SEAWARD

ELECTRICAL SAFETY TESTING
& MEASURING.

APOLLO+ SERIES

USER MANUAL

seaward.com

TESTED. TRUSTED... WORLDWIDE

LIMITED WARRANTY & LIMITATION OF LIABILITY

SEAWARD Electronic Limited 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:

- Any normal wear and tear.
- 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 (ii) repaired with unauthorised spare parts;
- 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.

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Due to a policy of continuous development SEAWARD Electronic Limited 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.

Table of Contents

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 Apollo+ 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.

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2 Safety Notes

This Apollo 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 Apollo+ 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 Apollo+ to electric circuits with nominal voltage greater than CAT II 300 V AC/DC.

The Apollo+ 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 Apollo+ Series.

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

The Apollo+ 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 Apollo+ 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 Apollo+ in an explosive gas or dust environment.

The Apollo+ has been designed to make measurements in a dry environment.

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

Do not open the Apollo+, no user serviceable parts.

To avoid losing data or damaging your Apollo+, 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. Seaward cannot guarantee compatibility with all USB memory sticks. If you encounter problems using a particular USB memory stick with your Apollo+, please try using a different brand and/or size of USB memory stick before contacting technical support.

Where safe operation of the Apollo+ 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 Using Apollo+ Series Firmware on Older Apollo Instruments.

This instruction manual has been produced for firmware installed on the latest Apollo+ Series of instruments. However, the Apollo+ Series firmware can be used on older Apollo Series instruments, for example:

Apollo 600+ firmware can be used on the Apollo 600+ and Apollo 600.

Apollo 500+ firmware can be used on the Apollo 500+ and Apollo 500.

Apollo 400+ firmware can be used on the Apollo 400+ and Apollo 400.

Please note there are some differences in the hardware versions of the Apollo+ Series and also previous Apollo versions, for example the external battery and increased touch current range, however, the Apollo+ Series firmware can still be used on the original Apollo instruments.

For instructions on how to update the firmware on your Apollo, please see section 15.

4 Accessories

4.1 Standard Apollo+ Contents (What's in the Box)

		600+	500+	400+
1.	Apollo+ Instrument	x1	x1	x1
2.	Professional Carry Case	x1	x1	–
3.	Test Lead 1.2m with Alligator Clip, Red	x1	x1	x1
4.	Test Lead 1.2m with Alligator Clip, Black	x1	x1	–
5.	IEC Extension Lead, 0.5m	x1	x1	x1
6.	Black Mains Lead	x1	x1	x1
7.	USB Download Lead	x1	x1	x1
8.	Apollo+ Check Box	x1	x1	–
9.	Calibration Certificate	x1	x1	x1
10.	Quick Start Guide	x1	x1	x1

4.2 Part Numbers

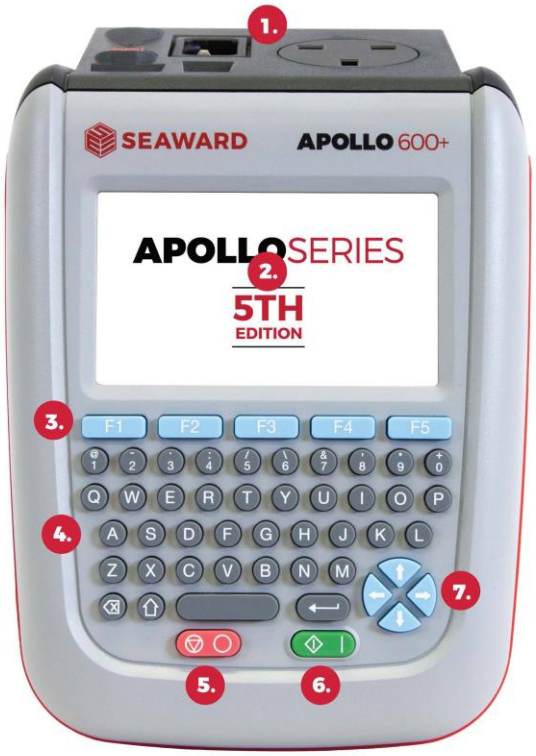
Instrument Only	
Apollo 600+	380A926
Apollo 500+	380A928
Apollo 400+	380A930
Accessory Kits without Instrument	
Elite Accessory Bundle (includes Test n Tag Elite 2 Printer, Bluetooth Elite 2D Scanner, 2x Elite label 25mm, 2x Elite label 75mm, Apollo Kit carry case, 110V test adaptor.	380A9912
Pro Accessory Bundle (includes: Test n Tag Pro Printer, Bluetooth Elite 1D Scanner, 2x Pro labels 25mm, 2x Pro labels 75mm, Apollo Kit carry case, 110V test adaptor.	380A9911
Supplied with Instrument	
Apollo 600+ Elite Kit	380A9893
Apollo 600+ Elite Kit with 1 year PATGuard 3 software	380A9894
Apollo 500+ Elite Kit	380A9899
Apollo 500+ Elite Kit with 1 year PATGuard 3 software	380A9900
Apollo 400+ Elite Kit	380A9906
Apollo 400+ Elite Kit with 1 year PATGuard 3 software	380A9907
Apollo 600+ Pro Kit	380A9890
Apollo 600+ Pro Kit with 1 year PATGuard 3 software	380A9891
Apollo 500+ Pro Kit	380A9896
Apollo 500+ Pro Kit with 1 year PATGuard 3 software	380A9897
Apollo 400+ Pro Kit	380A9902
Apollo 400+ Pro Kit with 1 year PATGuard 3 software	380A9903
PATGuard 3 Elite 1 Year Card:	400A910
PATGuard 3 Elite Outright Purchase	400A917
PATGuard 3 Software, download 30 day free trial at	www.seaward.com/PATGuard3

4.3 Optional Accessories / Replacement Parts

Test n Tag Elite 2 Bluetooth printer	339A989
Test n Tag Elite 2 Durable Label Rolls (52x74mm) approx. 120 off	339A9491
Test n Tag Elite 2 Durable Label Rolls (52x25mm) approx. 304 off	339A9490
Test n Tag Pro Bluetooth printer	339A980
Roll of Large White Label Rolls (52x74mm) approx. 130 off	339A946
Roll of Small White Label Rolls (52 x 25mm) approx. 350 off	339A947
Bluetooth Elite 2D Scanner	339A925
Bluetooth Elite 1D Scanner	339A923
110V Test Adaptor (for Rpe and IR)	270A076
3 Phase Leakage Adaptor, Star 5 pin 16A (for Rpe and Leakage)	391A920
3 Phase Leakage Adaptor, Star 5 pin 32A (for Rpe and Leakage)	391A910
3 Phase Adapter, Delta 4 pin 16A (for Rpe & IR)	209A910
3 Phase Adapter, Star 5 pin 16A 415V (for Rpe & IR)	209A911
3 Phase Adapter, Delta 4 pin 32A 415V (for Rpe & IR)	209A912
3 Phase Adapter, Star 5 pin 32A 415V (for Rpe & IR)	209A913
Apollo+ Series Checkbox:	380A953
Apollo+ Series USB Download Lead	396A976
Apollo+ Series 0.5m IEC Test Lead	300A002
Apollo+ Series Red and Black Test Lead Set	380A951
Apollo+ Series Red Test Lead	380A982
Apollo+ Series Black Test Lead	380A983
Apollo+ Series Spare Battery	380A019
Apollo+ Series Battery Charger	380A9910
Apollo+ Series Kit Bag:	71G109
Apollo+ Series Carrying Case:	380A952

5 Getting Started

5.1 Getting to Know Your Apollo+ 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. USB Flash Drive Port (600 Only)
14. Flash (600 Only)
15. Camera (600 Only)
16. Battery Cover

(Note: Only the Apollo 600+ has the USB Flash Drive Port, Camera and Camera Flash features)

5.2 Before Using Your Apollo+ Series for the First Time

Before using your Apollo+ 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.)

5.3 Powering ON / OFF an Apollo+ Series

Switch on the Apollo+ 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

5.4 Apollo+ Series Battery Status Indication

While the Apollo+ Series is powered on there are periodic checks of the batteries. The Apollo 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 Apollo+ will switch itself off after a short period of time. The batteries must be recharged.


This symbol indicates that the Apollo+ is bulk charging batteries at the full charge current.


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


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

5.5 Charging the Battery Pack

The battery pack will be charged whenever the Apollo+ Series is connected to the **M**ains **S**upply 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.

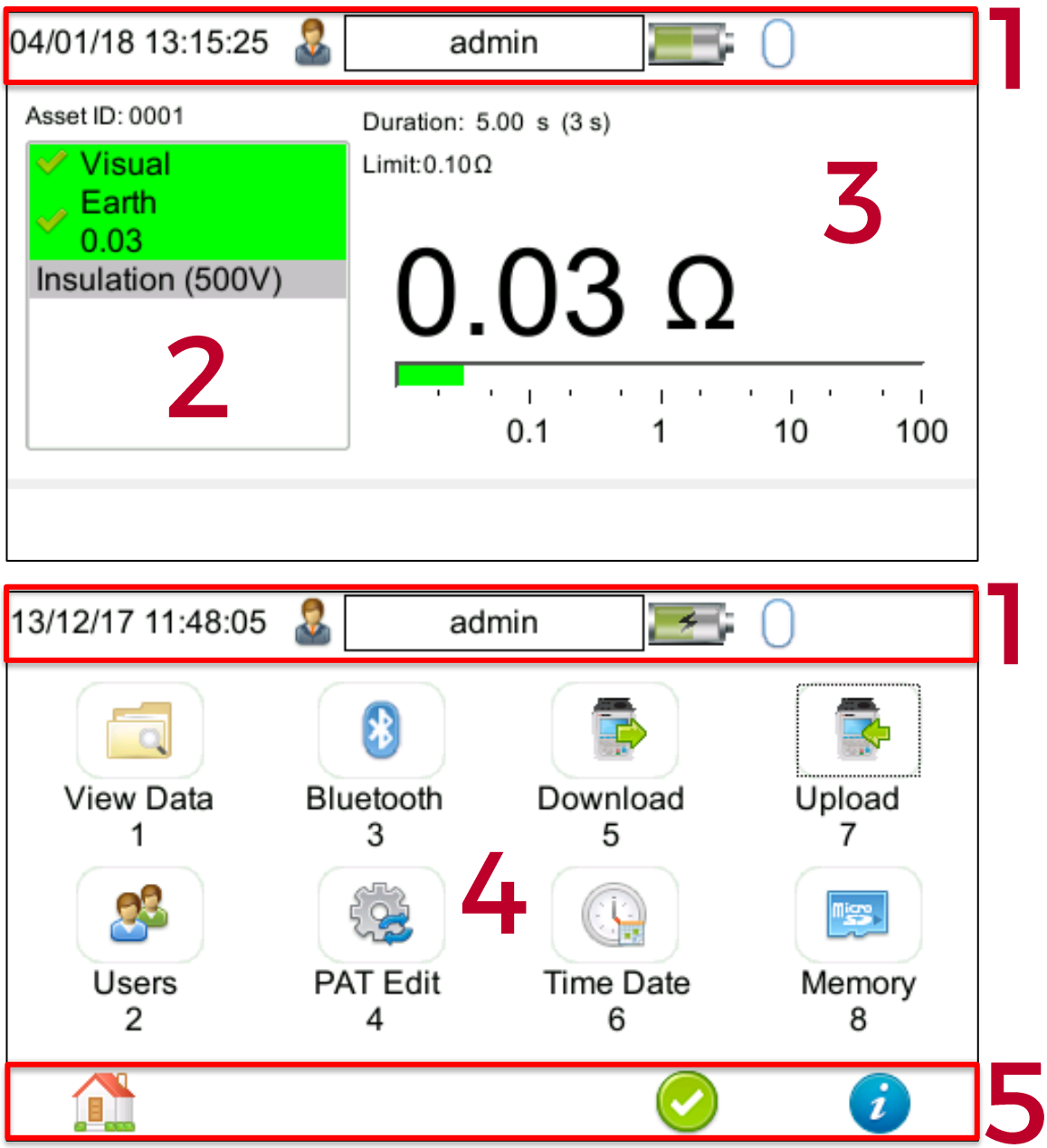
5.6 Replacing the Battery Pack

Before opening the Apollo+ Series 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 SEAWARD OR A SEAWARD APPROVED DISTRIBUTOR.

5.7 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).

6 User Options (PAT Settings, Apollo 500+ and 600+ only)

PAT Settings is used to setup standard user preferences, such as the options after each test. Note this is only applicable with the Apollo 500+ and 600+, User Options (PAT Settings) is not applicable with the Apollo 400+.

User options can be accessed from the **Home Screen**  by selecting  (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:

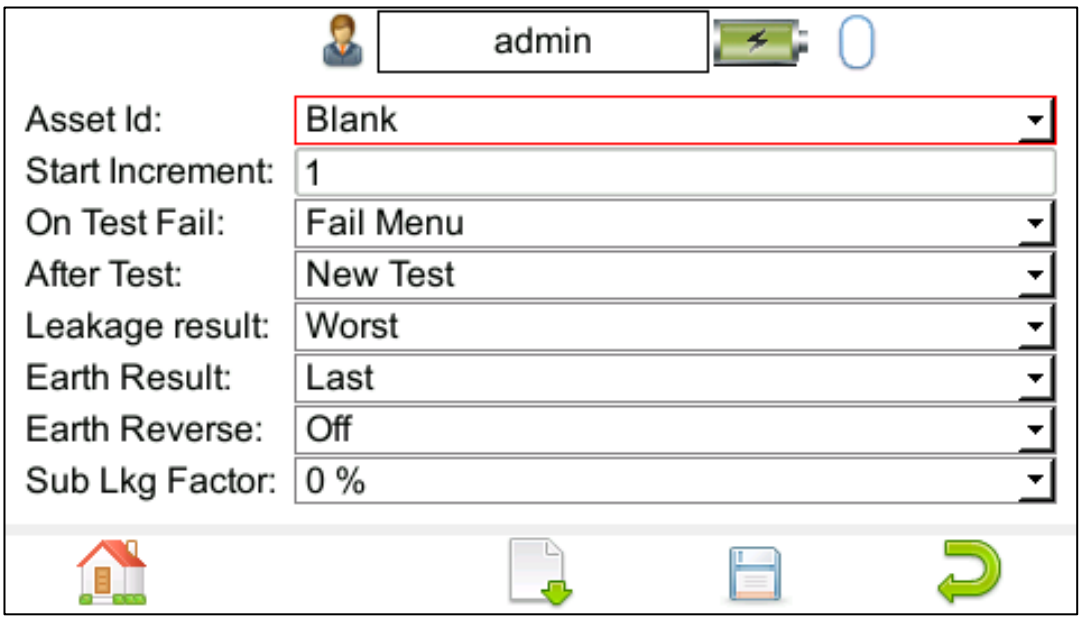
 Use F1 to return to the **Home Screen**, without saving.

 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.

6.1 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 Apollo 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

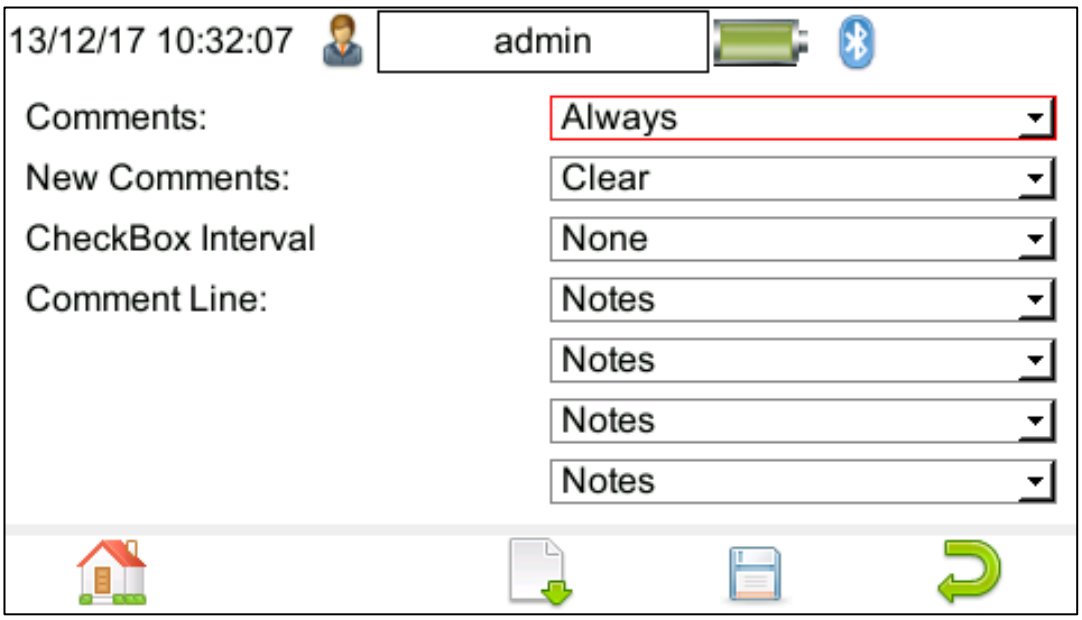
This field is used to enable or disable automatic reversal of the earth continuity test current polarity. "**Off**" sets the earth continuity test current to +200mA and "On" sets the earth continuity test current to +200mA followed by -200mA.

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%).

6.2 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

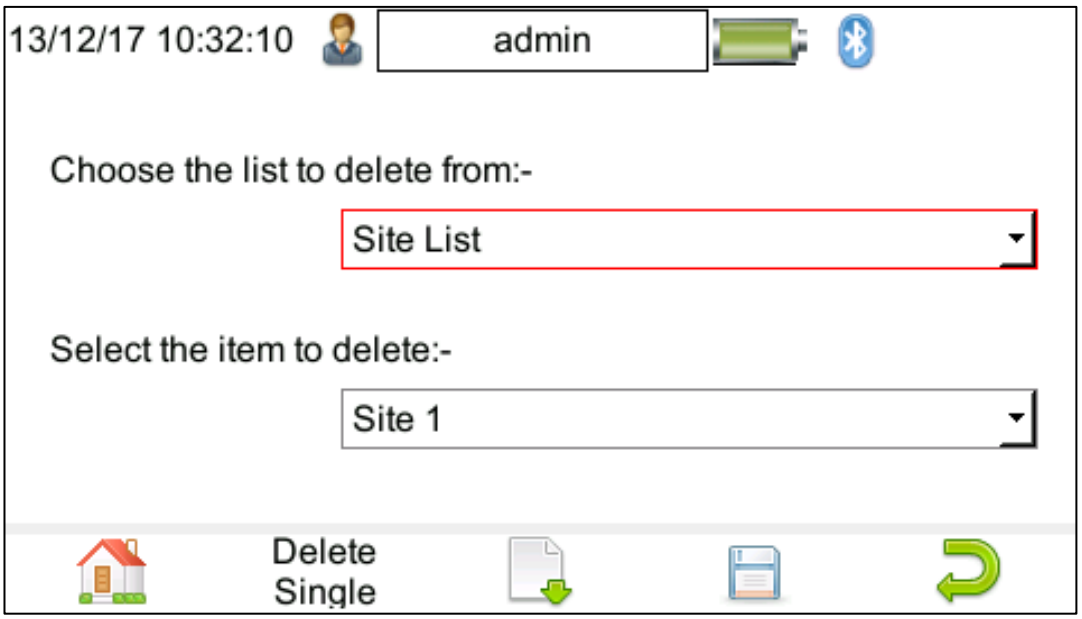
This field is used to set the frequency of the Checkbox reminder to **None**, **Daily**, **Weekly** or **Monthly**.

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).

6.3 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.

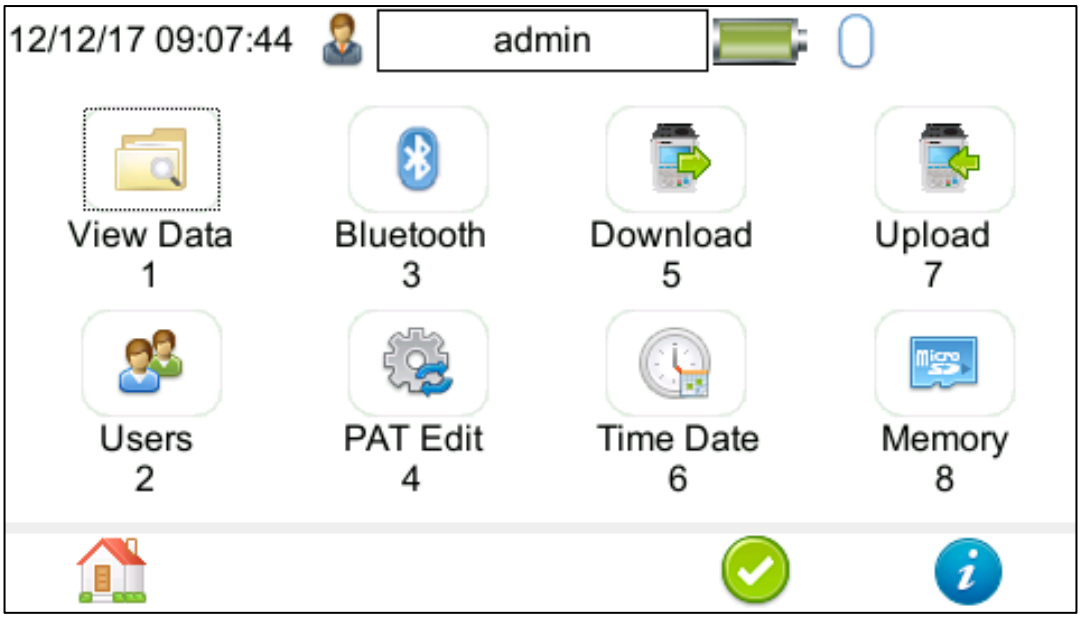
To delete the item selected use "**Delete Single**" (F2), a warning message is displayed confirming the list and item to be deleted.

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".

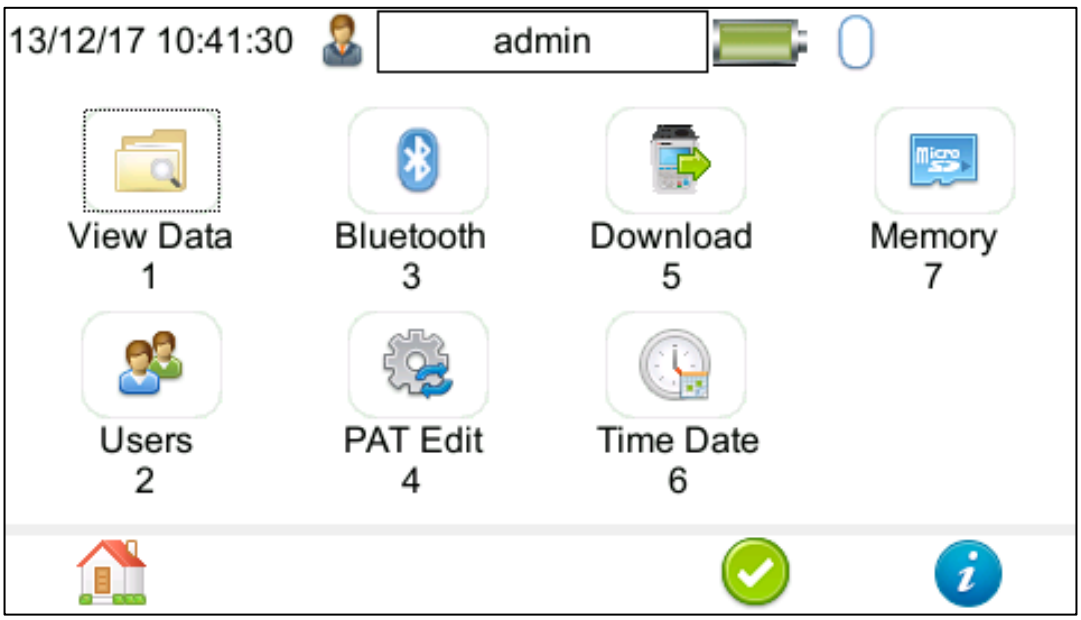
7 Setting Up Your Apollo+ Series Instrument

7.1 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 Apollo 500+ and 600+.



There are 7 available options, in the **Main Menu** window, for the Apollo 400+, as **Upload** is not applicable.

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

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

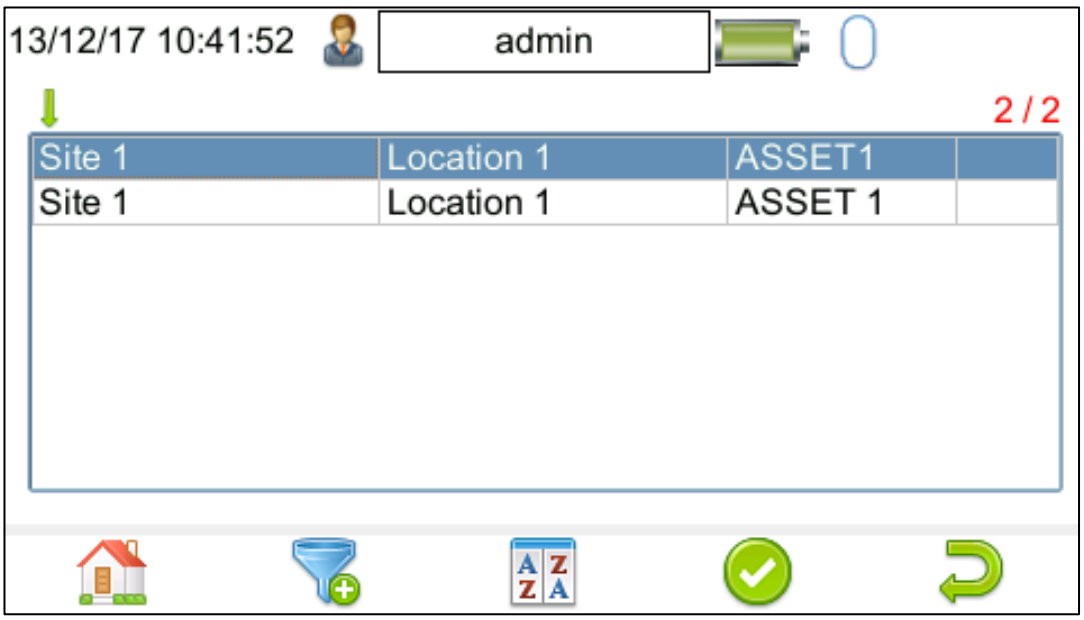
Use F4 to accept / select a highlighted option (highlighted using the keyboard arrow keys).

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**".

7.2 Main Menu Window - View Data

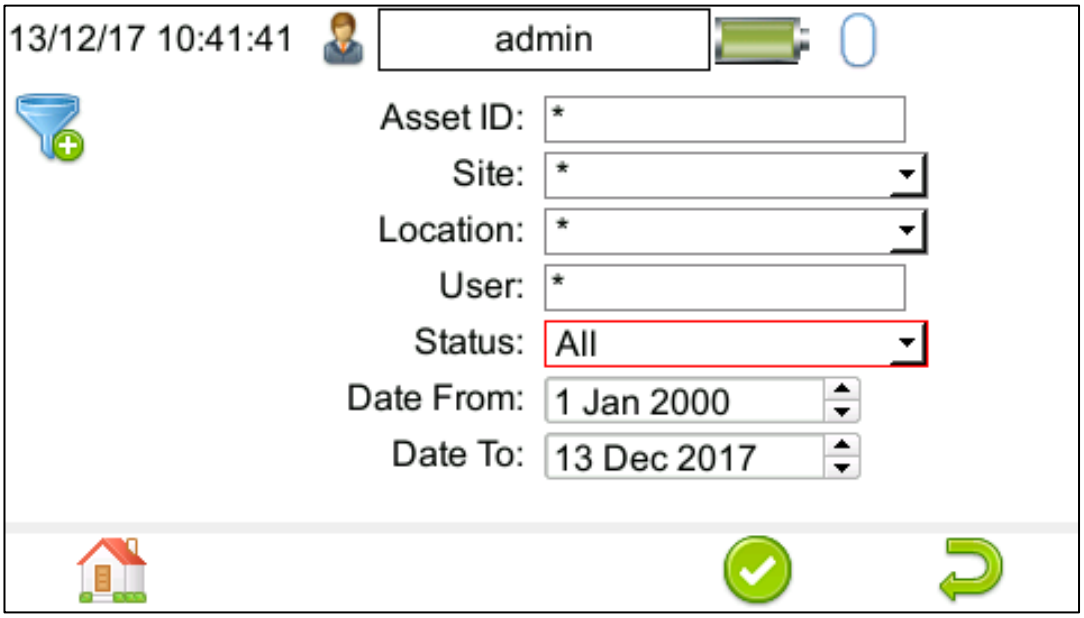
By selecting **View Data** (1), in the **Main Menu**, you can view any data that you have saved in the Apollo+ by **Site**, **Location** or **Asset ID**.



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

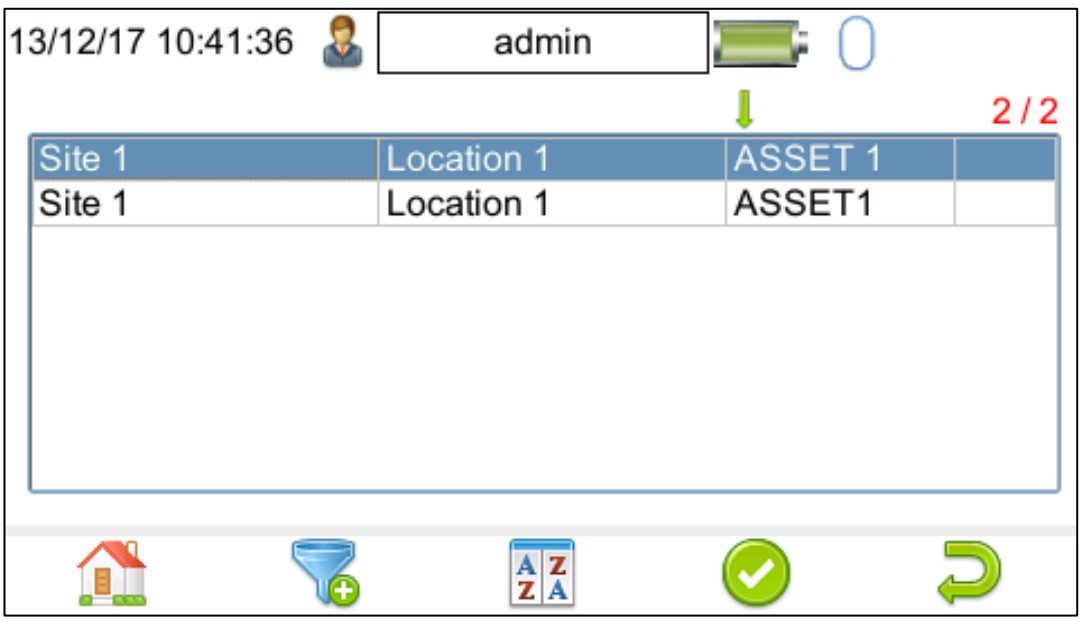
Use F1 to return to the **Home Screen**.

Use F2 to filter records to give a customised view.

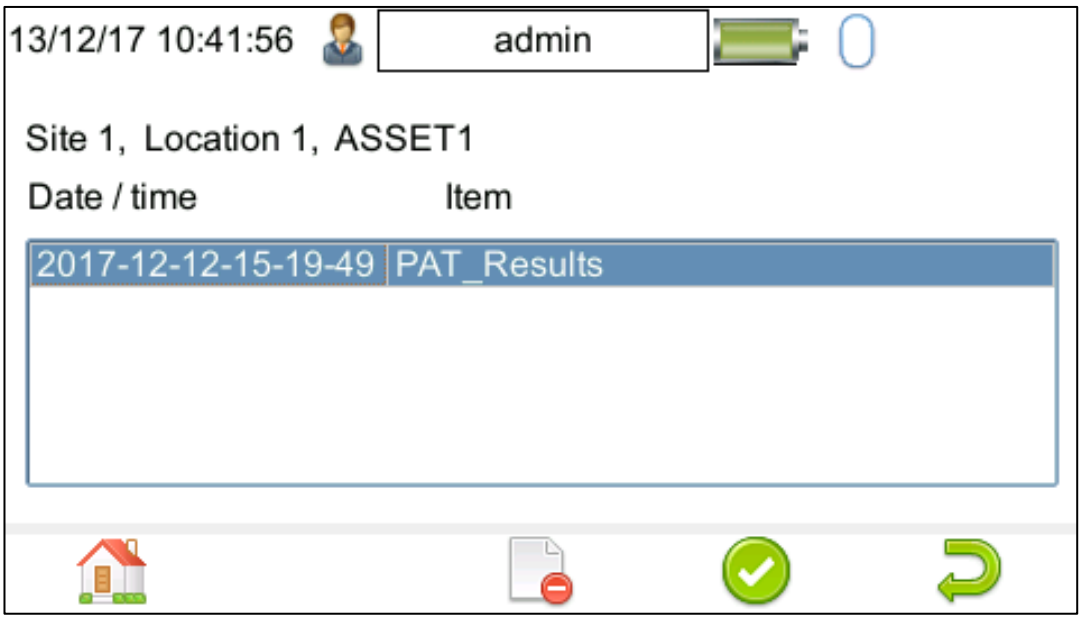


Select the filters you wish to apply, using the keyboard arrow keys on the keyboard, and use (F4) to accept or (F5) to cancel / return.

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.

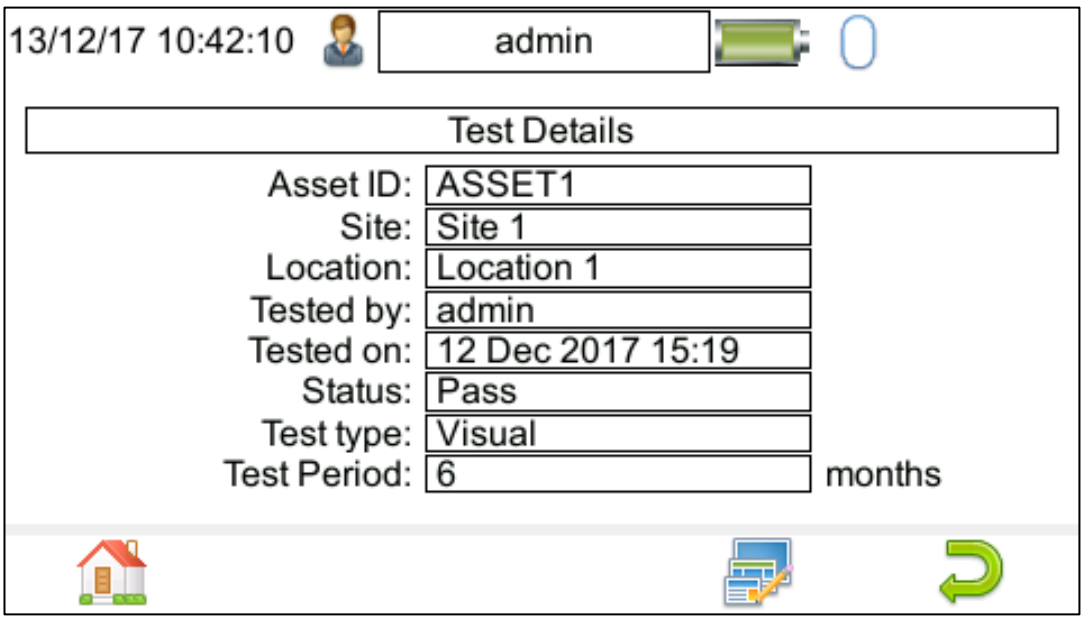


This is the Accept function, use the keyboard arrow keys to highlight an asset and use F4 view any corresponding results.



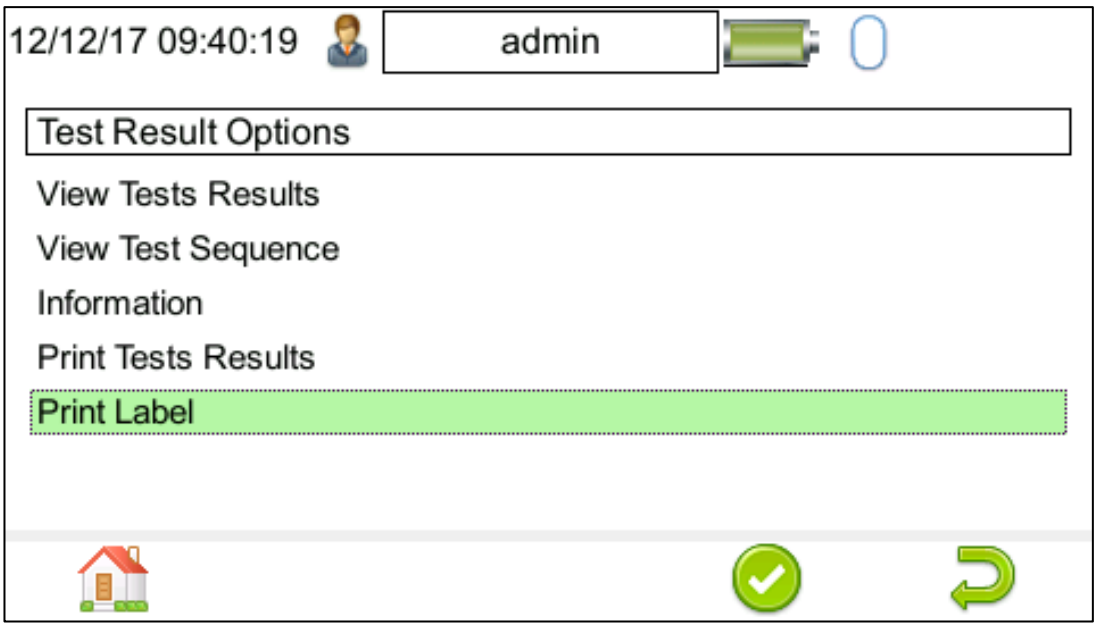
Once in the asset / record you will be given a list of items under that record such as PAT results and JPEG images, depending on what results have been saved against that asset. .

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

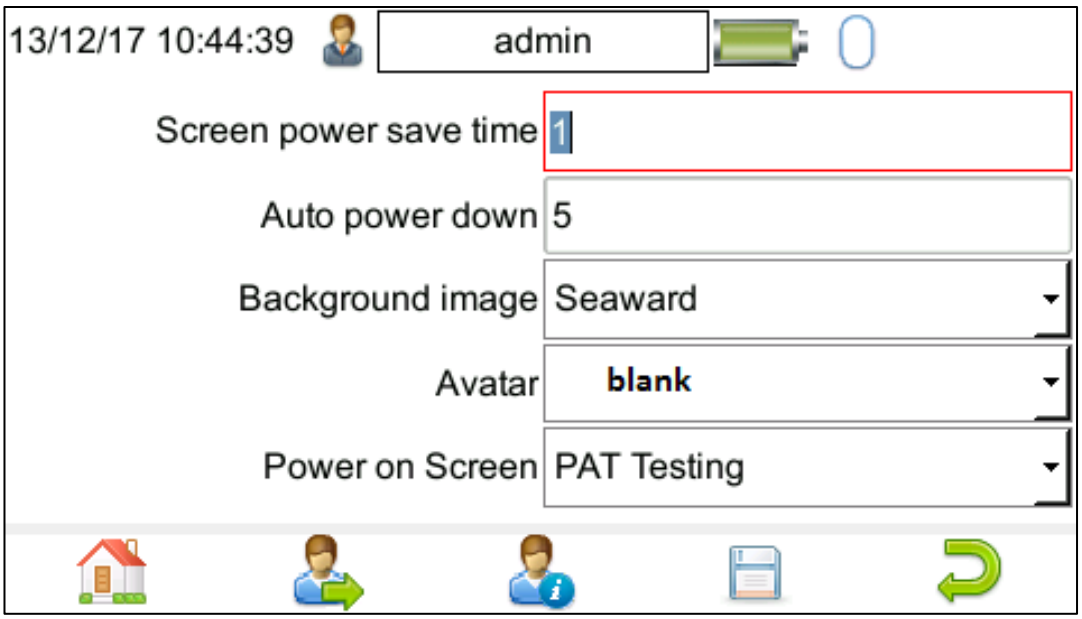


Use F5 to return to the Main Menu.

7.3 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.

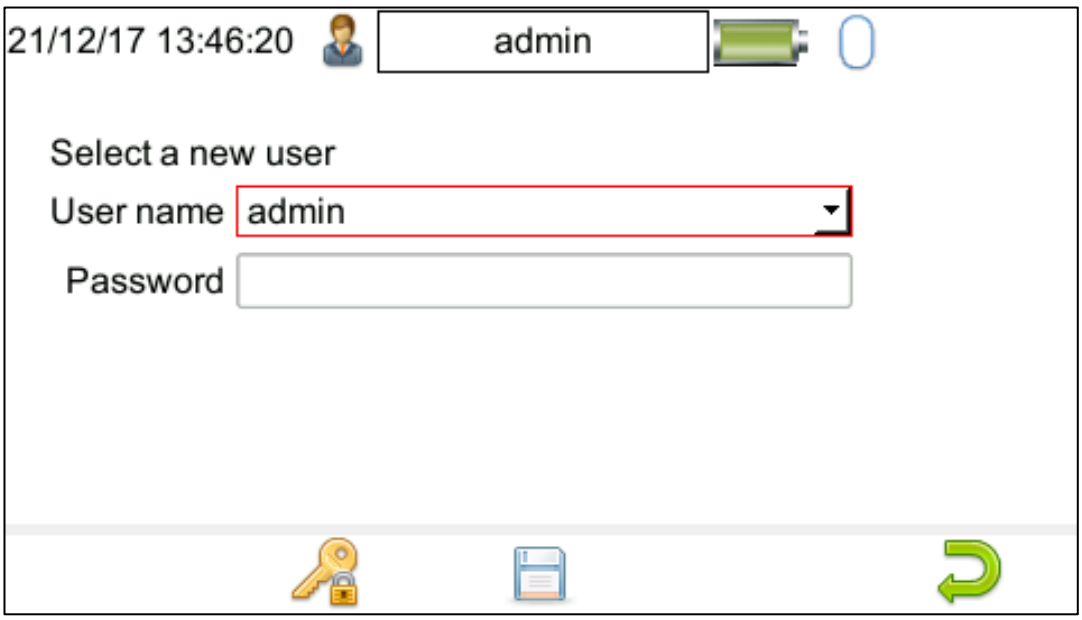
Note: the Apollo 400+ only has one additional account and limited functionality – not all aspects apply here.



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

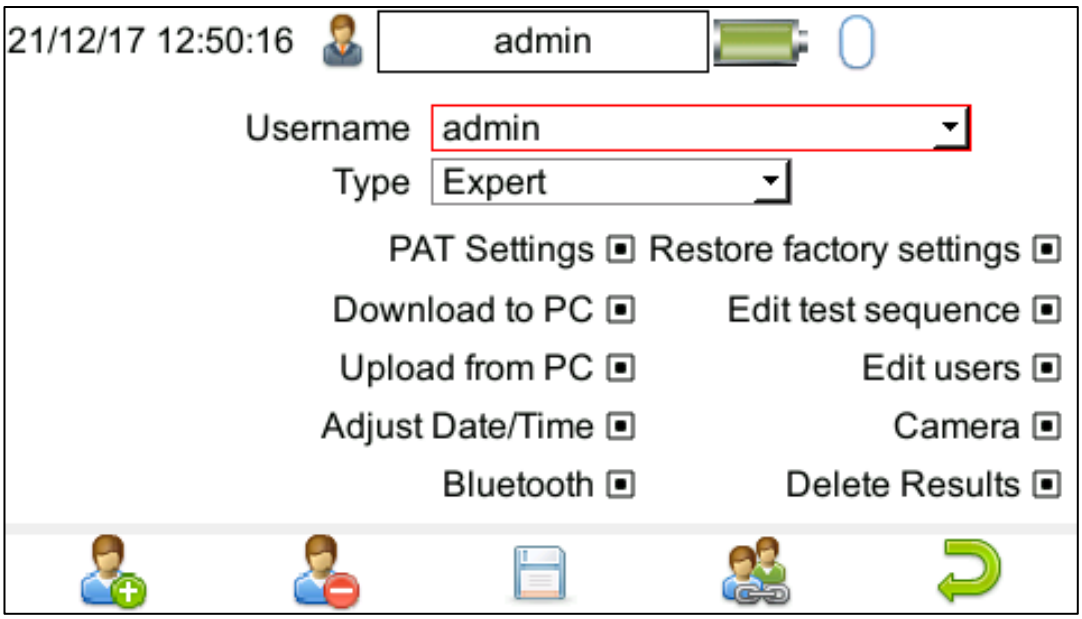
Use F1 to return to the **Home** screen.

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** (Apollo 500+ and 600+ only).

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 (Apollo 500+ and 600+ only).

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

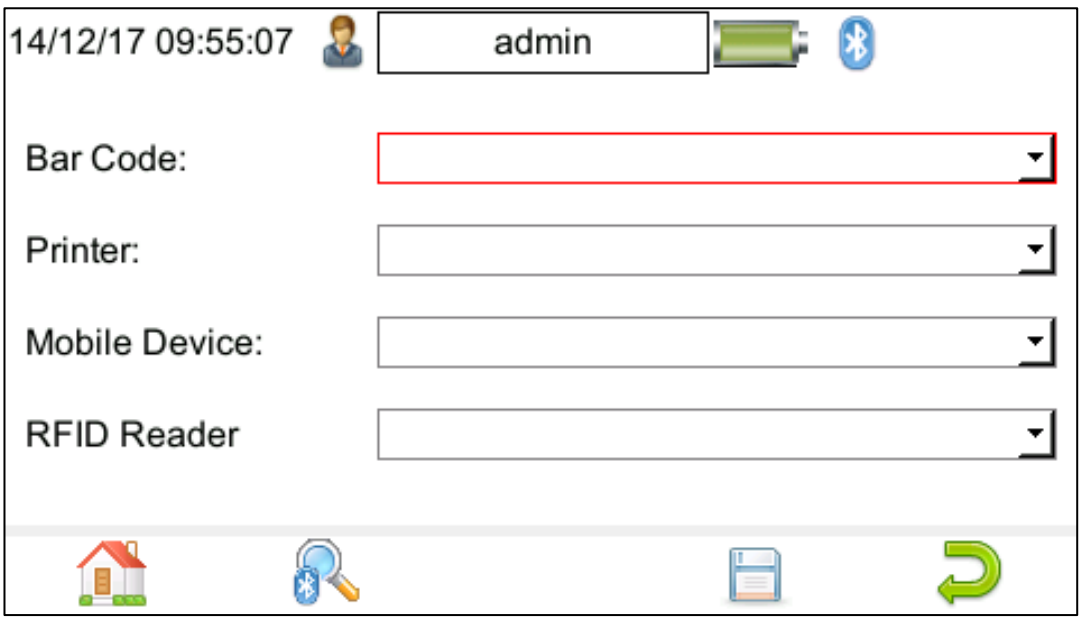
7.4 Main Menu Window - Connecting Bluetooth Devices

Select this icon (3) to setup your Bluetooth accessories to work with the Apollo Series. The Apollo Series can be connected to Bluetooth accessories including bar code scanners, printers, smart phones and RFID scanners (**Note:** Only the Apollo 600+ in the series has the RFID Scanner feature).

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**, **Mobile Device** or **RFID Reader** (Note: Only the Apollo 600 in the series has the RFID Scanner feature).

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.

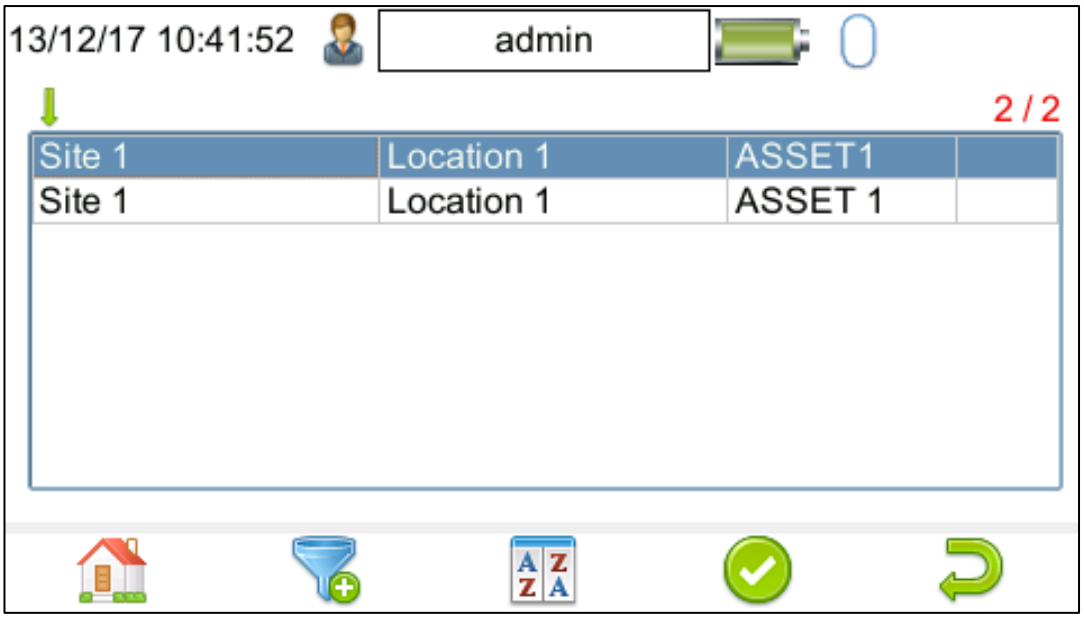
Select **RFID Reader** field and choose your device from the list using the keyboard arrow keys. (**Note:** Only the Apollo 600 in the series has the RFID Reader feature).

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

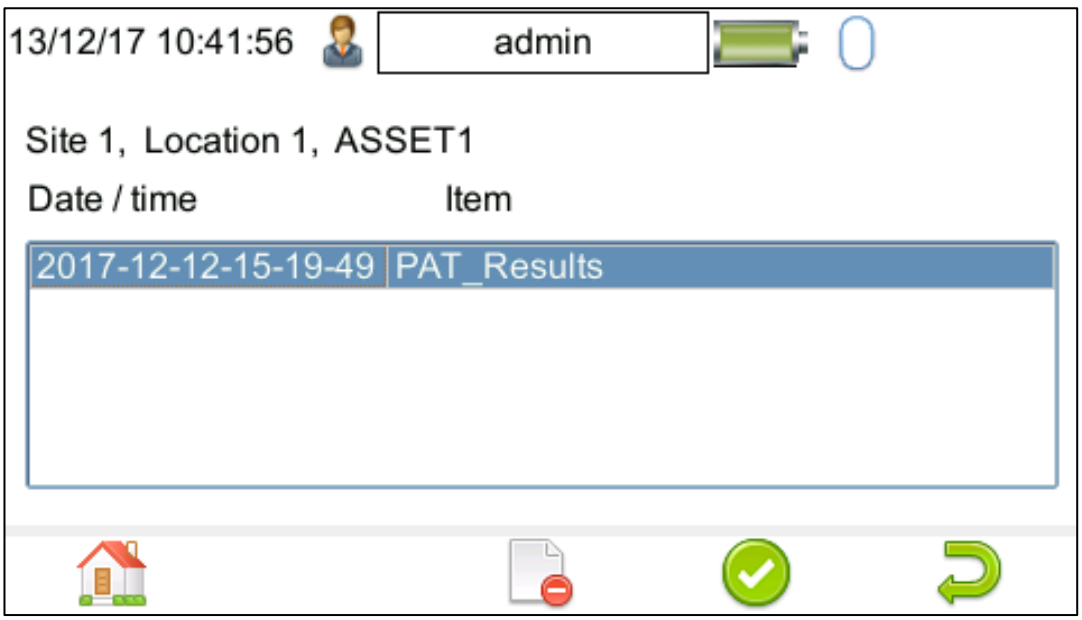
7.4.1 How to Setup a Printer with your Apollo+ Series

(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)

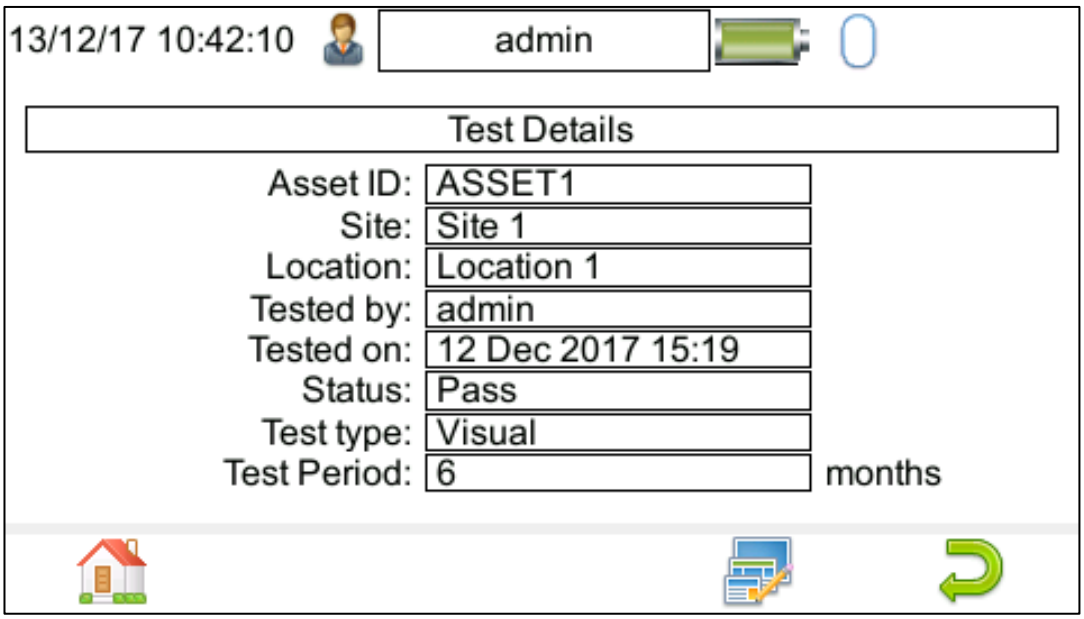
Select **View Data** (1), in the **Main Menu**, to access previously saved data on the Apollo+ Series.



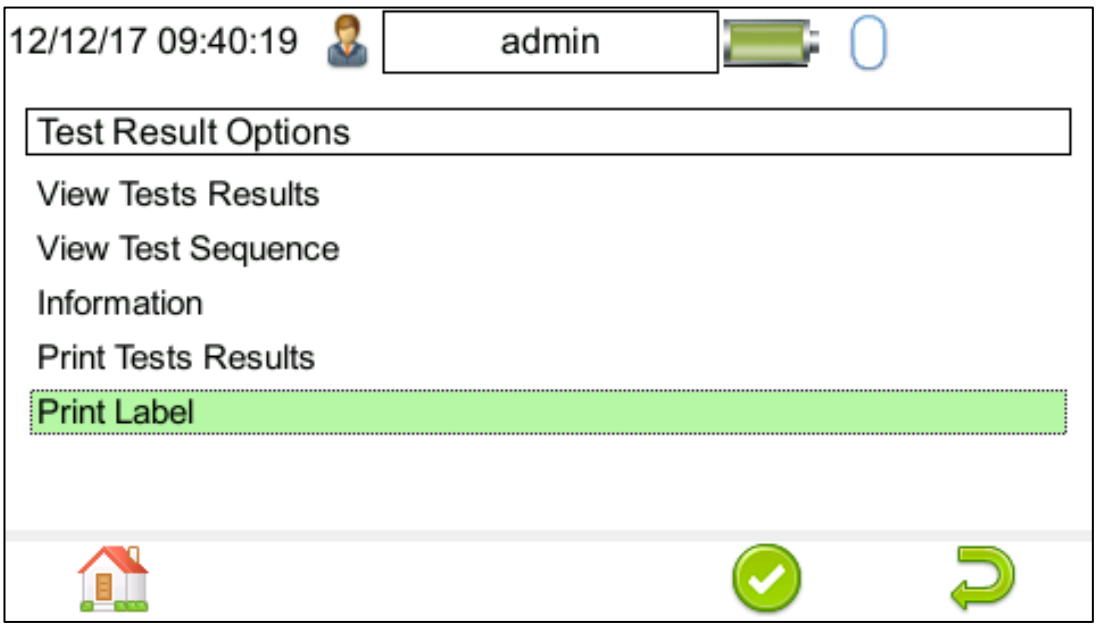
Highlight an asset and use the **Accept** function  (F4) to select this.



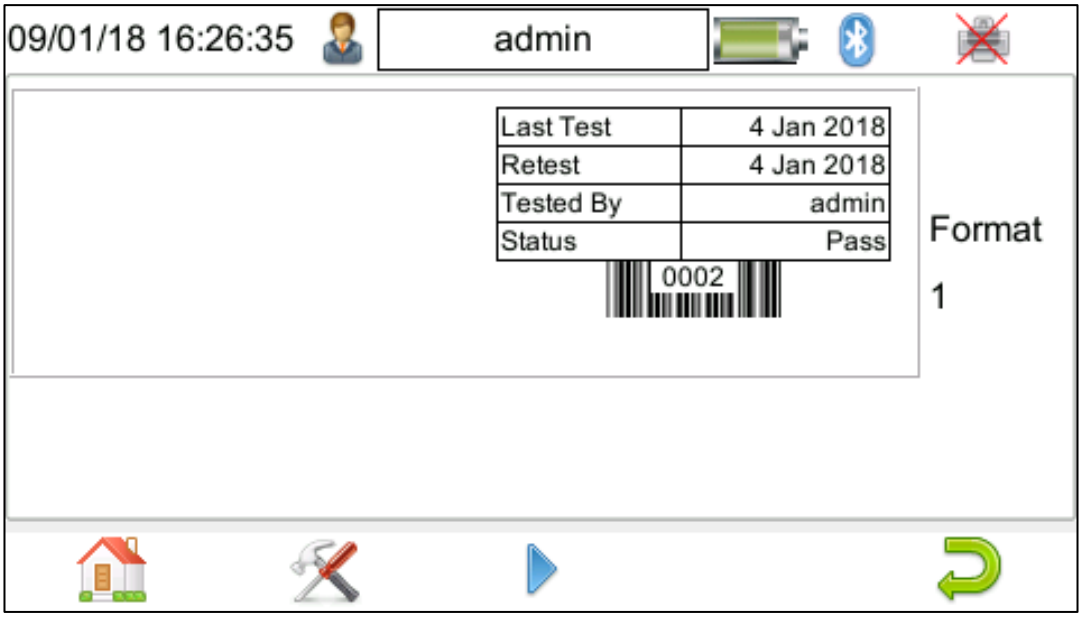
Once in the asset test details page you will be shown a list of items under that record (this could be one or many), highlight a **PAT_Results** entry and use  (F4) to **Accept**.



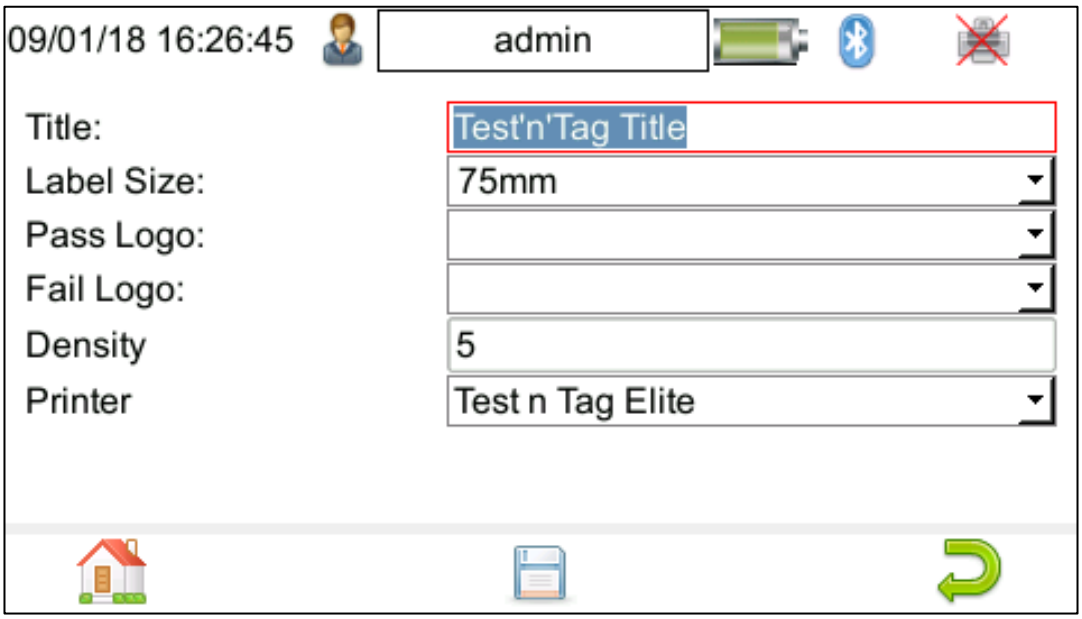
In the **Test Details** window, use the **Menu** icon  (F4) to access the **Test Results Options** window.



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 (not Apollo 400+)
Pass Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Fail Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Density	Print density – default 5
Printer	selection of printer type.

Test n Tag Elite (Test n Tag Elite 1 – printer now obsolete), options:

Title:	free text field – to display information on label
Label Size:	75mm
	25mm
	75mm Extra Durable
	25mm Extra Durable
Pass Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Fail Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Density	Print density – default 5
Printer	selection of printer type.

Test n Tag Pro, options:

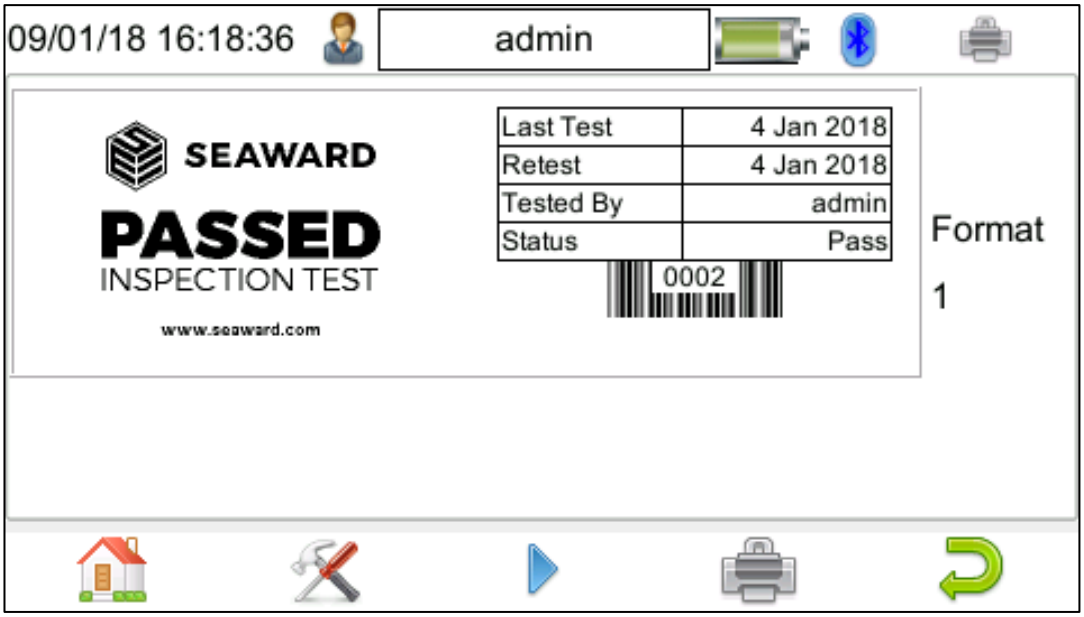
Title:	free text field – to display information on label
Label Size:	75mm
	25mm
Pass Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Fail Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Printer	selection of printer type.

Test n Tag (Kroy 3000 series printers – printer now obsolete), options:

Title:	free text field – to display information on label
Pass Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Fail Logo:	Choice of using the default logo or upload own logo (not Apollo 400+)
Density	Print density – default 5
Printer	selection of printer type.

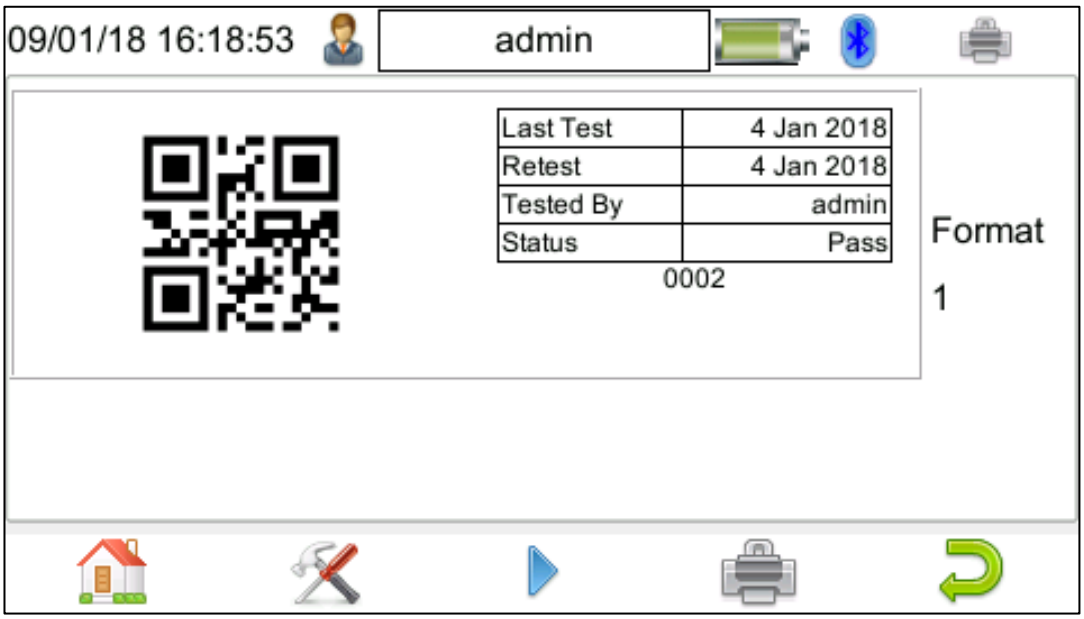
Use  (F3) to **Save** / confirm these changes and return to the virtual printer window or use  (F5) to return to the previous window without saving.

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 Seaward example pass logo **example_logo_1.bmp**. Alternative logos can be loaded and used (not applicable to the Apollo 400+)

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.**

(**Note:** Only the Apollo 500+ and Apollo 600+ in the series have the QR code feature)

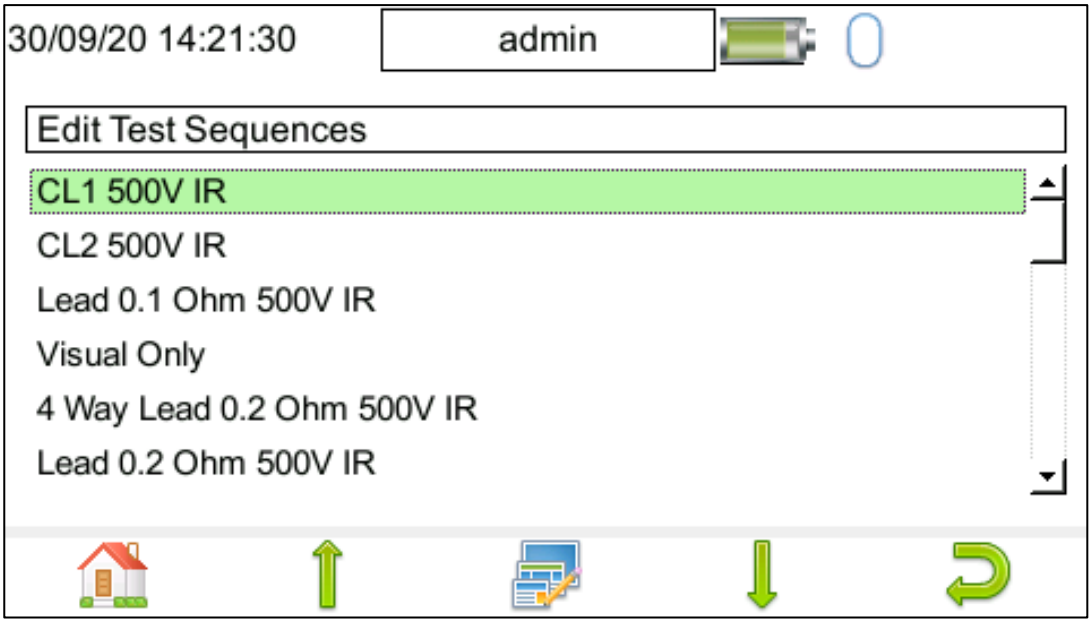
When the Apollo+ Series is connected to the Bluetooth printer it will display a **Printer** icon , using F4 will enable a label to be printed.

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

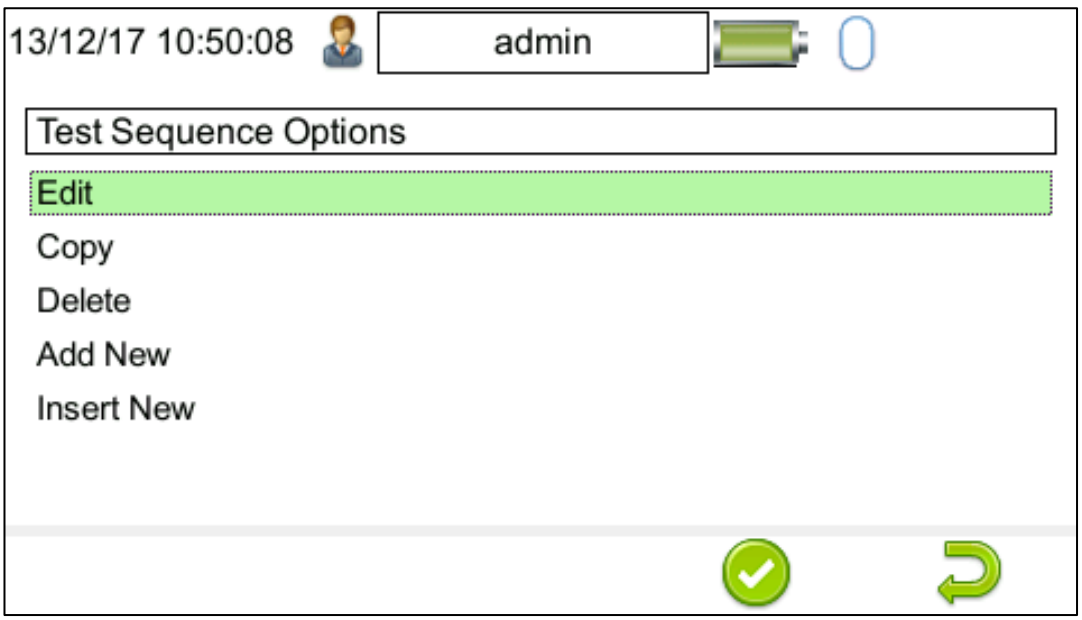
Although the Apollo+ Series comes with a number of pre-defined **Test Sequences** (see section 17.1), you can modify existing or create new test sequences of your own.

Note: the Apollo 500+ and 600+ come with 25 pre-defined test sequences and the ability to add another 75 custom sequences. The Apollo 400+ comes with the same 25 pre-defined test sequences but to create a custom sequence a pre-defined test sequence (one of the original 25) will need to be edited or, alternatively, deleted first.

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.

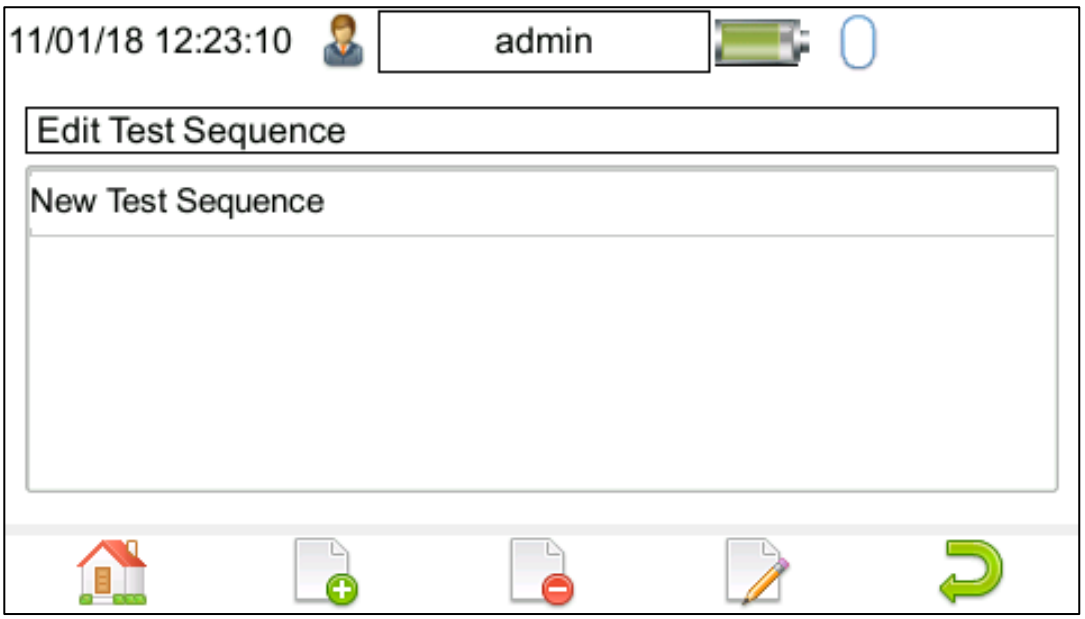


Select **Add New** using the keyboard arrow keys and the **Accept** button (F4). This will add a **New Test Sequence** to the bottom of the test sequence list.

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 (Apollo 500+ and Apollo 600+ only) - **Accept** using button (F4).

Note: If you select the **Custom User Test** (Apollo 500+ and Apollo 600+ only) 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.

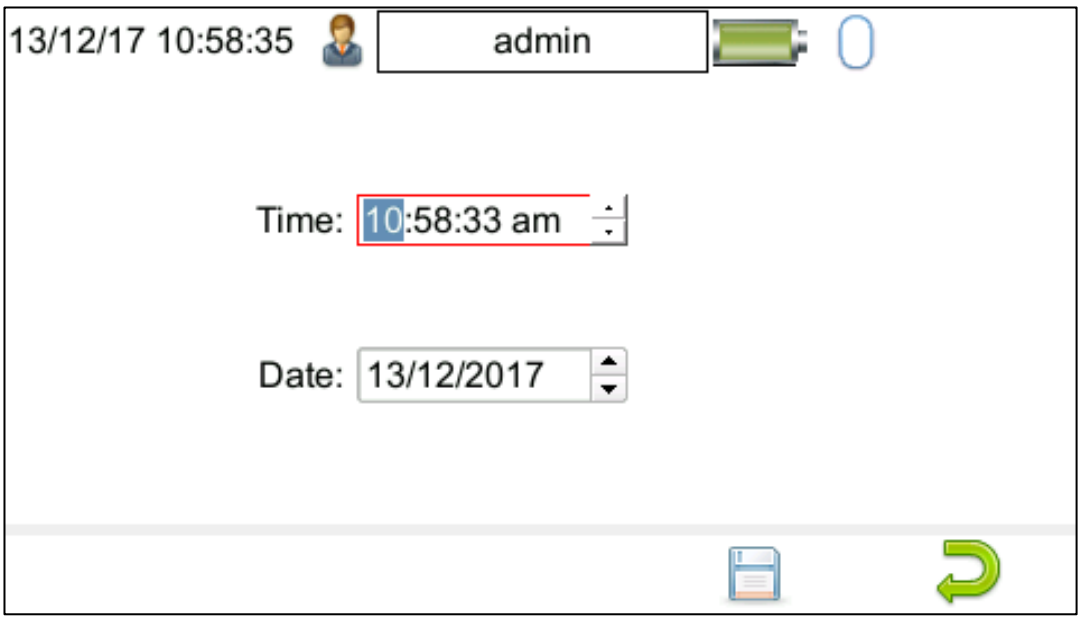
Once complete press the **Back** button (F5) and then select **Yes** by pressing the **Y** key when asked if you want to save changes.

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.

7.6 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 Apollo+ Series.

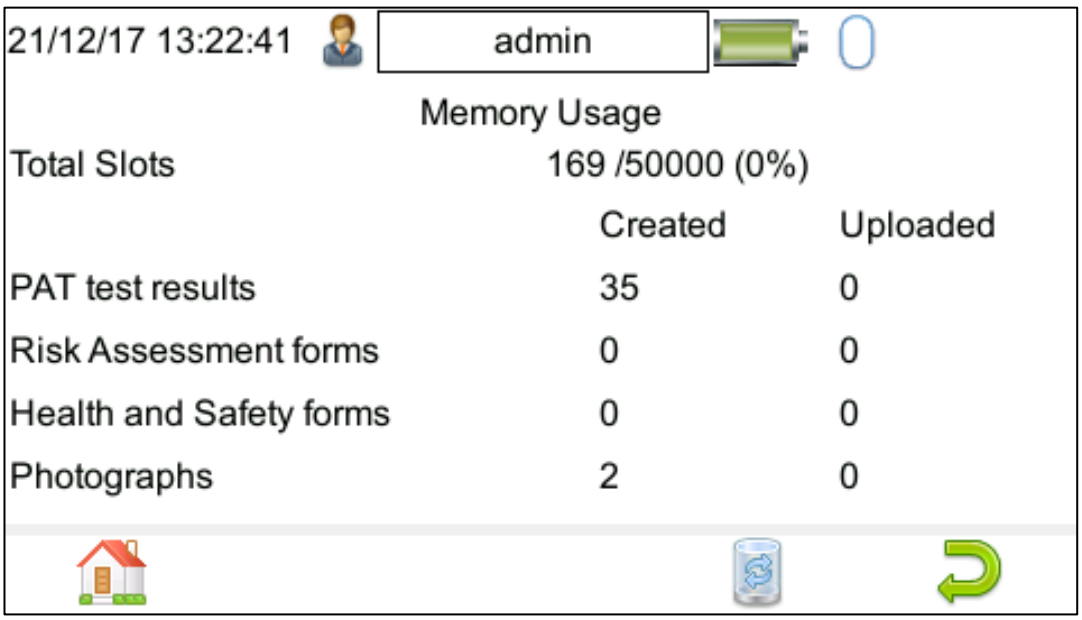


Use the **Left** / **Right** keyboard arrow keys to highlight the required parameter and then use the **Up** / **Down** keyboard keys to increase or decrease this, respectively.

7.7 Main Menu Window – Memory Options

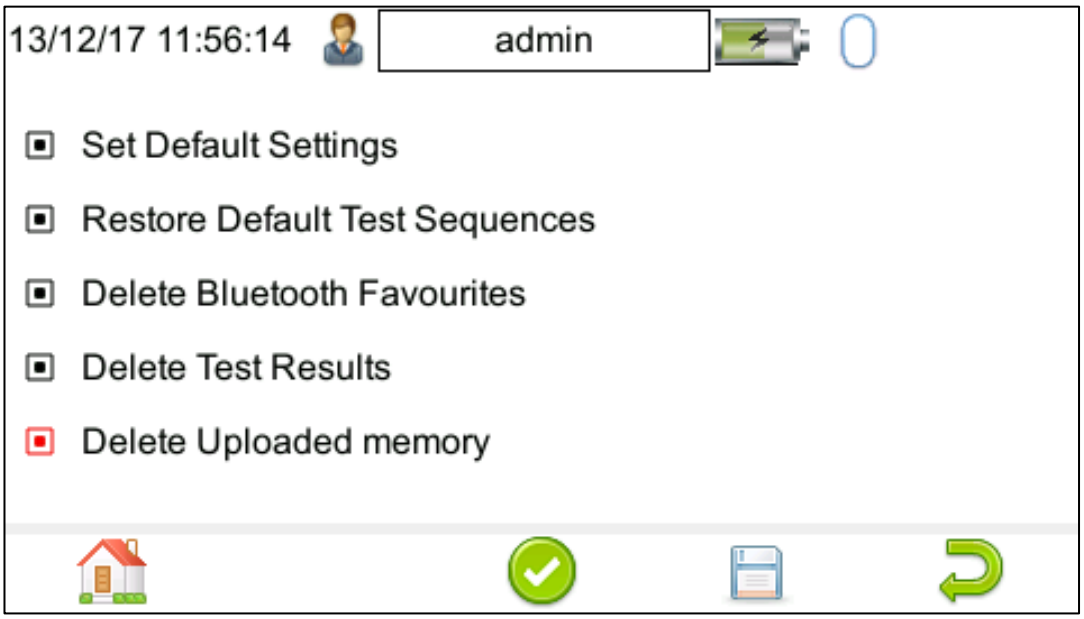
Note: the **Memory** option can be used to reset factory settings / delete data or clear Bluetooth settings on the Apollo+ Series.

Select **Memory** (7 on the Apollo 400+ or 8 on the Apollo 500+ or 600+), in the **Main Menu** to access the **Memory Usage** window.



Note: the **Memory Usage** window will vary depending on which Apollo+ Series instrument is being used.

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



Note: the **Memory** options window will vary depending on which Apollo+ Series instrument is being used.

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.

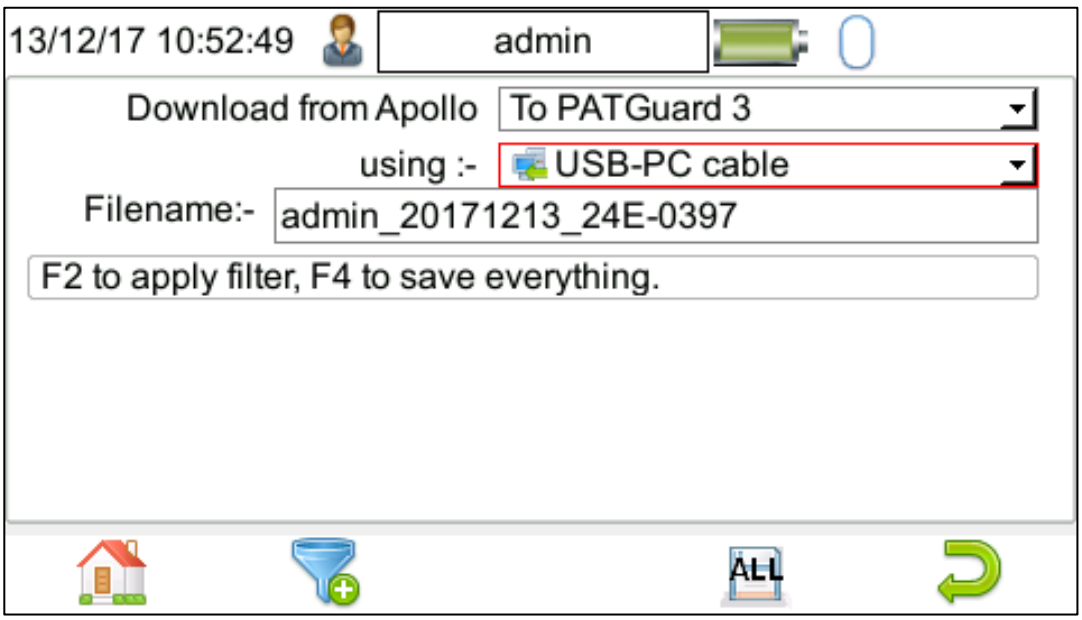
8 Downloading your Apollo+ Series

The Apollo+ Series 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 – (Apollo 500+ and 600+ - not applicable to the Apollo 400+).
ASCII	creates a .txt file
To other software	creates a .tar file for use with other software

8.1 Downloading From Your Apollo+ 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 Apollo** field select **To PATGuard 3**, using the keyboard arrow keys to select from the dropdown menu.

(a) In the "using:-" field select "  USB-PC cable" (for the Apollo+ Series).

or

(b) In the "using:-" field select "  Flash Memory Stick" (Apollo 600+ only).

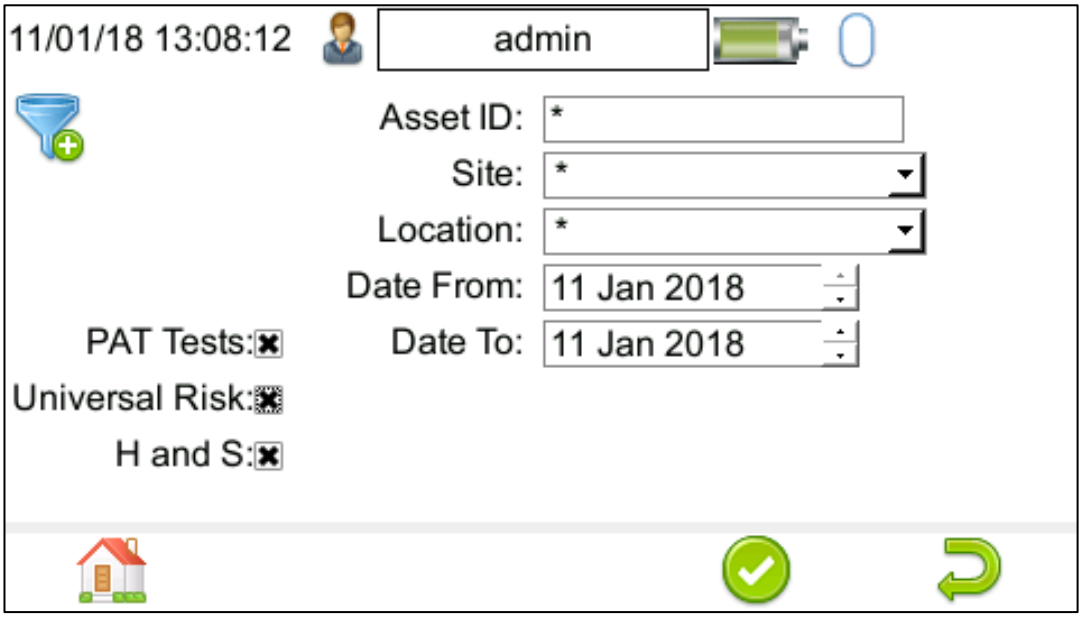
Add or alter the filename in the **Filename** field.

(a) Connect the USB lead between the PC and Apollo (for the Apollo+ Series).

or

(b) You will be prompted to "Insert USB memory stick...." any data on this memory stick will be displayed in the bottom box (Apollo+ 600 only).

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:-

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

(b) the file appears on the memory stick, remove the memory stick from the Apollo and transfer it to the PC (Apollo 600+ only).

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

(a) Browse for the *.gar file in the Apollo drive. Select **open**, then **OK** and your downloaded data should appear in the PATGuard 3 database (for the Apollo+ Series).

(b) Browse for the *.gar file on the flash memory stick. Select **open**, then **OK** and your downloaded data should appear in the PATGuard 3 database (Apollo 600+ only).

8.2 Downloading Clone Data from an Apollo 500+ or 600+

Note: Downloading Clone Data can be used to backup current user settings or to transfer to another Apollo 500+ or 600+, not applicable to Apollo 400+.

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

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

(a) In the "using:-" field select "  USB-PC cable" (for the Apollo500+ or 600+).

or

(b) In the "using:-" field select "  Flash Memory Stick" (Apollo 600+ only).

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

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

If you have used the USB – PC lead you will need to save the file to a location on your PC. If you have used a USB memory stick you can then remove it from the tester and the file will be saved.

9 Uploading your Apollo 500+ and 600+

The Apollo 500+ and 600+ have 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

Note: Apollo 400+ does not have an **Upload** facility.

9.1 Uploading from PATGuard 3 to an Apollo 500+ or 600+

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

In the **Upload data into Apollo** 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 Apollo drive (for example ApolloXXXX:) will appear on your PC, as long as a USB cable is connected. (Apollo 500+ or 600+)

or

In the "using:-" field select "  Flash Memory Stick" (Apollo 600+)

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 – this will be either the ApolloXXXX: drive or Flash Memory Stick drive from a previous step - 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 :\ApolloUpload.gar" should appear on the PC

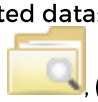
On the Apollo the message "Save data to Apollo drive, press F3 when done" – select this using the function key  (F3). The following message will then appear on the Apollo "Valid Data files from PC. Select one of these files and press F4. Select the file containing your uploaded data (*.gar), using the keyboard arrows keys, and save by selecting  (F4) (USB-PC cable, Apollo 500+ or 600+)

or

After transferring the USB memory stick (you will receive a message if you have not done this), in the field below "Valid data files from USB memory stick. Select one of these files and press F4" - select the file containing your uploaded data (*.gar), using the arrows keys, and save by selecting  (F4) (Flash Memory Stick, Apollo 600+)

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 Apollo 500+ or 600+

Note: The uploaded data is displayed in a different location to the already tested data: From the Apollo 500+ or 600+ **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.

9.2 Uploading Printer Logos to an Apollo 500+ or 600+

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 Apollo** 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 to an Apollo 500+ or 600+**

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).

9.3 Uploading Clone Data to an Apollo 500+ or 600+

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

In the **Upload data into Apollo** 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 Apollo 500+ or 600+**

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

9.4 Uploading Background Images to an Apollo 500+ or 600+

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 Apollo** 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 to an Apollo 500+ or 600+**

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.

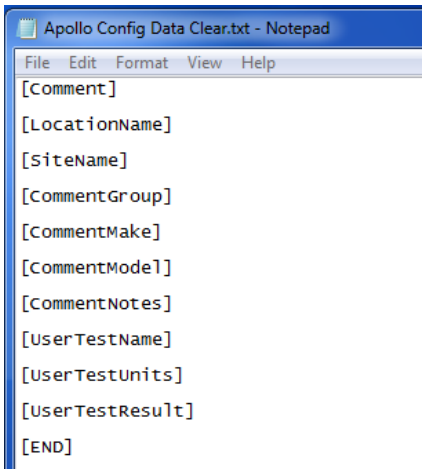
Confirm the **User** changes by selecting **Save**  (F4).

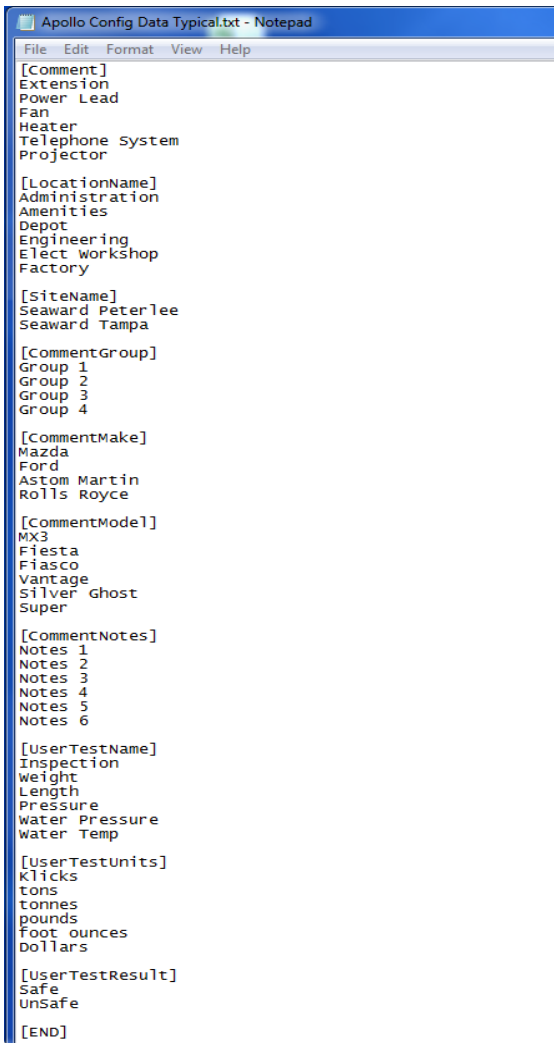
9.5 Uploading List Configuration Data to an Apollo 500+ or 600+

The Apollo 500+ or 600+ 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):

		Apollo 500+	Apollo 600+
Asset Description	[Comment]	100	300
Location	[LocationName]	100	100
Site	[SiteName]	100	100
Asset Group	[CommentGroup]	100	100
Make	[CommentMake]	100	100
Model	[CommentModel]	100	100
Notes	[CommentNotes]	100	100
Custom User Test	[UserTestName]	100	100
Custom User Test Units	[UserTestUnits]	100	100
Result of Custom User Test	[UserTestResult]	100	100

The text file used to update the Apollo 500+ or 600+ 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.



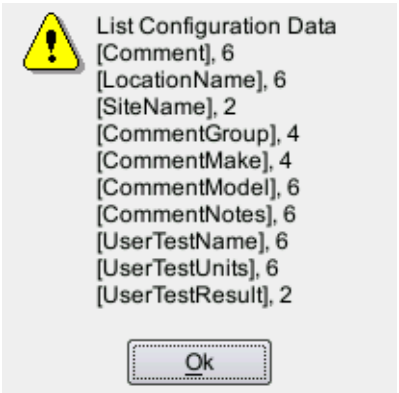



From the **Main Menu** select **Upload** by using the keyboard arrow keys or selecting key number **7**.

In the **Upload data into Apollo** 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 to an Apollo 500+ or 600+**

The Apollo 500+ or 600+ will begin the upload and in the **Apollo 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 Apollo 500+ or 600+.

10 Performing an Electrical Safety Test – Auto Mode

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

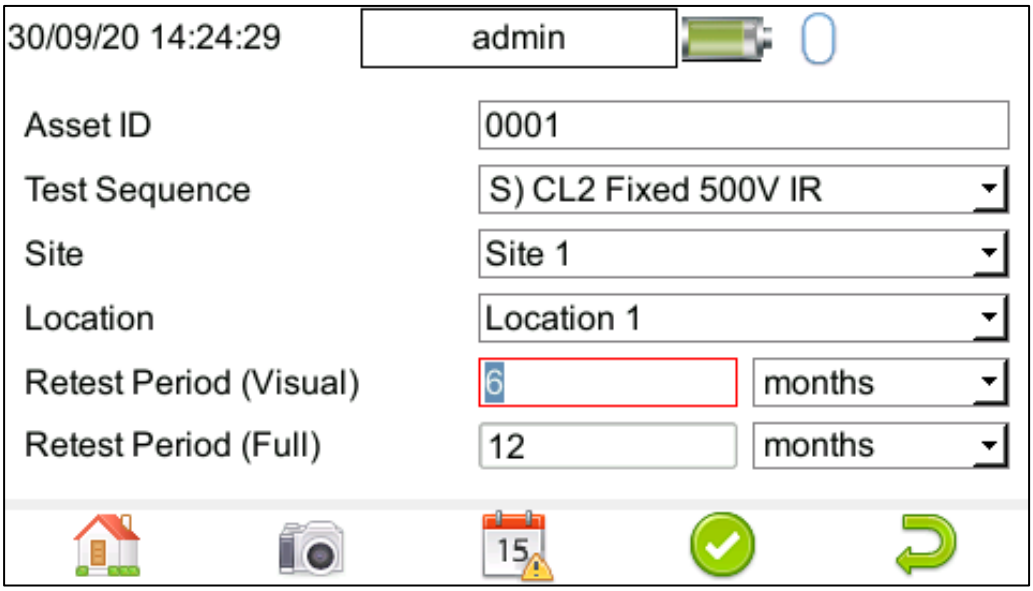
 Use F4 to setup the **User Options / PAT Settings** page, see section 6 User Options (PAT Settings, Apollo 500+ and 600+ only). **User Options (PAT Settings)** is not applicable with the Apollo 400+.

 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 Apollo+ 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).



Note: The Apollo 600+ has an additional option of the **Camera** (F2), whereas, the Apollo 500+ and 600+ have a **Risk Assessment** option, (F3).

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 (Apollo 500+ and 600+) 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 (Apollo 500+ and 600+ only).

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 (Apollo 500+ and 600+ only).

10.1 Auto Mode – Camera Function (Apollo 600+ Only)

Camera Function (Apollo 600+ only). You can use the **Camera** function (F2) to attach photos to the asset record.

Press this button (F1) to take the picture.

This button (F2) will enable and disable the flash light.

This button (F3) will attach the picture and go back to the record. Note a smaller attach icon  will be shown on the **Auto Mode** test window. To add another picture press the **Camera** button again.

This button (F4) will cancel the picture and allow you to take another.

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

Note: Regarding photograph locations when downloaded from the Apollo 600+ into **PATGuard 3**, there are two options:

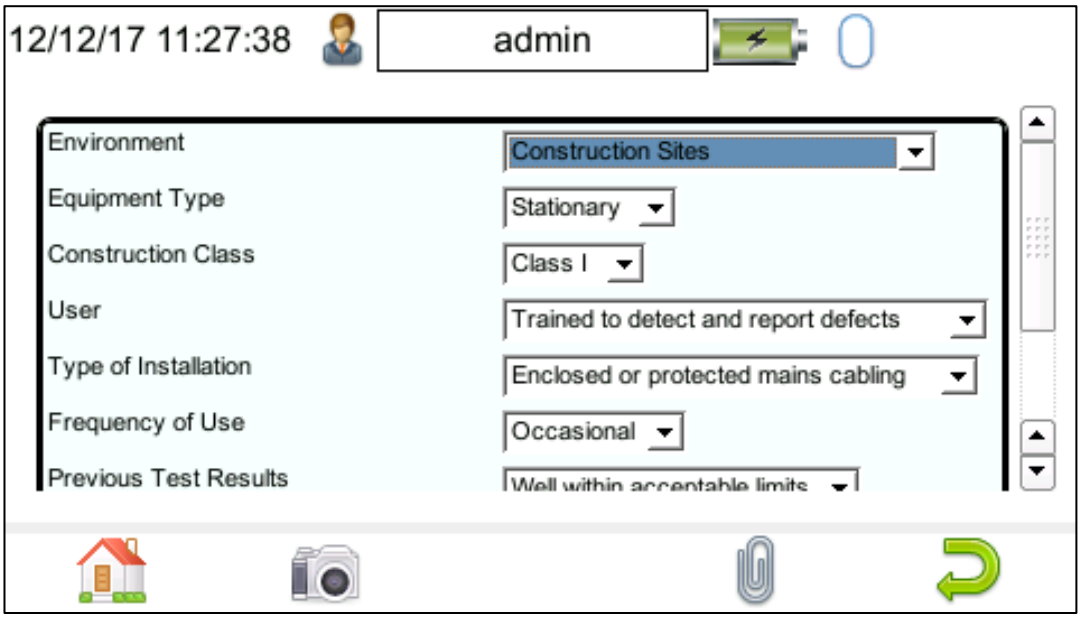
If the photograph is taken in the **Auto Mode** window it will appear as the main picture in **PATGuard 3** (in the **Asset Details** page)

If the photograph is taken during, or after the test, this picture will show in the **Test Results** – you will need to double click on the **Test Results** to view the **Test Details** page.

10.2 Auto Mode – Risk Based Retest Period Calculator

Using the Risk Based Retest Period Calculator (Apollo 500+ and 600+ only).

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.



Camera Function (Apollo 600+ only).

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

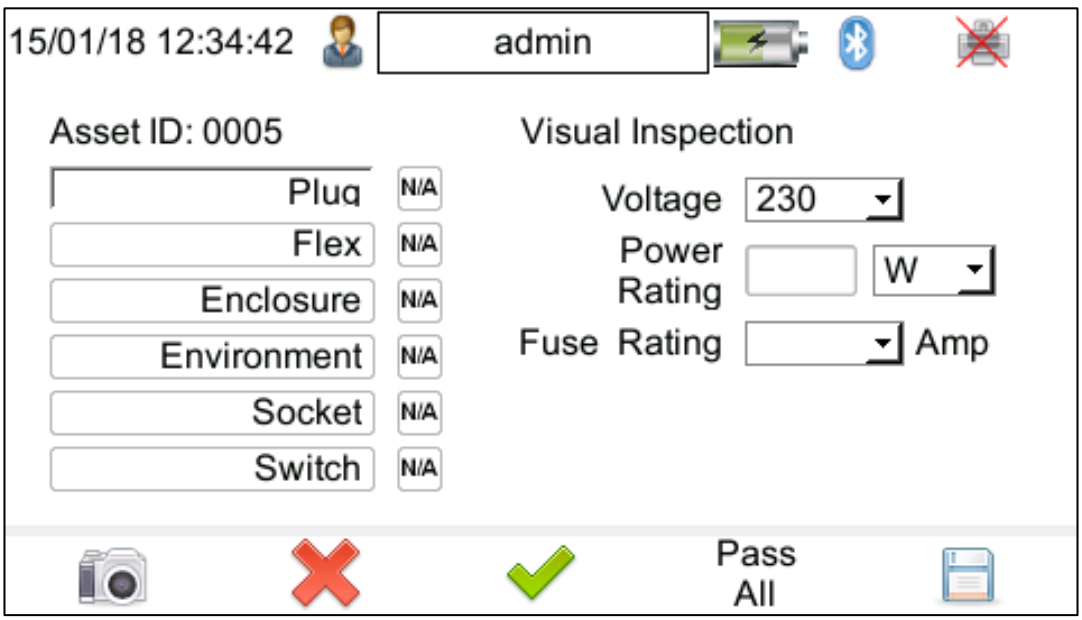
Once all the all test details such as Asset ID and Test Sequence has been entered and, if applicable photographs or a Risk Assessment has been performed, use **Accept** (F4) to move on to the test and inspection sequence and follow through the on screen instructions. Alternatively, use F5 to return to 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)** (Apollo 500+ and 600+ have up to four Lines, whereas, the Apollo 400+ has one Line only).

Select (F4) to save the record.

10.3 Auto Mode – The Visual Inspection

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



Using the **Camera** in this screen (F1) will tag the picture to the test result. (Note: Only the Apollo 600+ has the Camera feature)

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

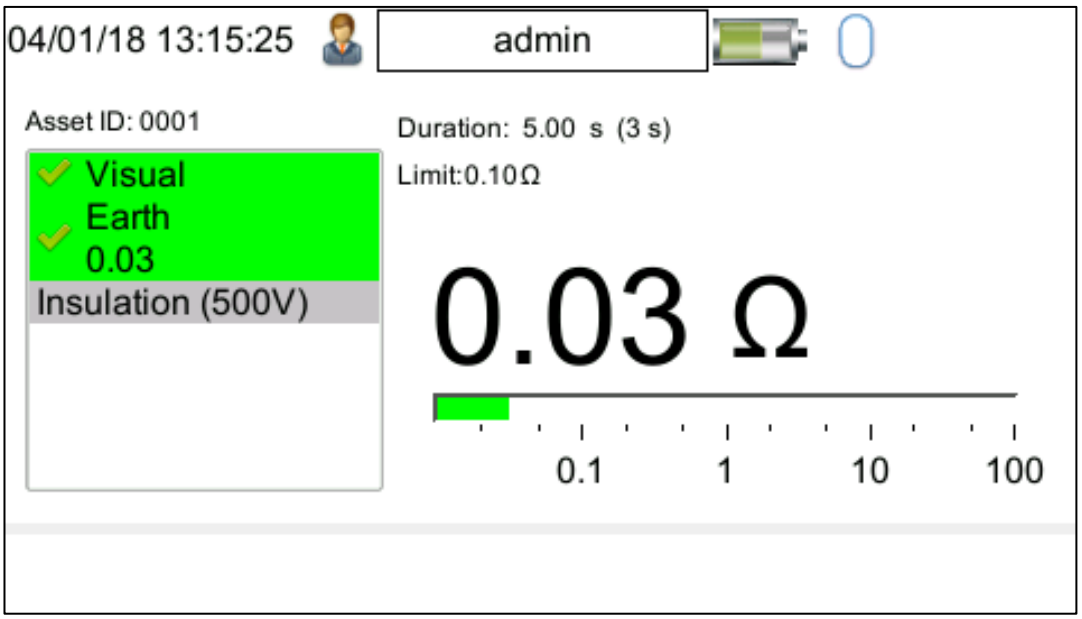
This is the **Pass** icon – use the keyboard arrow keys to highlight the parameter and F3 to **Pass** this part of the test.

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**.

10.4 Auto Mode – The Electrical Tests

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



The Apollo 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, 5.7.**

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 6**.

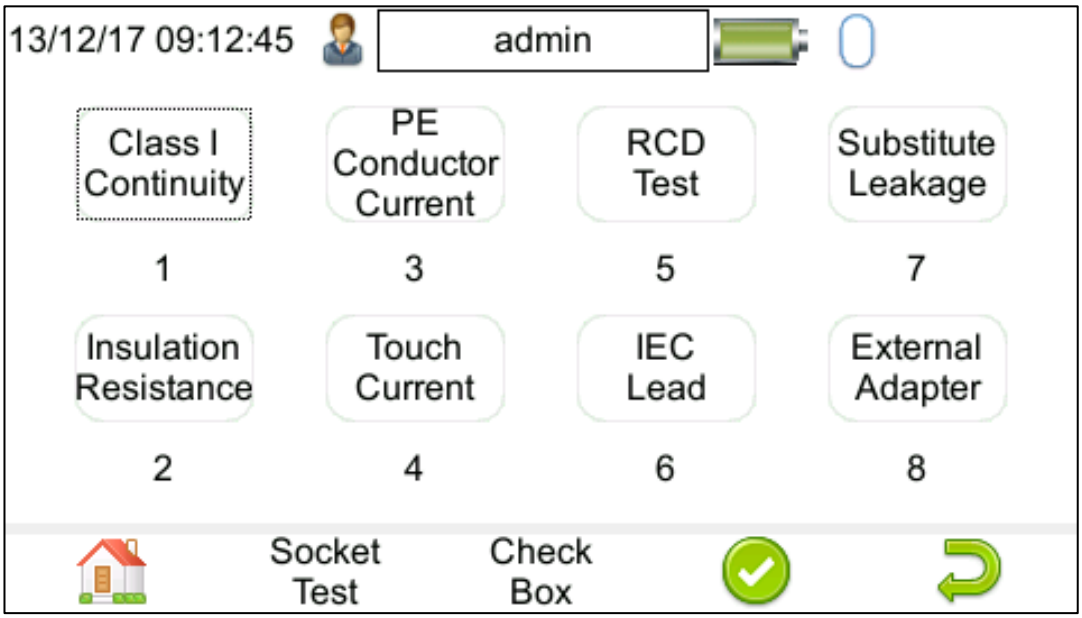
11 Performing an Electrical Safety Test – Manual Mode

The Apollo 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.

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 12, for specific information about each test type.

12 Test Functions

12.1 Earth Continuity

Always ensure that the circuit under test is electrically isolated.

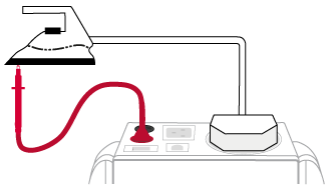
Note that measurements can be adversely affected by parallel resistances of additional circuits or by transient currents.

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.

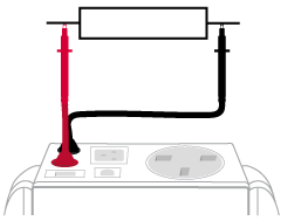
This test is applicable to Class I equipment. This test will measure one of the following:

- 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**

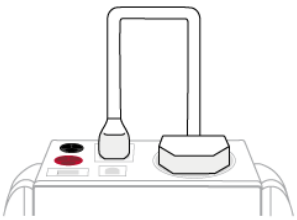
To ensure that the connection is satisfactory and of sufficiently low resistance, the measurement will be displayed in Ohms. There are three possible connection methods for the Earth Continuity test.



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 fails if you chose 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.

12.1.1 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 Apollo 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.

12.2 Insulation Resistance

Always ensure that the circuit under test is electrically isolated.

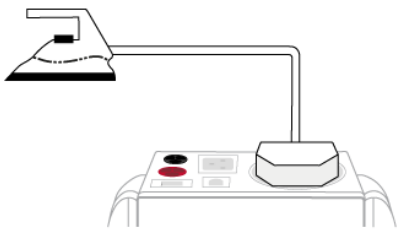
Connecting a test probe to a hazardous voltage when a point to point measurement is active will result in that voltage being present on the other tests probes.

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:

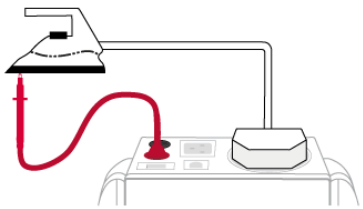
- **Insulation Resistance** between live circuits and the protective earth circuit in the **Equipment Under Test (EUT)** – **Class I / IEC lead insulation test**
- **Insulation Resistance** between live circuits and a test probe applied to the EUT – **Class II insulation test**
- **Insulation Resistance**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

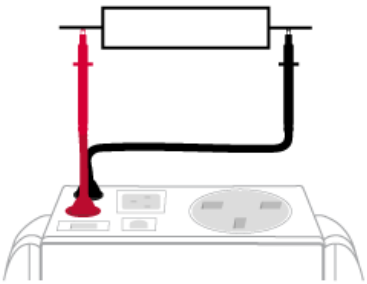


CLI and IEC Insulation Resistance
The test is performed between the EUT test socket live and neutral and the EUT test socket earth pin.

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.

12.2.1 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).

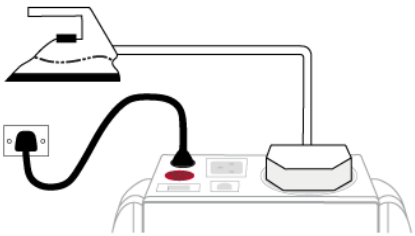
12.3 Protective Earth (PE) Conductor Current (Used on Class 1 Appliances)

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 Apollo+ 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.

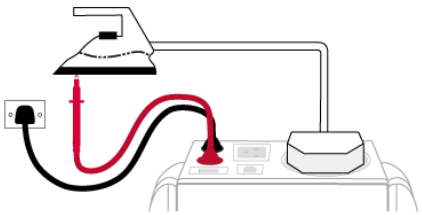
12.4 Touch Current

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 Apollo+ 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.

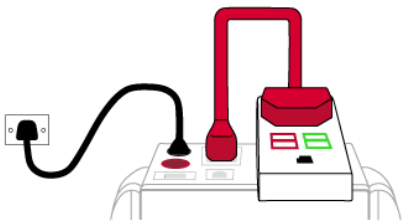
In **Manual Mode** once the correct connections have been made for the selected test type press the **Start** button, in automatic mode the test will proceed automatically. The test will continue until it times out. If we wish to abort the current test press the **Stop** button. The measurement will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

12.5 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.

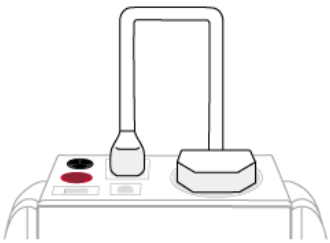


The Apollo+ Series should be connected to a mains supply. The RCD should be plugged into the EUT test socket (on the Apollo+ Series) and a connection should be made from the RCD mains output to the IEC test socket.

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 Apollo+ 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.

12.6 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.



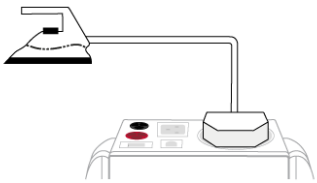
The Polarity test checks the wiring polarity of an IEC lead, the IEC should be plugged into both the **Equipment Under Test** (EUT) socket and IEC test sockets on the Apollo+ Series.

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.

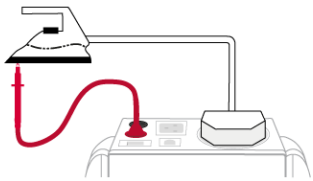
12.7 Substitute (Alternative) Leakage

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.

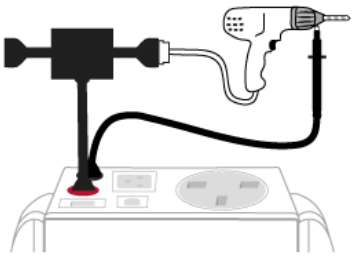
This test can prove useful in situations where neither conventional insulation nor flash tests are acceptable methods of testing the insulation of the appliance.

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 (eg 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.

12.8 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 Apollo+ Series, is intended to be used only in conjunction with the one of Seaward'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 6), ensure the **Earth Reverse** option is set to **Off** (not applicable to Apollo 400+).

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 Apollo+ Series instruments for the **External Leakage Adaptor**, however, the **Automatic Test Sequence Editor / PAT Edit** (see section 7.5), 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.

12.9 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 Apollo+ Series) 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 Apollo+ Series 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 Apollo **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 Apollo+ Series instruments for the **Socket Test**. This allows an inspection and electrical test to be performed on the **Socket** to be tested.

12.10 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 Apollo 500+ and 600+ are supplied with a Checkbox (this is an optional extra with the Apollo 400+). The Apollo Checkbox can be used to verify that the Apollo+ Series test functions are working correctly. When selecting the Checkbox function follow the onscreen instructions.

From the Apollo **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 Apollo+ Series

Connect the **Red** IEC lead between the **Equipment Under Test** (EUT) socket and the IEC on the Apollo+ Series (do not connect the **Checkbox** yet)

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

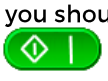
You will now see a page requesting you to **Attach checkbox**

Keep the **Red** IEC lead connected to the EUT socket on the Apollo+ Series and then connect the **Checkbox**

Connect the **Red** test lead to the **Red** test socket on the Apollo+ Series 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.

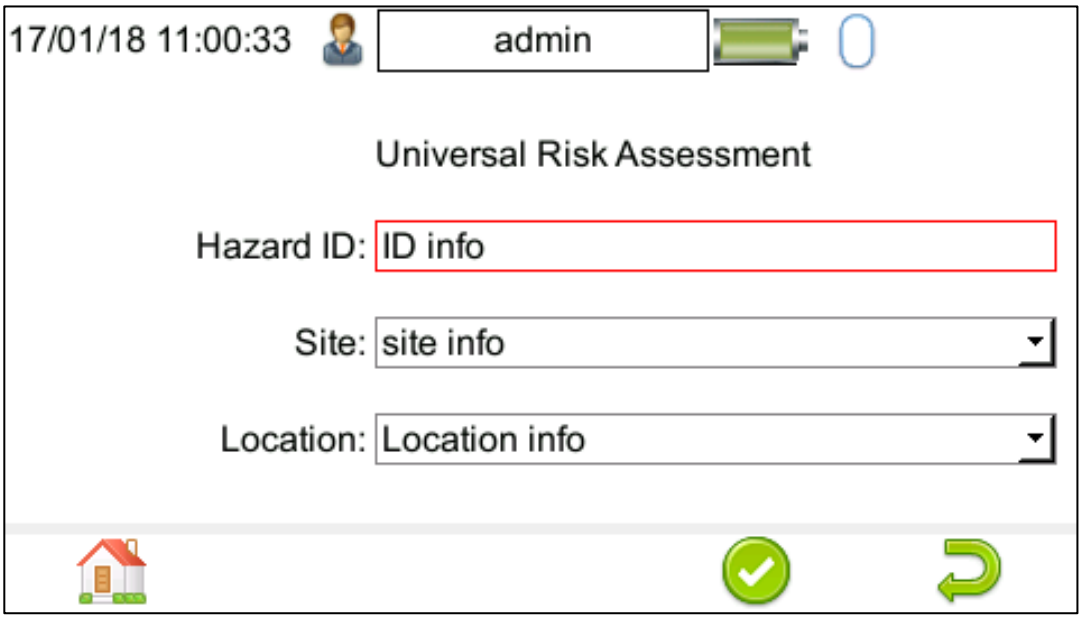
The **Test Sequence** should now be complete and a message displaying the outcome will be displayed – confirm this using the **Return** key (the button above the green start button).

13 Universal Risk Assessment (Apollo 600+ Only)

This function allows you to complete **Universal Risk Assessments** for workplace hazards and calculate a risk score.

From the Apollo 600+ **Home Screen**  select  (F2) to enter the **Universal Risk Assessment** (URA) window.

Select  (F2) to add a new hazard. Use  (F4) to configure the URA settings.

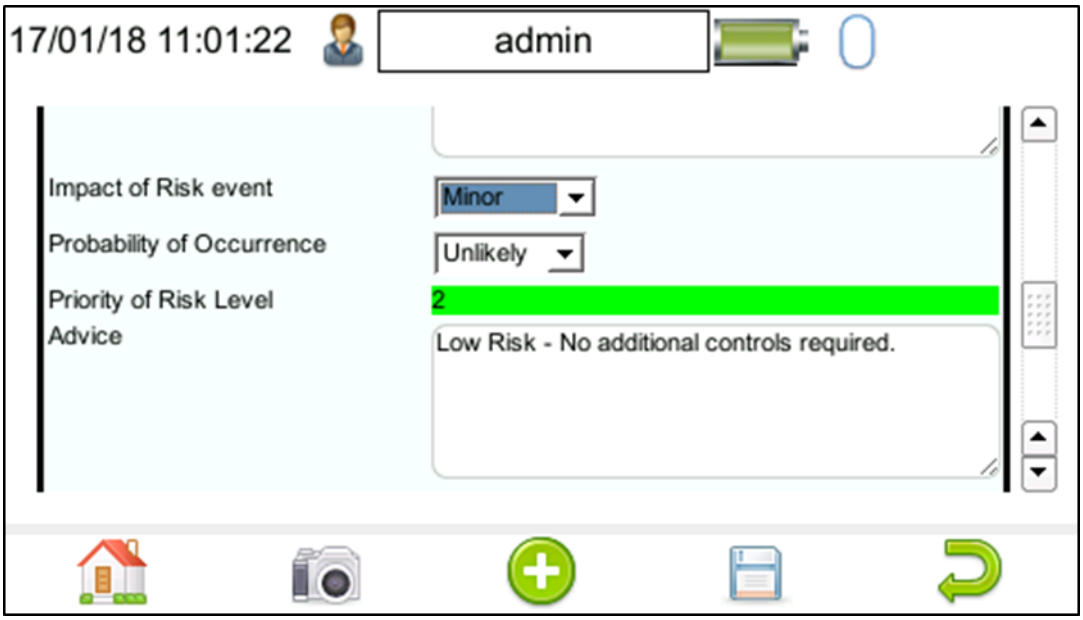


Enter a **Hazard ID**, and the **Site / Location** information (from the dropdown if required), in the **Universal Risk Assessment** window and use the **Accept** button  (F4) or use  (F5) to return.

Use the keyboard arrow keys to move through the form and the QWERTY keyboard to complete the relevant fields.

You can use the **Camera** function (F2) to attach photos to the record (see section 10.1 Auto Mode – Camera Function (Apollo 600+ Only)

If necessary, you can **Add** (F3) corrective actions, assign them to personnel, and give dates for completion.



Use the **Right** and **Left** keyboard arrow keys to select **Impact of Risk event** and **Probability of Occurrence**. This will give a calculated score between 1-12 for **Priority of Risk Level** and **Advice** based on this score.

Use F4 to **Save** changes and return to the previous screen or use  (F5) to return.

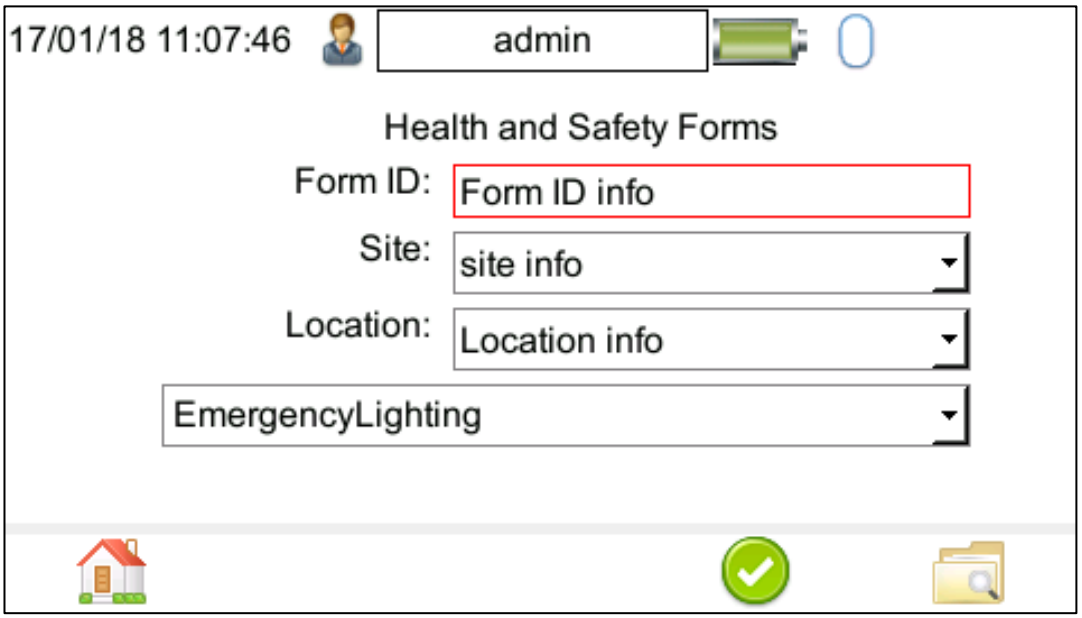
14 Health & Safety Reports (Apollo 600+ Only)

This function allows you to complete and save **Health & Safety Forms** such as **Emergency Lighting** and **Fire Alarm & System Inspection** reports.

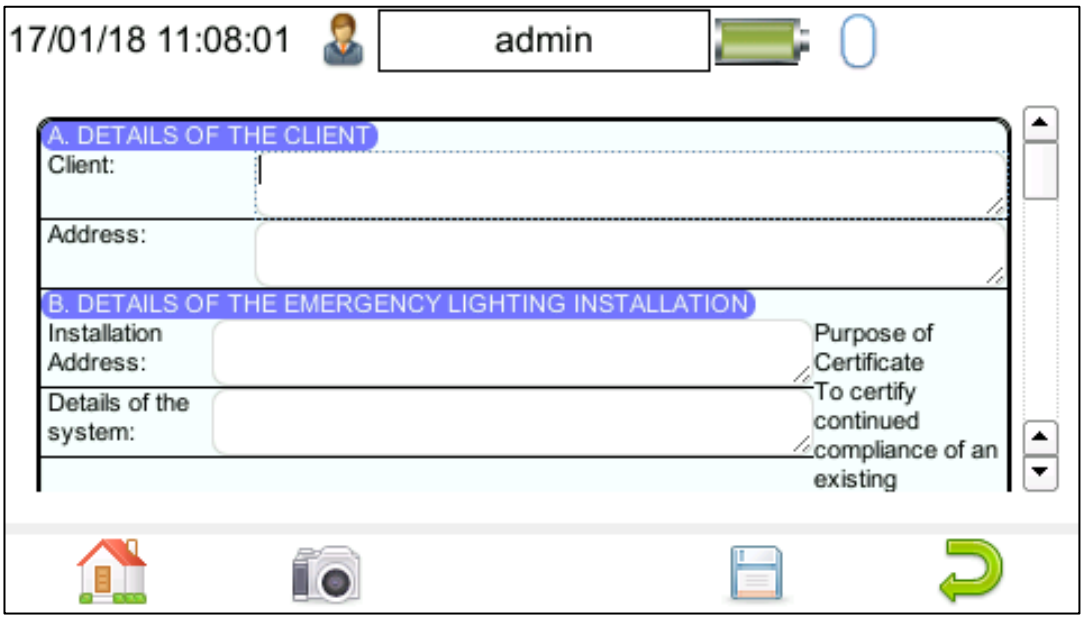
From the Apollo 600+ **Home Screen**  select  (F3) to enter the **Health & Safety Forms** selection window. This allows you to complete and save **Health & Safety Forms** such as **Emergency Lighting** and **Fire Alarm & System Inspection** reports.

14.1 Health & Safety Reports - Emergency Lighting Report (Apollo 600+ Only)

This function allows you to complete and save **Health & Safety Forms** such as **Emergency Lighting** and **Fire Alarm & System Inspection** reports.



Enter a **Form ID**, the **Site** / **Location** information and the form required – **EmergencyLighting** from the dropdown and use the **Accept** button  (F4).



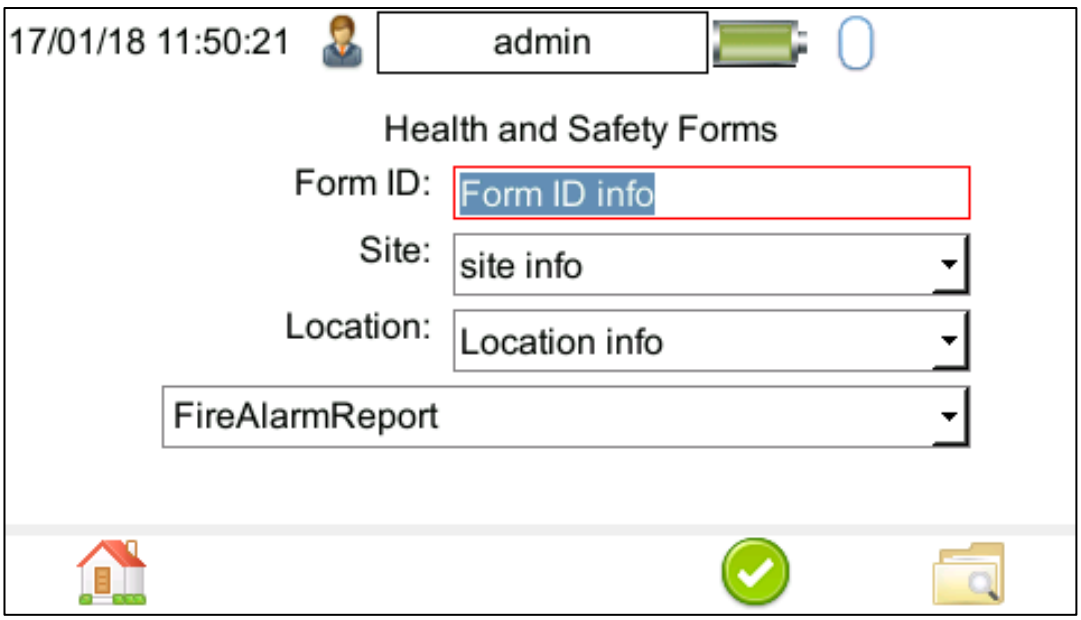
Use the keyboard arrow keys to move through the form and the QWERTY keyboard to complete the relevant fields.

You can use the **Camera** function (F2) to attach photos to the record (see section 10.1 Auto Mode – Camera Function (Apollo 600+ Only)

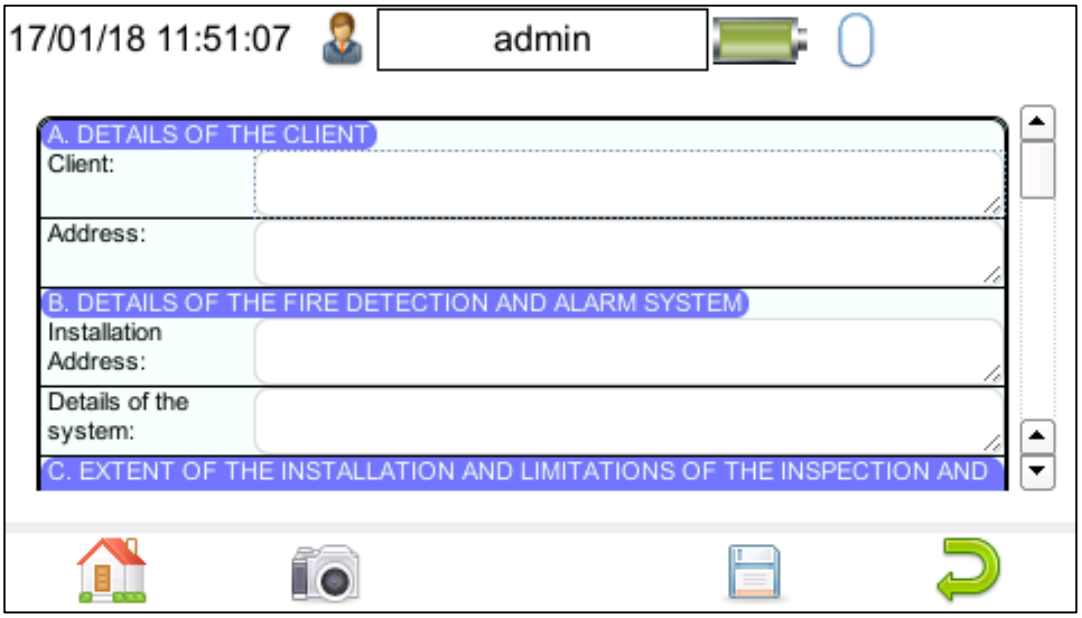
Use F4 to **Save** changes and return to the previous screen or use  (F5) to return.

14.2 Health & Safety Reports - Fire Alarm Report (Apollo 600+ Only)

This function allows you to complete and save **Health & Safety Forms** such as **Emergency Lighting** and **Fire Alarm & System Inspection** reports.



Enter a **Form ID**, the **Site / Location** information and the form required – **FireAlarmReport** from the dropdown and use the **Accept** button (F4).



Use the keyboard arrow keys to move through the form and the QWERTY keyboard to complete the relevant fields.

You can use the **Camera** function (F2) to attach photos to the record (see section 10.1 Auto Mode – Camera Function (Apollo 600+ Only)

Use F4 to **Save** changes and return to the previous screen or use (F5) to return.

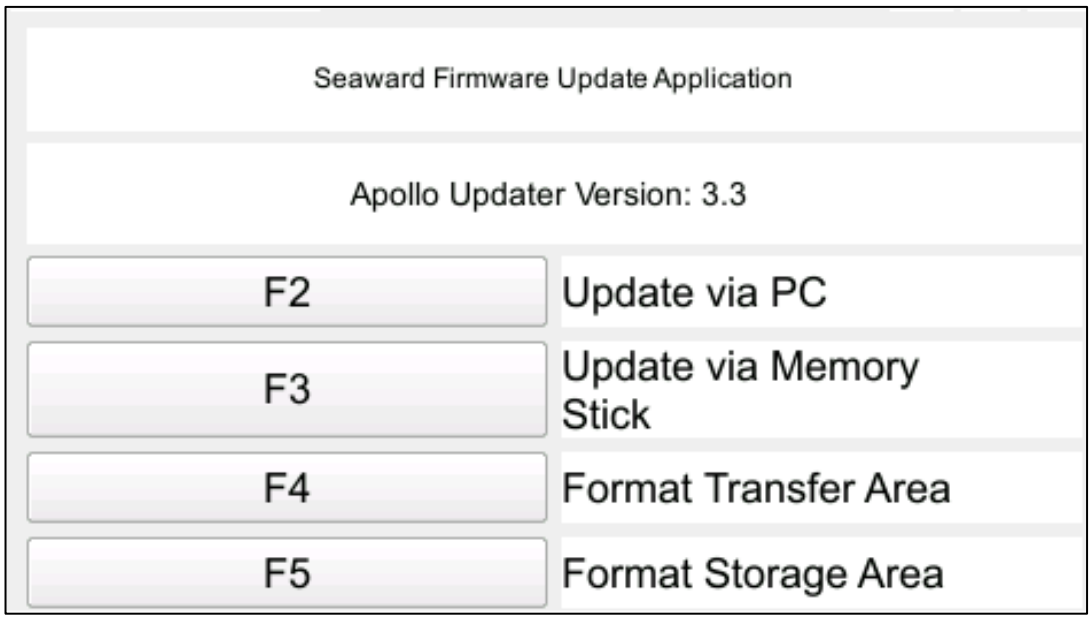
15 Updating your Firmware

To check the firmware version on your Apollo+ Series, 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 the following: www.seaward.com/ApolloSeries

Make sure you backup (download) any data on your instrument beforehand. You may want to also clone (download) your settings data (Apollo 500+ and 600+) so that you can upload these afterwards.

Make sure the Apollo+ Series is switched off. Press and hold the function key F1, then press the **ON** button to power on the Apollo+ Series, keeping the F1 key depressed until the updater screen is displayed.



Press **F2** to **Update via PC** (Apollo+ Series). Connect the USB lead between the PC and the Apollo+ Series and press **F1**, as instructed.

Copy the downloaded firmware file (with extension **.tar.bz2**) to the new Apollo+ Series drive on your PC (for example, Apollo (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 Apollo+ Series powers off. The firmware update, via the PC, is now complete and the Apollo+ Series is ready to use.

16 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

17 Useful Information

17.1 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

17.2 Other Information

Parameter	Default	Min	600+ (max)	500+ (max)	400+ (max)
Earth Continuity Pass / Fail limit (Ω)	0.1	0.01	19	19	19
Earth Continuity Duration (s)	5	2	30	30	30
Insulation Resistance Pass / Fail limit (MΩ)	1	0.1	19	19	19
Insulation Resistance Duration (s)	2	2	30	30	30
Substitute (Alternative) Leakage Pass / Fail limit (mA)	0.75	0.25	19	19	19
Substitute (Alternative) Leakage Duration (s)	5	2	99	99	99
IEC Cord Earth Continuity Pass / Fail limit (ohms)	0.1	0.01	19	19	19
IEC Cord Insulation Pass / Fail limit (MΩ)	1	0.1	19	19	19
PE Conductor Current Pass / Fail limit (mA)	0.75	0.25	19	19	19
PE Conductor Current Duration (s)	5	2	240	240	240
Touch Current Pass / Fail limit (mA)	0.25	0.25	3.40	3.40	3.40
Touch Current Duration (s)	5	2	30	30	30
External Adapter Continuity (Ω)	0.1	0.01	19	19	19
External Adapter Leakage (mA)	0.75	0.25	9	9	9
External Adapter Duration (s)	2	2	30	30	30
RCD 30mA trip time (ms)	200	1	2000	2000	2000
RCD 150mA trip time (ms)	40	1	40	40	40
Number of Tests in a Test Sequence		1	60	60	60
Characters in a Test Sequence Name		1	30	30	30
Characters in a User Test name		1	40	40	15
Characters in a User Test Unit		1	12	12	15
Total number of Test Sequences			100	100	25
Test Results (Typical)			50000	10000	2000
Sites			100	100	50
Characters in Site name		1	15	15	15
Locations			100	100	50
Characters in Location name		1	15	15	15
Number of User Accounts (Including Admin)			50	50	2
Characters in User name		1	15	15	15
Comments List (Asset Description)			300	100	100
Comments List (Other Descriptions)			100	100	100
Characters in a Comment			25	25	25
Characters in Asset ID		1	15	15	15
Items in Custom Inspection Form		1	12	12	N/A
Characters in Inspection Form Item		1	20	20	N/A
Barcode, Standard Label Formats (25 and 75mm)			6	6	6
Barcode, Extra Durable Label Formats (25 and 75mm)			6	6	6
QR Code, Standard Label Formats (75mm only)			6	6	N/A
QR Code, Extra Durable Label Formats (75mm only)			6	6	N/A
RFID Reader (Comments Line Entry Only)			Yes	N/A	N/A

18 Environmental Conditions

The Apollo 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.

19 Maintenance

19.1 Securing the Apollo+ Series

Under certain conditions safe operation of the Apollo 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 Apollo should be immediately switched off, disconnected from any test and measurement function and secured to prevent any further use.

19.2 Cleaning the Apollo+ Series

Clean the external case of the Apollo with a dry clean cloth.

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

20 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 Seaward Service Agent. We recommend a recalibration period of one year.

Should the Apollo+ Series become faulty please secure the instrument so that is can longer be used. Ship the Apollo+ Series back to a Seaward authorised dealer.

For help or advice on Service and Calibration contact:

Service Department
Seaward Electronic
Bracken Hill
South West Industrial Estate
Peterlee
Co Durham SR8 2SW
England
Tel: 0191 5878739 / 0191 5878737
Email: service@seaward.com

20.1 Calibration Statement

The Apollo+ Series is fully calibrated and found to be within the specified performance and accuracy at the time of production. The Seaward 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: service@seaward.com

Part Number 380A5510 | Revision 1.1

21 Online Resources

INFORMATION & MANUAL DOWNLOAD

For more information about your Seaward Apollo Plus and for a downloadable version of the operational manual please got to
www.seaward.com/Apolloseries

SOFTWARE DOWNLOAD

To download the Apollo plus software supporting PATGuard 3, Time manager 3 and Auto scheduler, please go to
www.seaward.com/PATGuard3

REGISTER YOUR APOLLO+ NOW

To register and activate your Apollo Plus please go to
www.seaward.com/register