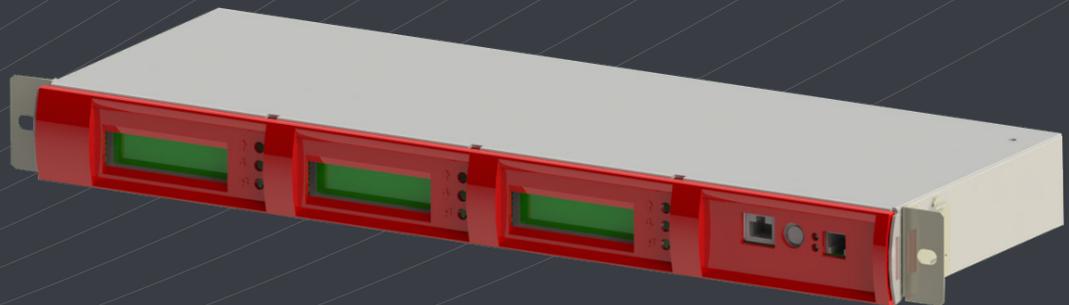


MONITORING - T1S/ T2S/ CANDIS

User Manual V1.2

BEYOND THE INVERTER
THE NEW GENERATION OF POWER CONVERTERS

- » **DUAL INPUT INVERTER**
Commercial Power as default source
- » **AC BACKUP IN A DC ENVIRONMENT**
Leverage your existing DC infrastructure
- » **ONE STOP SHOP**
Wide output power range
- » **HARSHEST AC INPUT CONDITIONS**
Without compromising the quality of the AC output



Important Safety Instructions
Save these Instructions

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Leading AC Backup Technology

Release Note:

Version	Release date (DD/MM/YYYY)	Modified page number	Modifications
1.0	08/08/2016	-	First release of the Manual.
1.1	18/04/2018	-	Added CS141.
1.2	07/02/2019	-	Updated digital input information.



Leading AC Backup Technology

CE+T Power at a glance

1. CE+T Power at a glance

CE+T Power designs, manufactures and markets a range of products for industrial operators with mission critical applications, who are not satisfied with existing AC backup systems performances, and related maintenance costs.

Our product is an innovative AC backup solution that unlike most used UPS's

- Maximizes the operator's applications uptime;
- Operates with lowest OPEX;
- Provides best protection to disturbances;
- Optimizes footprint.

Our systems are:

- Modular
- Truly redundant
- Highly efficient
- Maintenance free
- Battery friendly

CE+T power puts 60+ years expertise in power conversion together with worldwide presence to provide customized solutions and extended service 24/7 - 365

2. Abbreviations

TSI	Twin Sine Innovation
EPC	Enhanced Power Conversion
REG	Regular
DSP	Digital Signal Processor
AC	Alternating current
DC	Direct current
ESD	Electro Static Discharge
MET	Main Earth Terminal
MBP	Manual By-pass
TCP/IP	Transmission Control Protocol/Internet Protocol
USB	Universal Serial Bus
PE	Protective Earth (also called Main Protective Conductor)
N	Neutral
PCB	Printed Circuit Board
TRS	True Redundant Structure

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 should 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.
- This product is intended to be installed only in a restricted access area as defined by UL 60950 and in accordance with the National Electrical Code ANSI/NFPA 70, or equivalent local agencies.
- Maximum operating ambient temperature is 40°C (104°F).
- 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

Warranty and Safety Conditions

- **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 Inverter / 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

- The inverter System contains output over current protection in the form of circuit breakers. In addition to these circuit breakers, the user must observe the recommended UL listed upstream and downstream circuit breaker requirements as defined in this manual.
- UL listed (DIVQ) branch overcurrent protections have to be provided by others / by customer.
- Please use extreme caution when accessing circuits that may be at hazardous voltages or energy levels.
- The modular inverter 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.
- 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. Ground the enclosure to the electrode terminal.
- Remove output neutral-to-ground jumper when input AC MAINS is connected.
- 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 inverter must disconnect in 5 seconds maximum. The parameter can be adjusted on T2S; 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.
- The system is designed for installation within an IP20 or IP21 environment. When installed in a dusty or humid environment, appropriate measures (air filtering ...) must be taken.

3.3.1 Handling

- The cabinet shall not be lifted using lifting eyes.
- Remove weight from the cabinet by unplugging the inverters. Mark inverters clearly with shelf and position for correct rebuild. This is especially important in dual or three phase configurations.
- Empty inverter positions must not be left open. Replace with module or cover.

Warranty and Safety Conditions

3.3.2 Surge and transients

The mains (AC) supply of the modular inverter system shall be fitted with Lightning surge suppression 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 obey to precise technical rules. Distance to equipments 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 decline any liability in regard to damaged caused to equipments 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 modular inverter 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 on a system/unit make sure that AC input voltage and DC input voltage 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 when handling PCB's and open units.
- CE+T cannot be held responsible for disposal of the Inverter 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 - T1S

4.1 Introduction

The T1S is a basic monitoring unit for the TSI inverter range. By default it is provided with the NOVA, VEDA and MEDIA ranges. If the information or monitoring function are not enough this unit should be replaced by a T2S monitoring device (see following sections).

The T1S can monitor up to 32 inverters, provide Major and Minor free contacts with signaling. It is able to monitor one digital input.

Except the 2 settings available by T1S dipswitch, all other modification must be done through a T2S monitor (voltage, frequency...).

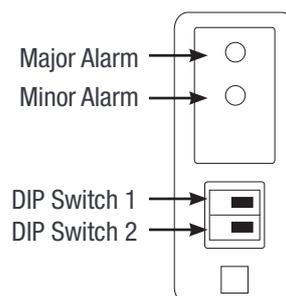
After setting the parameters using the T2S, start up the system, wait until the system comes to full operation, the T1S can now be re-plugged on the shelf and it will read all settings recorded into the inverter memory.

Modbus and Canbus are not available on T1S, If you need to connect to optional peripheral devices, the T1S must be replaced with a T2S.

4.2 Specifications

T1S monitoring	
Alarm contacts	2
	Major + Minor
Alarm lights	2
	Major + Minor
Digital Input	1
	NO or NC input contact
Communication	No
Add. Configuration	simple via dipswitch 1 and 2
	(1) Digital input polarity (NC or NO)
	(2) Redundancy (Yes present or No)
Log file	No
Extended monitor	Not available with this monitoring

4.3 Front view and description



4.4 Dipswitch configuration

Name	Description
DIP 1	<p>This dipswitch is used to configure the digital input detection.</p> <p>Right position for activation on close contact.</p> <p>Left position for activation if contacts became open</p>
DIP 2	<p>This dipswitch is used to configure redundancy. By default the dipswitch is in right position for redundancy equal to one inverter.</p> <p>If the system has more than one phase the redundancy is applied for all phases.</p> <p>On the left position there is no redundancy.</p>

4.5 Operations

4.5.1 Detection of the number of inverter modules in the system

Each powered inverter is recognized by the T1S.

When an inverter fails or is removed from the shelf the T1S gives an alarm.

If one or more inverters must be removed for any reason, the T1S must be unplugged and plugged back (in the live system) to reset the inverter recognition and cancel the alarms. Each new inverter will be automatically detected.

4.5.2 Alarms conditions

This basic monitoring unit can generate a few alarm listed in the table below

Number	Description	Type
1	Redundancy plus one inverter lost on one phase (*1)	MAJ
2	TSI Bus defect	MAJ
3	Incompatibility parameter	MAJ
4	Main source lost (see configuration done by T2S)	MAJ
5	At least one digital input activated (*2)	MAJ
6	Redundancy lost	MIN
7	Secondary source lost	MIN
8	At least one inverter in alarm	MIN

(*1): The redundancy is fixed by dipswitch and can be 0 or 1

(*2): The detection depends on the configuration of dipswitch 1.

The priority source must be defined through a T2S monitoring unit. By default this is the commercial AC.

4.5.3 Alarm contact

The LED are activated immediately when an event occurs, and the relays are delayed by 60 seconds for major alarms and by 30 seconds for minor alarms.

5. Monitoring - T2S

5.1 Introduction

The T2S is an extended monitoring unit for the TSI inverter range. By default it is provided with all BRAVO solution.

For NOVA, VEDA, MEDIA PACK designs, the inverters are by default monitored through basic T1S (see T1S section for more information). In option, these Packs can be monitored by T2S.

The T2S can monitor up to 32 inverters, provide Major, Minor Alarm and one user selectable free contact with signaling. It is able to monitor 2 digital inputs.

When several shelves are used, the T2S will be usually installed in the most upper shelf, but bare in mind that the free potential contact, the digital MODBUS and CanBus will be ONLY available on the same shelf that the one where T2S is plugged. We remind you that only one T2S is required for monitoring one system (Maximum 32 inverters).

To summarize, T2S have been designed in order to:

- Monitor TSI inverters
- Give visual alarms
- Provide free potential alarm contact
- Deliver status through laptop and HyperTerminal®
- Supply communication on MODBUS and CANBUS protocols
- Send configuration to TSI inverter
- Receive configuration from TSI inverter on PC
- Monitor 2 digital inputs
- Record up to 200 events
- Generate alarm “check log file” if any abnormal events appears
- Order a server shutdown

T2S part numbers are the following in relation with different types of shelves:

A) T2S Monitor

TSI-T2S-VEDA / NOVA Protocol RS232	T312010000
TSI-T2S-VEDA / NOVA Protocol RS485	T312030485
TSI-T2S-CANOPEN - NOVA - VEDA	T312010050
TSI-T2S-BRAVO / MEDIA 24/48 VDC Protocol RS232	T322010000
TSI-T2S-BRAVO / MEDIA 24/48 VDC Protocol RS485	T322030485
TSI-T2S-BRAVO / MEDIA 24/48 VDC (CAN OPEN)	T322010050
TSI-T2S-BRAVO 2C 60/110/220 VDC RS232	T322050000
TSI-T2S-Bravo - 2C - RS485	T322050485
TSI-T2S-Bravo - 2C - CANOPEN	T322050050

B) Filler (Closing part to fill up empty slot)

TSI-T1S T2S -NOVA VEDA FILLER	T312010001
TSI-T2S-MEDIA FILLER (Dummy Box)	T332010001
TSI-T2S-BRAVO FILLER (Red Plastic Front)	T322010001

Please check that the operating manual version you are reading is corresponding to TSI version running in your installation.

5.1.1 Visual Information

The T2S monitor allows technicians to visually control when alarms are present on the system by watching the front panel.

LED are green for no alarm and are red for related alarms.

It is known that there is Major alarm or Minor alarm or User selectable alarm present when corresponding LED are red.

User Selectable Alarm (refers to section 6.9.5, page 26 for configuration.) can be associated with any internal operating alarm.

The LED user selectable alarm is green when the condition is met or flashing when T2S is exchanging Data with TSI inverter EEPROM.



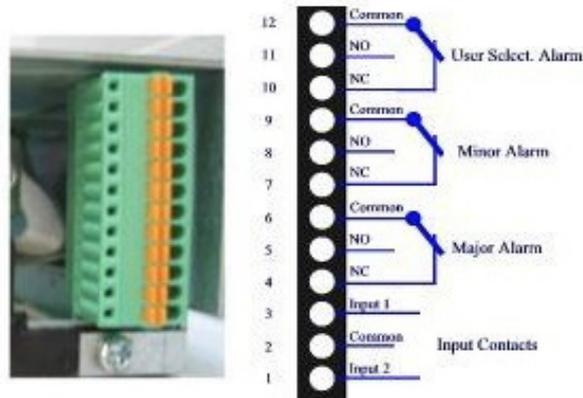
6. T1S and T2S Characteristics

6.1 T1S and T2S Electrical characteristics

T1S and T2S system are equipped with relays outputs for remote alarms:

- Major Alarm (contact 5-6 closed when No alarm)
- Minor Alarm (contact 8-9 closed when No alarm)
- User selectable Alarm (Applicable only on T2S)

Those alarms are available on the main shelf. They are reported on the front through the T1S.



User Selectable Alarm is available only in T2S

T1S - One Digital Input
T2S - Two Digital Inputs

All alarms are qualified in Minor alarm except the one configurable by T2S. These configurable alarms are identified by the ID601 to 900. Refer to list of factory settings (see 6.9.5, page 26)

The above picture shows the back of shelf itself.

If the T2S is included in one complete system including for example Termination box or some customers packages, the terminal will be located somewhere else. (See User Manual or System Manual)

There are 3 free potential changeover contacts provided. The terminal connectors accept maximum wire size of 0.5 mm²

Maximum wire size is 0.5 mm²

NB: relays are energized while idle (i.e. relays dé-energized when event occur).

6.1.1 T1S and T2S Digital Input

T2S equipped with two digital inputs and T1S equipped with only one Digital input.

Two external input contacts can be monitored. They can be used for rack alarms such as “Door Opening”, “Temperature too high”, “Fan status”.

The voltage present on terminal 1 and 3 is +5V (no galvanically insulated). Care should be taken to avoid connecting any external voltage on terminal 1 to 3.

External signals should be applied to these terminals via Volt-free contacts.

The function is activated when the 2 terminals concerned are short-circuited (i.e. when the external Volt-free contact is closed).

T1S and T2S Characteristics

6.1.2 Digital Output

MAJOR, MINOR, and User Select (T2S Only) provide an open or close free potential contact

Relay characteristics:

- Maximum switching capacity: 2A @ 30VDC or 1A @ 60VDC
- Maximum switching power: 60W
- Maximum voltage: 60VDC SELV (For higher voltage, it is mandatory to install an additional relay with appropriate characteristics – especially for 60/110/220 VDC).
- Maximum switching current: 2A

6.2 Troubleshooting

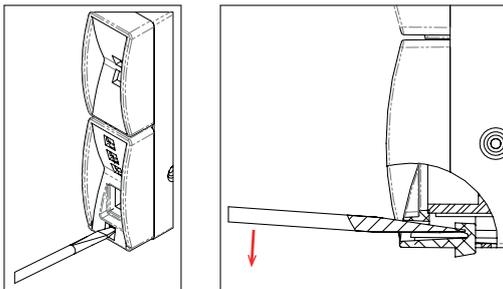
The trouble shooting of the system must be done by the T2S monitoring Unit (see related section).

A T1S with a software version below v1.5 will give a “Grid Failure” alarm if monitoring inverters working in REG Mode (see Inverter manual for REG Mode explanations).

6.3 T1S/T2S Removing and Inserting

6.3.1 6.3.1 Removing

- Use a small screw driver to release the latch keeping the T1S/T2S in position.
- Take care when inserting screw driver in T1S/T2S. If tip is not well engaged, there is a chance to damage dip switches.
- Pull the T1S/T2S Controller out.



6.3.2 Inserting

- Push the T1S/T2S Controller firmly in place until the latch snaps in position.

6.4 Monitoring by CANBUS & CANOPEN

CanBus protocol is available on the “User Bus” port located on the back of shelf. For pin out information and conversion table, See annex “MODBUS protocol for T2S.

The CANBUS protocol is used to supply an optional CanDis display.

- Available since software version 2.3 on T2S.

CANOPEN protocol is only available with a dedicated software on the “User Bus” port located on the back of shelf. It is developed for specific applications, and must be adapted for each new controller.

The software must be x.x1 in order to offer the CANOPEN (CAN OPEN reference is shown by the last software version digit i.e. 2.71).

When T2S is configured for CANOPEN, USB port and Display are no more used. The front USB access must be masked. MODBUS and TCPIP remain operational.

All settings and monitoring will be done by the CANOPEN protocol.

6.5 Monitoring by MODBUS

The Modbus protocol is available on the “User Bus” port located on the back of shelf. For pin out information and conversion table See annex “MODBUS protocol for T2S.

- Available since software version 2.0 on T2S. Since January 2011, the TS2 is ordered with protocol RS232 or RS485. By default, without another specification, RS232 is supplied.

6.6 Install a new T1S and T2S Monitoring in the system

When one system is working with a T2S, the current customer configuration is saved both in the inverters and in the T2S.

If the system is powered, follow the procedure in section 6.6.1, page 16, if system is not powered follow the procedure in section 6.6.2, page 17.

CAUTION

When a new configuration is send to the T2S, the process can take 30 minutes to be completed.

If the T2S is removed or inverters are switched off before completion of the upload process, the new configuration will not be taken in consideration at all.

6.6.1 If system powered

Replacement of a T2S plugged in one running system (running means that the system is still fed by either the DC supply or the AC mains; the output can be either OFF or ON)

Procedure:

- Remove the old T2S from the system.
- Insert the new T2S.
- The new T2S will take the configuration from the inverters.
- Exchange data can take 5 to 30 minutes depending on data to be exchanged.

T1S and T2S Characteristics

6.6.2 If system not powered

When a new T2S monitoring unit is inserted in a non running system, it will not contain the correct configuration as this is stored in the old T2S and in the inverters. So if you start the system at this point, it is the configuration of the new T2S that will be uploaded to the inverters, hence replacing the correct one.

To avoid this, apply the following rules.

In this situation all LED's are OFF

Procedure:

- Remove the old T2S from the system,
- Start the system without T2S,
- After about one minute, the 3 status LED's ON INVERTERS will be blinking an orange colour, meaning the system has no T2S.
- Insert the new T2S,
- The new T2S will take the configuration from the inverters. Exchange data can take 5 to 30 minutes depending on data to be exchanged.
- After this period, the exchanged data will read the configuration in T2S and control whether all parameters are correct.

N.B.:

When T2S is exchanging data, DO NOT CHANGE or ADD new inverters.

If T2S and INVERTERS have to be changed:

- FIRST change the T2S (according to the procedure)
- Then (when T2S is running) change the inverters.

6.7 PASSWORD in T2S Monitoring

NOTE: The password procedure (see section 6.9.2, page 22) must be repeated when a new T2S is installed in system.

6.8 Hardware configuration for CAN protocol

6.8.1 T2S running with CanDis DISPLAY

That unit doesn't need any hardware modification. See section 6.4, page 16 for software information.

6.8.2 T2S running with CANOPEN

Since a CAN bus must be terminated at both ends by a 120-ohm resistor placed across CAN_H and CAN_L so that reflections of signals are avoided, the T2S must be factory adapted. Please contact your Sales Representative.

T1S and T2S Characteristics

6.9 Inverter System Configuration

The T2S together with a laptop must be used for configuring the TSI system and for advanced diagnostic.

Three important tasks can be performed:

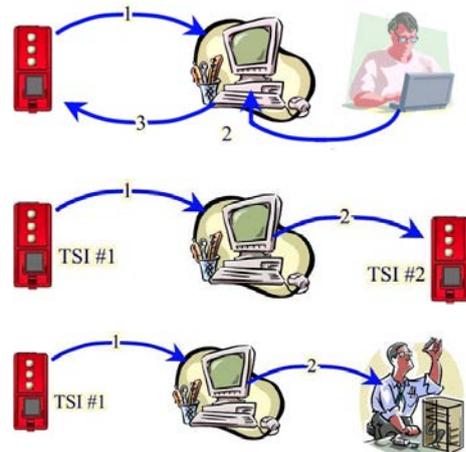
- Changing the system configuration

Project Engineer customizes the TSI system Configuration file.

Application Engineer check configuration and transfers the file to the T2S

- Copy-paste the system configuration from one system to another

- Viewing internal parameters status for system evaluation and diagnostic



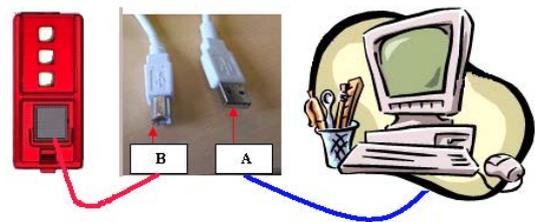
The TSI is delivered with factory settings.

Unless specific ordering defaults, the setting of parameters is in accordance with the configuration (Pack or Cabinet System). When T2S is integrated in “A la Carte” system, Default values of parameters are listed on “LIST OF FACTORY SETTING” (see 6.9.5, page 26)

On site changes can be achieved through laptop.

You need:

- PC running Windows 2000, Windows XP, Windows Seven or VISTA
- Equipped with “HyperTerminal®” software and having one USB port available. If your platform is Windows Seven or Vista, it should be provide without Hyper terminal embedded. On our portal (see following point 4) you may download the complete package for these OS.



Compatibility:

	Hyper terminal	Driver
Windows XP	Already equipped on laptop	CET_T2S.inf (provide by CE+T)
Windows Vista 32 bit	We can provide htpe63 to be install on laptop	CET_T2S.inf (provide by CE+T)
Windows Vista 64 bit	We can provide htpe63 to be install on laptop	ST Microelectronics (provide with OS)
Windows Seven 32 bit	We can provide htpe63 to be install on laptop	CET_T2S.inf (provide by CE+T)
Windows Seven 64 bit	We can provide htpe63 to be install on laptop	ST Microelectronics (provide with OS)

- USB cable type “A to B” as shown here

Use preferably a cable with noise suppressor (ferrite nut). It prevents some communication bugs due to poor immunity of USB protocol

- Complete package for XP; Seven; Vista including driver, hyperterminal and procedure to be downloaded from our portal. Portal address: <http://my.cet-power.com> and click *Documents > Download SOFT*.

T1S and T2S Characteristics

Note: Start the TSI system without any cable connected to the front connection of the T2S

Wait for the T2S to be completely.

The two LED's in the upper part are lighting.

Connect the USB cable to the laptop and to the T2S.



USB Cable

The laptop shall find automatically the newly connected device and shall prompt for the driver. Follow displayed instructions to indicate the right path where the file "CET_T2S.inf" has been actually installed.

As soon as the T2S is recognized it is logged into your computer as new COM port.

It's name is "COMx" where "x" is automatically allocated by the laptop.

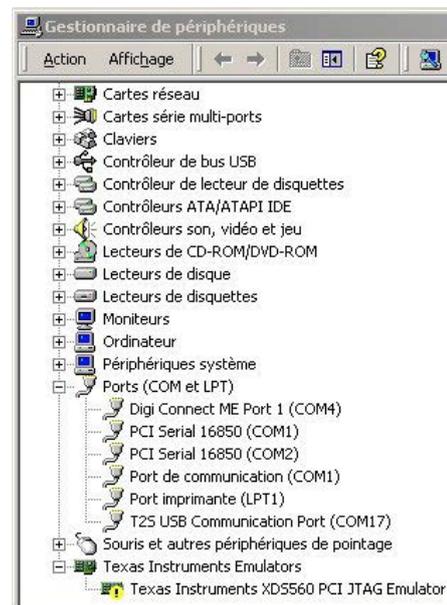
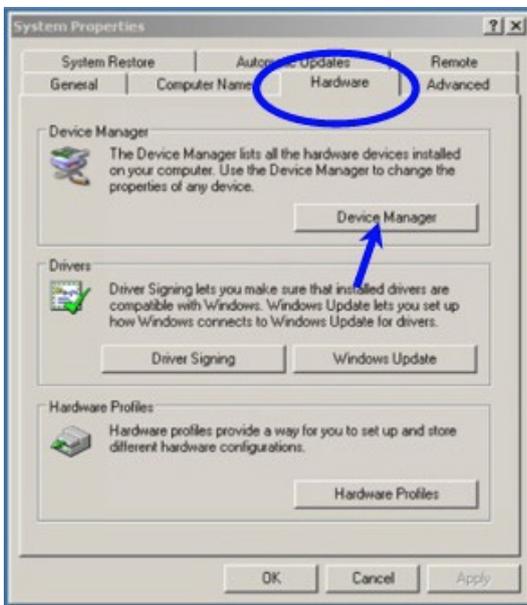
If you have some doubt what COM port has been allocated to your T2S, open your "Control Panel"

[Start – Settings – Control Panel].

Select « System » « Hardware » - « Device Manager »:

Find out « T2S USB Communication Port » in the directory « Ports (COM et LPT) »

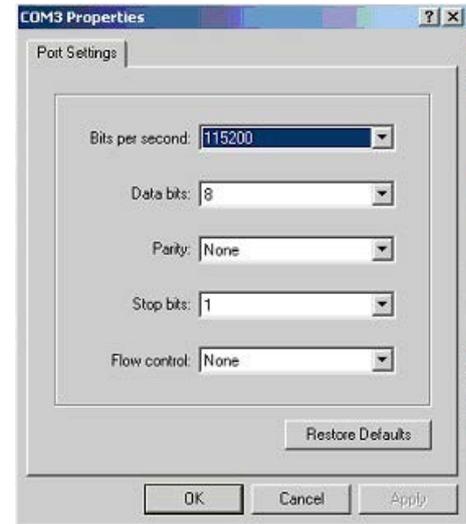
The COM port that has been allocated is clearly indicated.



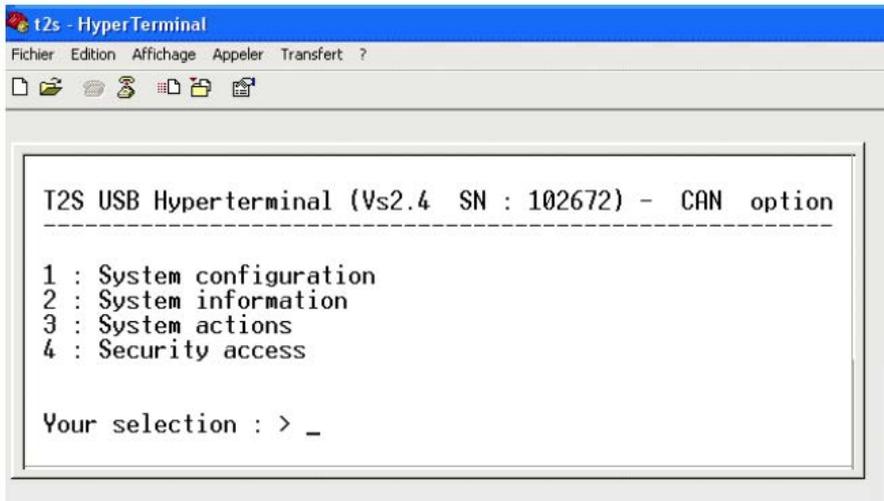
T1S and T2S Characteristics

Open “HyperTerminal®” from your Microsoft Windows Application and configure “COMx” as shown hereby.

Baudrate: 115200
Databits: 8
Parity: No
Stop Bit: 1
Flow Control: No



Such screen should appear (when the T2S Menus are not yet protected).



The software version of the T2S as well as its serial number is displayed on this screen.

You are ready to configure and/or to maintain your TSI system.

The menu tree is shown in following page:

6.9.1 Root Menu

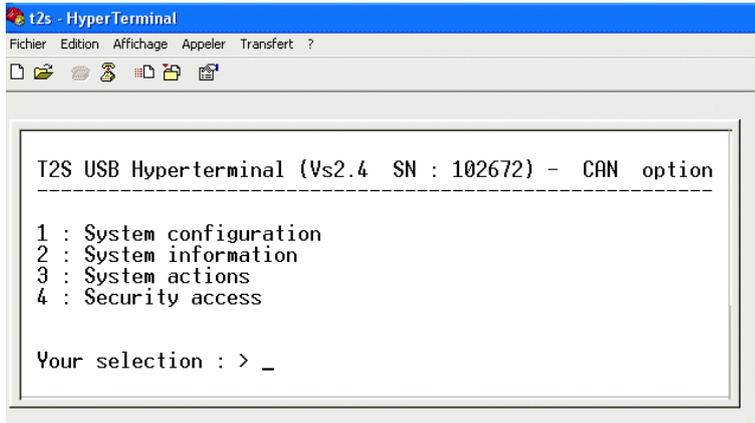
Root Menu

- 1 > System configuration
 - 0 > Return to previous menu
 - 1 > Send config file to T2S
 - 2 > Read config file from T2S
 - 3 > Restore default settings (not available since version 2.5)
 - 4 > Restore factory settings (not available since version 2.5)
- 2 > System information selection
 - 0 > Return to previous menu
 - 1 > Module information's
 - 0 > Return to previous menu
 - 1 > Variables set 1
 - 2 > Variables set 2
 - 3 > Variables set 3
 - 4 > Variables set 4
 - + > Next page
 - > Previous page
 - 2 > Phase information
 - 0 > Return to previous menu
 - 1 > Variables set 1
 - 2 > Variables set 2
 - 3 > Variables set 3
 - 3 > Groups information
 - 0 > Return to previous menu
 - 1 > Display AC group information
 - 2 > Display DC group information
 - 4 > Alarms information
 - 0 > Return to previous menu
 - 1-1 > Page selection
 - 5 > History of the log display
 - 0 > Return to previous menu
 - 1-14 > Page number selection
 - 16 > Clear log
 - 17 > Save log to a file
 - 6 > Module errors information
 - 0 > Return to preceding menu
 - 1-32 > detailed Modules errors
- 3 > System actions selection
 - 0 > Return to previous menu
 - 1 > System actions
 - 0 > Return to index
 - 1 > Turn ON system
 - 2 > Turn OFF system
 - 3 > Change Date and time setting
 - 2 > Inverter Module action
 - 0 > Return to previous menu
 - 1-4 > Page number selection
 - 5 > Identify selected Module
 - 6 > Turn ON selected Module
 - 7 > Turn OFF selected Module
 - 8 > Change address of sel. Module
 - 9 > Change phase of selected Module
 - 10 > Automatic address assignment
 - 11 > Change DC group of selected Module
 - 12 > Change AC group of sel. Module
 - 13 > Notify changed fan of sel. Module
 - + > Increment selector
 - > Decrement selector
 - 3 > T2S actions
 - 0 > Return to index
 - 1 > Force refresh of configuration texts and constants
 - 2 > Force refresh of events description texts
- 4 > Security Access
 - 0 > Return to index
 - 1 > Enable Password protection

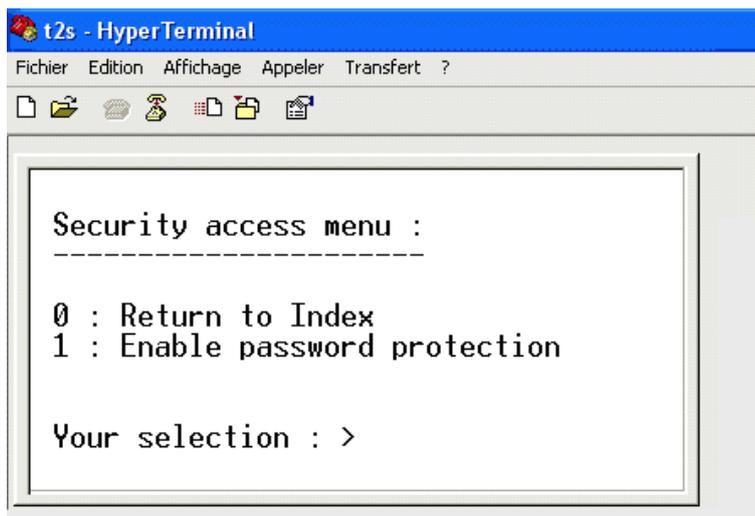
T1S and T2S Characteristics

6.9.2 Security Access (Protected Menus)

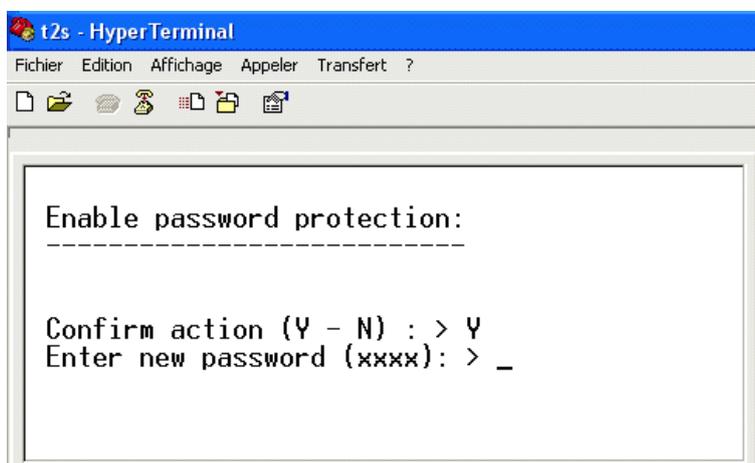
To secure access to Menu of T2S, use HyperTerminal as explained before. Available since SW 2.4 version



1. Select (4) as « Security Access » Menu



2. After, select (1) on Security access menu



3. Type “Y” for introducing your Password

4. Type your Password

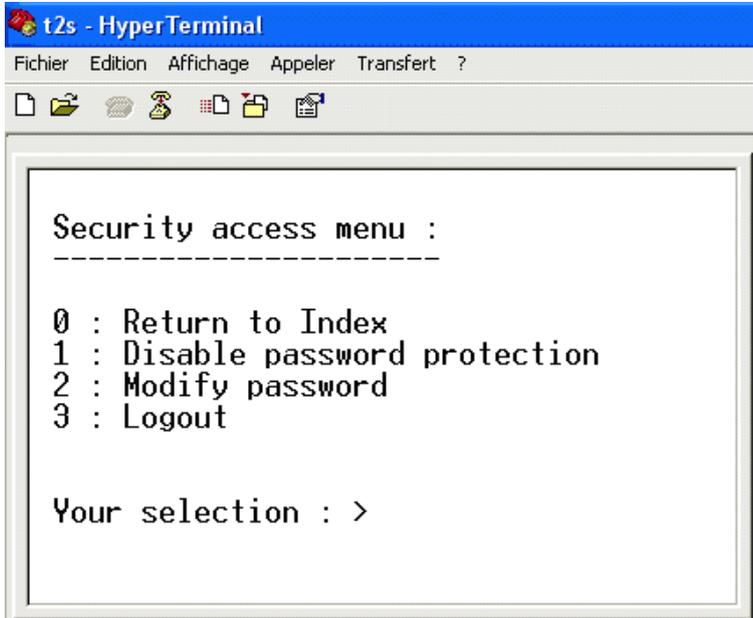
5. The password must be confirmed.

6. After validation of the password, a new menu is shown

**Password must contains FOUR FIGURES
(Only figures, No signs, No letters)**

Example : “1234”

T1S and T2S Characteristics



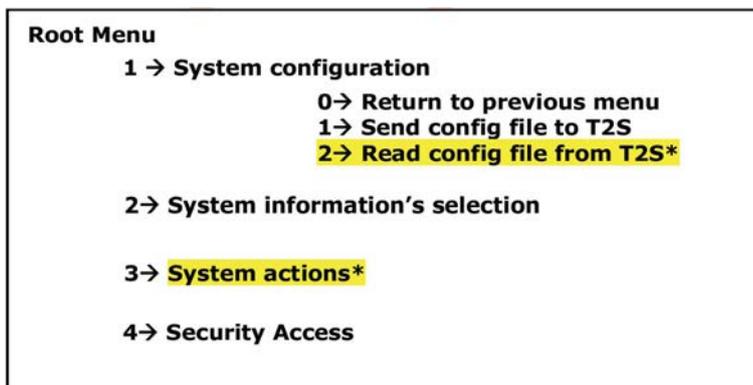
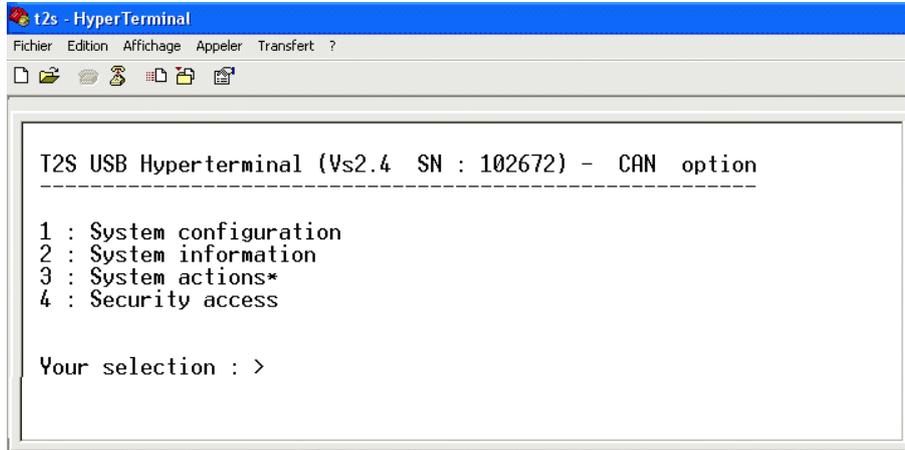
On this Menu, type “0” to return to « Root Menu » There, every menu are accessible and menu protection is not validated.

On this Menu, “1” is used to remove the secured option.

Type “2” for changing the password.

With “3”, the secured option is activated, and some menus will show the sign “*”.

Menu having the sign « * » are no more accessible without password.



The menu tree with protected menus is the following:

In the Menu 1, it is only possible to send a configuration file to T2S monitor

The Menu 2 and the Menu 4 are totally open

The Menu 3 is totally protected

Choosing a protected menu leads to message “This action is locked ! “

T1S and T2S Characteristics

```

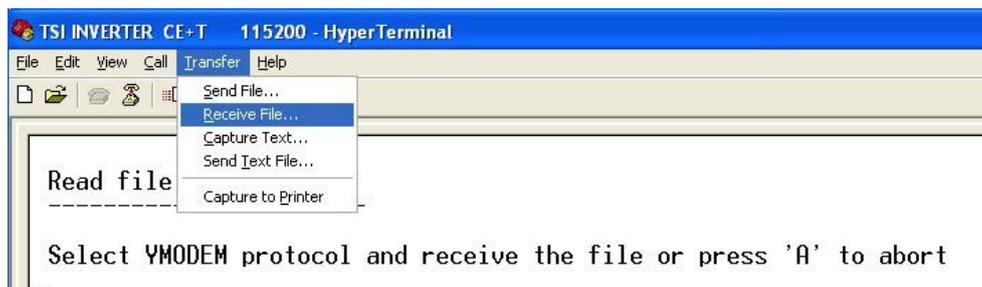
T2S USB Hyperterminal (Vs2.4 SN : 102646) - CAN option
-----
1 : System configuration
2 : System information
3 : System actions*
4 : Security access

Your selection : > 3
--> This action is locked !
  
```

Note: it is not possible to choose which menus are protected or which menus are free.

6.9.3 Receive configuration from T2S

Select (1) in root menu « System configuration » Menu, then Select (2) « Read Configuration file from T2S » the T2S prompts for downloading. Click “Transfer” and then “Receive File”



Following screen pops up



Use « Browse » button to select directory where you want to save the configuration file.

Select “Ymodem” from drop down list.

Press “Receive” to start downloading.

The file is named « T2S_config_file_hh_mm_ss__dd_MM_yyyy.txt »

Where « hh :mm :ss dd/MM/yyyy » stands for date and time.

If the transfer have been done successfully the next message appear “Successfully uploaded”

T1S and T2S Characteristics

If you want to copy-paste this configuration to another system, go directly to section 6.9.8.5, page 41.

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6.9.4 Changing the Configuration

The configuration file can be splitted in two parts:

- Operating parameters (thresholds, number of modules, redundancy, ...)
- System parameters (modules addresses, phases, group ...)

The change of the TSI operating parameters cannot be achieved inside the T2S but on the laptop. The section hereafter describes the procedure for changing these parameters. Refer to section 6.9.7, page 34 for changing the system parameters.

The file that has been downloaded (see previous section) can be changed with any kind of text editor or notepad. After completion the new file is uploaded to the T2S (see section 6.9.6, page 33)

```

|DCFG_HDR|
-----
- ID: - - VAR DESCRIPTION - - VALUE - - UNIT -
-----
1 2 3 4
-----
- Global settings (ID : 1 - 50)
-----
;1; ;Number of module in phase 1; ;6; ;
;2; ;Number of module in phase 2; ;0; ;
;3; ;Number of module in phase 3; ;0; ;
;4; ;Number of module in phase 4; ;0; ;
;5; ;Number of module in phase 5; ;0; ;
;6; ;Number of module in phase 6; ;0; ;
;7; ;Number of module in phase 7; ;0; ;
;8; ;Number of module in phase 8; ;0; ;

;21; ;Amount of redundancy in phase 1; ;1; ;
;22; ;Amount of redundancy in phase 2; ;0; ;
;23; ;Amount of redundancy in phase 3; ;0; ;
;24; ;Amount of redundancy in phase 4; ;0; ;
;25; ;Amount of redundancy in phase 5; ;0; ;
;26; ;Amount of redundancy in phase 6; ;0; ;
;27; ;Amount of redundancy in phase 7; ;0; ;
;28; ;Amount of redundancy in phase 8; ;0; ;

;40; ;Number of DC input groups; ;1; ;
;41; ;Number of AC input groups; ;1; ;

-----
- Inverter parameters (ID : 51 - 550)
-----
;60; ;Input source (AC : 0, DC : 100); ;0; ;%;
;61; ;ACin Mode (0 : normal, 1 : Safe); ;0; ;
;62; ;walk-in Mode (0 : NO, 1 : YES); ;0; ;

;70; ;Number of phases ; ;1; ;
;71; ;Mode (0 : star, 1 : triangle) ; ;0; ;

;75; ;Free running Frequency ; ;50.0; ;Hz;
;80; ;Short circuit voltage threshold ; ;80; ;V;
;81; ;Short circuit hold time ; ;60.0; ;s;
;82; ;Booster delay (0 : OFF, 1 : ON) ; ;1; ;
" " " "
" " " "
;904; ;Inputs polarity (0:SC-1:open); ;0; ;

-----
- ModBus Settings (ID : 951 - 1000)
-----
;951; ;T2S Modbus slave address (1-247); ;1; ;
;955; ;Modbus write password; ;Modbus_T2S; ;

```

T1S and T2S Characteristics

1: The content of the first column is used as an identifier for the parameter. It can never be changed.

2: The second column is a parameter description. It is just skipped by the T2S compiler. It should not be changed but any modification has no consequences.

3: The field of the third column is the parameter value. It can be changed. Decimal digits are separated by a dot. If the comma is used or any other character is used . Digits to the right of the comma will be ignored.

4: The field of the last column is the unit. It is ignored by the T2S compiler.

Remark:

Semicolons (sign “ ; ”) are separators. They must stay in place.

After any change, you can save the configuration file for backup

6.9.5 List of factory settings (Default Values)

These settings are only available when the TS2 is ordered for spare parts, or when you apply a default configuration.

ID	TEXTUAL DESCRIPTION	Values			
		Min	Default	Max	UNIT
Global Settings (ID : 1 - 50)					
1	Number of modules configured in phase 1	0	1	32	
2	Number of modules configured in phase 2	0	0	32	
3	Number of modules configured in phase 3	0	0	32	
4	Number of modules configured in phase 4	0	0	32	
5	Number of modules configured in phase 5	0	0	32	
6	Number of modules configured in phase 6	0	0	32	
7	Number of modules configured in phase 7	0	0	32	
8	Number of modules configured in phase 8	0	0	32	
21	Amount of redundancy in phase 1	0	0	n-1	
22	Amount of redundancy in phase 2	0	0	n-1	
23	Amount of redundancy in phase 3	0	0	n-1	
24	Amount of redundancy in phase 4	0	0	n-1	
25	Amount of redundancy in phase 5	0	0	n-1	
26	Amount of redundancy in phase 6	0	0	n-1	
27	Amount of redundancy in phase 7	0	0	n-1	
28	Amount of redundancy in phase 8	0	0	n-1	
40	Number of DC input groups	1	1	8	
41	Number of AC input groups	1	1	4	
43	Partial load on DC;	0	100	100	%
44	Disable AC Group 4 Alarm(No: 0 ; Yes : 1)	0	0	1	

T1S and T2S Characteristics

Inverter parameters (ID : 51 - 550)					
AC common setting (ID : 51 - 100)					
60	Input Source (AC : 0, DC :100)	0	0	100	%
61	Acin Mode (0 : normal , 1 : safe)	0	0	1	
62	Walk-in Mode (0 : No ; 600 : progressive)	0	0	600	Sec
70	Number of phase	0	1	8	
71	Mode (0 : Star ; 1 : Delta)	0	0	1	
75	Free running Frequency	50	50	60	Hz
80	Short circuit output voltage threshold	20	80	200	V
81	Short circuit hold time	0.1	60	600	Sec
82	Booster 10x lin (0 : OFF, 1 : ON)	0	1	1	
90	Max current (pc of nominal curr)	30	150	150	%
91	Max power (pc of nominal power)	30	150	150	%
92	Max overload duration	0	15	15	s
93	Airco Mode (0:No , 1 Yes)	0	0	1	
94	Pdc Max (0 : Function Disabled)	0	0	2000	W
100	Synchronization Tracking Speed	-2	0	2	
101	Remote OFF disable Acin Power	0	0	1	
102	Negative Power (0 : OFF , 1 ON)	0	1	1	
103	External clock (0 : OFF , 1 ON)	0	0	1	
104	Starting Without T2S (0 : No , 1 : Yes)	0	0	1	
AC Output (ID : 101 - 259)					
160	OUT 1 : phase shift	-180	0	360	Deg
161	OUT 1 : Nominal output voltage	200	230	240	V
170	OUT 2 : phase shift	-180	0	360	Deg
171	OUT 2 : Nominal output voltage	200	230	240	V
180	OUT 3 : phase shift	-180	0	360	Deg
181	OUT 3 : Nominal output voltage	200	230	240	V
190	OUT 4 : phase shift	-180	0	360	Deg
191	OUT 4 : Nominal output voltage	200	230	240	V
200	OUT 5 : phase shift	-180	0	360	Deg
201	OUT 5 : Nominal output voltage	200	230	240	V
210	OUT 6 : phase shift	-180	0	360	Deg
211	OUT 6 : Nominal output voltage	200	230	240	V
220	OUT 7 : phase shift	-180	0	360	Deg
221	OUT 7 : Nominal output voltage	200	230	240	V
230	OUT 8 : phase shift	-180	0	360	Deg
231	OUT 8 : Nominal output voltage	200	230	240	V

T1S and T2S Characteristics

ID	TEXTUAL DESCRIPTION	Values			
		Min	Default	Max	UNIT
DC Input Related (ID : 260 – 369)					
260	DC 1 : vdc_in Low Start	39	44	62	V
261	DC 1 : vdc_in Low Transfer	39	39	62	V
262	DC 1 : vdc_in Low Stop	39	39	62	V
263	DC 1 : vdc_in High Start	39	58	62	V
264	DC 1 : vdc_in High Transfer	39	61	62	V
265	DC 1 : vdc_in High Stop	39	61	62	V
270	DC 2 : vdc_in Low Start	39	44	62	V
271	DC 2 : vdc_in Low Transfer	39	39	62	V
272	DC 2 : vdc_in Low Stop	39	39	62	V
273	DC 2 : vdc_in High Start	39	58	62	V
274	DC 2 : vdc_in High Transfer	39	61	62	V
275	DC 2 : vdc_in High Stop	39	61	62	V
280	DC 3 : vdc_in Low Start	39	44	62	V
281	DC 3 : vdc_in Low Transfer	39	39	62	V
282	DC 3 : vdc_in Low Stop	39	39	62	V
283	DC 3 : vdc_in High Start	39	58	62	V
284	DC 3 : vdc_in High Transfer	39	61	62	V
285	DC 3 : vdc_in High Stop	39	61	62	V
290	DC 4 : vdc_in Low Start	39	44	62	V
291	DC 4 : vdc_in Low Transfer	39	39	62	V
292	DC 4 : vdc_in Low Stop	39	39	62	V
293	DC 4 : vdc_in High Start	39	58	62	V
294	DC 4 : vdc_in High Transfer	39	61	62	V
295	DC 4 : vdc_in High Stop	39	61	62	V
300	DC 5 : vdc_in Low Start	39	44	62	V
301	DC 5 : vdc_in Low Transfer	39	39	62	V
302	DC 5 : vdc_in Low Stop	39	39	62	V
303	DC 5 : vdc_in High Start	39	58	62	V
304	DC 5 : vdc_in High Transfer	39	61	62	V
305	DC 5 : vdc_in High Stop	39	61	62	V
310	DC 6 : vdc_in Low Start	39	44	62	V
311	DC 6 : vdc_in Low Transfer	39	39	62	V
312	DC 6 : vdc_in Low Stop	39	39	62	V

T1S and T2S Characteristics

313	DC 6 : vdc_in High Start	39	58	62	V
314	DC 6 : vdc_in High Transfer	39	61	62	V
315	DC 6 : vdc_in High Stop	39	61	62	V
320	DC 7 : vdc_in Low Start	39	44	62	V
321	DC 7 : vdc_in Low Transfer	39	39	62	V
322	DC 7 : vdc_in Low Stop	39	39	62	V
323	DC 7 : vdc_in High Start	39	58	62	V
324	DC 7 : vdc_in High Transfer	39	61	62	V
325	DC 7 : vdc_in High Stop	39	61	62	V
330	DC 8 : vdc_in Low Start	39	44	62	V
331	DC 8 : vdc_in Low Transfer	39	39	62	V
332	DC 8 : vdc_in Low Stop	39	39	62	V
333	DC 8 : vdc_in High Start	39	58	62	V
334	DC 8 : vdc_in High Transfer	39	61	62	V
335	DC 8 : vdc_in High Stop	39	61	62	V

For DC voltage 24VDC, 60VDC, 110VDC and 220VDC parameters are 260-265 for DC1, 270-275 for DC2, 280-285 for DC3, 290-295 for DC4, 300-305 for DC5, 310-315 for DC6, 320-325 for DC7, and 330-335 for DC8. Refer the following table:

ID	TEXTUAL DESCRIPTION	Values												UNIT
		24 VDC			60 VDC			110 VDC			220 VDC			
		Min	Default	Max	Min	Default	Max	Min	Default	Max	Min	Default	Max	
DC Input Related (ID : 260 – 369)														
260	DC 1 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
261	DC 1 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
262	DC 1 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
263	DC 1 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
264	DC 1 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
265	DC 1 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
270	DC 2 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
271	DC 2 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
272	DC 2 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
273	DC 2 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
274	DC 2 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
275	DC 2 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
280	DC 3 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
281	DC 3 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
282	DC 3 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V

T1S and T2S Characteristics

ID	TEXTUAL DESCRIPTION	Values												UNIT
		24 VDC			60 VDC			110 VDC			220 VDC			
		Min	Default	Max	Min	Default	Max	Min	Default	Max	Min	Default	Max	
283	DC 3 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
284	DC 3 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
285	DC 3 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
290	DC 4 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
291	DC 4 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
292	DC 4 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
293	DC 4 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
294	DC 4 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
295	DC 4 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
300	DC 5 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
301	DC 5 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
302	DC 5 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
303	DC 5 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
304	DC 5 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
305	DC 5 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
310	DC 6 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
311	DC 6 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
312	DC 6 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
313	DC 6 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
314	DC 6 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
315	DC 6 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
320	DC 7 : vdc_in Low Start	18.5	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
321	DC 7 : vdc_in Low Transfer	18.5	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
322	DC 7 : vdc_in Low Stop	18.5	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
323	DC 7 : vdc_in High Start	18.5	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
324	DC 7 : vdc_in High Transfer	18.5	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
325	DC 7 : vdc_in High Stop	18.5	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V
330	DC 8 : vdc_in Low Start	39	23.0	36	48	56.0	75	89	100.0	176	165	185.0	303	V
331	DC 8 : vdc_in Low Transfer	39	19.5	36	48	50.0	75	89	92.0	176	165	169.0	303	V
332	DC 8 : vdc_in Low Stop	39	19.0	36	48	49.0	75	89	90.0	176	165	165.0	303	V
333	DC 8 : vdc_in High Start	39	31.0	36	48	71.0	75	89	150.0	176	165	280.0	303	V
334	DC 8 : vdc_in High Transfer	39	34.5	36	48	74.0	75	89	158.0	176	165	296.0	303	V
335	DC 8 : vdc_in High Stop	39	35.0	36	48	75.0	75	89	160.0	176	165	300.0	303	V

T1S and T2S Characteristics

ID	TEXTUAL DESCRIPTION	Values			
		Min	Default	Max	UNIT
AC Input Related (ID : 370 – 550)					
370	AC : Fac_in Low Start	47	47.3	63	Hz
371	AC : Fac_in Low Stop	47	47	63	Hz
372	AC : Fac_in High Start	47	52.7	63	Hz
373	AC : Fac_in High Stop	47	53	63	Hz
380	AC 1 : Vac_in Low Start	182	191.5	268.5	V
381	AC 1 : Vac_in Low Transfer	150	181.5	268.5	V
382	AC 1 : Vac_in Low Stop	150	181.5	268.5	V
383	AC 1 : Vac_in High Start	182	258.5	268.5	V
384	AC 1 : Vac_in High Transfer	182	268.5	268.5	V
385	AC 1 : Vac_in High Stop	182	268.5	268.5	V
390	AC 2 : Vac_in Low Start	182	191.5	268.5	V
391	AC 2 : Vac_in Low Transfer	150	181.5	268.5	V
392	AC 2 : Vac_in Low Stop	150	181.5	268.5	V
393	AC 2 : Vac_in High Start	182	258.5	268.5	V
394	AC 2 : Vac_in High Transfer	182	268.5	268.5	V
395	AC 2 : Vac_in High Stop	182	268.5	268.5	V
400	AC 3 : Vac_in Low Start	182	191.5	268.5	V
401	AC 3 : Vac_in Low Transfer	150	181.5	268.5	V
402	AC 3 : Vac_in Low Stop	150	181.5	268.5	V
403	AC 3 : Vac_in High Start	182	258.5	268.5	V
404	AC 3 : Vac_in High Transfer	182	268.5	268.5	V
405	AC 3 : Vac_in High Stop	182	268.5	268.5	V
410	AC 4 : Vac_in Low Start	182	191.5	268.5	V
411	AC 4 : Vac_in Low Transfer	150	181.5	268.5	V
412	AC 4 : Vac_in Low Stop	150	181.5	268.5	V
413	AC 4 : Vac_in High Start	182	258.5	268.5	V
414	AC 4 : Vac_in High Transfer	182	268.5	268.5	V
415	AC 4 : Vac_in High Stop	182	268.5	268.5	V
Alarm Settings (ID : 551 - 950)					
Global Parameters (ID : 551 - 600)					
551	Alarm on prog. relay option (255 means Not Used)	*	255	*	
553	Major relay temporization	2	60	65535	s
554	Minor relay temporization	2	30	65535	s

T1S and T2S Characteristics

556	Saturation alarm threshold	0	80	100	%
558	AC in is present (1:true 0:false)	0	1	1	
570	Log near. Full thresh. (100-200)	100	180	200	
Alarm Type (ID : 601 - 900) : Minor (1) - Major (2)- No Alarm (0)					
681	80 . Brownout Derating	0	1	2	
828	227 . DIG INP1 FAILURE	0	2	2	
829	228 . DIG INP2 FAILURE	0	2	2	
830	229 . REDUNDANCY LOST	0	1	2	
831	230 . REDUND + 1LOST	0	2	2	
832	231 . SYS SATURED (see parameter ID 556)	0	1	2	
833	232 . MAIN SOURCE LOST	0	2	2	
834	233 . SEC SOURCE LOST	0	1	2	
835	234 . T2S BUS FAIL	0	2	2	
836	235 . T2S FAILURE	0	2	2	
843	242 . LOG NEARLY FULL (see parameter ID 560)	0	0	2	
845	244 . CHECK LOG FILE	0	1	2	
846	245 . SHUTDWON DC 1	0	1	2	
847	246 . SHUTDWON DC2-->DC8	0	1	2	
User Input Alarm Labels (ID : 901 - 950)					
901	Digital input 1 label (max 16 characters)	text	DIG INP1 FAILURE**	text	
902	Digital input 2 label (max 16 characters)	text	DIG INP2 FAILURE**	text	
904	Input polarity (0:ShortCircuited-1; open)	0	0	1	
ModBus Settings (ID : 951 - 1000)					
951	T2S Modbus slave address (1 - 247)	1	1	247	
952	Modbus baud rate (19200 or 9600)		19200		
953	Modbus parity (0:no 1:odd 2:ev)	0	2	2	
954	Modbus stop bits (1 or 2)	1	1	2	
955	Modbus write password (max 16 characters)	text	Modbus_T2S	text	

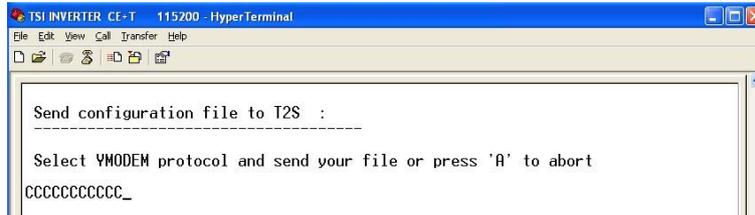
ID 551: The default Value (255) means that this function is not used. When an other value is recorded (i.e. 230 ; this relay will change when “redundancy will lost” and specific text will appears.

**** ID 901 & 902:** The customer is able to use these fields for specific custom message. Texts can be recorded with max 16 characters. The ID 901 is mainly use to give status of MBP and reduce the current in MBP transfer position.

6.9.6 Sending configuration to the system

Select (1) in root menu « System configuration » Menu

- Select 1 “Send configuration file to T2S”
- The T2S prompts to send configuration
- Click “Transfer” and then “Send File”

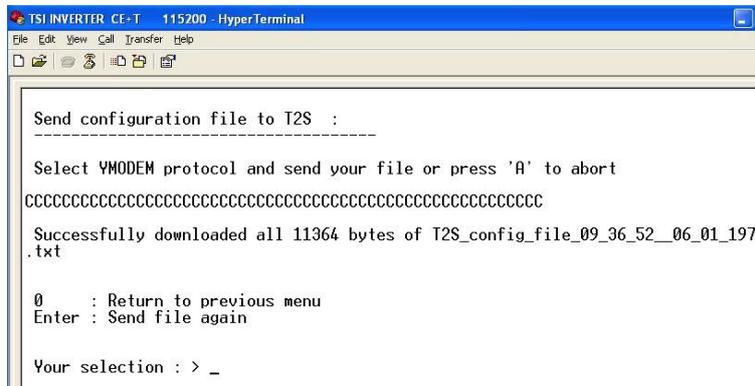


Use « Browse » button to select directory where you have saved the configuration file.

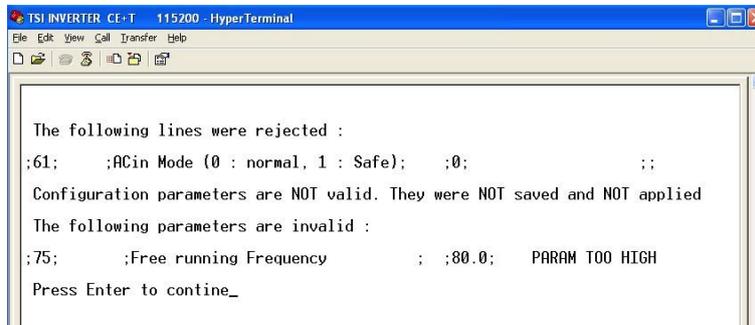
Select “Ymodem” from drop down list.

Press “Send” to start sending file.

The T2S acknowledges the upload.



Whenever some parameters are not valid they are rejected and an appropriate message is displayed.



After an update of the configuration file, the TSI inverters complete update can take up to 30 minutes. Do not make any intervention on the system during this time period.

6.9.7 Changing the System Parameters

Addressing modules

Modules inside the TSI system have an internal address that is not visible to the users. Thanks to this as soon as the power is turned on, the system starts operation normally.

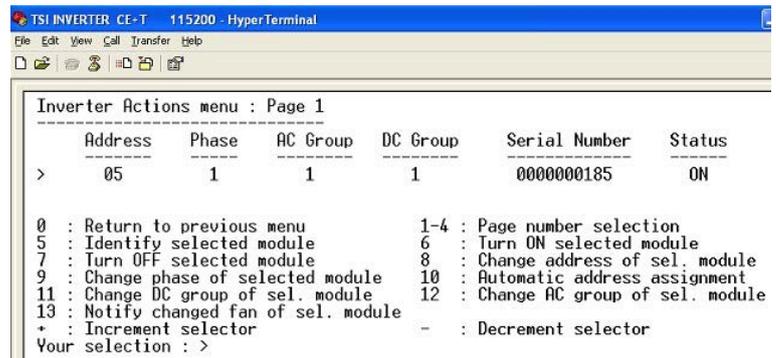
However for maintenance and monitoring it is more convenient to set a relation between the physical position of the module inside the rack and the operating parameters that are displayed.

From the root menu

... Select (3) "System Actions Selection"

... then (2) "Inverter module action"

Following screen is displayed:



```

TSI INVERTER CE-T 115200 - HyperTerminal
File Edit View Call Transfer Help
Inverter Actions menu : Page 1
-----
Address   Phase   AC Group   DC Group   Serial Number   Status
-----
> 05      1       1          1          0000000185     ON

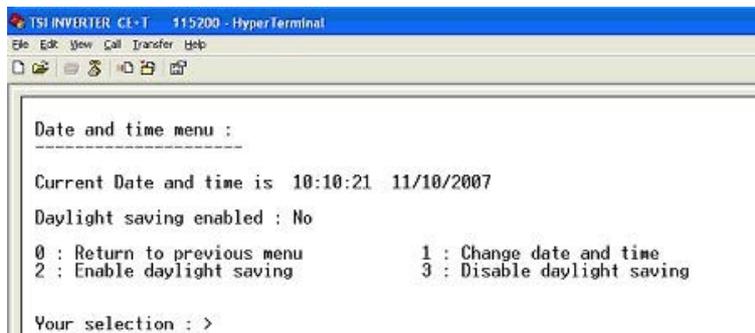
0 : Return to previous menu           1-4 : Page number selection
5 : Identify selected module          6 : Turn ON selected module
7 : Turn OFF selected module         8 : Change address of sel. module
9 : Change phase of selected module   10 : Automatic address assignment
11 : Change DC group of sel. module   12 : Change AC group of sel. module
13 : Notify changed fan of sel. module
+ : Increment selector                - : Decrement selector
Your selection : >
    
```

The inverters that are recognized by the system are successively displayed in 4 lists of 8 modules.

- The cursor [>] on the left hand side points on the inverter actually selected.
- Type « 5 » to force blinking all LED's for 5 seconds of the corresponding module.
- Type "8". The T2S prompts for the new address of the module. Choose something convenient like a sequence of number from left to right and from top to bottom. Only figures between 1 and 32 can be used. All other characters will be rejected. Refresh screen by "enter" toggle after few seconds to see the new address.
- Type "10" to use the automatic address assignment feature. The addresses are allocated following the sequence in which the modules have been inserted (switched on), and not in their physical position in the system.
- Use "+" and "-" to move the cursor up and down, and to select another module.
- Type "1", "2", "3" and "4" for scanning the 4 x 8 modules that are part of the TSI system.

Remarks:

1. If two modules share the same address a warning is displayed.



```

TSI INVERTER CE-T 115200 - HyperTerminal
File Edit View Call Transfer Help
Date and time menu :
-----
Current Date and time is 10:10:21 11/10/2007
Daylight saving enabled : No

0 : Return to previous menu           1 : Change date and time
2 : Enable daylight saving            3 : Disable daylight saving

Your selection : >
    
```

2. The new module address is immediately stored in the module's EEPROM. It will be used for any further reference to this module until you decide to change it again.

T1S and T2S Characteristics

- This address sticks to the module. It has nothing to do with the slot. Consequently if the module is replaced by a new one the configuration process needs to be repeated for the new module..

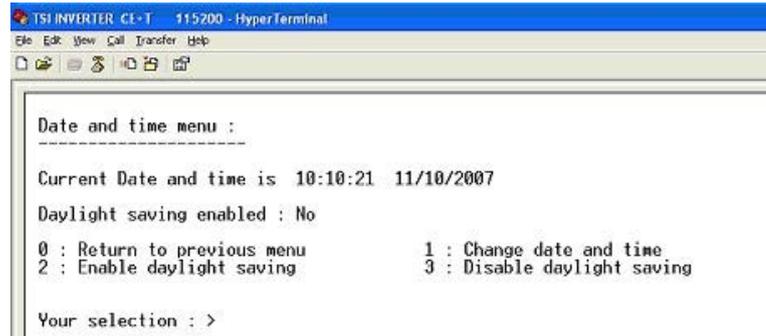
Changing Date-Time

From the root menu

- ... Select (3) "System Actions"
- ... then (1) "System Actions"
- ... then (3) "Change Date and Time settings"

Following screen is displayed:

- "2" and "3" allow to activate or deactivate respectively the daylight saving
- "1" forces the T2S to prompt for Date-Time change. See example for format and casing.



```

TSI INVERTER CE-T 115200 - HyperTerminal
File Edit View Call Transfer Help
Date and time menu :
-----
Current Date and time is 10:10:21 11/10/2007
Daylight saving enabled : No
0 : Return to previous menu      1 : Change date and time
2 : Enable daylight saving      3 : Disable daylight saving
Your selection : >
    
```

Remarks:

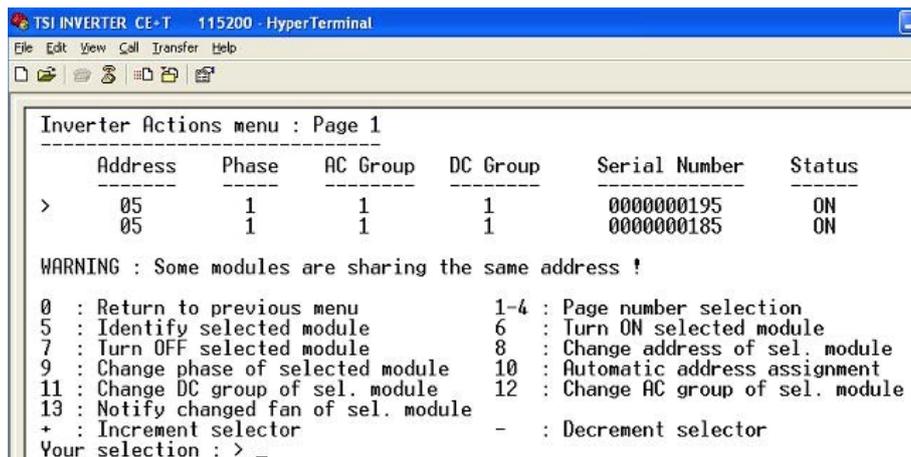
Date and Time values are lost as soon as the T2S is removed from its slot.

Changing the phase, the DC group, the AC group

From the root menu

- ... Select (3) "System Actions"
- ... then (2) "Inverter Module Actions"

The following screen is displayed:



```

TSI INVERTER CE-T 115200 - HyperTerminal
File Edit View Call Transfer Help
Inverter Actions menu : Page 1
-----
      Address   Phase   AC Group   DC Group   Serial Number   Status
-----
>    05         1       1         1         0000000195     ON
      05         1       1         1         0000000185     ON

WARNING : Some modules are sharing the same address !

0 : Return to previous menu      1-4 : Page number selection
5 : Identify selected module    6 : Turn ON selected module
7 : Turn OFF selected module    8 : Change address of sel. module
9 : Change phase of selected module 10 : Automatic address assignment
11 : Change DC group of sel. module 12 : Change AC group of sel. module
13 : Notify changed fan of sel. module
+ : Increment selector          - : Decrement selector
Your selection : > _
    
```

The inverters that are recognized by the system are successively displayed in 4 lists of 8 modules.

- The cursor [>] on the left hand side points on the inverter actually selected
- Type « 5 » to force blinking all LED's for 5 seconds of the corresponding module
- Use "+" and "-" move the cursor up and down, and to select another module
- Type "9", "11" and "12" to change respectively the phase, the DC group and the AC group the module is part of. (Refer to TSI Technical Sheets for how to use groups)

Changing Operating Mode (EPC/On Line)

Refer to configuration file.

Parameters '60' sets the operating mode:

Equal to "0" → AC input default feeding (100% AC feed the load)

Equal to 100 → DC input default feeding (100% DC feed the load)

6.9.8 Displaying Operating Parameters

6.9.8.1 Module Information

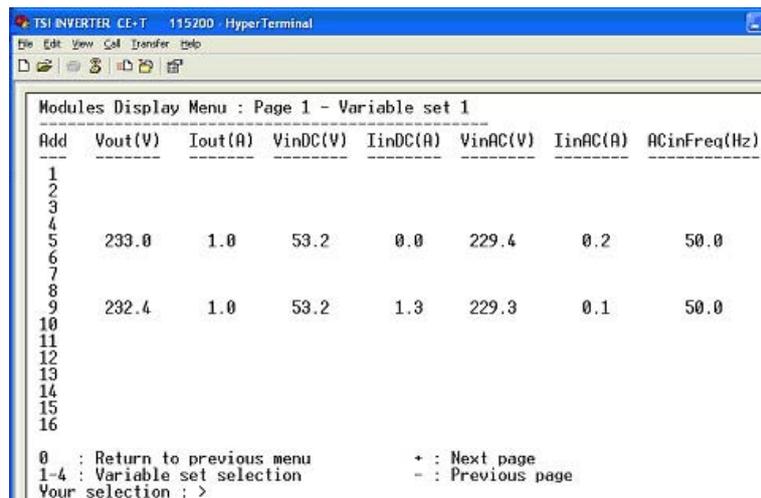
From the root menu

... Select (2) "System Information"

... then (1) "Inverter Information"

Following screen is displayed:

Set #1:



Add	Vout(V)	Iout(A)	VinDC(V)	IinDC(A)	VinAC(V)	IinAC(A)	ACinFreq(Hz)
1							
2							
3							
4							
5	233.0	1.0	53.2	0.0	229.4	0.2	50.0
6							
7							
8							
9	232.4	1.0	53.2	1.3	229.3	0.1	50.0
10							
11							
12							
13							
14							
15							
16							

0 : Return to previous menu + : Next page
 1-4 : Variable set selection - : Previous page
 Your selection : >

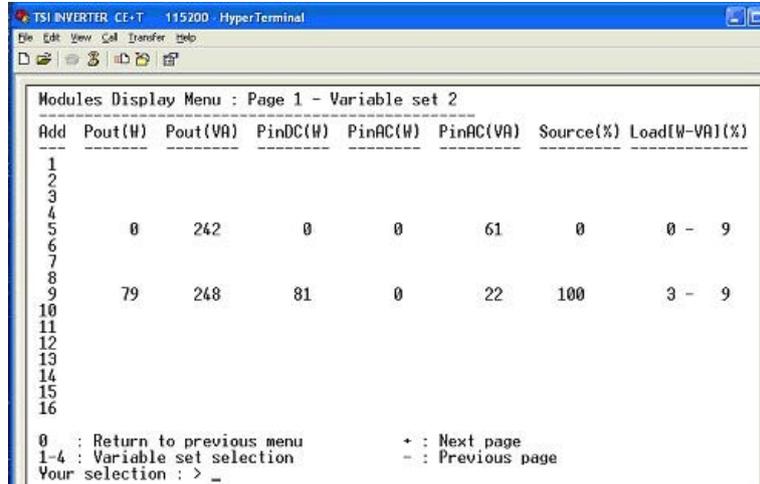
The inverters that are recognized by the system are listed in 2 groups of 16 modules and 4 sets of parameters.

1. Type "1", "2", "3" or "4" to select the right set of parameters
2. The set #1 shows current and voltage of each module
3. The set #2 shows power variables of each module
4. The set #3 shows the phase, the working temperature, the serial number, the software version and the status of DC/AC ports for each module

The set #4 shows the nominal values of each module

T1S and T2S Characteristics

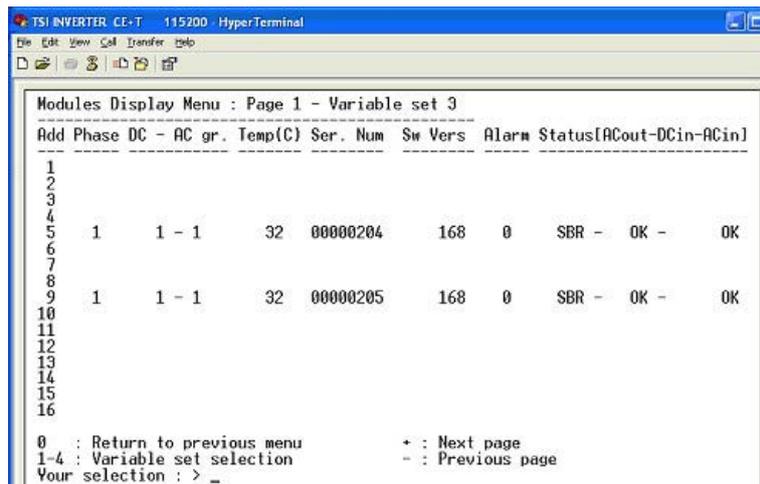
Set #2:



Add	Pout(W)	Pout(VA)	PinDC(W)	PinAC(W)	PinAC(VA)	Source(%)	Load(W-VAI(%))
1							
2							
3							
4							
5	0	242	0	0	61	0	0 - 9
6							
7							
8							
9	79	248	81	0	22	100	3 - 9
10							
11							
12							
13							
14							
15							
16							

0 : Return to previous menu + : Next page
 1-4 : Variable set selection - : Previous page
 Your selection : > _

Set #3:



Add	Phase	DC - AC gr.	Temp(C)	Ser. Num	Sw Vers	Alarm	Status[ACout-DCin-ACin]
1							
2							
3							
4							
5	1	1 - 1	32	00000204	168	0	SBR - OK - OK
6							
7							
8							
9	1	1 - 1	32	00000205	168	0	SBR - OK - OK
10							
11							
12							
13							
14							
15							
16							

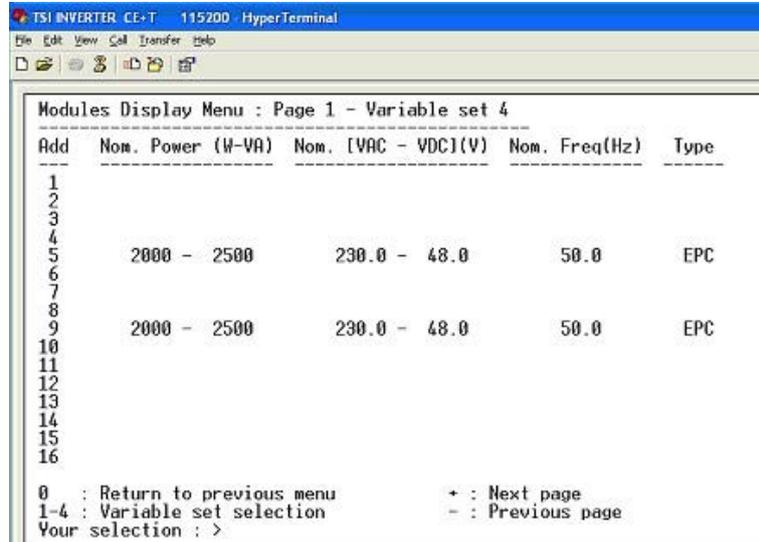
0 : Return to previous menu + : Next page
 1-4 : Variable set selection - : Previous page
 Your selection : > _

Second and third columns show groups and phase ownership. Next columns show module serial number and software version. Last columns show the alarm code and the status of each module port:

- The list of alarm codes is available at the end of present manual
- Status acronyms are as such:
 1. SBR = Stand by running. The module is idle and ready to feed the load on request
 2. OK = normal operation
 3. OFF = the module is manually stopped

T1S and T2S Characteristics

Set #4:



Add	Nom. Power (W-VA)	Nom. [VAC - VDC](V)	Nom. Freq(Hz)	Type
1				
2				
3				
4				
5	2000 - 2500	230.0 - 48.0	50.0	EPC
6				
7				
8				
9	2000 - 2500	230.0 - 48.0	50.0	EPC
10				
11				
12				
13				
14				
15				
16				

0 : Return to previous menu + : Next page
 1-4 : Variable set selection - : Previous page
 Your selection : >

- Status acronyms are as such:
 1. EPC = inverter is designed for ACin and DCin
 2. REG = inverter is only fed with DCin
 3. EPC-L = inverter is designed for ACin and DCin BUT for PACK system (6 inverters maximum per system)

6.9.8.2 Phase Information

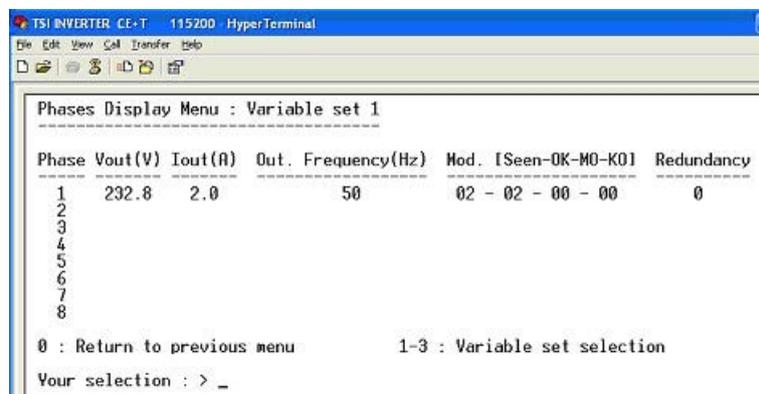
From the root menu

... Select (2) "System Information"

... then (2) "Phase Information"

The following screen is displayed:

Set #1:



Phase	Vout(V)	Iout(A)	Out. Frequency(Hz)	Mod. I Seen-OK-MO-KO1	Redundancy
1	232.8	2.0	50	02 - 02 - 00 - 00	0
2					
3					
4					
5					
6					
7					
8					

0 : Return to previous menu 1-3 : Variable set selection
 Your selection : > _

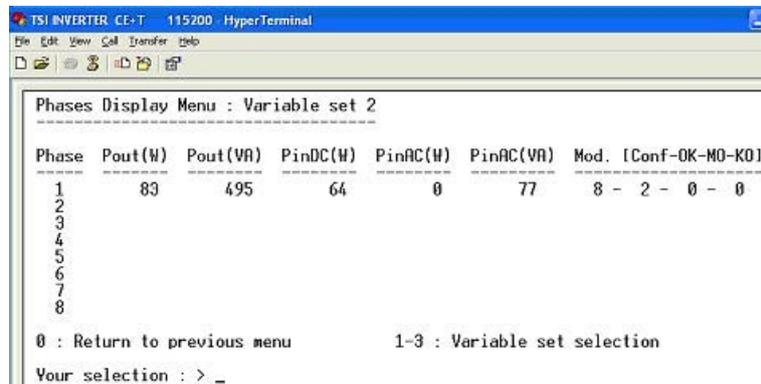
The phases that are recognized by the system are listed here-below and show 3 sets of parameters.

- Type "1", "2" or "3" to select the right set of parameters
 1. The set #1 shows current, voltage and frequency of each phase

T1S and T2S Characteristics

- Plus a string of digits showing the list of modules recognized by the system in this particular phase:
 - Number of module configured
 - Number of module in operation
 - Number of modules set manually to off state
 - Number of modules out of service
 - The last column shows the number of modules set for redundancy
2. The set #2 shows power transfer of each phase and each TSI ports (DCin – ACin – Acout) plus the same list of digits as above showing the status of the modules
 3. The set #3 shows the installed power, the available power and a string of the percentage of each power currently in use

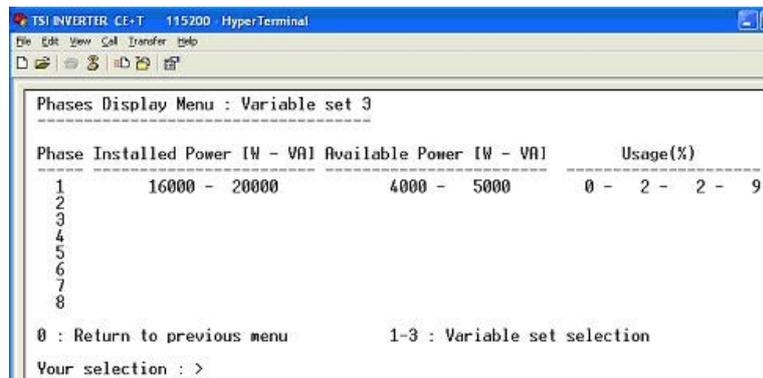
Set #2:



Phase	Pout(W)	Pout(VA)	PinDC(W)	PinAC(W)	PinAC(VA)	Mod. [Conf-OK-MO-KO]
1	83	495	64	0	77	8 - 2 - 0 - 0
2						
3						
4						
5						
6						
7						
8						

0 : Return to previous menu 1-3 : Variable set selection
Your selection : > _

Set #3:



Phase	Installed Power [W - VA]	Available Power [W - VA]	Usage(%)
1	16000 - 20000	4000 - 5000	0 - 2 - 2 - 9
2			
3			
4			
5			
6			
7			
8			

0 : Return to previous menu 1-3 : Variable set selection
Your selection : >

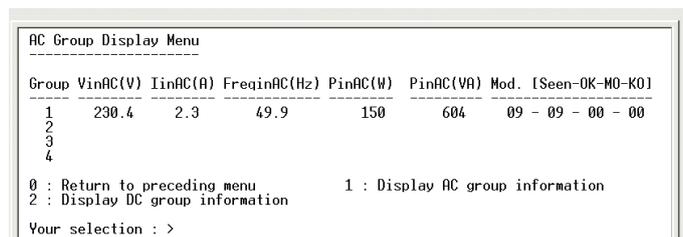
6.9.8.3 Groups Information

AC Groups

From the root menu

- ... Select (2) "System Information"
- ... then (3) "Groups Information"
- ... then (1) "AC Groups"

Following screen is displayed:



Group	VinAC(V)	IinAC(A)	FreqinAC(Hz)	PinAC(W)	PinAC(VA)	Mod. [Seen-OK-MO-KO]
1	230.4	2.3	49.9	150	604	09 - 09 - 00 - 00
2						
3						
4						

0 : Return to preceding menu 1 : Display AC group information
2 : Display DC group information
Your selection : >

The screen gives an overall view of all parameters with regards to AC input groups.

T1S and T2S Characteristics

The last column displays a string of digits showing the list of modules recognized by the system in this particular group:

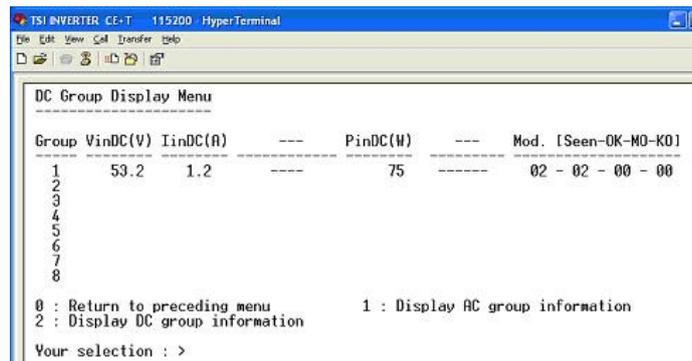
- Number of module configured
- Number of module in operation
- Number of modules set manually to off state
- Number of modules out of service

DC Groups

From the root menu

- ... Select (2) "System Information"
- ... then (3) "Groups Information"
- ... then (2) "DC Groups"

Following screen is displayed:



```

T1S INVERTER CE-T 11520D HyperTerminal
File Edit View Call Transfer Help
DC Group Display Menu
-----
Group VinDC(V) IinDC(A) --- PinDC(W) --- Mod. [Seen-OK-M0-K0]
-----
1      53.2      1.2      ----      75      -----      02 - 02 - 00 - 00
2
3
4
5
6
7
8
0 : Return to preceding menu      1 : Display AC group information
2 : Display DC group information
Your selection : >
    
```

The screen gives an overall view of all parameters with regards to AC input groups.

The last column displays a string of digits showing the list of modules recognized by the system in this particular group:

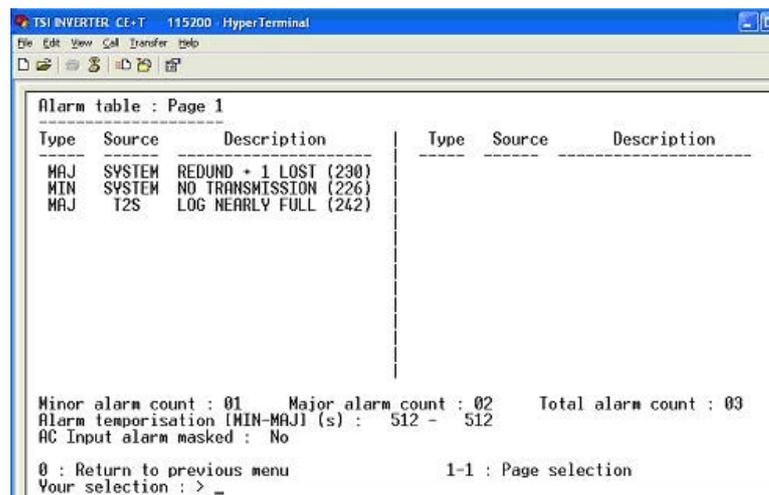
- Number of module configured
- Number of module in operation
- Number of modules set manually to off state
- Number of modules out of service

6.9.8.4 Alarms

From the root menu

- ... Select (2) "System Information"
- ... then (4) "Alarms information"

Following screen is displayed:



```

T1S INVERTER CE-T 11520D HyperTerminal
File Edit View Call Transfer Help
Alarm table : Page 1
-----
Type Source Description
-----
MAJ SYSTEM REDUND + 1 LOST (230)
MIN SYSTEM NO TRANSMISSION (226)
MAJ T2S LOG NEARLY FULL (242)
-----
Minor alarm count : 01      Major alarm count : 02      Total alarm count : 03
Alarm temporisation [MIN-MAJ] (s) : 512 - 512
AC Input alarm masked : No
0 : Return to previous menu      1-1 : Page selection
Your selection : > _
    
```

- Active alarms are listed. The column "Source" indicates whether the alarm is present in one module only (Module Address is displayed) or present in all modules simultaneously (SYSTEM is displayed).

- Three counters are shown:
 1. Number of minor alarms
 2. Number of major alarms
 3. Total number of alarms

- TempORIZATION refers to time delay between the occurrence of the alarm and changing status on free potential contact
- "Programmable Relay" Inactive when settings is "255" stands for idle = no alarm condition. Other settings for activating following condition.
- Changing the status of these alarms can be achieved through the configuration file.

T1S and T2S Characteristics

- Message check log file will generate when too much plug unplug are made on system, and we request the user to analyze the log file. To delete the message you have to clear the log file.

6.9.8.5 Log File - History

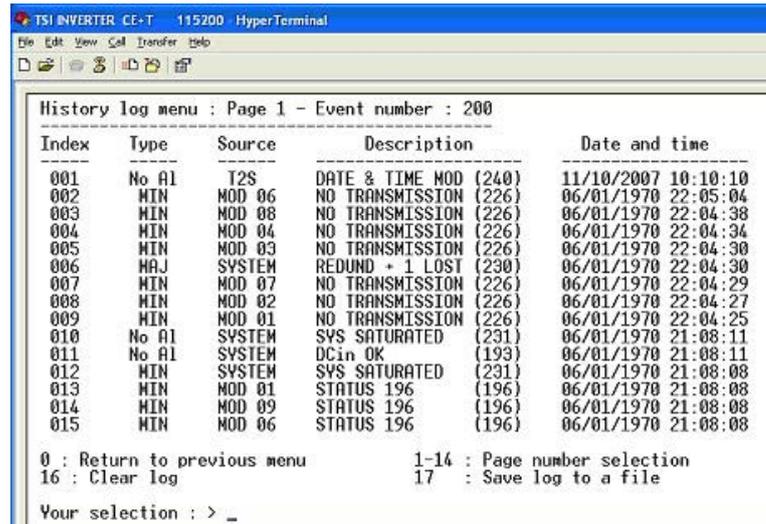
From the root menu

... Select (2) "System Information"

... then (5) "History log display"

Following screen is displayed:

- The history is displayed. It can also be downloaded in a laptop file.
- It can also be erased.
- The internal memory is sized for about 200 events.



Index	Type	Source	Description	Date and time
001	No Al	T2S	DATE & TIME MOD (240)	11/10/2007 10:10:10
002	MIN	MOD 06	NO TRANSMISSION (226)	06/01/1970 22:05:04
003	MIN	MOD 08	NO TRANSMISSION (226)	06/01/1970 22:04:38
004	MIN	MOD 04	NO TRANSMISSION (226)	06/01/1970 22:04:34
005	MIN	MOD 03	NO TRANSMISSION (226)	06/01/1970 22:04:30
006	HAJ	SYSTEM	REDUND + 1 LOST (230)	06/01/1970 22:04:30
007	MIN	MOD 07	NO TRANSMISSION (226)	06/01/1970 22:04:29
008	MIN	MOD 02	NO TRANSMISSION (226)	06/01/1970 22:04:27
009	MIN	MOD 01	NO TRANSMISSION (226)	06/01/1970 22:04:25
010	No Al	SYSTEM	SVS SATURATED (231)	06/01/1970 21:08:11
011	No Al	SYSTEM	DCin OK (193)	06/01/1970 21:08:11
012	MIN	SYSTEM	SVS SATURATED (231)	06/01/1970 21:08:08
013	MIN	MOD 01	STATUS 196 (196)	06/01/1970 21:08:08
014	MIN	MOD 09	STATUS 196 (196)	06/01/1970 21:08:08
015	MIN	MOD 06	STATUS 196 (196)	06/01/1970 21:08:08

0 : Return to previous menu 1-14 : Page number selection
 16 : Clear log 17 : Save log to a file

Your selection : > _

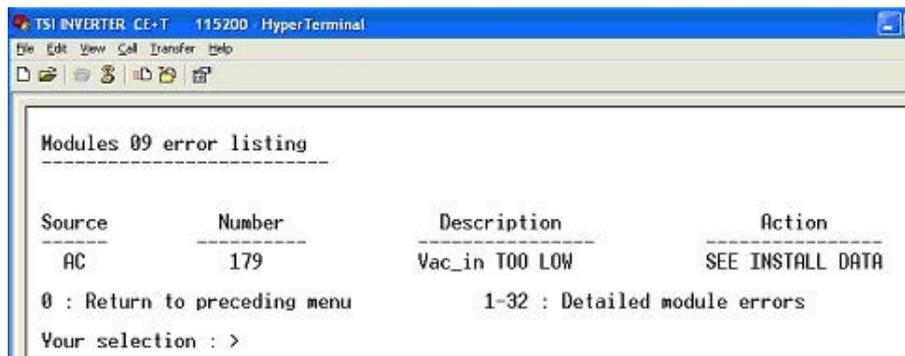
6.9.8.6 Modules Errors Information

From the root menu

... Select (2) "System Information"

... then (6) "Modules Errors Information"

The screen is:



Source	Number	Description	Action
AC	179	Vac_in TOO LOW	SEE INSTALL DATA

0 : Return to preceding menu 1-32 : Detailed module errors

Your selection : >

It gives access to internal status of each module individually. Column "Action" gives indication for troubleshooting when possible.

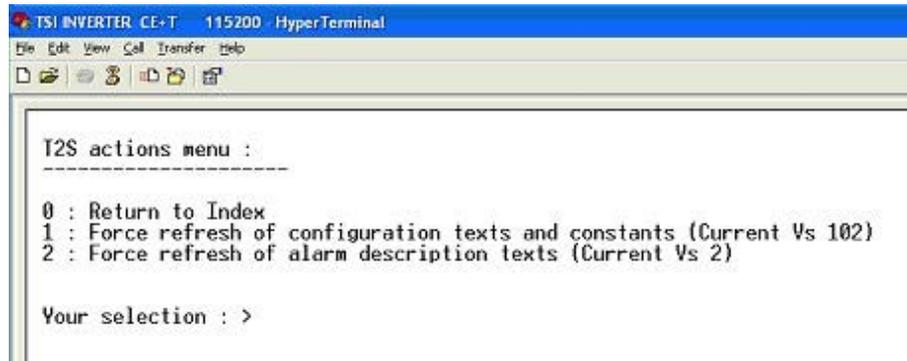
6.9.9 Update texts and constants

From the root menu

... Select (3) "System Actions"

... then (3) "T2S actions menu"

Following screen is displayed:

A screenshot of a HyperTerminal window titled "TSI INVERTER CE-T 115200 HyperTerminal". The window displays a menu with the following text:

```
T2S actions menu :
-----
0 : Return to Index
1 : Force refresh of configuration texts and constants (Current Vs 102)
2 : Force refresh of alarm description texts (Current Vs 2)

Your selection : >
```

By default the T2S detects automatically when more recent TSI modules are inserted in the system. It updates accordingly the internal description of parameters and messages.

Nevertheless if the update must be forced the above screen allows to do so.

7. T2S Configuration Parameters

All available parameters are described bellow, not all of them are used in a basic installation.

Caution: Bad configurations will shutdown the system and the load will be lost.

7.1 Global Settings (ID 1 – 50)

```

;1;      ;Number of module in phase 1;      ;4;
;2;      ;Number of module in phase 2;      ;4;
;3;      ;Number of module in phase 3;      ;4;
;4;      ;Number of module in phase 4;      ;0;
;5;      ;Number of module in phase 5;      ;0;
;6;      ;Number of module in phase 6;      ;0;
;7;      ;Number of module in phase 7;      ;0;
;8;      ;Number of module in phase 8;      ;0;

```

- **Number of inverter modules present in the system, per phase.(Here: 4 modules per phase in 3PH system) in each phase including the number of redundant modules mentioned in parameters 21 to 28.**
- (same value for ACin and ACout)

```

;21;     ;Amount of redundancy in phase 1;     ;1;
;22;     ;Amount of redundancy in phase 2;     ;1;
;23;     ;Amount of redundancy in phase 3;     ;1;
;24;     ;Amount of redundancy in phase 4;     ;0;
;25;     ;Amount of redundancy in phase 5;     ;0;
;26;     ;Amount of redundancy in phase 6;     ;0;
;27;     ;Amount of redundancy in phase 7;     ;0;
;28;     ;Amount of redundancy in phase 8;     ;0;

```

- **Number of redundant inverter modules in each phase (Here : 1 module)**
- **When no inverter failed = no alarm**
- **When the number of inverters which failed are \leq redundancy (if different to 0) = Minor alarm (Non Urgent)**
- **When the number of inverters which failed are $>$ redundancy = Major alarm (Urgent)**

T2S Configuration Parameters

;40; ;Number of DC input groups; ;1;

- **Number of DC groups**
- Allows to feed several groups of inverters from several sets of batteries physically separated

;41; ;Number of AC input groups; ;1;

- **Number of AC groups**
- Allows to feed several groups of inverters from different Mains physically separated (i.e : Main network and Diesel generator)
- This parameter is also use for 3 phases system which requires a CANDIS to display correct values

;43; ;Partial load on DC; ;25; ; ;

- **Sets the percentage of the load to be on DC and AC, when digital input 2 is active AND a specific text in field 902 (refer to param 902) .**
- This feature is active when the digital input 2 is activated. During this time the TSI inverter shares the input source for example 25% from DC and 75% from AC. This Parameter can be set from 0 to 100%.
- By default, the value is 100% on AC
- In order to activate this option, a specific text must be written at the ID 902 text field see param 902.

;44; ;Disable AC Group 4 Alarm (No: 0, Yes: 1) ; ;0; ; ;

- **Allows to inhibit the alarm monitoring when no AC In is present on AC GR 4 input (since T2S version 3.30)**
- 0 : monitor the AC GR 4 if the configuration include 4 group
- 1 : doesn't monitor the AC GR 4. Typically for clock system.

7.2 Inverter Parameters (ID 51 – 550)

;60; ;Input Source (AC : 0, DC : 100) ; ;0; ;%;

- **Defines the priority source**
- 0 → Feeding from ACin has priority (converter AC/AC - EPC mode) default value
- 100 → Feeding from DC has priority (converter DC/AC - On Line mode)
- Since software version 180, it is possible to set the share between DC and AC from 0 to 100% by steps of 1%.
- When parameter 43 is activated (through external signal on DIGITAL INPUT 2 with specific text to be used) the parameter 60 takes the value recorded in parameter 43.
- When there is no external signal on DIGITAL INPUT 2 or when text is different than the specific requested text, the share between DC and AC takes the value of parameter 60.

T2S Configuration Parameters

;61; ;ACin Mode (0 : normal, 1 : Safe); ;0; ; ;

➤ **Allows to open the ACin inlet relay**

➤ 0 → normal running in EPC mode

➤ 1 → ACin inlet relay is open and so the system is insulated from the Mains

➤ In our circuit, the neutral is common in the whole installation. With this option, ACin line is insulated from its converter. If DC disappears, the ACin relay switches on and the loads are fed from the ACin source. This transition takes 10 msec maximum.

;62; ;Walk-in Mode (0 to 60) ; ;0; ; ;

➤ **Defines the walking mode configuration. Available from 177 sw version**

➤ The Walk-in mode allows the inverter to come back progressively on the AC priority source after an outage. Friendly use on Genset

➤ 0 no progressive switching

➤ 1 progressive switching at 10% by second for software 177 and 178

➤ Since software version 185.24 it is possible to set the value using formula $Delay=A+10 \cdot P \cdot (50/f)$

- A is the fixed timer for sync average 10sec.
- P (between 1 and 60) to adjust the slope between 0 and 600 seconds
- 1 to 60 (each unity take 10 seconds).
 - ◇ For instance “6” means 60 sec or 1 minute with 6 step of 15%
 - ◇ For instance 10 means 100 sec with 10 steps of 10%
 - ◇ For instance 4 means 40 sec with 4 steps of 25%

;70; ;Number of phases ; ;3; ; ;

➤ **Sets the number of phases: 1 (Single phase), 2 (2PH), 3 (3PH)**

;71; ;Mode (0 star ; 1 Delta) ; ;0; ; ;

➤ **Defines the protection type for working on Delta load.**

➤ The ‘Star or Delta’ mode allows to configure the automatic protection when the load is delta connection (engine for instance). This protects the load when 1 phase is lost. The protection consists of switching off all inverters.

➤ 0 Default setting, and no delta load protection.

➤ 1 Delta load protection available (only use on manufacturer request).

➤ When the load is a mix of Star and Delta it will better to kept the default setting and install a specific protection for Delta load when 1 phase fails.

T2S Configuration Parameters

;75; ;Free running Frequency ; ;50.0; ;Hz;

- Sets the Inverters system frequency.

CAUTION: When the running frequency is set to 60Hz, parameters 370 to 373 MUST BE ADAPTED

;80; ;Short Circuit Voltage Threshold ; ;80; ;V;

- Minimum Voltage Threshold where module considers that outlet is in short circuit
- Adjustable from 20 to 200 Vac

;81; ;Short Circuit Hold Time ; ;60.0; ;s;

- Time Duration when a module tries to eliminate the short-circuit existing on outlet
- When this time duration is over and the voltage is lower than parameter line “80”, the module stops
- Adjustable from 0,1 to 600 sec.

;82; ;Booster 10xlin (0 : OFF, 1 : ON); ;1; ;;

- Allow to inhibit the Booster option which generates a current of 10 In for 20ms in case of short-circuit (9 In for Nova inverter).

;90; ;Max current (pc of nominal curr); ;150; ;%;

- Maximum Current that module can supply.
- “Adjustable from de 100 to 150 % for BRAVO and MEDIA, from 100 to 135 % for NOVA

;91; ;Max power (pc of nominal power) ; ;150; ;%;

- Maximum Power that module can supply.
- Adjustable from de 100 to 150 % for BRAVO and MEDIA, from 100 to 135 % for NOVA
- ALWAYS RECORD THE SAME VALUES for 90 & 91

;92; ;Max Overload Duration ; ;15; ;s;

- Maximum Time Duration when module can run with overload
- Adjustable from 0 to 15 sec

;93; ;Airco Mode (0:No , 1: Yes) ; ;0; ;;

- When this mode is activated, the overload capabilities are moved from default value to 330% overload in current and power for maximum 900 msec. Only release for BRAVO 48VDC/230VAC. Available from sw 192. After 900 msec the overload are reduce to 150% for 14 seconds them 110% permanent. After this period the output could switch OFF according with parameter lines 80 and 81.
- 0: default overload capabilities
- 1: allow start load with high inrush current

T2S Configuration Parameters

;94; ;Pdc Max (0 : function disabled); ;0; ;W;

- This feature allow to limit or reduce the INRUSH DC current when the system work on battery. To limit the current this configuration line should limit the inrush DC current. To allow for the high capability this inverter is build with extra capacitor running on 400VDC to provide the requested energy. (Feature only available in Bravo HC system - T32H73E02S).
- 0 means no DC limitation
- 2000: power limitation at 2000W. (should be activate when battery capacity is lower than 300AH per 2500VA module installed)

;100; ;Synchronization Tracking Speed ; ;0; ;;

- The speed at which the module tries to synchronize the ACout with the Main
- Possible Values:

	Value	Variation of Frequency (Hz/sec)
very fast	-2	2,5
Fast	-1	1,25
Normal	0	0,5
Slow	1	0,25
very slow	2	0,1

- When there are several TSI inverters in cascade: Upstream is the slowest and downstream is the fastest.

;101; ;Remote OFF disable ACin Power ; ;0; ;;

- 0 → Normal mode
- 1 → ACin power stage in converter is de-activated
- Allows for the deactivation of the ACin power in order to use this inlet as reference for the synchronization
- The load is then fed by the DC/AC converter. The ACin power is not used but ACout of inverter is still synchronized with ACin wave (signal)

;102; ;Negative Power (0 : OFF, 1 : ON); ;1; ;;

- 0 → ACin not allowed to re-inject to the Mains (only for factory test)
- 1 → Allows the ACin to re-inject to the Mains when load re-injects (module's default value)

T2S Configuration Parameters

;103; ;External clock (0 : OFF, 1 : ON); ;0; ;;

- Records the “External Clock” mode configuration Available from 177sw version
- Only used in 3 phase systems considered as single phase using a clock.
- Prevents any phase drift outside 120° between phases to protect delta 3 phase loads.
- 0 → no protection in: phase drift is allowed.
- 1 → protection in: no phase drift allowed, stops the system after 1 minute.

;104; ;Start without T2S (0 : No , 1 : Yes); ;0; ;;

- When this mode is activated, the TSI inverter is able to start without T2S. This solution doesn't provide monitoring. In this application we will use different backplane which include alarm relay. From 192 sw version
- 0→do not allow the starting without T2S
- 1 → allow starting TSI without T2S

;160; ;OUT 1 : phase shift ; ;0; ;deg;

;161; ;OUT 1 : Nominal Output Voltage ; ;230.0; ;V;

- Records the phase shift and the nominal Outlet voltage

;170; ;OUT 2 : phase shift ; ;240; ;deg;

;171; ;OUT 2 : Nominal Output Voltage ; ;230.0; ;V;

- Records the phase shift and the nominal Outlet voltage

;180; ;OUT 3 : phase shift ; ;120; ;deg;

;181; ;OUT 3 : Nominal Output Voltage ; ;230.0; ;V;

- Records the phase shift and the nominal Outlet voltage

T2S Configuration Parameters

;190;	;OUT 4 : phase shift ;	;0;	;deg;
;191;	;OUT 4 : Nominal Output Voltage ;	;230.0;	;V;
;200;	;OUT 5 : phase shift ;	;0;	;deg;
;201;	;OUT 5 : Nominal Output Voltage ;	;230.0;	;V;
;210;	;OUT 6 : phase shift ;	;0;	;deg;
;211;	;OUT 6 : Nominal Output Voltage ;	;230.0;	;V;
;220;	;OUT 7 : phase shift ;	;0;	;deg;
;221;	;OUT 7 : Nominal Output Voltage ;	;230.0;	;V;
;230;	;OUT 8 : phase shift ;	;0;	;deg;
;231;	;OUT 8 : Nominal Output Voltage ;	;230.0;	;V;

➤ The same for the phases 4 to 8

7.3 DC groups parameters settings

;260;	;DC 1 : Vdc_in Low Start ;	;44.0;	;V;
-------	----------------------------	--------	-----

➤ Low DC Voltage where a higher value leads the DC/AC converter to re-start

;261;	;DC 1 : Vdc_in Low Transfer ;	;39.0;	;V;
-------	-------------------------------	--------	-----

➤ Low DC Voltage where a lower value leads to transfer the load from DCin to ACin

;262;	;DC 1 : Vdc_in Low Stop ;	;39.0;	;V;
-------	---------------------------	--------	-----

➤ Low DC voltage where a lower value stops the DC/AC converter

;263;	;DC 1 : Vdc_in High Start ;	;58.0;	;V;
-------	-----------------------------	--------	-----

➤ High DC voltage where a higher value re-starts the DC/AC converter

;264;	;DC 1 : Vdc_in High Transfer ;	;61.0;	;V;
-------	--------------------------------	--------	-----

➤ High DC Voltage where a higher value leads to transfer the load from DCin to ACin

T2S Configuration Parameters

;265; ;DC 1 : Vdc_in High Stop ; ;61.0; ;V;

➤ High DC voltage where a higher value stops the DCin converter. Value increased from sw 173 to 62 VDC

;270; ;DC 2 : Vdc_in Low Start ; ;44.0; ;V;

;271; ;DC 2 : Vdc_in Low Transfer ; ;39.0; ;V;

;272; ;DC 2 : Vdc_in Low Stop ; ;39.0; ;V;

;273; ;DC 2 : Vdc_in High Start ; ;58.0; ;V;

;274; ;DC 2 : Vdc_in High Transfer ; ;61.0; ;V;

;275; ;DC 2 : Vdc_in High Stop ; ;61.0; ;V;

➤ The same for Group DC 2

;280; ;DC 3 : Vdc_in Low Start ; ;44.0; ;V;

;281; ;DC 3 : Vdc_in Low Transfer ; ;39.0; ;V;

;282; ;DC 3 : Vdc_in Low Stop ; ;39.0; ;V;

;283; ;DC 3 : Vdc_in High Start ; ;58.0; ;V;

;284; ;DC 3 : Vdc_in High Transfer ; ;61.0; ;V;

;285; ;DC 3 : Vdc_in High Stop ; ;61.0; ;V;

➤ The same for Group DC 3

;290; ;DC 4 : Vdc_in Low Start ; ;44.0; ;V;

;291; ;DC 4 : Vdc_in Low Transfer ; ;39.0; ;V;

;292; ;DC 4 : Vdc_in Low Stop ; ;39.0; ;V;

;293; ;DC 4 : Vdc_in High Start ; ;58.0; ;V;

;294; ;DC 4 : Vdc_in High Transfer ; ;61.0; ;V;

;295; ;DC 4 : Vdc_in High Stop ; ;61.0; ;V;

➤ The same for Group DC 4

;300; ;DC 5 : Vdc_in Low Start ; ;44.0; ;V;

;301; ;DC 5 : Vdc_in Low Transfer ; ;39.0; ;V;

;302; ;DC 5 : Vdc_in Low Stop ; ;39.0; ;V;

;303; ;DC 5 : Vdc_in High Start ; ;58.0; ;V;

;304; ;DC 5 : Vdc_in High Transfer ; ;61.0; ;V;

;305; ;DC 5 : Vdc_in High Stop ; ;61.0; ;V;

➤ The same for Group DC 5

T2S Configuration Parameters

;310;	;DC 6 : Vdc_in Low Start ;	;44.0;	;V;
;311;	;DC 6 : Vdc_in Low Transfer ;	;39.0;	;V;
;312;	;DC 6 : Vdc_in Low Stop ;	;39.0;	;V;
;313;	;DC 6 : Vdc_in High Start ;	;58.0;	;V;
;314;	;DC 6 : Vdc_in High Transfer ;	;61.0;	;V;
;315;	;DC 6 : Vdc_in High Stop ;	;61.0;	;V;

➤ The same for Group DC 6

;320;	;DC 7 : Vdc_in Low Start ;	;44.0;	;V;
;321;	;DC 7 : Vdc_in Low Transfer ;	;39.0;	;V;
;322;	;DC 7 : Vdc_in Low Stop ;	;39.0;	;V;
;323;	;DC 7 : Vdc_in High Start ;	;58.0;	;V;
;324;	;DC 7 : Vdc_in High Transfer ;	;61.0;	;V;
;325;	;DC 7 : Vdc_in High Stop ;	;61.0;	;V;

➤ The same for Group DC 7

;330;	;DC 8 : Vdc_in Low Start ;	;44.0;	;V;
;331;	;DC 8 : Vdc_in Low Transfer ;	;39.0;	;V;
;332;	;DC 8 : Vdc_in Low Stop ;	;39.0;	;V;
;333;	;DC 8 : Vdc_in High Start ;	;58.0;	;V;
;334;	;DC 8 : Vdc_in High Transfer ;	;61.0;	;V;
;335;	;DC 8 : Vdc_in High Stop ;	;61.0;	;V;

➤ The same for Group DC 8

7.3.1 Synchronization with ACin source

;370;	;AC : Fac_in Low Start ;	;47.3;	;Hz;
-------	--------------------------	--------	------

➤ Frequency where a higher value leads the outlet of the inverters trying to synchronize with ACin

;371;	;AC : Fac_in Low Stop ;	;47.0;	;Hz;
-------	-------------------------	--------	------

➤ Frequency where a lower value leads the outlet of inverters stop to synchronize with ACin

;372;	;AC : Fac_in High Start ;	;52.7;	;Hz;
-------	---------------------------	--------	------

➤ Frequency where a lower value leads the inverters outlet to synchronize with ACin

T2S Configuration Parameters

;373; ;AC : Fac_in High Stop ; ;53.0; ;Hz;

- Frequency where a higher value leads the inverters outlet to stop to synchronize with ACin

Caution: WHEN PARAMETER 75 IS SET ON 60Hz, 370 to 373 must be adapted (add 10Hz)

7.3.2 Parameters for AC groups

;380; ;AC 1 : Vac_in Low Start ; ;191.5; ;V;

- ACin Voltage where a higher value leads the ACin to start

;381; ;AC 1 : Vac_in Low Transfer ; ;181.5; ;V;

- ACin Voltage where a lower value leads to the transfer of the load from the ACin to DCin

;382; ;AC 1 : Vac_in Low Stop ; ;181.5; ;V;

- ACin Voltage where a lower value leads the ACin converter to stops
- It is possible to step down to 150 Vac. In this case, the AC/DC converter will run at a lower power. The converter DC/DC supply the rest (ONLY if DC is available, if not, there is a derating)

;383; ;AC 1 : Vac_in High Start ; ;258.5; ;V;

- ACin Voltage where a lower value leads the ACin converter re-start

;384; ;AC 1 : Vac_in High Transfer ; ;268.5; ;V;

- ACin Voltage where a higher value leads to the transfer the load of the charge from the ACin converter to the DCin converter

;385; ;AC 1 : Vac_in High Stop ; ;268.5; ;V;

- ACin Voltage where a higher value leads to stop the ACin converter

;386; ;AC 1 : Stop Power (1 : no power) ; ;0; ;;

- Use ACin for synchronization but could never take power from AC IN (sensor). Fuel cell

T2S Configuration Parameters

```
;390;      ;AC 2 : Vac_in Low Start ;           ;191.5;      ;V;
;391;      ;AC 2 : Vac_in Low Transfer ;       ;181.5;      ;V;
;392;      ;AC 2 : Vac_in Low Stop ;        ;181.5;      ;V;
;393;      ;AC 2 : Vac_in High Start ;      ;258.5;      ;V;
;394;      ;AC 2 : Vac_in High Transfer ;    ;268.5;      ;V;
;395;      ;AC 2 : Vac_in High Stop ;       ;268.5;      ;V;
;396;      ;AC 1 : Stop Power (1 : no power) ; ;0;          ;;
```

➤ The same as AC Group 1

```
;400;      ;AC 3 : Vac_in Low Start ;           ;191.5;      ;V;
;401;      ;AC 3 : Vac_in Low Transfer ;       ;181.5;      ;V;
;402;      ;AC 3 : Vac_in Low Stop ;        ;181.5;      ;V;
;403;      ;AC 3 : Vac_in High Start ;      ;258.5;      ;V;
;404;      ;AC 3 : Vac_in High Transfer ;    ;268.5;      ;V;
;405;      ;AC 3 : Vac_in High Stop ;       ;268.5;      ;V;
;406;      ;AC 1 : Stop Power (1 : no power) ; ;0;          ;;
```

➤ The same as AC Group 1

```
;410;      ;AC 4 : Vac_in Low Start ;           ;191.5;      ;V;
;411;      ;AC 4 : Vac_in Low Transfer ;       ;181.5;      ;V;
;412;      ;AC 4 : Vac_in Low Stop ;        ;181.5;      ;V;
;413;      ;AC 4 : Vac_in High Start ;      ;258.5;      ;V;
;414;      ;AC 4 : Vac_in High Transfer ;    ;268.5;      ;V;
;415;      ;AC 4 : Vac_in High Stop ;       ;268.5;      ;V;
;416;      ;AC 1 : Stop Power (1 : no power) ; ;0;          ;;
```

➤ The same as AC Group 1

7.4 Alarm Settings (ID 551 – 950)

- Global Parameters (ID : 551 - 600)

;551; ;Alarm on prog. relay (255 is NU); ;255; ;;

- Replace the “255” value by the Alarm Code you wish for activating the user selectable relay 3
- The alarms code list is available on request only.

;553; ;MAJ relay temporization; ;60; ;s;

- Temporization of Urgent alarm (from 0 to 65536 sec)

;554; ;MIN relay temporization; ;30; ;s;

- Temporization of NON-Urgent alarm (from 0 to 65536 sec)

;556; ;Saturation alarm threshold; ;80; ;%;

- Level of load for which an alarm is generated in order to indicate that there is a risk of overload
- This parameter takes into account the redundancy defined here before
- I.e. : system with 4 modules with 1 redundant → 80 % of 3 modules

;558; ;ACin is present (1:true 0:false); ;1; ;;

- Allow to inhibit the alarm when ACin not Present
- 1 → give alarm when main Network is not Present
- 0 → no alarm when main Network is not Present (AC in not available or Regular inverter)

;570; ;Log near. full thresh. (100-200); ;180; ;;

- Sets the number of messages in the log file that will trigger the alarm set at line 843

7.5 Configuration of alarms types

- Alarm Type (ID : 601 - 900) : Minor(1) - Major(2) - No Alarm(0)

- Choice for type of alarms as detailed hereafter
- No Alarm = 0 / Minor = 1 / Major = 2

;681; ;80.BROWNOUT DERATING; ;1; ;;

- Type of alarm when AC input voltage his under the limit at which it is not possible to take full power from grid. If need be, power will take from DC IN (since T2S version 3.20).

;828; ;227.DIG INP1 FAILURE; ;2; ;;

- Type of alarms for Digital inlet 1 (Inlet to be configured by user)

;829; ;228.DIG INP2 FAILURE; ;2; ;;

- Type of alarms for Digital inlet 2 (Inlet to be configured by user)

;830; ;229.REDUNDANCY LOST; ;1; ;;

- Type of alarm when redundancy is lost

;831; ;230.REDUND + 1 LOST; ;2; ;;

- Type of alarm more than the parametered number of modules of redundancy are lost.

;832; ;231.SYS SATURATED; ;1; ;;

- Type of alarms when the threshold of pre-alarm “overload” is over passed

;833; ;232.MAIN SOURCE LOST; ;2; ;;

- Type of alarm when Main source is lost
- In EPC mode : Main source is ACin = Network
- In ON LINE mode : Main source is DCin = battery

;834; ;233.SEC SOURCE LOST; ;1; ;;

- Type of alarm when Secondary source is lost
- In EPC mode : Secondary Source is DCin = battery
- In ON LINE mode : Secondary Source is ACin = Network

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;835; ;234. T2S BUS FAIL; ;2; ;;

- Type of alarm when Bus communication with T2S is lost

;836; ;235. T2S FAILURE; ;2; ;;

- Type of alarm when the T2S is no more running

;843; ;242. LOG NEARLY FULL; ;0; ;;

- Type of alarm when the “logfile” is nearly full

;845; ;244. Check log file; ;1; ;;

- Type of alarm when non critical non lasting abnormal conditions keep returning too frequently.

;846; ;245. Shutdown DC 1; ;1; ;;

- Type of alarm when the DC voltage for DC GROUP 1 is lower or equal than “Vdc in Low transfer” and mains is not present.

;847; ;246 Shutdown DC 2 -> DC 8; ;1; ;;

- Type of alarm when the DC voltage for DC GROUP 2 up DC GROUP 8 are lower or equal than “Vdc in Low transfer” and mains is not present.

;848; ;247 Missing module; ;1; ;;

- Type of alarm when the number of modules present in the system is lower than the number of modules parametered in the configuration. May occur if the redundancy is bigger than 2.

T2S Configuration Parameters

7.6 Configuration for User Alarms

- User Input Alarm Labels (ID : 901 - 950)

;901; ;Digital input 1 label; ;DIG INP1 FAILURE;;

- Replace the « DIG INP1 FAILURE » by a text corresponding to the User Alarm 1
- Maximum 16 characters
- When a Manual By-Pass is present in the system, the text must be “MBP ENGAGED” to allow for the synoptic animation. This digital input, in the same configuration, is also used to reduce the current in transfer position. This requires softwares versions 3.0 for the T2S and 194 for the inverter modules. T2S is 3.0 and for module inverter 194.

;902; ;Digital input 2 label; ;DIG INP2 FAILURE;;

- Replace the « DIG INP2 FAILURE » by a text corresponding to the 2d Alarm for User
- Maximum 16 characters
- When this Input is used with parameter 43 the text is a factory setting, which may not be changed.

;904; ;Inputs polarity (0:SC-1:open); ;0; ;

- Choice of the polarity of Users Alarms (1 & 2)
- 0 → Alarm when contact is close
- 1 → Alarm when contact is open

7.7 Modbus Settings (ID 951 – 1000)

;951; ;T2S Modbus slave address (1-247); ;1; ;

- Address for communication via Modbus

;952; ; Modbus baud rate (19200 or 9600); ;19200; ;

- Modbus communication speed

;953; ; Modbus polarity (0:no 1:odd 2:ev); ;2; ;

- Modbus polarity configuration

;954; ;Modbus stopbits (1 or 2); ;1; ;

- Modbus stopbits configuration

;955; ;Modbus write password; ;Modbus_T2S; ;

- Password for writing data in the memory via Modbus

8. Monitoring - CanDis

8.1 Introduction

The CanDis is an optional interface allowing the user to get information concerning the running system on display(s) and/or to access to the TSI inverter system from a remote computer/site using a web browser or SNMP protocol.

Depending on the requirements the CanDis would consist in one, two or three displays and/or TCPIP interface (Optional).



This picture shows CANDIS shelf with one display and one TCPIP in cubicle with BRAVO shelves

The parameters available on CanDis are voltages, currents, frequency, inverter configured etc.
(See details of displayed parameters in section 8.4.3, page 62)

Warning !!

The Candis Display and internal TCP-IP are powered from the auxiliary power supply of the modules which are limited in power. Therefore systems with only one module installed are not capable of supplying both Display and internal TCP-IP. In such cases it is recommended to use the external TCP-IP which has its own 230VAC/12VDC power supply. A 120Vac version is available on request.

8.2 Specifications

Depending on the requirements, the CanDis shelf may be equipped with the following:

	Code	Designations
CanDis Shelf	T302002000	CanDis Shelf supporting Displays and/or TCPIP
	T302003000	Display (1 to 3 units for 1PH to 3PH)
	T302007000	TCP IP
	Included in T30200200	Fixing device for mounting in cubicle supplied with CanDis Shelf
External	T302007010	TCP-IP external package.

The CanDis dimensions are:

- Length: 445mm (for 19" cabinet).
- Depth: 160 mm.
- Height: 44 mm (1U).

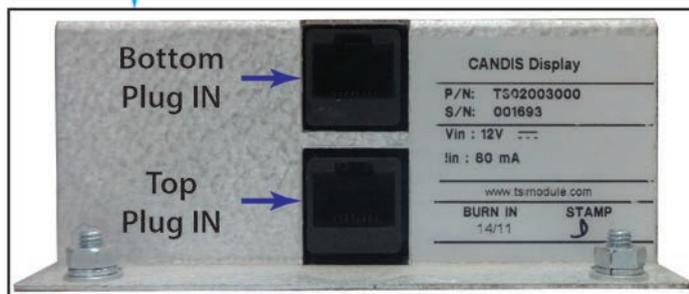
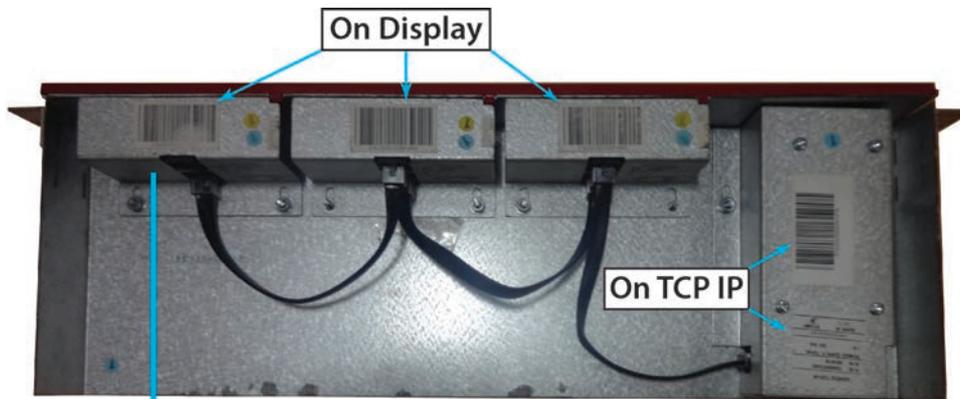
Weight: 1 to 3 kg according to options.

8.2.1 CanDis System Identification plate:

Part Number and Serial Number on Shelf



Part Number and Serial Number on Display and TCP IP



The PART NUMBER, SERIAL NUMBER and BURN IN DATE are essential information when you contact CE+T Power to get help in commissioning, in troubleshooting or when items are sent back for repair.

8.3 Installation

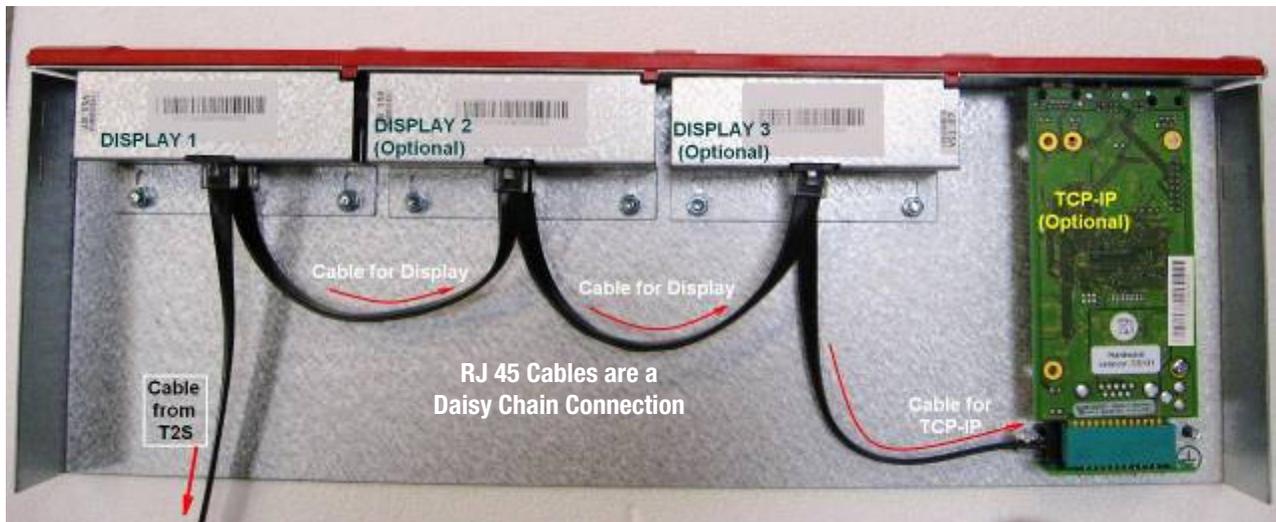
The CanDis is designed to be installed in 19" inches frame, it takes 1U height.

The CanDis is usually installed above the highest Inverter modules shelf and must be fastened with screws. (see picture on section 8.1, page 58)



Connect the RJ45 cable placed on the top of the inverter shelf (when top cabling cabinet) on the first display's top plug. Make sure that this RJ45 comes from the same shelf where the T2S is installed.

Each display has two RJ45 terminals that are used as IN or OUT equally.



When there are more than one displays in the CanDis shelf, connect the provided set of cables with the device between the free terminal on display 1 to display 2 and the same for the third display.

When a TCP/IP board is used with the displays, connect the set of cables provided with the device between the last display and the TCP/IP board black RJ45 connector as shown here above.

If the TCP/IP board is used separately without CanDis in the system, the cable from the T2S will be directly inserted in the TCP/IP black RJ45 connector.

The Candis shelf ground must be connected to cabinet ground.

Install the provided caged nuts on the frame of cabinet at the advised location for the CanDis shelf.

Fix the CanDis shelf in the cabinet by screwing the two screws in the caged nuts.

8.4 Display's User Interface and Configuration

8.4.1 Display and Buttons

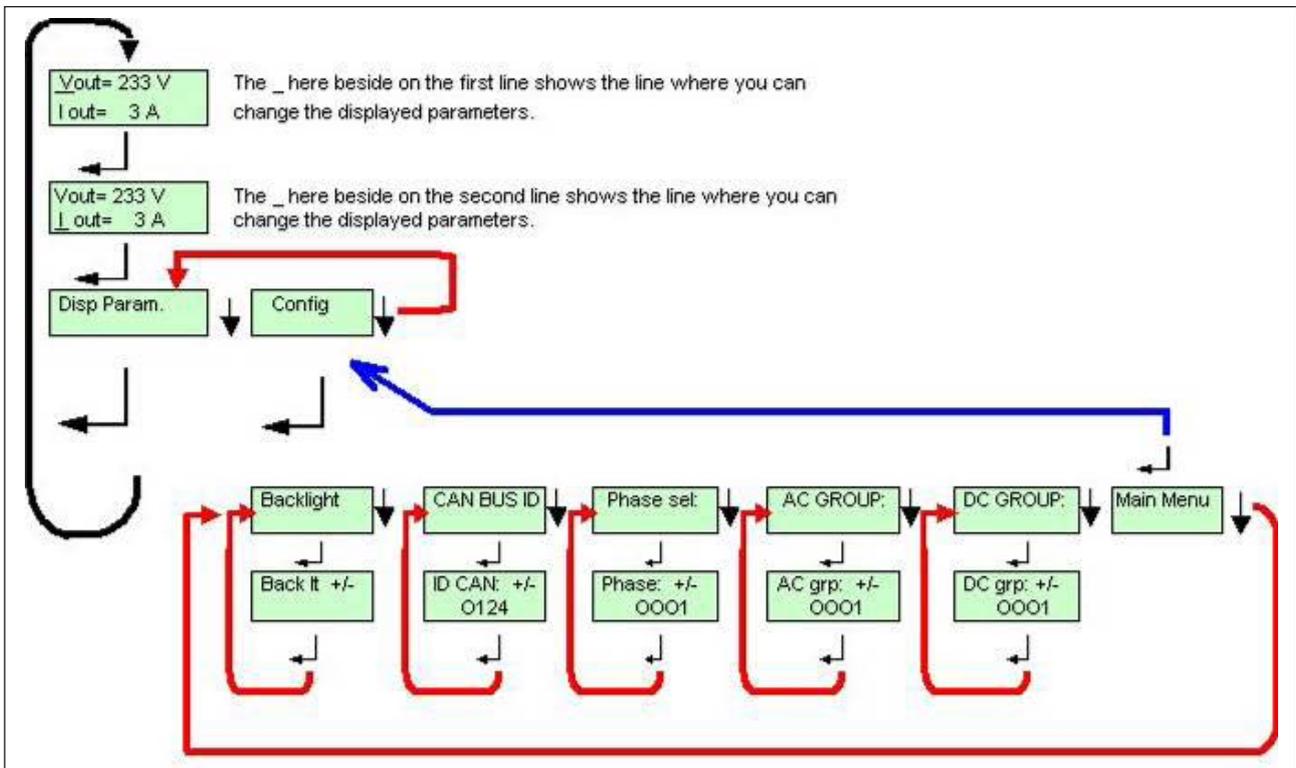


(Use a tip pen or a soft edge stick to push on buttons 2 ; 3 or 4)

- 1 → Display (2 lines provided to display information).
- 2 → Up button to scroll UP in the menus.
- 3 → Down button to scroll DOWN in the menus.
- 4 → Enter button to change display or validate modifications.

8.4.2 Display Configuration

8.4.2.1 Configuration block diagram.



8.4.2.2 Configuration

When more than one display is used on the same system, the CANBUS ID must be different and include values from 124 to 264 (i.e as 134; 144 ; 154, ...264).

The other information that can be configured are the related phase, the AC group or DC group, and the adjustment the backlight.

If the installed system is multi-phase or has multiple DC groups, the T2S and the inverter modules must be correctly configured to display the correct value by phase or DC group.

For instance in three phase systems, the inverter modules must be configured to show the 3 phases' output information, but also the one related to the three AC group who correspond to each AC input phase. By doing so, the display will show the values phase by phase.

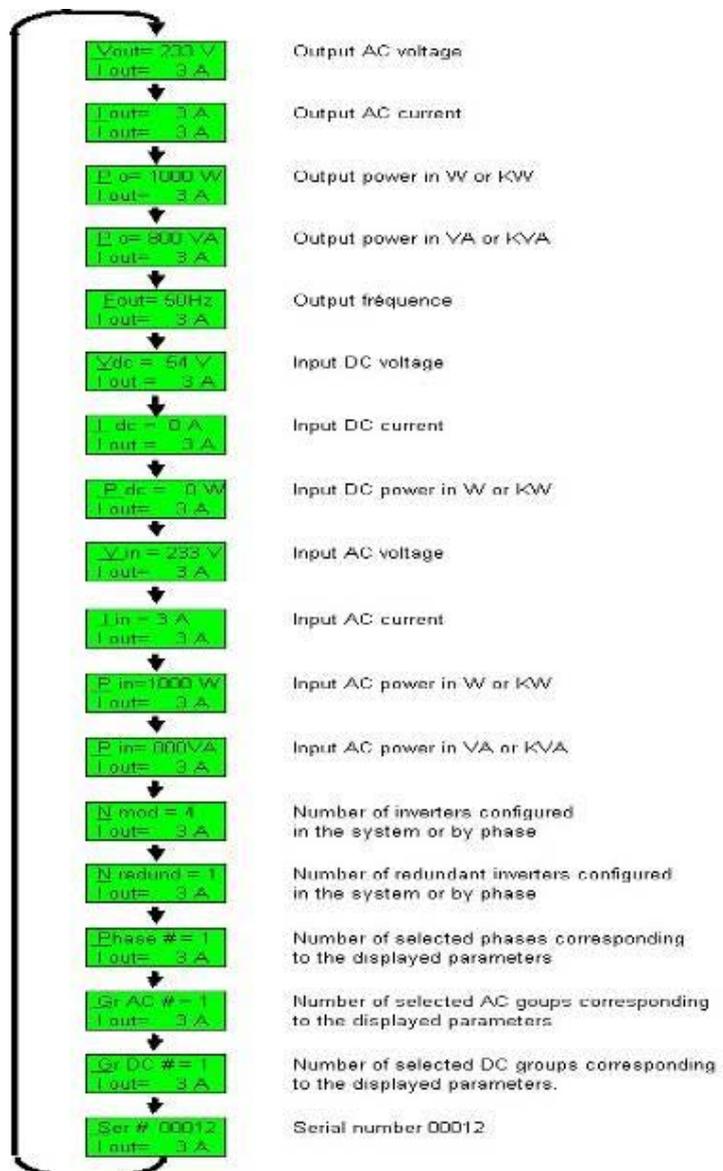
8.4.3 Variable available on Display

A display always shows two values. They can be different or the same (see the second green rectangle)

By default the selected parameters are different, but can be modified by the user.

The selected line is identified by an underscore under the first letter (i.e Vout = 230V).

To change the selected line, refer to section 8.4.2, page 61



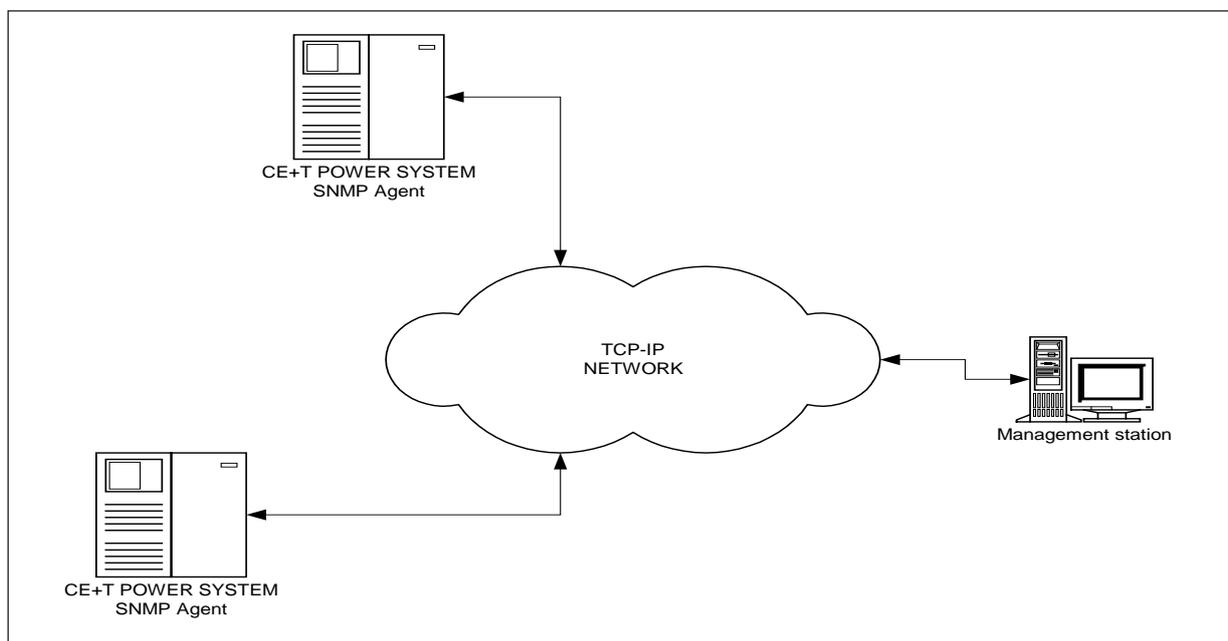
8.5 TCP/IP Interface and Configuration

8.5.1 Introduction

TCPIP-SNMP is a protocol allowing the user to have access to the system from a remote site using a web browser (configure and information display), or through SNMP (Simple Network Management Protocol) to only monitor the equipment. The available information will be the following: current, voltage, alarms, status

In our MODBUS network the TCPIP interface is the master and T2S is the slave. No other master should be installed on the MODBUS network when the TCPIP interface is foreseen.

The settings must be adapted with your LAN to give access through the firewall. Make sure to have it done by someone knowledgeable in the configuration of IT networks!



When equipped with the Web-SNMP interface, one can have access to:

1. A web browser (Internet explorer) through http protocol;
2. The SNMP protocol, which works like a client-server where there is only one client for the NMS (Network Management Station) and many servers (the equipments). The NMS can poll the TCPIP and TCP-IP can send traps to inform the NMS that one alarm has been activated.

The TCPIP interface CS121 and CS141 has multiple functionalities that are not used nor are validated with our TSI inverters.

IF ANY OTHER CONFIGURATION or PARAMETERS which are not in relation with the TSI inverter IS USED BY THE USER, IT IS UNDER THE CUSTOMER'S RESPONSIBILITY.

To be able to install WEB-SNMP interface you need the following equipment and capabilities:

- Operating manual for configuration.
- Your system must be equipped with TCPIP_IP interface.
- ETHERNET 10 /100 connection to your LAN with RJ45 crossover cable.
- Laptop or computer to set the parameters.
- IT network management know-how.

Monitoring - CanDis

8.5.2 Description



CS121



CS141

The powerful and flexible management card for TSI systems

CanDis / TCP-IP interface is a powerful and flexible network management card with autosensing Ethernet port included. CanDis / TCP-IP interface is a slot located inside the CANDIS Shelf.

Measurement values and alarms are written with time stamps into the non-volatile storage of the CanDis TCP-IP interface. The time synchronisation protocols are written with precise time values.

The CanDis TCP-IP Interface provides its users with a simple to use overview for a broad range of functionality within its monitoring and configurations capabilities. It has a high performing graphical analysis tool.

There is a live system on CE+T Power premises of which anyone can access the remote monitoring screens. Password and access address can be obtained from your sales representative.

For more details about CS121 and CS141, refer Annexe 12.1, page 85

SNMP

The CanDis TCP-IP supports standard MIB and MIB extensions to make all of its information gathered from other service devices available via SNMP, and can operate with major management platforms.

This MIB file can be obtained from your sales representative or from my.cet-power.com (if you're an end-user and not a CE+T customer, contact the company who has provided your TSI installation):

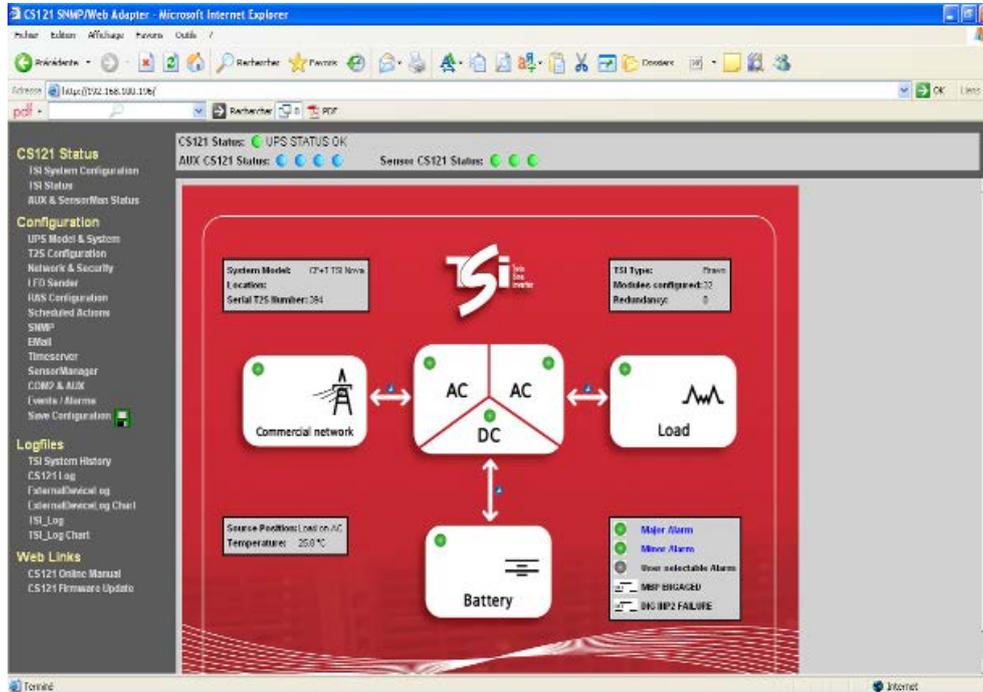
8.5.3 Configuration - CS121

This configuration procedure must be done through a web browser and requires a crossover Ethernet cable.

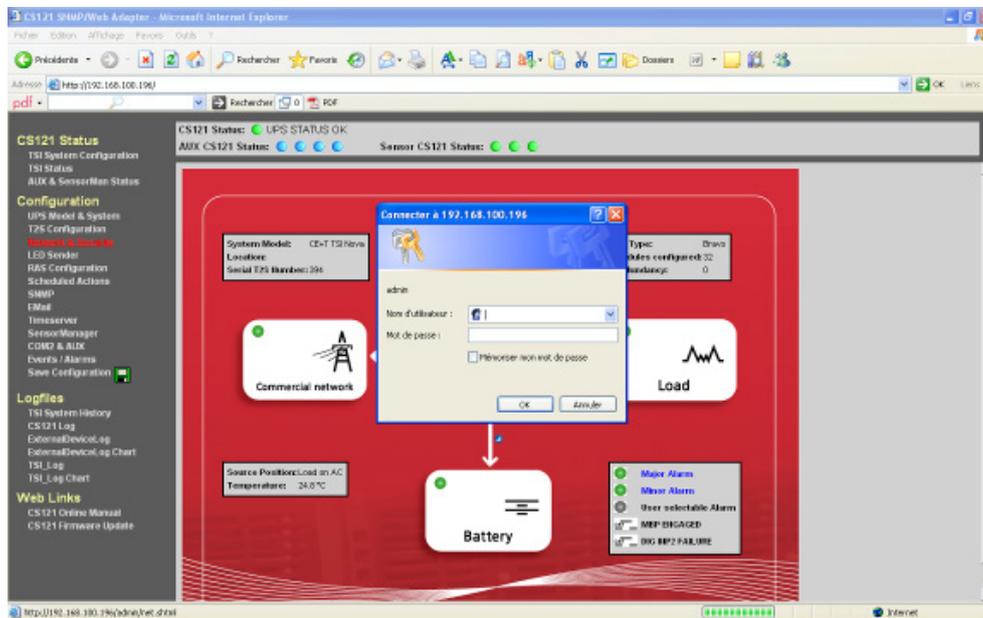
1. Connect the cross Ethernet cable between the Web-SNMP interface and your computer. At least one TSI inverter module and the T2S monitoring unit must be in function.
2. Fix in your computer an IP address near of the default address Web-SNMP address: "192.168.100.196". For instance choose " 192.168.100.194"
3. Open your favourite web browser and type in the URL field the following URL: <http://192.168.100.196>. If the default IP address was changed or if you don't know the last IP address, the only way to change the setting will using the section 8.5.5, page 68.

Monitoring - CanDis

If the settings are correct this home page should be displayed.



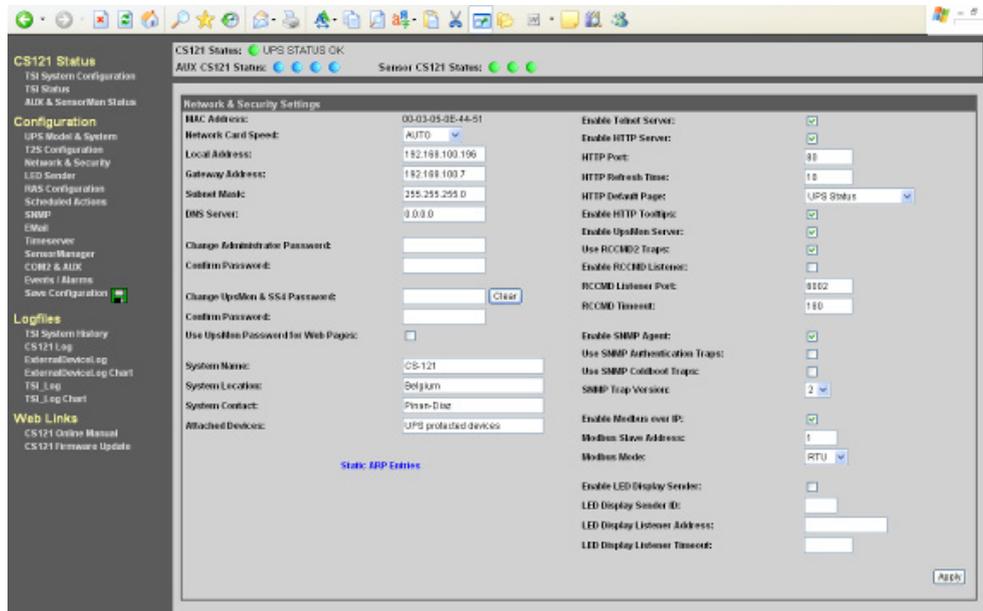
4. Select the menu "Network and security" to set the LAN parameters.



5. User name is: admin.
6. Password is: cs121-snmp.

Monitoring - CanDis

- The screen here below must appear after clicking on OK.



- Set the new parameter in relation with typical address used on the network where your device is installed. Let say that typical IP address in this area is "xxx.xxx.xxx.xxx". All new settings must be applied with clicking and will take them into account only after saving and rebooting.
- Select "SNMP" menu configuration if you will use this functionality.
- Go in the Save configuration menu here and use the function "save exit" and reboot the TCP-IP interface. After rebooting and saving, the new IP address will apply and you must change your computer's IP address to match with the one you have set in the TCP-IP interface.

The rebooting process will take 1 or 2 minutes.



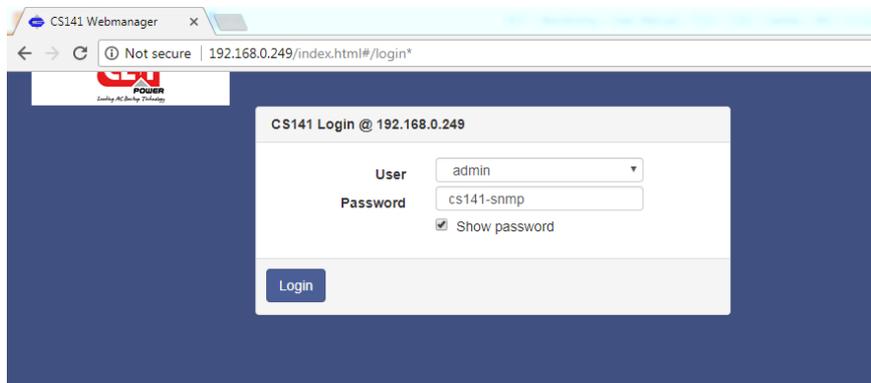
- Go to section 8.5.7, page 71 for explanations on the user interface.

8.5.4 Configuration - CS141

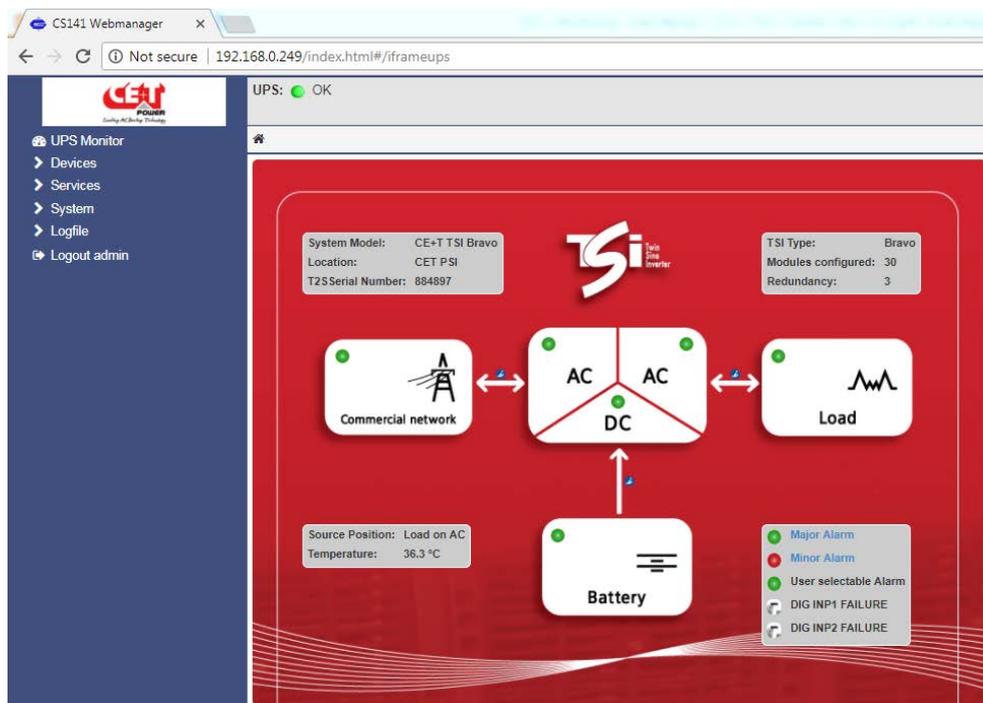
This configuration procedure must be done through a web browser and requires a crossover Ethernet cable.

1. Connect the cross Ethernet cable between the Web-SNMP interface and your computer. At least one TSI inverter module and the T2S monitoring unit must be in function.
2. Fix in your computer an IP address near of the default address Web-SNMP address: "192.168.100.196". For instance choose " 192.168.100.194"
3. Open your favourite web browser and type in the URL field the following URL: http://192.168.100.196. If the default IP address was changed or if you don't know the last IP address, the only way to change the setting will using the section 8.5.5, page 68.

If the settings are correct this home page should be displayed as follow.

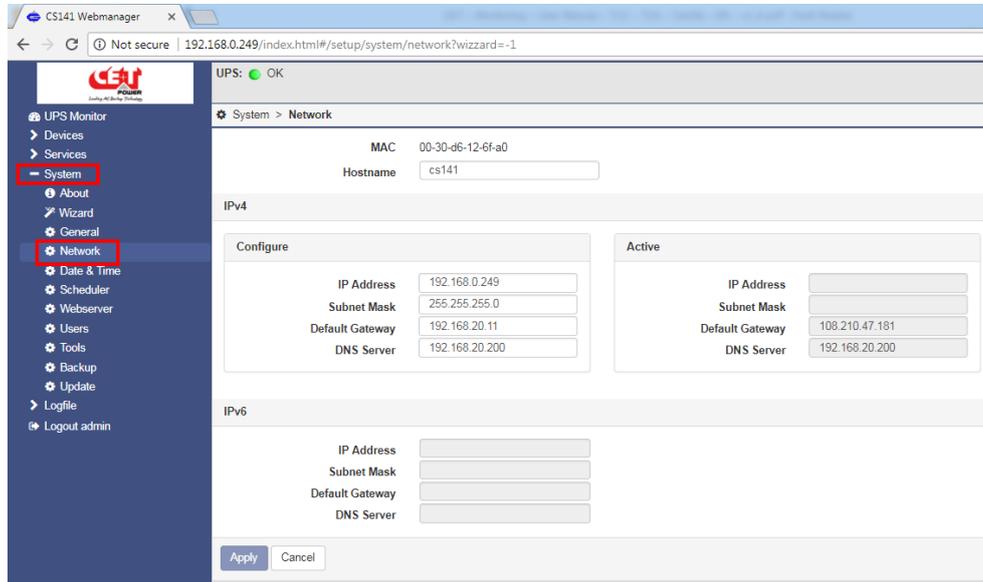


4. Select **User** as "admin" and **Password** is "cs141-snmp"
After successful login, the following screen will appear



Monitoring - CanDis

- Set the new parameter in relation with typical address used on the network where your device is installed. Let say that typical IP address in this area is "xxx.xxx.xxx.xxx". All new parameters will be taken into account only after clicking the "Apply" button.



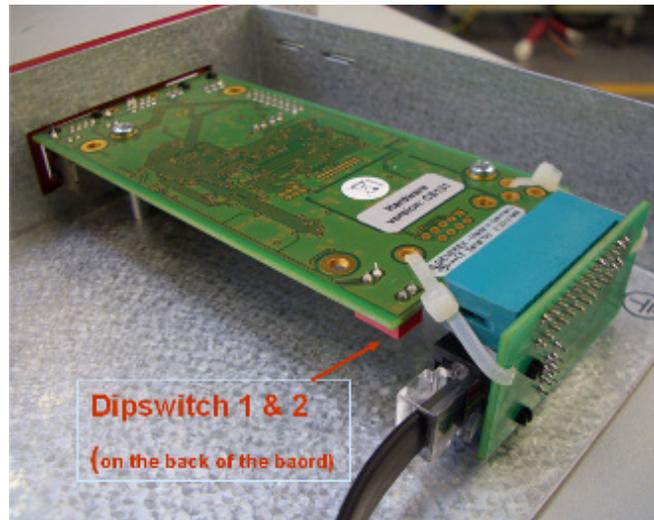
The rebooting process will take 1 or 2 minutes.

- Go to section 8.5.7, page 71 for explanations on the user interface.

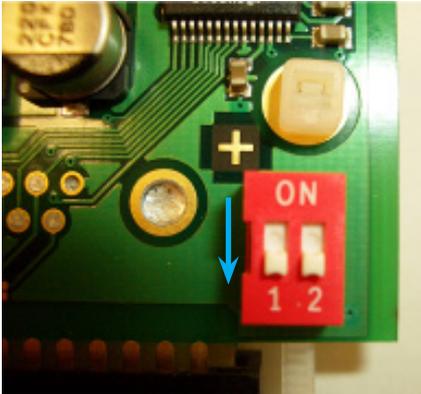
8.5.5 CS121 - Hardware Default Setting

This configuration needs a crossover Ethernet cable.

- Remove the screws that fix the CANDIS shelf on the cubicle frame.
- Remove the shelf and disconnect the RJ45 CAT straight cable connected on the TCP/IP interface.
- Set the 2 dipswitch on OFF position. Here picture shows localisation of DIPSWITCHES. Use a mirror to check the position of the Dipswitches 1 & 2.



Monitoring - CanDis



Please note that, in “Normal position” Dipswitch “1” is on the “ON” position and Dipswitch “2” is on “OFF” position. These are the positions when TCP IP is mounted on CanDis in the CE+T Factory.

4. Reconnect the RJ45 RJ45 CAT straight.
5. Connect the Ethernet cable between the Web-SNMP interface and your computer.
6. Fix in your computer one IP address near of the default “10.10.10.10” Web-SNMP address. For instance chose “10.10.10.11”.
7. Open your favourite web browser and type in the URL field the following address <http://10.10.10.10>. If the connection is not establish check the parameter in your laptop and your proxy server.
8. Follow the step 4, page 65 on section 8.5.3 to set the new address you have chosen as “xxx.xxx.xxx.xxx”.
9. Select SNMP menu configuration if you will use this functionality.
10. After saving and rebooting, you must disconnect the cable RJ45. (see point 2, page 68 on section 8.5.5).
11. Set the Dipswitch “1” in “ON” position when Dipswitch “2” is still in “OFF” position.
12. Reconnect the RJ45 cable and fix the CANDIS.
13. Go to section 8.5.7, page 71 for explanations on the user interface.



Monitoring - CanDis

8.5.6 CS141 - Hardware Default Setting

This configuration needs a crossover Ethernet cable.

1. Remove the screws that fix the CANDIS shelf on the cubicle frame.
2. Remove the shelf and disconnect the RJ45 CAT straight cable connected on the TCPIP interface.

Here picture shows localisation of DIP SWITCH.



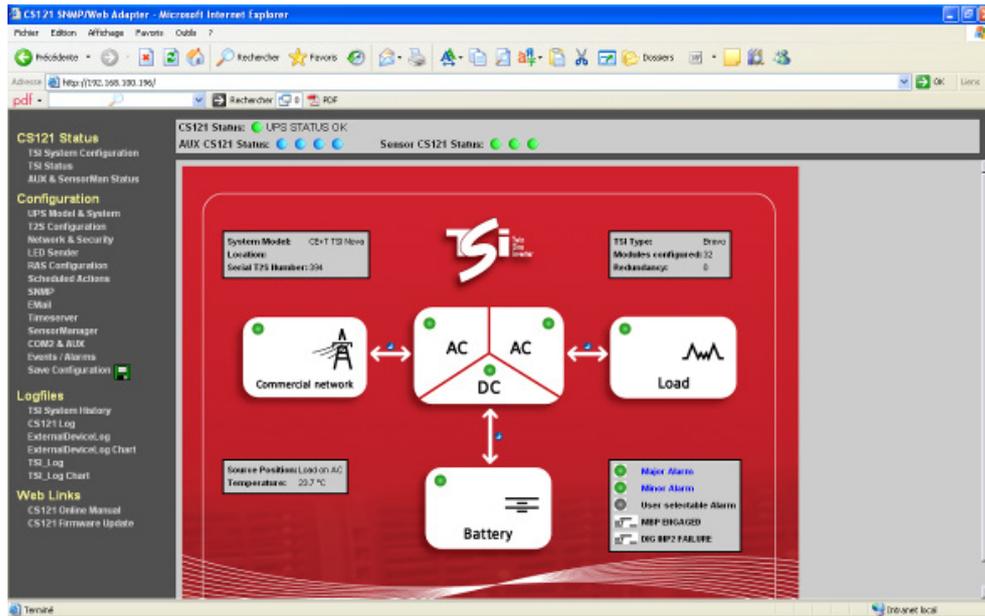
<p>Sliding switch center position:</p> <p>Enables configuration mode. After reboot the hard-coded IP address 10.10.10.10 is active.</p>	
<p>Sliding switch to the right:</p> <p>Automatic IP addressing: DHCP is activated and an IP address is set automatically. Check the MAC address of your CS141 to identify the IP address in the DHCP server table.</p>	
<p>Sliding switch to the left:</p> <p>Use of the IP address values manually configured. If DHCP is used, the IP address needs to be blocked for single usage.</p> <p>Note: Default switch position from the CE+T factory is Left</p>	

3. Reconnect the RJ45 CAT straight cable.
4. Connect the Ethernet cable between the Web-SNMP interface and your computer.
5. Fix in your computer one IP address near of the default "10.10.10.10" Web-SNMP address. For instance chose "10.10.10.11".
6. Open your favourite web browser and type in the URL field the following address <http://10.10.10.10>. If the connection is not establish check the parameter in your laptop and your proxy server.
7. Follow the step 3, page 67 on section 8.5.3 to set the new address you have chosen as "xxx.xxx.xxx.xxx".
8. Select SNMP menu configuration if you will use this functionality.
9. After saving and rebooting, you must disconnect the cable RJ45. (see point 2, page 70 on section 8.5.6).
10. Set the Dipswitch in "Left" position.
11. Reconnect the RJ45 cable and fix the CANDIS.
12. Go to section 8.5.7, page 71 for explanations on the user interface.

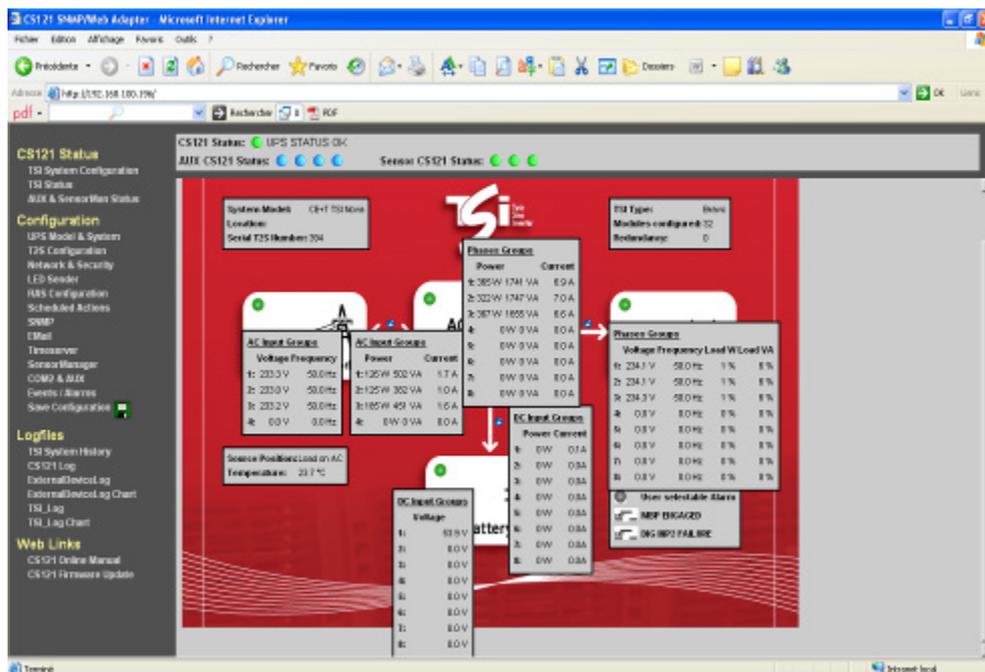
8.5.7 Web User Interface.

8.5.7.1 CS121

1. Fix in your computer an IP address close to the new IP address you have chosen in relation with area where device is installed i.e. “xxx.xxx.xxx.xxx” Web-SNMP.
2. Following screen will appear on your notebook.

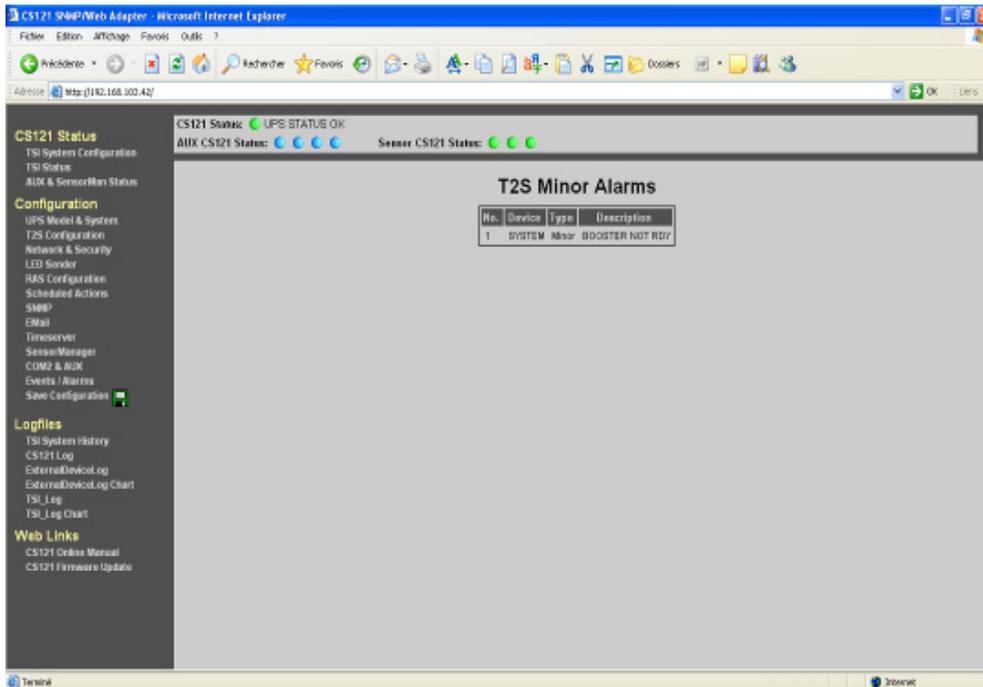


3. By clicking on the followings box “Commercial network”, “Battery”, “Load” and this information screens appears.

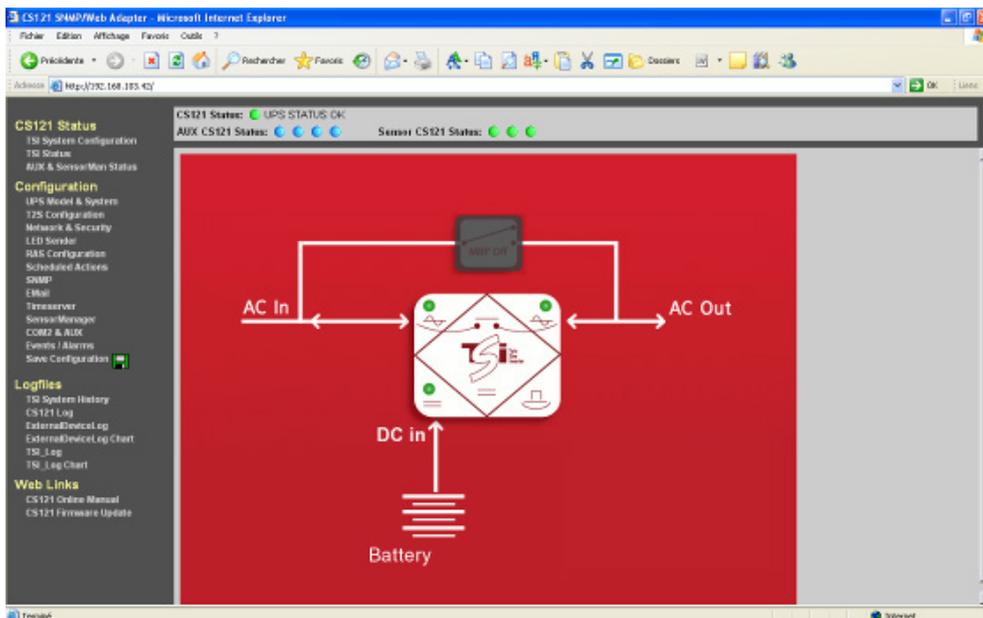


Monitoring - CanDis

- Green LEDs mean there is no alarm at the moment. If LEDs turn red one or more alarms are present. A click on the Major or Minor alarm line will bring up the following screen (information concerning a minor alarm in this case).



- The box on the middle "AC/DC/AC" converter will give access to the following screen.

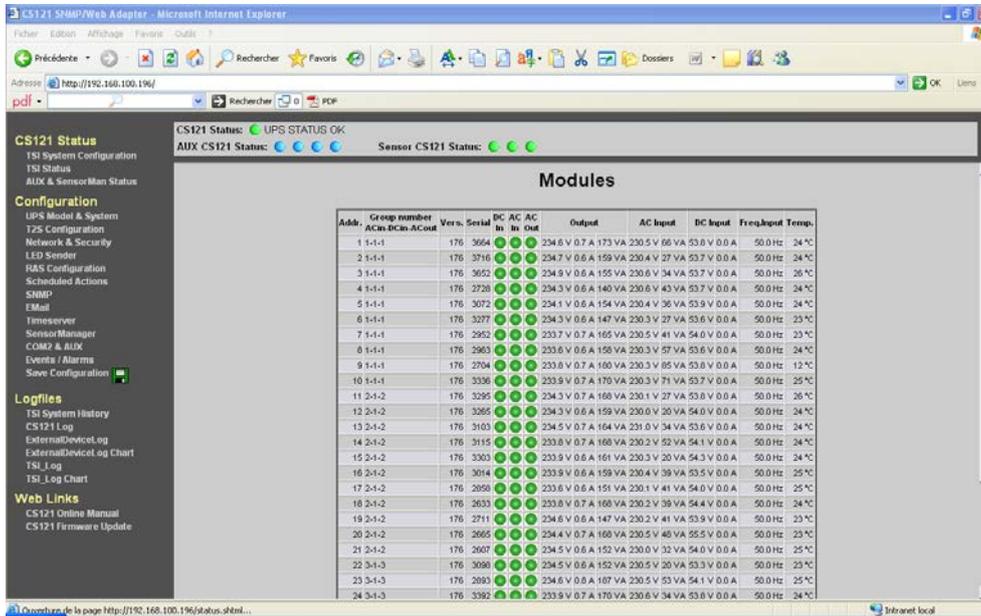


On above screen, the "MBP" box  is greyed because there is no MBP present on this system or because the text configuration in the T2S file is not correct (see line 901 in section 7.6, page 57).

Text on input digital must be ;MBP ENGAGED; (";" are essential and there is no space before and after the text).

Monitoring - CanDis

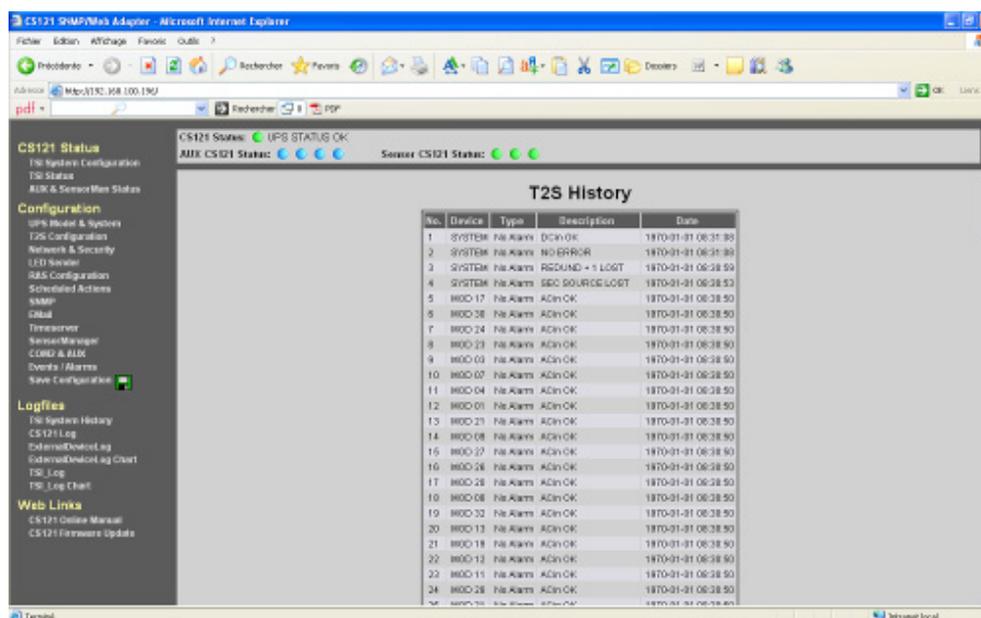
6. One click on the middle “TSI” box gives the inverter details screen.



Inverter details are as follows:

Addr.	Group number ACin-DCin-ACout	Vers.	Serial	DC In	AC In	AC Out	Output	AC Input	DC Input	Freq.Input	Temp.
1	1-1-1	176	3664	●	●	●	234.6 V 0.7 A 173 VA	230.5 V 66 VA	53.8 V 0.0 A	50.0 Hz	24 °C
2	1-1-1	176	3716	●	●	●	234.7 V 0.6 A 159 VA	230.4 V 27 VA	53.7 V 0.0 A	50.0 Hz	24 °C
3	1-1-1	176	3652	●	●	●	234.9 V 0.6 A 155 VA	230.6 V 34 VA	53.7 V 0.0 A	50.0 Hz	26 °C

7. When clicking on “TSI System History”, the screen displays the T2S History log.



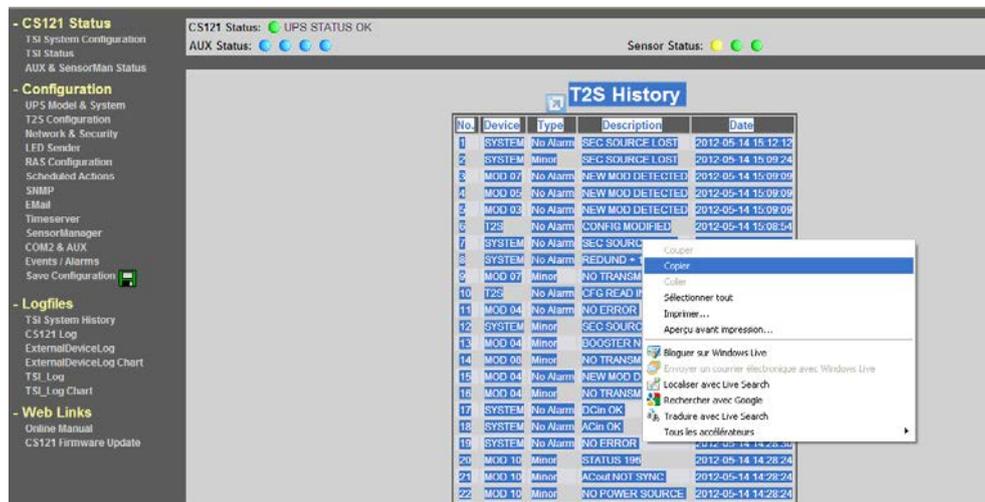
Up to 200 events are recorded and the newest supersedes the oldest.

No.	Device	Type	Description	Date
1	SYSTEM	No Alarm	DCin OK	1970-01-01 08:31:08
2	SYSTEM	No Alarm	NO ERROR	1970-01-01 08:31:08
3	SYSTEM	No Alarm	REDUND + 1 LOST	1970-01-01 08:30:59
4	SYSTEM	No Alarm	SEC SOURCE LOST	1970-01-01 08:30:53
5	MOD 17	No Alarm	ACin OK	1970-01-01 08:30:50
6	MOD 30	No Alarm	ACin OK	1970-01-01 08:30:50
7	MOD 24	No Alarm	ACin OK	1970-01-01 08:30:50
8	MOD 23	No Alarm	ACin OK	1970-01-01 08:30:50

Customer can copy the history log file in an .xls file.

Procedure:

- A) After retrieving the history log file.
- B) Press on right mouse button.
- C) Press on “select all” menu.
- D) Press on right mouse button again.
- E) Press on “copy” menu.
- F) Open an .xls file and past the data as “Paste Special”.
- G) Save your new file.



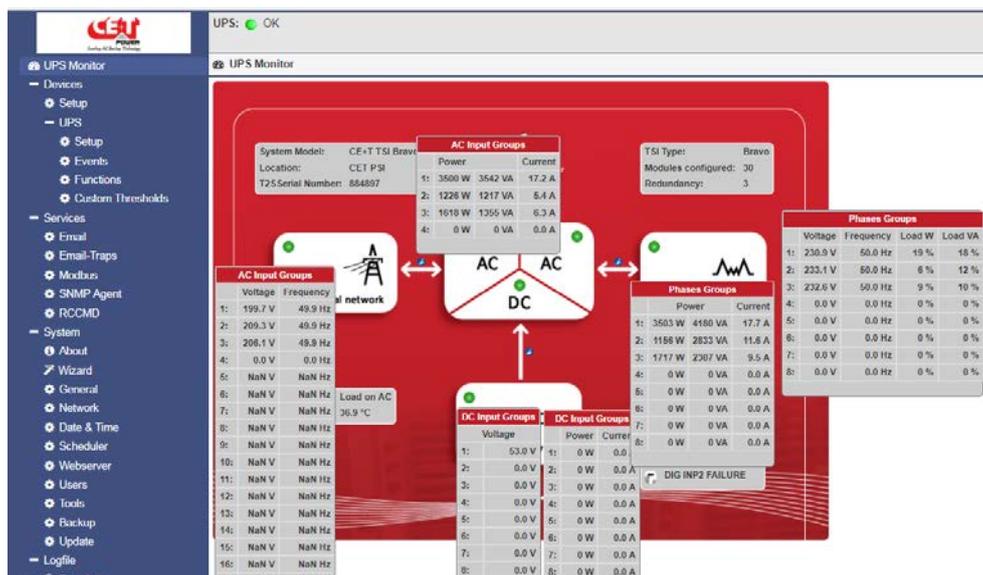
The screenshot shows the monitoring software interface for a CS121 system. The main window displays the 'T2S History' table, which is identical to the one shown in the previous image. A context menu is open over the table, showing options like 'Copier', 'Coller', 'Sélectionner tout', 'Imprimer...', and 'Aperçu avant impression...'. The interface also shows system status indicators at the top: 'CS121 Status: UPS STATUS OK' and 'AUX Status: [indicators]'. On the left, there is a navigation menu with sections for 'CS121 Status', 'Configuration', 'Logfiles', and 'Web Links'.

8.5.7.2 CS141

1. Fix in your computer an IP address close to the new IP address you have chosen in relation with area where device is installed i.e. “xxx.xxx.xxx.xxx” Web-SNMP.
2. Following screen will appear on your notebook.



3. By clicking on the followings boxes “Commercial network”, “Battery”, “Load” and the information screens appear.

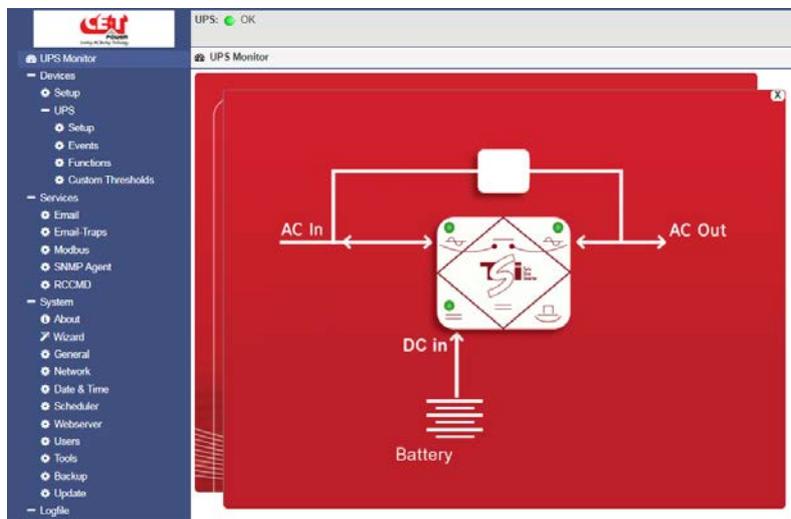


Monitoring - CanDis

- Green LEDs mean there is no alarm at the moment. If LEDs turn red one or more alarms are present. A click on the Major or Minor alarm line will provide the corresponding alarm in a new page. (The following image is minor alarm).



- Click on middle of the TSI Logo, the following pop up screen will appear.



- Click on middle of the TSI Logo in the pop up screen gives the modules detail screen.

Addr.	Group number ACin-DCin-ACout	Vers.	Serial	DC In	AC In	AC Out	Output	AC Input	DC Input	Freq. Input	Temp.
1	1-1-1	201	15350	●	●	●	229.7 V 1.7 A 397.0 VA	199.6 V 323.0 VA	52.9 V 0.0 A	49.9 Hz	37.0 °C
2	1-1-1	203	20856	●	●	●	229.5 V 1.7 A 403.0 VA	199.9 V 333.0 VA	52.4 V 0.0 A	49.9 Hz	37.0 °C
3	1-1-1	203	29048	●	●	●	229.7 V 1.7 A 406.0 VA	199.7 V 311.0 VA	52.6 V 0.0 A	49.9 Hz	37.0 °C
4	1-1-1	203	22666	●	●	●	236.8 V 1.7 A 419.0 VA	200.0 V 330.0 VA	53.3 V 0.0 A	49.9 Hz	36.0 °C

Inverter details are as follows:

Addr.	Group number ACin-DCin-ACout	Vers.	Serial	DC In	AC In	AC Out	Output	AC Input	DC Input	Freq. Input	Temp.
1	1-1-1	201	15350	●	●	●	229.7 V 1.7 A 397.0 VA	199.6 V 323.0 VA	52.9 V 0.0 A	49.9 Hz	37.0 °C
2	1-1-1	203	20856	●	●	●	229.5 V 1.7 A 403.0 VA	199.9 V 333.0 VA	52.4 V 0.0 A	49.9 Hz	37.0 °C
3	1-1-1	203	29048	●	●	●	229.7 V 1.7 A 406.0 VA	199.7 V 311.0 VA	52.6 V 0.0 A	49.9 Hz	37.0 °C
4	1-1-1	203	22666	●	●	●	236.8 V 1.7 A 419.0 VA	200.0 V 330.0 VA	53.3 V 0.0 A	49.9 Hz	36.0 °C

7. When clicking on **Logfile > UPS Alert History**, T2S History screen will appear.



Up to 200 events are recorded and the newest supersedes the oldest.

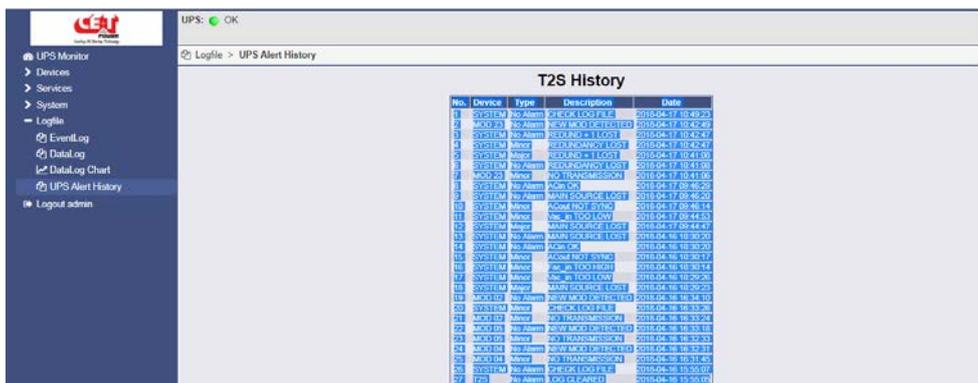
T2S History

No.	Device	Type	Description	Date
1	MOD 23	No Alarm	NEW MOD DETECTED	2018-04-17 10:42:49
2	SYSTEM	No Alarm	REDUND + 1 LOST	2018-04-17 10:42:47
3	SYSTEM	Minor	REDUNDANCY LOST	2018-04-17 10:42:47
4	SYSTEM	Major	REDUND + 1 LOST	2018-04-17 10:41:08
5	SYSTEM	No Alarm	REDUNDANCY LOST	2018-04-17 10:41:08
6	MOD 23	Minor	NO TRANSMISSION	2018-04-17 10:41:06
7	SYSTEM	No Alarm	ACIn OK	2018-04-17 09:46:29
8	SYSTEM	No Alarm	MAIN SOURCE LOST	2018-04-17 09:46:20
9	SYSTEM	Minor	ACOut NOT SYNC	2018-04-17 09:46:14

Customer can copy the history log file in an Excel file (.xls).

Procedure:

- A) After retrieving the history log file.
- B) Press on right mouse button.
- C) Press on “select all” menu.
- D) Press on right mouse button again.
- E) Press on “copy” menu.
- F) Open a new excel file and past the data as “Paste Special”.
- G) Save file.



8.5.8 Control SNMP functionalities.

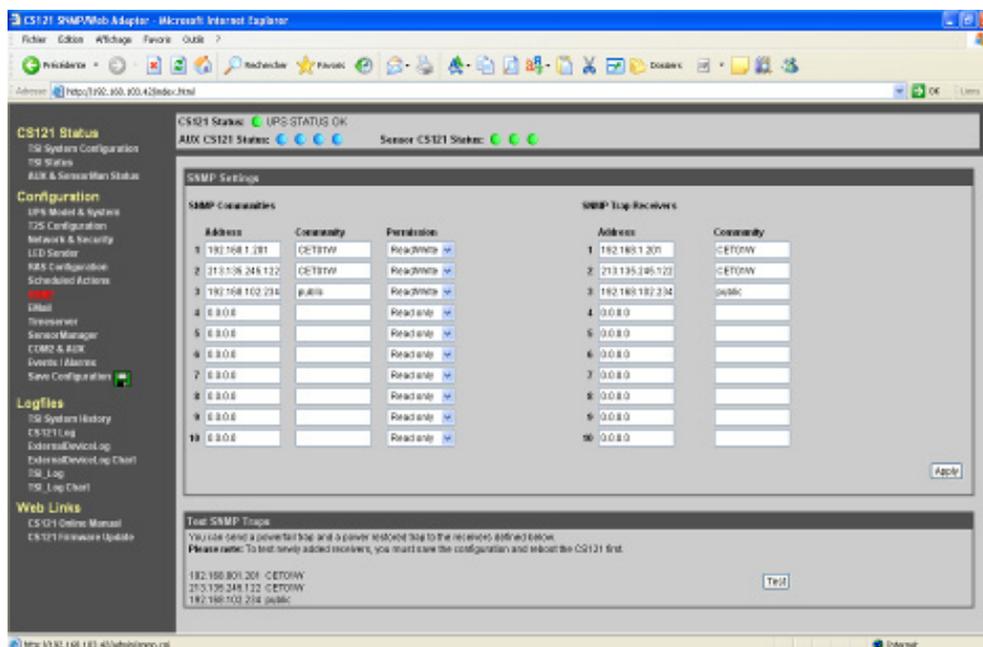
SNMP Reliability

Please pay also attention to the fact that SNMP trap is not 100% a secure way to rely on for monitoring. Traps should be considered (and that's the way they are defined according to SNMP protocol) as a notification service of a particular SNMP agent to catch attention from the monitoring station on a special event. The reason is that there is no guarantee that a trap sent is always correctly received. If a trap is lost, it will be lost forever. In those conditions, a 100% reliable SNMP monitoring will always use polling on critical parameters through SNMP. Use the "GET commands" ("Polling request") rather than counting only SNMP traps reception.

8.5.8.1 CS121 SNMP Configuration

In the configuration Menu select SNMP submenu and set or check the LAN parameter.

Parameter will apply only after saving and rebooting. A test functionality will be use to check the Trap.



SNMP Check

Before installing the equipment on your network we recommend to check the functionalities directly on your laptop.

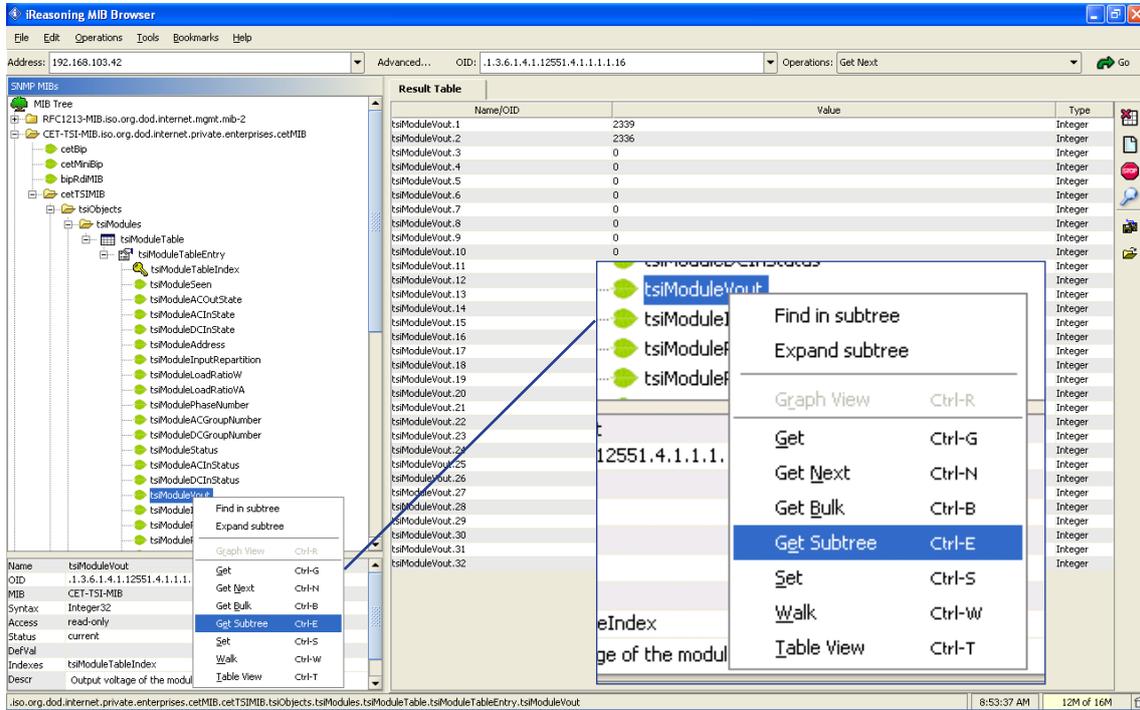
Proceed as mentioned below:

- Set the IP address as explained in section 8.5.3, page 64.
- Install on your laptop a free MIB browser (i.e; ireasoning)
- Load the related MIB file in the MIB browser.
- Configure the MIB browser to receive OID and Traps IP settings.

Following MIB file are available on my.cet-power.com (if you're an end-user and not a CE+T customer, contact the company who has provided your TSI installation):

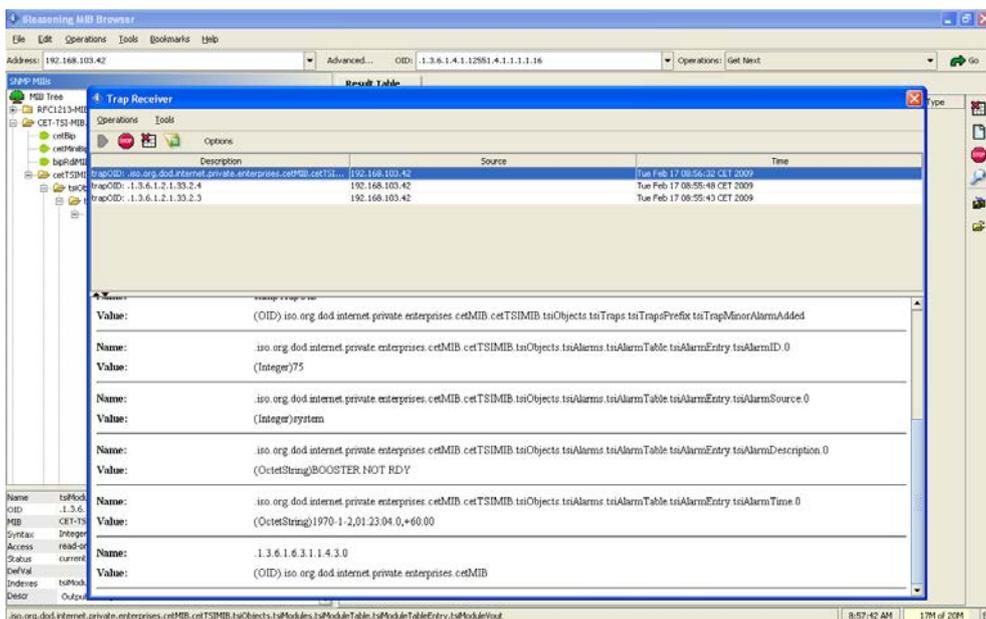
CET-TSI-MIB.mib	for TSI purpose
CET-TSI-SMI.mib	for TSI purpose
RFC1628cs121.mib	for CS121 purpose

Test Polling OID



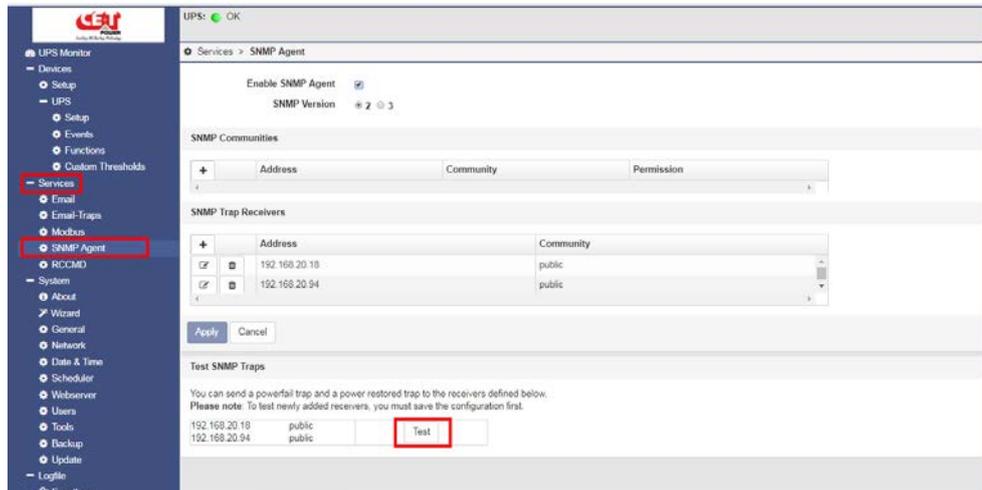
Test traps receiver. Following setting must applied be (SNMP V1 or V2).

Port	161
Read Community	Public
Write Community	Public
SNMP Version	1

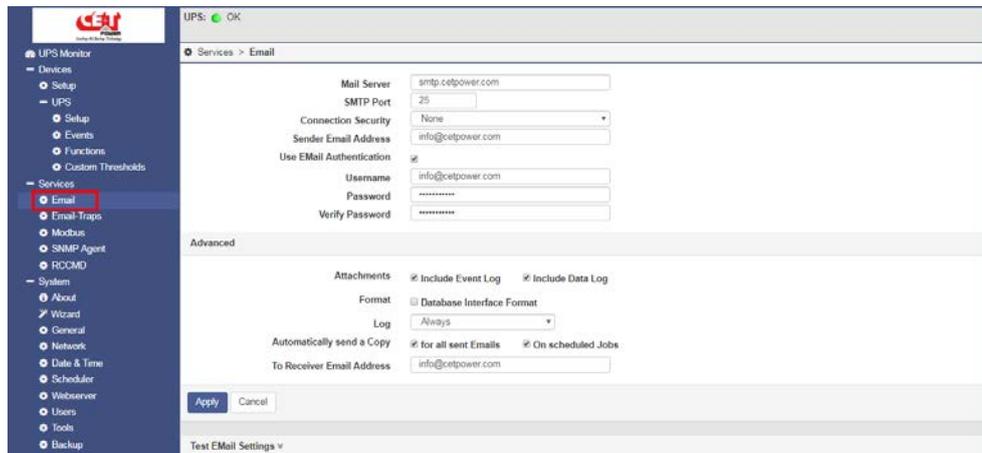


8.5.8.2 CS141 SNMP Configuration

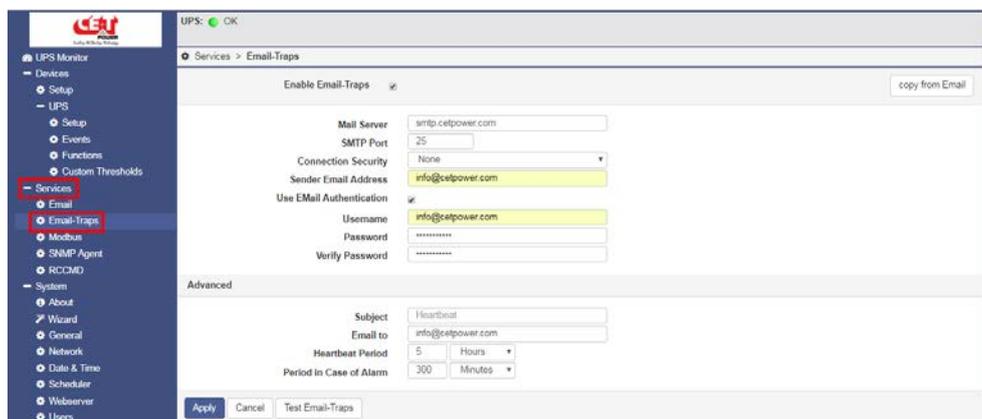
- **SNMP:** In the main menu select **Services > SNMP Agent**, set or check the SNMP parameters. A Test functionality will be use to check the Trap.



- **Email:** In the main menu select **Services > Email**, configure the email parameters.

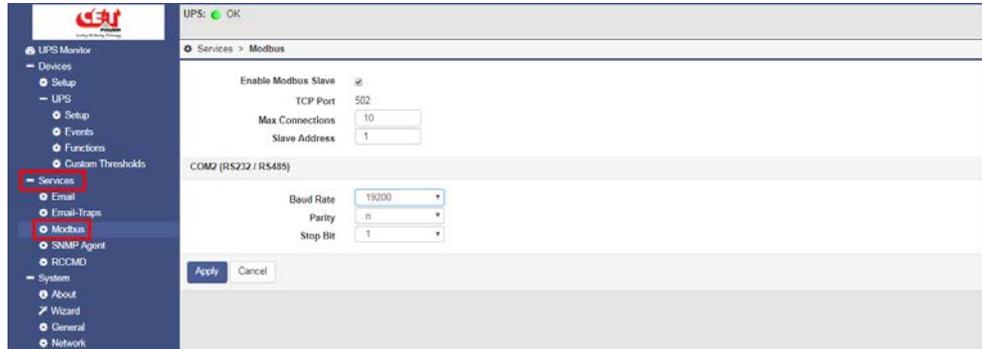


- **Email-Traps:** In the main menu select **Services > Email**, configure the email-traps parameters.



Monitoring - CanDis

- **Modbus:** In the main menu select **Services > Modbus**, set the Modbus parameters.



8.5.9 TCPIP Troubleshooting Procedure.

If there is NO ACCESS TO THE TCPIP INTERFACE:

- Check the IP setting on your laptop
- Check the IP setting introduced in the TCP-IP interface (IP, GW, NM, PORT etc)
- Check if the Ethernet cable truly is a 'crossover' one
- Check if the TCPIP is fed (power supply)
- Use the PING function to check the presence of the device
- Use hardware default IP to recover connection (see section 8.5.5, page 68)

ACCESS TO TCPIP INTERFACE WITHOUT TSI VALUE:

- Wait 1 or 2 minutes while the device reads the serial values.
- Check if the cable is properly connected to the T2S shelf.
- Check if the T2S it is indeed located on the same shelf as the one to which the RJ45 communication cable is connected.
- Replace the T2S by a new one.

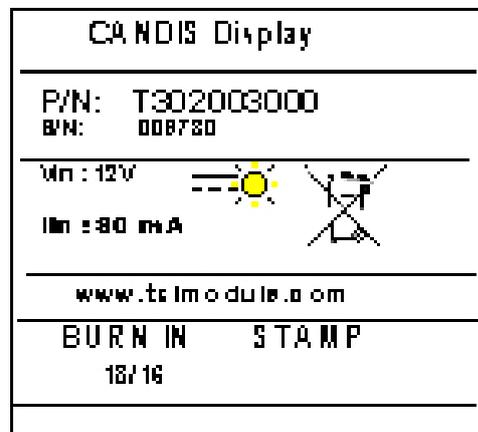
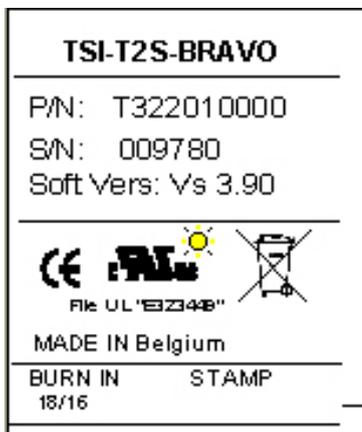
9. Defective Situations Fixing

9.1 Return defective T2S interface

A T2S totally dark (indication area) or that cannot interface with your laptop are evidence of failure. Proceed as per section 9.1.1, page 82

9.1.1 Return defective unit

- 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 given through Menu 2-1 shall be attached to defective unit return package or recorded in RMA.





10. 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 call CE+T directly. Toll free Number **1(855) 669 - 4627(**)**

Service is available from 8:00 A.M. to 10:00 P.M. EST, Monday through Friday, except closing periods for holidays or inclement weather.

Major Incidents and Emergency conditions can be invoked for immediate handling of same number or by dropping a mail on customer.support@cet-power.com or customer.support@cetamerica.com (***)

- (*) CE+T will redirect your call to your vendor if he has such SLA in place.
- (**) Valid in USA and Canada only.
- (***) Messages that are not Major Incident or Emergency will be served at the next scheduled working a day.

11. Maintenance Task¹

As maintenance will perform on live system, all task should perform only by trained people with sufficient acknowledge on TSI product.

Tasks :

- Identify the site, customer, responsible, cabinet 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 analyze 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 analyze 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 internal dust built up clean the TSI with vacuum cleaner and/or soft compressed air.
- Clean cabinet (vacuum cleaner or dry cloth)
- Control the inverter 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 I from power analyzer.
- Take cabinet picture
- Keep track of report and provide end user with a copy.
- Perform a MBP procedure. This task is not really recommended*, but could be demanded by site manager.

* It is not recommended because when you perform a By-pass procedure, generally there is no back up on AC input line, and the load shutdown if mains disappear.

¹ This section is not relevant for T1S, T2S, and Candis. But it is applicable for all other CE+T power products.

12. ANNEXE

12.1 CS121 Vs CS141

CS141		CS121	
Feature	Customer advantage	Feature	Restrictions
Processor ARM Cortex A8 800 MHz	<ul style="list-style-type: none"> Higher performance in comparison to CS121 (app. 10 times faster) The CS141 uses open Source for future development Future-proof platform 	32-Bit RISC-Processor	<ul style="list-style-type: none"> No compatible source code available Limited development
Flash memory 512MB	<ul style="list-style-type: none"> Bigger capacity, over 4500 log file entries Can be used as BACS Webmanager 	Max. memory size 64MB (for BACSKIT_B/ BSC/BII)	<ul style="list-style-type: none"> Logfiles about 12-16h
DIP switches on the front plate	<ul style="list-style-type: none"> No remove from slot necessary if change required 	DIP switches on motherboard	<ul style="list-style-type: none"> Remove from slot necessary to change settings of the DIP switch
Different users	<ul style="list-style-type: none"> Different authorization Only administrative users can change network settings 	Only one user	<ul style="list-style-type: none"> Only one user with admin rights
Leaner menu structure	<ul style="list-style-type: none"> Easier configuration Easier event handling Faster and easier to use 	Classic menu	<ul style="list-style-type: none"> Restricted event configuration
Firmware Update via "Drag & Drop"	<ul style="list-style-type: none"> Easier handling Firmware update possible with every browser independent from OS 	Firmware Update via Flash Wizard	<ul style="list-style-type: none"> Windows is necessary for firmware update FTP must be active (in newer network structures this is often complicated)
BACS	<ul style="list-style-type: none"> Integrated 	BACS	<ul style="list-style-type: none"> Not available for CS121SC/L A BACS Webmanager has to be used
Changed settings are taken over immediately	<ul style="list-style-type: none"> No save, exit & reboot required Simplified operation Massive time saving 	Save, Exit and Reboot required	<ul style="list-style-type: none"> Changing configuration and saving needs about 5 -10 minutes every time
Auto log out + advanced security settings	<ul style="list-style-type: none"> Higher security due HTTPS and SSH 	No auto log out, no SSH, limited https	<ul style="list-style-type: none"> Security is restricted The CS121 fails many security tests because of using old interfaces
Rescue Boot Mode	<ul style="list-style-type: none"> Second OS for backup completely usable 	No rescue system	<ul style="list-style-type: none"> Repairing is possible only with Flash wizard Complete loss of configuration

ANNEXE

USB Port	<ul style="list-style-type: none"> Connecting UPS devices with USB is possible in future versions 	No USB port	<ul style="list-style-type: none"> Tools only available via COM2
AUX Port with Serial Protocol	<ul style="list-style-type: none"> Robust against UPS noise through RS232 Longer cable wires possible than CS121 (up to 20 meters), for CON_R_AUX/CON_AUX 	AUX Port with Optokoppler	<ul style="list-style-type: none"> Prone for UPS noise Only short wires for AUX, less than 1meter
RCCMD Broadcasting	<ul style="list-style-type: none"> Possible with new firmware Through this functions whole networks segments can be shut down within a few seconds 	RCCMD Broadcasting	<ul style="list-style-type: none"> CS121 can only use single IP addresses for RCCMD Shutdown No broadcasting (Command gathering)
SMS via IP Modem (RASMAN_G_II)	<ul style="list-style-type: none"> Possible, RASMAN_G_II can be installed anywhere (better transmission/signal) 	SMS via IP Modem (RASMAN_G_II)	<ul style="list-style-type: none"> CS121 can not handle IP modemsrestricted to signal of GSM modem range
IP V4 / V6	<ul style="list-style-type: none"> Both are possible 	IP V4 / V6	<ul style="list-style-type: none"> Only IPv4
CS141LM/SCM terminal strip instead of Mini DIN8 plug	<ul style="list-style-type: none"> No soldering necessary 	Mini DIN 8 connector	<ul style="list-style-type: none"> Mini DIN8 plug requires soldering
Mean Time before Failure	<ul style="list-style-type: none"> MTBF 100 years 	Mean Time before Failure	<ul style="list-style-type: none"> 10 years, components of CS121 are >10 years no longer available
Preise	<ul style="list-style-type: none"> Identical price as CS121 range 	Prices	<ul style="list-style-type: none"> Components for CS121 are no longer available respectively very expensive no spare parts available
Performance in High network load networks	<ul style="list-style-type: none"> 10 times faster than CS121 	Performance	<ul style="list-style-type: none"> The CPU of the CS121 is overloaded in bigger networks and causes reboots of the device. Only possibility is to limit traffic which is often denied by customers
Standards	<ul style="list-style-type: none"> Embedded OS, industry standard 	Standards	<ul style="list-style-type: none"> Embedded OS, but not Linux but POSIX (outdated) Proprietary Generex OS The CS121 can not receive any more update which affect the OS Vulnerable to hackers, outdated SSL TLS lib.
Current consumption	<ul style="list-style-type: none"> 12V (min. 9V, max. 30V DC), 150 mA 	Current consumption	<ul style="list-style-type: none"> 12V (min. 9V, max. 30V DC), 160 mA
Boot phase	<ul style="list-style-type: none"> Less than 30 seconds 	Boot phase	<ul style="list-style-type: none"> Between 5 and 10 minutes

