ENcombi



ECpvX Cluster

User manual

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Document change log

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2025-03-24	Updated for version 1.04.2
2025-09-03	Updated for version 1.05.0

Introduction

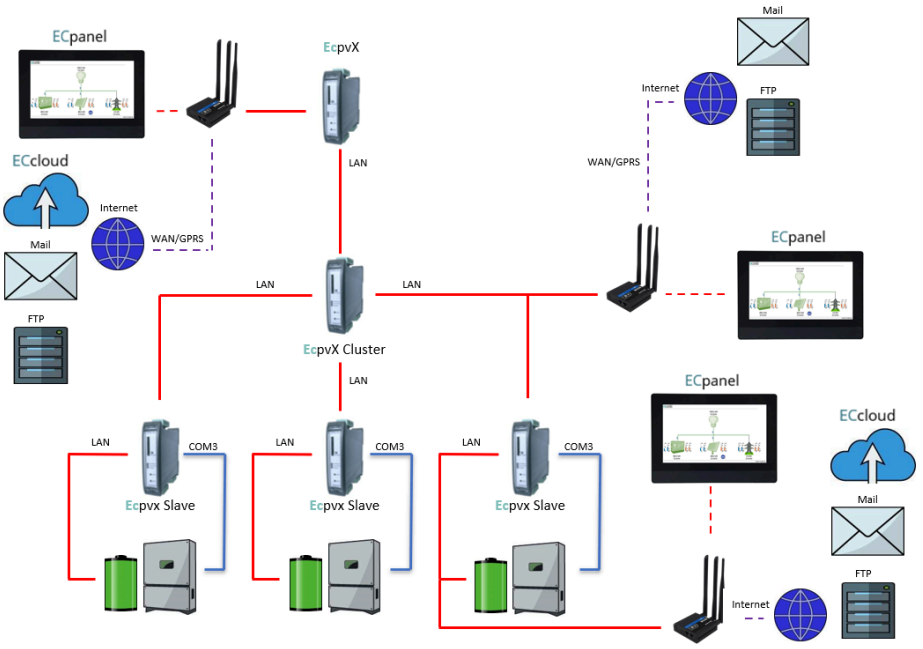
The ECpvX Cluster from ENcombi is capable of controlling a stack of ECpvX slave controllers. The Cluster will receive references from ECpvX master and distribute references to each slave controller individually. The reference to the ECpvX slave will be calculated in terms of Online generating capacity and Online charging capacity. Examples will be shown in the specific chapter regarding setup.

The production of each ECpvX slave/battery inverter is controlled seamlessly via a communication interface to the ECpvX slave. This interface can be either via Modbus RTU running on serial RS485 line or via Modbus TCP running on ethernet.

The interface between the cluster and ECpvX are pre-embedded and are enabled merely by parameter setting.

All configuration and real time monitoring of the ECpvX Cluster is done by connecting with a standard web browser to its built-in webserver (ECweb). Comprehensive help texts guide you through the configuration setup. ECweb can run on any device featuring a web browser. Use for instance a panel PC as a local HMI. A laptop or portable device which will give you monitoring and control capabilities even from remote if connectivity to the ECpvX Cluster is in place.
It is not mandatory for the control and monitoring of the ECpvX to have a HMI or laptop connected to ECweb. It is required for commissioning of the ECpvX Cluster only.

The ECpvX Cluster can make a local event log file on an SD card or USB memory stick. This log can be sent to the customer ftp server.
Below schematics are examples of how the ECpvX Cluster is fitted into and interconnected to its surrounding environment.


ECpanel
EcpvX
Mail
Internet
FTP
ECcloud
Internet
Mail
WAN/GPRS
FTP
LAN
WAN/GPRS
LAN
LAN
EcpvX Cluster
ECpanel
LAN
ECpanel
ECcloud
LAN
COM3
LAN
COM3
LAN
COM3
Ecpvx Slave
Ecpvx Slave
Ecpvx Slave
Mail
FTP
Internet

ECweb

ECweb is the built- in webserver of the ECpvX Cluster. All configuration and real time monitoring of the ECpvX Cluster is done via ECweb. Connection to ECweb is done with a standard web browser

Using a laptop/PC and Internet Explorer browser running on Java is the best option for connecting to ECweb. Other browsers and mobile devices can be used as well.

Connecting to ECweb with Internet Explorer or Pale Moon browser on PC/laptop

Java from oracle must be installed on PC/laptop. Java can be downloaded from the link below. Note that either the Internet Explorer or the Pale Moon browser must be used for the download.
Java download

1: Type in IP address of the ECpvX Cluster in the browser command line.
Default IP address is:
192.168.1.101.

2: Type in login credentials when prompted.
Default login credentials are:
user: web_user0
password: web_password0

3: Accept/Ignore all warnings populated.

4: If tiles on the front page are out of order, click on the page and they will fall into place. If any Icons are missing on the tiles, restart the browser and start over.

Connecting to ECweb using any other browser or mobile device

For all other browsers on PC/laptop or from any browser on mobile devices.

1: Type in IP address/webvisu.html in the browser command line.
Default IP address is:
192.168.1.101.

2: Type in login credentials when prompted.
Default login credentials are:
user: web_user0
password: web_password0

Troubleshooting

If connection can't be established verify that:

1. ECpvX Cluster is powered up and running. ECpvX Cluster must have 24VDC (+/-15%) supply voltage. The green Power and the green Run LEDs in the front of the ECpvX must both be illuminated. Note that a two low supply voltage can result in a situation where sufficient voltage is present to power up the ECpvX Cluster but not to run the program. In this case the Power LED is illuminated but the Run LED. When powering up the ECpvX Cluster the Power LED will light up first and the Run LED will come approximately 30s after when ECpvX is initialized and the program is up and running.
2. Your laptop must be on the same subnet as the ECpvX Cluster. Even though you have an ethernet cable going directly from your laptop to the ECpvX you still need to make sure that your laptop is provided with a suitable IP address. In the case where the default IP address of the ECpvX Cluster 192.168.1.101 is kept a suitable IP address for your laptop would be 192.168.1.x, where x is a number in the range [2;249] excluding "101" as this is used by the ECpvX Cluster itself.
3. Once the IP of your laptop is in place you must be able to ping the ECpvX Cluster. This can be done by opening a command prompt and writing the command "ping xxx.yyy.zzz.www" where xxx.yyy.zzz.www is the IP address of the ECpvX Cluster as shown below. First when the ECpvX Cluster replies to the command it is verified that your laptop and the ECpvX Cluster can see each other on the network and you can connect to ECweb using the browser as described above.

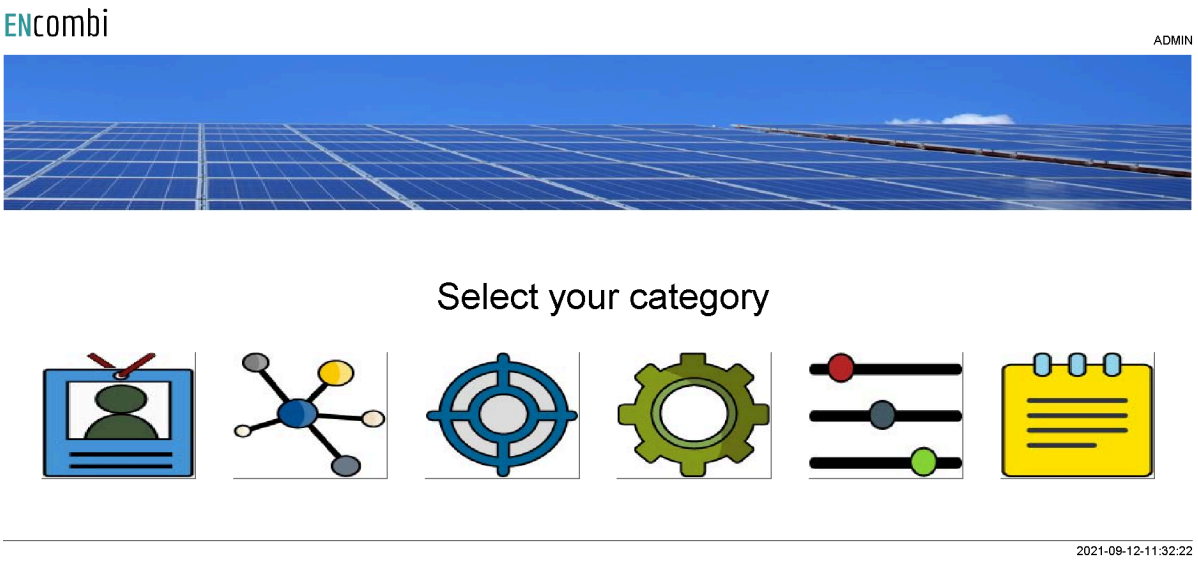
```
C:\Users\Claus>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:
Reply from 192.168.1.101: bytes=32 time=15ms TTL=255
Reply from 192.168.1.101: bytes=32 time=25ms TTL=255
Reply from 192.168.1.101: bytes=32 time=1ms TTL=255
Reply from 192.168.1.101: bytes=32 time=11ms TTL=255

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 25ms, Average = 13ms
```

Navigating the ECweb

The first page to be displayed after an initial welcome page when connection is established is the front page of ECweb.



Whenever navigating around the ECweb you can always return to this page by clicking the ENcombi logo in the upper left corner.

In the upper right corner you can see the current access login level. Find more information about this in the chapter revolving password scheme.

In the lower left corner ECpvX Cluster will display any info and warning messages it wants to communicate to the user. Some messages will clear themselves automatically. Others demand user action to be acknowledged first. In that case a dedicated button with a garbage can symbol will be presented alongside the messages. Furthermore when changing certain settings etc. a reboot of the ECpvX Cluster is required before the changes take effect. This will be communicated in the message as well and a dedicated button with refresh symbol will be presented alongside with the messages.

In the lower right corner is the internal clock of the ECpvX Cluster displayed.

In the lower center a total of six menu tiles are available. These are from the left:

1. “Identifiers” gives access to overview of SW version installed and extras present in the ECpvX Cluster as well as set up of project details (name, location etc.), password scheme etc.
2. “EClogic” provides the possibility of making project specific logical expressions when required. That could be for linking physical digital inputs applied on IO modules to the position of breakers or similar.

3. “Monitoring” provides a high level overview of the installation as well as detailed information about each individual EXpvX slave.
4. “Control” gives access to set up of ECpvX Cluster controller related parameters such as IP configuration, Internal clock handling etc.
5. “Settings” give access to setup of site specific parameters such as number of ECpvX slaves and ratings of inverters.
6. “Logs” give access to setup of log specific parameters.

In the following chapters the content of the six menu tiles are discussed in detail.

Control

Under this tile set up of ECpvX Cluster controller related parameters for IP configuration, Internal clock handling etc. are found.

IP configuration

First page presented when clicking the Control tile is the below page where IP configuration is set up and connectivity to the gateway can be tested.



On the right hand side there are four submenus for.

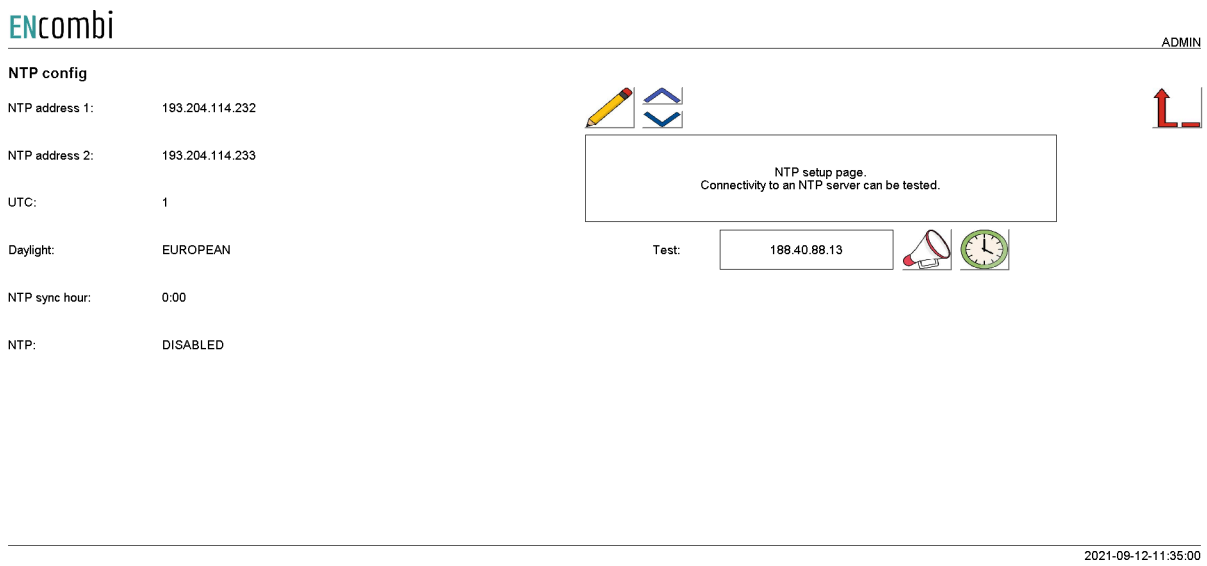
1. Internal clock.
2. FTP client.
3. ECpvX Cluster server access.

Internal clock

The internal clock can be synchronized against an NTP server as well as be set manually.

NTP synchronization

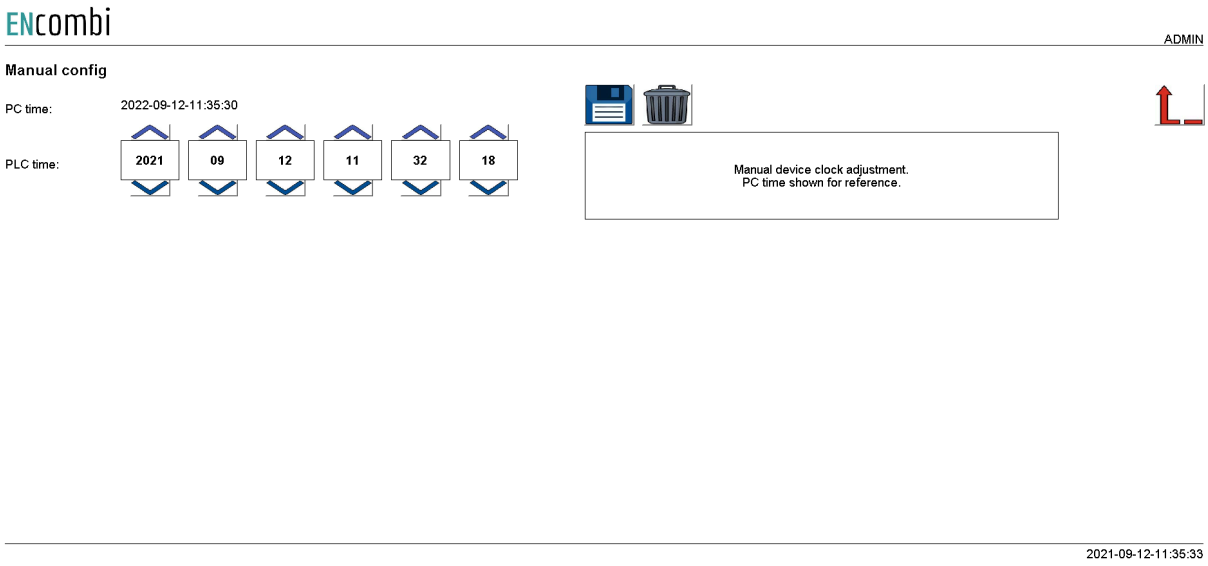
First page presented when clicking the clock button is the below page where NTP synchronization can be set up and connectivity to an NTP server and its functionality can be tested.



On the same submenu level the manual time adjustment of the internal clock is found. Clicking the up/down arrows will lead to it.

Manual time adjustment

On the page below the internal clock can be set manually. The time of the PC connected is presented and can be used to set the ECpvX Cluster clock against.

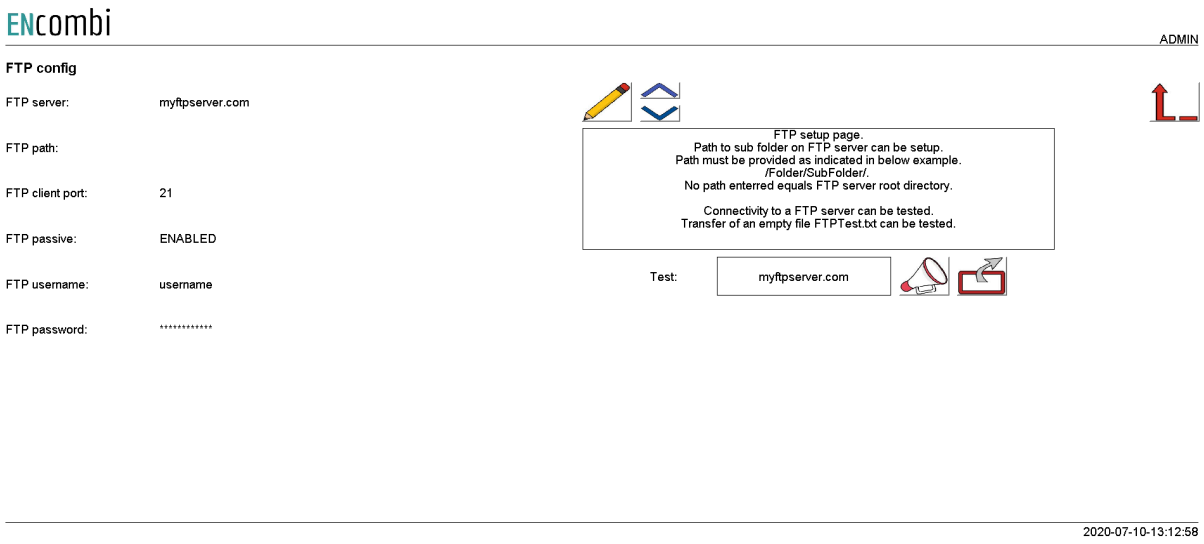


FTP client

The ECpvX Cluster has an FTP client and can transfer logs to an FTP server. It can be set up to do so automatically in case of event/alarm occurring. This is discussed in detail in the Logs chapter later in this document. The customer/installer must make use of their own FTP server.

FTP server

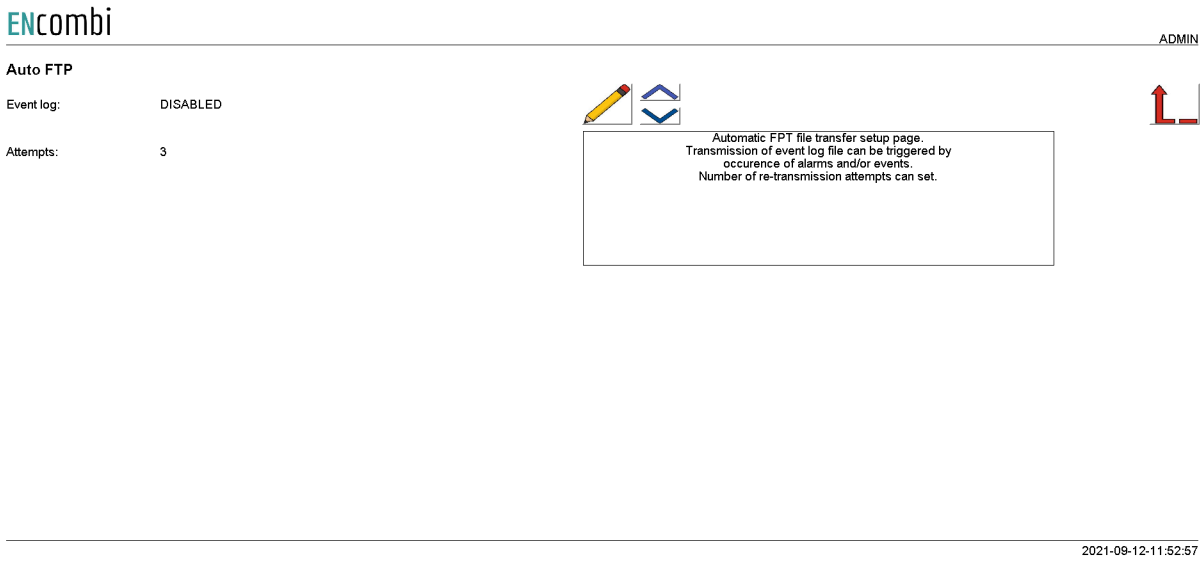
First page presented when clicking the FTP button is the page below where the FTP server details are set up.Connectivity to FTP server as well as functionality can be tested.



On the same submenu level the set up of automatic FTP transfer is found. Clicking the up/down arrows will lead to it.

Automatic FTP transfer

On the page below the automatic transfer of files is set up.



ECpvX Cluster server access

The ECpvX Cluster features three servers:

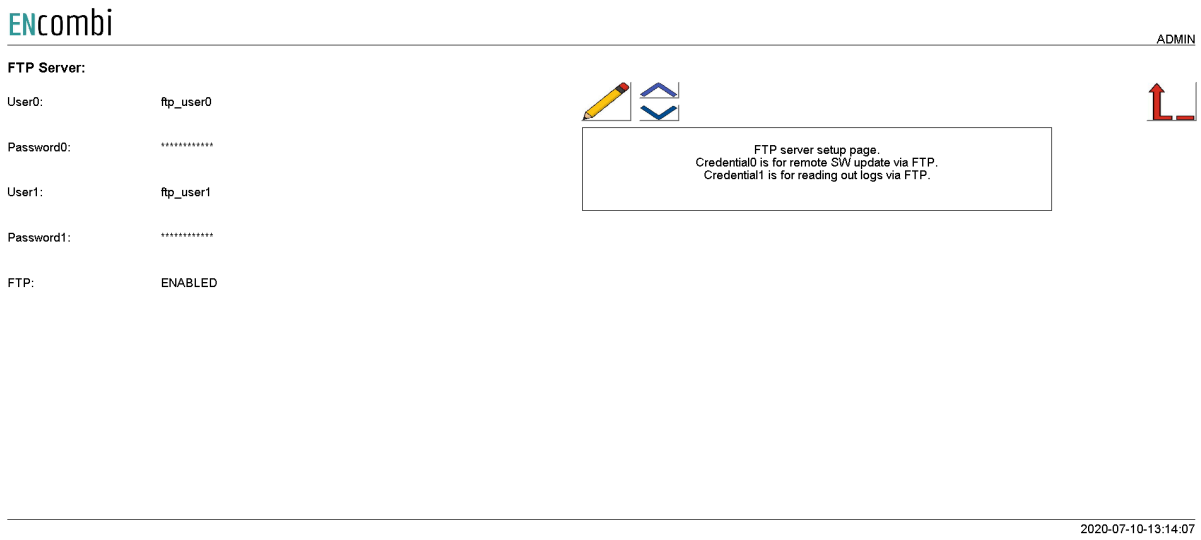
1. FTP server.
2. Telnet server.
3. Web server (ECweb).

ECpvX FTP server

First page presented when clicking the server button is the page below where the FTP server access details are set up.
Two sets of credentials exist.

1. Credential set0 will provide access to the PLC_PRG folder on the SD-card.
2. Credential set1 will provide access to the Logs folder on the SD-card.

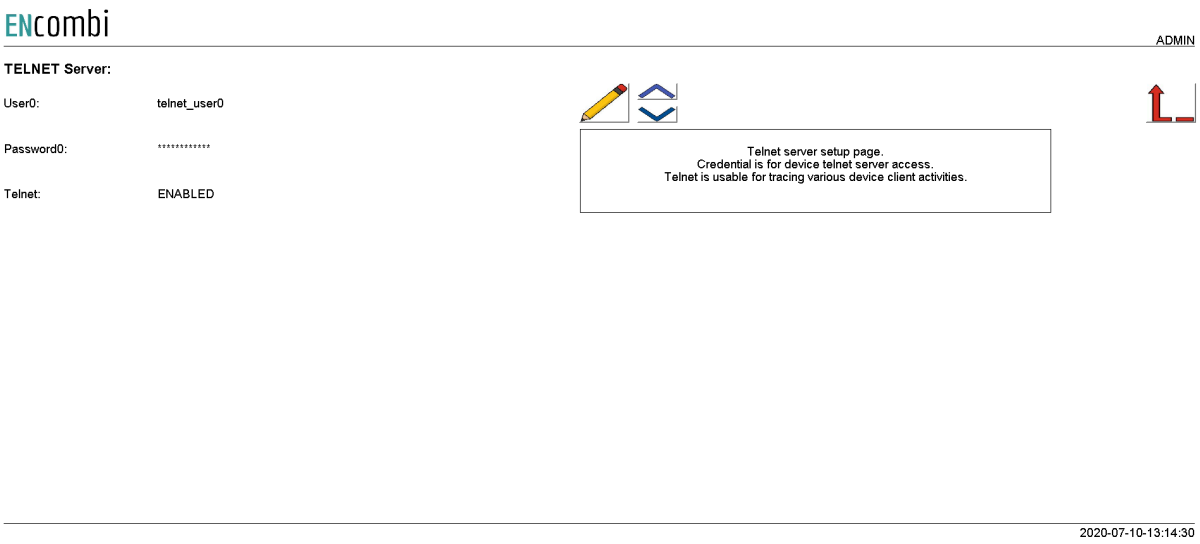
FTP server access in general can furthermore be enabled/disabled.



On the same submenu level the set up of telnet server access is found. Clicking the up/down arrows will lead to it.

ECpvX Telnet server

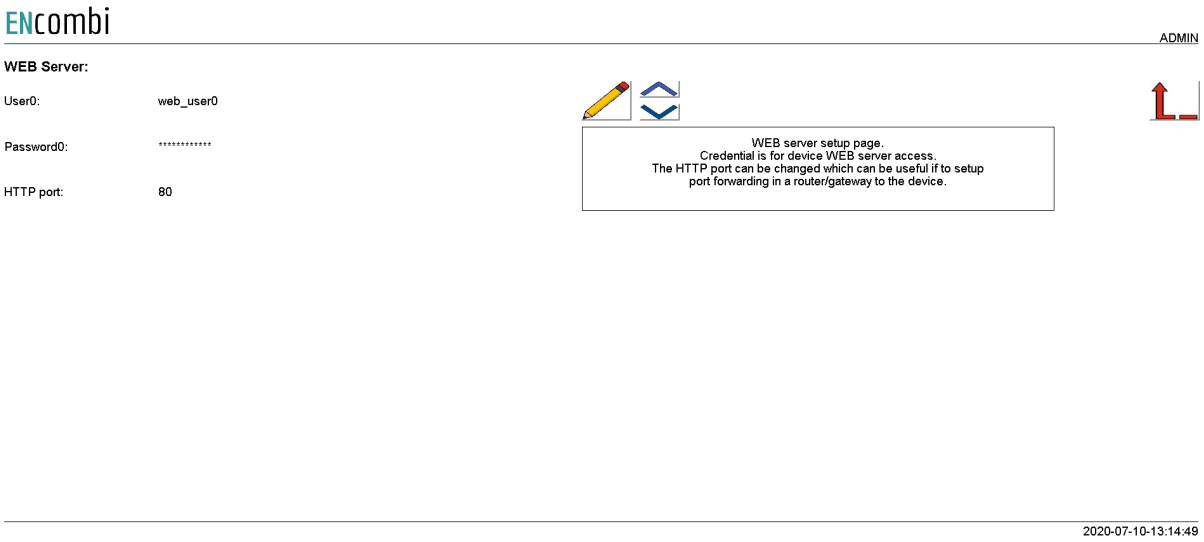
On the below page the telnet server access is set up. It is normally not used as it is intended for debug purposes only by tracing various ECpvX Cluster client activities.
Telnet server access in general can furthermore be enabled/disabled.



On the same submenu level the set up of web server access is found. Clicking the up/down arrows will lead to it.

ECpvX web server (ECweb)

On the page below the web server access is set up.
The HTTP port can be changed. This can be useful if to access ECpvX Cluster from outside the LAN using port forwarding and multiple ECpvX's or other devices also featuring a web server are connected to the LAN as well.



Identifiers

Under this tile overview of SW version installed and extras present in the ECpvX Cluster as well as set up of project details (name, location etc.), password scheme etc. are found.

ECpvX information

First page presented when clicking the Identifiers is the below page where various details about the ECpvX Cluster such as extras available, SW version, serial number etc. Also the MAC address can be found.

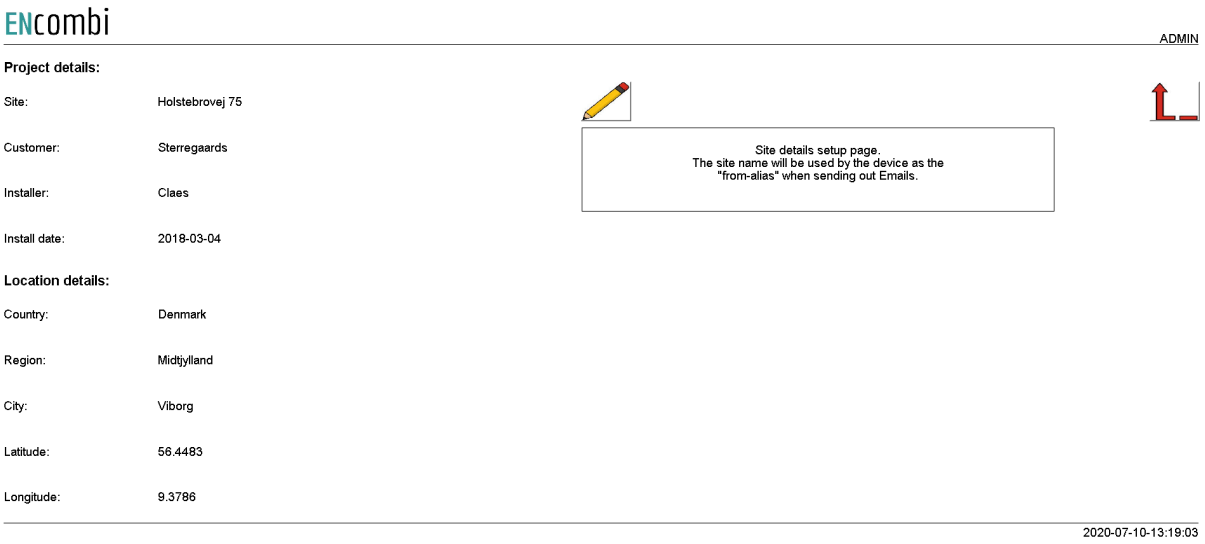


On the right hand side there are five submenus for.

1. Project details.
2. Password scheme.
3. Extras.
4. Metrics.
5. Backups.
6. Application

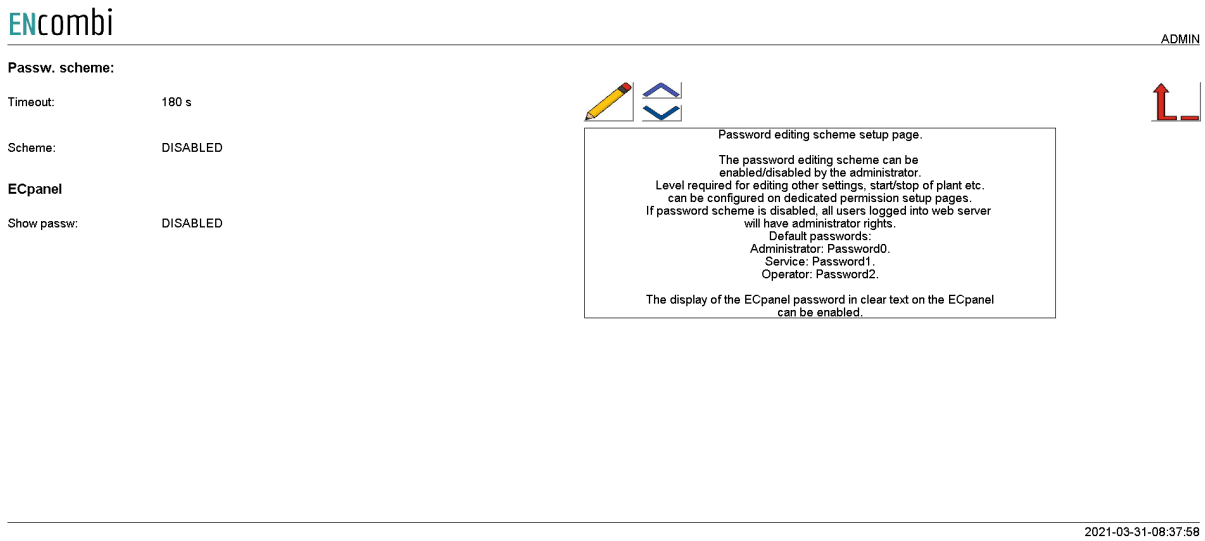
Project details

Clicking the location button leads to the below page where project details such as site name and location can be entered.



Password scheme

Clicking the log-in button leads to the below page where the password scheme can be enabled/disabled.

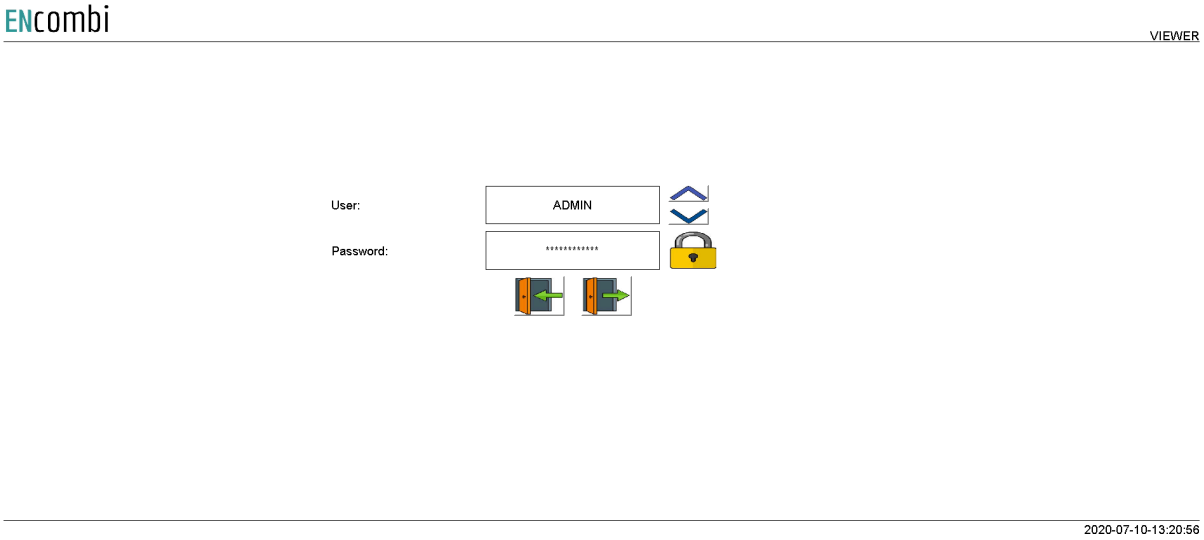


The password scheme holds four access levels:

1. Administrator.
2. Service.
3. Operator.
4. Viewer.

Required access levels of the various functionalities can be tailored by the customer as shown later. Whenever an attempt is made to alter/activate anything which is not allowed with the current access level, ECpvX Cluster will discard the command and populate a message text informing which access level is required to apply the command.

Viewer level is obtained just by logging on to ECweb.
When to change the access level the upper right text string informing about the current access level is to be clicked. Doing that leads to the below log-in page.



When logging in the requested access level and associated password is typed in. When the correct password is typed in the padlock will open. Hereafter the log-in button must be clicked. That will give the selected access level and take you back to the previous page.

When logging out just click the log-out button. The ECpvX Cluster will log out automatically when no editing occurs within the timeout period. Users will be degraded to Viewer level and must log in again as described above to regain the required access level.

When the password scheme is disabled as per default the user will have administrator rights.
Only an administrator can disable the password scheme.

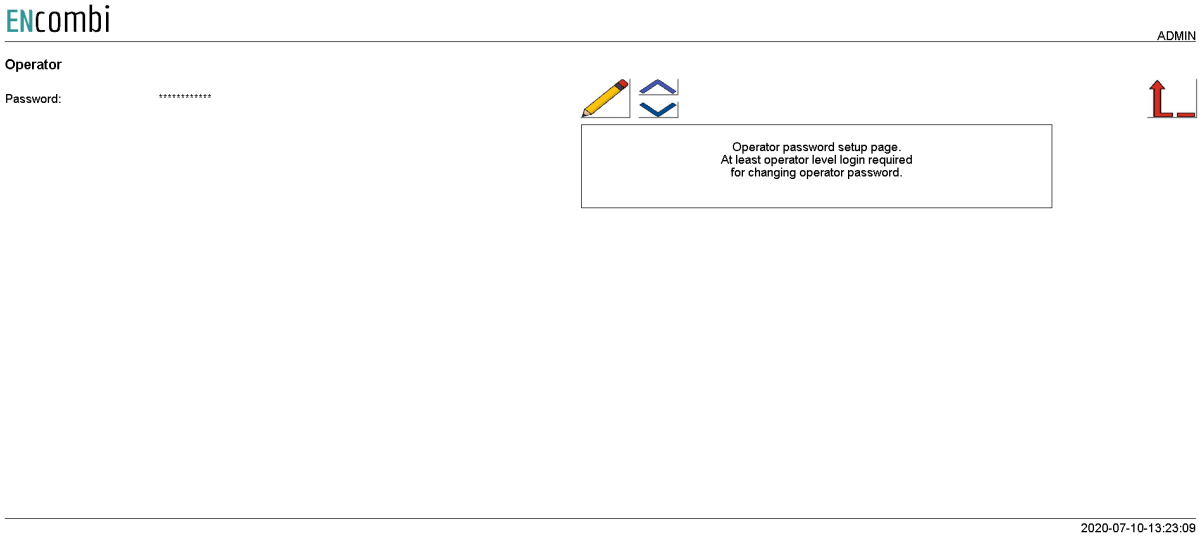
Besides the enabling of the password scheme for ECweb itself, there is a setting for enabling visualization of the ECpanel password in clear text on the ECpanel itself. When disabled the ECpanel password is hidden on the ECpanel.

On the same submenu level the set up pages for Operator, Service and Administrator level passwords are found. Clicking the up/down arrows will lead to them.

Passwords

Operator access or high is required for changing the Operator password.
Service access or high is required for changing the Service password.
Administrator access is required for changing the Administrator password.

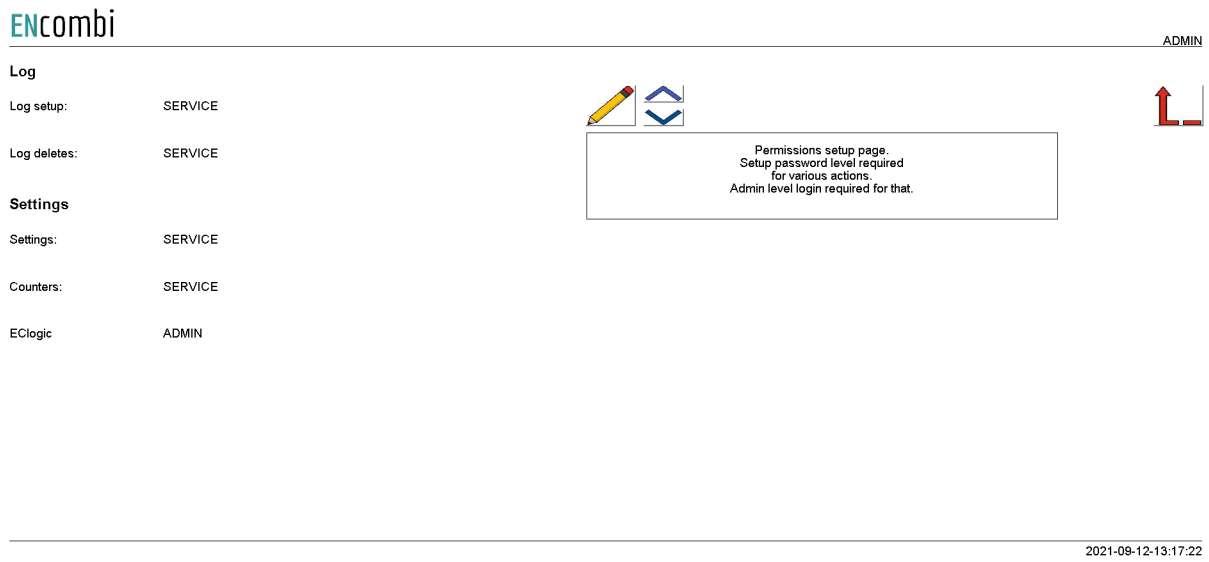
three dedicated menus exist for changing the passwords. Below example for changing Operator password.



On the same submenu level the set up pages for tailoring access level required for executing various commands are found. Clicking the up/down arrows will lead to them.

Permissions

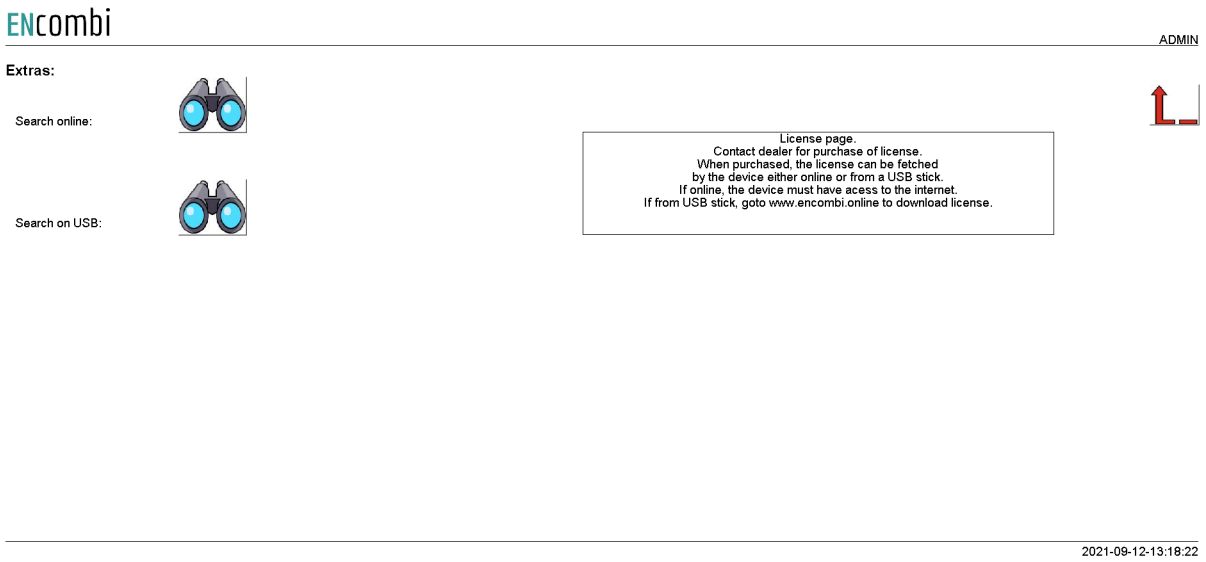
The various access levels required are set as below example.



Only an administrator can change the access level required for the various functionalities.

License & Extras

Clicking the extras button leads to the page below where activation of License can be done from here.



After purchase of License the ECpvX Cluster is upgraded in one of the following ways.

Search online

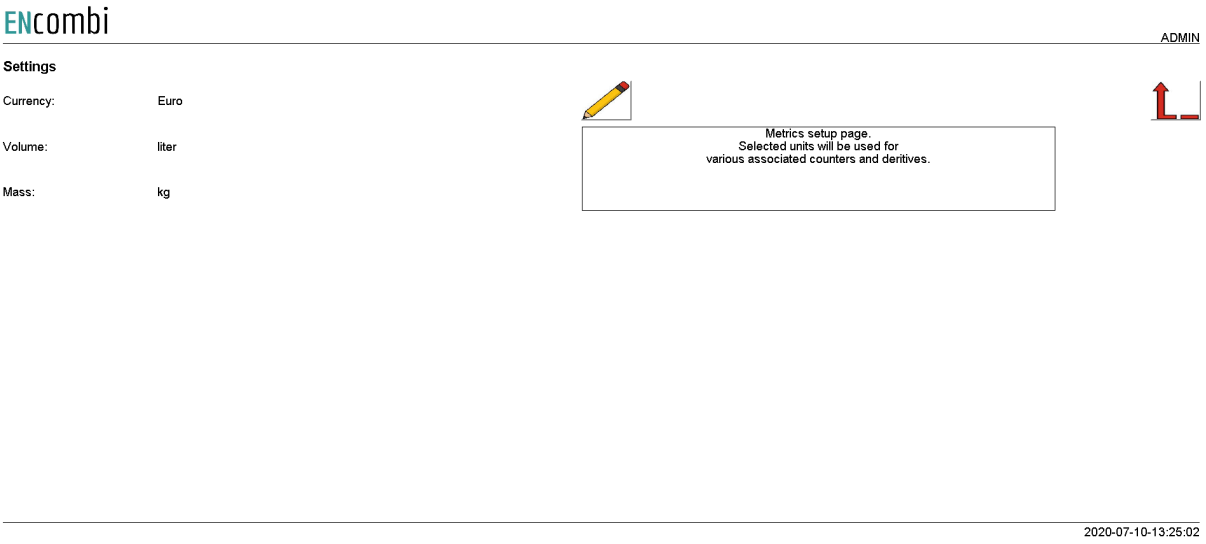
The ECpvX Cluster will have to be connected to the internet for this approach. Click the binoculars button for “Search online”. When successfully completed the ECpvX Cluster will request a reboot.

Search on USB

The License for the specific ECpvX Cluster are to be downloaded from ECcloud on www.encombi.online and put on the root directory on a USB stick. Insert the USB stick in the USB port on the ECpvX Cluster and click the binoculars button for “Search on USB”. The ECpvX Cluster will check the USB stick for the upgrade. When successfully completed the ECpvX Cluster will request a reboot.

Metrics

Clicking the metrics button leads to the below page where the metrics to use by ECpvX Cluster can be set up. The ECpvX Cluster will use the selected metrics for various displays on ECweb as well as in ECcloud.



Backups

Clicking the Backup button leads to the below page where the backups supported by ECpvX Cluster are managed. The ECpvX Cluster provides two backups.

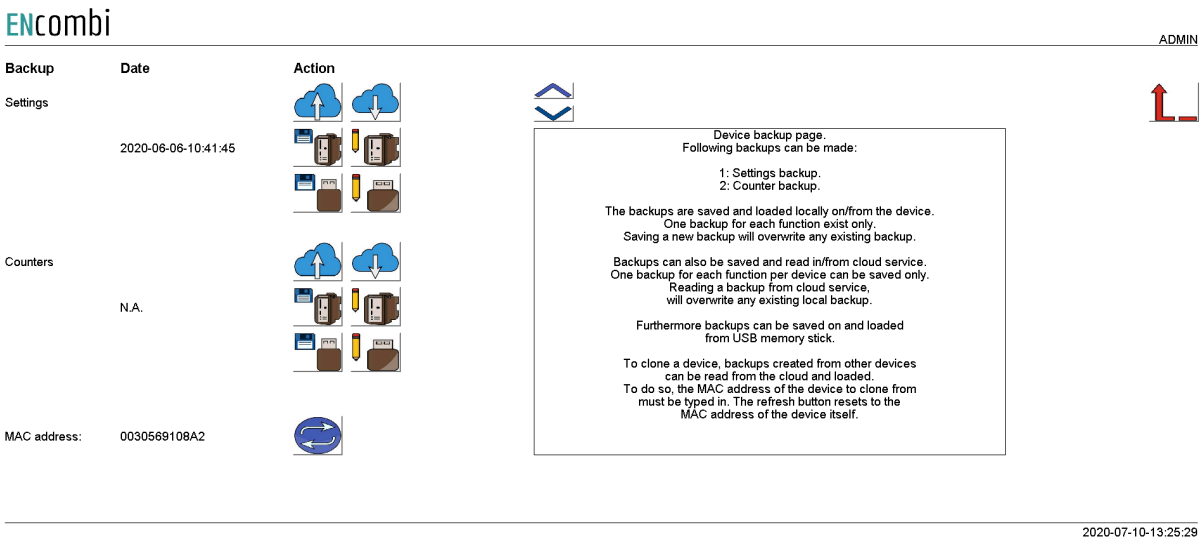
1. Settings.
2. Counters.

Both types can be:

1. Generated and stored locally on internal memory of ECpvX Cluster.
2. Loaded into ECpvX Cluster project from internal memory of ECpvX.
3. Copied from internal memory of ECpvX Cluster to ENcombi cloud for save storage.
4. Read from ENcombi cloud to internal memory of ECpvX Cluster.
5. Generated and stored on USB-stick.
6. Loaded into ECpvX Cluster project from USB-stick.

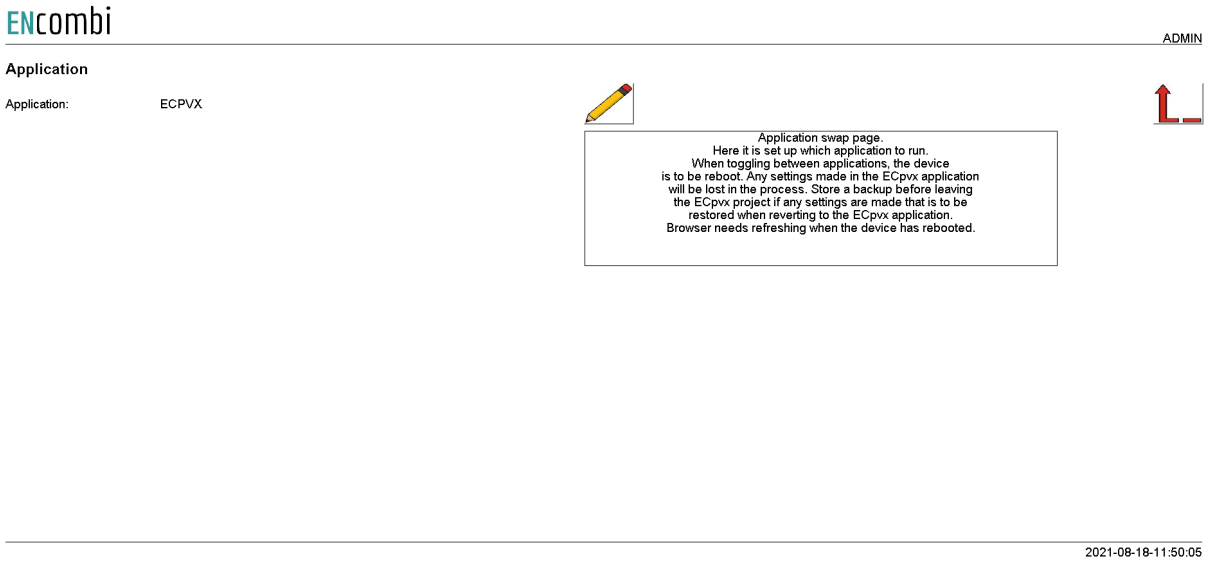
When reading backups from the cloud it will overwrite any existing backup already present on the internal memory of the ECpvX Cluster. The presents of and date of origin of the backups on internal memory are displayed.

Per default when reading backups from ENcombi cloud, the ECpvX Cluster will read backups generated by itself. If to clone an ECpvX Cluster this can be done by typing in the MAC access of the ECpvX Cluster you request to clone. Doing this ECpvX Cluster will read backups generated by that ECpvX Cluster instead.



Application

Clicking the Application button leads to the page below. Here it can be selected which application is to be active.



The following applications are available.

1. ECpvX Cluster.
2. ECpvX Cluster Service Tool.
3. ECpvX Cluster Boot

ECpvX Cluster is the default application and the one to use for the normal operation of the ECpvX Cluster. ECpvX Cluster Service Tool is a separate application that offers various tests and configuration features and the ECpvX Cluster Boot is a tool for updating both the ECpvX Cluster and the ECpvX Cluster Service Tool SW. The ECpvX Cluster Service Tool and the ECpvX Cluster Boot are treated in separate chapters.

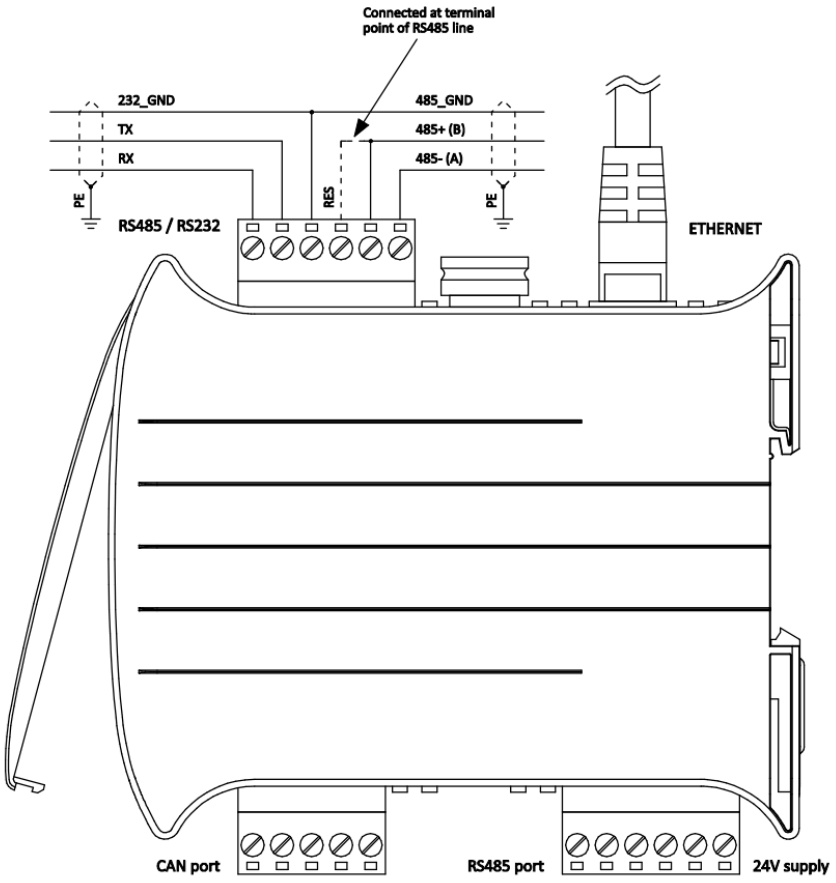
When toggling between applications the device is to be rebooted. Any settings made in the ECpvX Cluster application will be lost in the process. Make a backup before leaving the ECpvX Cluster application if any settings are made that are to be restored when reverting to the ECpvX Cluster application once again. The browser needs refreshing when the device is rebooted after switching the application.

Settings

Under this tile the setup of site specific parameters as numbers and ratings of ECpvX slave can be found.

RS485 COM ports

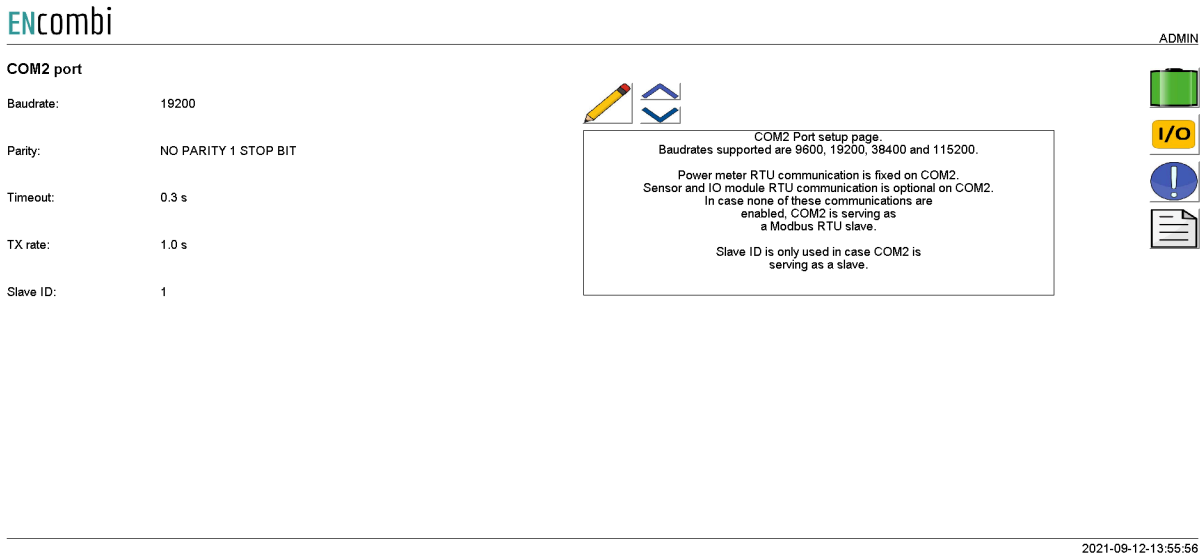
The ECpvX Cluster features two RS485 COM ports which are referred to as COM2 and COM3.



COM2 is the one found next to the power supply and COM3 is the one found next to the ethernet port.

- COM2 is reserved for interfacing to power meters and/or meteorological sensors.
  In case none of this is enabled, COM2 is acting as a slave port.
- COM3 is reserved for interfacing to ECpvX slaves and/or meteorological sensors.
  In case none of this is enabled, COM3 is acting as a slave port.

First page presented when clicking the Settings tile is the below page where COM2 configuration is set up.



Baud rates supported are:

- 9600, 19200, 38400 and 115200

Parity supported are:

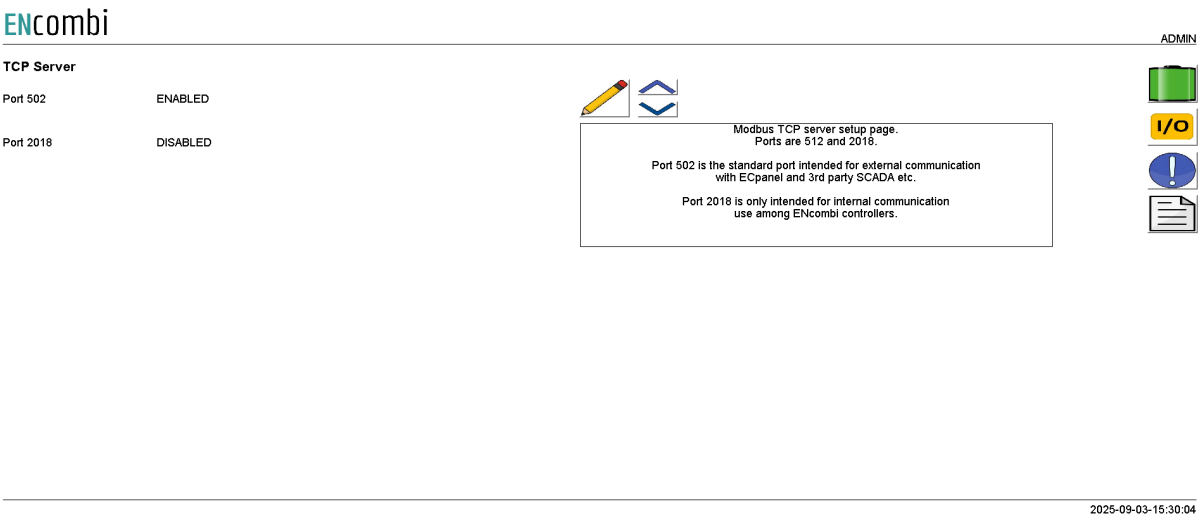
- “Parity one stop bit”, “No parity”, “Even parity” and “Odd parity”.

When a COM2 port is acting as a master, the transmit rate can be used to control the rate at which the ECpvX Cluster transmits to the slaves.

The Slave ID is only used when a COM2 port is acting as a slave.

On the same menu level a similar setup page for COM3 configuration is found. Clicking the up/down arrows will lead to it.

On the same menu level the Modbus TCP server configuration is found. Clicking the up/down arrows will lead to it. The standard port 502 port for external communication with the ECpanel HMI and 3rd party SCADA systems etc. is enabled per default. The port 2018 is reserved for internal communication among ENcmobi controllers between.



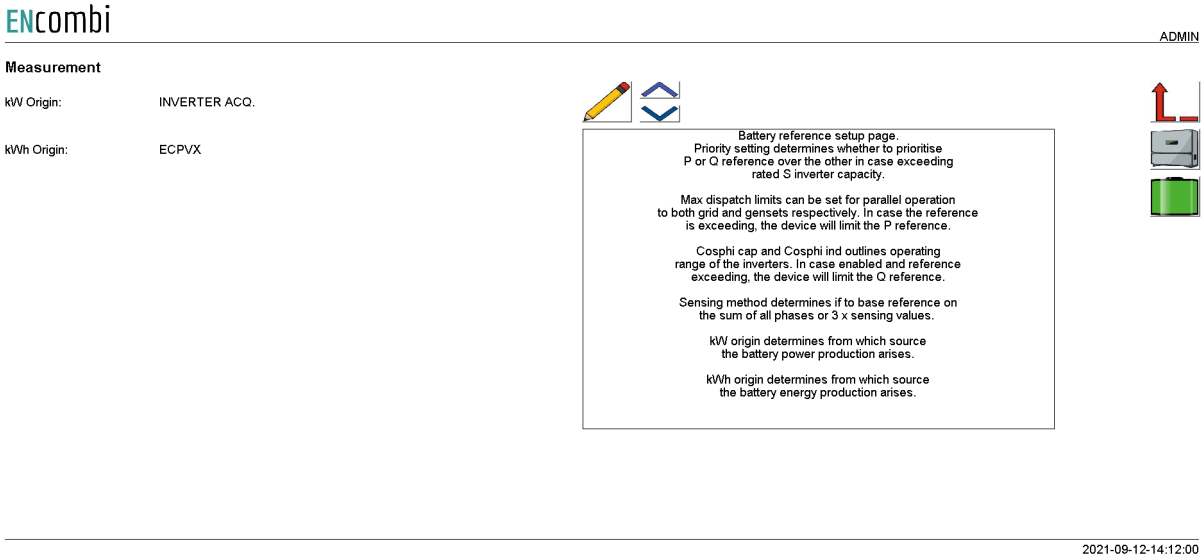
On the right hand side there are four submenus for.

1. Battery related parameters.
2. IO module related parameters.
3. Alarm related parameters.
4. Modbus slave profiles.

Battery

Measurement

Clicking the battery button leads to the below page where the measurements can be set up.



kW origin determines from where to retrieve/calculate the Battery power production. Supported methods are:

1. Inverter acquisition.

Inverter acquisition
The ECpvX Cluster will take the power contribution of the individual ECpvX slaves directly from their own power measurements via the inverter communication.

kWh origin determines from where to retrieve/calculate the PV energy production. Supported methods are:

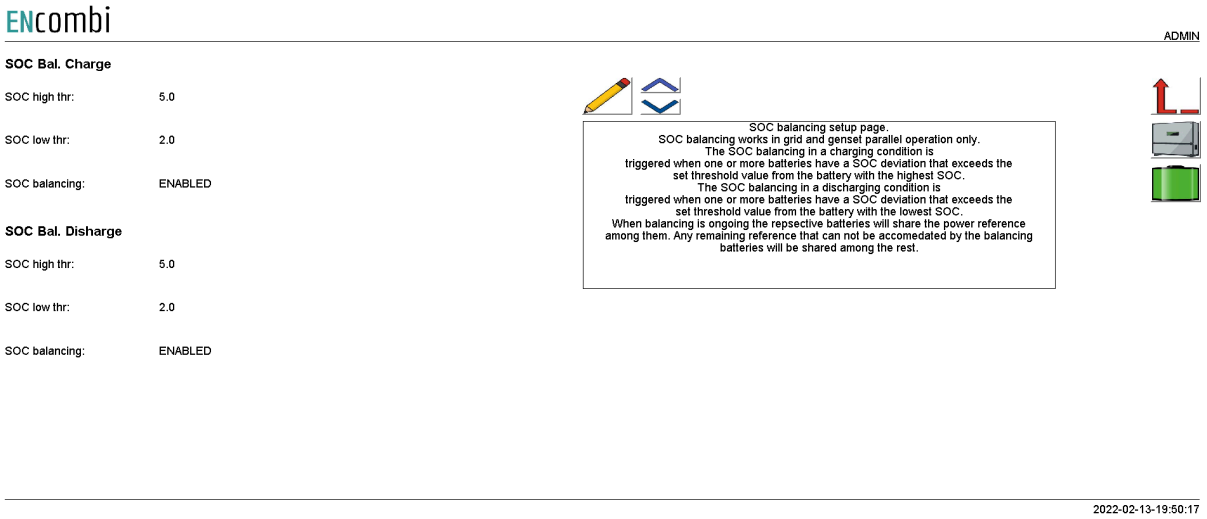
1. ECpvX Cluster.
2. EcpvX slaves

ECpvX
Based on the kW measured, the ECpvX Cluster integrates energy counters itself.

ECpvX slaves
The ECpvX Cluster will read the total energy counter from each ECpvX slave and base the energy from the reading.

SOC Balancing

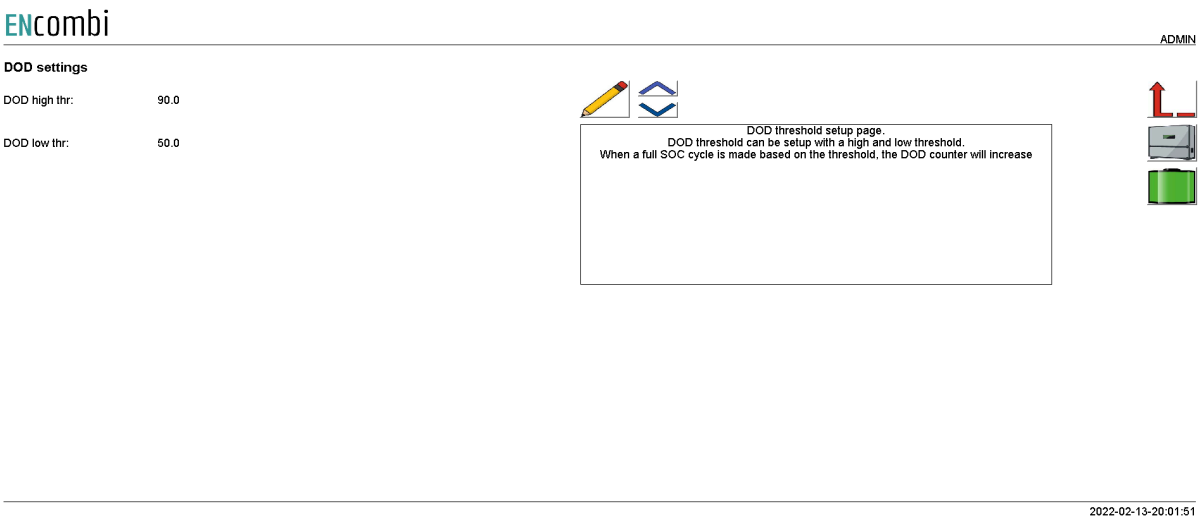
On the same submenu level the menu for setting up the SOC balancing is found. Clicking the up/down arrows will lead to it.



SOC balancing works in grid and genset parallel operation only; that is the mode received from the ECpvX Master must be PQ mode. The SOC balancing in a charging condition is triggered when one or more batteries have a SOC deviation that exceeds the set threshold value from the battery with the highest SOC. The SOC balancing in a discharging condition is triggered when one or more batteries have a SOC deviation that exceeds the set threshold value from the battery with the lowest SOC.
When balancing is ongoing the respective batteries will share the power reference among them. Any remaining reference that can not be accommodated by the balancing batteries will be shared among the rest.

DOD thresholds

On the same submenu level the menu for setting up the DOD counter thresholds is found. Clicking the up/down arrows will lead to it.



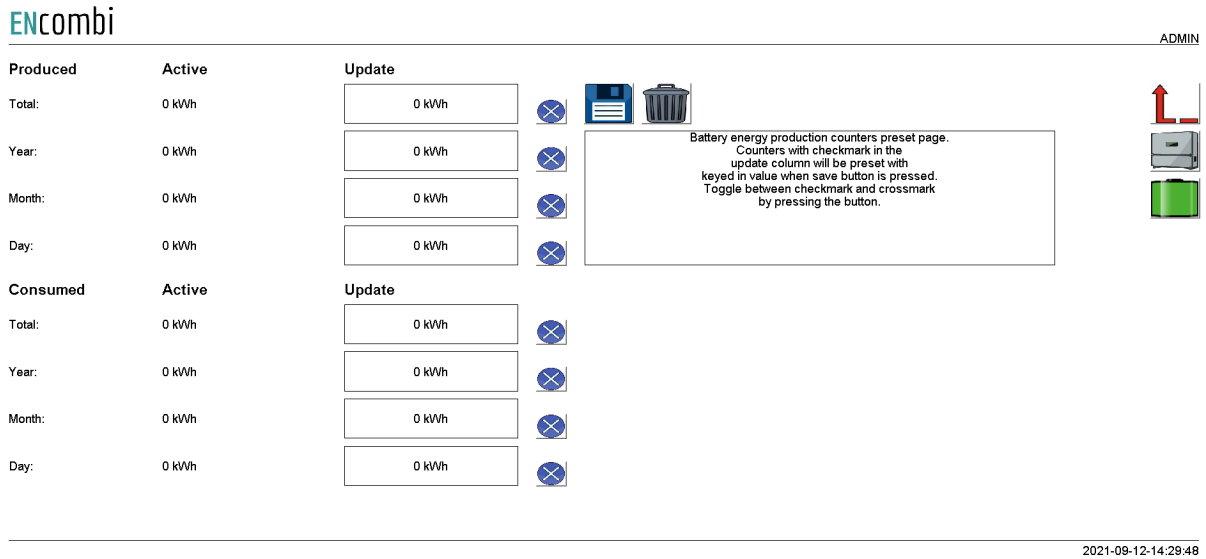
The DOD counter is incremented when the SOC drops below the low threshold and once again reaches the high threshold.

Counters

On the same submenu level pages for various battery related counters are found. Clicking the up/down arrows will lead to them.

- Produced energy (daily, monthly, yearly and total).
- DOD counters (daily, monthly, yearly and total).

Below is an example.

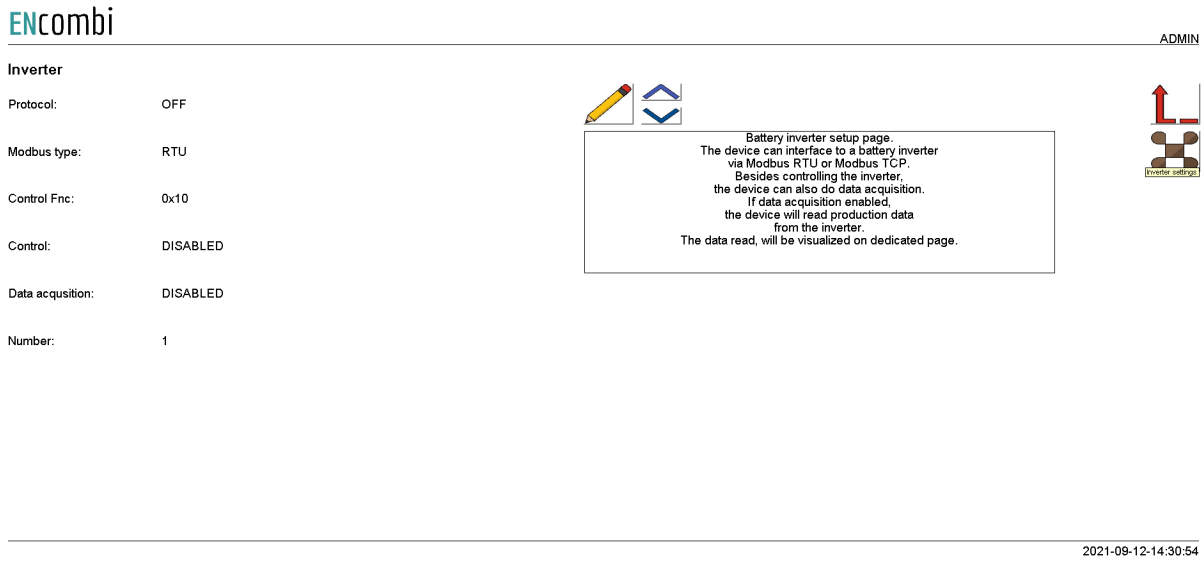


The counters will be incremented automatically by the ECpvX Cluster in accordance with operation conditions. The counters are part of the counters backup discussed in the Identifier chapter.

The menus are only providing the possibility for manually presetting of the counters. Counters with a check mark in the update column will be preset with the keyed in value when the save button is pressed. Toggle between check mark and cross mark by pressing the respective buttons.

Inverter

Clicking the inverter button leads to the following page.



A maximum of 32 ECpvX slaves is supported by a single ECpvX Cluster. In case more than 32 ECpvX slaves are to be controlled, multiple ECpvX cluster can be stacked to work together. The communication can be either Modbus RTU or TCP.

Controlling the slaves and data acquisition from the slaves can be enabled/disabled independently. ECpvX cluster supports Modbus function code 0x06 and 0x10 for applying control commands.

If data acquisition is enabled, the data read from the slaves, will be visualized on dedicated pages under monitoring.

RTU

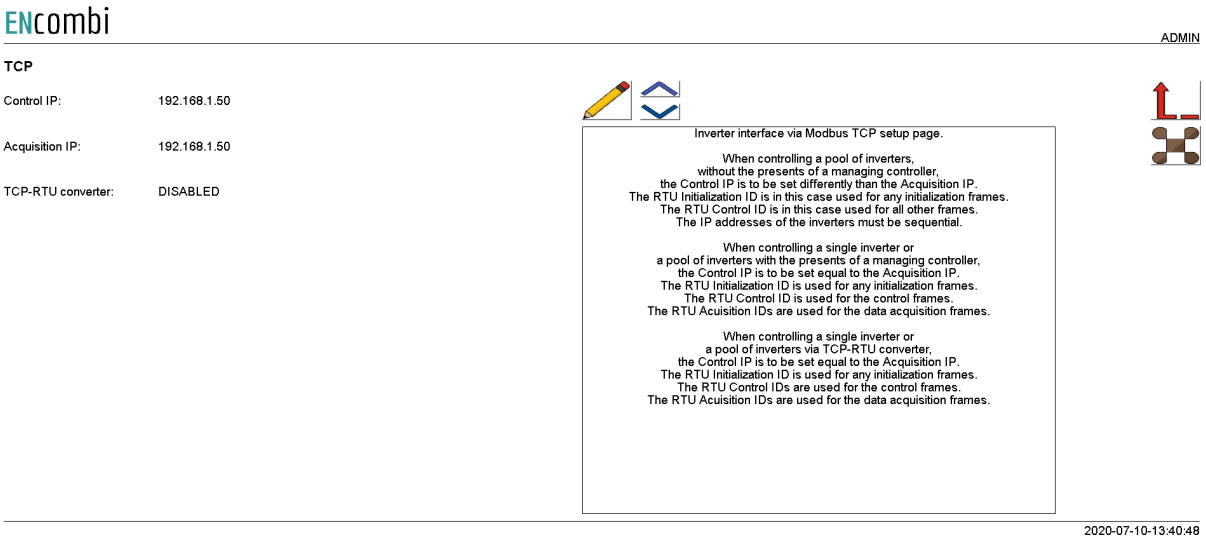
On the same submenu level the page for setting up Modbus RTU specifics for slave communication is found. Clicking the up/down arrows will lead to it.



The ECpvX cluster can communicate with the slaves on RTU. It will use unicast and the control ID and acquisition ID must be the same in order to communicate with the slaves.

TCP

On the same submenu level the page for setting up Modbus TCP specifics for slave communication is found. Clicking the up/down arrows will lead to it.



When controlling a pool of ECpvX slaves the Control IP is to be set differently than the Acquisition IP.

- The RTU ControlID is used for TCP frames for both acquisition and control references. The IP addresses of the inverters must be sequential.

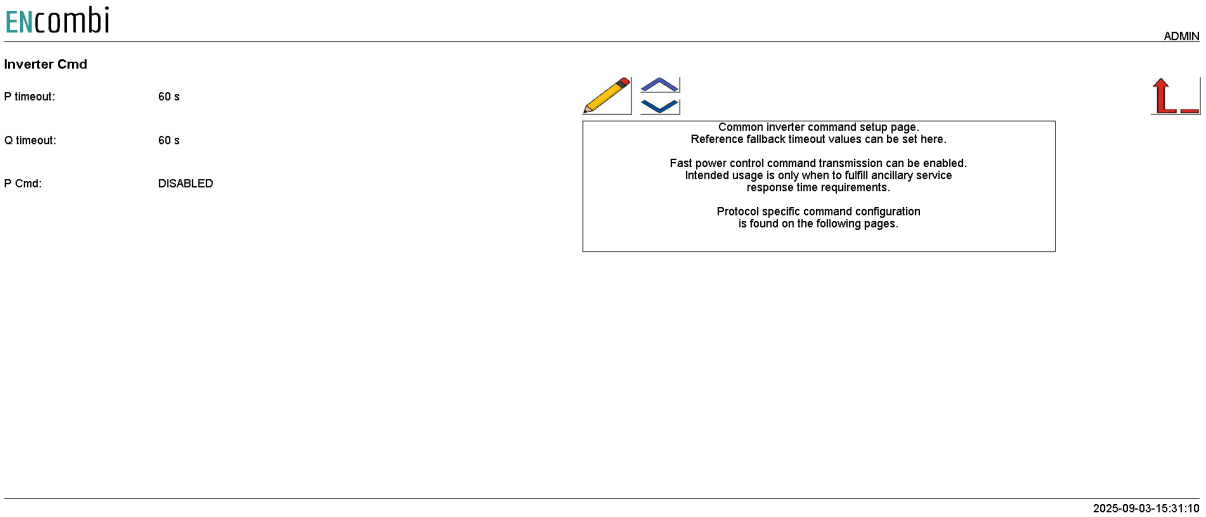
When controlling a single ECpvX slave, the Control IP is to be set equal to the Acquisition IP.

- The RTU Control ID is used for the TCP frames related to control references.

- The RTU Acquisition IDs are used for the TCP frames related to data acquisition.

Advanced Inverter command setup

On any of the above inverter pages clicking the Command button will lead to the below page for advanced inverter command setup.

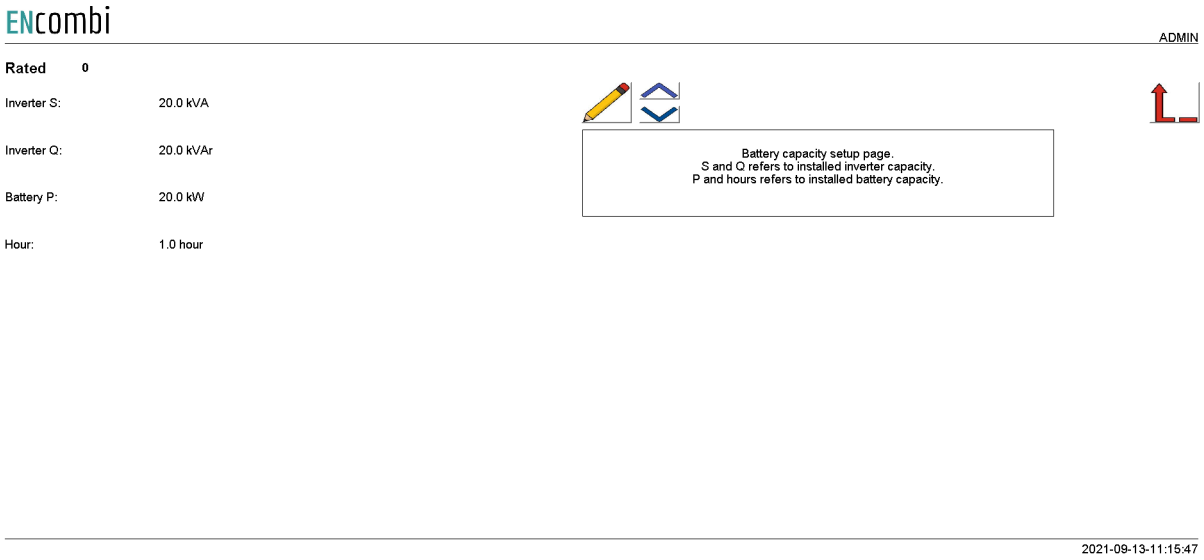


These settings are common for all inverters and may or may not apply to the specific inverter make/model selected. Here the delay between transmission of commands that is set to be transmitted at a defined interval can be set. Furthermore the fallback timeouts for reverting to a predefined production level in case of loss of communication can be set up.

Frequent transmission of power control commands can be enabled. The intended usage is for when doing ancillary services to fulfill time response requirements.

Battery ratings

Clicking the battery button leads to the following page.



From here it is possible to setup the size of each ECpvX slave. It is possible to setup 32 slaves by toggling the arrow buttons up and down.

DOD settings

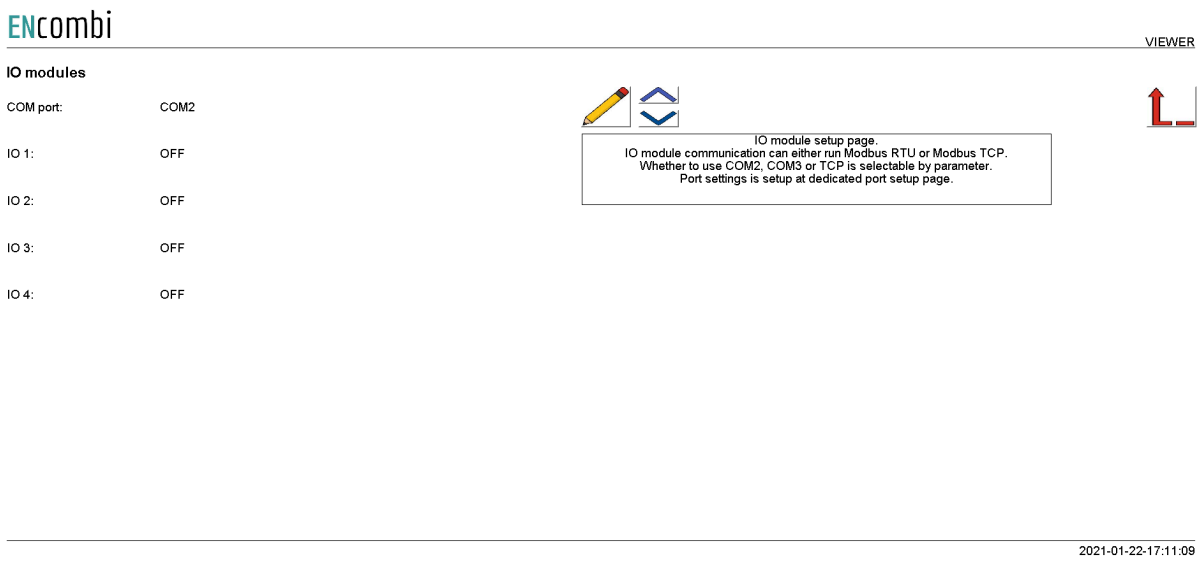
On the same submenu level the setup page for DOD settings is found. Clicking the up/down arrows will lead to it.



DOD threshold can be set up in order to count a DOD cycle. When a full cycle is made based on the threshold, the DOD counter will increase.

IO modules

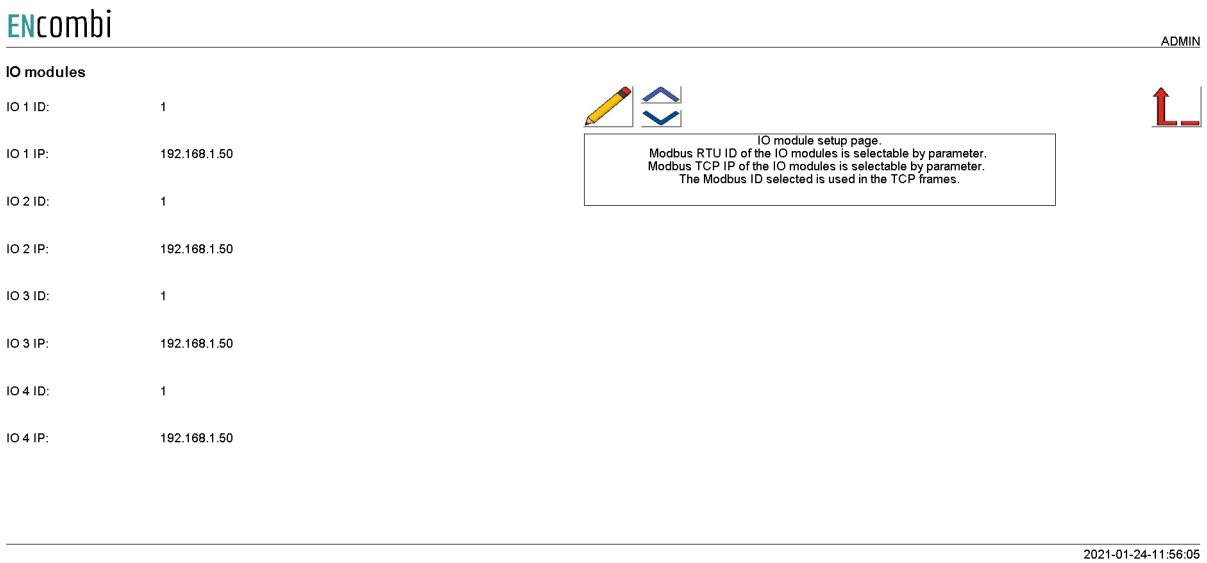
Clicking the IO module button leads to the following page.



Above page holds the setting up Modbus IO module communication. IO module communication runs either Modbus RTU or Modbus TCP. Whether to use IO modules on COM2, COM3 or TCP is selectable by parameter. A maximum of 4 Modbus IO modules can be connected to the ECpvX Cluster. The ECpvX Cluster can also read IO data directly from another ECpvX. This is selectable by parameter.

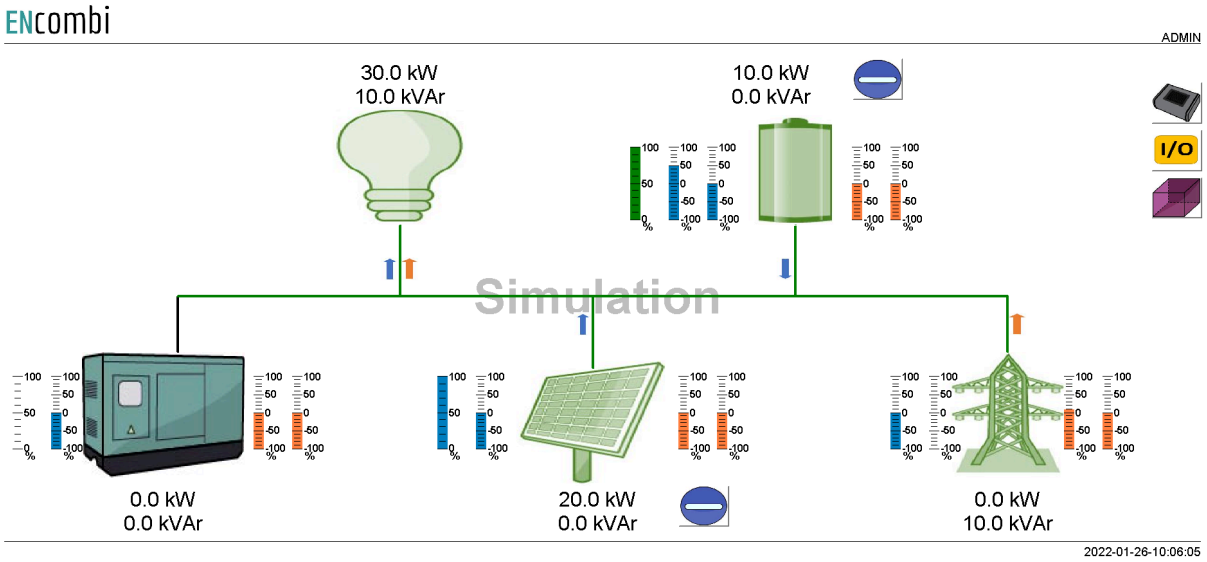
Check the link below to see which IO modules that are supported by ECpvX Cluster.
http://www.encombi.com/products/ecpvx/

Clicking the up/down arrows leads to the page below where the Modbus ID and IP addresses for the respective IO modules are set up.

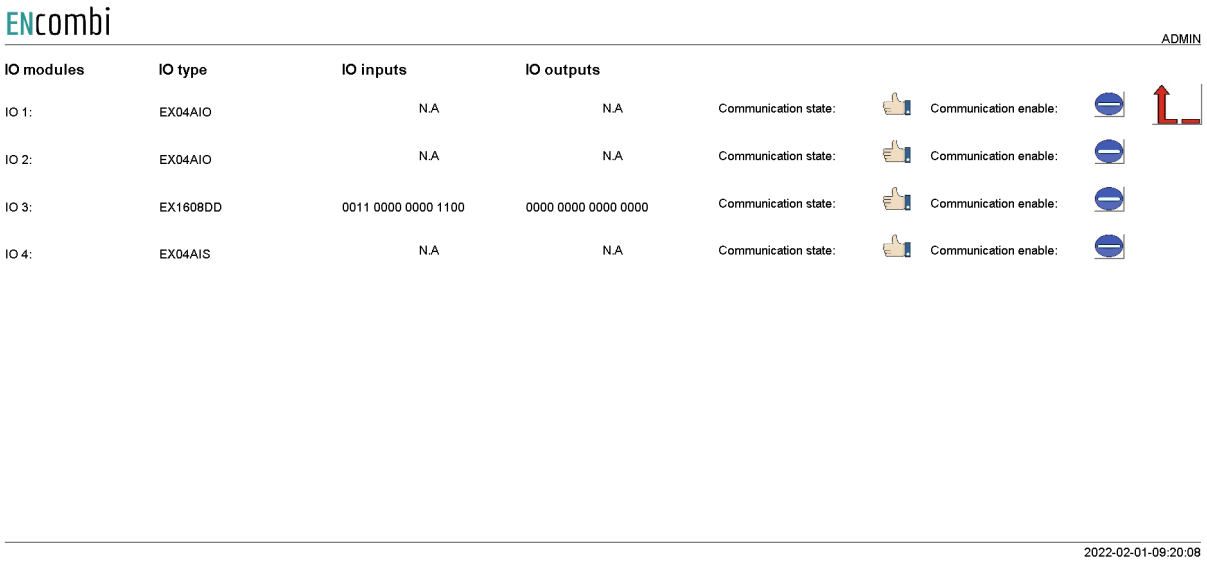


Analogue input/output

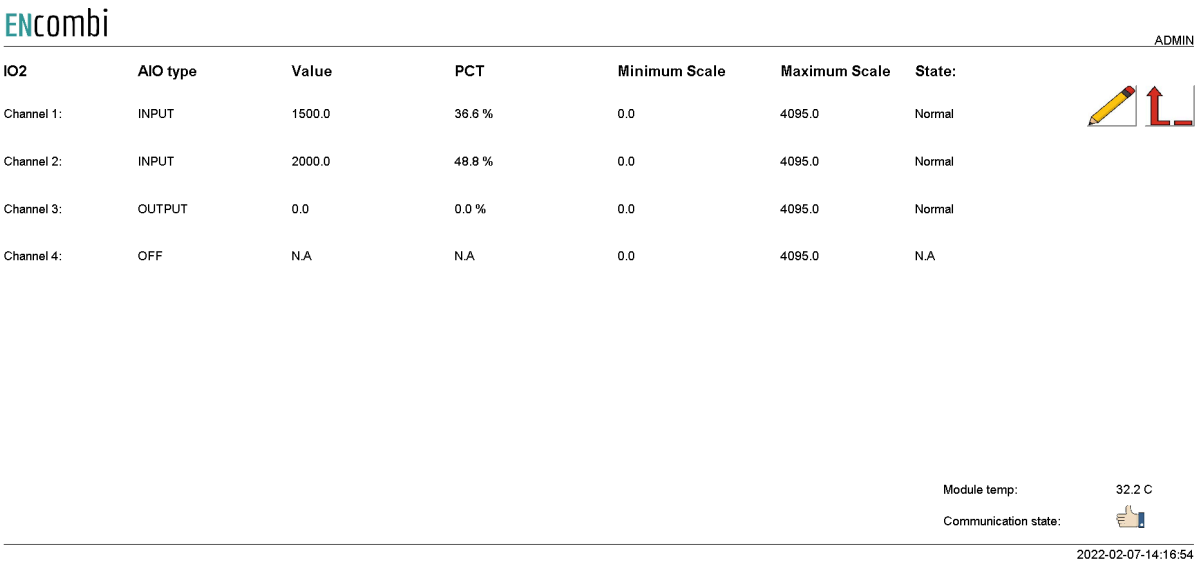
The ECpvX Cluster supports analogue input/output modules. When the analogue module is selected in the IO window setup, all settings are placed in the monitoring of the IO module.



When pressing the IO button, it will lead to the following page.



From this page it is possible to select which IO module to set up and monitor values.
If the IO module is digital input/output, it is not possible to click on the module, the actual bit value is present at this page.
By clicking on the IOx module, it will lead to the following page.



From this page it is possible to scale the input/output on each channel of the IO module. The input value can be used for Pref, Qref or other data points. This is set in EClogic. The value shown is the scaled value and the percentage is the percentage of the range from 0-100%. The maximum range is 0-4095.
The module temperature is shown in the lower right corner and the state of each channel can be read to the right.

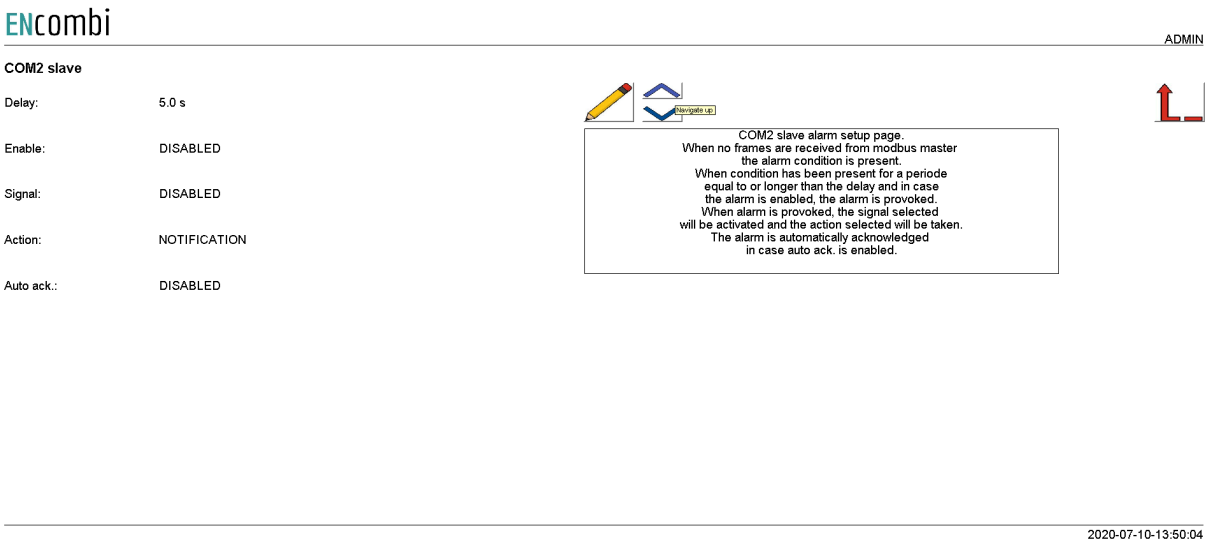
Alarms

Clicking the alarm button leads to menus of customizable alarms.

- COM2 port slave alarm.
- COM3 port slave alarm.
- TCP port slave alarm.
- Common master communication alarm.

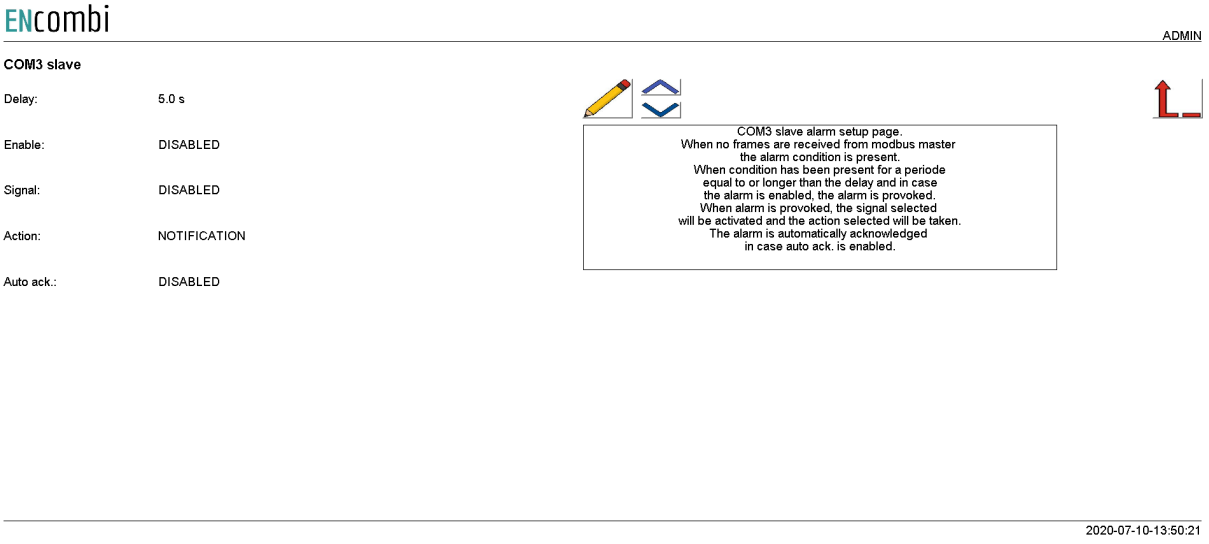
Other alarms exist as well but they are not customizable alarms as the ones listed above.

COM2 slave



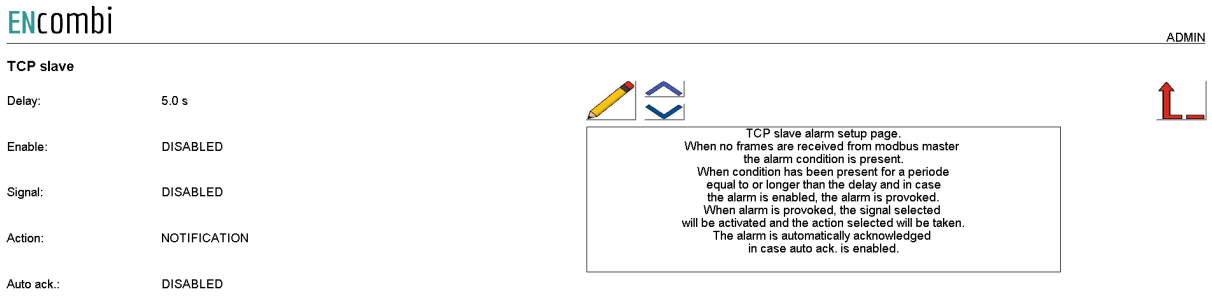
When no frames are received from the modbus RTU master, the alarm condition is present. When the condition has been present for a period equal to or longer than the delay and in case the alarm is enabled, the alarm is provoked. When the alarm is provoked, the signal selected will be activated and the action selected will be taken. The alarm is automatically acknowledged
in case auto ack. is enabled.

COM3 slave



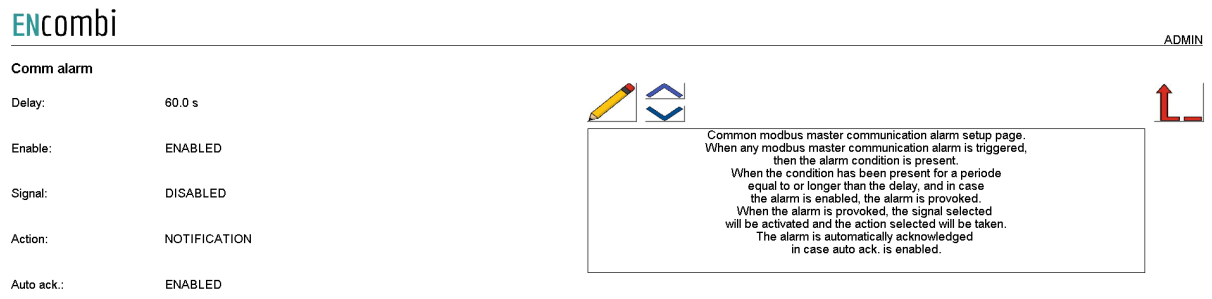
When no frames are received from the modbus RTU master, the alarm condition is present. When the condition has been present for a period equal to or longer than the delay and in case the alarm is enabled, the alarm is provoked. When the alarm is provoked, the signal selected will be activated and the action selected will be taken. The alarm is automatically acknowledged
in case auto ack. is enabled.

TCP slave



When no frames are received from the modbus TCP master, the alarm condition is present. When the condition has been present for a period equal to or longer than the delay and in case the alarm is enabled, the alarm is provoked. When the alarm is provoked, the signal selected will be activated and the action selected will be taken. The alarm is automatically acknowledged
in case auto ack. is enabled.

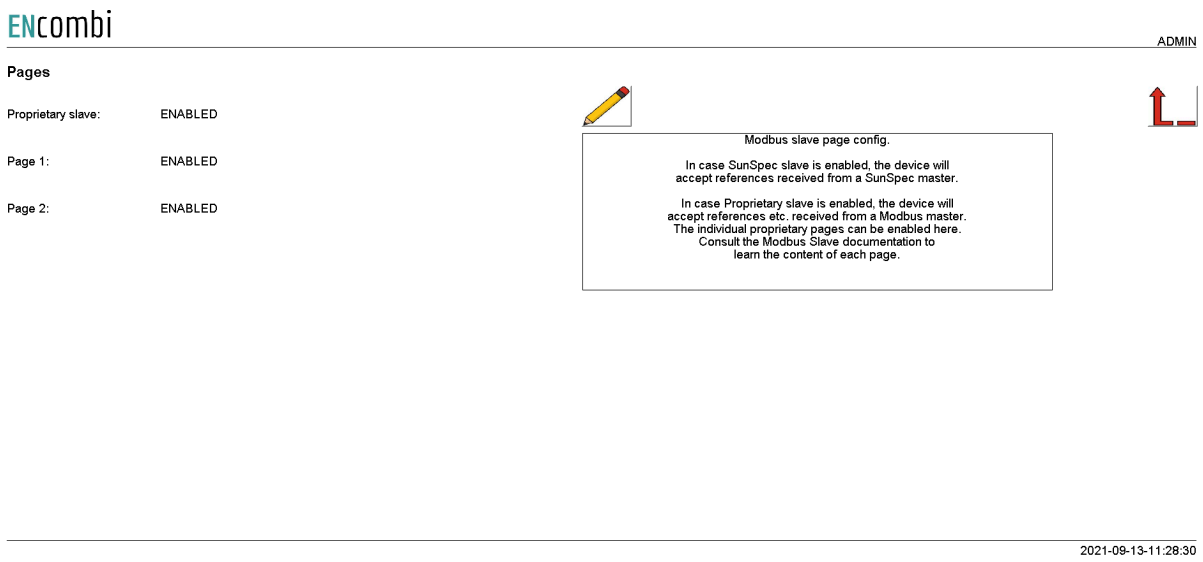
Common master communication



This alarm condition is present in case any of the modbus master communication alarms for the inverter, power meter, sensor or IO communication are raised. When the condition has been present for a period equal to or longer than the delay and in case the alarm is enabled, the alarm is provoked. When the alarm is provoked, the signal selected will be activated and the action selected will be taken. The alarm is automatically acknowledged in case auto ack. is enabled.

Proprietary modbus pages

Clicking the pages button leads to the following page.

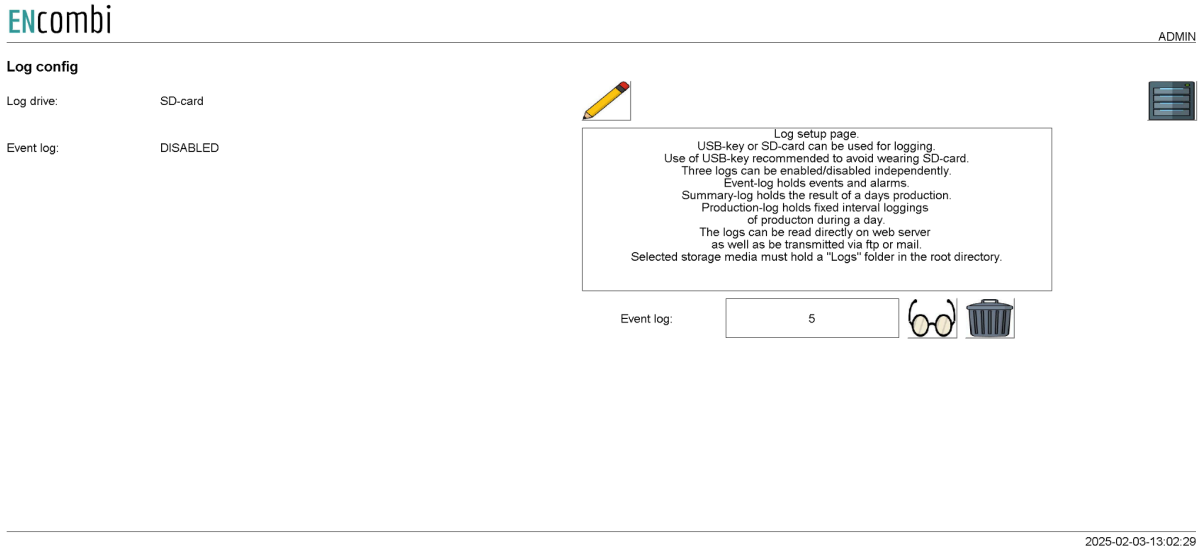


In case Proprietary slave is enabled, the ECpvX cluster will accept instructions to be received over modbus via a dedicated proprietary modbus profile. The various instructions are furthermore grouped together in different pages that need to be enabled individually.
Consult the Modbus slave documentation on ENcombi website for detailed information about the proprietary modbus profile.
http://www.encombi.com/products/ECpvx/

Logs

Local logs with transmission via ftp

The ECpvX Cluster features an event log stored locally on SD-card or on USB stick.



A new Event log is generated every day. The event log holds entries of any events taking place or any occurrences of alarms on that particular day. All entries are time stamped.

All Eventlogs can be displayed directly on ECweb. Below example shows how the Eventlog looks on ECweb. The first page is a list of all the Eventlogs available. Second page is showing data from one of those logs:

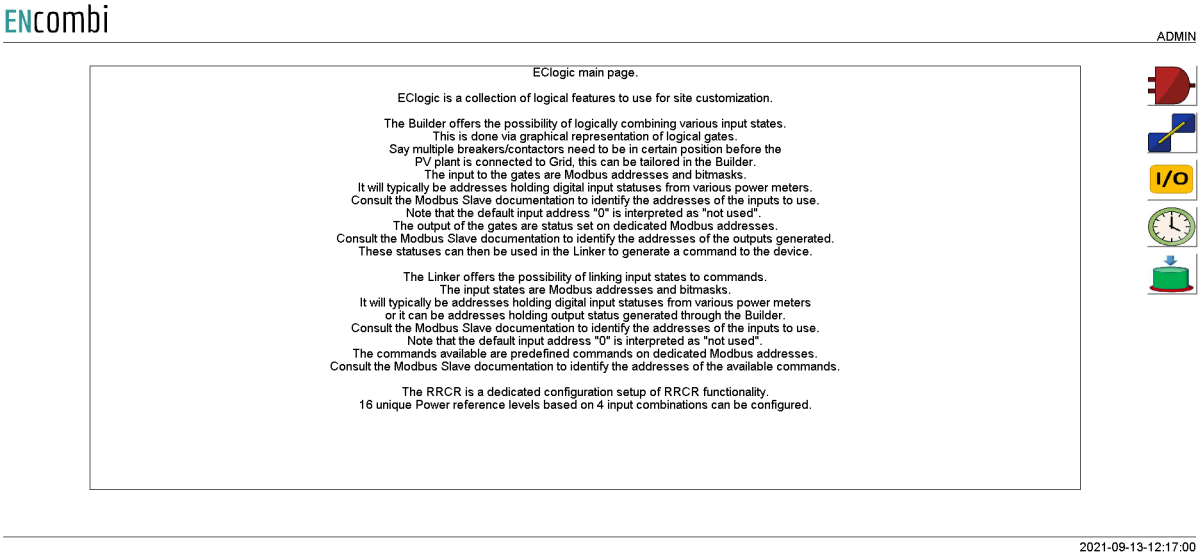




Consult the “Control” chapter in this document for details on how to set up the various automatic file transmissions.

EClogic

EClogic provides the possibility of making project specific logical expressions when required. That could be for linking physical digital inputs applied on power meters to the position of circuit breakers or similar. Also here, RRCR can be set up providing the option of a superior control system to give power references for the ECpv to follow. First page presented when clicking the EClogic tile is the page below.



EClogic is divided into five sub categories.

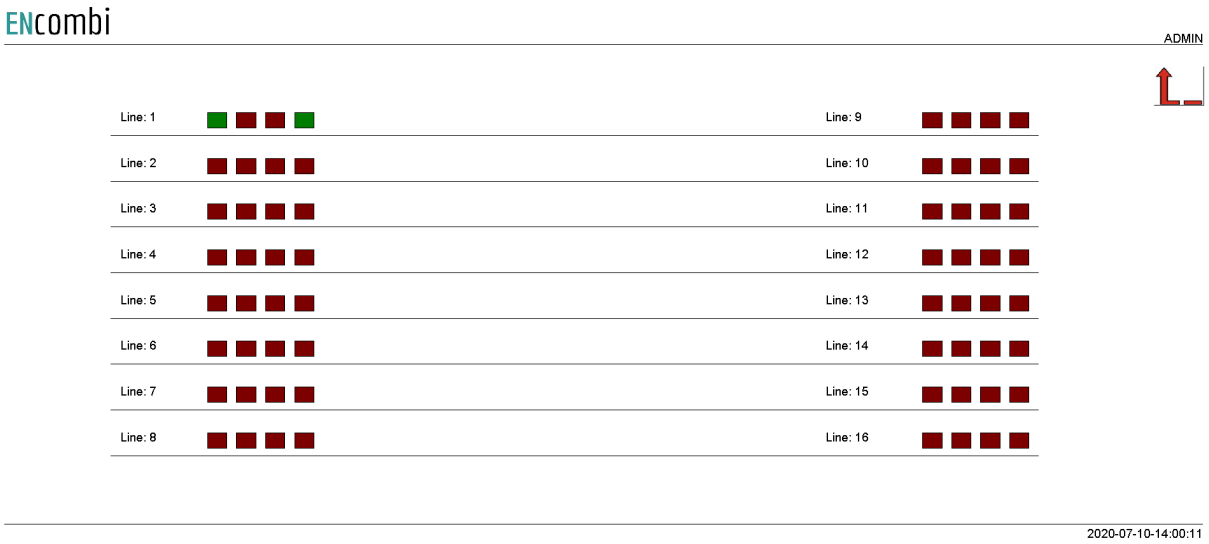
1. Builder
2. Linker
3. IO

4. Command timers
5. Command panel

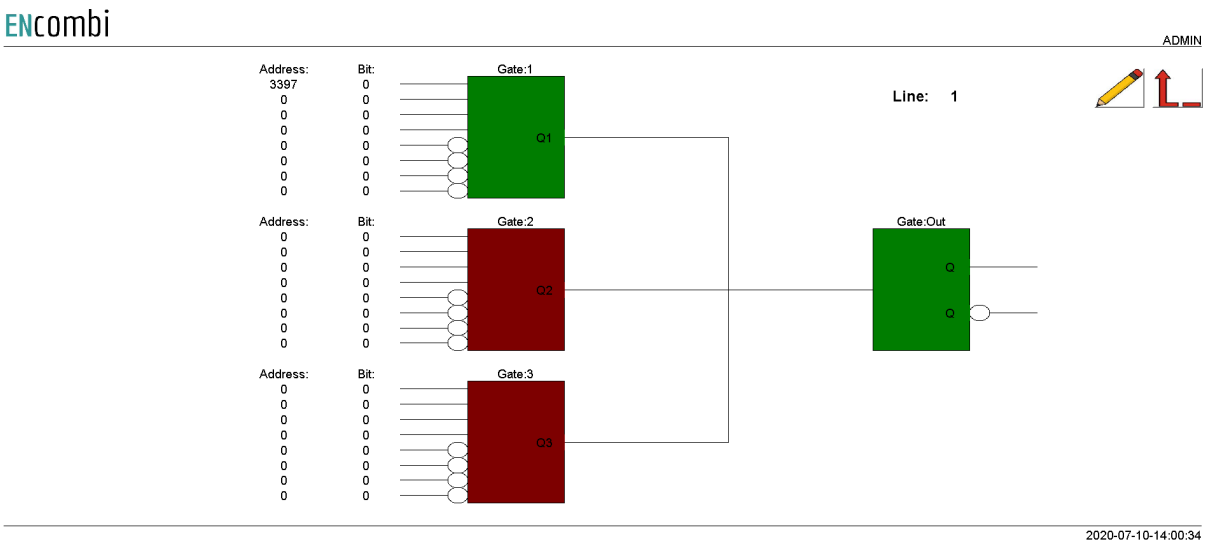
Builder

The Builder offers the possibility of logically combining various input states. This is done via graphical representation of logical gates.
The input to the gates are function code 0x04 Modbus addresses and bitmasks. It will typically be addresses holding digital input statuses from various power meters. Consult the Modbus Slave documentation to identify the addresses of the inputs to use. Note that the default input address "0" is interpreted as "not used".
The output/status of the gates are set on dedicated Modbus addresses. Consult the Modbus Slave documentation to identify the addresses of the outputs generated. These statuses can then be used in the Linker to generate a command to the device.

First page presented when clicking the builder button is the page below. Here an overview of the 16 builder lines supported is presented.



Each builder line consists of four gates. The status of the gates are represented by the color. Red means that the gate is false and green that the gate is true.



Clicking the line number will lead to the set up page for the specific line.

Each of the first three gates take four AND inputs and four AND NOT inputs. These three inputs are OR'ed together to generate one input to the output gate.

Example (Ecpv example)

In the configuration shown above, address 3397 bit0 is used as input to Gate1.
From Modbus Slave documentation this is found to be input1 on PV meter1. As the input1 is active the Gate1 state is true which again results in the output gate to be true. This will generate the following statuses in the designated modbus area to go high.

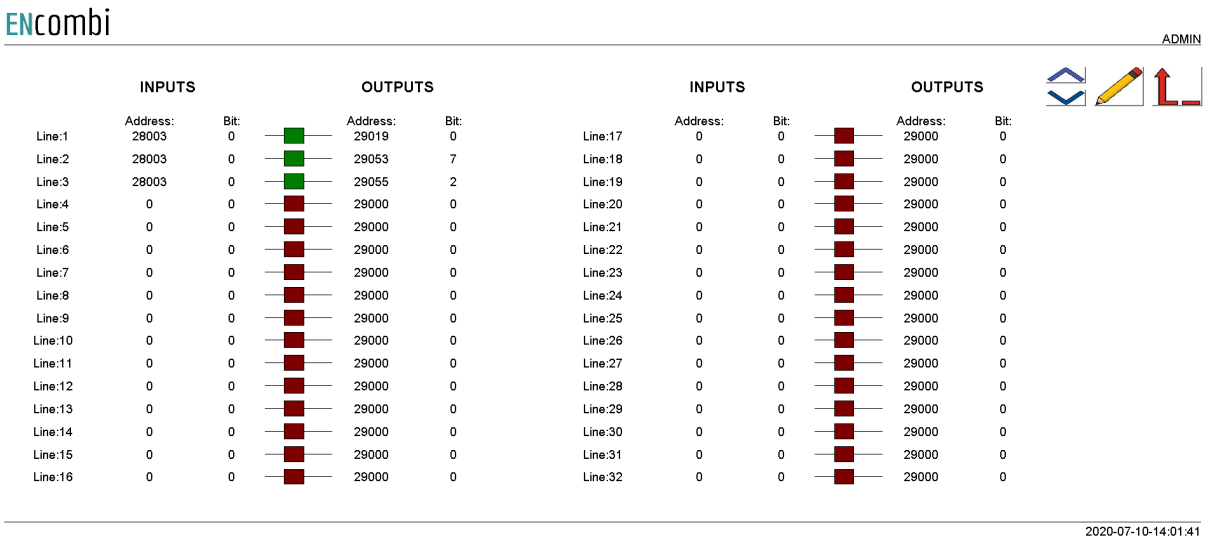
ECLOGIC BUILDER AREA 1				
28000	Q1 gate output status line 1-16	16 unsigned int	bitwise	Not defined
28001	Q2 gate output status line 1-16	16 unsigned int	bitwise	Not defined
28002	Q3 gate output status line 1-16	16 unsigned int	bitwise	Not defined
28003	Q-out gate output status line 1-16	16 unsigned int	bitwise	Not defined
28004	Inverted Q-out gate output status line	16 unsigned int	bitwise	Not defined
28005..28999	RESERVED	Not defined	Reserved for later use	Not defined

Address 28000 bit0: Gate1, line1
Address 28003 bit0: Output Gate, line1

Linker

The Linker offers the possibility of linking input states to commands. The input states are Modbus addresses and bitmasks. It will typically be addresses holding digital input statuses from various power meters or it can be addresses holding output status generated through the Builder. Consult the Modbus Slave documentation to identify the addresses of the inputs to use. Note that the default input address "0" is interpreted as "not used".
The commands available are predefined commands on dedicated Modbus addresses. Consult the Modbus Slave documentation to identify the addresses of the available commands.

First page presented when clicking the linker button is the page below. Here the 32 linker lines supported can be set up. Furthermore, the status of each link is indicated by green and red color.



Example continued (Ecpv example)

In the configuration shown above address 28003 bit0 being the status of the output gate of builder line1 is used to set commands on address 29019 bit0, 29053 bit7 and 29055 bit2 respectively. From Modbus Slave documentation this is found to be the commands for:

1. Relay 1-16 on all PV meters.
2. Minimum genset load 1-8.
3. RRCR input 1-4.

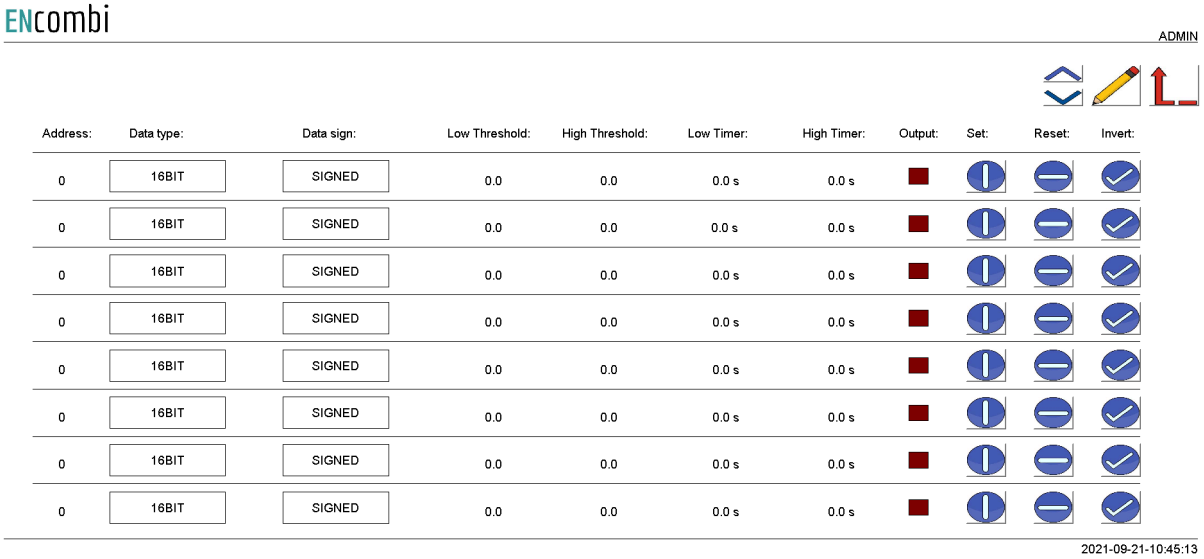
Hence activating input1 on PV meter1 has the effect of:

1. Activating relay1 on all PV meters present.
2. Overruling the parameter set under “Settings”, using the Minimum genset load setting8 from EClogic instead.
3. RRCR input3 applied.

Point 2 and 3 will be explained in the following.

General Purpose Hysteresis

General purpose hysteresis is a generic configuration tool to trigger alarms based on different inputs.



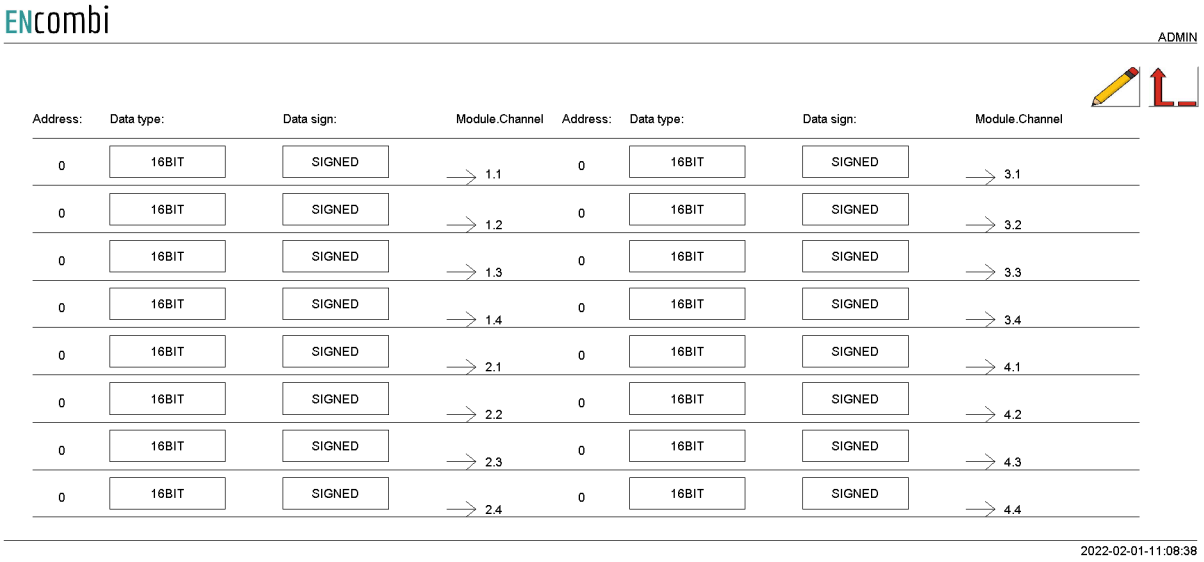
The address column is the input for the flip flop. The data type and sign for the selected address must be changed according to the modbus manual for the address.
The flip flop is built up with a low threshold and a high threshold.
If the value from the address is lower than the low threshold value, the low timer will start. After the lower timer has expired, the output box will change color to green which indicates that the line is present. The status of each line can also be read out on modbus.
If the value from the address is higher than the high threshold value, the high timer will start. After the high timer expires, the output box will change color to red which indicates that the line is not present any more.

It is possible to manually force the line to be set or reset by clicking on the buttons corresponding to the line which should be forced.

Furthermore it is possible to inverse the output by clicking the button.

IO

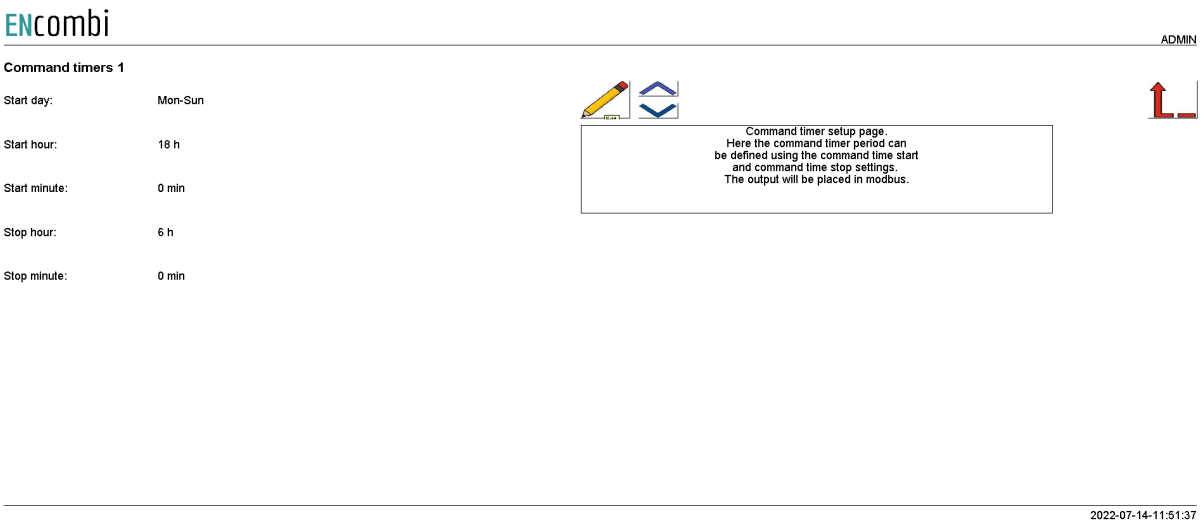
By clicking on the IO icon, it will lead to the following page.



From here it is possible to set up which data should be linked to each output of the AIO module. All 16 outputs are present and it is possible to select which data to be sent out on each channel.

Command timers

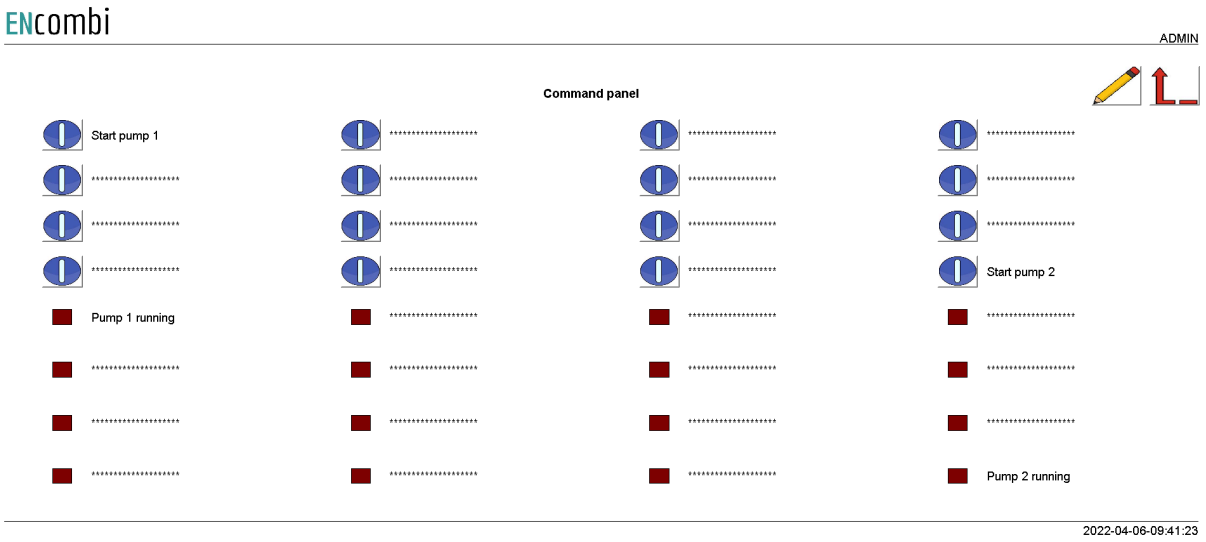
By clicking on the command timer icon, it will lead to the following page.



It is possible to set up 4 command timers. Type in the start day and time and stop time for the command timer. The output will be available on modbus and can be used for EClogic status/commands.

Command panel

The command panel holds 16 configurable command buttons and 16 status indicators. By clicking on the command panel icon, it will lead to the following page where the associated text strings for the 16 buttons and indicators can be typed in.



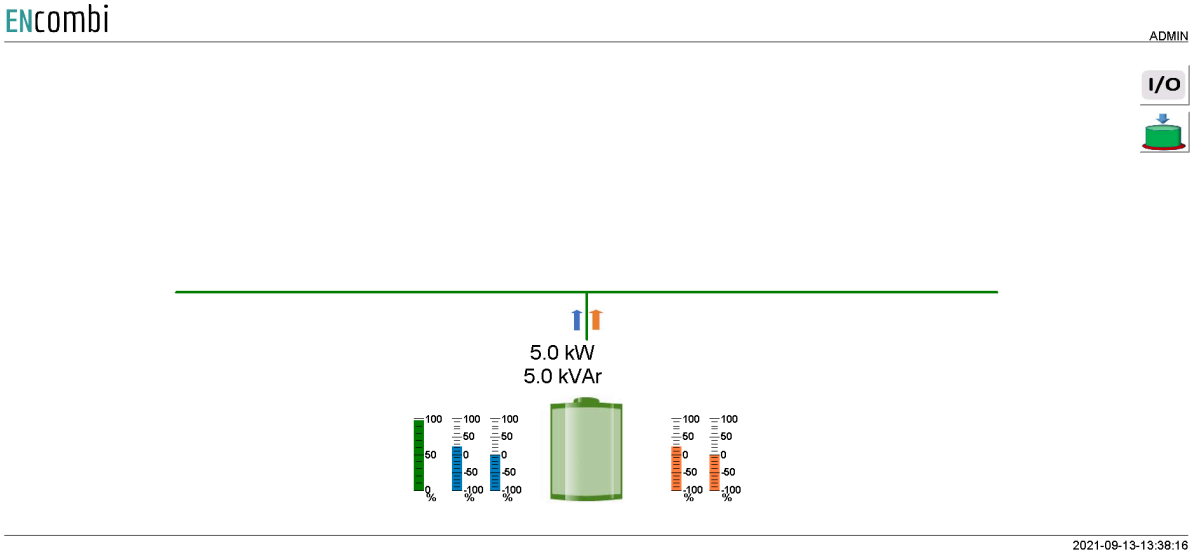
The actual functionality of the command panel is set up in the Builder/Linker using the addresses below.

31007	BITFIELD_7	16 unsigned int	Command Panel buttons 01..16

29005	Cmd panel LED01..16: Green	16 unsigned int	bitwise	Not defined
29006	Cmd panel LED01..16: Red	16 unsigned int	bitwise	Not defined

Monitoring

The ECweb provides a high level overview of the installation as well as detailed information about each slave. Below is an example of the first page presented under the Monitoring tile.



In case the battery symbol is neither gray nor green it means that the start signal is not present. In case the battery symbol is green it means that the start signal is present.

Blue and orange arrows indicate active power and reactive power flow direction respectively.

On the left hand side of the sources two blue bar graphs are shown. The one to the left shows the active power loading of the source in percentage. The one to the right shows the deviation from the active power reference in percentage.

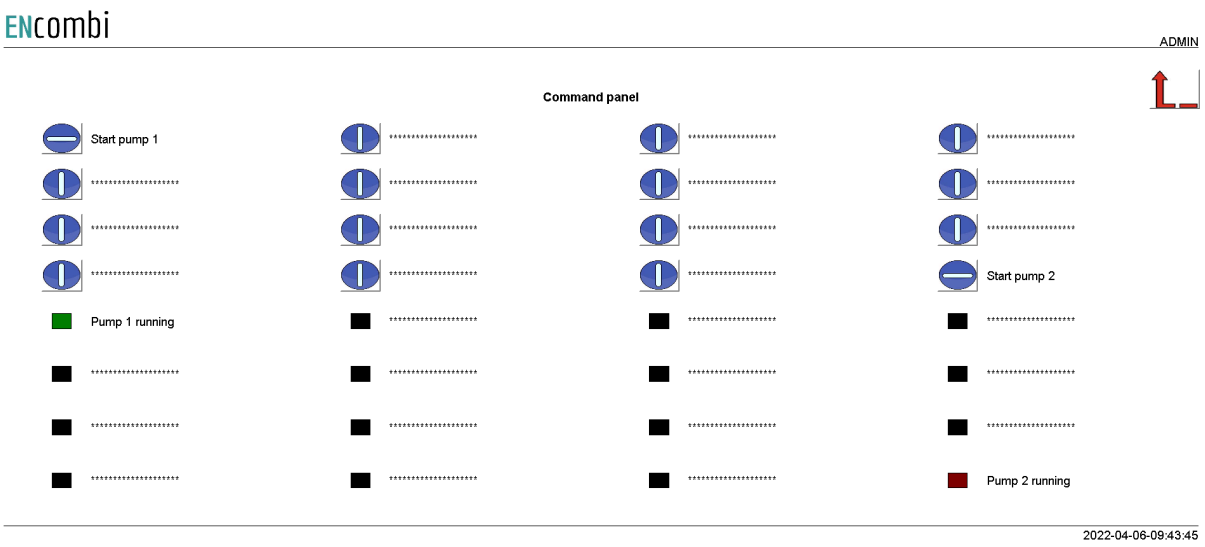
On the right hand side of the sources two orange bar graphs are shown. The one to the left shows the reactive power loading of the source in percentage. The one to the right shows the deviation from the reactive power reference in percentage.

In the upper right corner four buttons are shown.

1. Command panel
2. IO module data.

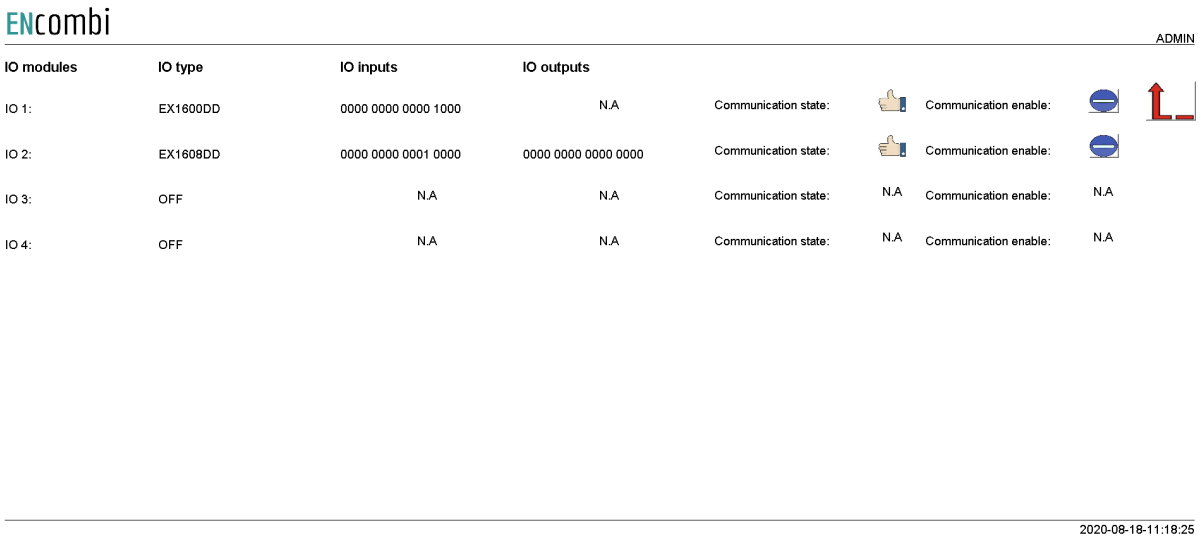
Command panel

Clicking the command panel button will lead to the page below where the button commands and status indications are displayed.



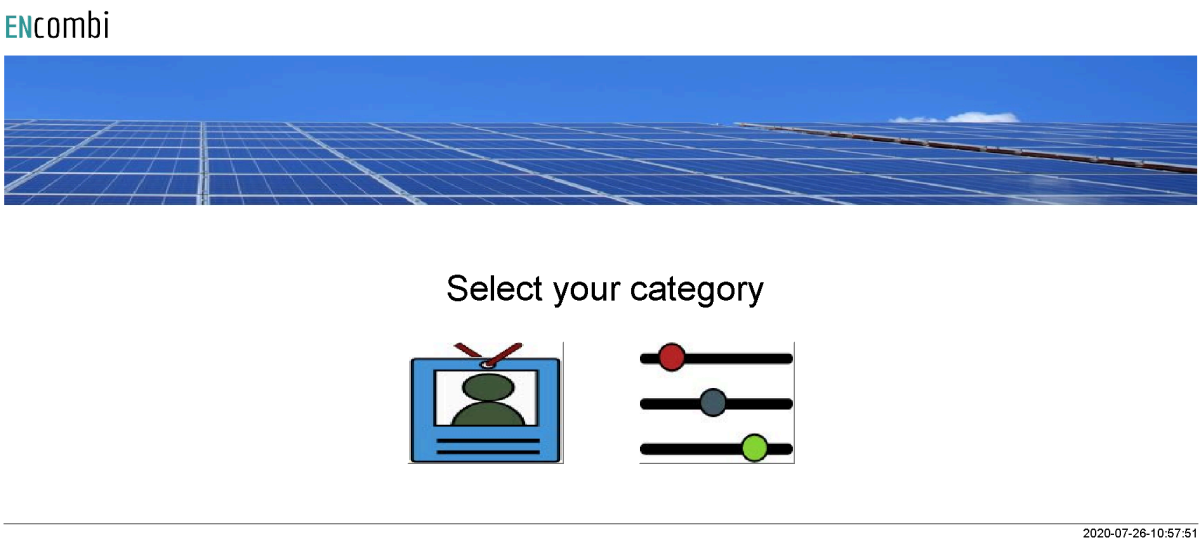
IO module data

Clicking the IO module button will lead to the below page where an overview of all the readings from the IO modules is provided. In case a reading is not supported or communication to the IO module is failing, the readings will be displayed as “N.A”.



Service Tool

First page to be displayed after an initial welcome page when switching to the Service Tool application is the front page of ECweb.



Navigating around in the Service Tool is done in the same manner as in the ECpvX Cluster application.

In the lower center two menu tiles are available. These are from the left:

1. “Identifiers” gives access to an overview of the SW version installed as well as to the menu for switching between the applications.
2. “Settings” give access to the set up of various features.

In the following chapters the content of the two menu tiles are discussed in detail.

Identifiers

Under this tile overview of SW version installed and extras present in the ECpvX cluster as well as to the menu for switching between the applications.

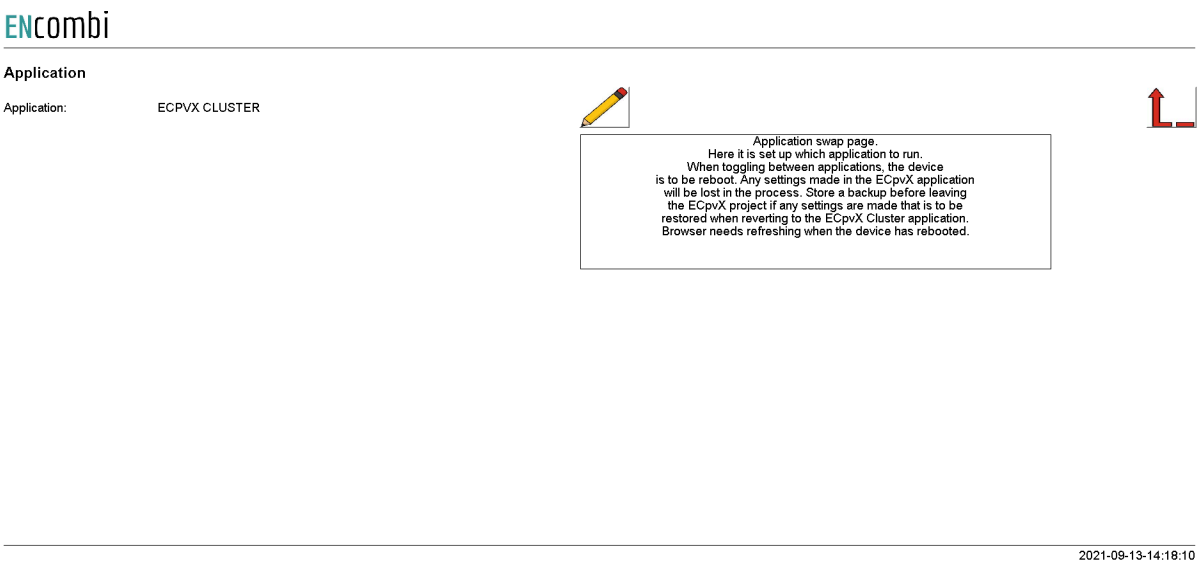


On the right hand side there are one submenu for.

1. Application switch.

Application

Clicking the Application button leads to the page below. Here it can be selected which application is to be active.



The following applications are available.

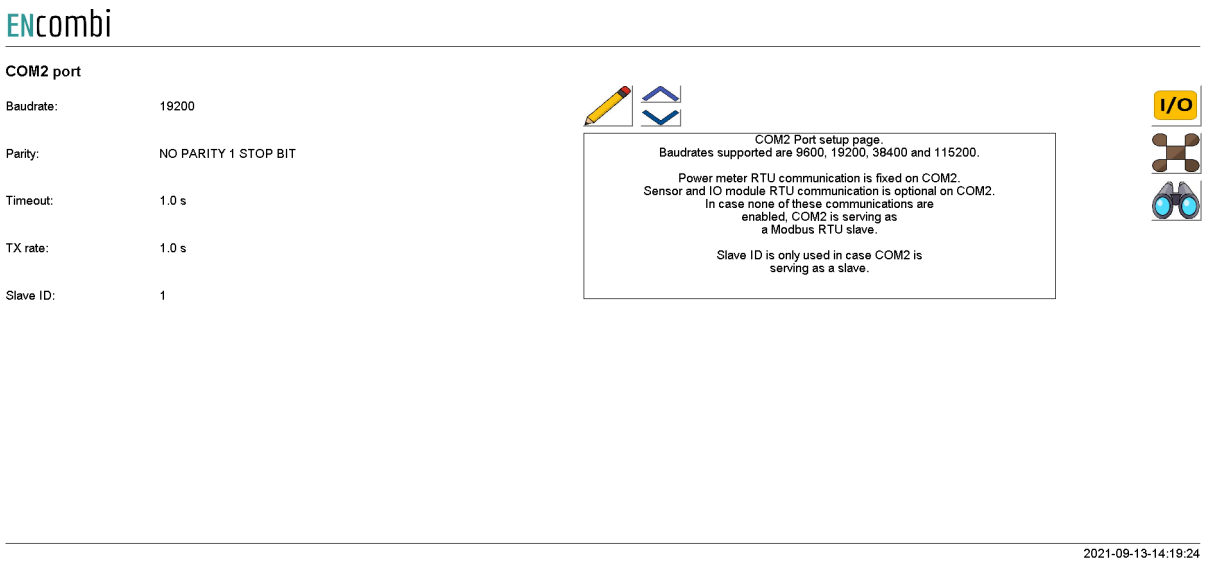
1. ECpvX Cluster.
2. ECpvX Cluster Service Tool.
3. ECpvX Cluster Boot.

ECpvX Cluster is the default application and the one to use for the normal operation of the ECpvX Cluster. ECpvX Cluster Service Tool is a separate application that offers various tests and configuration features and the ECpvX Cluster Boot is a tool for updating both the ECpvX Cluster and the ECpvX Cluster Service Tool SW.

When toggling between applications the device is to be rebooted. Any settings made in the ECpvX Cluster application will be lost in the process. Make a backup before leaving the ECpvX Cluster application if any settings are made that are to be restored when reverting to the ECpvX Cluster application once again. The browser needs refreshing when the device is rebooted after switching the application.

Settings

Under this tile the setup of various features are found.
First page presented when clicking the Settings tile is the below page where COM2 configuration is set up.



Baud rates supported are:

- 9600, 19200, 38400 and 115200

Parity supported are:

- “Parity one stop bit”, “No parity”, “Even parity” and “Odd parity”.

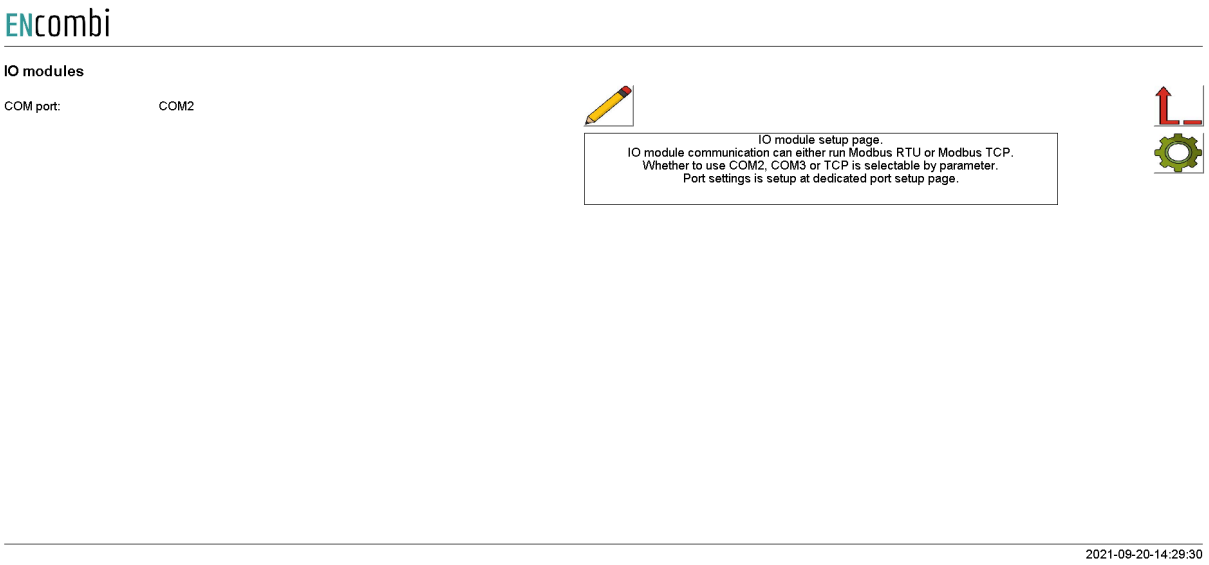
On the same menu level, a similar setup page for COM3 configuration is found. Clicking the up/down arrows will lead to it.

On the right hand side there are two submenus for.

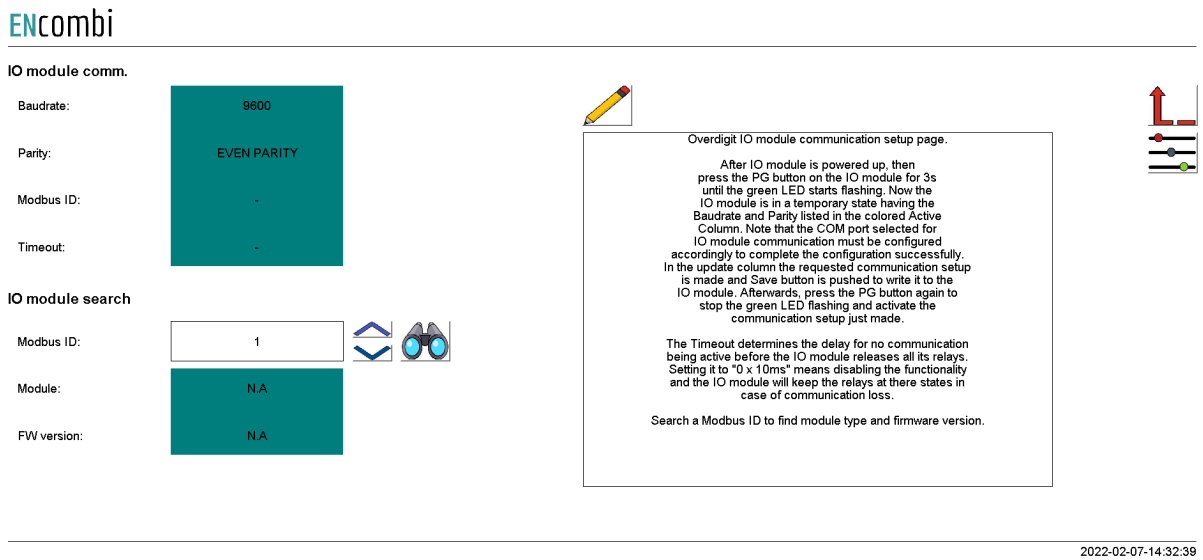
1. IO modules
2. Modbus Tester.
3. Client Trace.

IO configuration

IO configuration allows you to read and write the configurations of IO modules over Modbus. Clicking the IO button leads to the page below where COM2 or COM3 can be selected.



Afterwards clicking on the IO configuration button on the right hand side leads to the IO configuration page.



It is possible to set up the Overdigit IO module with the tool.

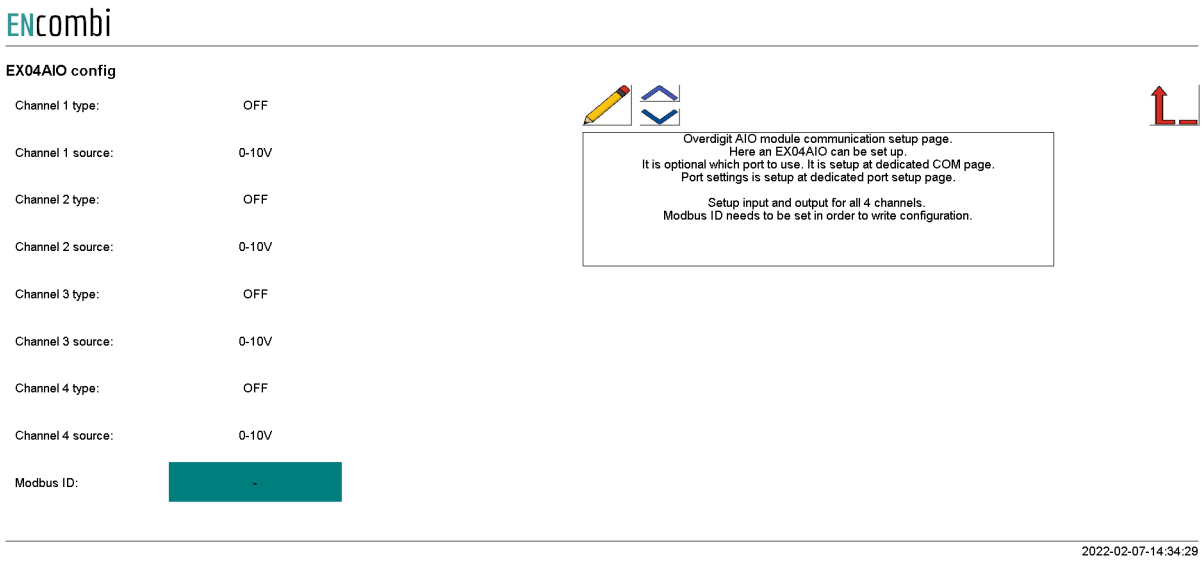
After the IO module is powered up, then press the PG button on the IO module for 3s until the green LED starts flashing. Now the IO module is in a temporary state, having the Baudrate and Parity listed in the colored Active Column. Note that the COM port selected for IO module communication must be configured accordingly to complete the configuration successfully. In the update column the requested communication setup is made and the Save button is pushed to write it to the IO module. Afterwards, press the

PG button again to stop the green LED flashing and activate the communication setup just made.

The Timeout determines the delay for no communication being active before the IO module releases all its relays. Setting it to "0 x 10ms" means disabling the functionality and the IO module will keep the relays at their states in case of communication loss.

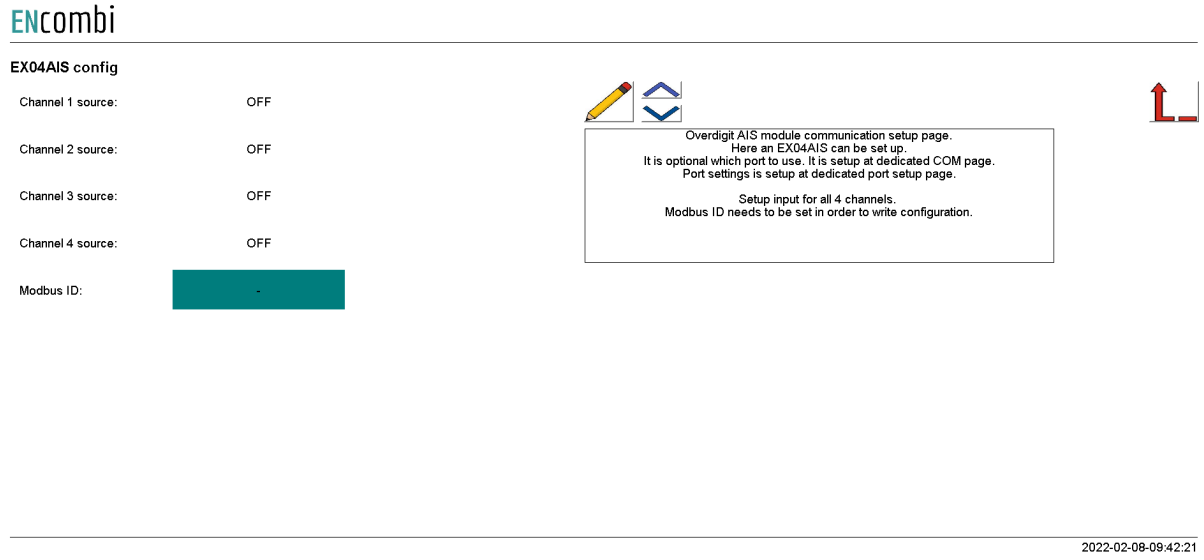
AIO

When pressing the settings icon, it will lead to the following page.



From there it is possible to set up an EX04AIO module. From here it is selectable which channel to use for input and output.
All 4 channels can be selected as off, input and output. It is also selectable which source the input or output should work with. The two options are 0-10 or 4-20mA.
When the configuration is ready, the modbus ID must be set and after that it is possible to write the configuration to the module. An icon will show if the writing was successful or failed.

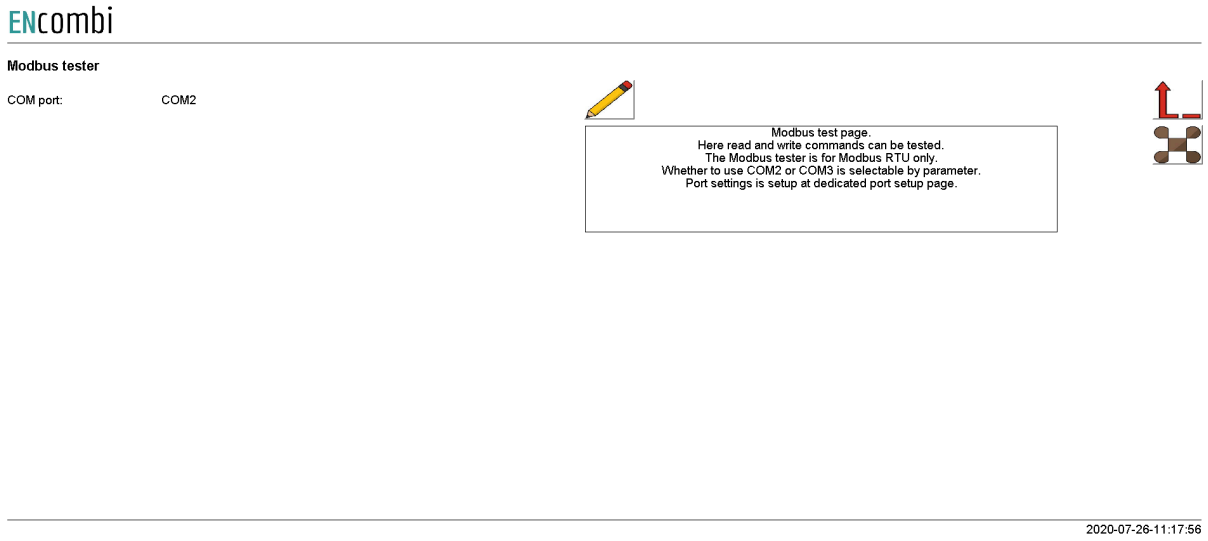
Toggle to the next page will lead to the set up of EX04AIS.



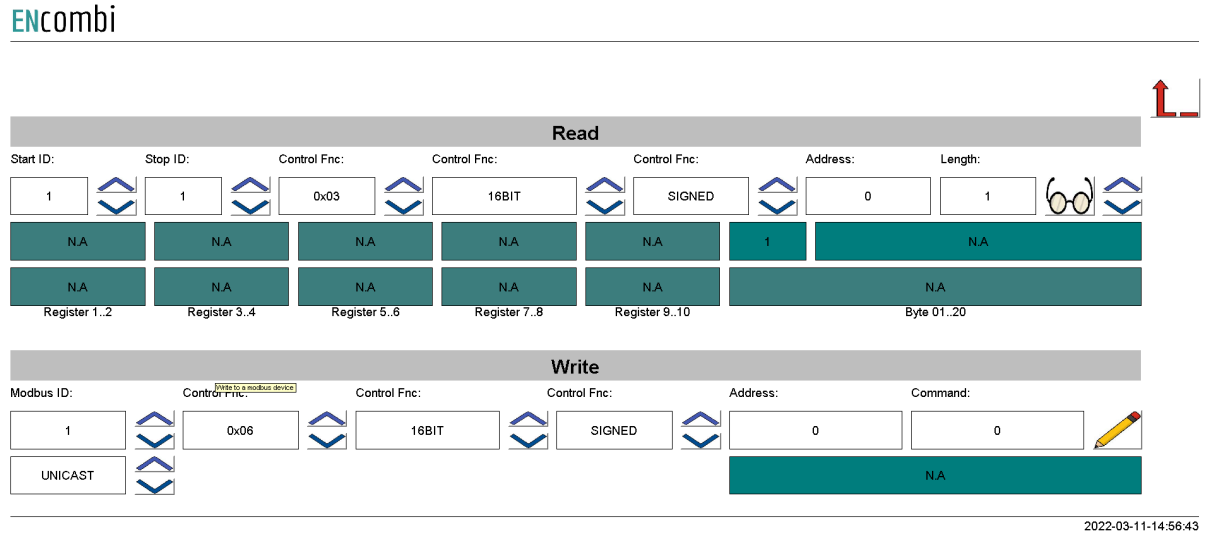
These are only inputs, so the only configuration is which source the channels should be. It can also be selected as OFF, which means the channel is deactivated.

Modbus Tester

Modbus Tester is a feature where the Service Tool acts as a Modbus RTU Master and communication with a Modbus RTU Slave can be tested. Clicking the Modbus Tester button leads to the page below where it is set up whether the Modbus Tester is to use COM2 or COM3.

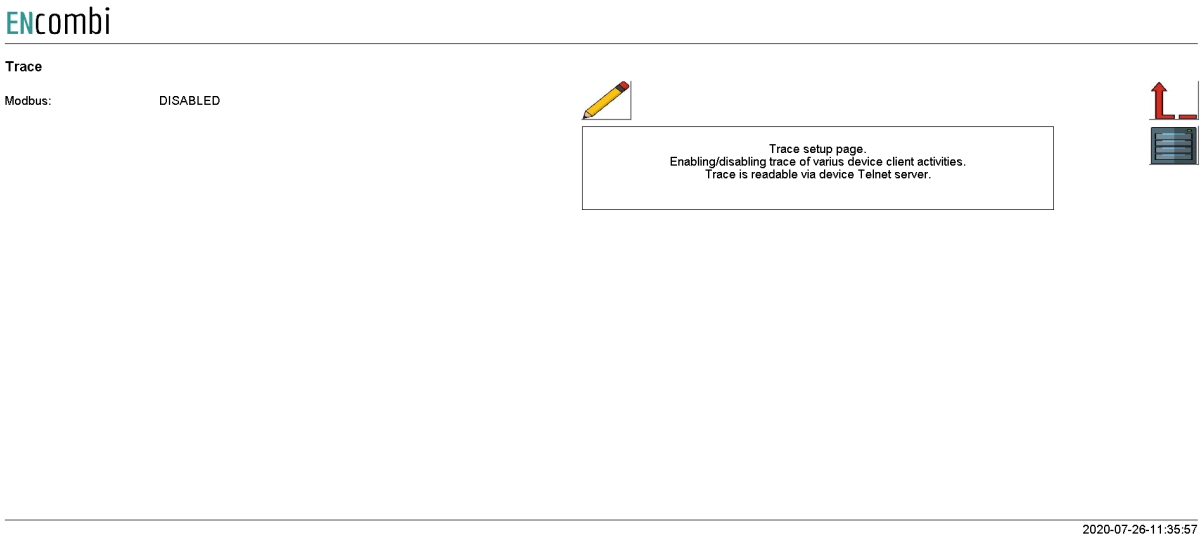


Afterwards, clicking on the Modbus Tester button on the right hand side leads to the Modbus Tester itself where Modbus RTU read and write commands of various length and function codes can be transmitted and the response received is shown.



Client trace

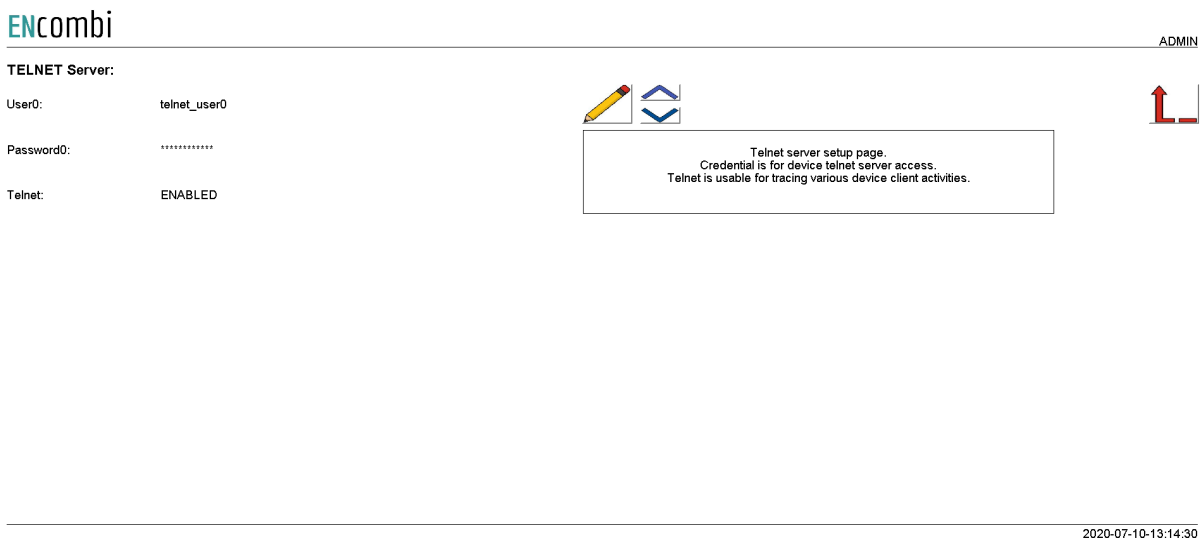
Clicking the Client Trace button leads to the page below where trace of Modbus communication can be enabled/disabled. The Modbus Tester only shows the result/content of valid Modbus frames received. The Trace, on the other hand, provides information on any communication being detected on the RS485 line even if it is not perceived as valid Modbus frames.



Trace is available via the built-in Telnet server. Clicking on the Telnet server button on the right hand side leads to the Telnet server setup.

Telnet server

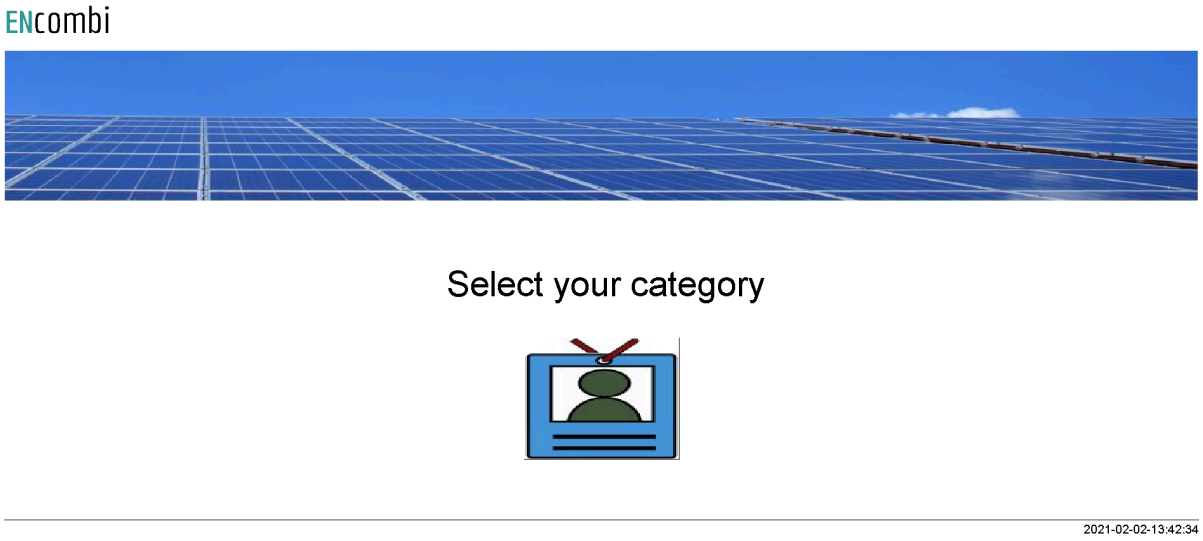
On the page below the telnet server access is set up.



Use the PC application “Chiptool” to connect to the Telnet Server to follow activities such as the Modbus trace.

Boot

First page to be displayed after an initial welcome page when switching to the Boot application is the front page of ECweb.



Navigating around in the Service Tool is done in the same manner as in the ECpvX Cluster application.

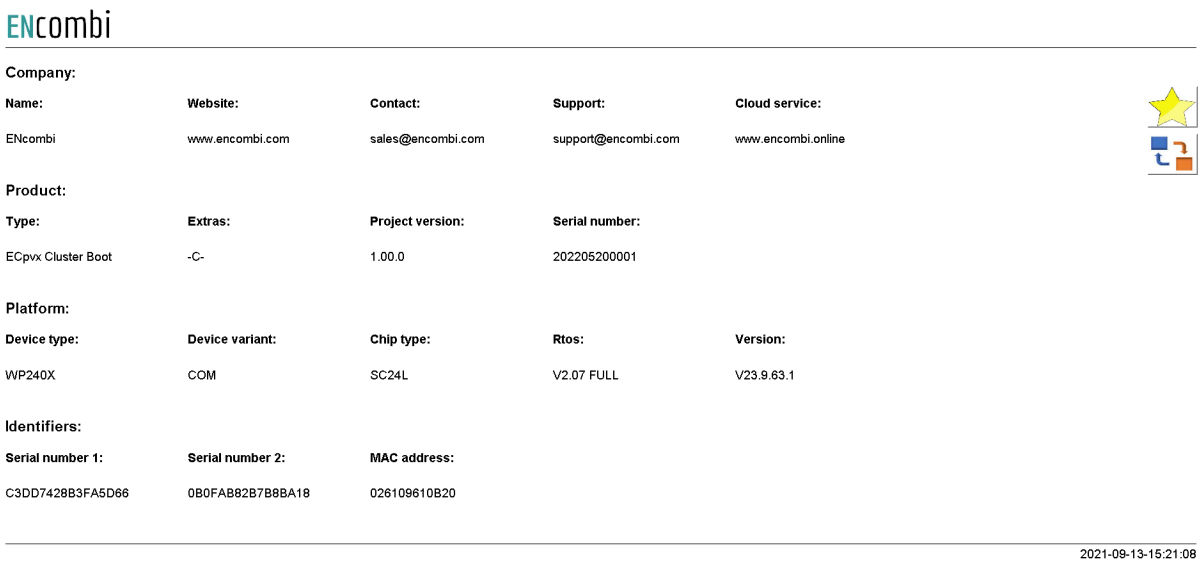
In the lower center one menu tile is available:

1. “Identifiers” gives access to an overview of the SW version as well as to the menus for updating SW and switching between the applications.

In the following chapters the content of the menu tile is discussed in detail.

Identifiers

Under this tile overview of SW version installed and extras present in the ECpvX.

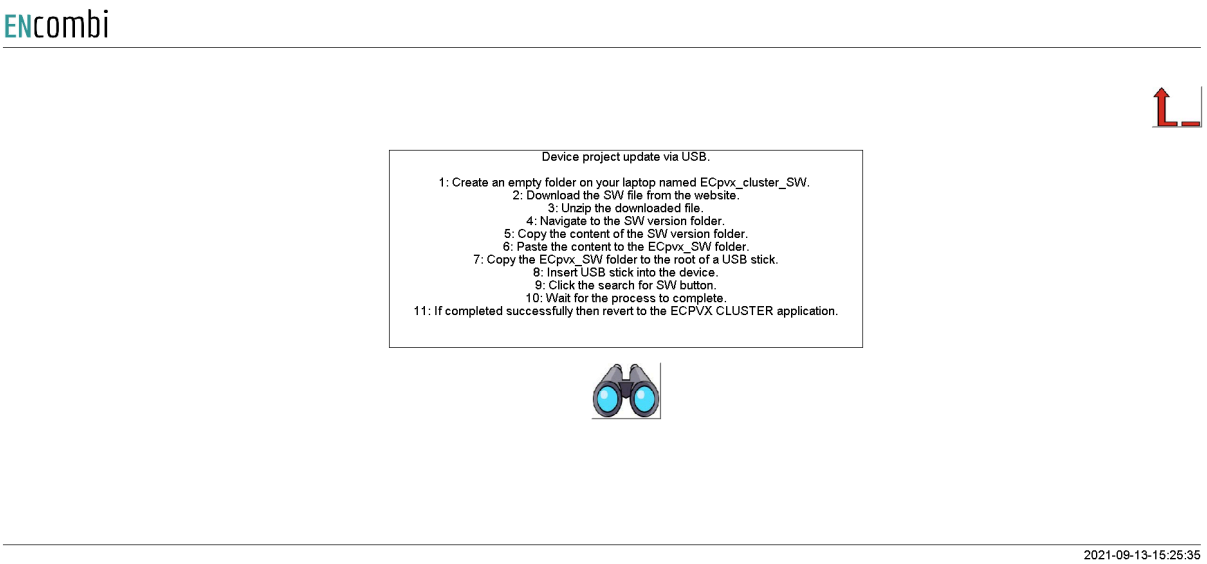


On the right hand side there are submenus for.

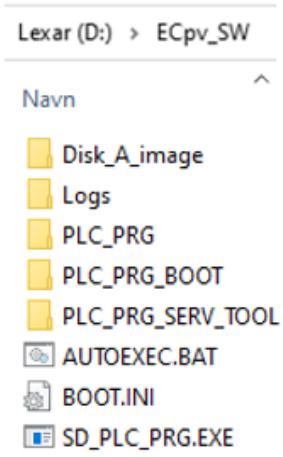
1. SW update.
2. Application switch.

SW update

Clicking the SW update button leads to the page below. From here the ECpvX Cluster and the ECpvX Cluster Service Tool SW can be updated from a USB stick.



Download the SW from the website and place it in a folder named “ECpvx_Cluster_SW” in the root of a USB stick like shown below:



Then insert the USB stick into the ECpvX Cluster and press the binoculars button to start the SW update. When the SW update is completed successfully, then you can safely revert to the ECpvX Cluster application. If the SW is interrupted and it fails, then remain in the Boot application and try to update the SW once again. Do not return to the ECpvX Cluster application until the SW update is completed successfully.

SW update via server

Using the up or down arrow on the right leads to the page below.

ENcombi

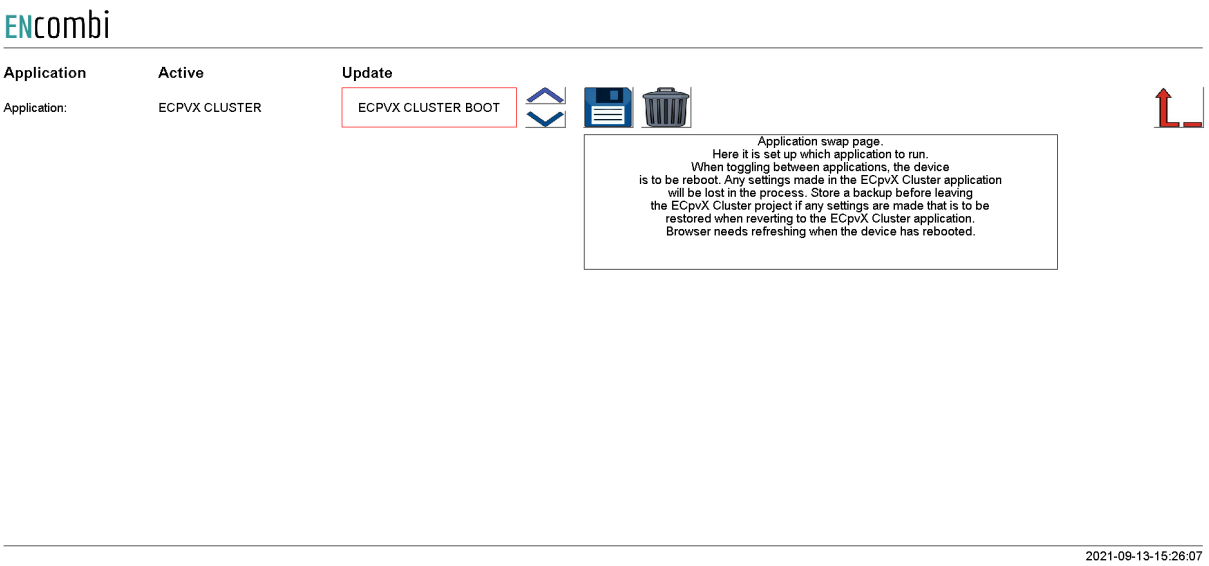


2025-03-13-15:32:11

On this page, the software can be updated via ENcombi servers. The ECpvx_cluster will automatically download and install the software version available on the ENcombi servers.
Beware that settings and counters are NOT saved automatically. They need to be saved manually before entering the Boot software.

Application

Clicking the Application button leads to the page below. Here it can be selected which application is to be active.



The following applications are available.

1. ECpvX Cluster.
2. ECpvX Cluster Service Tool.
3. ECpvX Cluster Boot.

ECpvX Cluster is the default application and the one to use for the normal operation of the ECpvX Cluster. ECpvX Cluster Service Tool is a separate application that offers various tests and configuration features and the ECpvX Cluster Boot is a tool for updating both the ECpvX Cluster and the ECpvX Cluster Service Tool SW.

When toggling between applications the device is to be rebooted. Any settings made in the ECpvX Cluster application will be lost in the process. Make a backup before leaving the ECpvX Cluster application if any settings are made that are to be restored when reverting to the ECpvX Cluster application once again. The browser needs refreshing when the device is rebooted after switching the application.