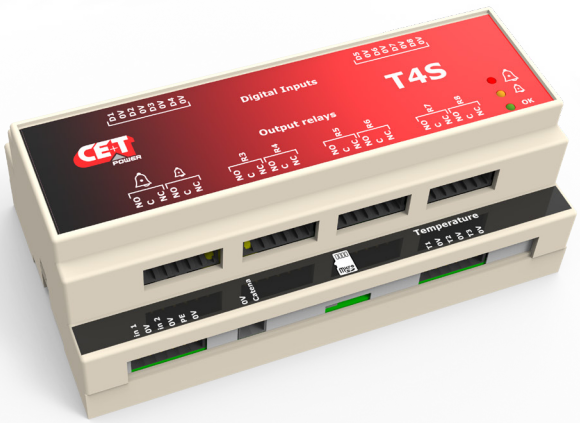
Leading Conversion Technology for Power Resilience

INVIEW WITH T4S

User Manual

THE NEW GENERATION OF MONITORING

- EXTENDED LOG CAPABILITIES
- WEB-BASED USER INTERFACE



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VERSION 1.0

Leading Conversion Technology for Power Resilience

Table of Contents

Release Note:

Version	Release date (DD/MM/YYYY)	Modified page number	Modifications
1.0	10/02/2025	-	First release of the Manual

1. CE+T Power at a glance

CE+T Power i s your trusted partner in **advanced power solutions** engineered to meet the demands of modern and dynamic industrial applications. With over 60 years of experience in power conversion technology, CE+T Power nurtures the industry with **innovative solutions designed for critical power backup and energy management**.

Our complete range of power solutions includes **modular inverters** (DC to AC), **UPS** (securing AC loads with batteries), and **multidirectional converters** (inverter, rectifier, and UPS all-in-one). Coupled with our state-of-the-art **monitoring solution**, you have a real energy blender to connect multiple sources of energy seamlessly!

Whether you require **robust backup power solutions**, **energy management solutions**, **or a combination of both**, CE+T Power delivers tailored solutions to meet your specific needs. Our products are **designed with integration in mind, ensuring seamless compatibility with other components of your system**. CE+T Power is committed to providing you with the expertise and resources needed to maximize the performance of your power systems.

Thank you for choosing CE+T Power as your partner in advanced power management. Let's power the future together.

2. Abbreviations

AC	Alternating current
CB	Circuit Breaker
DC	Direct current
DHCP	Dynamic Host Configuration Protocol
DSP	Digital Signal Processor
EPC	Enhanced Power Conversion
ESD	Electro Static Discharge
ETH	Ethernet
HTTP	HyperText Transfer Protocol
HTTPS	Secure HyperText Transfer Protocol
LAN	Local Access Network
MBP	Manual By-pass
MCB	Miniature Circuit Breaker
MCCB	Molded Case Circuit Breaker
MET	Main Earth Terminal
MIB	Management Information Base
N	Neutral
NTP	Network Time Protocol
NUA	Non-Urgent Alarm
PCB	Printed Circuit Board
PE	Protective Earth (also called Main Protective Conductor)
PWR	Power
REG	Regular
SBP	Smart By-Pass
SNMP	Simple Network Management Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TRS	True Redundant Structure
TSI	Twin Sine Innovation
UA	Urgent Alarm
USB	Universal Serial Bus

3. Warranty and Safety Conditions*

WARNING:

The electronics in the power supply system are designed for an indoor, clean environment.

When installed in a dusty and/or corrosive environment, outdoor or indoor, it is important to:

- Install an appropriate filter on the enclosure door, or on the room's air conditioning system.
- Keep the enclosure door closed during operation.
- Replace the filters on a regular basis.

Important Safety Instructions and Save These Instructions.

3.1 Disclaimer

- The manufacturer declines all responsibilities if equipment is not installed, used or operated according to the instructions herein by skilled technicians according to local regulations.
- Warranty does not apply if the product is not installed, used and handled according to the instructions in the manuals.

3.2 Technical care

- This electric equipment can only be repaired or maintained by a "qualified employee" with adequate training. Even personnel who are in charge of simple repairs or maintenance are required to have knowledge or experience related to electrical maintenance.
- Please follow the procedures contained in this Manual, and note all the "DANGER", "WARNING" AND "NOTICE" marks contained in this manual. Warning labels must not be removed.
- Qualified employees are trained to recognize and avoid any dangers that might be present when working on or near exposed electrical parts.
- Qualified employees should know how to lock out and tag out machines, so the machines will not accidentally be turned on and injure employees working on them.
- Qualified employees also understand safety related work practices, including those by OSHA and NFPA, as well as knowing what personal protective equipment should be worn.
- All operators are to be trained to perform the emergency shut-down procedure.
- Operating ambient temperature is -20°C to 65°C.
- This unit is intended for installation in a temperature-regulated, indoor area that is relatively free of conductive contaminants.
- Never wear metallic objects such as rings, watches, or bracelets during installation, service or maintenance of the product.
- This product is suitable for use in a computer room.

* These instructions are valid for most CE+T Products/Systems. Some points might however not be valid for the product described in this manual

- CAUTION – Risk of electric shock. Capacitors store hazardous energy. Do not remove cover until 5 minutes after disconnecting all sources of supply.
- CAUTION – Risk of electric shock. This Converter / UPS receives power from more than one source. Disconnection of the AC source and DC source is required to de-energize this unit before servicing.
- CAUTION - For continued protection against risk of fire, replace only with same type and rating of fuse.
- Insulated tools must be used at all times when working with live systems.
- When handling the system/units pay attention to sharp edges.

3.3 Installation

- This product is intended to be installed only in a restricted access area as accordance with the National Electrical Code ANSI/NFPA 70, or equivalent local agencies.
- The system may contain output over-current protection in the form of circuit breakers. In addition to these circuit breakers, the user must observe the recommended upstream and downstream circuit breaker requirements as defined in this manual.
- Please use extreme caution when accessing circuits that may be at hazardous voltages or energy levels.
- The system rack is a dual input power supply. The complete system shall be wired in a way that both input and output leads can be made power free in a single action.
- The systems that have no AC input wired and connected, can be seen as independent power sources. To comply with local and international safety standards, N (input) and PE shall be bonded. The bonded connection between N (input) and PE must be removed once the AC input is connected.
- When AC Mains is not connected, the output AC circuit is considered as a separately-derived source. If local codes require grounding of this circuit, use the identified terminal for bonding this circuit to the enclosure. Ground the enclosure to a suitable grounding electrode in accordance with local code requirements.
- Use 90°C copper wires / conductors only.
- AC and DC circuits shall be terminated with no voltage / power applied.
- The safety standard IEC/EN62040-1-1 requires that, in the event of an output short circuit, the converter must disconnect in 5 seconds. The parameter can be adjusted on monitoring ; however, if the parameter is set at a value > 5 seconds, an external protection must be provided so that the short circuit protection operates within 5 seconds. Default setting is 60 seconds.
- All illustrations in the manual are for general reference, refer to the technical drawing which is received along with the system for exact information.

3.3.1 Handling

- The cabinet shall not be lifted using lifting eyes.
- Remove weight from the cabinet by unplugging the converters. Mark converters clearly with shelf and position for correct rebuild. This is especially important in dual or three phase configurations.
- The converter slots must not be left open. Replace with a dummy cover or front plate.
- A minimum of two people are required to handle modules.

3.3.2 Surge and Transients

The mains (AC) supply of the modular converter system shall be fitted with Surge protective device (SPD) and Transient voltage surge suppression suitable for the application at hand. Manufacturer's recommendations of installation shall be adhered to. Selecting a device with an alarm relay for function failure is advised.

Indoor sites are considered to have a working lightning surge suppression device in service.

- Indoor sites Min Class II.
- Outdoor sites Min Class I + Class II or combined Class I+II.

Note:

Choosing and installing surge arrestors must obey to precise technical rules. Distance to equipment to protect, cable gage and cable routing have significant influence on proper device service.

Some areas are more susceptible to be hit by electrical strikes, especially when altitude increases.

Good earthing is also crucial for surge arrestors to work properly.

CE+T declines any liability in regard to damaged caused to equipment not correctly or not sufficiently protected.

3.3.3 Other

- Isolation test (Hi-Pot) must not be performed without instructions from the manufacturer.

3.4 Maintenance

- The converter system/rack can reach hazardous leakage currents. Earthing must be carried out prior to energizing the system. Earthing shall be made according to local regulations.
- Prior to any work conducted to a system/unit, make sure that AC input voltage and Battery are disconnected.
- Prior to accessing the system or modules, make sure all source of supply is disconnected.
  CAUTION – Risk of electric shock. Capacitors store hazardous energy. Do not remove cover until 5 minutes after disconnecting all sources of supply.
- Some components and terminals carry high voltage during operation. Contact may result in fatal injury.

3.5 Replacement and Dismantling

- ESD Strap must be worn while handling PCBs and open units. It is not recommended to open the modules at the site unless properly trained by CE+T.
- The UPS system/rack is not supplied with internal disconnect devices on input nor output.
- CE+T cannot be held responsible for disposal of the UPS system and therefore the customer must segregate and dispose of the materials which are potentially harmful to the environment, in accordance with the local regulations in force in the country of installation.
- If the equipment is dismantled to dispose of its component products, you must comply with the local regulations in force in the country of destination and in any case avoid causing any kind of pollution.

To download the latest documentation and software, please visit our website at www.cet-power.com

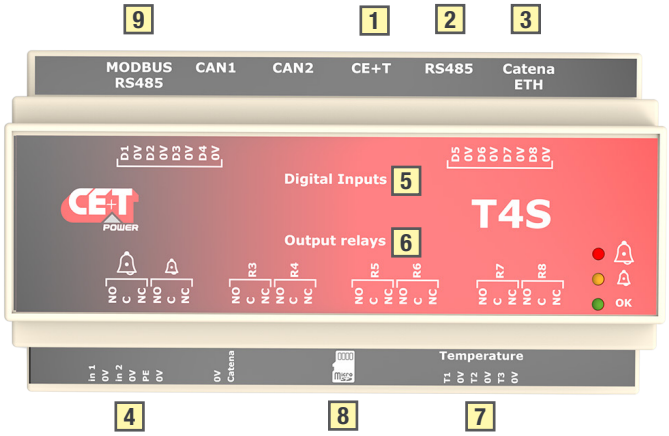
4. Monitoring devices – Inview X and T4S

4.1 Controller - T4S

T4S is a controller that acts as a link between the system and the user. It ensures that the control of the system is communicated to all modules.

The standard battery management system of the T4S allows float charge, boost charge, temperature compensated charging, discharge measurements etc.

T4S monitors up to 32 modules (Flexa 200 and SBP) as well as the system's environment. It is connected to:



- The modules via a hub board. A hub board is also needed to establish the communication between modules that are installed in different cabinets. The hub board is connected to [1].
- An external device via modbus RS485 RTU for monitoring of this device, if any and if supported [2].
- Inview X : connect ETH2 port to [3] and RS485 port (optional) to [9].

T4S has:

- 2 connections (2 x 12 Vdc) to assure a redundant power supply [4]. An auxiliary power supply kit can be provided.
- 8 Digital Inputs [5] (potential free contacts) referred to as D1 to D8 (Dx - 0 V).
  - D1 is to be used for the auxiliary contact of the manual by-pass
  - D2 is to be used for the auxiliary contact of the surge arrestor, if any
  - D3 to D8 are available for customer connections
  - Digital Input Mapping is explained in "7.4.3 Digital Input and Output Relay Mapping", page 28
- 8 Output Relays [6] (form C changeover contacts - NC-C-NO - with a rating of 60 VDC / 0.5 A). All user configurable.
  - R1/ Major alarms
  - R2/ Minor alarms
  - R3 to R8 are available for customer connections
  - Output Relay Mapping is explained in "7.4.3 Digital Input and Output Relay Mapping", page 28
- 3 temperature probes T1 to T3 [7]. T1 should used for battery 1 and T2 for battery 2, T3 is reserved.
- A micro-SD card [8] that contains all relevant files of the T4S controller. The content of this SD card should be changed by CE+T Customer Support only.

Please note that the T4S is not master and can be removed during operation without affecting the system operating as UPS.

Make sure that the software version of the T4S is 6.11.0 or above, in order to be compatible with Inview X.

4.2 Inview X

Inview X is an advanced monitoring and controller unit for power systems. It allows the user to easily view, access, configure the system information through LCD screen graphic display and web interface. The home screen of both LCD and web interface provides a summary of system power, modules, batteries, and events information.

The Ethernet ports in Inview X allow multiple communication points for remote communication and Web interface.

Inview X is a 7" LCD touch screen that displays the information from the T4S and gives access to the T4S web interface.

Please note that the Inview X is not master and can be removed during operation without affecting the system operating as UPS.

Make sure that the software version of the Inview X is 6.4.2 or above, in order to be compatible with T4S.

4.2.1 Inview X - Connections

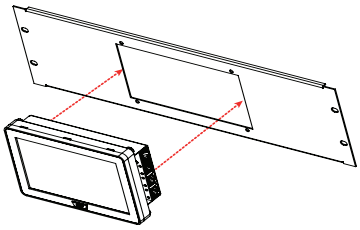
Inview X has multiple network ports and inbuilt free potential contacts. Only four of them are used with T4S and the other ports are not used.

- **ETH** ports are used for network connectivity, and user can access the system information through the web interface.
  - **ETH Front:** DHCP server, providing access to the configuration at URL https://inview.local or https://10.250.252.1
    - Intended for direct connection of a laptop computer.
      Warning: Do not connect this port to the network, as it might interfere with other DHCP servers.
  - **ETH1:** Main network interface
    - Default static IP address: 10.250.250.1/24
    - It can be configured to other static addresses or as a DHCP client in a web-based configuration interface
  - **ETH2:** Secondary network interface, which is dedicated to T4S and does not connect to the network
- **Power**: The unregulated separate +48 V power supply is required for powering Inview X and this power should not be shared with other devices.

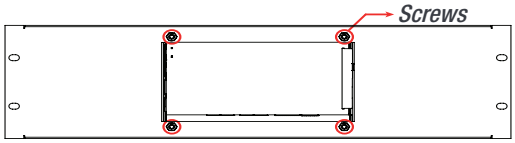
4.2.2 Inview X Mounting

Before mounting the Inview X in the system, route all the required connection cables from the system and place near to the Inview X mounting location.

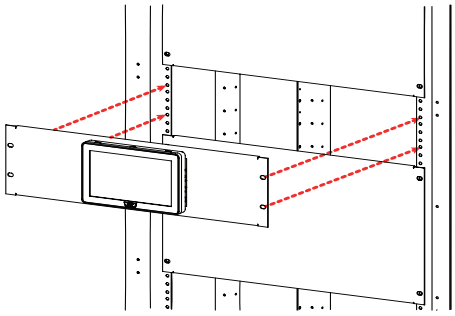
1. Place the Inview X in the panel sheet.
2. Fix the Inview X in the panel sheet using four screws at the rear side.
3. Connect required connection cables to the Inview X.
4. Place the panel sheet in the system and fix it with screws.



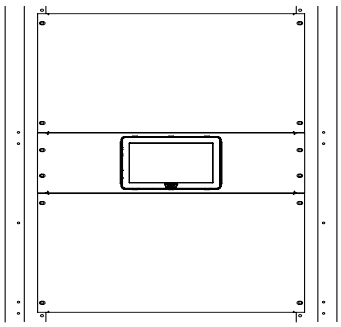
Place the Inview X in the panel sheet



Fix it with four screws



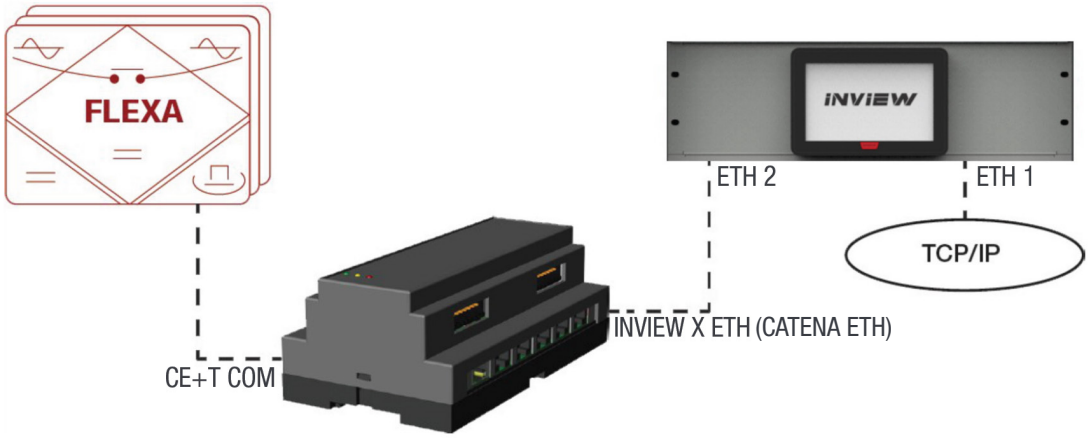
Connect wires and place the panel sheet in the cabinet



Fix the panel sheet with screws

4.3 System Connections

T4S is a DIN rail mountable controller which is connected to the Flexa 200 - 400/400 module / system.



4.3.1 Software Overview

The software embedded in T4S and Inview X allows complete system supervision through web browser, and provides functionalities such as:

- System setting and configuration (password protected).
- System status and information display.
- System alarms and events log file.
- System self-maintenance (battery test, battery boost charge,….)

In addition to these, there is minimal information available via “touch screen display”.

5. T4S / Inview X Start-up

In the complete system, CE+T will install the T4S and Inview X, test them and pre-configure them according to the system. Suppose the T4S and Inview X are purchased separately, make sure that connections are made according to the schematic in “Appendix 4. T4S - Inview X Connections”, page 61.

5.1 Inview X - LCD Interface

Inview X LCD interface is a 7-inch touch screen. Through the LCD interface, the user can view and access the system details. Once the system is powered upon, the Inview X is up and ready for operation.

Note: Interface graphics and layout may change based on firmware version.

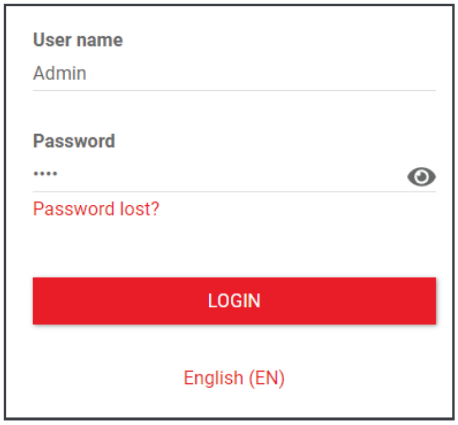
5.2 Inview X start-up

Open the web browser and type the default IP address **10.250.250.1/site** (or **inview.local** if ETH Front is used on Inview X) in the address field and press enter.

Inview X has three login – Basic, Expert and Admin. All three logins are password protected.

The default password for all three logins is “1234”. It can be modified, refer to Inview user manual for more details.

NOTE: The user is not allowed to modify any converter system parameter inside the Inview X Web UI.



5.3 T4S start-up

NOTE: The controller will perform a short self-test as it boots up. Alarm alerts are normal.

- Initiate the start-up routine by applying power to the T4S (close protection breaker powering the controller).
- Use a laptop to connect to the system.

If the T4S is properly connected and configured with Inview, the T4S web UI can be accessed through the IP address of Inview ETH1 (by default: 10.250.250.1).

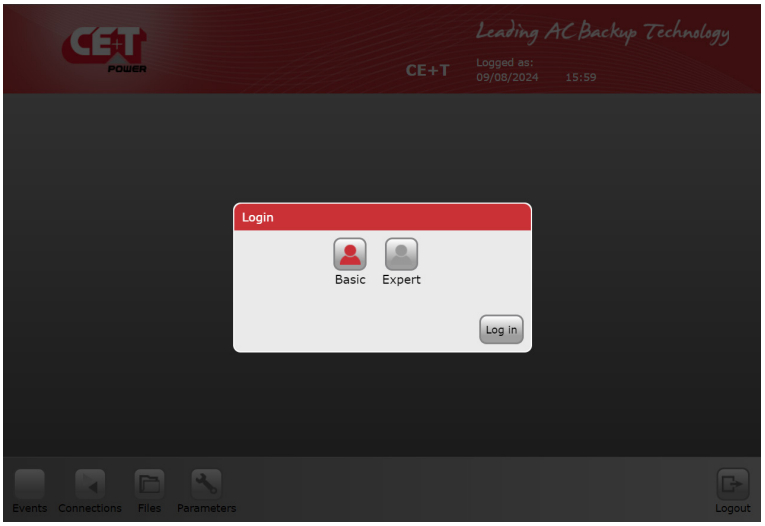
There are two access levels:

- **Basic login** can only browse the pages and download the files.
- **Expert login** can access and also modify the system parameter values. The default password is **pass456** but it's strongly advised to users to change that password.

In case of lost password, please refer to FAQ at page 60.

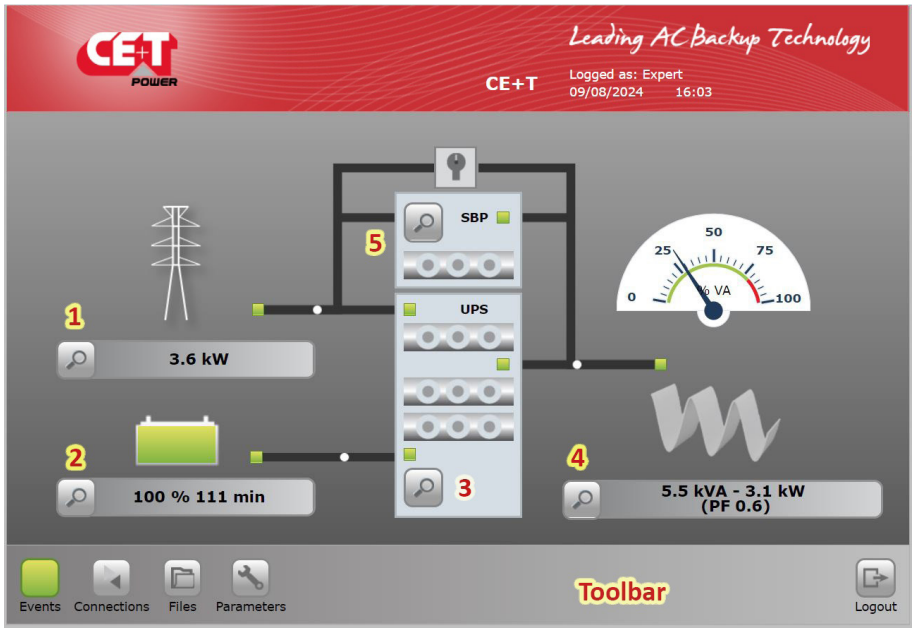
- Check and adjust alarms and control levels in the controller sub-menus.
- Check and adjust battery settings in the battery sub-menus; e.g. float, equalize voltage, etc.

NOTE: System modification and setting may result in alarm event. Make sure you are applying modification carefully.



6. T4S Standard Features

This chapter describes the standard features of T4S that are available on, Inview X in Catena mode and T4S web interface that is accessible via Inview X.



The main screen presents an overview of the system where any “click” on the magnifying glass icon will result to access the selected sub-menu:

1 → AC Input sub-menu.

2 → DC Battery sub-menu.

3 → Flexa Modules sub-menu.

4 → AC Output load sub-menu.

5 → SBP Modules sub-menu.

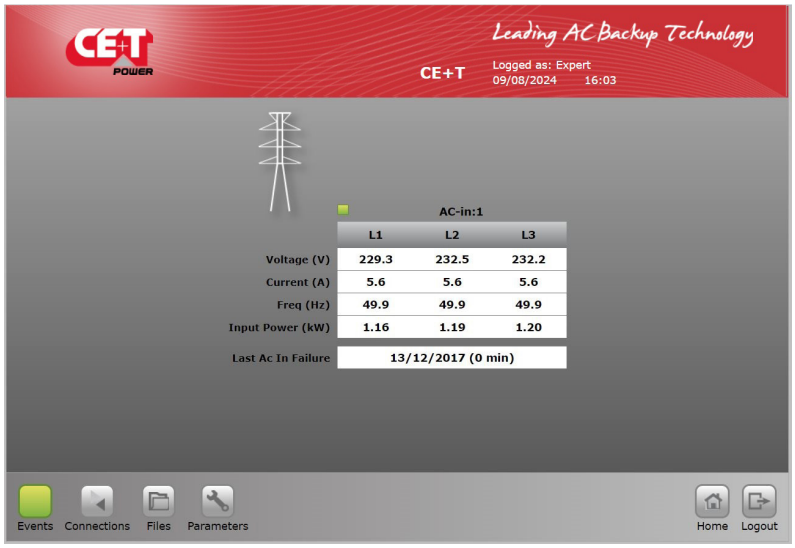
A click on an icon in the toolbar will give you, respectively, access to the event, communication, parameter, files sub-menu.

The main screen shows the status of each of your power system’s components.

- AC input: Green, Red.
- Battery: Green, Orange, Red.
- Flexa module(s): 3 LEDs (AC input , DC input, AC output).
- AC output / Load: Green, Red.

The energy flow direction is indicated by the “moving” white ball on the power lines.

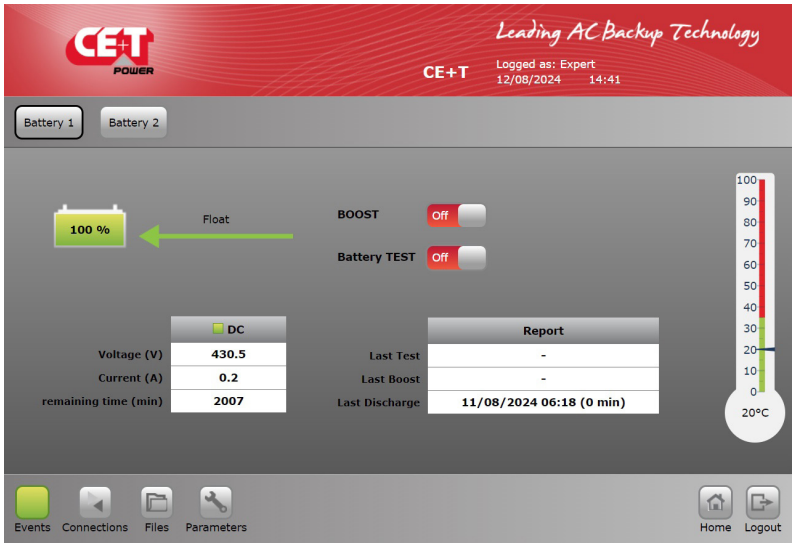
6.1 AC Input Sub-menu



Provides AC input information (up to 3 phases).

- AC input voltage.
- AC input current.
- AC input Frequency.
- AC input Power (kW).

6.2 DC Battery Sub-menu

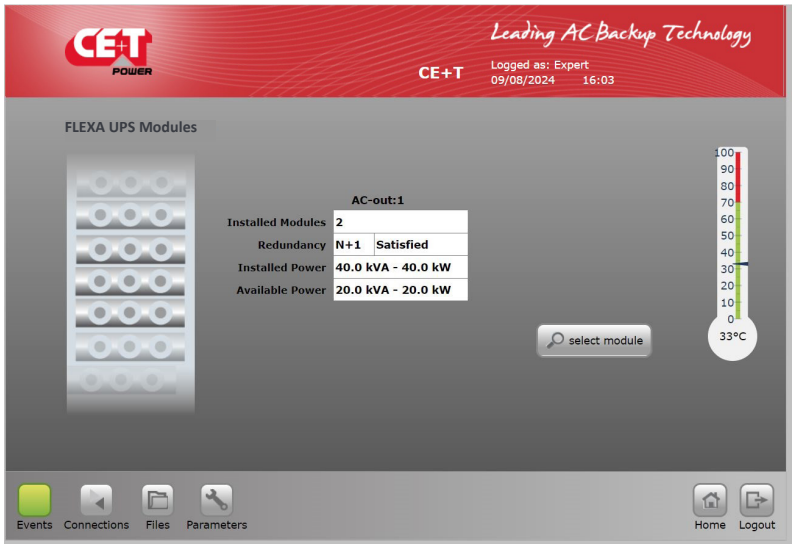


Battery x (x = 1 or 2) provide info on batteries status. The maximum DC group is two.

- BOOST ON or OFF
- Battery Test ON or OFF
- Battery is on float or discharge
- To view DC Voltage and Current

Estimated autonomy and info on last test, boost charge, discharge

6.3 Flexa Modules Sub-menu



Provides Flexa 200 module info

- Number of modules installed
- Redundancy level
- Installed power (Number of modules present in the system).
- Available power (Number of modules including redundancy).
- Ambient temperature of the module.

6.3.1 Flexa Modules Sub-menu

Clicking on the “Select Module” icon will open a module selection table.

Each number represents the address of a module in the system.

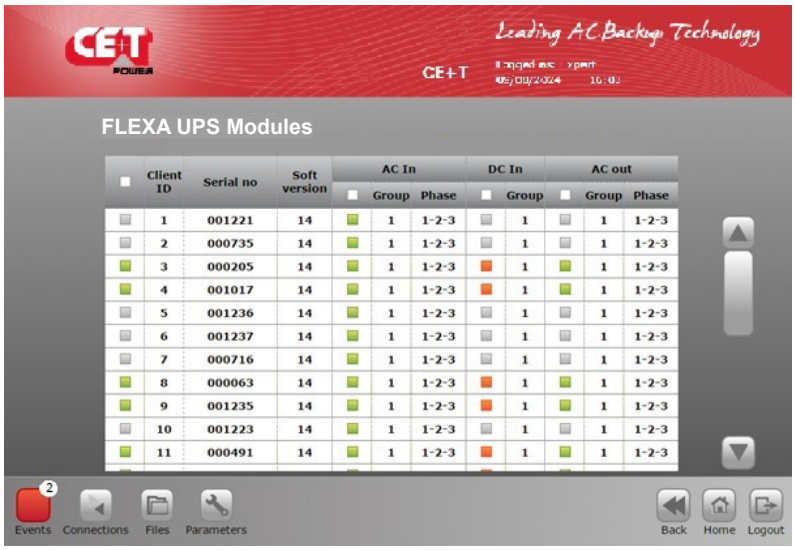
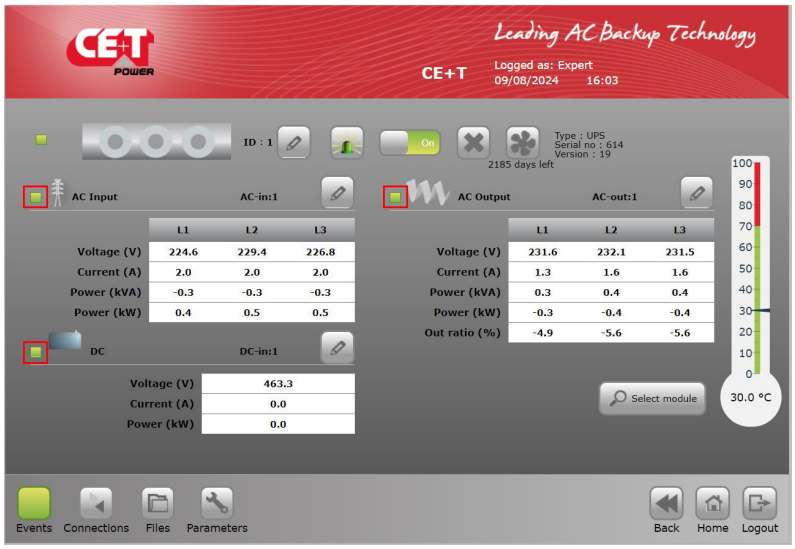


Table indicates the number of modules installed, ID, Serial number, Software version, AC IN, DC IN and AC Out details.

Click on an installed module to access the specific information of the selected module.



Selected Module information

- Click “identify icon” to see the corresponding module in the bay by all LEDs blinking on the respective module.
- Module status indicated through the LED colour on :
  - AC input.
  - DC input.
  - AC output.

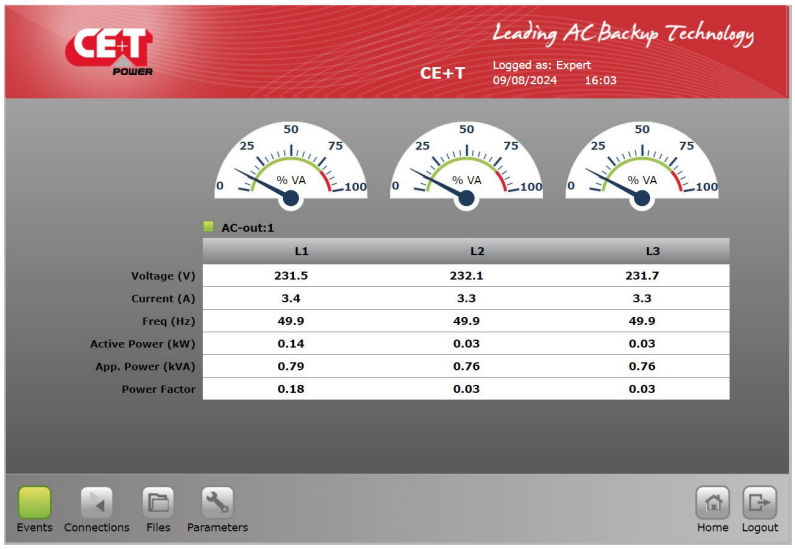
Green: OK.

Orange: Recoverable error.

Red: Non recoverable error.

	When a module is removed from the system, it must be uninstalled by clicking this icon.
	When fan is replaced in the module, the alarm “fan replaced” should be cleared by clicking this icon.
	Module can be switched off through web interface by clicking this icon. The current state (on or off) of the module is also given by this icon.
	Module AC-in, DC-in group and AC-out phase can be change by clicking this icon. Note: while changing the AC-out phase, all the modules should be in OFF condition.
	It will identify the current module in the system by clicking this icon. (All LEDs will blink on the respective module).

6.4 AC Output Load Sub-menu

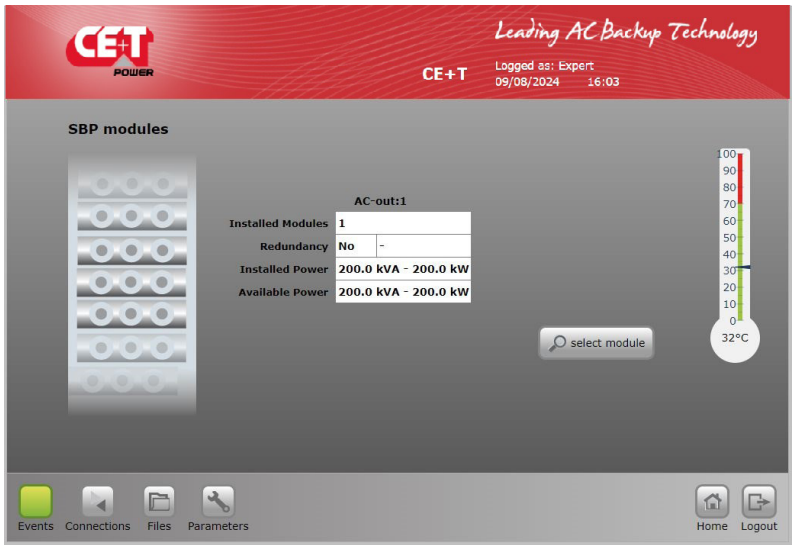


AC output

- Level of power bar graph in VA.
- Measures: individual phase details of L1, L2, and L3
  - Voltage
  - Current
  - Frequency
  - Active Power
  - Apparent Power
  - Power Factor

6.5 SBP Modules Sub-menu

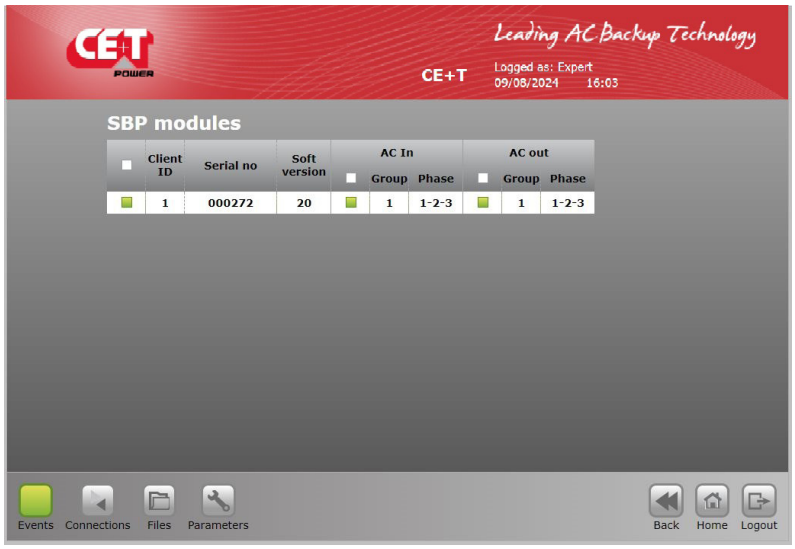
NB: This sub-menu is accessible only when there is at least one SBP installed in the system and to select the SBP mode as either “ECO mode” or “Online EPC mode”.



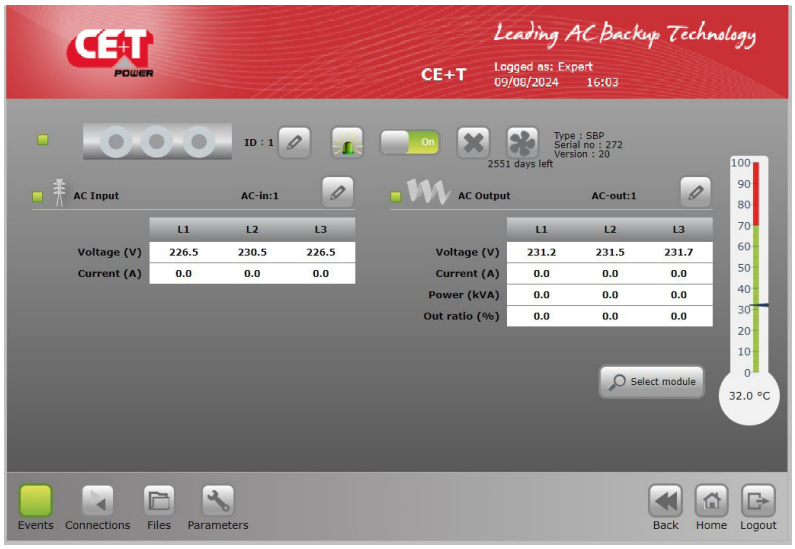
Provides SBP module which works with Flexa module in parallel.

- The number of SBP modules is installed in the system, and the capacity of per module is 200 kVA. (Maximum number of SBP can be installed in a system is three)
- Redundancy level
- Installed power
- Available power
- Ambient temperature of the module

6.5.1 SBP Modules Sub-menu



Clicking on the “Select Module” icon will open a module selection table.



Clicking on any line will give the view of the selected module.

While SBP engaged

- AC IN measures voltage and current
- AC Out measures apparent power and output ratio in percent.

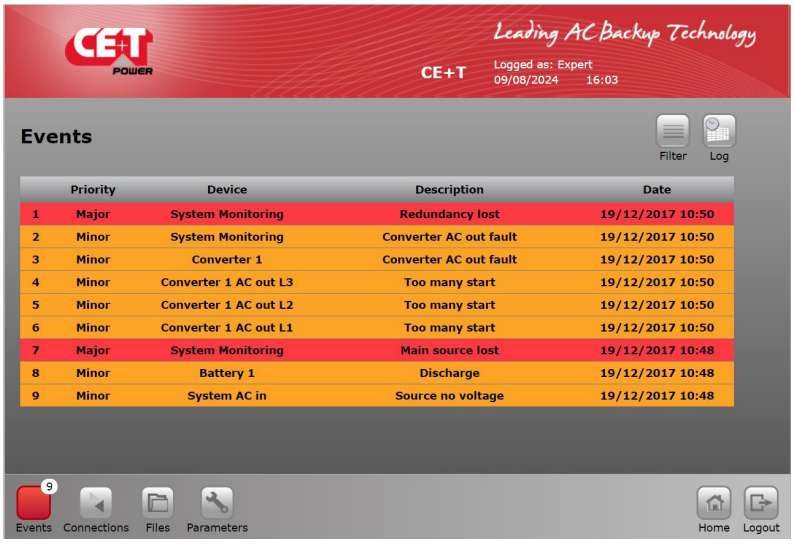
Note: If there are two independent sources, then the AC IN of SBP should be configured accordingly and ensure the sync priority.

Note: If there are two independent sources, then the AC IN of SBP should be configured accordingly and ensure the sync priority. Before changing to the SBP group, ensure the module is in OFF mode.

7. T4S Toolbar

7.1 Events and Log

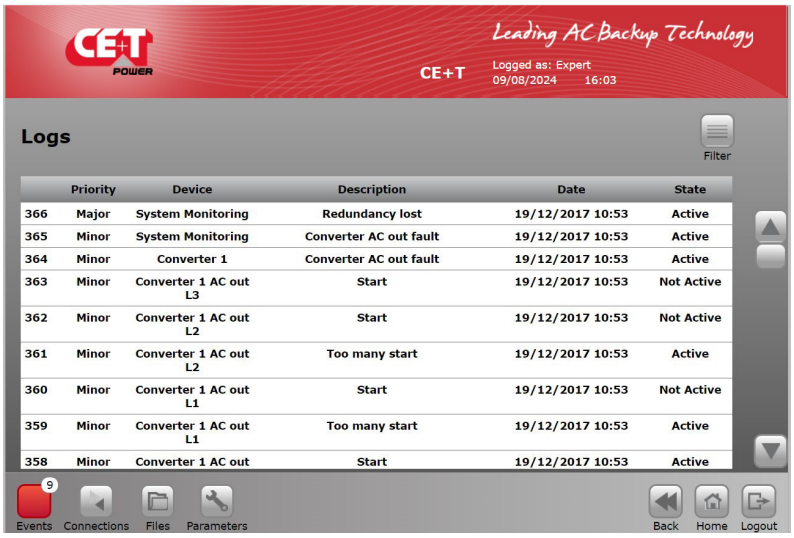
Please note “text alarm page” is refreshed every minute for easy reading while LED’s are active immediately.



Display the active event/alarm present on the system.

- Red: Major alarm.
- Orange: Minor alarm.
- White: No alarm.

Click on “Log” to view the history log file presented below

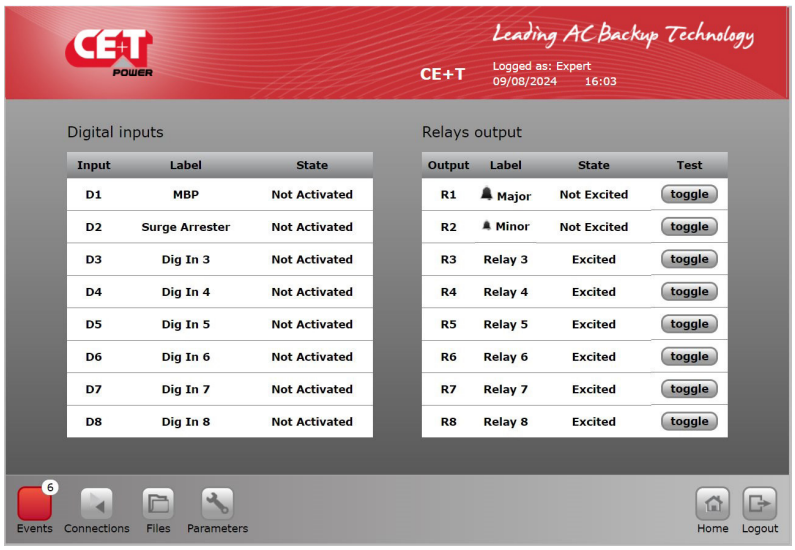


Log file can be filtered using the filter menu.

Do not forget to click apply to activated the selected filter.

Clear Filter will remove all selected filter and view all log file.

7.2 Input and Output Mapping



Input	Label	State
D1	MBP	Not Activated
D2	Surge Arrester	Not Activated
D3	Dig In 3	Not Activated
D4	Dig In 4	Not Activated
D5	Dig In 5	Not Activated
D6	Dig In 6	Not Activated
D7	Dig In 7	Not Activated
D8	Dig In 8	Not Activated

Output	Label	State	Test
R1	Major	Not Excited	toggle
R2	Minor	Not Excited	toggle
R3	Relay 3	Excited	toggle
R4	Relay 4	Excited	toggle
R5	Relay 5	Excited	toggle
R6	Relay 6	Excited	toggle
R7	Relay 7	Excited	toggle
R8	Relay 8	Excited	toggle

Present the output relay mapping with possibility to test each relay with the “toogle” button. Click and check relay changing status with an ohmeter.

Note:
Only available in expert mode through laptop web browser.

7.3 Files

Transfer screen allow to export the log file and export or import configuration file

Transfer:

Event History

- Both Event log and configuration file can be exported.
- Event file name cet.log is a text format *.txt file.
- Log size limited to about 500 – 800 lines.
- Click on “clear” will erase the CET log file. Password protected.

Configuration:

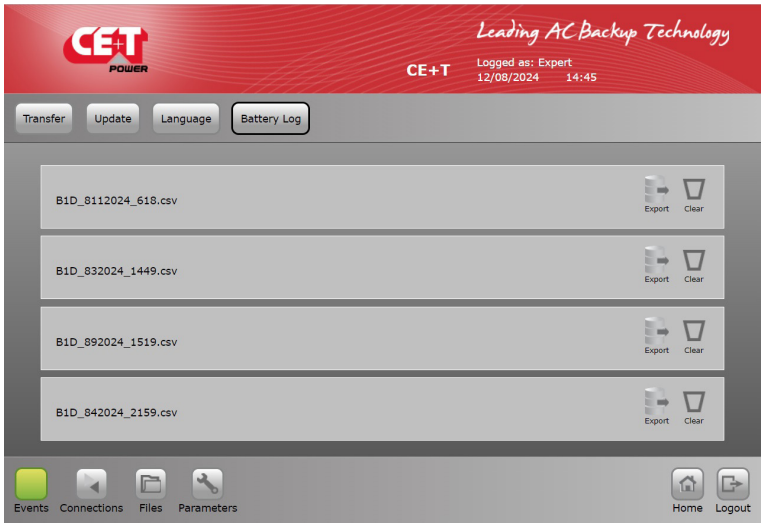
- Configuration file can be exported or imported from T4S.

Update:

To upgrade T4S firmware, download the latest firmware from My.CET website and upload it in T4S.

Language:

T4S store maximum 3 languages that can be changed, updated or cleared.



Battery Log:

The discharged or battery test reports are available to download.

7.4 Parameters

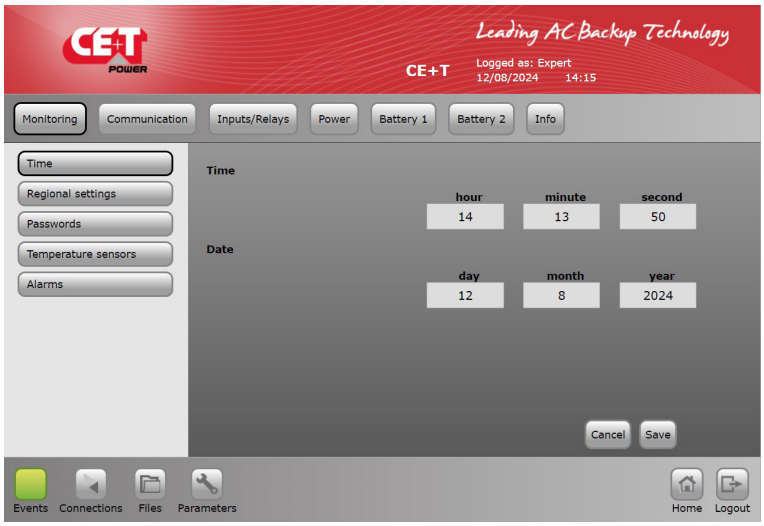
WARNING !

All values present are default values ! User shall consult and change default value with caution. Wrong parameters can affect the system operation, reliability, battery life duration and system autonomy.

7.4.1 Monitoring

NOTE: Once the new parameter has been entered click « save » to record the data otherwise the previous value will be retained.

This menu allow to Set time and region, Change password, Set Inview X network parameter, Set Temperature sensor, and Define the alarm mapping.



Time

- Allow to set Time and Date.

Regional settings

- Choose language.
- Site name.
- Site Location.
- Auto logout delay (will disconnect user after defined seconds).
- Keyboard layout.

Password

Choose password. Read the information carefully at section 5.3, page 15.

Temperature sensors

Allow to configure the temperature probe for battery compensation or ambient temperature.

Alarms

Allow to enable and disable the alarms.

7.4.2 Communication

Network:

Allow to configure the LAN Network parameters

(Note: Default IP address is 192.168.0.2)

"Standalone T4S" must always be selected in the Connection mode.

SNMP:

Do not change any settings in this page. For more details refer section 9, page 40.

Modbus:

You can view Modbus settings through RTU /TCP/IP mode. For more details refer section 10, page 42.

7.4.3 Digital Input and Output Relay Mapping

Inputs : Digital Input mapping > mapping and assign a “name” to any of the 8 digital input. By default DI-1 and DI-2 are related to Manual By Pass and surge arrestor.

Input labels

- Allow to define a label that will be used for any digital input activated.
- By default **Digital Input 1** is assigned to “Manual By Pass” and **Digital Input 2** is assigned to “Surge protection SPD” if it presents in the system.
  Digital Input3 is used to stop charger power.
- Example, Label 4: Door open will report the event “Dig In 4” every time the digital input 4 is active.

Relay Label

Relay label define the text that will be used for output relay

Relay 1 and 2 are reserved for Major and Minor alarm. Relay 3 to 8 are free for any alarm definition

Relays Delay

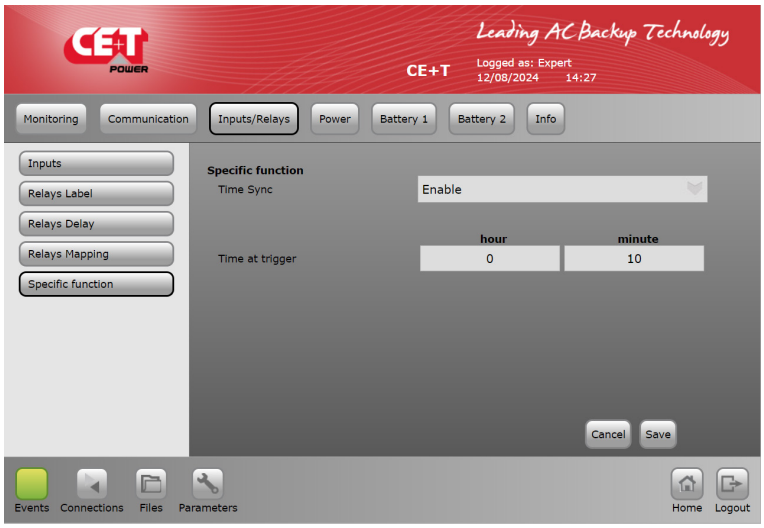
Allow to define the delay time in seconds after which the relay will change status once the event has occurred.

Range from 2 seconds to 60 seconds.

Relay Mapping

Allow to perform the mapping of mentioned alarms to any relay association.

One alarm can be allocated to more than one relays



Specific function that can be used to synchronized time of T4S controller through an impulse on “digital input 08”.

Please contact CE+T if you want to know more about this functionality.

7.4.4 Power Parameter Setting

The menu “Power” allow to perform the setting of the system, AC input, DC battery, AC output and Others.

General

To configure:

- SBP mode: Select “Online EPC mode”, if SBP module is present in the system. To know about **ECO mode**, refer to the Flexa user manual.
- Redundancy
- AC IN Groups and Phases
- AC Out Groups and Phases
- DC mode: Select “Battery”

AC out

To configure AC output parameter:

- Phase configuration: AC out voltage window is 200-240 and the frequency to set is +/- 3Hz for 50Hz or 60Hz
- SBP: Max and Min voltage window to set and sync with AC Out from Flexa module

Note: The parameter “Out voltage Set point ” set by default to 230 Vac shall be adjusted according nominal AC input voltage. This will limit the inrush current when operating on Smart By pass and Manual Bypass.

Note: The phase sequence must be respected between AC IN and AC Out. Improper phase sequence might damages equipment during MBP procedure.

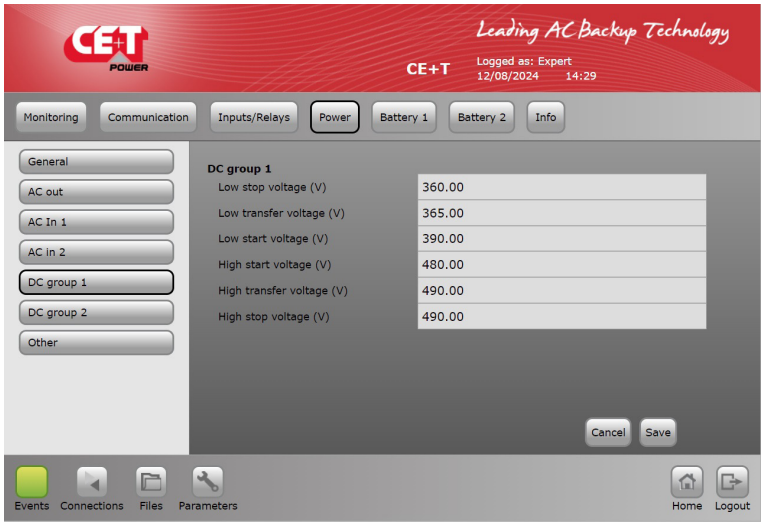
AC In

To configure AC input Parameter.

- Phase shift (120° for 3 phase)
- Sync Priority: Define on which Phase - if all present – the module will synchronise the AC output.
- Low and High defined voltage to configure the voltage boundaries min and max from where Flexa will transfer to DC and vice versa.
- Frequency Window: Allow to sync within the range. Else, will transfer to DC mode
- Maximum power setting at AC input: Description: This function will allow us to limit the power at Input side and act as Peak saving
- SBP Eco mode: This function helps to set the voltage window to operate the SBP mode with range of min - 207 V and max - 253 Vac

DC group

To define min, max battery voltage for default value are related to 408VDC nominal battery (204 cells).



To configure DC input 1 Parameter.

Low and High define voltage to configure boundaries min and max from where Flexa will STOP to preserve battery from deep discharge.

Note:

If more then 1 battery, there will be 2 DC group for Battery 1 and Battery 2.

By default the Flexa config value are listed in the before screen

If those value need to be changed please respect the rules below:

*(Number of cells x V float per cell) = Vdc ref the default value is described in section 7.4.5, page 34, Vref = 204 * 2, 27 = 463.1 V*

300V < Vdc low stop <= Vdc low transfer < [20V hysteresis] < Vdc low start < Vdc ref < Vdc high start < [10V hysteresis] <
Vdc high transfer <= Vdc high stop < 495V

Not respecting the rules above will result is parameters not accepted.

We recommend to proceed as below (respect the sequence):

*To define the new value of **Low start voltage, Low transfer voltage, Low stop voltage** and save.*

*To define the new value for **Battery cells, Float voltage, Capacity, Current limit** in section 7.4.5, page 34, and save.*

*To define the new value for **High start voltage, High transfer voltage, High stop voltage** and save.*

BATTERY type and capacity. To enter the data for charging voltage adjustment and T° compensation coefficient and T° compensation range where the compensation apply.

Other

- **Customer repartition:** 0 to 100% to define the ratio from AC in and battery.
  0% - AC input as primary source.
- **Commutation time:** define the duration to return from DC to AC.
- **Synchro speed:** To define the speed for synchronization (**0** is a default value).
  - Very Fast Synchronization: **- 2**
  - Very Slow Synchronization: **+ 2**
- **AC reinjection**: Can select either Enable or Disable, depends on the condition of boost In mode.
- **Vout min ovrl too long**: To define the value before alarm Over Load Alarm appear.
- **Delay ovrl too long:** To define the timeout to generate Over Load Alarm.
- **Triac enabled:** To define the BOOST function either Enable or Disable.
  - **Enable Boost**: If Flexa and SBP has same AC input source.
  - **Disable Boost:** If Flexa and SBP has two different AC input source.

7.4.5 Battery 1 and Battery 2

Warning: !!!

Battery configuration is extremely important. There must be correct value entered for battery. The wrong value will affect the operation of the system and might have an impact on the battery lifetime. Those parameter will define:

- The float voltage;
- The boost voltage (if enabled);
- The current limitation to protect battery from overcharging current;
- The prediction of the battery capacity when battery test are performed.

General

Note: Configure battery. Refer to battery manufacturer for detail value.

- Flexa need always even number as there is middle point. Ideal 204 cells (2V), Min is 192 V and Max is 216 V.
- Cell float V at 20°C
- Max current to limit during charging. Never exceed C10/4
- Cells capacity, If more then one string please multiply the cell capacity x number of string.

Temperature

Compensation

- Enter the value from manufacturer mV/°C
- Min: from where the compensation start
- Max: from where compensation stop

Note: Temp probe is must to connect between battery bank to Temp input at T4S.

Test

- To set up the battery test parameter Power, time duration and voltage stop
- Auto test to define the periodicity of the test

Boost

To set up Boost, enable the “Boost Mode” and set the parameters.

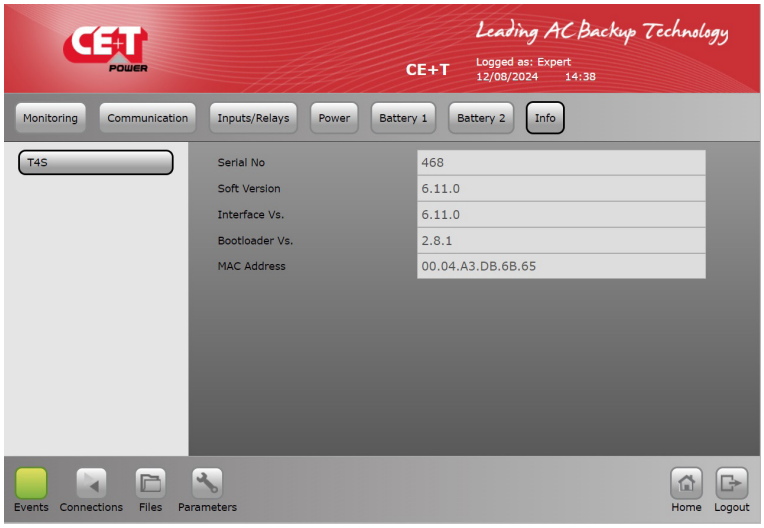
- Boost mode will be activated depending upon the values in the start and stop parameters of **Voltage, Current** and **Period**.
- To activate each conditions, the corresponding parameters should be enabled.

Alarms

The alarm will generate when the battery reaches any one of the following conditions occurs:

- Cell low voltage, pre-low and end of autonomy
- Battery remaining capacity at three levels
- Cell over-voltage and battery temperature
- Battery remaining time

7.4.6 Info



Info

Provides information about T4S:

- Serial number
- Software version
- Interface version
- Bootloader version
- MAC Address

Note: Check the latest T4S software version at My.CET portal.

8. Product Replacement Procedures

8.1 T4S Replacement

The T4S device can be removed from a live system, and it will not affect the load and system operations.

Perform the following steps to replace the T4S on Flexa 200 UPS systems.

1. Turn OFF the power supply (12 Vdc) of the T4S.
2. Remove all the connectors from the T4S (Note the position of all removed cables)
3. Pull out the faulty T4S from the system.
4. Remove the **micro-SD card** from the faulty T4S and copy the content to your laptop. Make sure that the "**Configuration.ini**" file is copied.
5. Remove the **micro-SD card** from the new T4S, place the "**Configuration.ini**" file on it, and insert it back into the new T4S.
6. Install the new T4S and connect back all the removed cables.
7. Switch ON the Aux power supply of the T4S
8. T4S will take a few minutes to extract the .saf file (both LEDs on the T4S will be flashing)
9. Once files are extracted, then T4S will come into normal operation. It means Modules transferred all the module parameters to T4S.
10. Connect it to the laptop and access it through the web interface using the default IP **192.168.0.2**; the password is **pass456**.
11. Then check all the power parameters, Alarm settings, Relay and DI mapping as per your setup.
12. Change the IP Address according to your local network if needed.

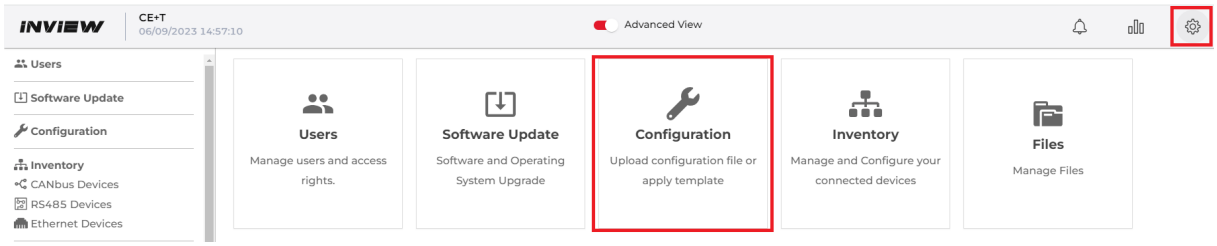
Disclaimer: The "Configuration.ini" file should be manually edited only by the CE+T crew or any specially trained operator. Any mistake made in this file could prevent the system from starting, and we shall not guarantee the whole system's behaviour once this file has been corrupted. All modifiable values contained here are easily accessible through the T4S web interface, which allows you to change this configuration carefully.

8.2 Inview X Replacement

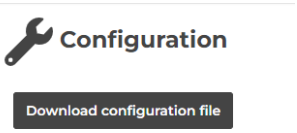
Inview X can be removed from the live system, and it will not affect the load and system operations.

Perform the following steps to replace the Inview X on Flexa 200 UPS systems.

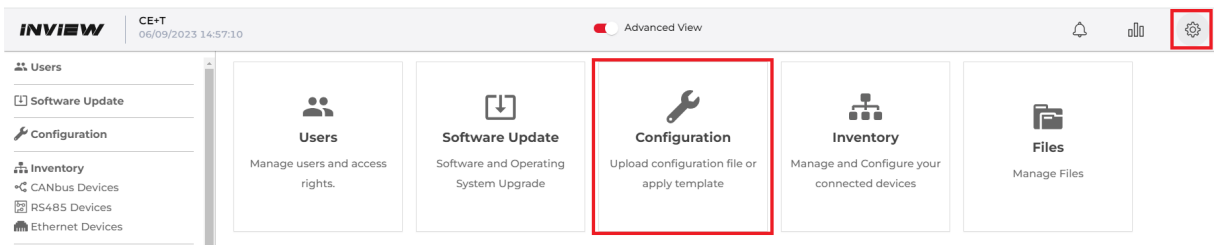
1. Go to Inview X Web UI
   - Click the Administration button and click on Configuration



   - Click on 'Download configuration file' and save the file in a folder.



2. Remove the four screws at Inview X's front plate.
3. Pull out the plate slowly from the system.
4. Unplug the power supply (48 Vdc) at the Inview X rear side.
5. Remove all other connectors from the Inview X rear side (Note the position of all removed cables).
6. Remove the Inview X from the system.
7. Check the new Inview X version from the sticker.
8. Install the New Inview X and connect all the removed cables including the power supply (48 Vdc) at the rear side.
9. Inview X will get powered up and wait a few minutes to communicate with T4S.
10. Go to Inview X Web UI
    - Click the Administration button and click on Configuration



- Under the ‘Upload’ option, click on ‘Choose file’ button, choose the saved configuration file and click on ‘Upload configuration file and reboot’ button.

11. If T4S communication is not established, go to Inview X web UI, select Site > Configuration.
    - Scroll down to ‘Network’ and make sure that the parameter CF340 value is 192.168.0.5/24.
    - Scroll down to ‘Ethernet’ and make sure that the parameter CF220 value is T4S(192.168.0.2,es1_convs1).
    - If the T4S IP address is changed by the user, then the same has to be entered in CF340 and CF220 values acordingly.
12. Ensure that the Dashboard and data are on the GUI screen.

9. SNMP v1 / SNMP v2c / SNMP V3 Configuration

SNMP is now available on the T4S supervisor and in the Inview X Web UI.

SNMPv1 is available on the T4S supervisor. The MIB implemented on the T4S SNMP agent is the standard USP MIB defined by RFC1628. This can only be accessed via a direct connection to the T4S (the T4S should be connected to the network).

The Inview X web UI includes support for SNMPv1, SNMPv2, and SNMPv3 which is Inview specific MIB.

9.1 SNMP Configuration via T4S

9.1.1 SNMPv1 Configuration

For SNMPv1 agent configuration, go to Parameters > Monitoring > Network.

See T4S network section for ETH port configuration:

- IP address.
- Subnet mask.
- Gateway.

See T4S SNMP section for SNMP agent configuration:

- Trap receivers IP addresses. Up to 5 trap receivers can be configured.
- Note that ports 161 and 162 (for traps) are used. Not configurable.

9.1.2 SNMPv1 MIB (RFC1628)

The MIB is the standard UPS MIB defined by RFC1628.

Meaning of “input lines”: input lines are AC input groups as existing in T4S web interface. One tri-phase system will have 3 input lines, one for each phase.

Meaning of “output lines”: output lines are AC output groups as existing in T4S web interface.

The following features of UPS MIB are not implemented in T4S:

- Writable entries. The current MIB is read-only. Entries can only be edited through the web server. For this reason, the upsConfig section is also read-only.
- Bypass values. As T4S doesn’t include the monitoring of bypass devices, bypass measurements are not available in the MIB. It is however possible to know when the system switched to MBP by reading ups Output Source value (OID .1.3.6.1.2.1.33.1.4.1).
- Well known test. Only standard battery test is available. No other test is implemented in T4S at current state.

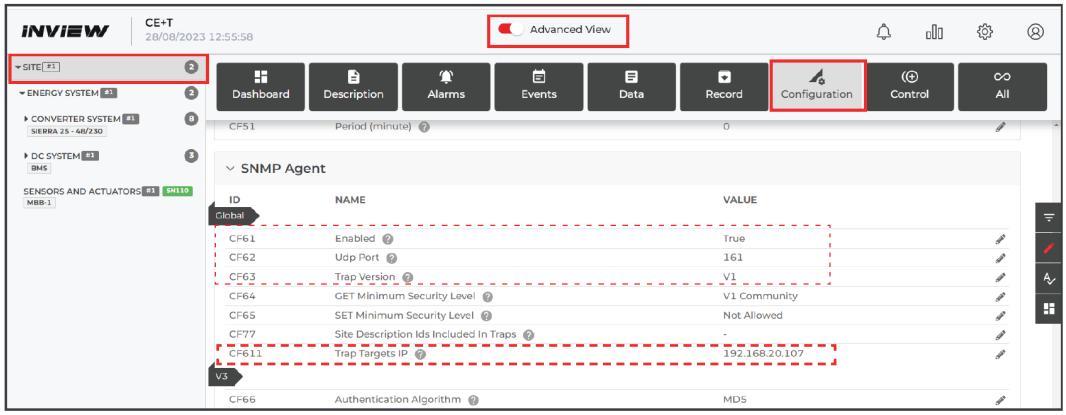
Any feature defined in RFC1628 that is not in the previous list is available.

9.2 SNMP Configuration via Inview X

9.2.1 SNMPV1, V2 and SNMPv3 configuration

For the SNMP configuration via Inview X web UI, go to *Advanced View* > *Site* > *Configuration*, scroll down to the SNMP Agent section and select the following options.

- In the ID CF61, select "True" to enable the SNMP function and enter the port address in the ID CF62.
- In the ID CF63, select the SNMP version V1, V2c and V3.
- In the ID CF611, enter the Trap Targets IP.

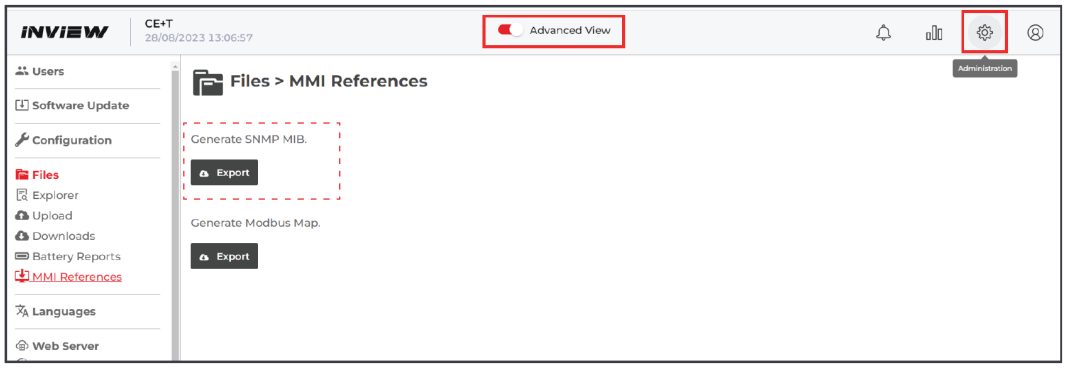


9.3 MIB

This section describes the Inview Management Information Base (MIB) schema design for SNMP V1, V2c and V3 configuration. A MIB schema describes the structure of information served by a Simple Network Management Protocol Subsystem (SNMP) agent.

The data is grouped in terms of high-level objects and therefore models a top-down hierarchical design.

To download the SNMP MIB file, go to *Administration* > *Files* > *MMI References* and click SNMP MIB "Export" button.



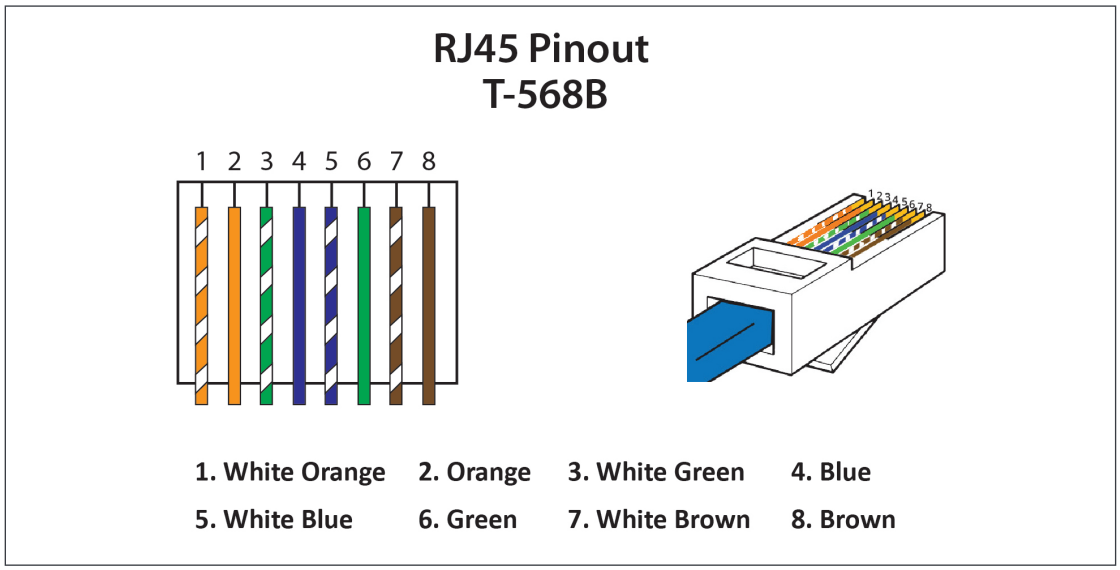
10. ModBus

10.1 ModBus RTU

T4S can act as a ModBus RTU slave with various baud rates and configuration options. No action can be done on the system through ModBus port; it's only for monitoring purposes.

10.1.1 Physical Connection

To get access to the ModBus, the RJ45 labelled "RS485" on T4S monitoring unit should be connected. RJ45 pin out is as follow:

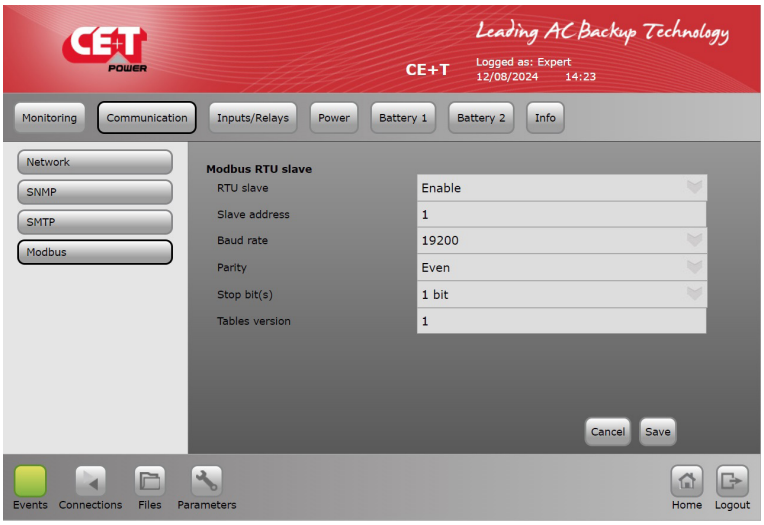


Note: The colour of wires is irrelevant and may vary, but make sure the position of wires is exactly crimped.

- Pin 4 = D1
- Pin 5 = D0
- Pin 8 = Common (GND)

10.1.2 Configuration

ModBus slave configuration is accessible through user interface by browsing menu *Parameters, Monitoring* tab*, ModBus* sub menu.



- Modbus RTU slave can be either *enabled* or *disabled*.
- Slave address ranges from *1* to *247*. Default is *1*.
- Supported baud rates are: *9600, 19200, 38400, 115200*, or *460800*. Default is *19200*.
- Parity can be *none, even,* or *odd*. Default is *even*.
- Stop bits can be *1* or *2*. Default is *1*.
- Configuration is applied once *save* button is clicked.

Table version parameters ensure that customer can use any revision of the modbus tables he wants. First release is based on table revision 1.

To know more about modbus, download it from My.CET.

For Modbus Data and Alarm details, refer to “Appendix 5. ModBus Table”, page 62

11. Defective Situations Resolution

11.1.1 Return Defective T4S Interface

A T4S totally dark (indication area) or that cannot interface with your laptop are evidence of failure. Proceed as per section 11.1.3, page 44.

11.1.2 Return Defective Shelf

The shelf is passive. Failure is unlikely to happen. In turn defective situation are barely always visible. After depose proceed as per section 11.1.3, page 44.

11.1.3 Return Defective Modules

- A repair request should follow the regular logistics chain:
  End-user => Distributor => CE+T Power.
- Before returning a defective product, a RMA number must be requested through the http://my.cet-power.com extranet. Repair registering guidelines may be requested by email at repair@cet-power.com.
- The RMA number should be mentioned on all shipping documents related to the repair.
- Be aware that products shipped back to CE+T Power without being registered first will not be treated with high priority!
- Information on failure occurrence as well as module status must be recorded in RMA.

12. Service

For Service

- Check Service Level Agreement (SLA) of your vendor. Most of the time they provide assistance on call with integrated service. If such SLA is in place, you must call their assistance first.
- If your vendor doesn't provide such assistance (*) you may contact CE+T through email: customer.support@cet-power.com

(*) CE+T will redirect your call to your vendor if he has such SLA in place.

13. Maintenance Task

As maintenance will be performed on live system, all task should be performed only by trained personnel with sufficient knowledge on TSI product.

Tasks:

- Identify the site, customer, rack number, product type.
- Download and save configuration file for back up.
- Check configuration file to be in accordance with operational site conditions.
- Read and save log file for back up.
- Check and analyse log file, and if alarm are present.
- Replace dust filter if present. Filter is mandatory in dusty environment.
- Check module temperature and log value. If internal temperature is higher then previous year, it should be interesting analyse if it is due an increasing load or dust effect. It is common to have a delta of 15°C by 30% of load between the ambient and the internal temperature. If temperature increase due to internal dust, clean the module by air suction blower or vacuum cleaner.
- Clean cabinet (vacuum cleaner or dry cloth).
- Control the converter mapping (AC Group, DC Group, Address).
- Check load level and record the rate value (print in word document the 4 screen modules information for the 32 modules, the 3 screen for the phases value and the 2 screens for the group AC and DC value).
- Change the configuration file for AC and DC mix mode to check that all TSI work on both power supply.
- Check alarm operation (e.g., redundancy lost, mains failure, DC failure) on dry contact and through SNMP system or web interface.
- Switch OFF AC IN and check alarms.
- Check temperature terminal and temperature wiring. If possible use an infrared camera.
- Read and record value as wave form, power factor, Crest factor, THD from power analyzer.
- Take the cabinet picture.
- Keep track of report and provide end user with a copy.

Appendix 1. Battery Management with Flexa Technology and T4S

1.1. Introduction

Battery is critical element in a UPS. Many manufacturer offer high performances of their electronic but sometimes forgot about providing an efficient and reliable battery management.

Battery is fragile and needs to be treated accordingly in discharge and recharge conditions. The purpose of this document is to provide an overview of how TSI and Flexa manage the batteries, prevent their end of life and reduce possible occurrence of thermal runaway.

1.2. CE+T Battery Charging and Discharging Mode

The purpose of a charger is to “refill” the charge tank of the battery. There are many other features which enhance the convenience of the charger, or grant protection for the battery being charged. These built-in protection features is what fundamentally elongates the battery’s life, or more correctly, prevents premature failure.

TSI technology provide those features:

- Higher current levels reduce recharge times (assuming the battery can accept charge at high rates).
- Voltage limits, current limits, and time out to reduce excessive gassing at end-of charge, and prevent dry-out.
- Modified voltage and current limits as a function of temperature reduce gassing and electrode damage.
- BOOST or Equalize mode to equalize battery blocs periodically

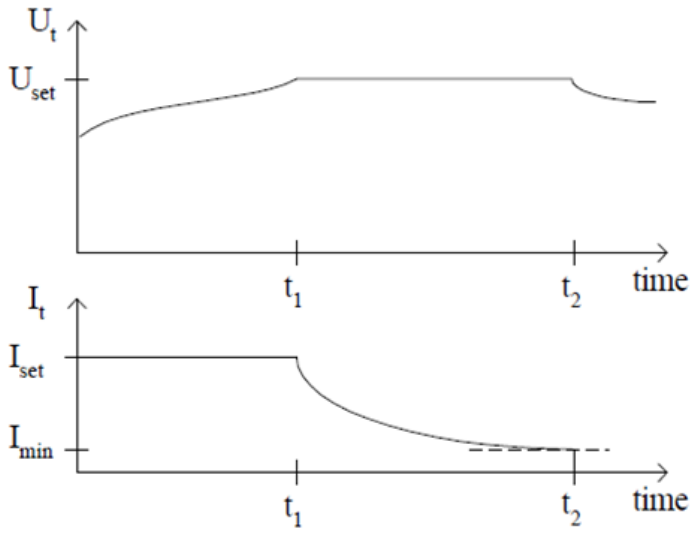
CE+T Flexa and controller T4S battery operating mode are described below

1.2.1 MODE 1 BOOST

This mode need to be activated and configured according the battery data from the manufacturer

A CCCV (constant current, constant voltage) algorithm to provide a “quick an fast recharge. Ideally to recover 80% of the battery capacity in maximum 8 hours. This mode use a U_{set} voltage level associated to current limit protection

Figure 1. Typical recharge curve versus time for voltage and current.



MODE 1 algorithm can be trigger based on the following parameter:

- Trig Start Voltage : Will activate MODE 1 when battery voltage goes below pre-set level
- Trig Start Current : will activate MODE 1 when battery current goes above the pre-set value
- Trig Start Period : Will activate MODE 1 periodically base on pre-set value
- Manual Start : Will activate MODE 1 manually through the GUI menu

In mode 1 the temperature compensation is disabled.

MODE 1 algorithm can be stopped based on the following parameter :

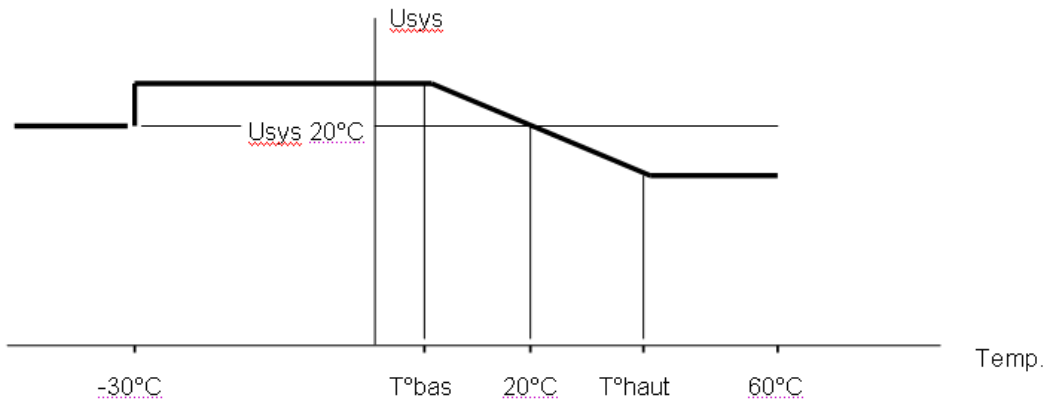
- Trig Stop Current: Will stop MODE 1 when battery voltage goes below pre-set level and MODE 1 for minimum 5 minutes (to avoid successive Start and Stop)
- Trig Stop Duration: 1H to 48H will stop MODE 1 (always active) will stop the MODE1 after the duration.

Note: If MODE1 stop based on "duration" before the "Stop current" reached an alarm will be generated as the battery need to be checked.

- Trig Start Period: Will activate MODE 1 periodically base on pre-set value
- An alarm appear in the system: MODE 1 will be disabled in case of alarm presence
- Manual stop: will STOP MODE 1 manually through the GUI menu

1.2.2 MODE 2 FLOAT:

This is the normal operating mode for maintaining the battery in charge. This mode is enabled by default



The MODE 2, charging voltage is adapted (provided it is enabled in the configuration) according the temperature. Using the charging curve below.

T° bas-low and T° haut-high are adjustable

Note: If the temperature probe is disconnected or defective the voltage will come back to the value at 20°C. An alarm T° sensor fail" will be generated.

1.2.3 MODE 3 Discharge

Discharge mode is active when energy flow is taken from the battery to the DC/AC converter (inverter) of each module.

In this mode the T4S monitoring sent a voltage and current value to the Flexa module. This help in case of one module has AC input failure to take power from DC and is feed through the other module to avoid discharging the battery and assure the continuity of supply for the AC load.

Following alarms and time out available:

- Ubat < Ufloat
- BAT cell V low
- BAT end of autonomy
- BAT discharge time out (Battery in discharge for more than xx minutes)
- V BAT stop: Flexa will stop operating to prevent deep discharge

Note: During discharge, T4S will record battery discharge value

1.2.4 MODE 4 BATTERY TEST

Battery test is a helpful function to get reliable information on the battery conditions and capacity.

It is recommended to perform periodic test of the battery but more important to perform those test in the same conditions in order to obtain comparative data over the years of the battery lifetime.

Starting BATTERY TEST conditions:

- Manual
- Trig Start Period: Specify the day of the week to perform the periodic test and the number of weeks between 2 tests.

Note: Periodic test will start only if no discharge during last 96 hrs. to guarantee the same start conditions for every test.

Stopping BATTERY TEST conditions:

- Trig Stop Duration : always active. Define the maximum time duration of a test
- Trig Stop Voltage : stop the test when battery voltage reaches the pre-set value
- An alarm appears in the system:
  - AC IN failure
  - Module failure
  - V BAT too low
  - System Overload
- Manually through the GUI menu

Note: During any test or battery discharge the following data will be recorded.

START BAT x TEST + data and time

FIN BAT x TEST + data and time

For every delta of 1VDC record of:

- Date in seconds
- Battery voltage
- Battery current
- Bat Temperature

END BAT TEST + date+Time, VBAT, Temp+ Success, FAIL

START BAT x DISH + data and time

FIN BAT x DISH + data and time

For every delta of 1VDC record of:

- Date in seconds
- Battery voltage
- Battery current
- Bat Temperature

END BAT DISH + date+Time, VBAT, TEMP

Appendix 2. T4S Alarms

2.1. Supervisor Alarms: T4S

This is the list of alarms issued by supervisor. Other alarms are issued by modules directly (see Flexa alarm table & OCA document). The supervisor is able to generate alarms that are related to the system, to Flexa modules, or to itself. Alarms related to Flexa will be seen as system alarms when module alarm is present on all Flexa modules.

Each alarm has a priority level. The level can be {disabled, event, minor, major}. If the level can be configured in user interface, then it is marked as “mappable”, please refers to the last table for standard mapping.

Monitoring Alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description/ Possible action**
224	MBP engaged	Mappable	/	The system is in manual by pass mode. Disengaged MBP to recover normal mode
225	Surge arrester	Mappable	/	Surge protection trip. Check & replace surge protection device
226	Redundancy lost	Mappable	/	The defined redundancy for a group is lost. According to config replace or restart faulty module
227	System saturated	Mappable	/	Load power is above the defined level (settable in Saturation threshold parameter). Check load level and add modules if possible or change parameter level
228	Main source lost	Major	/	Depending on the configuration, the AC input power source is missing. Check AC input breaker or source presence
229	Secondary source lost	Minor	/	The DC source (battery) is not present or end of autonomy. Check battery fuse or voltage
230	System overloaded	Mappable	/	The load power is above 100% of the system capacity
231	Log nearly full	Event	/	The number of events in the log file is above 80% of the maximum number of events
232	Missing converter	Mappable	/	A module is not seen on the bus. It can be bus failure at module level. Unplug module and re-plug. If problem still present module need to be replaced
233	Aux power supply fail	Minor	/	One of the two power supply of the T4S is lost. Check auxiliary power supply
234	New module	Event	/	A new module is seen on the bus, it will be installed by the system automatically
235	Log cleared	Event	/	The log file has been cleared
236	Config modified	Event	/	This temporary event appears to confirm the modification of some parameters
237	System started	Event	/	The system started and is in normal operation
238	DigIn 3	Mappable	/	The digital input 3 is active (NO or NC depending of the configuration)
239	DigIn 4	Mappable	/	The digital input 4 is active (NO or NC depending of the configuration)
240	DigIn 5	Mappable	/	The digital input 5 is active (NO or NC depending of the configuration)

Monitoring Alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description/ Possible action**
241	DigIn 6	Mappable	/	The digital input 6 is active (NO or NC depending of the configuration)
242	DigIn 7	Mappable	/	The digital input 7 is active (NO or NC depending of the configuration)
243	DigIn 8	Mappable	/	The digital input 8 is active (NO or NC depending of the configuration)
244	Monitoring started	Event	/	The T4S/CATENA has restarted
245	Log full	Minor	/	The log file has reach the maximum number of events. More events will not be recorded anymore
246	Converter off	Minor	/	The given module is off manually or remotely.
247	Converter AC out fault	Mappable	/	The given module has AC out problem. Module need replacement and repair
248	DigIn 1	Mappable	/	The digital input 1 is active (NO or NC depending of the configuration)
249	DigIn 2	Mappable	/	The digital input 2 is active (NO or NC depending of the configuration)
250	Redundancy +1 lost	Mappable	/	Means that the system has lost one module more than the configured redundancy for a group. Means that this groups could be overloaded.
251	Missing SBP	Mappable	/	A SBP is missing in the system.
252	SBP AC out fault	Mappable	/	Problem in SBP Ac out. Module need replacement
253	SBP engaged	Mappable	/	System is running on Smart By Pass
254	Time synchronized	Event		Time synchronization through digital input occurred
255	MBP procedure	Mappable		System with SBP is in MBP procedure
256	Battery charge remote off	Mappable		Battery charging is disabled through digital input
512	Discharge	Mappable	/	Battery is discharging.
513	Charging failure	Minor	/	Battery cannot be charged.
514	Boost in progress	Mappable	/	A boost charge is in operation on BAT1 or BAT 2
515	Test in progress	Mappable	/	A battery test is in operation on BATTERY 1 or BATTERY 2
516	Defect	Minor	/	Problem detected on a battery 1 or 2 after battery test
517	Low voltage pre	Minor	/	Battery voltage has reach the settable pre-alarm level
518	Low voltage	Mappable	/	Battery voltage has reach the settable alarm level
519	End autonomy	Mappable	/	The battery voltage has reach the settable end of autonomy level
520	Low capacity pre	Minor	/	Battery capacity is in pre-alarm condition
521	Low capacity	Minor	/	Battery capacity is in alarm condition
522	No more autonomy	Mappable	/	Battery has reach its lower level, DC converter will soon stop

Monitoring Alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description/ Possible action**
523	Overvoltage	Mappable	/	Battery is in overvoltage alarm
524	Unknown capacity	Minor	/	At startup, the battery is in unknown capacity state, the supervision system will soon detect the capacity
525	Temperature sensor fail	Mappable	/	Battery temperature sensor fail appears when the probe is disconnected
526	Over temperature	Mappable	/	Battery T° is above configured limits
527	Limited charging	Minor	/	The charger limits current to the battery according parameter.
528	Boost too long	Minor	/	Means that a boost charge of the battery exceed the specified time out. Please check battery is healthy
529	Low remaining time	Minor	/	The battery remaining time is low
530	Test: manual stop	Minor	/	Means that a test has stopped due to user manipulation
531	Test: recent discharge	Minor	/	A test will not start because battery has been in discharge within 96 hours
532	Test: voltage low	Minor	/	A test will not start because the voltage is too low
533	Test: system alarm	Minor	/	A test will not start because there is an alarm that prevent the battery test to start
534	Test: already in boost	Minor	/	A test will not start because the battery is already in boost charge.
535	Test: charger OFF	Minor	/	A test will not start because the charging is disabled and so the battery will not be charged after the test.

Mappable Events (Not alarms !!)				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
632	AC in failure	/	Major + R3	
633	AC out 1 failure	/	Major	
634	Battery 1 discharge	/	Major	
635	Battery 2 discharge	/	Major	
636	Battery 1 low	/	Major	
637	Battery 2 low	/	Major	
638	Digital input 1	/	Event	
639	Digital input 2	/	Event	
640	Digital input 3	/	Event	
641	Digital input 4	/	Event	
642	Digital input 5	/	Event	
643	Digital input 6	/	Event	
644	Digital input 7	/	Event	

Mappable Events (Not alarms !!)				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
645	Digital input 8	/	Event	
646	MBP Engaged	/	Major + R5	
647	Battery bad	/	Minor	Means that a test has failed
648	AC out 1 overload	/	Major	
649	AC out 1 redundancy lost	/	Event	
650	AC in freq out of limit	/	Minor	
651	Converter failure	/	Minor	
652	Temperature sensor 1 fail	/	Minor	Battery probe
653	Temperature sensor 2 fail	/	Minor	Battery probe
654	Not used	/	Event	
655	Module overtemperature	/	Minor	
656	Surge arrester	/	Minor	
657	AC out 1 redundancy +1 lost	/	Event	
658	AC out 1 saturated	/	Minor	System load is above the settable limit (normally 80%)
661	Battery 1 overvoltage	/	Event	
662	Battery 2 overvoltage	/	Event	
663	Battery 1 overtemperature	/	Event	
664	Battery 2 overtemperature	/	Event	
665	Battery 1 test active	/	Event	
666	Battery 2 test active	/	Event	
667	Battery 1 boost active	/	Event	
668	Battery 2 boost active	/	Event	
722	Battery test cancelled	/	Minor	Battery test has not started because of another event (See 530 -> 535)
723	SBP failure	/	Major	
724	SBP engaged	/	Major	
736	AC out 2 failure	/	Major	
737	AC out 2 overload	/	Major	
738	AC out 2 redundancy lost	/	Event	
739	AC out 2 redundancy +1 lost	/	Event	
740	AC out 2 saturated	/	Minor	
745	AC out 1 manual off	/	Event	
746	AC out 2 manual off	/	Event	
747	Log full	/	Minor	
758	MBP procedure	/	Major + R5	
759	Battery safe charging control	/	Major	

2.1.1 Module alarms (T4S)

Module alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
96	Start	Minor		System is starting
97	Boost not available	Minor		AC in and AC out not synchronized (boost cannot be used)
98	Boost recovery	Minor		Boost (triac) cooling down from previous activation
99	Boost failure	Minor		Boost (triac) fault short-circuit
100	Fan to be replaced	Minor		The timeout indicating FAN operates for 7 years
101	Fan failure	Minor		Fans are not functioning properly
102	Power disturbed	Minor		Transient power alarm with output stopped (module KO)
103	Param phase query	Minor		No assigned AC group or DC group yet (in progress)
104	Param mismatch	Minor		Param not compatible with the rest of the system
105	No source	Minor		No AC/DC input
106	Vcap too high	Minor		Internal voltage too high
107	Vcap too low	Minor		Internal voltage too low
108	Vref error	Minor		Reference voltage from auxiliary supply out of acceptable range
109	Memory eeprom error	Minor		Not implemented
110	Memory flash error	Minor		Flash continuous verification failed
111	OFF remote	Minor		Module remote OFF
112	OFF manual	Minor		Module OFF manually (ON / OFF switch)
113	BUS com fail	Minor		Too many missing bus frames
114	Bus A fail	Minor		Sync tops reception issue on bus A (com lost)
115	Bus B fail	Minor		Sync tops reception issue on bus B (com lost)
116	Bus sync filter error	Minor		Sync top filtering circuit fault (detected because sync tops are received at different times)
117				
118				
119	Bus A not present	Minor		bus A present signal of backplane not seen by the module
120	Bus B not present	Minor		bus B present signal of backplane not seen by the module
121	Bus frame collision	Minor		Bus A and bus B are not identical in content
122	Bus fail	Minor		Module can't see what it writes on both bus
123	Warm up too high	Minor		One of the measured temperature is above a threshold
124	Power noise	Minor		Transient power alarm (some trips happening)
125	Not defined 30			
126	Not defined 31			
127	Not defined 32			

Module DC input alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
128	Start up	Minor		
129	Temperature derating	Minor		Power is decreased due to high temperature
130	Temperature too high	Minor		DC converter stopped because of too high temperature
131	Temperature sensor fail	Minor		Communication with temperature probe was lost
132	Auto-calib error	Minor		Error during auto calibration of current offsets
133	Pdc too low	Minor		Pdc = f(Vdc). Alarm if Pdc < Pout
134	Impedance too high	Minor		DC input too high impedance detected
135	No AC voltage	Minor		For PV (photo-voltaique) mode
136	Current trip	Minor		Too many consecutive DC-/+ over-current trips
137	Driver error	Minor		Too many “not ready”/”fault” from DC-/+ drivers over some time
138	Not defined 43			
139	Not defined 44			
140	Not defined 45			
141	Not defined 46			
142	Not defined 47			
143	Not defined 48			
144	Source+ too low - transferred	Minor		DC+ V is under input transfer to AC threshold
145	Source- too low - transferred	Minor		DC- V is under input transfer to AC threshold
146	Source+ too high - transferred	Minor		DC+ V is over input transfer to AC threshold
147	Source- too high - transferred	Minor		DC- V is over input stop threshold
148	Source+ too low - stop	Minor		DC+ V is under input stop threshold
149	Source- too low - stop	Minor		DC- V is under input stop threshold
150	Source+ too high - stop	Minor		DC+ V is over input stop threshold
151	Source- too high - stop	Minor		DC- V is over input stop threshold
152	Source+ no voltage	Minor		DC+ V is under input not present threshold
153	Source- no voltage	Minor		DC- V is under input not present threshold

Module DC input alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
154	Source+ brownout (<150V)	Minor		DC+ V is under extended lower limit for too much time
155	Source- brownout (<150V)	Minor		DC- V is under extended lower limit for too much time
156	Not defined 61			
157	Not defined 62			
158	Not defined 63			
159	Not defined 64			

Module AC input alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
160	Start	Minor		
161	Temperature derating	Minor		Power is decreased due to high temperature
162	Temperature too high	Minor		ACin converter stopped because of too high temperature
163	Temperature sensor fail	Minor		Communication with temperature probe was lost
164	Auto-calib error	Minor		Error during auto-calibration of current offsets
165	Impedance Too High	Minor		AC input too high impedance detected
166	Backfeed error	Minor		Input stopped because of backfeed on it
167	Not defined 72			
168	Overcurrent	Minor		Too many consecutive ACin over-current trips
169	Driver not ready	Minor		Hardware driver not ready signal received
170	Driver fault	Minor		Hardware driver fault signal received
171	Driver perturbed	Minor		Too many consecutive “not ready”/”fault” from Acin driver or more than a threshold over some hours
172	Not defined 77			
173	Not defined 78			
174	Not defined 79			
175	Vres Absent	Minor		Fast alarm when source V is no longer present
176	Source V too low transferred	Minor		Source V is under input transfer to DC threshold
177	Source V too high transferred	Minor		Source V is over input transfer to DC threshold
178	Vres out of range	Minor		Source V is out of expected envelope

Module AC input alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
179	Source V too low stop	Minor		Source V is under input stop threshold
180	Source V too high stop	Minor		Source V is over input stop threshold
181	Source frequ too low	Minor		Source freq is under input stop threshold
182	Source frequ too high	Minor		Source freq is over input stop threshold
183	Source no voltage	Minor		Source V RMS is below 60V (SELV threshold) - no sync possible
184	SBP Vres absent	Minor		SBP Fast alarm when SBP source V is no longer present
185	SBP Source V too low stop	Minor		SBP source V is under output stop threshold
186	SBP Source V too high stop	Minor		SBP source V is over output stop threshold
187	SBP Source frequ too low	Minor		SBP source freq is under output stop threshold
188	SBP Source frequ too high	Minor		SBP source freq is over output stop threshold
189	SBP Res not sync	Minor		SBP source is not in sync (freq + phase shift) with system
190	Not defined 95			
191	Not defined 96			

Module AC output alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
192	Start	Minor		
193	Temperature derating	Minor		Power is decreased due to high temperature
194	Temperature too high	Minor		ACout converter stopped because of too high temperature
195	Temperature sensor fail	Minor		Communication with temperature probe was lost
196	Auto-calib error	Minor		Error during auto calibration of current offsets
197	Overload not ready	Minor		Overload capability is in cool-down
198	Overload	Minor		Output power is higher than a threshold above nominal power
199	Power derating	Minor		Derate output power because it cannot be supplied
200	Vout too Low	Minor		Output V is under a threshold (due to an overload)

Module AC output alarms				
Text ID	**Name**	**Level**	**Def. Map**	**Description**
201	Overload too long	Minor		Output V is under a threshold (due to an overload) for too much time
202	Vout modify	Minor		Output V setpoint was modified and is being converged on
203	Load-sharing low	Minor		Flexa module is supplying too much power to the load compared to the other modules
204	Load-sharing high	Minor		Flexa module is not supplying enough power to the load compared to the other modules
205	Mode support	Minor		Flexa is supporting either the SBP or MBP output, i.e. it does not supply any current, but in case of a voltage drop will try to keep the voltage at an acceptable level
206	Igbt driver alarm	Minor		An individual driver is sending an alarm but global drivers monitoring signals are OK
207	Not defined 112			
208	Driver not ready	Minor		Hardware driver not ready signal received
209	Driver fault	Minor		Hardware driver fault signal received
210	Over-current	Minor		Too many consecutive AC out over-current trips
211	Igbt error	Minor		Software detected IGBT fault
212	Vout pi2 error	Minor		Output V at Pi/2 (sine max) is out of expected range with open relay
213	Vout mpi2 error	Minor		Output V at -Pi/2 (sine min) is out of expected range with open relay
214	Off (bus)	Minor		Output Off from bus request
215	Backfeed error	Minor		Output stopped because of backfeed from this module or another one
216	Too many start	Minor		Too many attempts to start output over some time
217	AC out fuse open	Minor		Output fuse open or enventualy output connector not connected
218	SBP AC out open	Minor		SBP could not close when needed
219	SBP AC out short circuit	Minor		SBP could not open when needed
220	SBP temperature too high	Minor		SBP stopped because of too high temperature
221	SBP temperature sensor fail	Minor		Communication with temperature probe was lost
222	SBP overload	Minor		SBP Output power is higher than a threshold above nominal power (105%) (not KO)
223	SBP overload too long	Minor		SBP Output power is higher than a threshold (200%) above nominal power for too much time (KO)

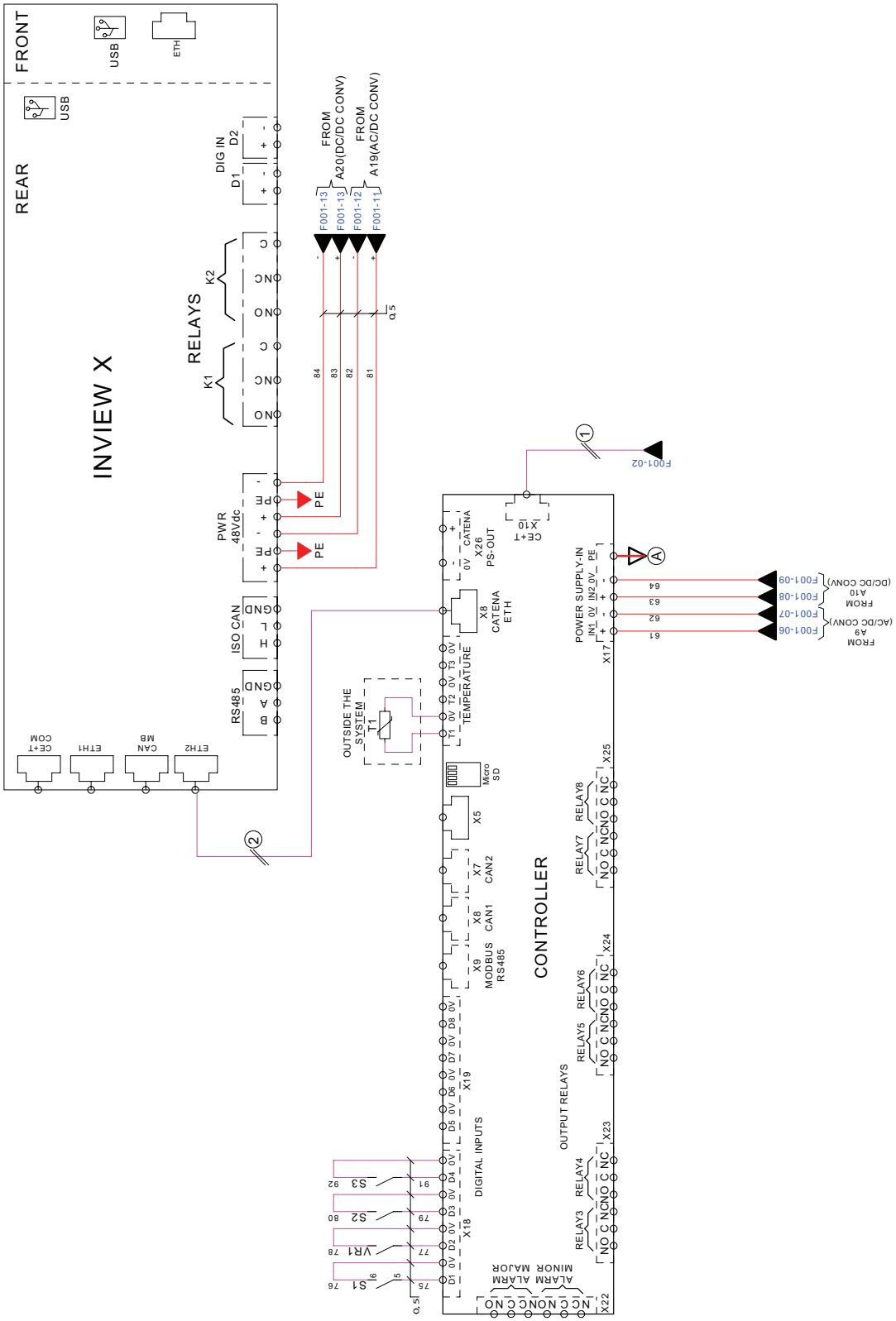
Appendix 3. FAQ

How can I reset my admin password if I have unfortunately forgotten it?

Before version 3.1, there is a generic password that always works: 123TEC. You can use it to connect and change your expert password. As this has been identified as a potential risk for system integrity, we strongly recommend to update to a newer version where security has been improved.

From version 3.1, in case of password loss, a new temporary password (valid 24 hrs. after creation) can be issued by CE+T Power. To receive a temporary password, send an email with your T4S serial Number and the date at which you expect to go back on site to change the password to customer.support@cet-power.com specifically requesting a new temporary password. The serial number can be found on the sticker on the T4S, or on screen in 'Parameters' then 'Info'.

Appendix 4. T4S - Inview X Connections



Appendix 5. ModBus Table

5.1. Data table

Device ID	Modbus Address	Scale	Description	Unit	Register type function 03
100	30015	No Conversion - Signed Short	Megabytes Received	MB	Input register
100	30016	No Conversion - Signed Short	Megabytes Sent	MB	Input register
100	30031	Divided By 100	Monitoring Memory Used	kB	Input register
100	30032	Multiplied by 100	CPU Percentage Usage	%	Input register
100	30033	No Conversion - Signed Short	Free Flash Memory Space	MB	Input register
100	30036	Multiplied by 10	CPU Temperature	°C	Input register
100	30037	No Conversion - Signed Short	CPU Frequency	MHz	Input register
100	30041	No Conversion - Signed Short	Total Fifo Size Of Second Records		Input register
100	30042	No Conversion - Signed Short	Total Fifo Size Of Minute Records		Input register
100	30043	No Conversion - Signed Short	Total Fifo Size Of Hour Records		Input register
100	30044	No Conversion - Signed Short	Total Fifo Size Of Day Records		Input register
100	30047	No Conversion - Signed Short	Number Of Active Major		Input register
100	30048	No Conversion - Signed Short	Number Of Active Minor		Input register
100	30049	No Conversion - Signed Short	Number Of Active Warning		Input register
100	30501	No Conversion - Signed Short	State		Input register
100	30502	No Conversion - Signed Short	Counter		Input register
100	30506	No Conversion - Signed Short	State		Input register
100	30507	No Conversion - Signed Short	Counter		Input register
91	30511	No Conversion - Signed Short	Power	kW	Input register
91	30512	Multiplied by 10	Voltage	V	Input register
91	30521	No Conversion - Signed Short	Power	kW	Input register
91	30522	Multiplied by 10	Voltage	V	Input register
91	30523	Multiplied by 10	Current	A	Input register
91	30531	No Conversion - Signed Short	Power	kW	Input register
91	30532	Multiplied by 10	Voltage	V	Input register
91	30533	Multiplied by 10	Current	A	Input register
31	30101	Multiplied by 10	Voltage	V	Input register
31	30102	Multiplied by 10	Current	A	Input register
31	30103	Divided By 100	Active Power	W	Input register
31	30104	Divided By 100	Apparent Power	VA	Input register
31	30105	Multiplied by 10	Frequency	Hz	Input register
31	30121	Multiplied by 10	Voltage	V	Input register
31	30122	Multiplied by 10	Current	A	Input register
31	30123	Divided By 100	Active Power	W	Input register
31	30124	Divided By 100	Apparent Power	VA	Input register
31	30125	Multiplied by 10	Frequency	Hz	Input register

31	30131	Divided By 100	Installed Active Power	W	Input register
31	30132	Divided By 100	Installed Apparent Power	VA	Input register
31	30133	Divided By 100	Available Active Power	W	Input register
31	30134	Divided By 100	Available Apparent Power	VA	Input register
31	30135	Multiplied by 100	Power Factor		Input register
31	30141	Multiplied by 10	Voltage	V	Input register
31	30142	Multiplied by 10	Current	A	Input register
31	30143	Divided By 100	Active Power	W	Input register
31	30144	Divided By 100	Apparent Power	VA	Input register
31	30145	Multiplied by 10	Frequency	Hz	Input register
31	30151	Divided By 100	Installed Active Power	W	Input register
31	30152	Divided By 100	Installed Apparent Power	VA	Input register
31	30153	Divided By 100	Available Active Power	W	Input register
31	30154	Divided By 100	Available Apparent Power	VA	Input register
31	30155	Multiplied by 100	Power Factor		Input register
31	30161	Multiplied by 10	Voltage	V	Input register
31	30162	Multiplied by 10	Current	A	Input register
31	30163	Divided By 100	Active Power	W	Input register
31	30164	Divided By 100	Apparent Power	VA	Input register
31	30165	Multiplied by 10	Frequency	Hz	Input register
31	30171	Divided By 100	Installed Active Power	W	Input register
31	30172	Divided By 100	Installed Apparent Power	VA	Input register
31	30173	Divided By 100	Available Active Power	W	Input register
31	30174	Divided By 100	Available Apparent Power	VA	Input register
31	30175	Multiplied by 100	Power Factor		Input register
31	30301	Multiplied by 10	Voltage	V	Input register
31	30303	Divided By 100	Active Power	W	Input register
31	30304	Divided By 100	Apparent Power	VA	Input register
31	30305	Multiplied by 10	Frequency	Hz	Input register
31	30306	No Conversion - Signed Short	Status		Input register
31	30321	Multiplied by 10	Voltage	V	Input register
31	30322	Multiplied by 10	Current	A	Input register
31	30323	Divided By 100	Active Power	W	Input register
31	30324	Divided By 100	Apparent Power	VA	Input register
31	30325	Multiplied by 10	Frequency	Hz	Input register
31	30331	Divided By 100	Installed Active Power	W	Input register
31	30332	Divided By 100	Installed Apparent Power	VA	Input register
31	30333	Divided By 100	Available Active Power	W	Input register
31	30334	Divided By 100	Available Apparent Power	VA	Input register
31	30341	Multiplied by 10	Voltage	V	Input register
31	30342	Multiplied by 10	Current	A	Input register

31	30343	Divided By 100	Active Power	W	Input register
31	30344	Divided By 100	Apparent Power	VA	Input register
31	30345	Multiplied by 10	Frequency	Hz	Input register
31	30351	Divided By 100	Installed Active Power	W	Input register
31	30352	Divided By 100	Installed Apparent Power	VA	Input register
31	30353	Divided By 100	Available Active Power	W	Input register
31	30354	Divided By 100	Available Apparent Power	VA	Input register
31	30361	Multiplied by 10	Voltage	V	Input register
31	30362	Multiplied by 10	Current	A	Input register
31	30363	Divided By 100	Active Power	W	Input register
31	30364	Divided By 100	Apparent Power	VA	Input register
31	30365	Multiplied by 10	Frequency	Hz	Input register
31	30371	Divided By 100	Installed Active Power	W	Input register
31	30372	Divided By 100	Installed Apparent Power	VA	Input register
31	30373	Divided By 100	Available Active Power	W	Input register
31	30374	Divided By 100	Available Apparent Power	VA	Input register
31	30501	Multiplied by 10	Voltage	V	Input register
31	30502	Multiplied by 10	Current	A	Input register
31	30503	Divided By 100	Power	W	Input register
1	30011	Multiplied by 10	Voltage	V	Input register
1	30012	Multiplied by 10	Current	A	Input register
1	30013	Divided By 100	Power	W	Input register
1	30014	Divided By 100	Available Power	W	Input register

5.2. Alarm Table

Device ID	Modbus Address	Modbus Id	Name	Register type function 01	Remarks
100	10010	10	Missing Devices	Input status	1=Active, 0=Inactive
100	10300	300	Weak Password Detected	Input status	1=Active, 0=Inactive
91	10510	510	Not connected to any equipment	Input status	1=Active, 0=Inactive
91	10520	520	Not connected to any equipment	Input status	1=Active, 0=Inactive
91	10530	530	Not connected to any equipment	Input status	1=Active, 0=Inactive
31	10002	2	Firmware Version	Input status	1=Active, 0=Inactive
31	10228	228	Main source lost	Input status	1=Active, 0=Inactive
31	10229	229	Secondary source lost	Input status	1=Active, 0=Inactive
31	10050	50	Communication Failure	Input status	1=Active, 0=Inactive
31	10112	112	OFF manual	Input status	1=Active, 0=Inactive
31	10200	200	Incorrect time configuration in T4S	Input status	1=Active, 0=Inactive
31	10233	233	Aux power supply fail	Input status	1=Active, 0=Inactive

31	10238	238	DigIn 3	Input status	1=Active, 0=Inactive
31	10239	239	DigIn 4	Input status	1=Active, 0=Inactive
31	10240	240	DigIn 5	Input status	1=Active, 0=Inactive
31	10241	241	DigIn 6	Input status	1=Active, 0=Inactive
31	10242	242	DigIn 7	Input status	1=Active, 0=Inactive
31	10243	243	DigIn 8	Input status	1=Active, 0=Inactive
31	10245	245	Log full	Input status	1=Active, 0=Inactive
31	10248	248	DigIn 1	Input status	1=Active, 0=Inactive
31	10249	249	DigIn 2	Input status	1=Active, 0=Inactive
31	10251	251	Missing SBP	Input status	1=Active, 0=Inactive
31	10253	253	SBP engaged	Input status	1=Active, 0=Inactive
31	10255	255	MBP procedure	Input status	1=Active, 0=Inactive
1	10149	149	Source- too low - stop	Input status	1=Active, 0=Inactive
1	10152	152	Source+ no voltage	Input status	1=Active, 0=Inactive