INSTALLATION & OPERATING MANUAL

BRAVO TSI 48-120
RACK-MOUNT HOT SWAPPABLE INVERTER SYSTEM

Document Number: TSI48120-MAN Rev. 1

UNIPOWER, LLC
65 Industrial Park Rd
Dunlap, TN 37327
Phone: +1-954-346-2442
Toll Free: 1-800-440-3504
Web site: www.unipowerco.com

Product Support

Product support can be obtained using the following addresses and telephone numbers.

Corporate office:	Manufacturing facility:	Manufacturing facility:
UNIPOWER, LLC	UNIPOWER, LLC	UNIPOWER Slovakia SRO
210 N University Dr	65 Industrial Park Rd	ZLATOVSKA 1279
Coral Springs, FL 33071	Dunlap, TN 37327	Business Center 22
United States	United States	91105 Trencin, Slovakia

Phone: +1-954-346-2442
Toll Free: 1-800-440-3504
Web site – www.unipowerco.com

When contacting UNIPOWER, please be prepared to provide:

1. The product model number, spec number, S build number, and serial number - see the equipment nameplate on the front panel
2. Your company's name and address
3. Your name and title
4. The reason for the contact
5. If there is a problem with product operation:
    - Is the problem intermittent or continuous?
    - What revision is the firmware?
    - What actions were being performed prior to the appearance of the problem?
    - What actions have been taken since the problem occurred?

REV	DESCRIPTION	CHK'd & APPR'd / DATE
1	PCO# 45613	CM / 05-21

Contents

1. 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
MCB	Miniature Circuit Breaker
MCCB	Molded Case Circuit Breaker
CB	Circuit Breaker

2. 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.

2.1 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.

2.2 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 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 know 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.
- Never wear metallic objects such as rings, watches, or bracelets during installation, service and maintenance of the product.
- Insulated tools must be used at all times when working with live systems.
- When handling the system/units pay attention to sharp edges.

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

2.3 Installation

- This product is intended to be installed only in restricted access areas as defined by UL60950 and in accordance with the National Electric Code, ANSI/NFPA 70, or equivalent agencies.
- The Inverter System may contain output over current protection in the form of circuit breakers. In addition to these circuit breakers, the user must observe the recommended UL listed upstream and downstream circuit breaker requirements as defined in this manual.
- Please use extreme caution when accessing circuits that may be at hazardous voltages or energy levels.
- The 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.
- REG systems and EPC systems that have no AC input wired and connected can be seen as independent power sources. **To comply with local and international safety standards N (output) and PE shall be bonded. The bonded connection between N (output) and PE must be removed once the AC input is connected.**
- 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.

2.3.1 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.

2.3.2 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. 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.

2.3.3 Other

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

2.4 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.
- Inverter modules and shelves contain capacitors for filtering and energy storage. Prior to accessing the system/ modules after power down, wait at least 5 minutes to allow capacitors to discharge.
- Some components and terminals carry high voltage during operation. Contact may result in fatal injury.

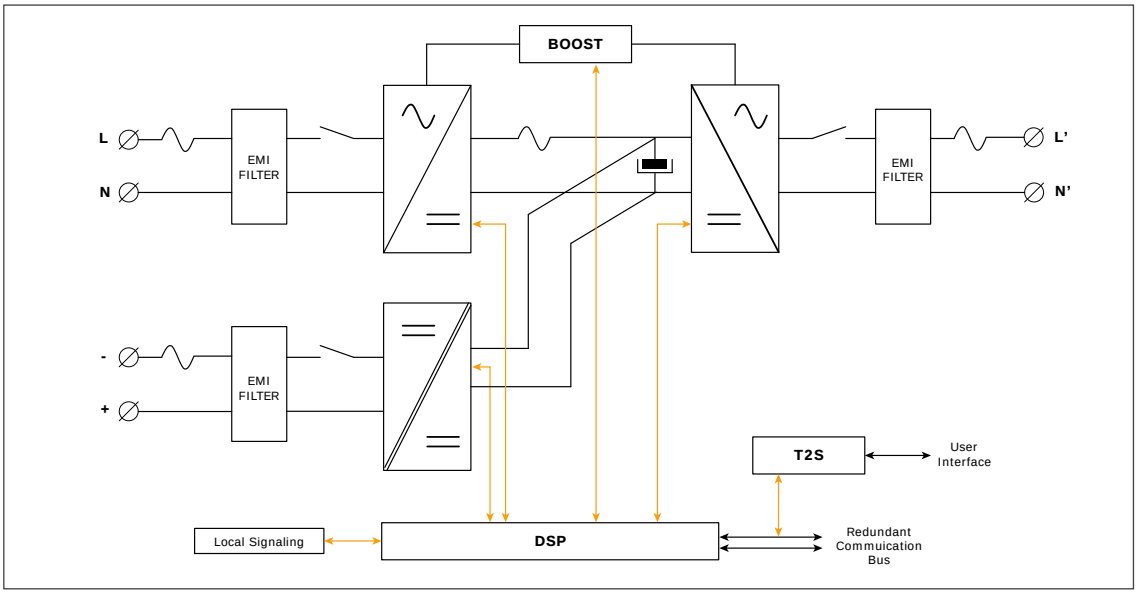
2.5 Replacement and Dismantling

- ESD Strap must be worn when handling PCB's and open units.
- UNIPOWER 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.

3. TSI TECHNOLOGY *

Inverter modules carrying the TSI logo and the EPC mark are triple port converters (AC in, DC in, AC out). Sinusoidal output is converted from Mains or/and DC.

The block diagram below gives an explicit description of the topology and operation.



The module is built around the following sub-converters

- AC to DC at input
- DC to DC at input
- DC to AC at output

The energy can flow either from the AC source or the DC source under the control of the local DSP controller. Thanks to internal energy buffering, the output sine wave is constant and disturbance free regardless of the active source.

The BOOST functionality multiples the nominal current for a period of 20 ms (max) in the event of down stream failures. The upstream breakers do not have to be oversized to prevent tripping. The overload capacity is 150% for 15 seconds.

The TSI works according to True Redundant Structure (TRS) that features decentralized and independent logic, redundant communication bus and three internal levels of disconnection to isolate a module after internal failure.

This functionality is included in every inverter module. Running them in parallel provides a modular system with, no single point of failure, always-conditioned output, high system efficiency and 0 ms source transfer time.

* Information and data given in this chapter is intended to serve as an overview of the TSI Technology. Detailed features and parameters for each individual module type in the range may differ and should be referred to in the dedicated data sheet.

3.1 On-line Mode

DC is the primary source of supply whilst Mains (AC) works as the secondary source. Switching time between DC input and AC input is 0 ms (source transfer). The power delivered by the DC source (usually a battery, but possibly any other type of DC generator) is converted to provide regulated and transient-free power to the load. In the event of a short circuit on the load side, the boost is automatic, timely and energized for a specific duration to trip downstream protective devices.

3.2 Safe mode

Safe mode uses DC as the primary source of supply while Mains (AC) is on standby.

Mains (AC) is normally disconnected through an internal inlet relay and is only connected when down stream clearance is required (boost) or if DC is unavailable.

The transfer between DC and AC results in a typical transfer time of 10 ms.

Typically the safe mode is used in extremely harsh environments such as railways. Under such conditions, it provides extra isolation against mains-borne disturbances.

3.3 EPC-mode

Mains input (AC) is the primary source whilst DC works as backup.

The TSI is designed to operate on Mains on a permanent basis and to deliver output voltage conditioned with low THD.

The output sine wave is physically independent of whether the source is AC (or) DC. If the Mains is out of tolerance or goes down, the converter seamlessly switches to DC and the converter operates in “Back-up mode” (Changeover switching time is 0 ms).

As soon as the Mains returns to its valid range, the EPC mode is automatically resumed.

The EPC mode offers higher efficiency (up to 96% depending on the model) without compromising the purity of the output sine wave.

3.4 Mix mode & Walk-in mode

Under some circumstances the DC and AC sources can be combined. The sequence is defined by a user selectable set of parameters. Start, control and exit are fully automatic.

A specific example of Mix-mode is the Walk-in mode where the transfer from DC source to AC source is ramped up within a fixed and adjustable period of time.

4. Building Blocks

4.1 Inverter

Telecom / Datacom -48 VDC / 120 VAC, 50/60Hz

- The TSI Bravo is a 2500 VA / 2000 W triple port inverter.
- The TSI inverter modules are hot swappable and hot pluggable.
- The module operator interface comprises LEDs showing converter status and output power.
- The inverter modules are equipped with soft start.
- The fan is equipped with an alarm and run time meter. The fan is field replaceable.
- 435 (D) x 102 (W) x 88 (H).
- 5 Kg.

4.2 Sub-rack

- The BRAVO shelf shall be integrated in min 600 mm deep cabinets, inch/ETSI mounting.
- The BRAVO shelf houses max four (4) inverter modules and one (1) monitor unit.
- The extension shelf houses max four (4) inverter modules and one (1) monitor blank.
- The BRAVO shelf is designed with individual DC input, Common AC input and Common AC output.
- Optional rear cover for IP 20 in open rack.
- Max 10 kVA (6 kVA²) per shelf.
- 18.9" | 480 mm (D) x 19" (W) x 2U (H).
- 13.2 lbs | 6 Kg empty.

4.3 Monitor unit T2S-ETH

The T2S-ETH stands for T2S Ethernet. It replaces the former T2S with the same form factor but with a front Ethernet connector replacing the former USB one. Like his predecessor, T2S-ETH is a monitoring solution for the full ECI inverter range and is able to monitor up to 32 inverters through a friendly web base interface.

This new monitoring device provides a graphical user interface, embeds a SNMPv1 agent and is compatible with Catena if one needs a touch screen display. It also allows user to change the configuration of the system.

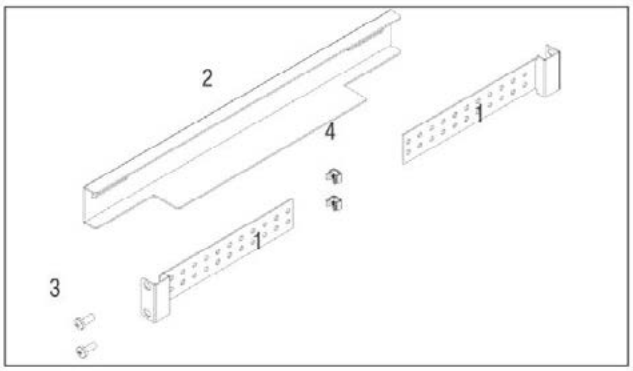
- T2S-ETH provides 3 leds: Red for major alarm signaling, orange led for minor alarm signaling and green led for power and network connection status.
- The RJ45 is a standard ETH connector that could be connected on any IPv4 network

5. Installation of Bravo TSI shelf

- Read safety instructions prior to starting any work.
- Do NOT attempt to use lifting eyes to erect the cabinet.
- System is preferably handled without modules.
- Pay attention to the module position: make sure that modules are repositioned in their original slot.
- T2S is always mounted in the first shelf, left hand position.
- In PACK the 4th inverter position (1st sub-rack) contains an output circuit breaker.
- In three phase systems modules are configured per phase 1 (A, R), phase 2 (B, S) and phase 3 (C, T). While the system is not in operation, make sure that modules from one phase are not mixed with modules from another phase.
  (When the system is running, modules can be moved from one phase to another without issue.)
- The system is designed for installation in an IP20 or IP21 environment. When installed in a dusty or humid environment, appropriate measures (air filtering …) must be taken.

5.1 Mounting kit for Bravo TSI shelf

The fixing brackets, together with the sliders, allow for different cabinet depths.

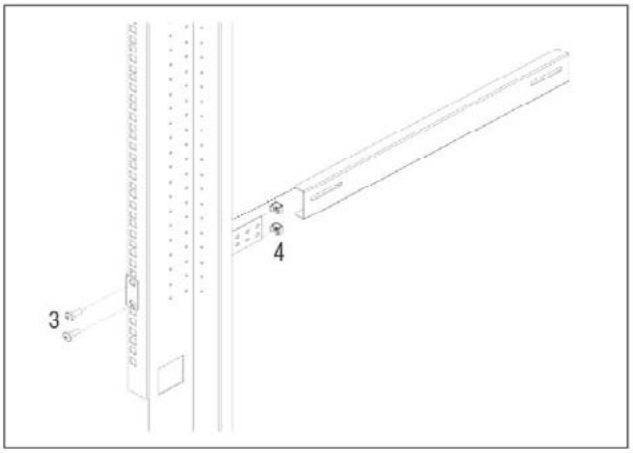


4x Fixing brackets (ref 1)

2x Slider (ref 2)

12x Mounting screws (ref 3)

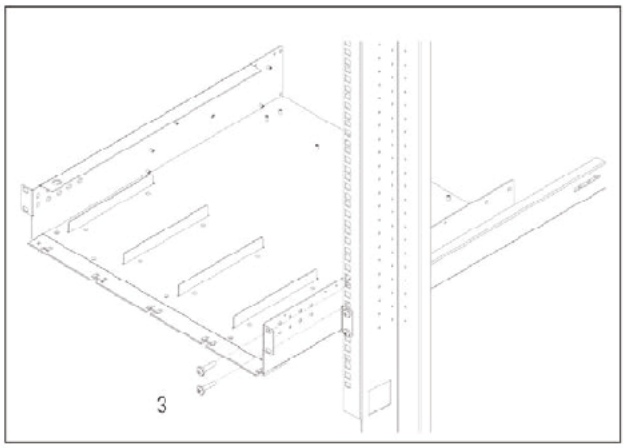
12x Cage nuts (ref 4)



Assemble the sliders and adjust the length to suit the mounting depth.

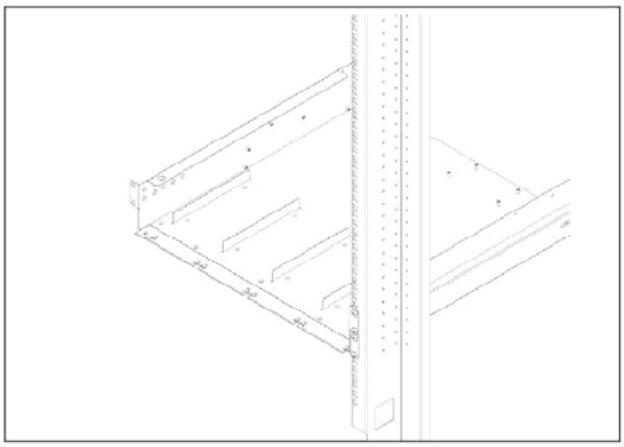
Fix cage nuts (4) in the cabinet front and left and the right side rear frame.

Fix the left and right cabinet slider with the supplied screws (3).



Fix cage nuts (4) in the mounting frame.

Slice the shelf into position and fix it with the supplied screws (3).



Finished.

5.2 Electrical installation for Bravo shelf

5.2.1 Pre-requisites

- The sub –rack has markings for all terminations.
- All cables shall be rated at min 90 deg C.
- Electrical terminations shall be tightened to 5 Nm.
- All connection screws are M5 x 12 mm.
- DC Input-Individual (per module): observe polarity.
- AC Input / AC output – Common (per shelf): respect phases.
- Wire all positions in the sub-rack for future expansion.
- Input AC / Output AC / Input DC / Signal cables shall be separated.
- Cable crossings shall be done at 90 degree angles.

5.2.2 Surge Suppression

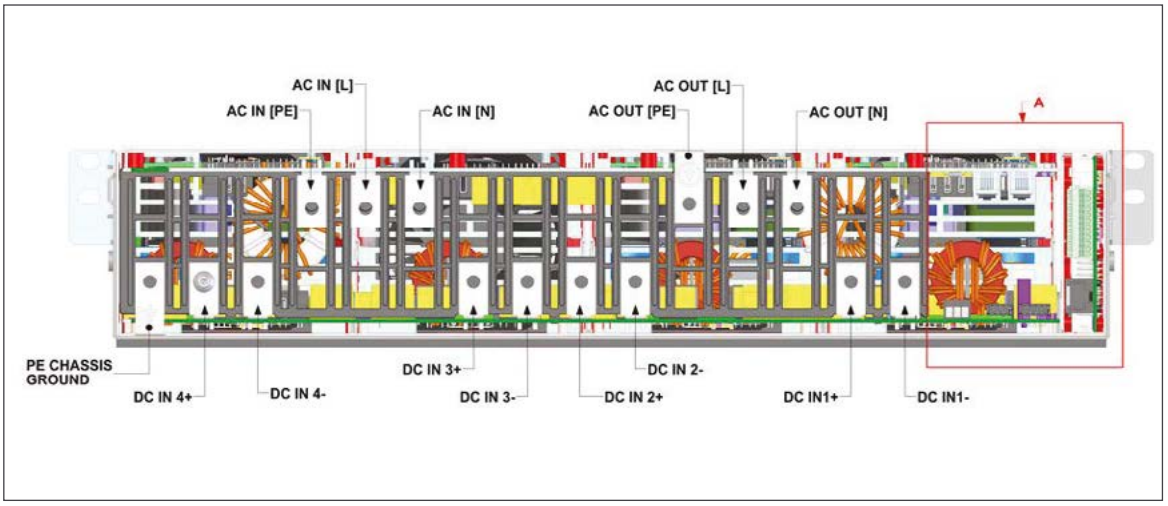
The mains (AC) supply of the modular inverter system shall be fitted with Lightning surge suppression and Transient voltage surge suppression suitable for the application at hand. Manufacturer's installation recommendations shall be followed. Selecting a device with an alarm relay for function failure 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.

5.2.3 Terminations

All terminations are clearly marked.



5.2.4 Grounding

"PE CHASSIS GROUND"

PE Chassis ground shall be wired to MET or distributed earth bar connected to MET, according to local regulations.

5.2.5 DC Input

Circuit Protection	Cable Size, min.	Terminal	Torque
70 A	6 AWG / 16 mm²	M5	5 Nm

Important Note:
Each shelf position is supplied separately with DC and **MUST** be sepatately fed and protected as indicated.

5.2.6 AC Input

WARNING !!!
Recommendation of IEC 60364 4. 43

431.3 Disconnection and reconnection of the neutral conductor in multi-phase systems

Where disconnection of the neutral conductor is required, disconnection and reconnection shall be such that the neutral conductor shall not be disconnected before the line conductors and shall be reconnected at the same time as or before the line conductors.

Circuit Protection	Cable Size, min.	Terminal	Torque
125 A	2 AWG / 35 mm²	M5	5 Nm

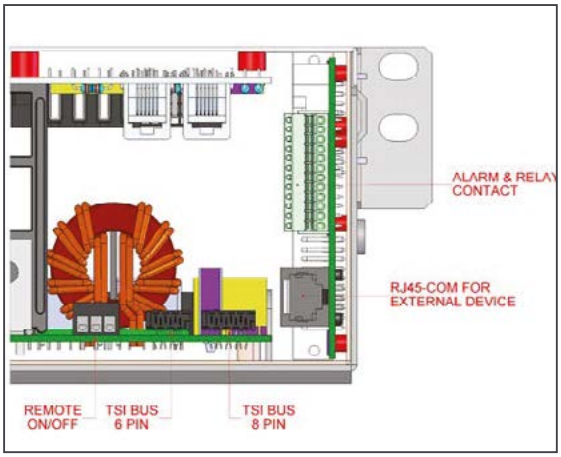
Important Note:
The above **MUST** be used for each shelf regardless of the number of installed inverter modules.

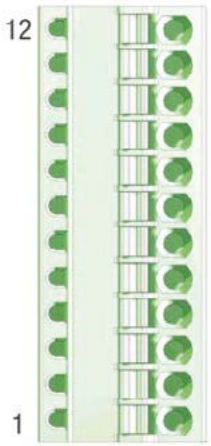
5.2.7 AC Output

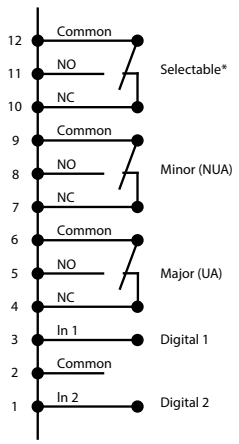
Circuit Protection	Cable Size, min.	Terminal	Torque
125 A	2 AWG / 35 mm²	M5	5 Nm

Important Note:
The above **MUST** be used for each shelf regardless of the number of installed inverter modules.

5.2.8 Signalling







Relay characteristics (Selectable, Major, Minor)

- Switching power 60 W
- Rating 2 A at 30 VDC / 1 A at 60 VDC
- Max wire size 1 mm^2

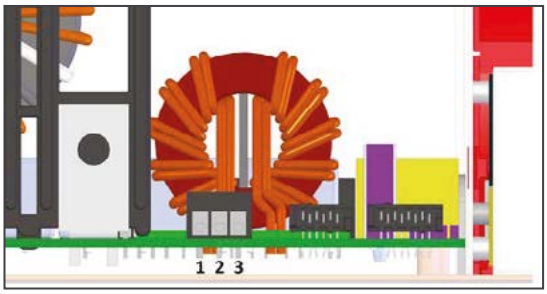
Digital input characteristics (Digital In 1 / 2)

- Signal voltage +5 VDC (galvanically insulated)
- Max wire size 1 mm^2

5.2.9 Remote ON/OFF

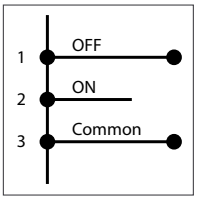
Notice: The shelf is by default equipped with a connection between pins 3 and 2. If remote ON/OFF is not used the strap shall remain in all connected shelves. Should the remote ON/OFF be used, all straps must be removed and replaced in one (1) shelf with a changeover contact or emergency button.

- The remote ON/OFF switches the output AC OFF.
- Input AC and input DC is not affected by the remote ON/OFF.
- The remote ON/OFF can be connected to any shelf.
- The remote ON/OFF requires changeover contacts, one input opens as the other closes.
  The status is not changed unless both transitions are detected.



Relay characteristics (Remote ON/OFF)

- Signal voltage +5 VDC (galvanically insulated)
- Max wire size 1 mm^2



Functional table for remote ON/OFF function

#	Pin 1-3	Pin 2-3	Status	Indication
1	Open	Open	Normal operation	All (Green)
2	Closed	Open	OFF	AC output (OFF) AC Input (Green) DC Input (Green)
3	Open	Closed	Normal operation	All (Green)
4	Closed	Closed	Normal operation	All (Green)

Warning: If remote ON/OFF not used, pin 2 and 3 MUST be bridged together!

5.2.10 Internal bus (TSI Bus 6 pin / TSI Bus 8 pin)

- In PACK/A la Carte systems the internal bus is pre-installed.
- The internal bus comprises a 6 pole ribbon cable and an 8 pole ribbon cable.
- The internal bus connectors are sensitive and special caution should be taken during installation to keep them out of harm's way.
- The internal bus is connected from the first shelf to the last shelf.

5.2.11 Rear cover

- The rear cover provides IP 20 protection for the rear terminations when required.
- The rear cover is snapped into position in the rear of the sub-rack.
- Remove material using a pair of side-cutters to allow cable entry and exit.
- The rear cover is ordered separately.

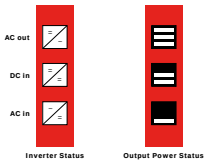
Connect cables

Cut holes to allow cable access

Clip rear cover into place

6. Interface

6.1 Inverter module



Inverter Status LED	Description	Remedial action
OFF	No input power or forced stop	Check environment
Permanent green	Operation	
Blinking green	Converter OK but working conditions are not fulfilled to operate properly	
Blinking green/orange alternatively	Recovery mode after boost (10 in short circuit condition)	
Permanent orange	Starting mode	
Blinking orange	Modules cannot start	Check T2S
Blinking red	Recoverable fault	
Permanent red	Non-recoverable fault	Send module back for repair

Output Power (redundancy not counted)						
<5%	5% to 40%	40 to 70%	80 to 95%	100%	100% = overload	Output Power (redundancy not counted)
x	x	x	≡	≡	≡	Status output power LED
x	x	═	═	═	═	
—	—	—	x	—	—	
1B	1P	2P	2P	3P	3B	Behaviour (B = blinking, P = permanent)

6.2 T2S-ETH

- Alarm indication on T2S-ETH (Urgent / Non Urgent / Configurable).
  - Green: No alarm
  - Red: Alarm
  - Flashing: Exchanging information with inverters (only Configurable alarm).
- Outgoing alarm relay delay
  - Urgent 60 seconds delay
  - Non urgent 30 second delay
- Parameter setting via Laptop.
- Factory default according to list of set values, see Table of set values.

7. Inserting/removing/replacing - modules

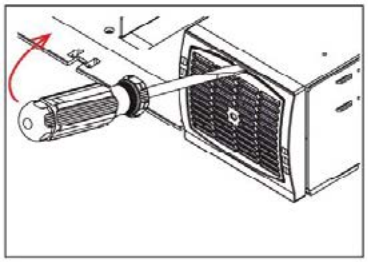
7.1 TSI Inverter

- The TSI inverter is hot swappable.
- When a new module is inserted in a live system it automatically adapts to a working set of parameters.
- When a new module is inserted in a live system it automatically assigns the next available address.

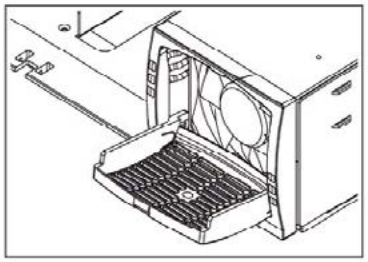
7.1.1 Removal

Notice: When one or several inverter modules is/are removed access to live parts becomes possible. Replace module(s) with blanks without delay.

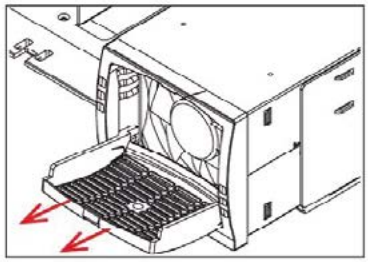
- The inverter module is not switched off when opening the handle. The handle only fixes the module to the shelf.
- Use a screw driver to release the handle latch.
- Open the handle and pull the module out.
- Replace with a new module or blanking unit.



A) Use screwdriver to release the latch



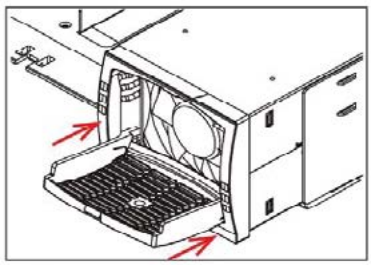
B) open the cover completely



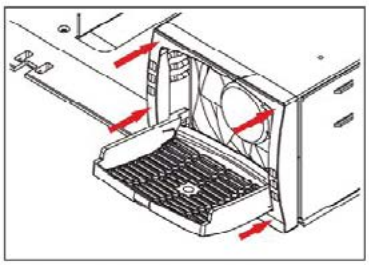
C) Use the cover as a handle to remove the module

7.1.2 Inserting

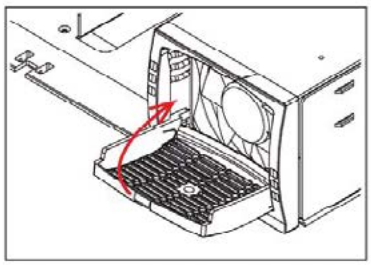
- Check module compatibility (DC Voltage!).
- Use a screw driver to release the handle latch.
- Open the handle and push firmly until the unit is properly connected.
- Close the cover and latch in position.



A) Slide the module in



B) Push firmly till the connection is properly engaged

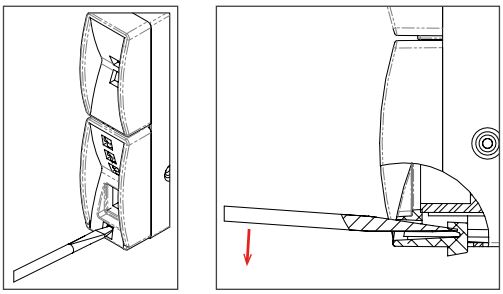


C) Close the cover and latch the module in place if too hard redo step B

7.2 T2S-ETH

7.2.1 Removal

- Gently pull the module until it disengages and then remove it.



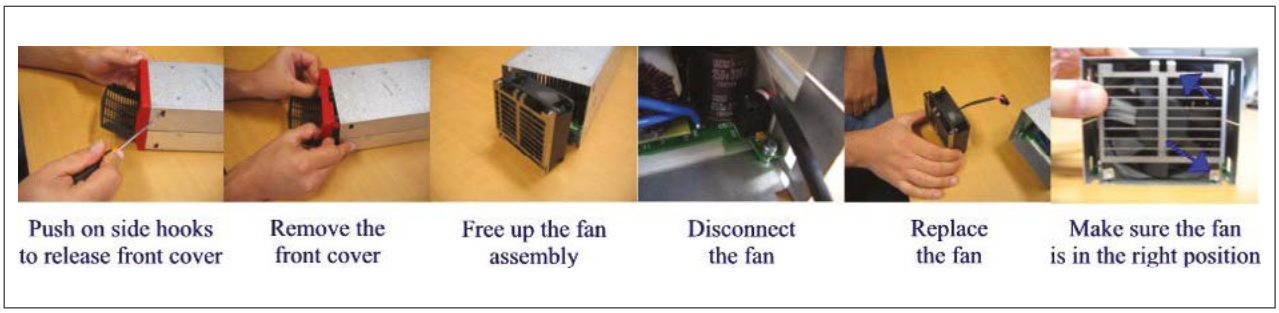
7.2.2 Inserting

- Push the module firmly in place until the latch snaps into position.

7.3 Fan replacement

The FAN life is approximately 60,000 (Sixty Thousand) hours. The inverter modules have fan runtime meters and fan failure alarms. Fan failure can result from a failing fan or driver circuit.

- Let the module rest at least 5 minutes before initiating work.
- The inverter front must be removed. Use a blunt tool to depress the latches on the module side fixing the front to the module.
- Remove the fan and unplug the supply cord.
- Replace with new fan and connect supply cord.
- Replace front, make sure that the front latches properly.
- Plug in.
- Check fan for operation.
- Access T2S-ETH and reset the fan run time alarm from within the action menu.



8. Commissioning

The DC breaker is a protection device. Modules are plugged into a system and the DC breaker is then engaged. Please make sure that the corresponding DC breaker is engaged in the ON position. Failure to observe this rule will result in not all modules operating when running on DC, and module failure when the AC input recovers from the fault condition.

Installation and commissioning must be done and conducted by trained people fully authorized to do so. Performing any isolation test is prohibited without instructions from the manufacturer.

Equipment is not covered by warranty if procedures are not respected.

8.1 Check list

DATA	
Date	
Performed by	
Site	
System serial number	
Module serial numbers	
T1S/T2S serial number-Specify T1S/T2S	
ACTION	OK/ N.OK
Unplug all inverters except one inverter per phase (Just pull the inverter out from the shelf, to break electrical contact)	
Check the commercial AC power before closing the AC input breaker.	
Switch the commercial AC ON	
Check if inverters are working (Green LED)	
Check the DC power supply and switch the DC breakers ON	
Plug in all inverters one by one	
Check output voltage (on bulk output or on breaker)	
Check if inverters are working properly	
Check if system has no alarm (Disable the alarm if any)	
Read configuration file and review all parameters. Some parameters must be adapted to site conditions (LVD, load on AC, AC threshold level)	
Switch OFF ACin and check if system is working on DC	
Switch ON ACin and check if system correctly transferred load on AC	
Switch OFF system and start on AC only	
Switch OFF system and start on DC only	
Check if display working properly (if this CANDIS option is present)	
Check if TCPIP working properly (if this option is present)	
Test on load (if available)	
ALARM	
Switch ON AC input and DC input, and check that no alarms are present	
Pull out one inverter and check alarm according to redundancy	
Pull out two inverters and check alarm according to redundancy	
Switch OFF AC input (commercial power failure) and check the alarm according to the configuration	
Switch OFF DC input (DC power failure) and check that the alarm according to the configuration	
Check the different digital input according to the configuration (when used)	

9. Trouble Shooting and Defective Situation Resolution

9.1 Trouble Shooting

Inverter module does not power up:	Check AC input present and in range (AC breakers) Check DC input present and in range (DC breakers) Check that the inverter is properly inserted Remove inverter to verify that slot is not damaged, check connectors. Check that module(s) is (are) in OFF state Check for loose terminations
Inverter system does not start:	Check that T2S is present and properly inserted Check remote ON/OFF terminal Check the configuration and setting Check threshold level
Inverter only run on AC or DC:	Check AC input present and in range (AC breakers) Check DC input present and in range (DC breakers) Check the configuration and setting Check threshold level(s)
No output power:	Check output breaker
All OK but one has alarm:	Check configuration file and correct number of modules Download/clear log file
No output alarm:	Check the default time delay (UA: 60 s, NUA: 30 s) Check configuration file
No information on CanDis:	Check that T2S is present and properly inserted Check that the RJ45 cable is connected between T2S shelf and CanDis shelf
No value on TCP/IP:	Check that the RJ45 cable is connected between T2S shelf and CanDis shelf Wait approximately 2 minutes to allow the system to collect serial data.

10. Maintenance

Maintenance shall only be performed by properly trained people.

10.1 Access T2S with Laptop

- Download system LOG FILE and save
  - Analyse log file and correct errors
- Download system CONFIGURATION FILE and save
  - Check/correct configuration file according to operating conditions
  - Check/correct alarm configuration
- Check module internal temperature for deviation between modules
  - Temperature deviation may indicate build-up of dust. Clean with compressed air.
- Check module/system load
- Check/Correct inverter mapping (DC group/AC group/ Address)
- Change configuration file to validate that system operates on both supply sources
- Check outgoing alarm, consult configuration file to see which actions will generate alarm

10.2 Manual check

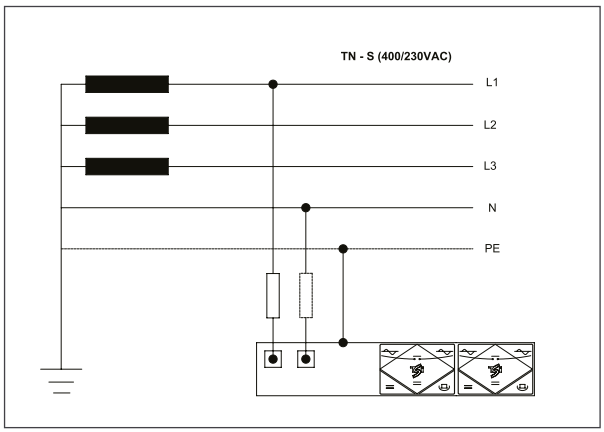
- Validate input voltage (AC input, DC input, AC output) with multi-meter
- Replace dust filter
- Take a snap shot of the cabinet

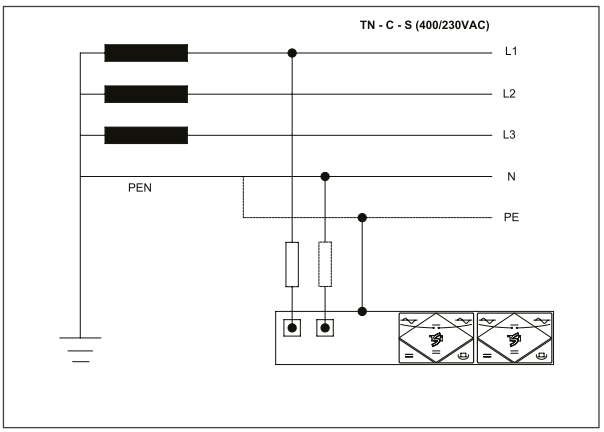
10.3 Optional

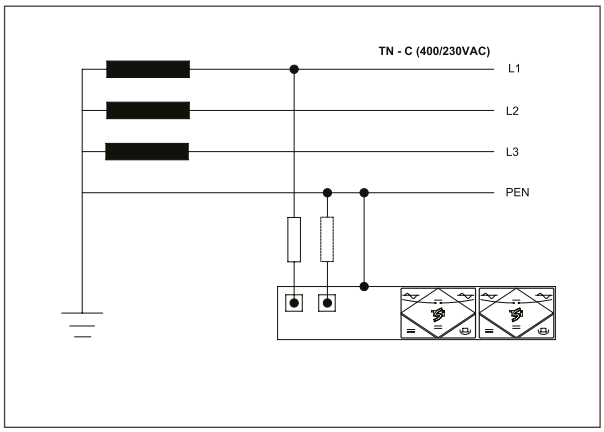
- With an infrared camera check termination hot spots
  - Tighten terminations

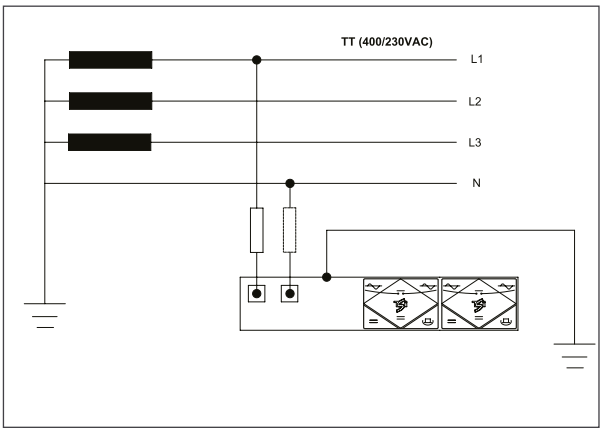
11. Appendix

11.1 Mains connection, single phase

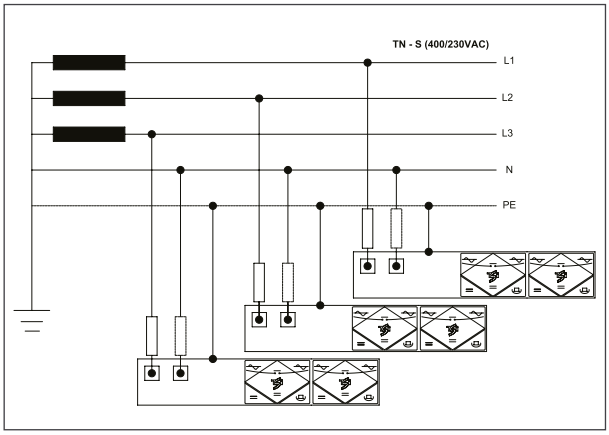


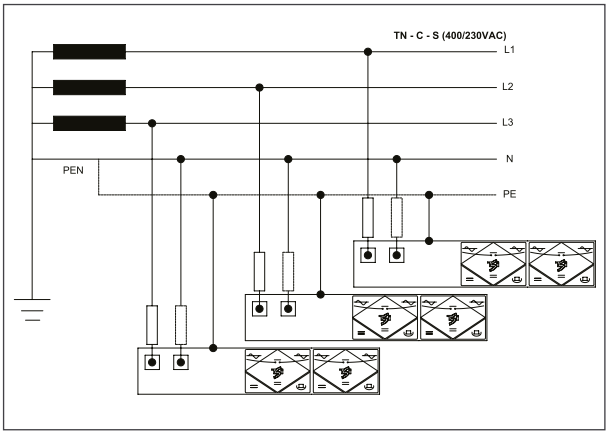


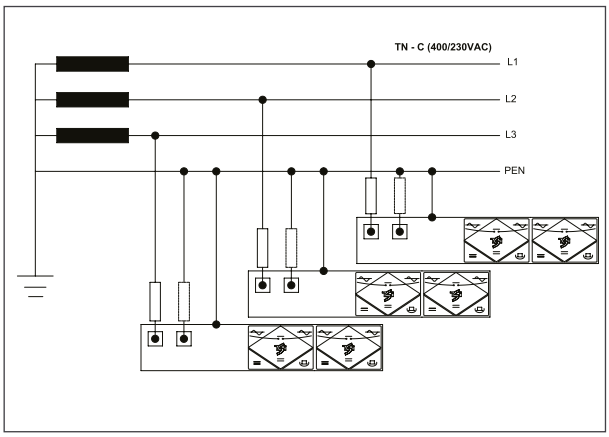


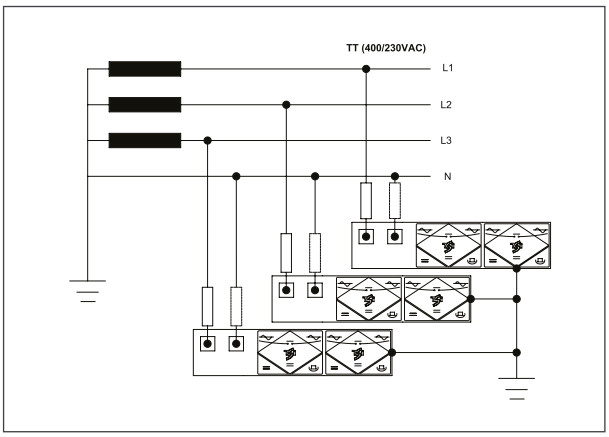


11.2 Mains connection, three phase









11.3 System default T2S-ETH relay mapping

Relays Mapping				
	Major	Minor	R3	
MBP Enagaged				(not set)
Surge Arrester				(not set)
Redundancy Lost	X			
Redundancy +1 Lost	X			
Main Source Lost				(not set)
Secondary Source Lost				(not set)
AC source Lost				(not set)
DC Source Lost	X			
AC Source Not Sync				(not set)
DC Source Low	X			
Output Saturated		X		
Output Overload	X			
Output Failure	X			
System Manual Off	X			
Missing Module		X		
Module Manual Off	X			
Module Output Fault		X		
Module Brownout Derating				(not set)
Module Temperature Derating				(not set)
Module Over Temperature				(not set)
Dig Input 1				(not set)
Dig Input 2				(not set)
Log Nearly Full		X		
Log Full		X		

11.4 Parameters setting

List of parameter with MIN, MAX and default value for 48 Vdc only. Units are 0,1V(dV), 0,01Hz (cHz) for voltage and frequency

Name	Index	Max	Default	Unit
VDC_LOW_START_1_dV	0	620	440	dV
VDC_LOW_START_2_dV	1	620	440	dV
VDC_LOW_TRANSFER_1_dV	8	620	390	dV
VDC_LOW_TRANSFER_2_dV	9	620	390	dV
VDC_LOW_STOP_1_dV	16	620	390	dV
VDC_LOW_STOP_2_dV	17	620	390	dV
VDC_HIGH_START_1_dV	24	620	580	dV
VDC_HIGH_START_2_dV	25	620	580	dV
VDC_HIGH_TRANSFER_1_dV	32	620	610	dV
VDC_HIGH_TRANSFER_2_dV	33	620	610	dV
VDC_HIGH_STOP_1_dV	40	620	610	dV
VDC_HIGH_STOP_2_dV	41	620	610	dV
VAC_LOW_START_1_dV	48	1343	958	dV
VAC_LOW_START_2_dV	49	1343	958	dV
VAC_LOW_START_3_dV	50	1343	958	dV
VAC_LOW_START_4_dV	51	1343	958	dV
VAC_LOW_TRANSFER_1_dV	52	1343	908	dV
VAC_LOW_TRANSFER_2_dV	53	1343	908	dV
VAC_LOW_TRANSFER_3_dV	54	1343	908	dV
VAC_LOW_TRANSFER_4_dV	55	1343	908	dV
VAC_LOW_STOP_1_dV	56	1343	908	dV
VAC_LOW_STOP_2_dV	57	1343	908	dV
VAC_LOW_STOP_3_dV	58	1343	908	dV
VAC_LOW_STOP_4_dV	59	1343	908	dV
VAC_HIGH_START_1_dV	60	1343	2585	dV
VAC_HIGH_START_2_dV	61	1343	2585	dV
VAC_HIGH_START_3_dV	62	1343	2585	dV
VAC_HIGH_START_4_dV	63	1343	2585	dV
VAC_HIGH_TRANSFER_1_dV	64	1343	1343	dV
VAC_HIGH_TRANSFER_2_dV	65	1343	1343	dV
VAC_HIGH_TRANSFER_3_dV	66	1343	1343	dV
VAC_HIGH_TRANSFER_4_dV	67	1343	1343	dV
VAC_HIGH_STOP_1_dV	68	1343	1343	dV
VAC_HIGH_STOP_2_dV	69	1343	1343	dV
VAC_HIGH_STOP_3_dV	70	1343	1343	dV
VAC_HIGH_STOP_4_dV	71	1343	1343	dV
FREQ_AC_LOW_START_cHz	72	6300	4730	cHz

FREQ_AC_LOW_STOP_cHz	73	6300	4700	cHz
name	index	max	default	unit
FREQ_AC_HIGH_START_cHz	74	6300	5270	cHz
FREQ_AC_HIGH_STOP_cHz	75	6300	5300	cHz
FREQ_OUT_NOMINAL_cHz	76	6300	5000	cHz
PHASE_OUT_NUMBER_1	77	8	1	/
PHASE_SHIFT_OUT_1_deg	78	360	0	degrees
PHASE_SHIFT_OUT_2_deg	79	360	120	degrees
PHASE_SHIFT_OUT_3_deg	80	360	240	degrees
VOUT_CONS_1_dV	86	2400	2300	dV
VOUT_CONS_2_dV	87	2400	2300	dV
VOUT_CONS_3_dV	88	2400	2300	dV
Short Circuit Voltage Threshold (V)	94	200	80	V
Short Circuit Hold Time (s)	95	6000	600	ds
Source Power Ratio DC vs AC	96	100	100	%
SYNCHRONISATION_TRACKING_SPEED_1	97	2	0	/
MAX_OUT_CURRENT_DERATING_pc	98	150	150	%
MAX_OUT_POWER_DERATING_pc	99	150	150	%
MAX_OVERLOAD_DURATION_s	100	15	15	s
FORCE_AC_SAFE_MODE_1	101	1	0	/
Booster 10 x In	102	1	1	/
REMOTE_OFF_DISABLE_AC_IN_POWER_1	103	0	0	/
AC in grid feed disable	104	1	1	/
If lost External Clock	105	2	0	/
Walk In Mode Time (x10 s.)	106	60	0	/
DELTA Mode	107	0	0	/
EXTRA_OVERLOAD_MODE_1	108	0	0	/
START_WITHOUT_SUPERVISION_ALLOWED_1	109	1	1	/
MAX_DC_POWER_W	110	0	0	W
DISABLE_POWER_MODE_AC_1_1	111	1	0	/
DISABLE_POWER_MODE_AC_2_1	112	1	0	/
DISABLE_POWER_MODE_AC_3_1	113	1	0	/
DISABLE_POWER_MODE_AC_4_1	114	1	0	/
Synchronizator enable	117	1	1	/
number of Synchronizator	118	32	2	/
address on XY Bus	119	32	1	/
Phase of this sub sub system	120	7	1	/
Group of this sub system	121	7	1	/
number of line in system	122	32	1	/

supply X mode	123	3	3	/
supply Y mode	124	3	3	/
DC synchronized by TUS	125	7	0	/

Name	Index	Min	Max	Default	Unit
Number of AcIn	637	0	2	1	
Nb of module AC 1	526	0	32	30	
Nb of module AC 2	527	0	32	0	
Nb of Module AC 3	528	0	32	0	
Redundancy AC 1	529			2	
Redundancy AC 2	530			0	
Redundancy AC 3	531			0	
AC in present	547	0	1	0	
Nb of AC in	637	0	2	0	
Number of AcIn	637	0	2	1	
Saturation Threshold	592	0	100	90	