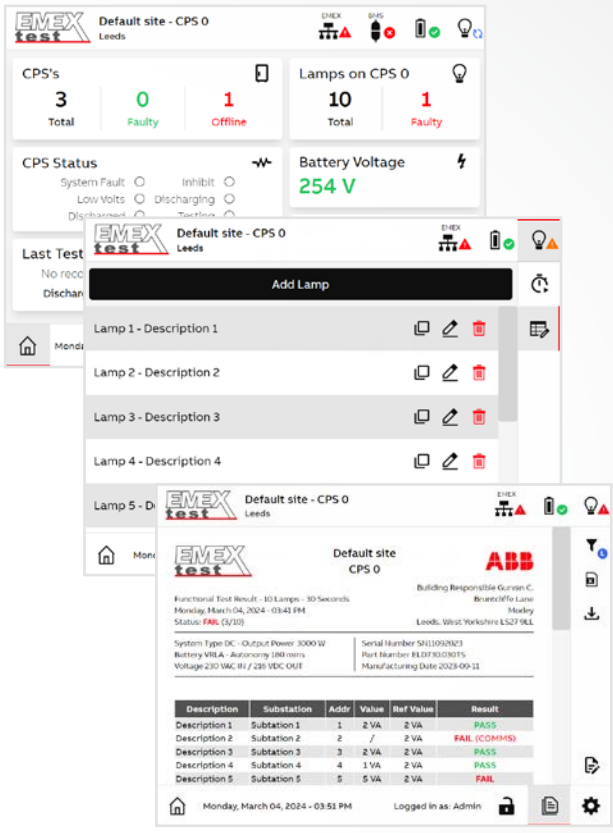
USER MANUAL

EMEX Test



What’s EMEX Test?

EMEX Test is an industry-leading emergency lighting central system testing solution that has been explicitly designed to ensure the best operation of emergency lighting systems in adherence with current regulations and risk assessment requirements.

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Introduction

Software

EMEX Test software is the heart of the entire EMEX Test system and as such, offers detailed address information of all connected Central Power Supply Systems and luminaires. The software's primary function is to manage the automated, scheduled testing of the emer-gency lighting system's power supply. This process is designed not only for compliance with mandatory testing regulations but also to provide users with peace of mind and an in-depth understanding of their system's performance and needs.
The EMEX Test software is simple to use with key functions that include automating, scheduling, and reporting of tests, which are designed to be conducted during periods of minimum disruption. Using an intuitive and friendly user interface, test scheduling is quick and user friendly to configure. Once set up, the software can run independently, diligently conducting the requisite tests in the background running on a Windows IoT operating system (OS).
BACnet support, this allows Building Management Systems (BMS) to monitor the status of the system, providing a level of adaptability for the owner's or occupier's needs by enabling them with full control to access system information as needed

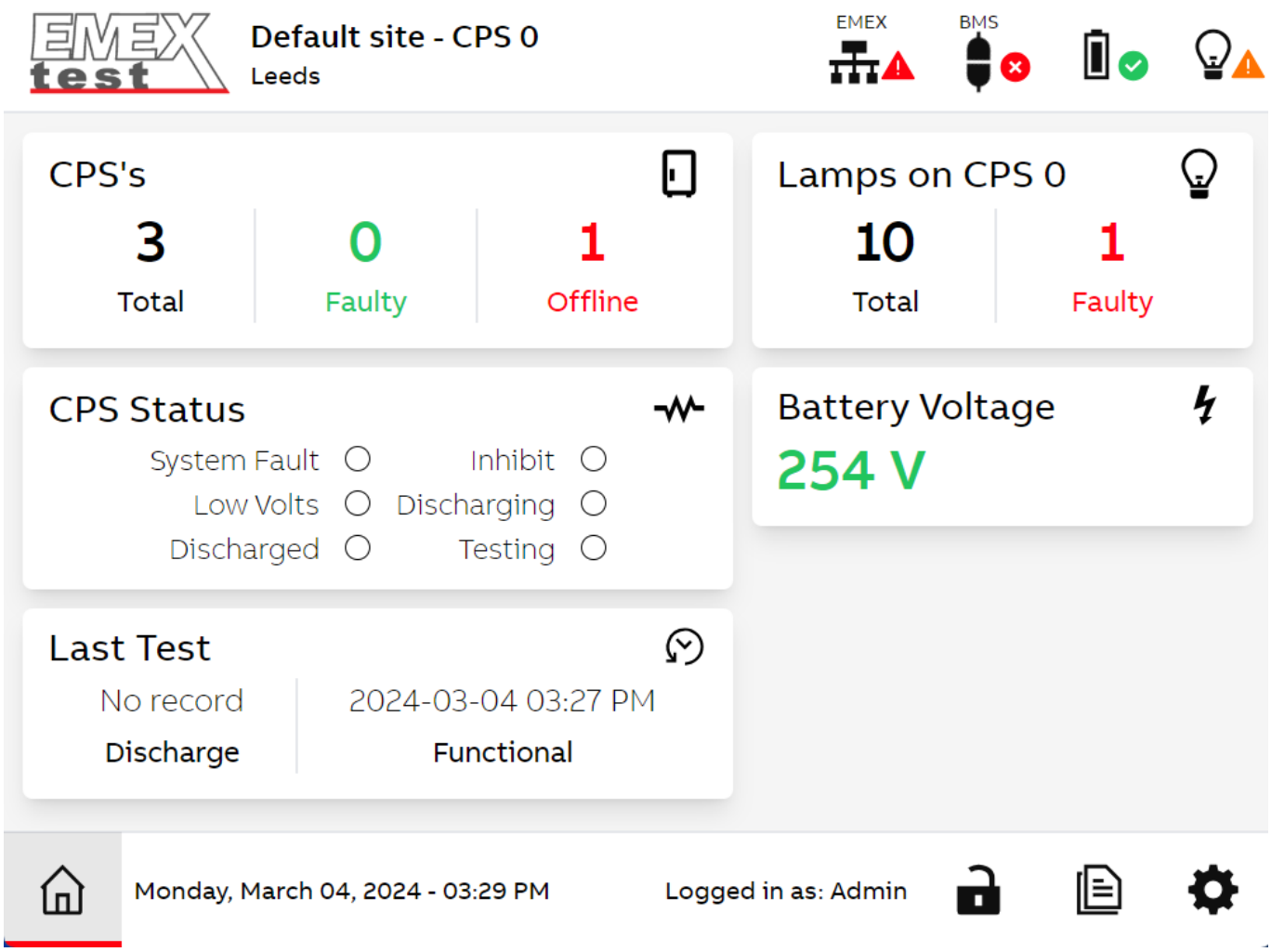
Note: The software can have a maximum of 50 CPS connected. It doesn't communicate simultaneous to all CPS the system will connect to each CPS panel one at a time. This means we are getting the CPS's status one by one and can only run a test (Discharge or functional test) on one CPS at a time.

User Guide

The software starts automatically when the operating system boots up, it will display a loading screen and then you will arrive on the home page.

Home page

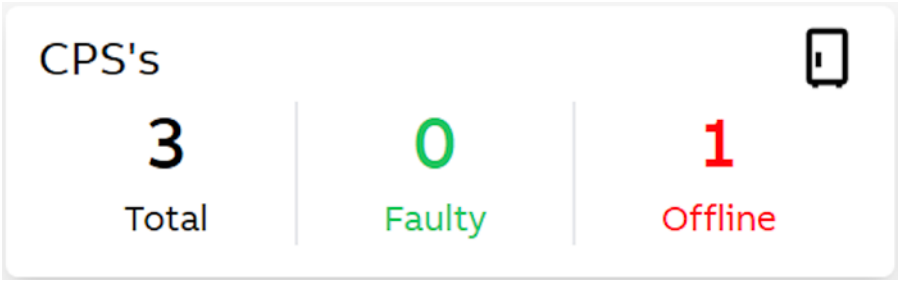
The home page is the dashboard where you can have an overview of current CPS status. It provides you with vital information about each part of the system.



Home page

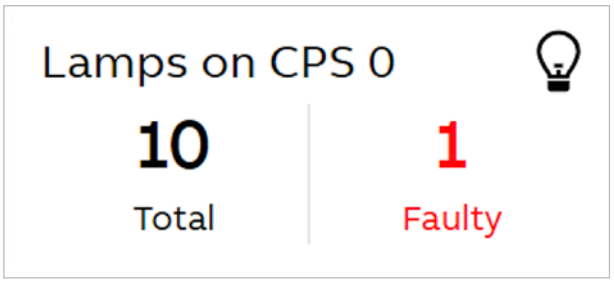
CPS's

This displays the total number of Central Power Supplies (CPS) configured on the system, the number of CPS that are faulty (common fault) and the number of CPS offline.



CPS Lamps

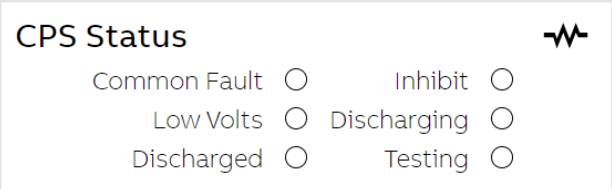
Displays the total number of lamps configured on the current CPS and the number of those lamps that are faulty. The number of lamps displayed as faulty are the result of the last test (functional or discharge.) A lamps is considered faulty if the lamp fails to communicate or if the measured lamp wattage is outside of the reference wattage range when conducting a test.



Home page

CPS Status

The CPS status array indicators provide feedback with different colours when a status is flagged.



1. **Common Fault:** This indicates in red that there is a fault somewhere in the CPS. It also activates the alarm relay in the CPS.
2. **Low Volts:** This shows in amber that the battery voltage is below 2% of the correct setting. It usually means that a discharge is taking or has taken place, and the battery is not fully charged. The alarm may also be triggered if the temperature rise above 30 degrees Celsius, as this will have a long term detrimental effect to the batteries. Refer to the central power supply manual for further information.
3. **Discharged:** This shows in red that the mains are present, but the battery is fully discharged. This signal, in online mode, will disappear when the battery has charged to approximately 60% of full capacity and can be used for another discharge.
4. **Inhibit:** This shows in red. There is an inhibit switch in the CPS that stops it running. This has been turned on. It is normally used for maintenance purposes. It must be turned off to enable normal operation.
5. **Discharging:** This shows in red. This indicates that the CPS is running and discharging the battery.
6. **Testing:** This shows in green. This indicates that the system is performing a test, and the CPS is in discharge mode.

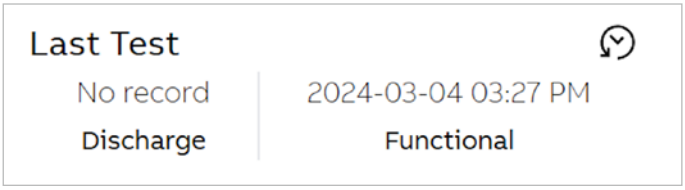
Battery Voltage

This is the current battery voltage. Some calculations are made from the software based on the “Reference Voltage” set in the CPS settings page.
Note – The Accuracy of this voltage scaling is +/- 2%

Home page

Last test

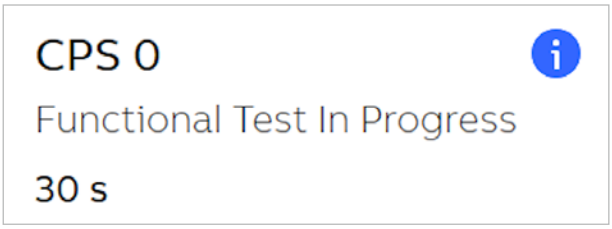
This shows when the last time a discharge test (Full discharge or Partial discharge) and a functional test was executed. If no record of any tests, it will be displayed “No record”.



Current test running

This is displayed when a test is running on a CPS, it will show the following information:

1. The CPS address & where the type of test being executed.
2. The type of test (Functional, Partial Discharge or Full Discharge test).
3. The current test status (Starting, Time left, Stopping or Saving Results).



Header

This is the software header that shows global information and status about each part of the system.

Header text

On the right side of the "EMEX test" logo (See previous figure), you can find information about the site and CPS:

1. **"Default site"**: this is the site name, it's editable on the CPS settings page.
2. **"CPS 0"**: this is the current CPS address selected.
3. **"Leeds"**: this is the current CPS location, it's editable on the CPS settings page. If no location is defined, it will not be displayed.

Header EMEX icon

The EMEX icon is the communication status between the CPS and the software. It's also where you can access the CPS list page by clicking on it, it will display all the CPS's configured with their status.

Below is the meaning of the different status icons

1. Global communication issue, the communication is lost between the CPS and software. It's mostly an issue with serial port cable or the wrong port is used.
2. Communication issue with one or more CPS's, there is no issue with the serial port communication but an issue to communicate with one or more of the CPS's.
3. Communication OK, the communication is working correctly between the CPS's and the software.

Header BMS icon

The BMS icon is the communication status between the software and BMS when the feature is enabled. It's also where you can access the BMS settings page by clicking on it.

Below is the meaning of the different status icons:

1. Communication issue, the communication is lost between the software and BMS. It's mostly an issue with serial port cable or the wrong port is used.
2. Communication OK, the communication is working correctly between the software and LIOB (BMS).

Header

Header Battery icon

The battery icon is the CPS status on the current CPS.

Below is the meaning of the different status icons:

1. CPS low voltage or discharging.
2. CPS is in a normal state.
3. CPS common fault or inhibit or discharged.
4. CPS is running a full discharge or partial discharge test.

Header Lamp icon

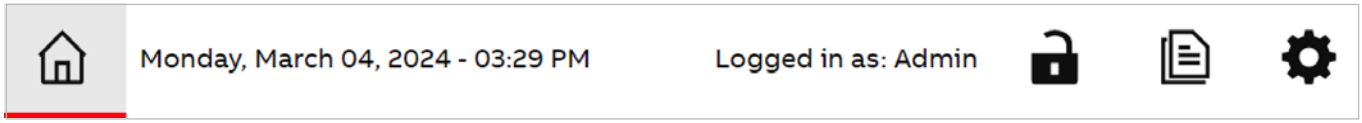
The lamp icon is the global status of all luminaires on the current CPS.

Below is the meaning of the different status icons:

1. Less than 10% of the luminaires are in fault from the last test.
2. More than 10% of the luminaires are in fault from the last test.
3. No lamp fault was detected from the last test.
4. A functional test is running.

Footer

This is the software footer that shows information about the current date and time , and user logged in.



Footer lock close and lock open icon

The lock close icon and lock open icon shows if a user is logged in.

By clicking on the lock close icon, it will show you the PIN dialog.

By clicking on the lock open icon, it will log out the current user and navigate to the Home page.

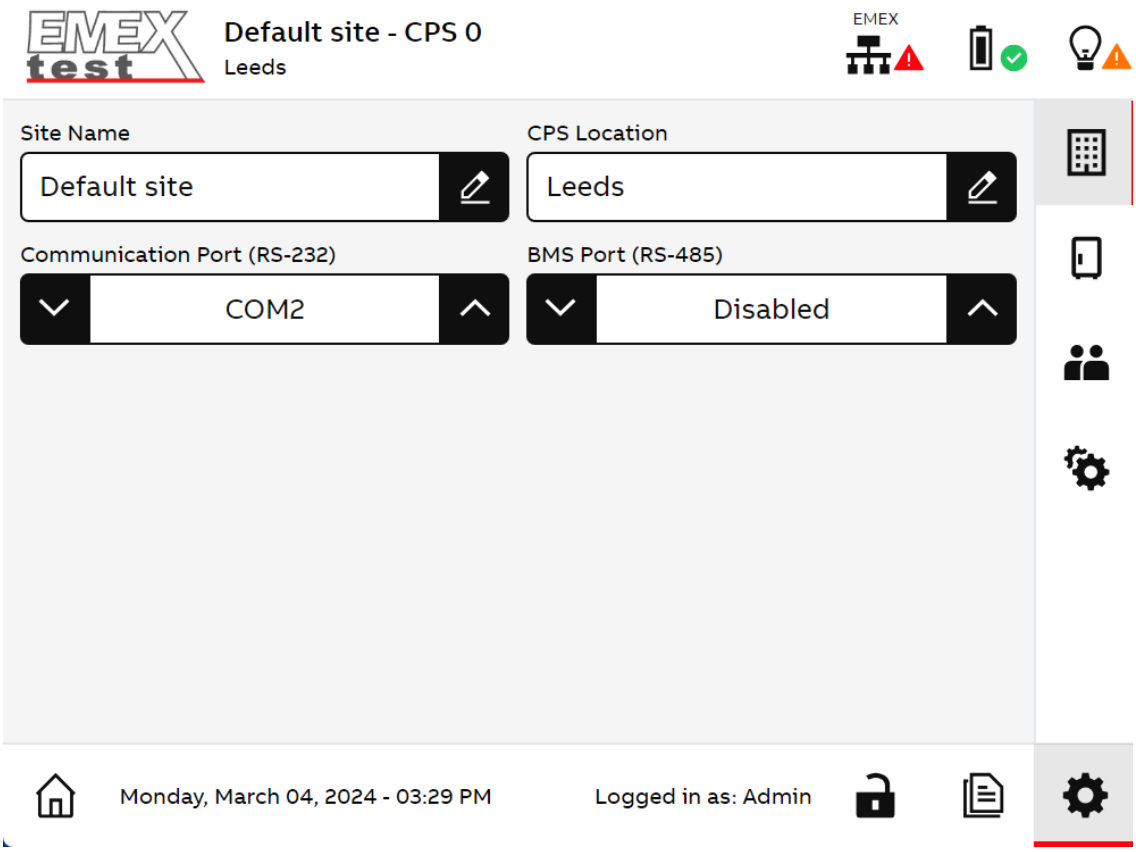
Footer reports icon

By clicking on the reports icon, you can access the Reports page.

Footer

Footer cog icon

By clicking on the cog icon, you can access the settings menu on the right, and navigate to the Site Settings page.

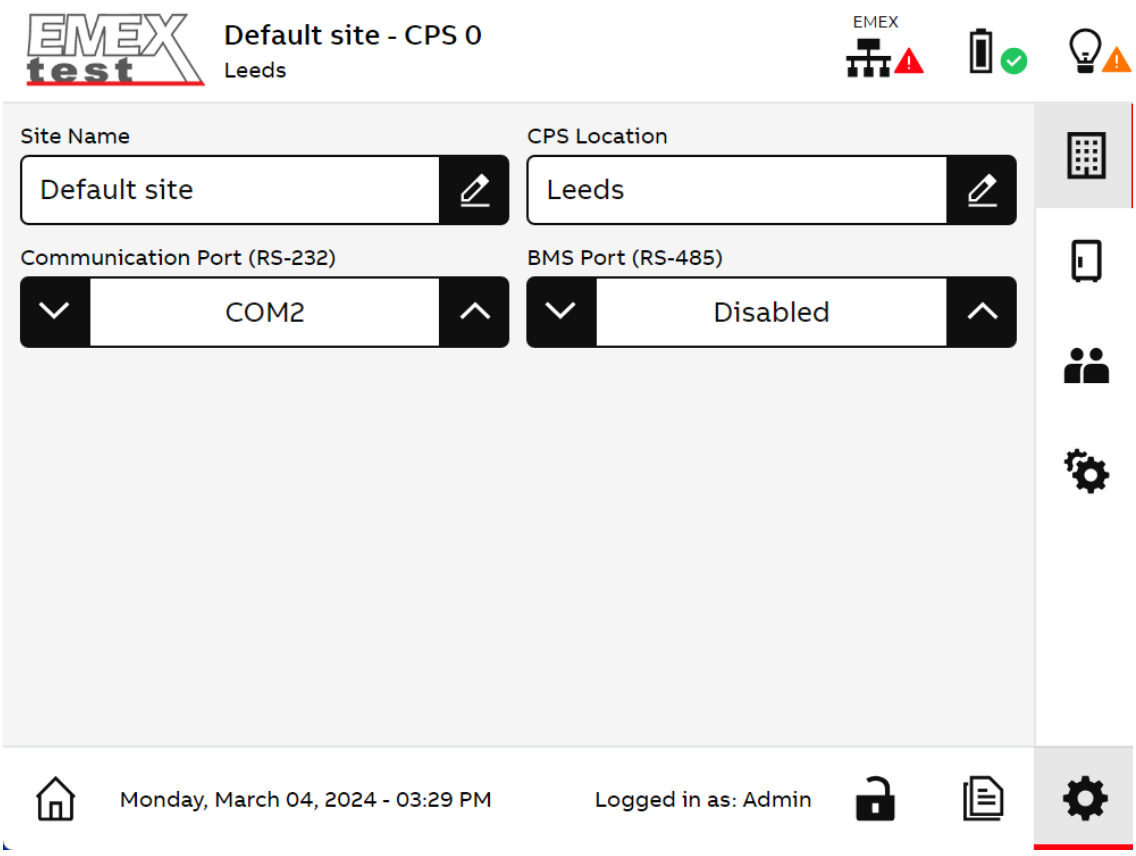


Settings

Users can have access to the software settings by clicking on the “cog” icon at the bottom right. After you logged in, it will display on the right hand side of the menu settings.

Site settings

By default, when you navigate to the settings it will display the Site settings page:



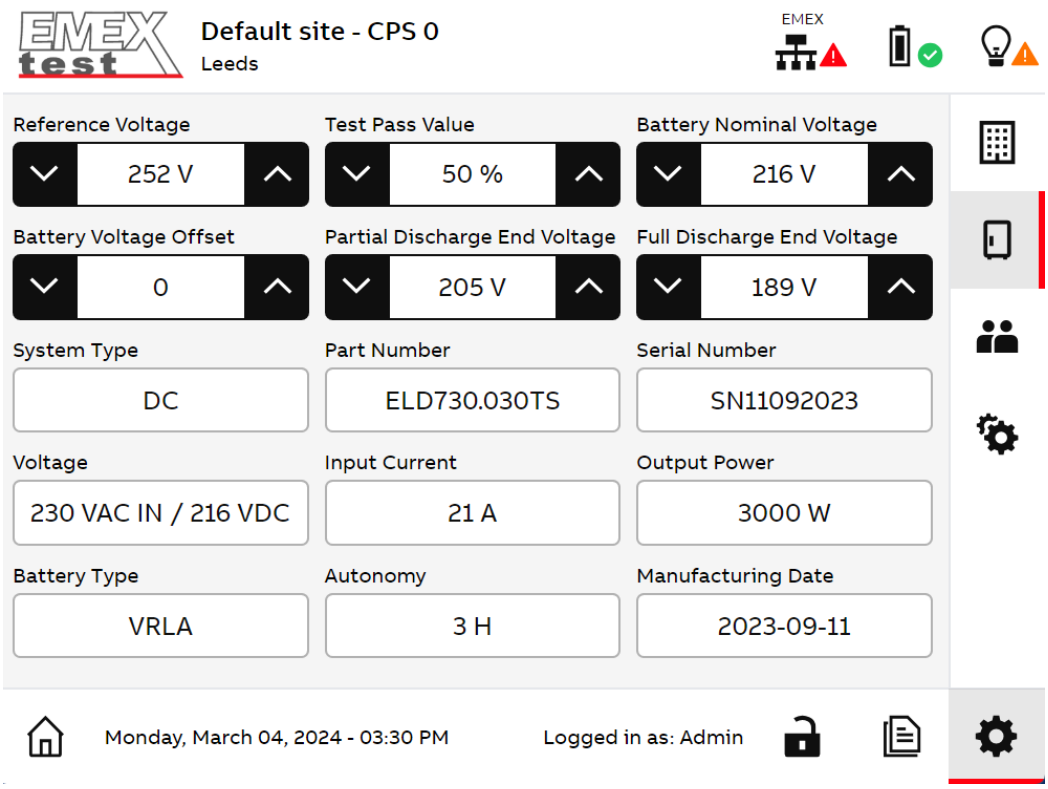
On this page you can change the following settings

1. **Site Name**: This is name of the site for your CPS, it will be displayed in the header and in the reports. Up to 26 characters are allowed.
2. **CPS Location**: This is the CPS location input to identify the location of the CPS, it will be displayed in the header and in the reports. Up to 16 characters are allowed.
3. **Communication Port (RS-232)**: This changes the COM port for the EMEX network. By default, it’s set to “COM2” for the Touchscreen.
4. **BMS Port (RS-485)**: This is the modified COM port for the BMS network (Modbus). By default, it’s set to “COM1” for the Touchscreen and should not be changed.

Settings

CPS settings

To navigate to the CPS settings page, click on the “CPS” icon in the menu settings on the right.



On this page you can change the following settings :

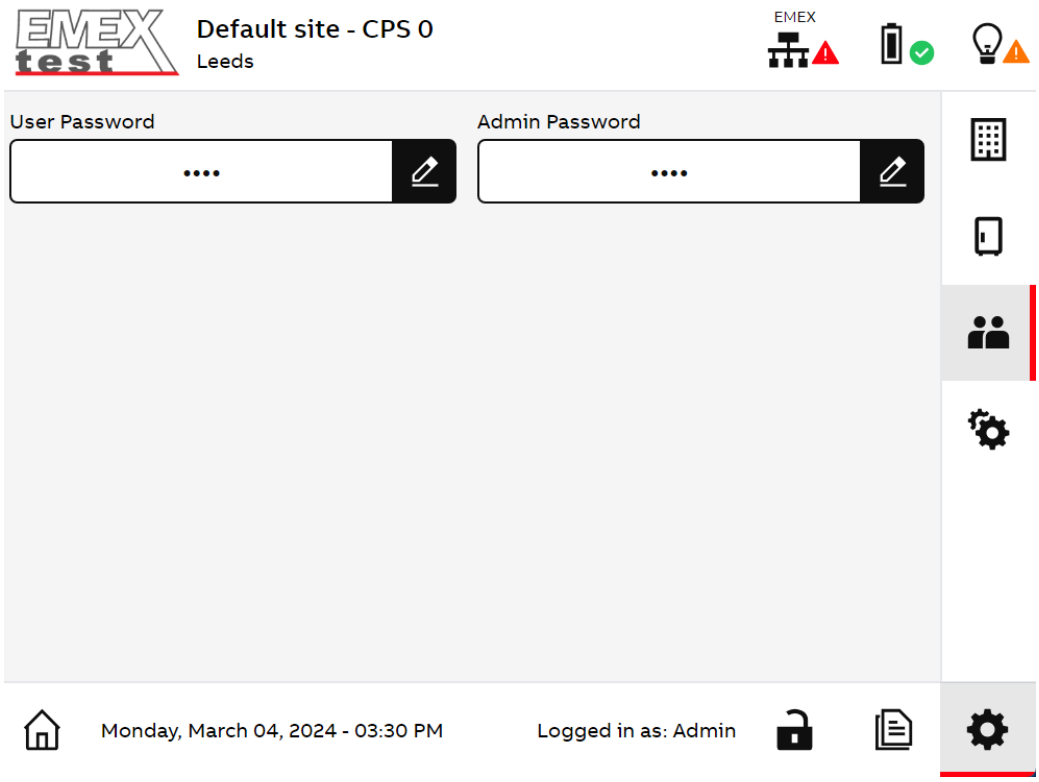
1. **Reference Voltage**: This is the battery reference voltage; it’s used to determine the current measured battery voltage.
2. **Test Pass Value**: This value is the acceptance range that the lamp wattage is allowed to vary ± by before the lamp is flagged as faulty. Default to 50%. (e.g: Lamp Reference Power value is 2 VA, test pass value is set 50%, any value between 1 to 3VA is accepted, otherwise it will be flagged as faulty)
3. **Battery Nominal Voltage**: This is the battery nominal voltage, used only for reference.
4. **Battery Voltage Offset**: This is the battery voltage offset; it’s used to adjust the current battery voltage measured.
5. **Partial Discharge End Voltage**: This sets the minimum battery voltage level during a partial discharge test. If the battery voltage falls below this level during the test, then the test will be deemed as a failure and marked as faulty in the test report. The “partial test end voltage” level should be set higher than “Full Discharge end Voltage”.
6. **Full Discharge End Voltage**: This sets the minimum voltage that the battery can be discharged to during a full discharge test. If the battery voltage falls below this level during the test, the CPS will be deemed as a failure and marked as faulty in the test report. The minimum level for is set at 1.75v/c, 95Volts for 54Cell AC, 105V for 60Cell AC and 189V for 108Cell DC System.

Settings

Password settings page

To modify the “Admin” or “User” password:

1. Click on the cog icon at the bottom right, log in as an “Admin” or “User”.
   Note: “User” can only change “User” password and “Admin” will be able to change both “User” & “Admin” passwords
2. Click on the “double user” icon in the right menu, it should navigate to the Password settings page like on the figure below:

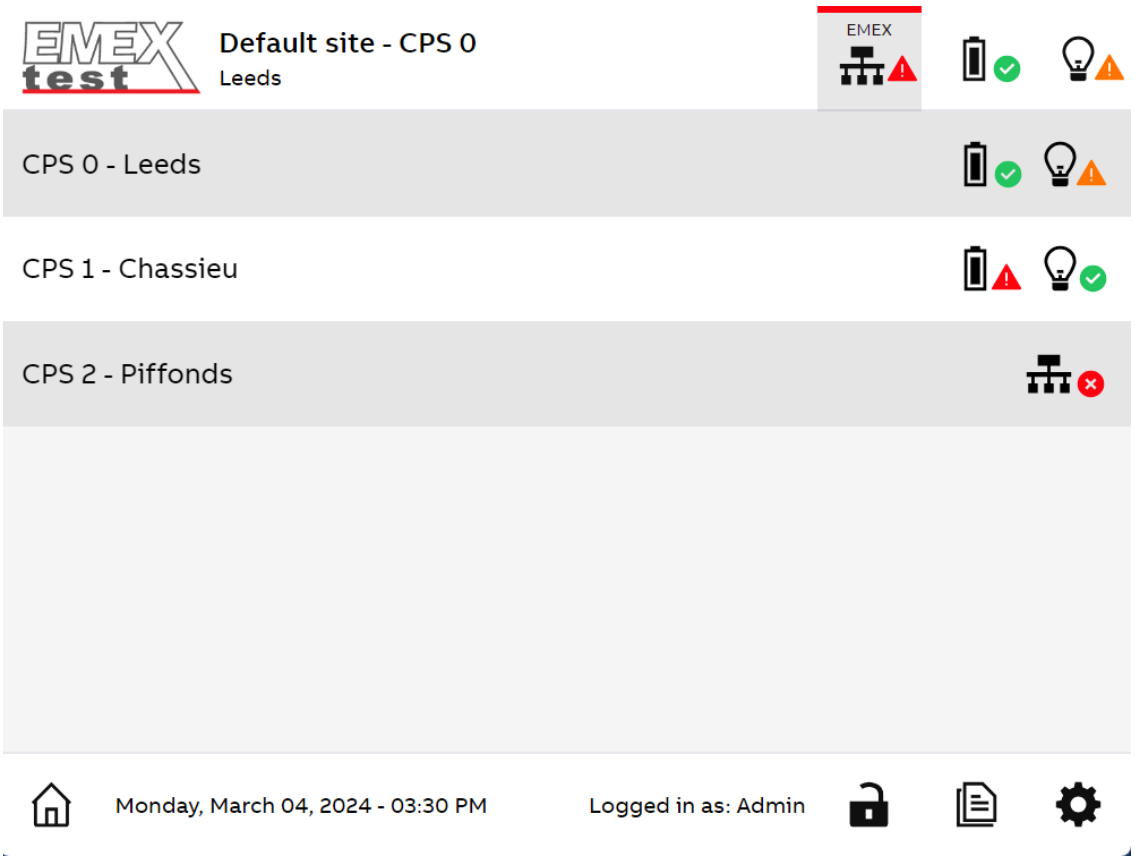


3. Click on the “User Password” or “Admin Password” depending on which password you want to edit. You will have to type the new password twice and press enter to confirm it each time. It will display a notification “Success: Password updated” at the bottom right of the screen when the password has successfully updated.

CPS's list

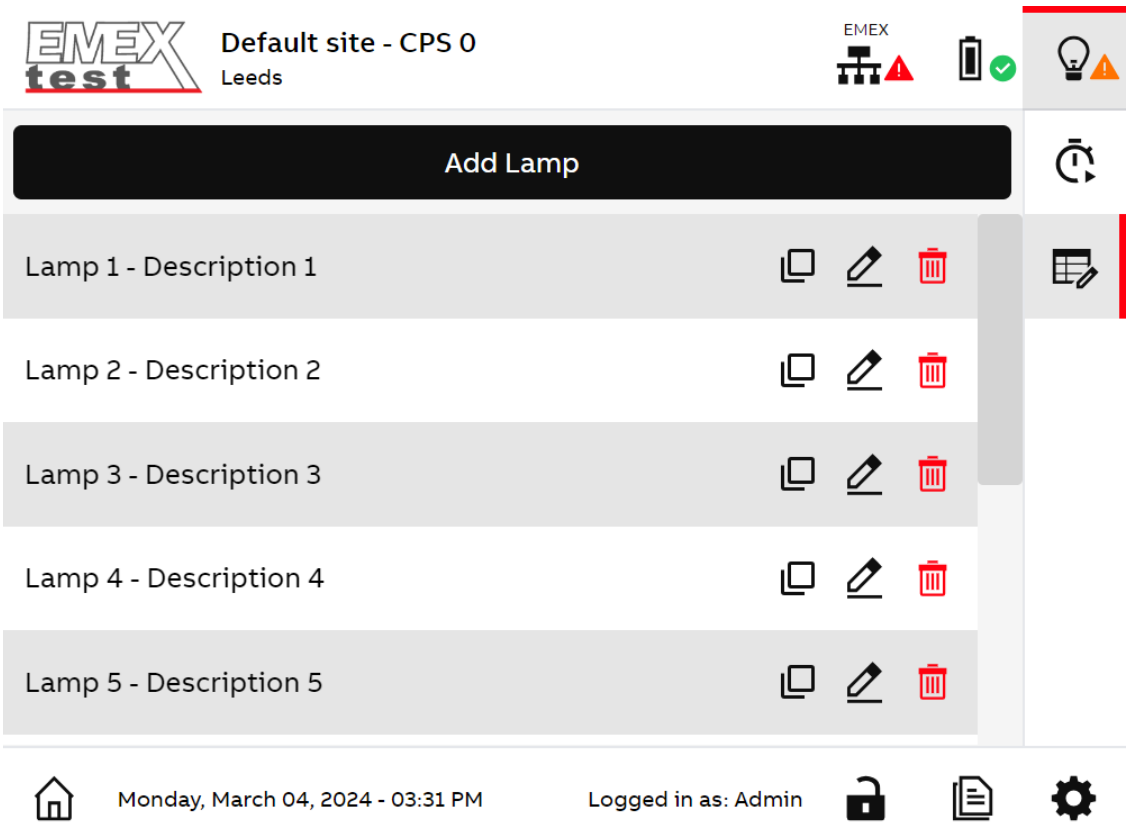
To navigate to the CPS's list page, click on the EMEX icon in the header. You can view all the CPS's set up and their status (See Header section for the meaning of each status icon).

To change the current CPS selected, click on another CPS address in the list.



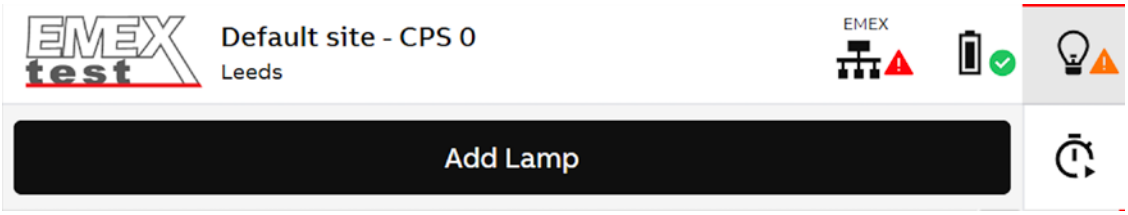
Lamps list

To navigate to the lamp list of the current CPS, click on the lamp icon in the header. Then in the right menu click on the table list icon (Second icon), you should see the following screen:

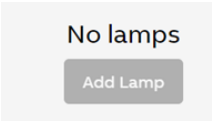


Add a lamp

To add a new luminaire, click on the button “Add Lamp” (See previous figure screen). The screen below will be displayed. Note you need to have your EMEX communication working in order to be able to add new lamps.

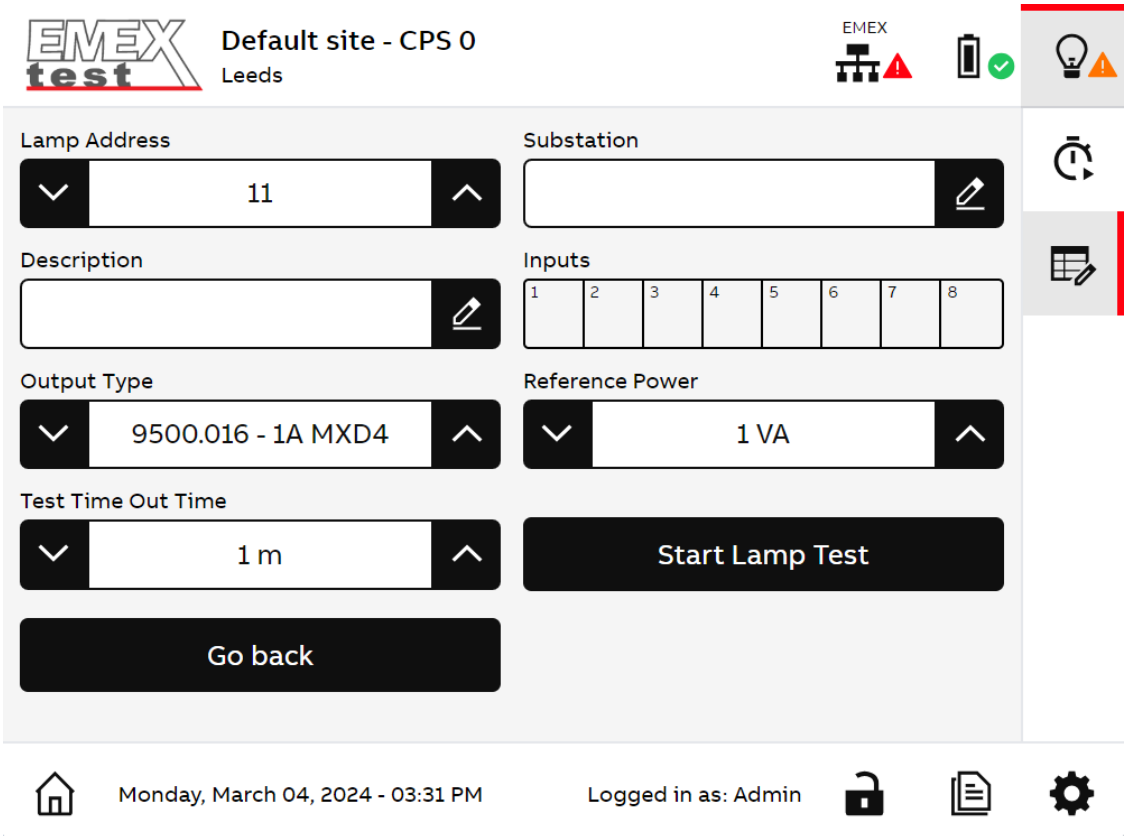


If no lamp list has been created for a new system then the below option will be displayed, once connected to a communicating system the Add lamp Button will be available.



Lamps list

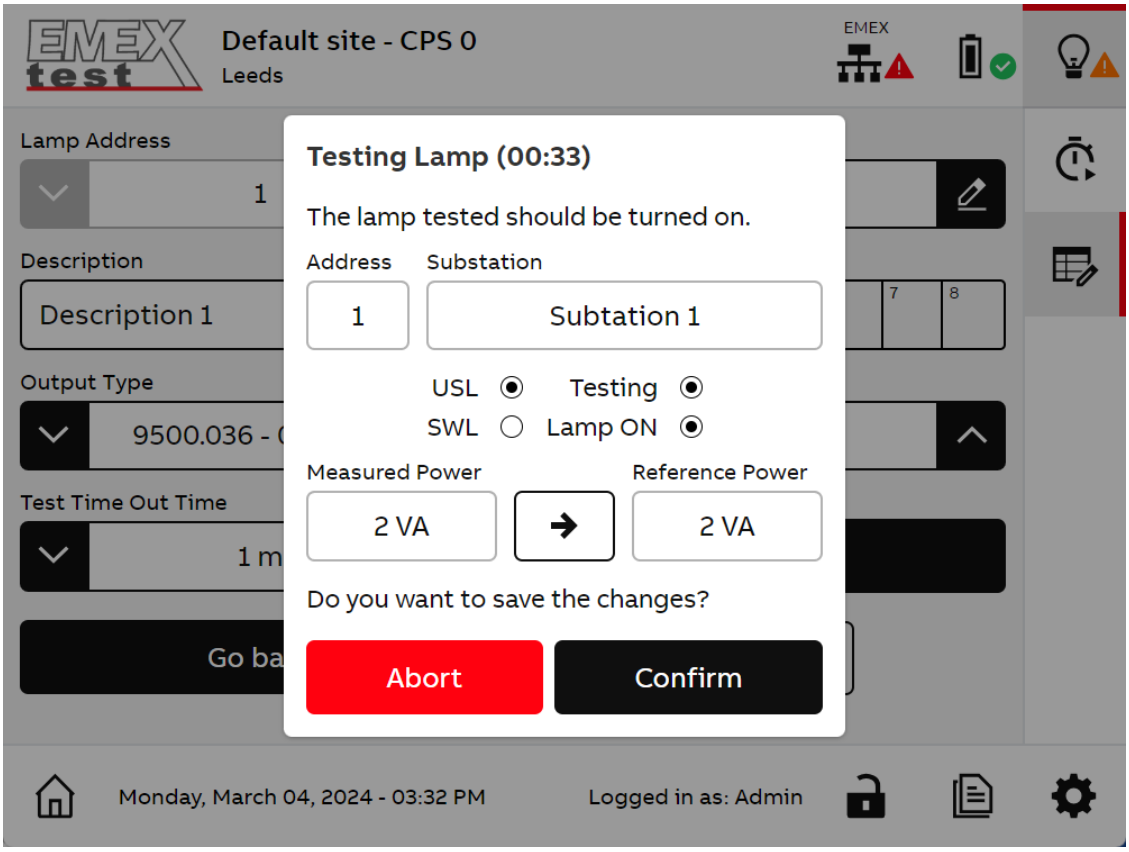
Following the add lamp action the Lamp attributes screen will appear



1. **Lamp Address**: By default, when you add a new lamp, it will automatically select the next available address. You can only specify an address not used already and between 1 to 3999.
2. **Substation** (Optional): You can set a substation for the lamp; it allows the lamps to be grouped by substation address. This helps with fault finding and circuit checking in the reports section.
3. **Description** (Optional): Lamp details i.e. Lamp location, description should be added for ease of fault finding at later stage if required and up to 32 characters available.
4. **Inputs**: Inputs 1-8 correspond to 8 monitored inputs of the MXC Substation and are used to control the output of the individual lamp controllers (luminaires).
   Entry is made by clicking on the box (Like a checkbox but with multiple states). The entry will cycle between an empty value Blank, U or S. These correspond to, no entry, unswitched input and switched input respectively. The lamp will respond to any combination of inputs.
5. **Output type**: This input list lets you select the type of controller used to control that lamp. The controller types are referenced by their part numbers (e.g.: 9500.036) and this is used in the software to calculate the lamp wattage.
6. **Reference Power**: This is the nominal lamp wattage used as a reference to compare with the measured value during test. This can be modified directly by accepting the value displayed during individual lamp test.
7. **Test Time Out Time**: This is the desired time for individual lamp test, default to 1min and up to 30mins maximum.
8. **Go Back**: This will cancel your action and go back to the lamp list.
9. **Start Lamp Test**: This will start a lamp test and show a dialog with live information about the lamp.

Lamps list

Once a lamp has been added, click on the button “Start Lamp Test”, a dialog will show up and the communication will start:



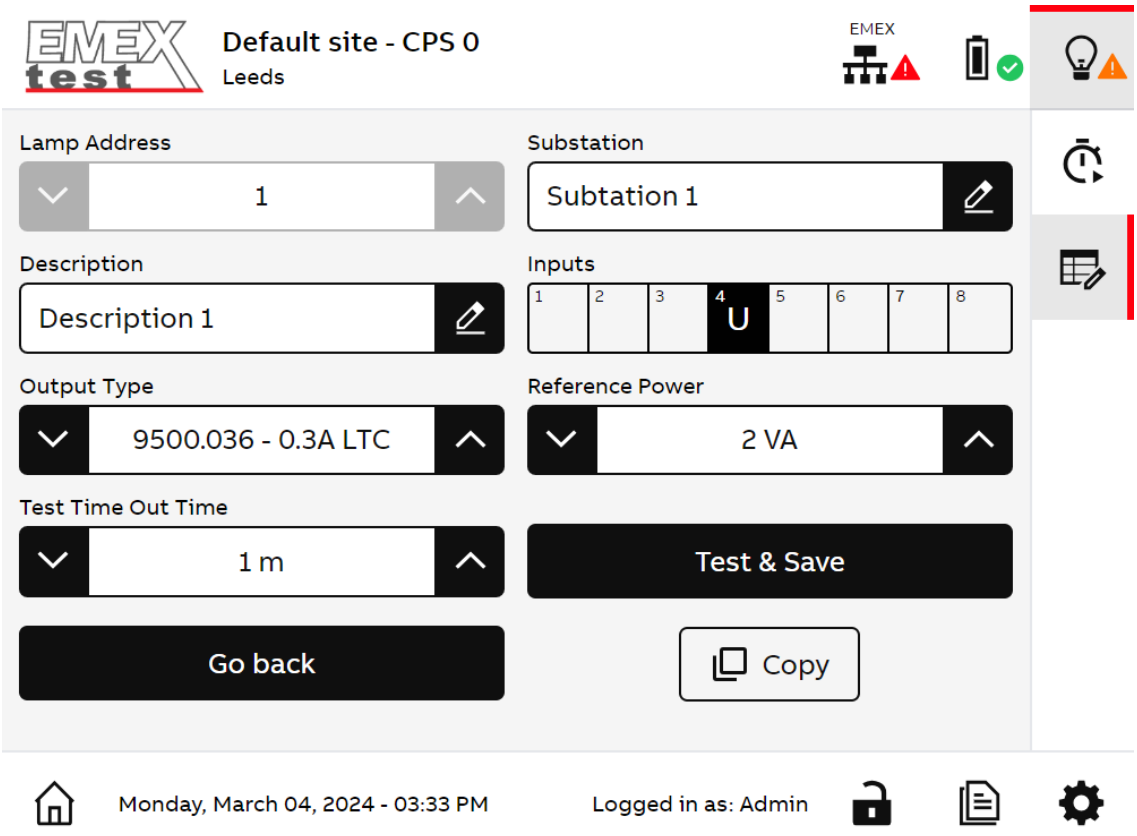
1. **Arrow button (→)**: Updates the lamp reference power with the measured power value.
2. **Abort**: Stop the lamp test and close dialog.
3. **Confirm**: Adds the lamp and go to the next lamp address.

Lamps list

Modify a lamp

To modify a lamp, click on the pencil icon on the right of the lamp you want to edit:

You will arrive on the following screen, with the same information as when you add a lamp, except the lamp address cannot be modified once it has been commissioned.



1. **Go back**: This will cancel your action and go back to the lamp list page.
2. **Copy**: Used to copy current lamp settings which can be pasted when setting up new or modifying existing lamps.
3. **Test & Save**: This will start an individual lamp test on the selected address and open a dialogue with the live information of the selected lamp address. Press “Confirm” to save your changes.

Lamps list

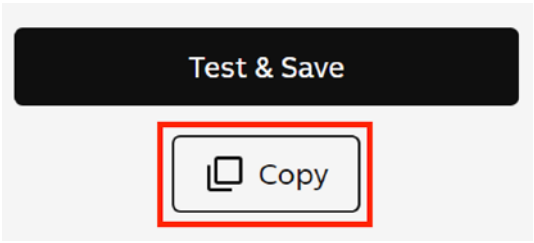
Delete a lamp

To delete a lamp, click on the waste bin icon on the right of the lamp you want to delete:

A confirm dialog will show up in order to delete the lamp.

Copy/Paste lamp settings

The lamp settings can be copy and pasted by clicking on the checkbox multiple icon on the right of the lamp address or by clicking on the “copy” button when modifying a lamp (see below).

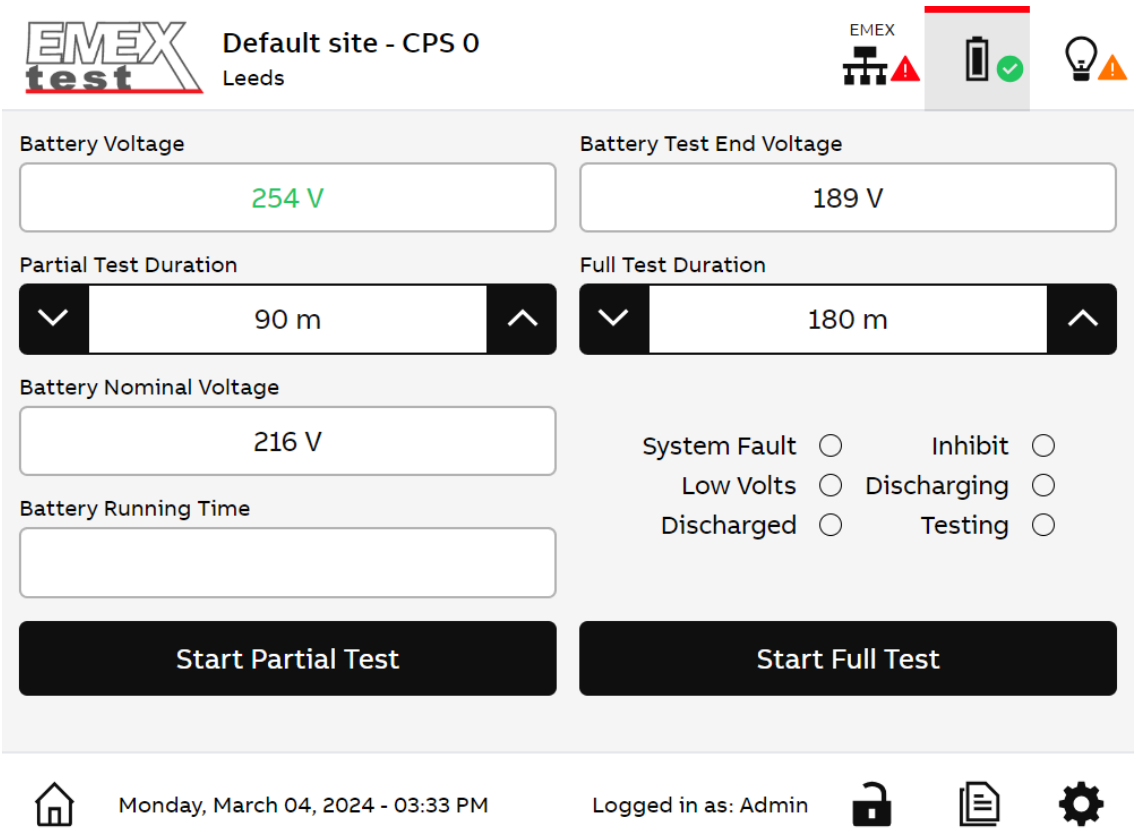


Once a lamps settings have been copied, the “copy” icon will change to indicate this (with a tick), see below.

The copied settings can be added to a new or existing lamp address by selecting the new address and clicking the “paste” button.

Discharge test

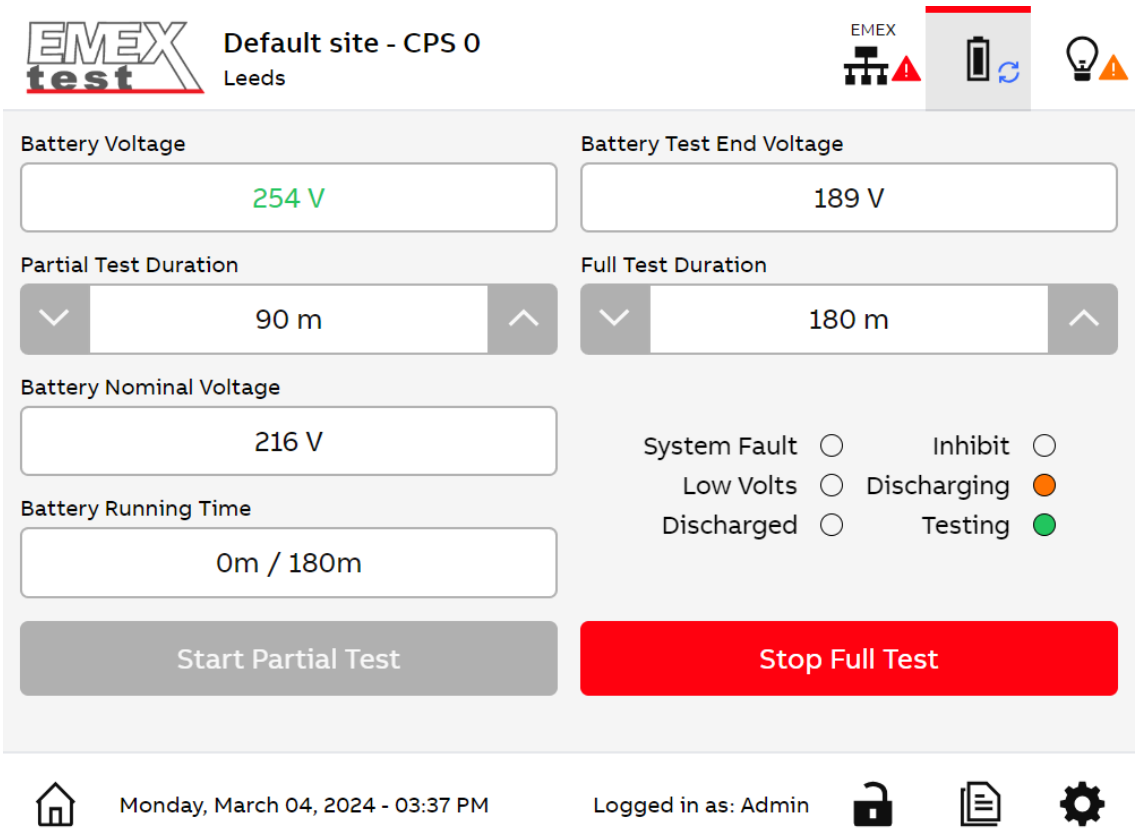
To navigate to the full discharge test page, click on the battery icon in the header. You should arrive on the following screen:



1. **Battery Voltage**: This is the system battery voltage.
2. **Battery Test End Voltage**: This is the Partial Discharge End Voltage or Full Discharge End Voltage value set in the “CPS settings”. If the test goes below this threshold the test will be marked as a failure. By default, it displays the Full Discharge End Voltage value, if a partial discharge test is running then it will display the Partial Discharge End Voltage value.
3. **Partial Test Duration**: This is the duration of the partial discharge test. By default it is set to half of the system autonomy which is entered in “CPS settings” and can be set between 30mins and half of system full autonomy.
4. **Full Test Duration**: This is the duration of the full discharge test. By default it is set to system autonomy which is entered in “CPS settings” and can be in range of 30-240mins depending on system design.
5. **Battery Nominal Voltage**: This is the Battery Nominal Voltage set in the “CPS settings”, used as a reference during a test.
6. **Battery Running Time**: This is the current time spent for a discharge test. It also displays the status (Starting, Saving Results, Stopping).
7. **CPS status**: See CPS status section
8. **Start Partial Test**: This will start a partial discharge test.
9. **Start Full Test**: This will start a full discharge test.

Discharge test

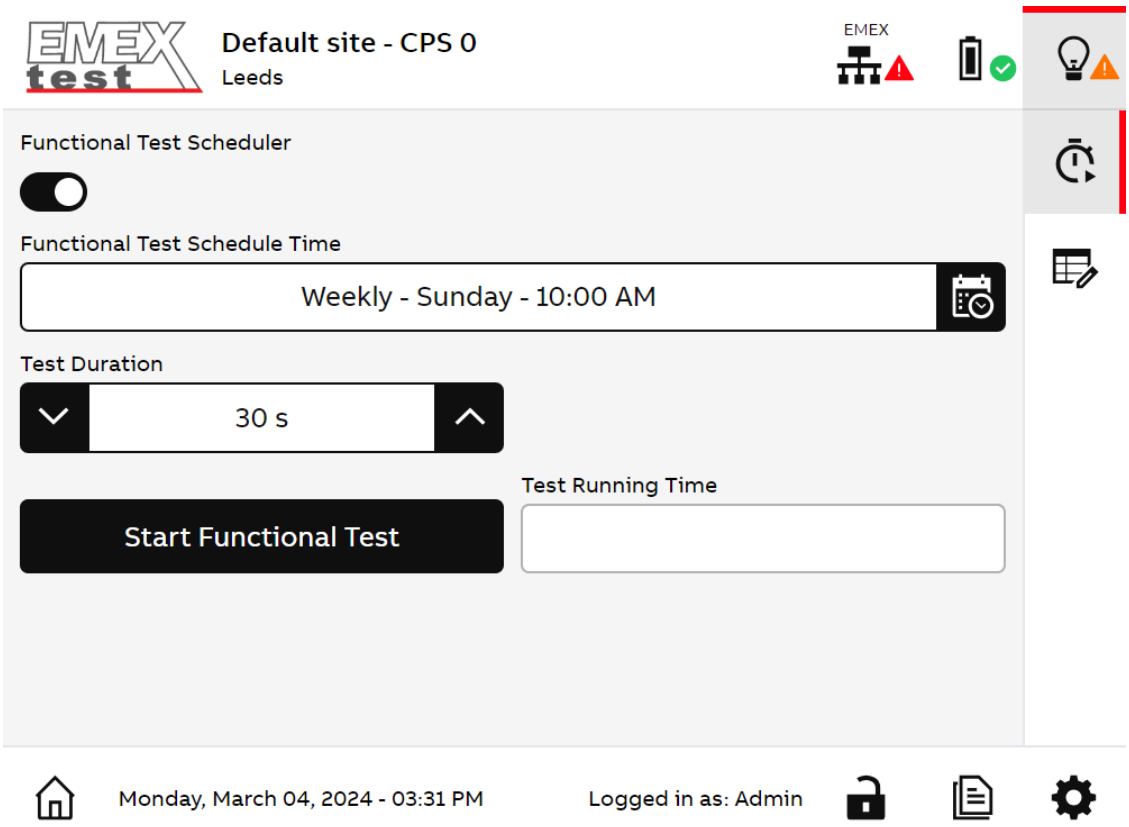
Once you start a discharge test you will have the following screen:



1. **Stop Partial Test** (Only displayed during a partial test): This will stop a partial discharge test.
2. **Stop Full Test** (Only displayed during a full test): This will stop a full discharge test.

Functional test

To navigate to the functional test page, click on the lamp icon in the header and the following screen will be displayed.



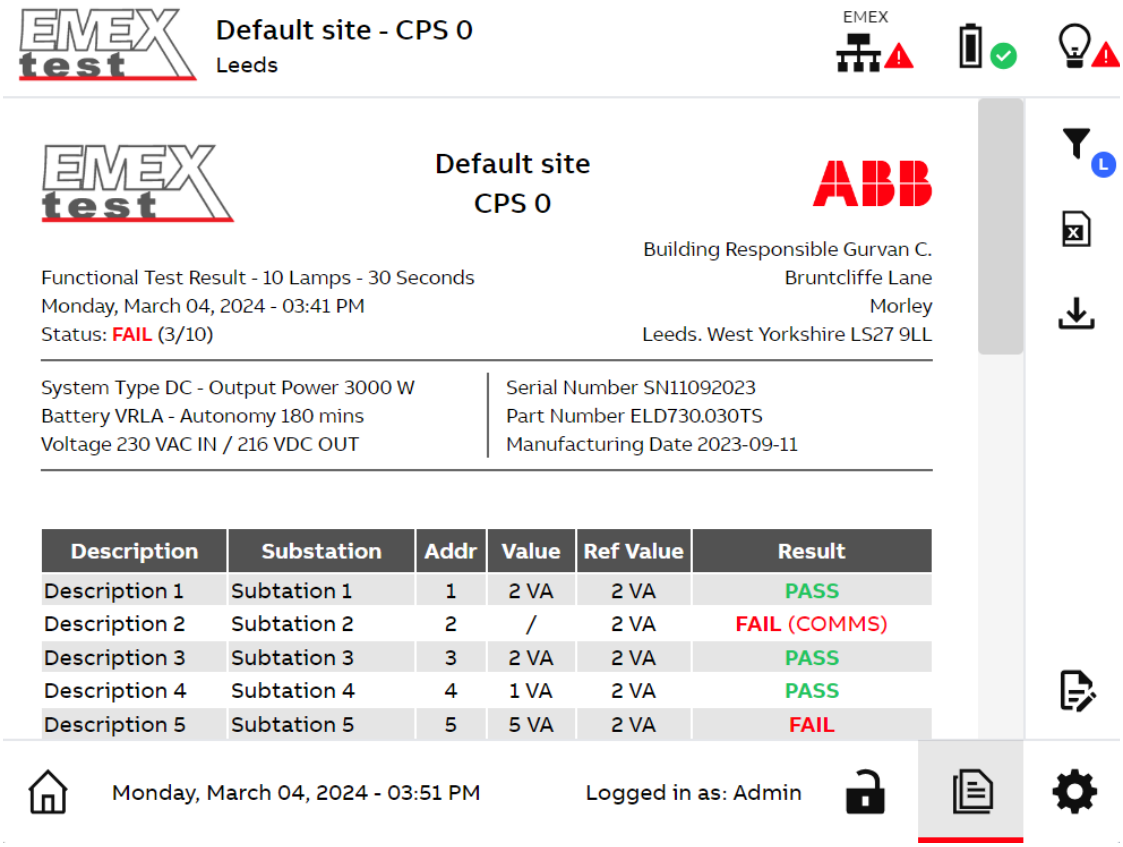
1. **Functional Test Scheduler**: Toggle button to enable automatic functional test, by default it's enabled.
2. **Functional Test Schedule Time**: This can be set to run a functional test on either a weekly or monthly basis.
    a) **Weekly**: Can be set to perform the test on specific day and time (e.g: "Sunday 10:00AM" will run a functional test every Sunday at 10AM).
    b) **Monthly**: Can be set to perform the test on specific day and time of each month (e.g: "Last Saturday 11:00PM" will run a function-al test every last Saturday of the month at 11PM).
3. **Test Duration**: This is the duration of a functional test. Default to 30 seconds and range between 30 to 300 seconds (5 minutes).
4. **Start Functional Test**: Start immediately a functional test.
5. **Stop Functional Test**: Stop a functional test.
6. **Test Running Time**: This is the remaining time of the functional test to run, it also displays the status (Starting, Saving Results, Stopping).

Note - A test can only run on one CPS at a time. If multiple CPS are set with the same scheduling date and time, they will be executed by each CPS address in ascending order (Expect a different start test time for each test report).

Reports

The reports area is the place where you can see the test results for all your luminaires under a CPS.

To navigate to the reports page, click on the report's icon in the bottom right and you will arrive on the following screen below. If you don't have any reports, it will display no tests found, otherwise by default it will show the last executed test.

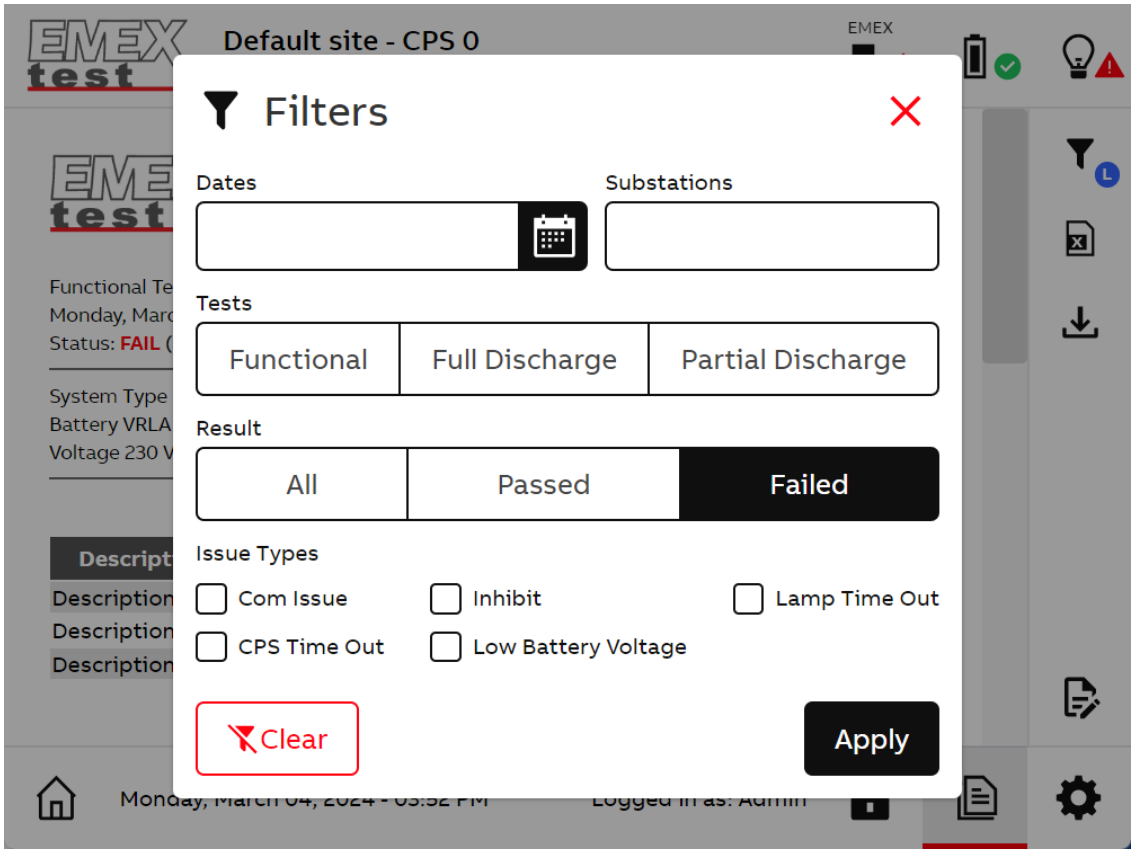


Reports filters

By default, the blue badge next to the filter icon has the initial "L" which means the latest test. If you select filters, it will show the number of filters applied currently.

Reports

To access the reports filters, click on the filter icon in the right menu, it will open a dialogue like below.



1. **Dates**: You can select one or multiple dates to display previous tests executed at a specific date.
2. **Substations**: This will filter the luminaires by substations if selected.
3. **Tests**: You can select the type of tests that you want to display.
4. **Result**: Luminaire test results can be filtered by All, Passed or Failed.
5. **Issue Types**: If selected by “failed” results then results can be further filtered by “Issue type”.
6. **Clear**: Clear all filters.
7. **Apply**: Apply the filters.

Export to CSV

You can export the reports to a CSV file by clicking on the Excel icon on the right, you will then be prompted with a dialog that asks you where you want to save the file.

Reports

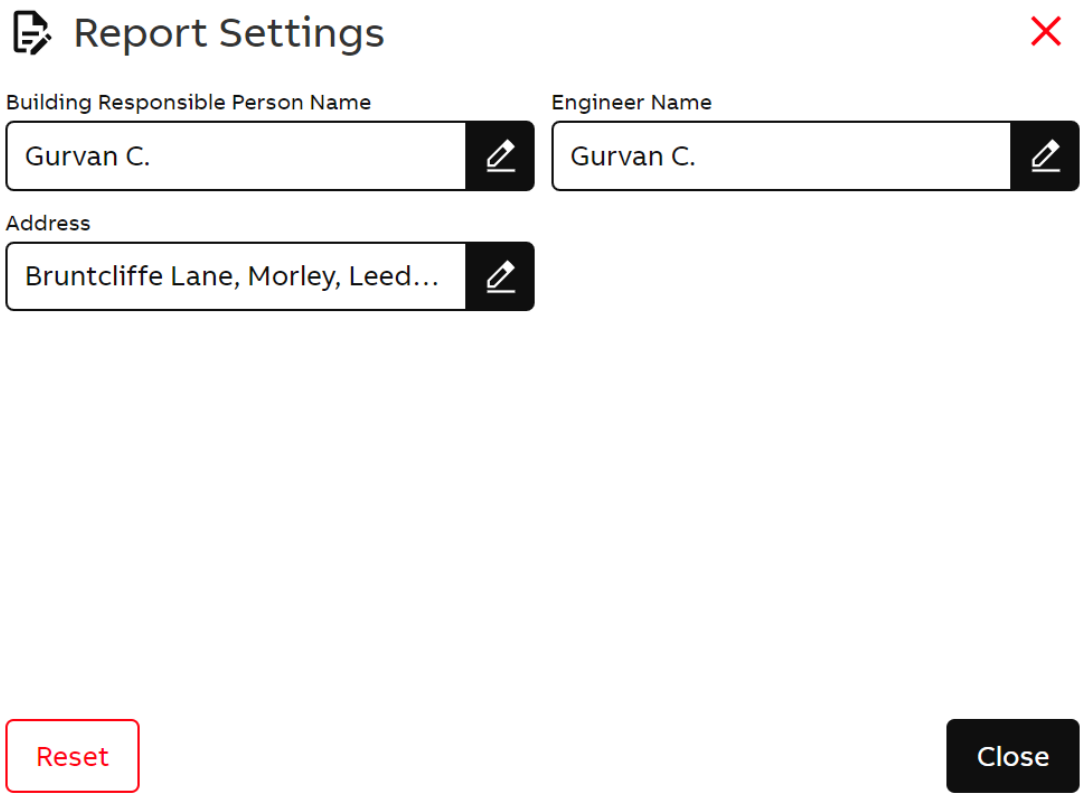
Export to PDF

The report can be exported to a PDF file by clicking the download icon on the right, when prompted save the file to desired location.

The PDF file cannot be exported if there are more than 4000 luminaires in all the reports displayed. A dialog will inform you in that case. However, there is no limitation via CSV export.

Reports settings

Additional information can be added to the PDF report file by clicking in the edit report icon at the bottom right.



1. **Building Responsible Person Name**: The building responsible person name for the installation is optional and if specified it will appear in the top right header of each report page.
2. **Engineer Name**: The engineer's name is optional and if specified it will appear in the bottom left footer of each report page.
3. **Address**: The address for the CPS, optional, if specified it will appear in the header top right of each report page. Use a comma "," to apply line return (maximum 3 lines).
4. **Reset**: Resets all the above inputs (Reports Settings).
5. **Close**: Close the dialogue and go back to the reports page.

BMS

The Building Management System (BMS) communication is made by using a gateway module (LIOB-594) that converts software data and live CPS information from Modbus to BAC-net protocol.

To navigate to the Modbus page, click on the BMS icon in the header.

1. **Modbus Address**: The Modbus address (CPS ID) is set to “2” by default but can be changed if required. By default address “1” is reserved for the energy meter.

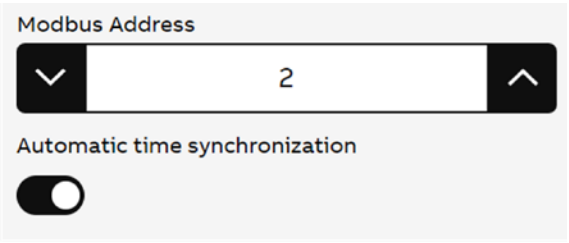
Time synchronization

By default, the EMEX Test application time is based on the Windows OS time. When the BMS communication is enabled the application will synchronize the Windows OS time with the LIOB-594 time. It will act as a master/slave where the LIOB-594 is the master and the Windows OS is the slave.

The synchronization is done every minute and it will only update the time if the difference between the LIOB-594 and the Windows OS is greater than 1 minute.

Note: In order to have the same time on the LIOB-594 and the Windows OS, you need to set the same time zone on both devices.

If you want to manually synchronize the time on the Windows OS, you can switch off the "Automatic time synchronization" button.



Configurator

For the setup of CPS's and luminaires a configuration tool is provided. It's an Excel format file that is provided with the software and is pre installed on the Touch screen, also this can can be downloaded from the EMEX Test website and saved locally.

Excel Configurator (Windows)

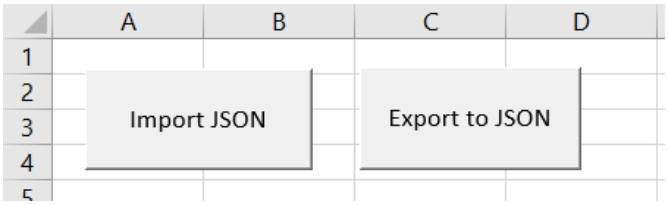
Open the locally saved configurator file by double clicking it and enter the site CPS and luminaire data.

There are 3 Tabs on the Excel Configurator file:

1. **Home Page**: This is the home page where you can import/export your JSON file.
2. **CPS's**: This is the CPS's sheet where you can configure your CPS's.
3. **Lamps**: This is the Lamps sheet where you can configure all your luminaires.

By default, you should arrive on the "Home Page" sheet, if not click on it. You will see two buttons:

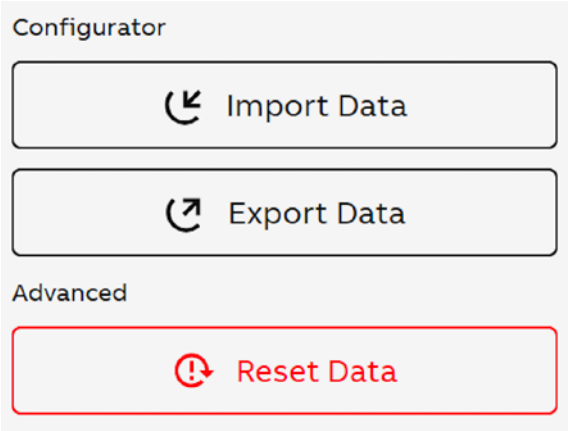
Note: Configuration guidance instructions are within the tool to assist compilation of the configurator file.



1. **Import JSON**: Import a previously exported configuration file from EMEX software or Excel configurator.
2. **Export to JSON**: This will export the configuration to a JSON file and save to the specified location.

Import configuration

Navigate to the advanced settings to access to the configurator menu:

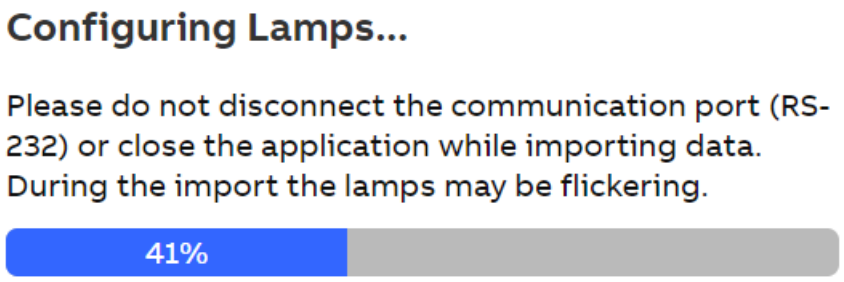


Configurator

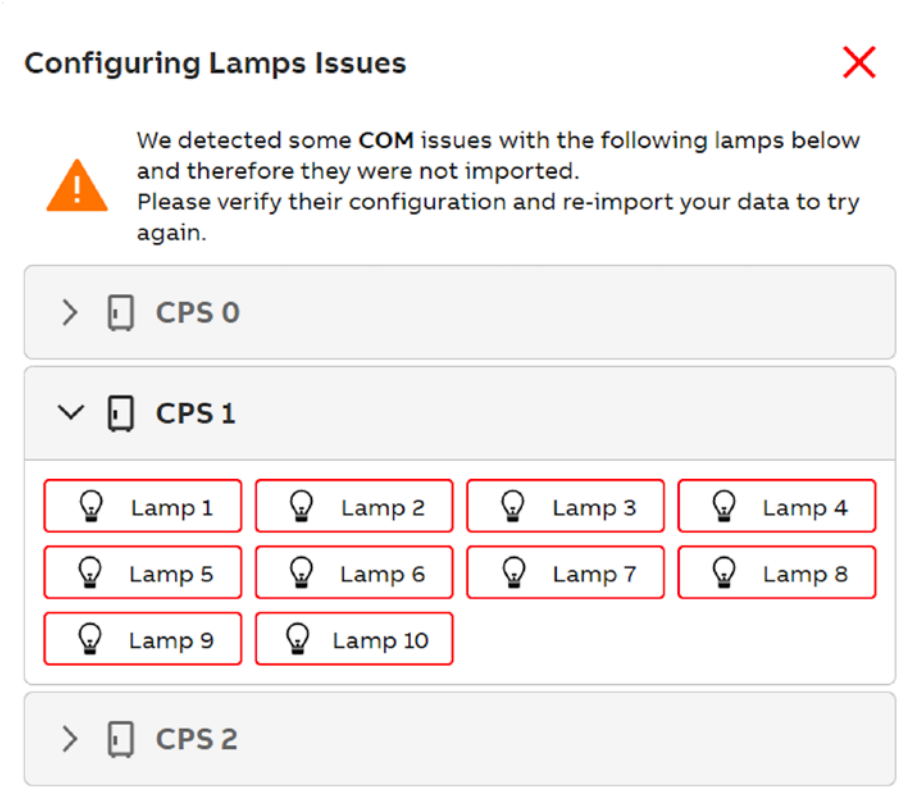
Import Data

A configuration (JSON) file can be imported by double clicking the “Import Data” dialogue.

WARNING : If there is already some CPS’s and luminaires setup on the system before importing data, then the data will be overwritten if they have the same CPS/Luminaire addresses.
Once confirmed, the configuration will start and add or update all the CPS/Lamp data (if changed).



Once the configuration is complete and all imported successful then a notification "Success, Data Imported" notification will be displayed. In case of issues, the below dialogue will be displayed listing the luminaire addresses with any errors:



Configurator

Export Data

This is used to export the current JSON file to be kept as a backup copy and can also be used to make changes to the current configuration if required. It can also be useful to edit and reuse on similar configurations on other sites.

Reset data

This will wipe the entire data on system including CPS, Luminaire and Test report data.

WARNING : It is recommended to backup data before using this (Reset Data) option.

Software backup data

1. Close the application.
2. Press the “Windows” key or click on the Windows menu, type “File Explorer” and press enter.
3. In the file explorer, click on the tab “View” in the header and make sure “Hidden items” is ticked.
4. Navigate to “C:\Users\<YOUR_USERNAME>\AppData\Roaming\Emex Test” for the production version or “C:\Users\<YOUR_USERNAME>\AppData\Roaming\Emex Test Dev” for the development one.
5. Copy the file “emex.db” to a different location or your USB key. Or rename your file to “2023-10-17. db” for example.

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