level.

There are two possible connection methods for the **Substitute (Alternative) Leakage** test.



CLI and IEC Substitute (Alternative) Leakage
The test is performed between the EUT test socket live and neutral and the EUT socket earth pin. For IEC leads the other end of the lead should be connected into the IEC test socket.



CLII Substitute (Alternative) Leakage
The test is performed between the EUT socket live and neutral and Red test terminal.

During this test, 40V A.C. is applied between the earth pin and both the live and neutral pins of the appliance mains supply plug.

In **Manual Mode** once the correct connections have been made for the selected test type press the **Start** button, in automatic mode the test will proceed automatically. The test will continue until it times out. If we wish to abort the current test press the **Stop** button. The measurement will be displayed in milli Amps.

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

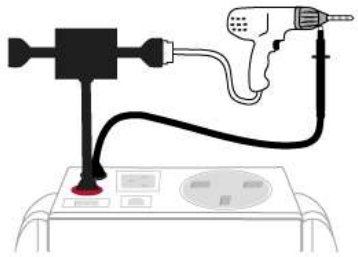
Please note that values for **Substitute (Alternative) Leakage** may differ substantially from that of conventional earth leakage tests because of the way that the test is performed (e.g. it will be affected by the presence of Neutral-to-Earth suppression capacitors). Substitute (alternative) leakage is measured between both line and neutral and the protective earth conductor. It is similar to an **Insulation Resistance** measurement except that a test voltage of 40V/50Hz is used rather than 500V DC. The measured current is then automatically scaled by the tester to show the leakage that would present at mains voltage (i.e. scaled by a factor of 6). If the appliance under test has filter components between both Line-Earth and Neutral-Earth (e.g. as with some washing machines) the **Substitute Alternative) Leakage**

method will measure both leakage currents. The **IET Code of Practise** includes the **Substitute (Alternative) Leakage** method but does not have limit values that take into account the additional leakage path between neutral-earth.

11.8 External Leakage Adaptors

⚠ While using an External Leakage Adaptor the mains supply will be connected to the EUT through this adaptor.

⚠ Ensure that when tests are performed using the External Leakage Adaptor that the Earth Reverse option is set to Off.



The **External Leakage Adaptor** test function, on the Ethos 9700 Series, is intended to be used only in conjunction with the one of Ethos's **External Leakage Adaptors.**

Note; The **External Leakage Adaptor** can perform an **Earth Continuity** and an External Leakage test to the **Equipment Under Test** (EUT).

1. In **User Options / PAT Settings** (see section 5), ensure the **Earth Reverse** option is set to **Off**
2. Connect the **External Leakage Adaptor** to the **Red** test terminal.
3. Connect the **Earth Continuity** probe into the **Black** test terminal.
4. Connect the **Equipment Under Test** (EUT) and **Mains Supply** to the **External Leakage Adaptor**.

Note that connecting both the EUT and mains supply to the **External Leakage Adaptor** will connect the **Mains Supply** to the EUT.

In the **Manual Mode** the External **Earth Continuity** and **External Leakage** tests form part of a **Manual** test sequence.

There is no pre-set **Automatic Test Sequence** on the Ethos 9700 instruments for the **External Leakage Adaptor**, however, the **Automatic Test Sequence Editor / PAT Edit** (see section 6.5), can be used to create a new / edit an existing **Test Sequence** and the **Earth Continuity External** and the **External Adapter Leakage** can be selected to create a Test Sequence.

11.9 Socket Test

⚠ When performing a Socket Test the instrument is subjected to mains voltage.

⚠ The socket test uses the Black Mains lead and Black Test Socket on the Ethos 9700 to perform the test.

⚠ The IEC lead input is a test socket and is not intended to be connected directly to mains. Do not connect this input to the mains supply.

⚠ Remove all other connections before performing an RCD test.

All Ethos 9700 instruments are supplied with a **Black** Mains lead, this lead needs to be plugged into the **Black** test socket on the instrument and to the socket to be tested.

From the Ethos **Home Screen**  select PAT (F1) then select the **Manual PAT** button  (F3).

In the **Manual PAT** window select **Check Box** (F3).

Use the green start  button to perform the **Socket Test.**

Alternatively, there is a pre-set **Auto Test Sequence** on the Ethos 9700 instruments for the **Socket Test**. This allows an inspection and electrical test to be performed on the **Socket** to be tested.

11.10 Checkbox Verification



The Checkbox function will perform a number of electrical tests. Ensure that the onscreen instructions are followed and that you do not touch the checkbox during the active tests.

The Ethos 9700 is supplied with a Checkbox. The Ethos Checkbox can be used to verify that the Ethos 9700 test functions are working correctly. When selecting the Checkbox function follow the onscreen instructions.

From the Ethos **Home Screen**  select PAT (F1) then select the **Manual PAT** button  (F3).

In the **Manual PAT** window select **Check Box** (F3).

You will now see a **Checkbox Setup** message:

> Connect the **Mains Supply** to the **Black** socket on the Ethos 9700
>
> Connect the Red IEC lead between the **Equipment Under Test** (EUT) socket and the IEC on the Ethos 9700 (do not connect the **Checkbox** yet)

An IEC lead and polarity test will be performed to check this lead

You will now see a page requesting you to **Attach checkbox**

> Keep the Red IEC lead connected to the EUT socket on the Ethos 9700 and then connect the **Checkbox**
>
> Connect the Red test lead to the Red test socket on the Ethos 9700 and then connect the probe to the 4mm socket on the **Checkbox**, you may need to use the crocodile clip.
>
> Select  (F3) to confirm (a green tick will appear in the middle of the page) and, if required, then select  (F5) to continue.

The instrument will now perform additional tests in a sequence.

After completion of the above you should see a **Warning** message before the **Mains Supply** is applied – you will need to select the green start  button to perform a mains powered test.

The **Test Sequence** should now be complete and a message displaying the outcome will be displayed – confirm this using the **Return** key (the button above the green start button).

12 Updating your Firmware

To check the firmware version on your Ethos 9700, select **Information**  (F5), from the **Home Screen**  - the instrument and firmware version are displayed at the bottom of the screen.

To check / download the latest version of firmware visit **www.Ethos.com**

Make sure you backup (download) any data on your instrument beforehand. You may want to also clone (download) your settings data so that you can upload these afterwards.

Make sure the Ethos 9700 is switched off. Press and hold the function key 

, then press the **ON** button  to power on the Ethos 9700, keeping the 

key depressed until the updater screen is displayed.



Press **F2** to **Update via PC** Ethos 9700. Connect the USB lead between the PC and the Ethos 9700 and press **F1**, as instructed.

Copy the downloaded firmware file (with extension **.tar.bz2**) to the new Ethos 9700 drive on your PC (for example, Ethos (E:))

Press **F1** to begin the firmware update - when the update is complete the display will show "Update complete, restart the system or press F1 to return to the main menu."

Press and hold the **OFF** button  until the Ethos 9700 powers off. The firmware update, via the PC, is now complete and the Ethos 9700 is ready to use.

13 Electrical Specification

Earth Continuity (RPE)

Output Current (Load 2Ω):	+/- 200mA DC with ZAP
Test Voltage (o/c) :	> 4VDC
Display Range:	0.01Ω to 19.99Ω
Measurement Range:	0.05Ω to 19.99Ω
Resolution:	0.01Ω
Operating Error:	+/-5% + 4 counts
Number of tests as per IEC61557-4:	approx. 1,500.

Insulation Test (IR)

Test Voltages:	500V and 250V DC
Test Current:	1mA minimum for a load of 1kOhm/volt, <2mA into s/c
Test Voltage Accuracy:	+20%, -0%
Display Range:	0.00MΩ to 19.99MΩ
Measurement Range:	0.10MΩ to 19.99MΩ
Resolution:	0.01MΩ
Operating Error:	+/-5% +5 counts (0.10MΩ to 9.99MΩ) +/-10% +5 counts (10.00MΩ to 19.99MΩ)
Number of tests as per IEC61557-2:	approx. 1,500.

Substitute (Alternative) Leakage Test

Test Voltages:	>25Vac <50Vac
Display Range:	0.00mA to 19.99mA
Measurement Range	0.20mA to 19.99mA
Resolution:	0.01mA
Operating Error:	+/-10% +2 digits

Protective Conductor Current (Class 1)

Measurement Method	Differential Leakage Current
Test Voltage:	Supply Voltage, maximum load current 16A
Display Range:	0.01mA to 19.99mA
Measurement Range:	0.25mA to 19.99mA
Resolution:	0.01mA
Operating Error:	+/-5% of reading +/- 3 digits
Frequency Response:	40Hz to 2.5 kHz

Touch Current (Class 2)

Measurement Method	Direct Leakage Current
Test Voltage:	Supply Voltage, maximum load current 16A
Display Range:	0.00mA to 5.0mA
Measurement Range:	0.10mA to 5.0mA
Resolution:	0.01mA
Operating Error:	+/-5% of reading +/- 2 digits
Frequency Response:	DC to 2.5 kHz

Load Power/Current

Test Voltage:	Supply Voltage, maximum load current 16A
Display Range:	0.00 - 16.00A (0.00kVA – 4.00kVA)
Measurement Range:	0.50 - 16.00A (0.50kVA – 4.00kVA)
Resolution:	0.01A
Operating Error:	+/-10% of reading +/- 5 digits

Lead Test

Test Voltage:	5V DC nominal
Test:	Live / Neutral checks for o/c, s/c and crossed polarity

Power Socket Test

Input voltage range:	195V – 253V AC
	Indicates configuration of voltage potential:-
	Line potential phase to earth
	Line potential phase to neutral
	Line potential neutral to earth

RCD Test

Test Voltage:	230V +10%, -15%
Test Current:	30mA / 150mA rms sinusoidal
Test Current Accuracy:	30mA -10% +0%, 150mA +10, -0%
Display Range:	0ms – 2000ms
Measurement Range:	1ms – 2000ms
Resolution:	1ms
Operating Error:	±1ms

External Leakage

Test Voltage:	Connected to External Adapter
Display Range:	0mA - 9.00mA
Measurement Range:	0.25mA - 9.00mA
Resolution:	0.01mA
Operating Error:	+-5%of reading +-2 digits

14 Useful Information

14.1 Factory Set Test Sequences

	Test Name	Visual	Earth Continuity		Insulation			PE Conductor Current	
			Duration (S)	Limit (Ohm)	Duration (S)	Voltage	Limit (M Ohm)	Duration (S)	Limit (mA)
A	CL1 500V IR	Y	5	0.1	2	500	1	N/A	N/A
B	CL2 500V IR	Y	N/A	N/A	2	500	2	N/A	N/A
C	Lead 0.1 Ohm 500v IR	Y	5	0.1	2	500	1	N/A	N/A
D	Visual Only	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	4 Way Lea…Ohm 500V IR	Y	5	0.2	2	500	1	N/A	N/A
F	Lead 0.2 Ohm 500V IR	Y	5	0.2	2	500	1	N/A	N/A
G	Lead 0.3 Ohm 500V IR	Y	5	0.3	2	500	1	N/A	N/A
H	Lead 0.4 Ohm 500V IR	Y	5	0.4	2	500	1	N/A	N/A
I	Lead Surge 0.1 Ohm 250V IR	Y	5	0.1	2	250	1	N/A	N/A
J	CL1 PE CURRENT 250V IR	Y	5	0.1	2	250	1	5	5
K	CL2 Touch Current 250V IR	Y	N/A	N/A	2	250	2	N/A	N/A
L	CL1 Sub Leak 250V IR	Y	5	0.1	2	250	1	N/A	N/A
M	CL2 Sub Leak 250V IR	Y	N/A	N/A	2	250	2	N/A	N/A
N	CL2 FE	Y	5	1	2	250	2	N/A	N/A
O	CL1 0.5 Ohm 500V IR	Y	5	0.5	2	500	1	N/A	N/A
P	CL1 No Ex…arth 500V IR	Y	N/A	N/A	2	500	1	N/A	N/A
Q	CL1 No Ex…arth 250V IR	Y	N/A	N/A	2	250	1	N/A	N/A
R	CL1 Fixed 500V IR	Y	5	0.1	5	500	1	N/A	N/A
S	CL2 Fixed 500V IR	Y	N/A	N/A	5	500	2	N/A	N/A
T	CL1 Fixed 250V IR	Y	5	0.1	5	250	1	N/A	N/A
U	CL2 Fixed 250V IR	Y	N/A	N/A	5	250	2	N/A	N/A
V	30mA RCD …pter 0.1 Ohm	Y	5	0.1	2	250	1	N/A	N/A
W	30mA RCD Lead 0.4 Ohm	Y	5	0.4	2	250	1	N/A	N/A
X	Socket Outlet Check	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Factory Set Test Sequences continued

	Touch Current		Substitute (Alternative Leakage)		Polarity	RCD 0				RCD 180				Voltage
	Duration (S)	Limit (mA)	Duration (S)	Limit (mA)		Current	Limit	Current	Limit	Current	Limit	Current	Limit	Check
A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
G	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
H	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
K	5	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L	N/A	N/A	5	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M	N/A	N/A	5	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V	N/A	N/A	N/A	N/A	N/A	30	200	150	40	30	200	150	40	N/A
W	N/A	N/A	N/A	N/A	N/A	30	200	150	40	30	200	150	40	N/A
X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	YES

14.2 Other Information

Parameter	Default	Min	Maximum
Earth Continuity Pass / Fail limit (Ω)	0.1	0.01	19
Earth Continuity Duration (s)	5	2	30
Insulation Resistance Pass / Fail limit (MΩ)	1	0.1	19
Insulation Resistance Duration (s)	2	2	30
Substitute (Alternative) Leakage Pass / Fail limit (mA)	0.75	0.25	19
Substitute (Alternative) Leakage Duration (s)	5	2	99
IEC Cord Earth Continuity Pass / Fail limit (ohms)	0.1	0.01	19
IEC Cord Insulation Pass / Fail limit (MΩ)	1	0.1	19
PE Conductor Current Pass / Fail limit (mA)	0.75	0.25	19
PE Conductor Current Duration (s)	5	2	240
Touch Current Pass / Fail limit (mA)	0.25	0.25	3.40
Touch Current Duration (s)	5	2	30
External Adapter Continuity (Ω)	0.1	0.01	19
External Adapter Leakage (mA)	0.75	0.25	9
External Adapter Duration (s)	2	2	30
RCD 30mA trip time (ms)	200	1	2000
RCD 150mA trip time (ms)	40	1	40
Number of Tests in a Test Sequence		1	60
Characters in a Test Sequence Name		1	30
Characters in a User Test name		1	40
Characters in a User Test Unit		1	12
Total number of Test Sequences			100
Test Results (Typical)			10000
Sites			100
Characters in Site name		1	15
Locations			100
Characters in Location name		1	15
Number of User Accounts (Including Admin)			50
Characters in User name		1	15
Comments List (Asset Description)			100
Comments List (Other Descriptions)			100
Characters in a Comment			25
Characters in Asset ID		1	15
Items in Custom Inspection Form		1	12
Characters in Inspection Form Item		1	20
Barcode, Standard Label Formats (25 and 75mm)			6
Barcode, Extra Durable Label Formats (25 and 75mm)			6
QR Code, Standard Label Formats (75mm only)			6
QR Code, Extra Durable Label Formats (75mm only)			6
RFID Reader (Comments Line Entry Only)			N/A

15 Environmental Conditions

The Ethos has been designed to perform tests and measurements in a dry environment.

- Maximum barometric elevation for making measurements is 2000M.
- Pollution degree 2 according to IEC 60529.
- Electromagnetic compatibility (EMC). Interference immunity and emitted interference conforming to IEC 61326-1.
- Operating temperature range of 0 to 40 degrees C, without moisture condensation.
- Operating Altitude 0 to 2000 metres.

16 Maintenance

16.1 Securing the Ethos 9700

Under certain conditions safe operation of the Ethos can no longer be assumed:

- Visible damage of the instrument case.
- Incorrect measurement results.
- Recognisable abuse to the instrument due to prolonged storage under improper conditions.
- Recognisable abuse to the instrument due to extraordinary transportation stress.

In these cases the Ethos should be immediately switched off, disconnected from any test and measurement function and secured to prevent any further use.

16.2 Cleaning the Ethos 9700

Clean the external case of the Ethos 9700 with a dry clean cloth.

- Avoid using solvents and abrasive scouring agents to clean the external case of the Ethos 9700.

17 Service and Calibration.

To maintain the specified accuracy of the measurement results, the instrument must be recalibrated at regular intervals by either the manufacturer or an authorised Ethos Service Agent. We recommend a recalibration period of one year.

Should the Ethos 9700 become faulty please secure the instrument so that is can longer be used. Ship the Ethos 9700 back to an Ethos authorised dealer.

For help or advice on Service and Calibration contact:

Ethos Test Instruments
Unit 12
Access 18
Bristol
BS11 8HT
United Kingdom
Tel: 0117 923 5375
Email: enquiries.ethos@adivision.co.uk

17.1 Calibration Statement

The Ethos 9700 is fully calibrated and found to be within the specified performance and accuracy at the time of production. The Ethos Group provides its products through a variety of channels; therefore it may be possible that the calibration date on the provided certificate may not represent the actual date of first use.

Experience has indicated that the calibration of this instrument is not affected by storage prior to receipt by the user. We therefore recommend that the recalibration period be based on a 12 month interval from the first date the unit is placed in to service.

For information on service or calibration please go to the link below.

Email: enquiries.ethos@adivision.co.uk

18 Online Resources

INFORMATION & MANUAL DOWNLOAD

For more information about your Ethos and for a downloadable version of the operational manual please got to
enquiries.ethos@adivision.co.uk

SOFTWARE DOWNLOAD

To download the software supporting the Ethos 9700, please go to
enquiries.ethos@adivision.co.uk

REGISTER YOUR ETHOS 9700 NOW

To register and activate your Apollo Plus please go to
enquiries.ethos@adivision.co.uk

Manual Version 1