



SLI15 INVERTERS

Installation & Operating Manual



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1.1 General

The SLI15 inverter is designed to operate from a DC Source, its input current features a very low ripple. Its psophometric value is 31dBnrc (without battery). The above feature allows the inverter to be supplied by a charger or power supply even without a battery in the circuit, as long as the DC source has the necessary current capacity to sustain the inverter's inrush current and the current variations induced by load changes of which the following diagram shows the worst case.

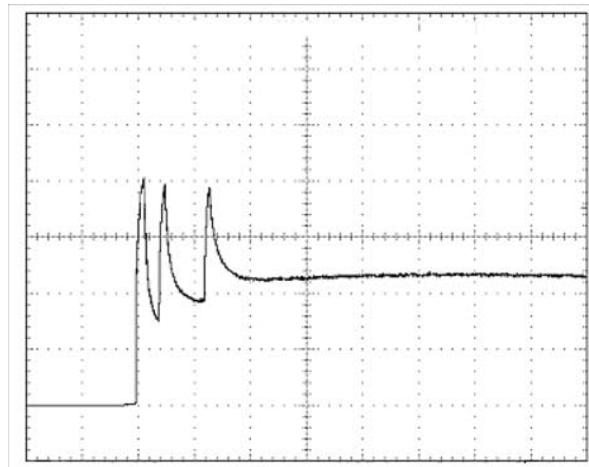


Figure 1-1 Input Current Absorption

Figure 1-1 shows the input current absorption with a 1500W resistive load step. Scale is 25mSec/div; 20A/div (48V input model) or 40A/div (24V input model). Input and Output Voltages are floating; even though it is possible to refer to GND one Input or Output terminal this connection is not required.

CAUTION It is essential to read and understand all Warnings, Cautions and Notes before any connections are made to the Unit or System.

CAUTION Before any connections are made to the Unit or the System, be sure to disconnect any AC load and any DC Input source. If the DC Input source is a battery, make all connections to the inverter **BEFORE** connecting DC leads to the battery.

WARNING The unit is not protected from Polarity Inversion: correct polarity of DC input leads is critical to avoid damage to the unit or system. Check DC Input source cables for correct polarity and voltage. The inverter features an internal reverse polarity protection diode and an upstream, non replaceable, fuse. The application of a reverse polarity may blow the fuse and make the inverter non operating. To prevent damage a proper circuit breaker should be installed between the DC source and the inverter's input. Refer to the following figure to determine the type of delay of the breaker.

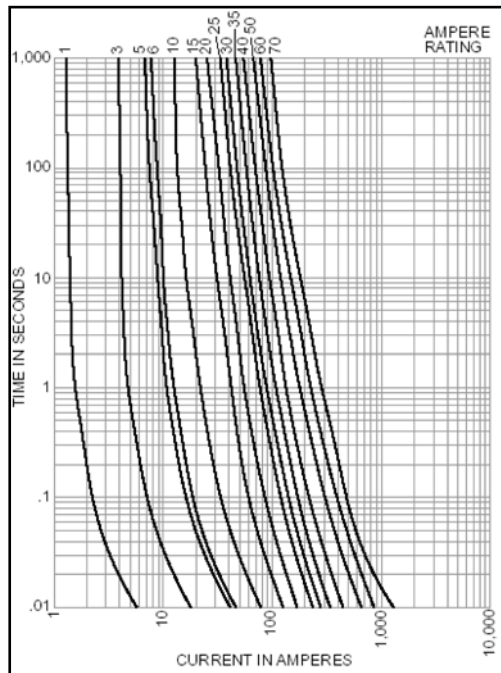


Figure 1-2 Input Breaker Delay

The curve to be used is the one indicated by “70”.

1.2 Feedback & Support

For technical support or feedback, please visit <https://www.unipowerco.com/contact/>.

1.3 Disclaimer

UNIPOWER is not responsible for system problems that are the result of installation or modification of the instructions provided in this manual.

The SLI15 Inverter is designed for indoor applications, away from heat and moisture. The inverter will provide its full performance with internal forced ventilation at ambient temperatures ranging from -25°C to +55°C (+65°C with power derating, see also Technical Specifications).

The following requirements must be considered when choosing a mounting location:

1. The Inverter must be sheltered from the elements. Select a clean, dry location.
2. The Inverter requires proper ventilation for cooling. It can be installed vertically as well as horizontally provided there is a 10" (254mm) minimum clearance on the rear side to provide adequate airflow. The fans suck in the air from the front ventilation holes and blow it through the rear holes.
3. The Inverter should be mounted as close to the DC Input source as possible to minimize losses in the DC Input cables.



NOTE For your protection, the following information and the rest of this manual should be read and thoroughly understood before unpacking, installing or using the equipment.

All UNIPOWER products are handed over to the delivering carrier securely packed and in perfect condition. Upon acceptance of the package from us, the delivering carrier assumes responsibility for its safe arrival to you.

Once you receive the product, it is your responsibility to document any damage the carrier may have inflicted, and to file your claim promptly and accurately.

3.1 Package Inspection

1. Examine the shipping crate or carton for any visible damage: punctures, dents or any other signs of possible internal damage.
2. Describe any damage or shortage on the receiving documents and have the carrier sign their full name.

3.2 Equipment Inspection

1. Within fifteen days, open crate or carton and inspect the contents for damages. While unpacking, be careful not to discard any equipment, parts or manuals. If any damage is detected, call the delivering carrier to determine the appropriate action. They may require an inspection.

Save all shipping material for the inspector to see!

2. After the inspection has been made, call us. We will determine if the equipment should be returned to our plant for repair or if some other method would be more expeditious. If it is determined that the equipment should be returned to us, ask the delivering carrier to send the packages back at the delivering carrier's expense.
3. If repair is necessary, we will invoice you for the repair so that you may submit the bill to the delivering carrier with your claim forms.
4. It is your responsibility to file a claim with the delivering carrier. Failure to properly file a claim for shipping damages may void warranty service for any physical damages later reported for repair.

3.3 Handling

Handle the inverter with care. Do not drop or lean on front panel or connector. Keep away from moisture.

3.4 Identification Label

The model number and serial number located on the label on the cover identify the unit. Please refer to these numbers in all correspondence with UNIPOWER.

3.5 Initial Settings

All inverters are shipped from our production facility fully checked and adjusted. Do not make any adjustments until you have read this manual.



NOTE Mounting brackets are included with the inverter when they are shipped from the factory. Failure to follow proper mounting procedures could result in the unit failing causing personal injury and equipment damage.

4.1 Rack mounting types

1. The inverters fit either a 19" or a 23" inch relay rack.
2. The mounting brackets can be installed either as a flush mount or a center mount on the inverters using the proper holes and tools as illustrated below.
3. Leave adequate clearance between this shelf and any existing shelves: a 10" (254mm) minimum clearance is required in the rear.
4. Connect the protective earth (PE) standoff located on the rear of the unit to the safety earth connection by the proper nut and washer provided in the package of the unit.

The mounting kit provided consists of:

- 2 x 19" mounting brackets.
- 2 x 23" mounting brackets if these have been ordered.
- 8 x M4 screws to connect the brackets to the unit (4 + 4).
- 2 x handles.
- 4 x screws to connect the handles to the brackets (2 + 2).

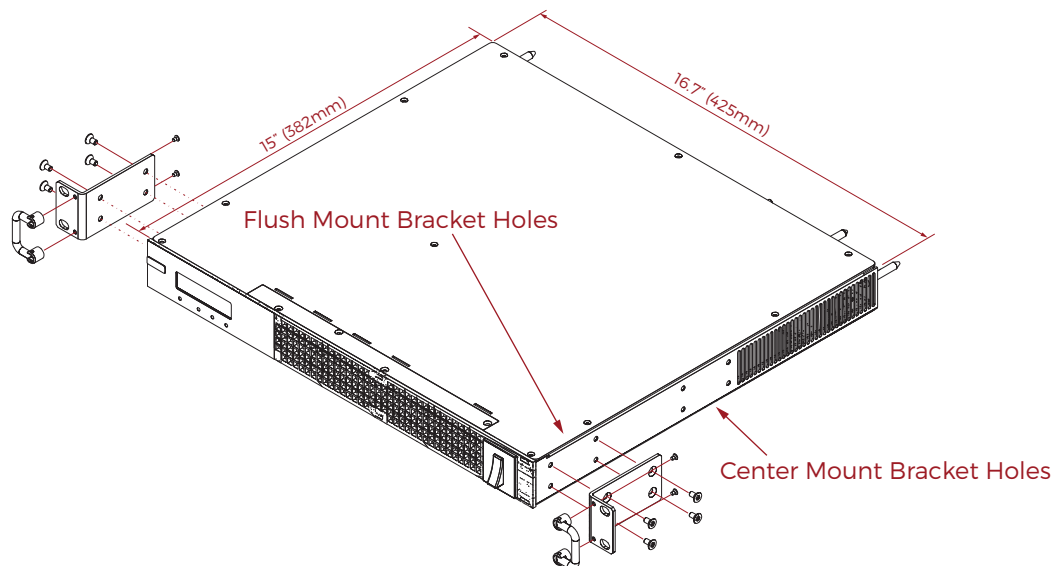


Figure 4-1 Fitting Mounting Brackets

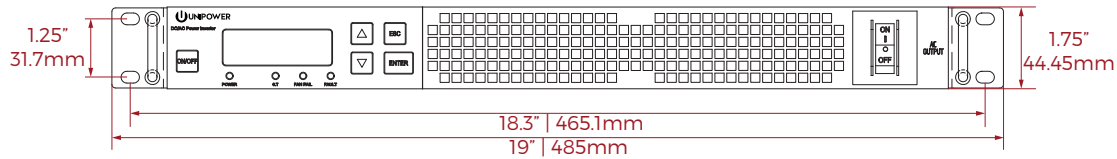


Figure 4-2 Mounting Dimensions

4.2 Connections

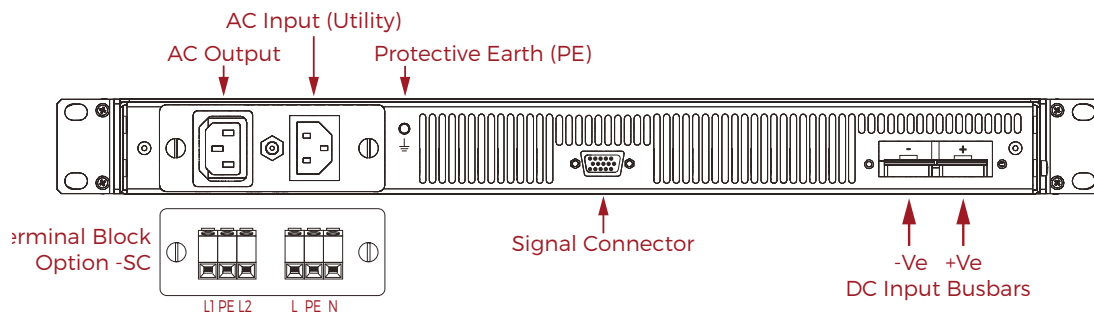


Figure 4-3 Rear View

4.2.1 Input Connections (all models)

Positive (+) and Negative (-) input terminals consist of two bars located on the rear side of the chassis, see Figure 4-4. The bars can be mated with clips or bolted to bus bars or cables. To facilitate connection the input bars have M6 holes. Polarity identifiers are marked on the chassis.

A plastic protection screen can be provided as an accessory to protect against accidental contact with the input terminations.

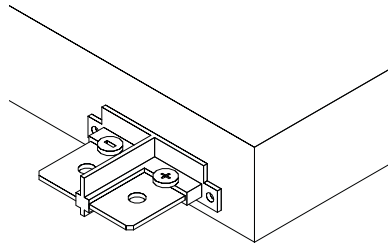


Figure 4-4 Input Connection Bus Bars



NOTE Consult Appendix “A” to set the proper wire size, length and terminal types for the 24V or 48V inverters models vs. distance from the source.

4.2.1.1 Inserting a Hot-Plug Inverter Module Into The Sub-Rack

Before inserting the SLI15 inverter module into the sub-rack coat the inner DC input clips with conducting paste for better electrical conduction and easier manipulation during insertion, see Figure 4-5.

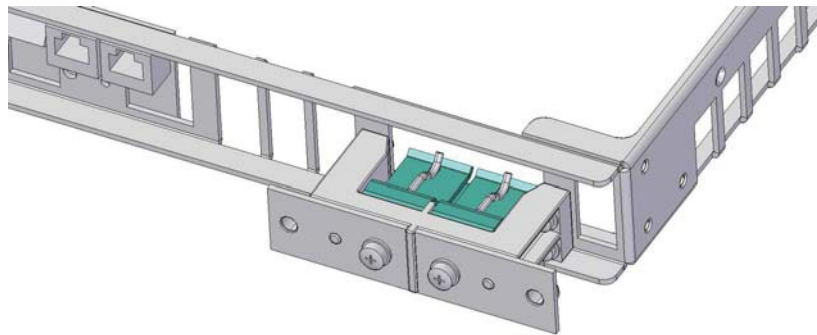


Figure 4-5 DC Input Clips in sub-rack

4.2.2 Output and Grid Connections

4.2.2.1 Models with Plug Connections

These models are equipped with the following connector types:

- Output: AC Appliance Outlet - IEC 320 socket
- Input Grid: AC Appliance Inlet - IEC 320 socket
(for inverters with Static Transfer Switch option only)

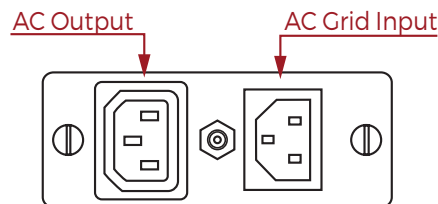


Figure 4-6 Plug Connections

4.2.2.1 Models with Screw Terminal Connections

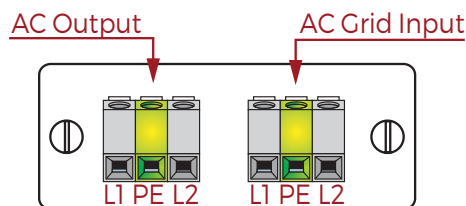


Figure 4-7 Screw Terminal Connections

4.2.2.3 AC Output Connections for Parallel Configuration

When connecting multiple units in parallel, pay attention to the following:

1. Observe the correct pin-to-pin correlation between the terminals avoiding cross connections (pin 1 to pin 1, pin 2 to pin 2, etc.).
2. Take care to use cables with the same section and length for each inverter, from the outlet terminals to the common points A, B, GND, as shown in Figures 4-8 and 4-9.

Longer cables improve the sharing current accuracy. Sharing performance is guaranteed with 10" (250mm) minimum cable length.

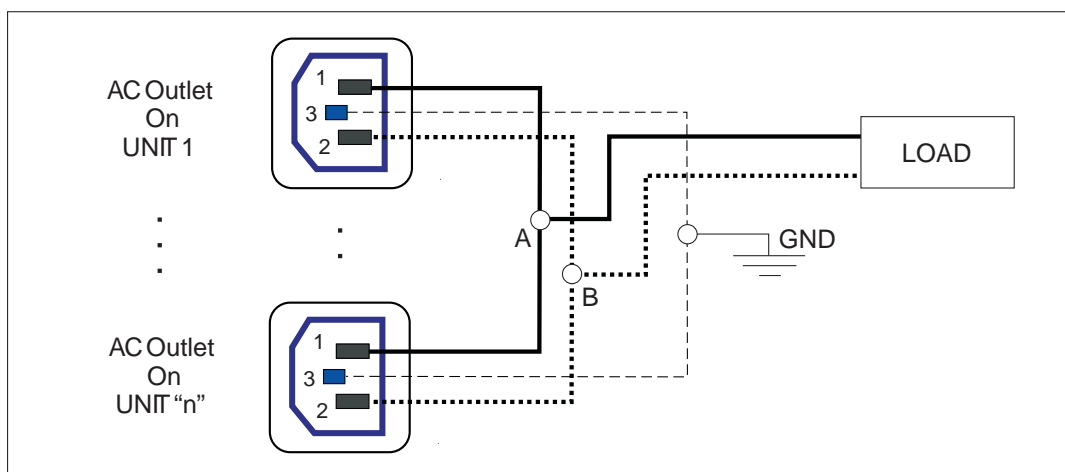


Figure 4-8 AC Output Connections for n-inverters in parallel configuration
(models with plug connectors - Note: L1=1; L2=2 ; PE=3)

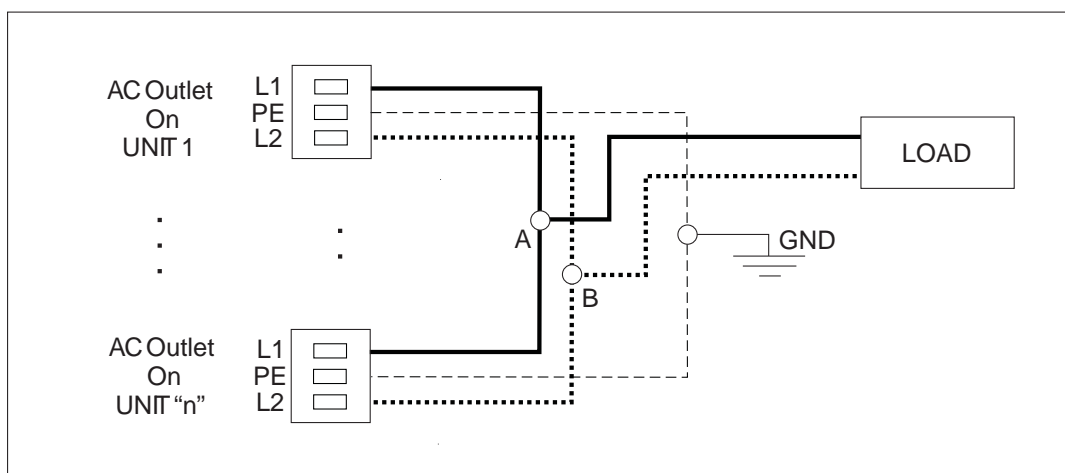


Figure 4-9 AC Output Connections for n-inverters in parallel configuration
(models with screw terminals)

4.2.2.4 AC Grid Input Connections for Parallel Configuration

(models with Static Transfer Switch)

It is important to note that the cables for the AC Grid connection must be the same size and length, see Figures 4-10 and 4-11.

It is recommended to use 11AWG / 4mm² gauge wire for 115VAC models and 13AWG / 2.5mm² gauge wire for 230VAC models.

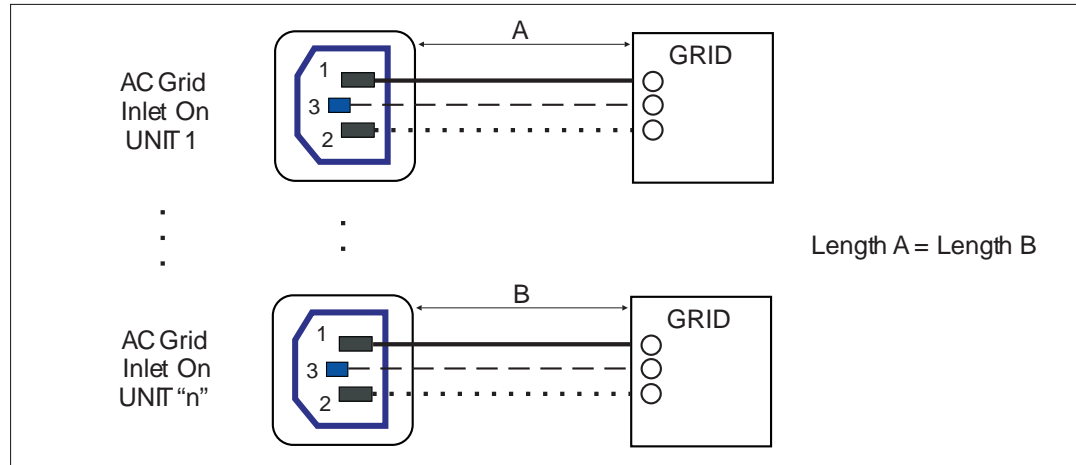


Figure 4-10 AC grid input connections for parallel configuration
(models with plug connectors - Note: L1=1; L2=2 ; PE=3)

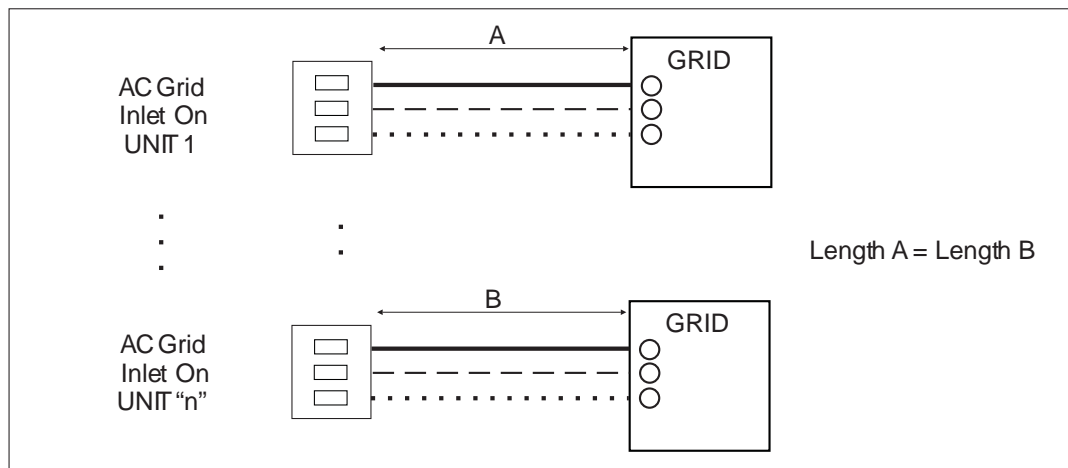


Figure 4-11 AC grid input connections for parallel configuration
(models with screw terminals)

4.2.3 Signal Connections

A 15 pole connector or the optional signal connector adapter can be used for connecting the signals.

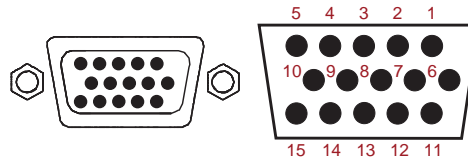


Figure 4-12 Signal Connector Type : Molex 89263-6065 (CON SUB 15HD)

Pin	Name	Description
1	General Failure	Normally open; active low. It provides a general failure indication related to any fault condition (see “General failure” Table in section 5 “User’s Guide”). It is referenced to Pin 4 “Signal Return”.
2	+T/R	Dedicated to the serial link for RS485. They are referenced to Pin 4, “Signal Return”.
3	- T/R	
4	Signal Return	Signal return for signals on Pins 1-3. This pin can be connected to an external ground.
5	Master Indicator	Master indicator: For parallel mode only.
6	Chassis Ground	Common GND (chassis) for all the signals from Pin 7 to pin 15.
7	Remote ON/OFF	Remote ON/OFF. Active low. It must be connected to Pin 6 (through a switch or relay), to turn on or off the unit remotely. The pin must be enabled from the front panel. Go to the settings menu and turn ON the remote ON/OFF option. Please note: If you do not use remote ON/OFF capability then you must leave the pin unconnected. Otherwise the Remote OFF option set through front panel will not have any effect.
8	Sync-120	Dedicated to the synchronization of units Y connected for 3-phase voltage generation.
9	-	Not used.
10	-TR/I (Reserved)	Reserved (do not connect to this pin).
11	Transfer Sync	For parallel mode between units with Static Transfer Switch option only.
12	Output Sync	For parallel mode only.
13	Sync-240	Dedicated to the synchronization of units Y connected for 3-phase voltage generation.
14	Sync	For parallel mode only.
15	+TR/I (Reserved)	Reserved (do not connect to this pin).

Table 4-1 Signal Description

4.2.3.1 Connecting units in parallel using the 15-pole connector

To operate two or more (max. 6) SLI15 inverters in parallel, pins 5, 6, 12, 14 of each unit must be connected together as shown in Figure 4-13.

Pins 1, 4, 6, 7 should also be connected between the units.

For inverters with the Static Transfer Switch option, pin 11 of each unit must also be connected together to ensure synchronization of the Static Transfer Switches in each unit.

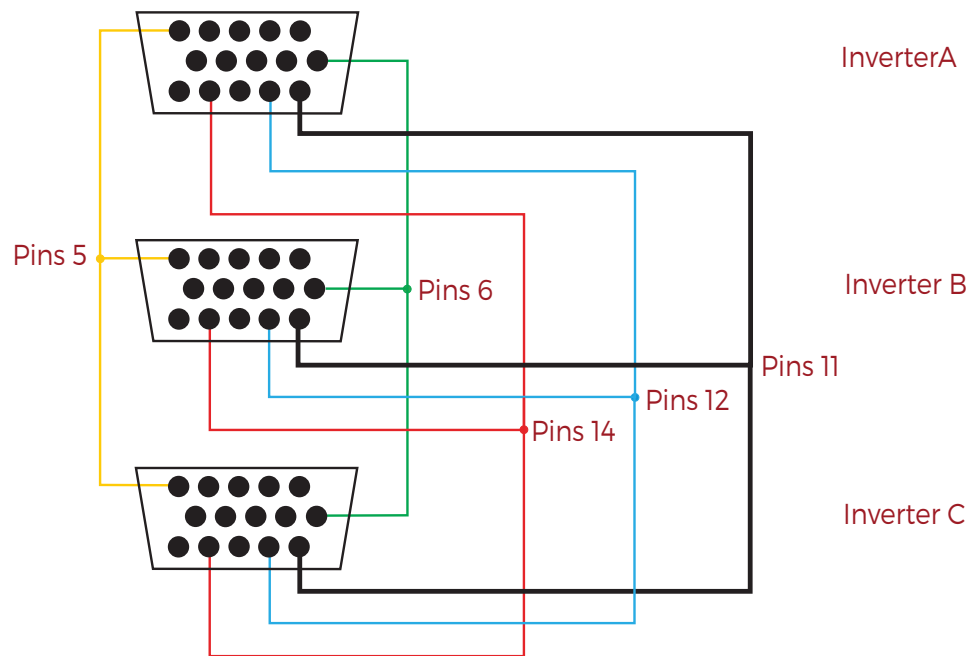


Figure 4-13 Parallel Configuration Signal Connections

4.2.3.4 Connecting standalone units in parallel using the optional Paralleling Adapter

By using the Paralleling Adapter shown in Figure 4-14, parallel connections between several units as shown in Figure 4-13 is simplified. Pin assignment is the same as described in Table 4-1 on page 16 for the 15-pole connector.

If units are paralleled and pin-to-pin connection of the signal connectors is done, it is not possible to discriminate signals coming from each individual unit.

If such discrimination is needed, the signal connector on the adapter should be used by removing the jumper on the board (see Figure 4-15D) and taking the fault signal individually from the associated connectors.

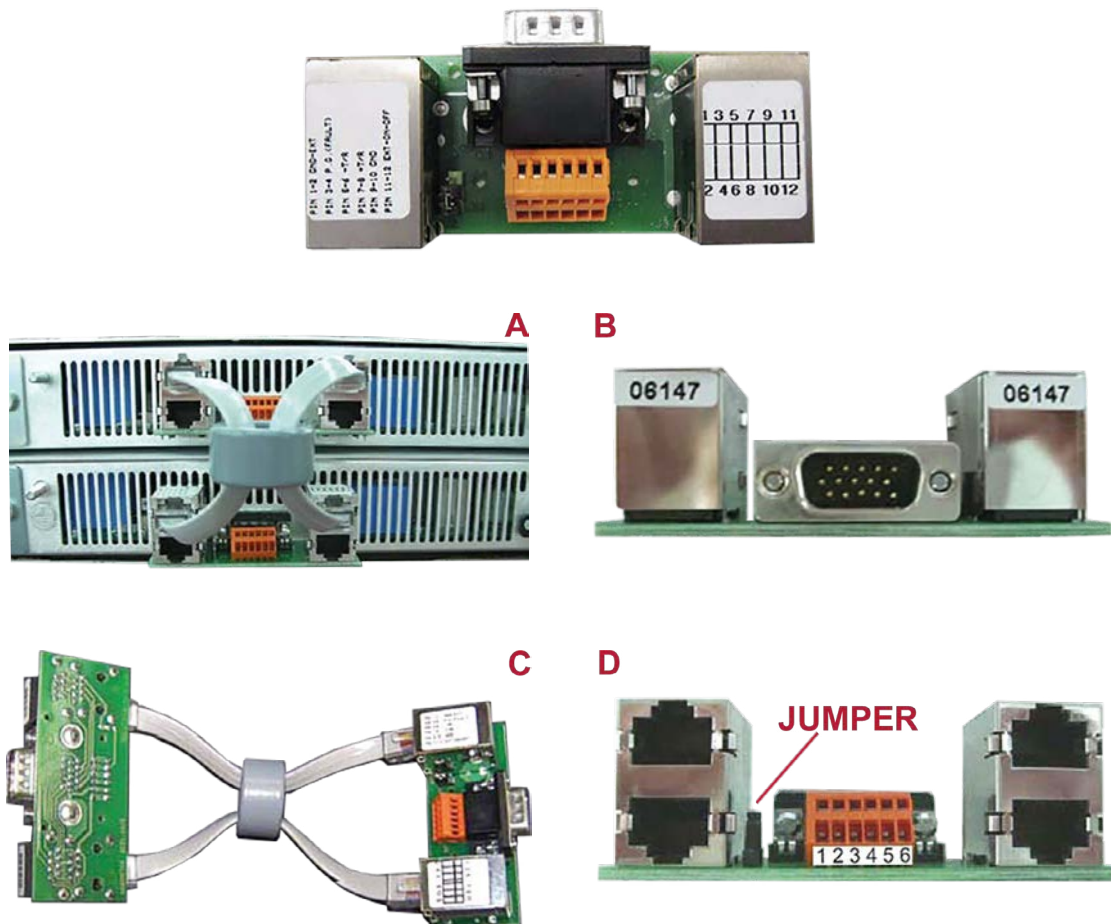


Figure 4-14 Parallel Adapter for Standalone Units

UNIPOWER provides a paralleling adapter kit which consists of one board assembly and one link cable/ferrite assembly. One kit is required for plugging into each inverter in a paralleled set. The part number for ordering this kit is 3C35000KIT7G, see the data sheet.

4.2.3.5 Connecting hot-plug units in parallel using the Hot-Plug Sub-Rack

The Paralleling Adapter shown in Figure 4-15 is an integral part of the hot-plug sub-rack. Interconnection of the signals between units is achieved by plugging in the link cable/ferrite as assembly shown. Pin assignment is the same as described in Table 4-1 on page 16 for the 15-pole connector.

If units are paralleled and pin-to-pin connection of the signal connectors is done, it is not possible to discriminate signals coming from each individual unit.

If such discrimination is needed, the signal connector on the adapter should be used by the jumper on the board (see Figure 4-15 C & D) and taking the fault signal individually from the associated connectors.

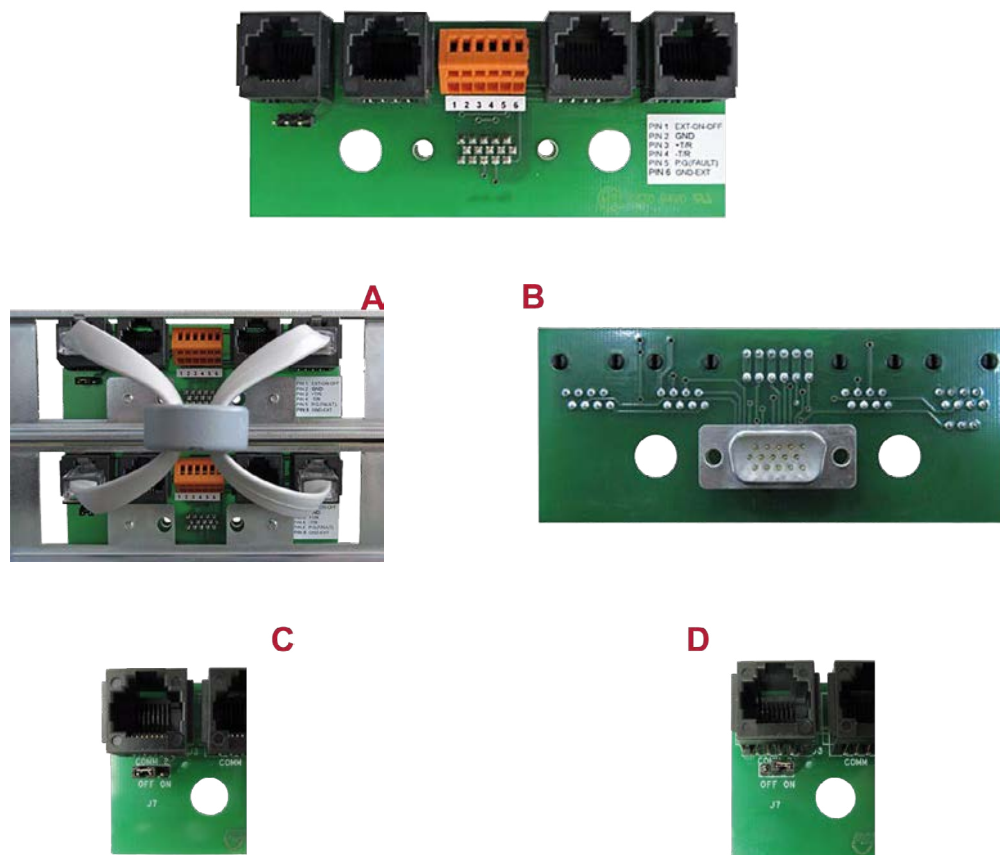


Figure 4-15 Parallel Adapter for Hot-Plug Units

One link cable/ferrite assembly, order part number 3C3500KITHPG, will be required for for connecting between each shelves, e.g. for 3 units in parallel two are required.

4.2.3.3 Generation of a 3-phase Y voltage

To generate a 3-phase voltage 3 SLI15 inverters can be connected in a Y configuration. Figure 4-16 shows an example of the necessary connections. Be aware that the 3-phase configuration needs to be enabled via the service menu of the unit (see section 5 “User’s Guide”).

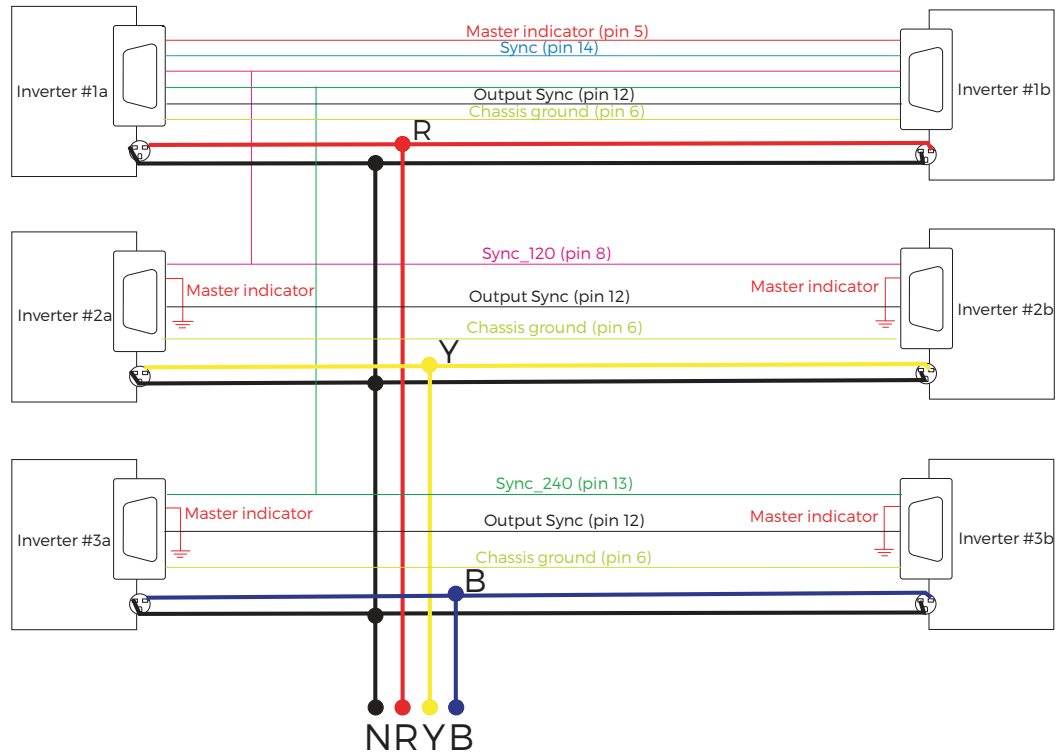


Figure 4-16 Signal Connections for 3-phase Y Output Configuration



NOTE 3 paralleled pairs of SLI15 inverters may also be configured in this way to provide a total of 3000W per output phase.

4.3 Step by Step procedure to turn on the unit

4.3.1 Models without the optional Static Transfer Switch, in stand-alone configuration

1. Make sure every AC load is disconnected and the AC Output Breaker on the front panel is turned OFF.
2. Connect the signal connector according to paragraph 4.2.3.
3. Make DC input connections to the inverter as described in paragraph 4.2.1. The display unit lights up and shows “STAND BY...” Refer to section 5 “User’s Guide”, page 3.
4. Press ENTER to show the status of the unit and verify on the display that the current Mode is “Stand Alone Mode” (you can change the settings for Frequency, Voltage, Current Limit and Remote ON/OFF only if the unit’s Mode is “Stand Alone”. Refer to section 5 “User’s Guide”, Note on page 9).
5. Optional: Change factory settings as desired for the following: Frequency, Voltage, Current Limit and Remote ON/OFF through the “SETTINGS MENU” (for procedures and factory settings see section 5 “User’s Guide”, page 8).
6. Switch the AC Output Breaker ON (the “Power” LED lights up GREEN) and check on the display that the output voltage from the inverter is 230Vac (115Vac). Turn the AC Breaker OFF.
7. Press the ON/OFF button to place the inverter in stand-by.

4.3.1.1 Turning on the Load

Check that the rated input power of the load is less or equal to the rated output power of the inverter.

Connect the load to the inverter as described in paragraph 4.2.2.

Press the ON/OFF key to turn the unit ON.

Switch the front panel AC Output Breaker ON. The unit should now be feeding the load.

4.3.2 Models without the optional Static Transfer Switch, in parallel configuration

4.3.2.1 Setting up the units

Make sure every AC load is disconnected and the AC Output Breaker on front panel of each inverter is turned OFF.



NOTE Repeat steps 2 to 6 for each unit.

Make DC input connections to the inverter as described in paragraph 4.2.1. The display unit lights up and shows “STAND BY...”.

Press ENTER to display the status of the unit and verify on the display that the current Mode is the “Stand Alone Mode 0”.



NOTE The settings for Frequency, Voltage, Current Limit and Remote ON/OFF can be changed only if the unit Mode is the “Stand Alone Mode 0” (default mode). To set that one (if necessary), refer to section 5 “User’s Guide”, Note on page 9.

Optional: Change the unit’s settings for Frequency, Voltage, Current Limit and Remote ON/OFF as desired through the “SETTINGS MENU”. See section 5 “User’s Guide” page 8 for the procedure.



NOTE This step operates on critical unit parameters: we suggest changing the factory settings only if it is strictly needed.



WARNING For proper parallel operation all units need to have exactly the same Frequency, Voltage, Current limit and Remote ON/OFF settings.

Set the “Unit Status” as “Parallel Mode 2” (see also the section 5 “User’s Guide”, Appendix A)

- Select the “SETTINGS Menu” (section 5 “user’s Guide, page 8) and press “Enter”.
- Insert the password (default password is “0000”, use “Enter” key to type the “0” character).
- Scroll the “SETTING Menu” using UP/DOWN keys up to “SERVICE”
- Menu. Press “Enter” to confirm.
- Type the password (default password: 1111).
- Select the “Operant. Mode” menu. Press “ENTER”.
- Set “ Mode = 2”. Press “ENTER”

Re-cycle the DC input voltage. After this is done the Inverter is set to work in parallel configuration.

Connect the Signal connector to the unit. Refer to paragraph 4.2.3.

Connect the grid. Refer to paragraph 4.2.2.4.

4.3.2.2 Turning on the load

1. Press the ON/OFF key to put each inverter in Stand-By.
2. Check that the rated input power of the load is less or equal to the rated output power of parallel system of inverters.
3. Connect the load to the inverter as described in paragraph 4.2.2. Make sure that the length and the section of the cables between each unit and the common point of the load are the same (Figure 4-8 and Figure 4-9 on page 14).
4. Switch ON the front panel AC Output Breaker of each inverter.
5. Press the ON/OFF button of one inverter to turn on all inverters in the system. The should now be feeding the load.

4.3.3 Models with the optional Static Transfer Switch in stand-alone configuration



NOTE To operate the Static Transfer Switch it is necessary to make sure that the nominal voltage and frequency of the grid match the corresponding settings of the unit (step 6 of procedure below).

4.3.3.1 Setting up the unit

1. Be sure every AC load is disconnected and the AC Output Breaker on the front panel is turned OFF.
2. Connect the Signal connector. Refer to paragraph 4.2.3.
3. Make DC input connections to the inverter as described in paragraph 4.2.1. The display unit lights up and shows “STAND BY...”
4. Verifying that the nominal Frequency and Voltage values are equal to those of the grid (refer also to section 5 “User’s Guide” page 3).
 - Press the ON/OFF key and wait few seconds. The display will indicate the Vout (and Iout) value,
 - Press “Enter” to indicate the frequency.
 - Return the unit to stand-by, pressing the “ON/OFF” key.

If it is necessary change the Vout and/or Frequency values, please follow the procedure in the next step.

5. Changing the settings of the unit.

- Press “Enter” from “STAND-BY” and check that the unit’s mode is the “Stand-Alone Mode 0” (refer to section 5 “User’s Guide”, page 3).
- If the “Stand-Alone Mode in step 5.1 is not verified, set the Stand-Alone mode as described in section 5 “User’s Guide”, Note on page 9.
- Enter in the “SETTINGS MENU” and set the new values for Vout and/or Frequency. Refer to section 5 “User Guide”, page 8).

6. Setting the Transfer Switch Mode

From the “TRANSFER SWITCH MENU” set the desired “Transfer Switch Operate Mode” option among the following (see section 5 “User’s Guide”, page 13):

- Mode 1 = “On-line Mode” (default Mode). The inverter is the primary source and the Static Transfer Switch is normally switched on the inverter.
- Mode 2 = “Off-Line Mode”. The grid is the primary source and the Static Transfer Switch is normally switched on the grid.
- Mode 3 = “Manual Mode”. Enables the Static Transfer Switch to be in a position determined by the “Manual Switch” setting. The positions can be: (a) switched on the inverter; (b) switched on the grid or (c) not connected. To change the position, use the “MANUAL SWITCH” menu (refer to section 5 “User’s Guide”, page13)

7. Connect the signal connector to the unit. Refer to paragraph 4.2.3.

8. Connect the grid. Refer to paragraph 4.2.2.4.

4.3.3.2 Turning on the load

1. Check that the rated input power of the load is less or equal to the rated output power of the inverter.
2. Connect the load to the inverter as described in paragraph 4.2.2.
3. Press the ON/OFF key to turn the unit ON
4. Switch the front panel AC Output Breaker ON. The unit should be feeding the load.

4.3.4 Models with the optional Static Transfer Switch in parallel configuration



NOTE To operate the Static Transfer Switch it is necessary to make sure that the nominal voltage and frequency of the grid match the corresponding settings of the unit (step 6 of procedure below).



NOTE It is not possible to connect to GND the neutral of units with Static Transfer Switch operating in parallel. In order to allow the grounding of the neutral an isolation transformer has to be used between the inverters' output and the load. Ask your UNIPOWER technical or commercial interface about suggestions on how to do it.

4.3.4.1 Setting up the units

1. Be sure every AC user is disconnected and the AC Output Breaker on front panel of each inverter is turned OFF.



NOTE Repeat steps 2 to 6 for each unit.

2. Make DC input connections to the inverter as described in paragraph 4.2.1. The display unit lights up and shows "STAND BY...".
3. Verify that the nominal Frequency and Voltage values are equal to those of the grid (refer also to section 5 "User's Guide" page 3).
 - Press the ON/OFF key and wait few seconds. The display will indicate the VOUT (and IOU) value.
 - Press "Enter" to indicate the frequency.
 - Turn again the unit in stand-by pressing the "ON/OFF" key.

If it is necessary change the Vout and/or Frequency values, please follow the procedure in the next step.

4. Changing the settings of the unit
 - Press "Enter" from the "STAND-BY..." and check that the unit's mode is the "Stand-Alone Mode 0" (refer to section 5 "User's Guide", page 3).
 - If the Stand-Alone Mode 0 is not verified, set the Stand -Alone mode as described in section 5 "User's Guide", Note on page 9.
 - Enter the "SETTINGS MENU" and set the new values for VOUT and/or Frequency. Refer to "User's Guide", page 8.

- Optional: If you desire, before exiting from the “SETTINGS MENU”, you can also change the default settings for Current Limit and Remote ON/OFF. Refer to “SET Limit” and “SET Remote ON/OFF” options in section 5 “User’s Guide”, page 8.



NOTE The default settings for Frequency, Voltage, Current Limit and Remote ON/OFF can be modified only if the unit Mode is the “Stand Alone Mode 0”(default mode). To set that one, refer to section 5 “User’s Guide”, Note on page 9.



WARNING for proper parallel operation, all units need to have exactly the same Frequency, Voltage, Current limit and Remote ON/OFF settings.

5. Set the “Unit Status” as “Parallel Mode 2” (see also section 5 “User’s Guide”, Appendix A)
 - Select the “SETTINGS Menu” (section 5 “User’s Guide”, page 8) and press “Enter”.
 - Insert the password (default password is “0000”, use “Enter” key to type the “0”character).
 - Scroll the “SETTING Menu” using UP/DOWN keys up to “SERVICE” Menu. Press “Enter” to confirm.
 - Type the password (default password: 1111).
 - Select the “Operate Mode” menu. Press “ENTER”.
 - Set “ Mode = 2”. Press “ENTER”.
6. Re-cycle the DC input voltage. After this is done the Inverter is set to work in parallel configuration.
7. Setting the Transfer Switch Mode.

From the “TRANSFER SWITCH MENU” set the desired “Transfer Switch Operate Mode” option among the following (see section 5 “User’s Guide”, page 13).

- Mode 1 = “On-line Mode” (default Mode). The inverter is the primary source and the Static Transfer Switch is normally switched on the inverter.
- Mode 2 = “Off-Line Mode”. The grid is the primary source and the Static Transfer Switch is normally switched on the grid.

- Mode 3 = “Manual Mode”. It enables the Static Transfer Switch to be in a position determined by the “Manual Switch” setting. The positions can be: (a) switched on the inverter; (b) switched on the grid or (c) not connected. To change the position, use the “MANUAL SWITCH” menu (refer to section 5 “User’s Guide”, page 13).



WARNING For proper parallel operation all units need to have exactly the same “Transfer Switch Operate Mode” setting.

8. Connect the signal connector on the unit(s). Refer to paragraph 4.2.3.
9. Connect the grid. Refer to paragraph 4.2.2.4.

4.3.4.2 Turning on the load

Check that the rated input power of the load is less or equal to the rated output power of the inverter.

Connect the load to the inverter as described in paragraph 4.2.2.

Press the ON/OFF key to turn the unit ON.

Switch the front panel AC Output Breaker ON. The unit should now be feeding the load.

5.1 The Display

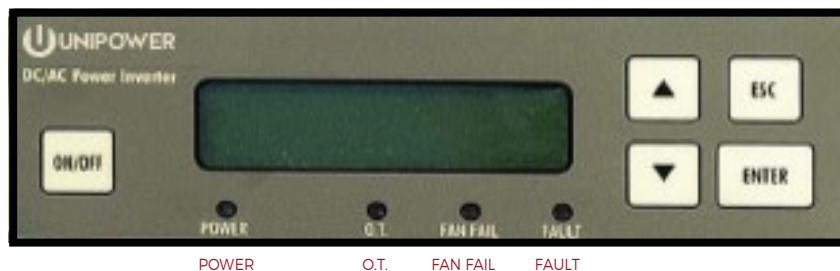







Figure 5-1 Front Panel Display/Touch Pad

1.1 Function Keys

-  <UP> /  <DOWN> keys - Use to scroll through menus.
-  <ESC> key - Use to exit from the current menu.
-  <ENTER> key - Use to confirm a selection or value
-  <ON/OFF> key - Use to turn ON or Stand-by (OFF) the unit.

1.2 LEDs for operating status

The four front-panel LED's show inverter status as shown in Table 5-1 below.

LED Status	Condition
POWER (green)	Supplying power to the load normally
O.T. (red)	Internal temperature is approaching the thermal shutdown threshold. In addition to the visual indication, the unit sounds audibly.
O.T. (red) and FAULT (red)	The thermal shutdown threshold has been exceeded. Note: The thresholds are factory set and not changeable (see Appendix E - Default Factory Settings).
FAN FAIL (red)	Speed of one of the fans is below its nominal value.
FAULT (red) and FAN FAIL (red)	More than one fan has stopped or a general malfunction is detected.
	The unit continues to works until an O.T. is detected.

LED Status	Condition
FAULT (red)	<p>General failure. One of the following conditions has occurred:</p> <ul style="list-style-type: none"> - Failure of at least 2 fans - Over Temperature - Output Over Current (the output breaker on the front panel, trips and a "Breaker OFF" state is indicated on the display.) - Output Over Voltage - Output Under Voltage - DC input voltage out of range (U.V. or O.V.) - DC Input Over Current

Table 5-1 Front Panel LED Status Indications

5.2 Startup sequence and the Standby Status

The STAND BY status shows the DC source is connected; loads are disconnected by two internal relays.

As soon as the DC input voltage is applied, "STANDBY..." is displayed.

Three operations are possible (see Figure 5-2):

1. Press <ESC> to enter the SETTINGS menu's first page, or
2. Press <ENTER> to view the configuration mode of the unit. Two screens are presented automatically within a few seconds. The first (1) shows the mode of the unit (Stand Alone or Parallel mode). In case of Parallel mode the screen tells whether the unit is master or slave; in case of Stand Alone mode the unit is always a master. The second screen (2) shows if the unit has the optional Static Transfer Switch.

Pressing the "ESC" key shows the SETTINGS menu's first page, or

3. Press <ON/OFF> to power up the unit. The display shows "STARTING..." and the screen (3) appears automatically after a few seconds. Using <UP> / <DOWN> keys it is possible to scroll six screens on the display and view the electrical parameters (Vout/Iout, Vout/Freq, Iout/Pout,...). When pressing <ENTER> the screen (1) is viewed for a short time, then the display goes back to the previous screen automatically.

By pressing <ESC> the SETTINGS menu is displayed.

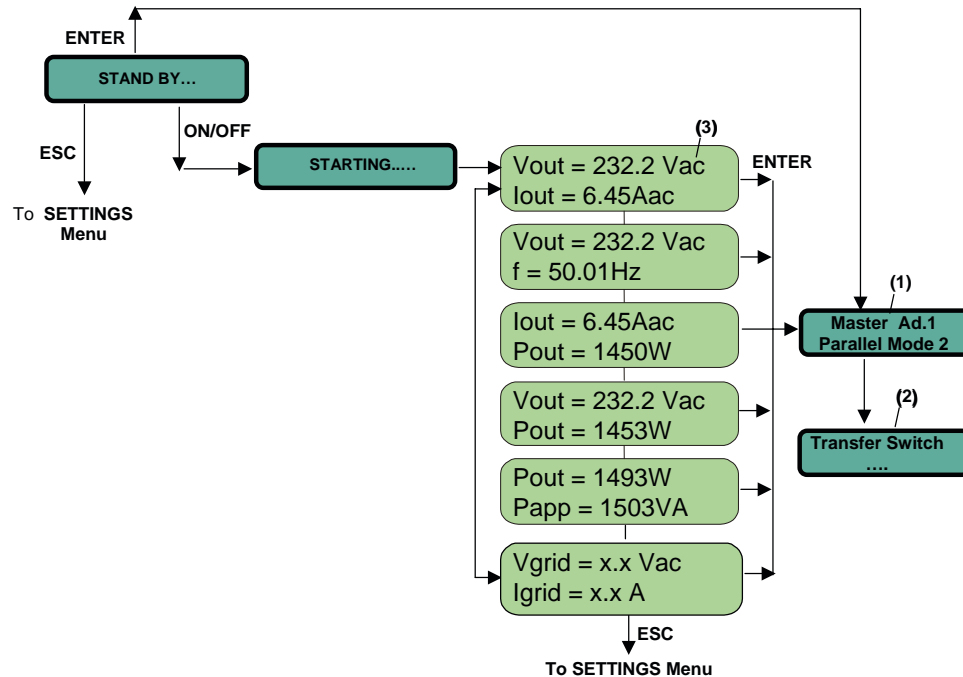


Figure 5-2 Startup and Status Menu

5.3 Operating Modes

The unit has two operating modes:

- Stand Alone mode: there is only one inverter in the system.
- Parallel mode: there are several inverters working in parallel (max. 6).

The default mode is Stand-Alone.

Trained personnel should set the operating mode before the system starts supplying the load (see SERVICE menu in Appendix D).

It is possible but not recommended to change the operating mode while the inverter is operating.

ATTENTION: incorrect unit setting may lead the system to latch up

Notes

When the unit works in Parallel mode it is not possible to change the following parameters in the SETTINGS menu: Vout, Iout, Frequency. Access to these parameters is locked to avoid system conflicts (see also Notes on page 36).

5.4 Controller status

When operating in Parallel mode the controller inside each unit can operate in two modes:

- Master: provides the commands for the whole system of paralleled inverters. There is only one master.
- Slave: follows the commands of the Master.

When working in Stand Alone mode the status of the unit is Master.

Controller statuses are assigned automatically and cannot be changed by the user. In case of failure of the master in a parallel configuration a new master is selected automatically and control of the system of paralleled inverters is transferred automatically to the new master.

5.5 Main menus

There are 3 main Menus (Figure 5-3):

- The SETTINGS menu
- The STATUS menu
- The INFO menu

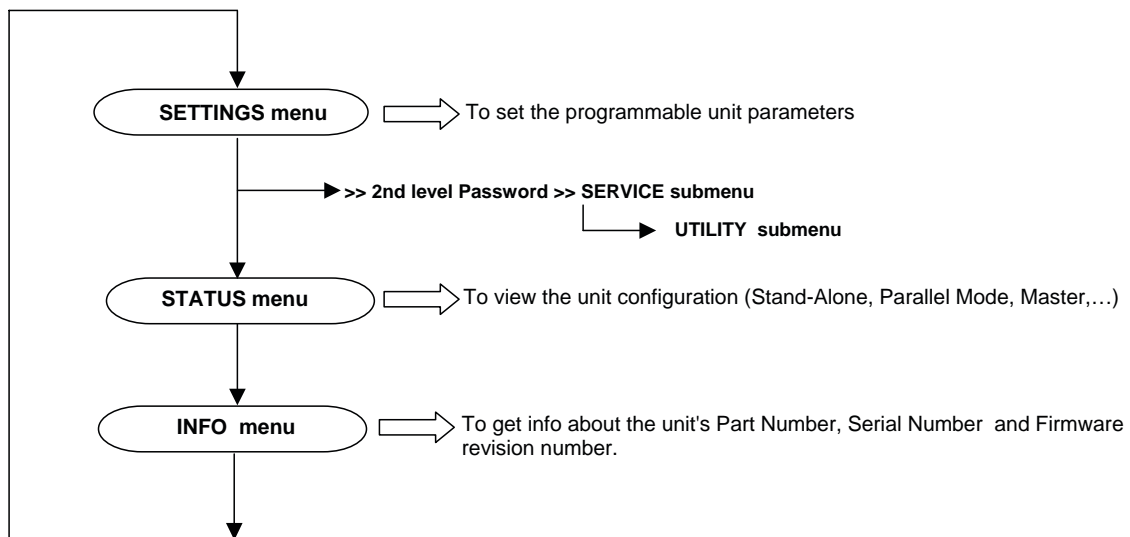


Figure 5-3 Main Menu Structure

5.6 The SETTINGS menu

6.5.1 Overview

Through this menu it is possible to set several parameters of the unit. To avoid problems make sure you know how the parameters will affect the load.

To access the SETTINGS menu contents a 1ST level password must be provided.

For increased protection certain sensitive parameters are protected by a 2ND level password that an Authorized operator must provide.

Settings changeable by Generic operator (1ST level password):

- Unit Serial Port Address, Vout, Ilimit, Frequency.
- Protections (AutoRestart or Latched types).
- Display Light (ON/OFF), Time Display Light ON and Key Click.
- Autostart, Remote ON/OFF.
- New Password 1ST level only.

Settings changeable by Authorized operator (2ND level password):

These settings are accessible via the SERVICE sub-menu whose access is protected by the 2ND level password.

- Operating mode.
- 2ND level Password.
- Restore data.
- Utility menu.
- System Time-out.

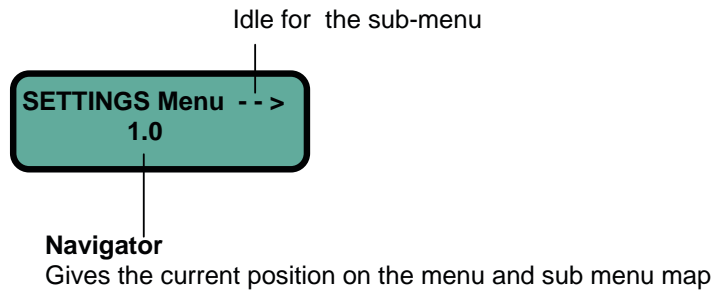
These settings are contained in the UTILITY sub-menu which contained in the SERVICE sub-menu (no password is needed to access the UTILITY sub-menu from the SERVICE sub-menu, see Figure 5-2 and also Appendix D).

- Change the Led Status (ON/OFF).
- Set the Buzzer (ON/OFF).
- Set the Fans (ON/OFF) and the Fan Speed.
- Read fan Speed, System Temperature, Internal Temperature and Ambient Temperature.



NOTE The SERVICE sub-menu should be accessed by trained personnel only. An error in these settings could seriously damage the system. To avoid potential conflicts during the operating procedures, it is preferable to keep the unit in STANDBY status before accessing and acting on the SERVICE sub-menu.

5.6.2 Navigating the SETTINGS menu



X.0 : shows the main menu start page.

X = 1 for SETTINGS menu

X = 2 for STATUS menu

X = 3 for INFO menu.

X.1 or X.2 or X.3 etc.

numbers coming after the point indicate any 1st level submenu items

X.1.1 or X.1.2 or X.1.3 etc.

numbers coming after the second point, mark any 2nd level submenu items

Example:

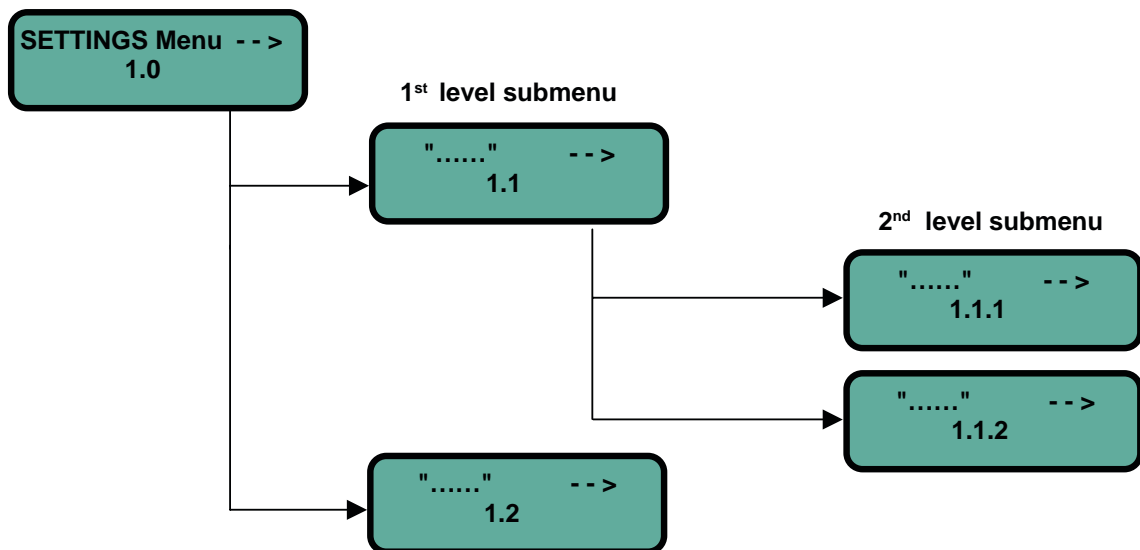


Figure 5-4 Settings Menu Navigation

5.6.3 Structure of the SETTINGS menu

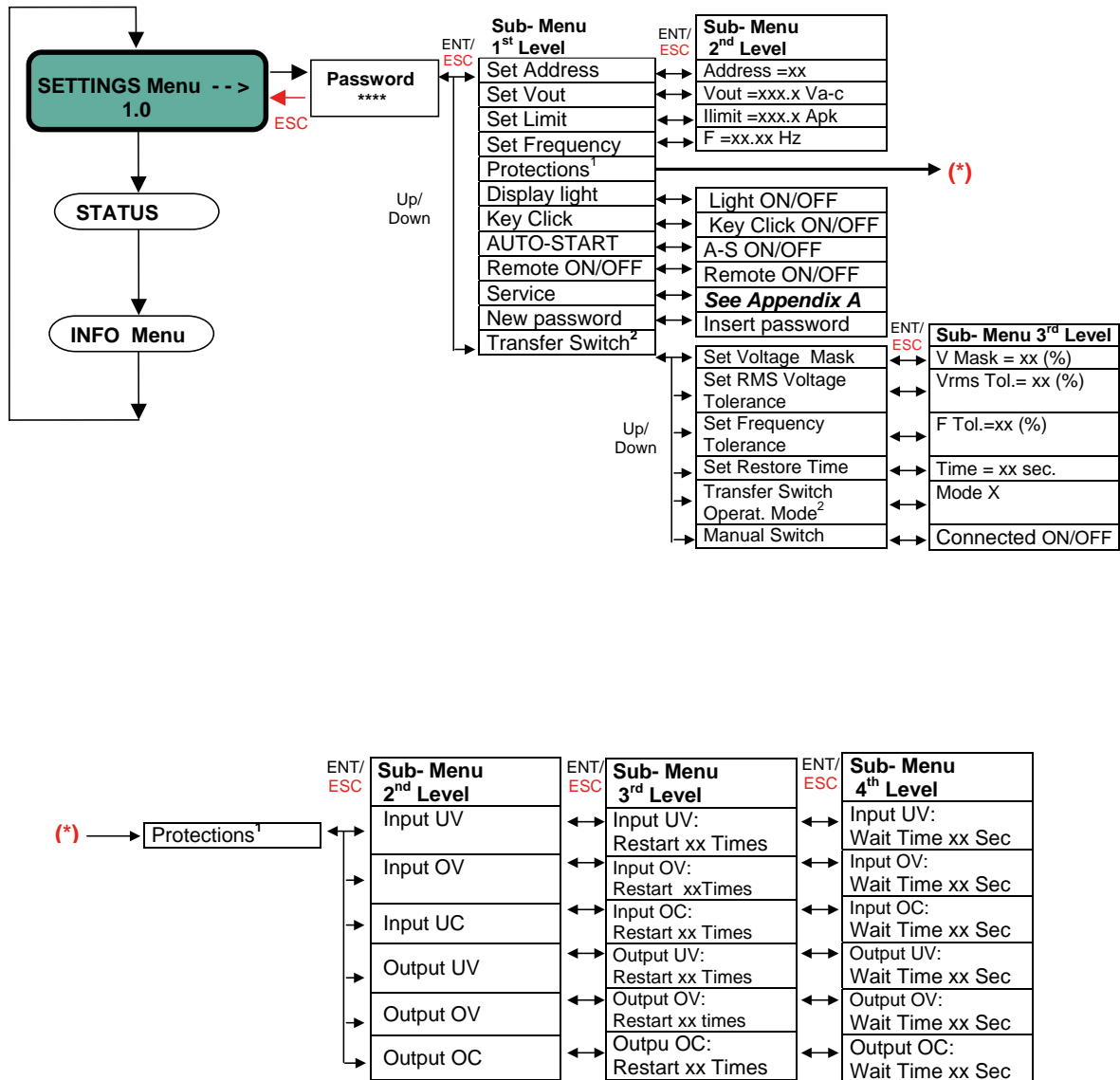


Figure 5-5 Settings Menu Structure

¹ For the Protections operating procedure, please see section 5.6.5 on page 37.

² For the Transfer Switch operating procedure, please see section 5.6.6 on page 38.

5.6.4 SETTINGS menu: access and sub-menus

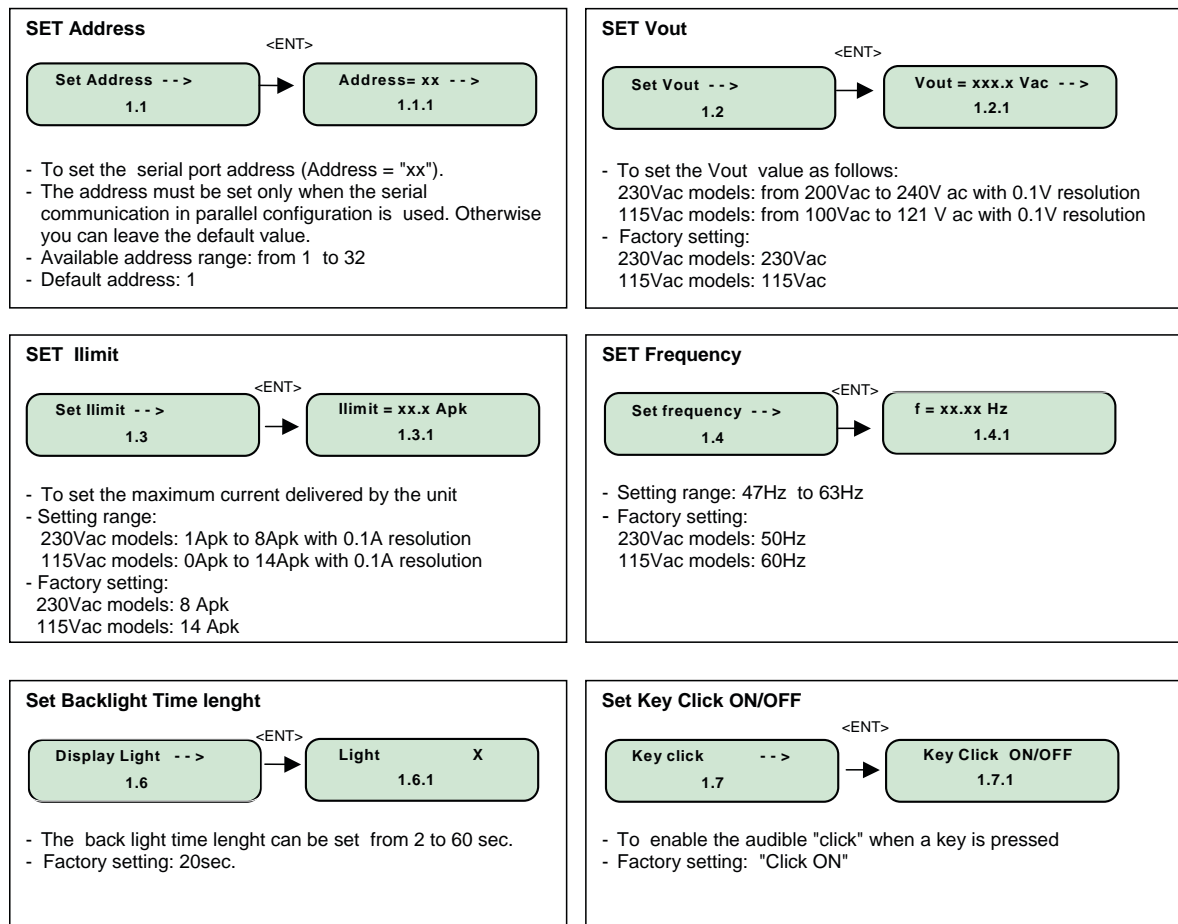
You can access the SETTINGS menu starting from the STAND BY... status just by pressing the <ESC> key or, alternatively, the <ENTER> key: see Figure 5-2 on page 30.

Access is protected by the 1st level password. The default password is “0000”. To insert a “0” character press the <ENTER> key on front panel.

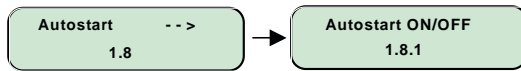
With the <UP> and <DOWN> keys you can scroll all the sub-menus listed in Figure 5-5. Use <ENTER> to select one of them.

The sequence of the 1st level sub-menus with the setting parameters is described below (PROTECTIONS and SERVICE sub-menus are addressed on the following pages).

Use <UP> and <DOWN> keys to set the “xx” parameters at the desired value. Then press <ENTER> to confirm.

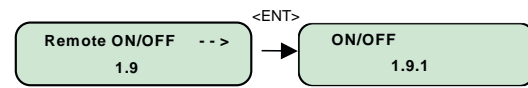


Set Autostart Mode



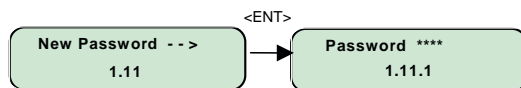
- Auto-Start ON \Rightarrow the unit starts up as soon as the DC input source connection is made. In this case there is no need to press the <ON/OFF> key on front panel.
- Auto-Start OFF \Rightarrow The unit starts up only after <ON/OFF> key has been pressed.
- Factory setting: Auto-Start OFF

Set Remote ON/OFF



- Remote ON \Rightarrow It is possible to turn ON /OFF the unit remotely provided that a switch or relay is connected between pins 6 and 7 of the signal connector on the back side of the unit. Refer to the Installation Manual".
- Factory Setting: Remote "OFF"

Set New Password



- This option allows to change the current password. To set the new password digits use the <UP> and <DOWN> keys.
- Max. Password length: 4
- Factory setting: "0000"

NOTES

The following settings are not accessible when the current configuration unit mode is the Parallel mode. This is to avoid conflicts within the system.

Set Vout, Set ILIMIT, Set Frequency, Set Remote ON/OFF.

If the user wants to make changes when operating in Parallel mode, the unit must first be set to Stand-Alone mode using the following procedure (to be repeated for each unit working in parallel):

1. Set the unit to Stand-alone mode:
 - on the SETTINGS menu select the SERVICE sub-menu. Press <Enter> to confirm the choice.
 - Insert the 2nd level password (default password is "1111"; use the <UP> and <DOWN> keys to select the digits. Press <Enter> to confirm.
 - Select the OPERATING MODE sub-menu and press <Enter>.
 - Change "Mode = 2"(parallel mode) into "Mode =0"(stand-alone mode). Use the <UP> key to insert the character "0".
2. Change the Vout, ILIMIT, Frequency and Remote ON/OFF settings like explained before.
3. After the changes are done restore the parallel mode with the same procedure described in step 1.

It is strongly recommended to set all units with identical Vout, ILIMIT, Frequency and Remote ON/OFF values when working in parallel.

5.6.5 SETTINGS menu: the PROTECTIONS sub-menu

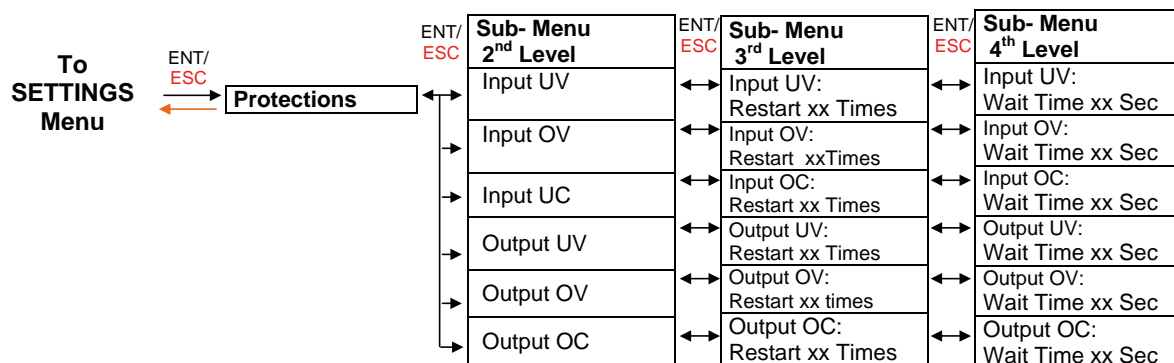


Figure 5-6 Protections Sub-menu Structure

Each type of protection listed on the table in Figure 5-6 (Input UV, Input OV, Input UC, Output UV, Output OV, Output OC) , can be customized from the front panel.

After selecting an item listed in the PROTECTIONS sub-menu (Figure 5-6) it is possible to choose between two types of protection mode: “Restart mode” or “Latch up mode”.

Restart mode

The unit tries to restart a certain numbers (“xx”) of times, after which the unit latches up.

Set “xx” from 1 to 10 using <UP> and <DOWN> keys. Press <Enter> to confirm. Factory setting = 5 times.

Set “xx” >10 and press the <ENTER> to have the unit continuously try to restart.

Latch up mode

Set “xx” = 0 to cause the unit latch up as soon as the protection occurs.

The default protection mode for all protections is Restart 5 times.

For any protection it is possible to set the wait time between two restart attempts. The wait time has to be defined in the following range: 2 sec - 60sec max. Factory setting = 5 sec.

5.6.6 SETTINGS menu: the TRANSFER SWITCH submenu

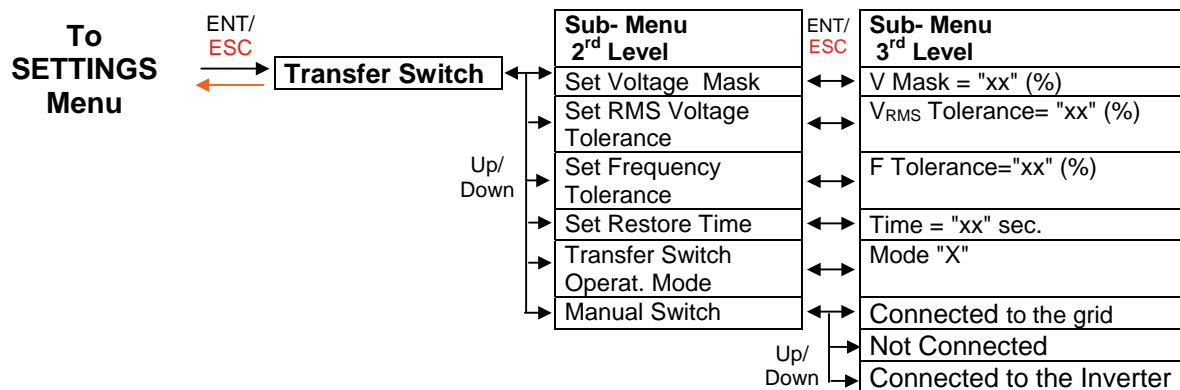
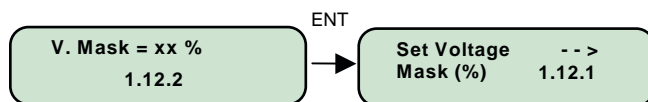


Figure 5-7 Transfer Switch Sub-menu Structure

With the TRANSFER SWITCH sub-menu you can set the Static-Transfer Switch (STS) operation mode for and define the tolerance of electrical parameters such as voltage and frequency for the operation with the STS.

Use <UP> and <Down> keys to set the “xx” parameters at the desired value.
To confirm: press <ENTER> .

SET Voltage Mask



The Voltage Mask defines the range of Vout values for which the STS does not operate.

The Voltage Mask limits are expressed as a percentage “xx” of the Vout (see Set Vout on page 35). For instance, if you set Vout = 230Vac and the Voltage Mask at 20% then the STS will activate only when Vout falls outside the 184-276Vac range (voltage mask width in Figure 5-8).

The settable percentage range is 15% to 50% of Vout. Factory setting: 15%

Example

Assuming that the current setting for STS mode is the ON-Line mode (the inverter is the primary source for the load) and that the output voltage is within the limits of the voltage mask, then the STS remains open (the load connected to the inverter). Otherwise, when Vout lies beyond the voltage mask limits, the STS switches the load to the grid (which is the secondary or back-up source in this case). The check of Vout is made on its peak value.

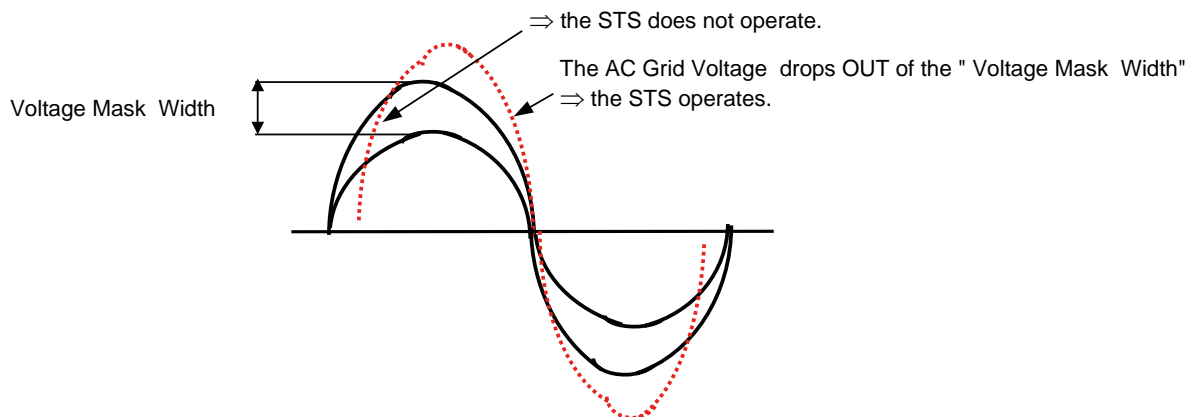
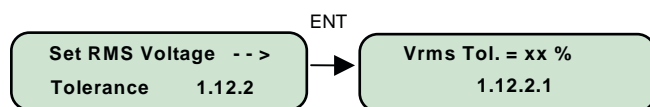


Figure 5-8 STS Voltage Mask

SET Vrms

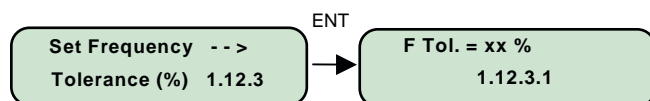


The STS can operate not only based on the peak value of V_{out} but also based on the RMS value. With the “Set VRMS” screen you can define a percentage “xx” of the V_{out} within which the STS does not operate.

For instance, if $V_{out} = 230V_{ac}$ and $VRMS = 10\%$ then the STS is activated only if the output RMS value $VRMS$ falls outside the 253-207Vac range.

The percentage range is 5% to 50% of V_{out} . Factory setting: 10%

SET Frequency Tolerance



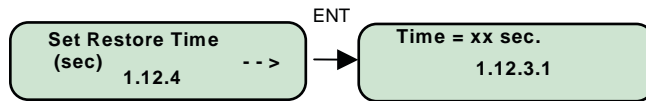
With this screen you can define the max. frequency over which the STS is activated.

The allowed range is 1 to 10% of the nominal frequency set by the SETTINGS menu (see SETfrequency on page 35). Factory setting: 2%

Example

If the frequency is set to 50Hz in the SETTINGS menu and the Frequency tolerance is set at 3%, then the STS changes state only if the frequency of the primary source exceeds 51.5Hz or falls below 48.5 Hz.

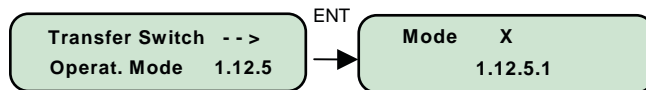
SET Restore Time



The Restore Time is the time “xx” elapsed after the STS is activated and before the STS attempts to restore the previous mode. During this time the STS checks the system parameters (Vout, VGRID, Frequency,...) to verify if they have all returned to the normal range, so that the load can be switched back safely to the primary source.

The Restore time range is 10 - 7200 sec with in increments of 5 seconds. Factory setting: 10 seconds.

Set Transfer Switch Mode



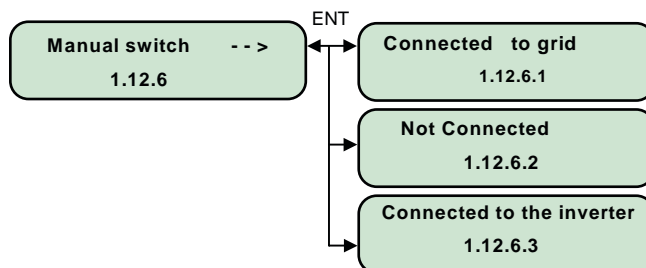
The STS can operate in the following modes:

- Mode 0 (“X”=0): :” OFF Mode”: the STS is NOT CONNECTED.
- Mode 1 (“X”=1): On-Line mode: the STS normally remains open (the load is connected to the inverter output) and connects the load to the grid when it closes.
- Mode 2 (“X”=2): Off-Line mode: the STS normally remains closed (the load is connected to the grid) and connects the load to the inverter when it opens.
- Mode 3 (“X”=3): Manual mode: the STS status is configured by Set Manual Switch screen.

Factory setting: Mode 1 (On-Line mode).

Set Manual Switch

The MANUAL SWITCH sub-menu is enabled by selecting Mode 3 (Manual mode) in the TRANSFER-SWITCH-MODE submenu.



With this setting it is possible to force the STS to connect the load to the grid, to the inverter ,or to maintain the load disconnected.

5.7 The STATUS menu

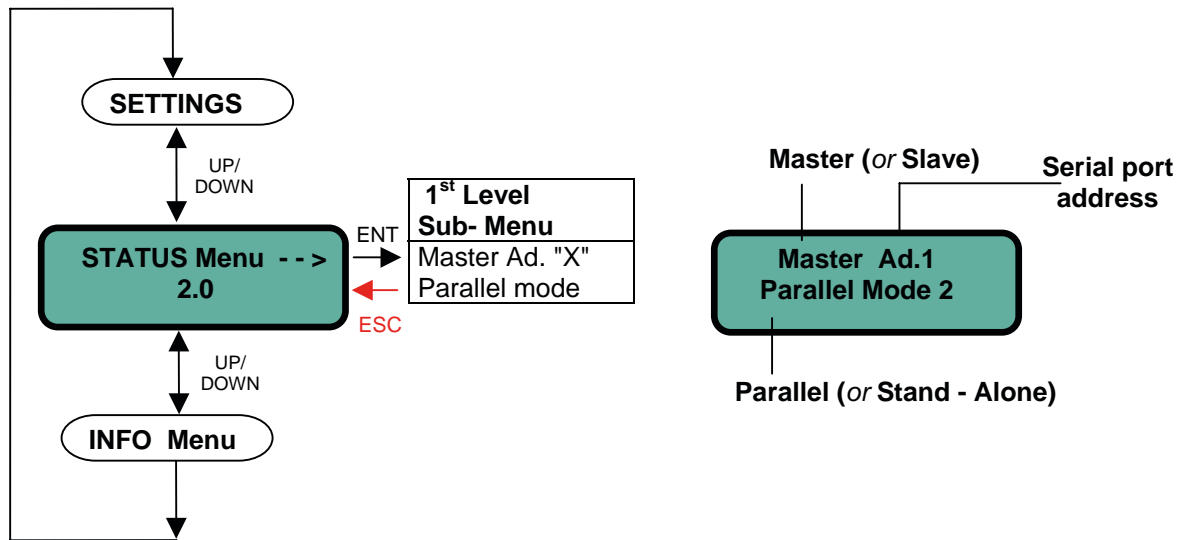


Figure 5-9 STATUS Menu

The STATUS menu shows:

- the current status (Master or Slave).
- the current configuration mode (Stand Alone mode or Parallel mode).
- the serial port address.

5.8 The INFO menu

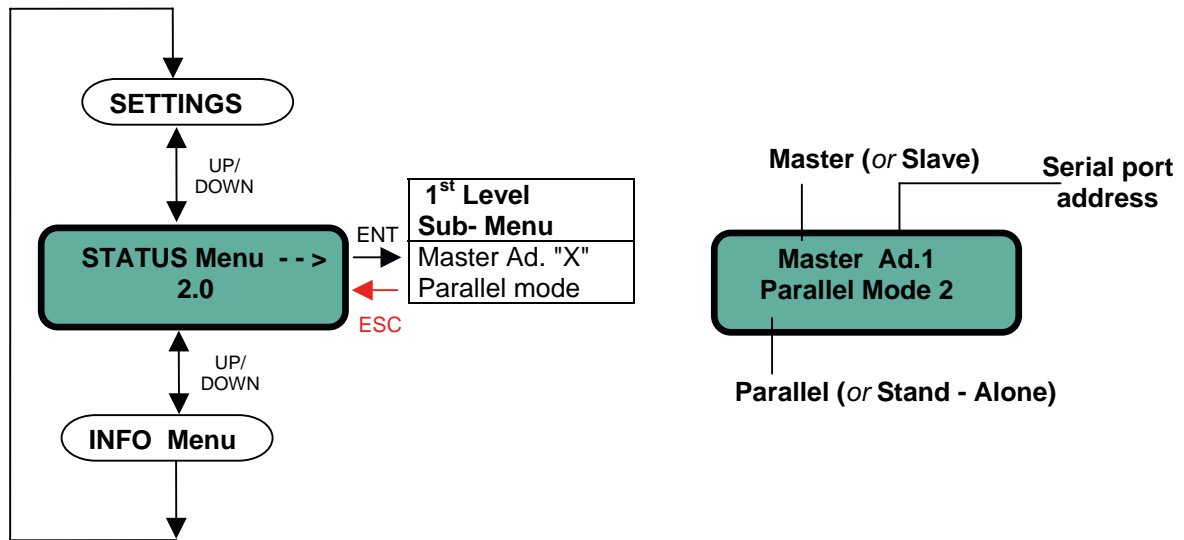


Figure 5-10 INFO Menu

With the INFO menu you can obtain information about:

- Model Number : SLI - xx - xxx
 - Factory description code
 - Vinput (48 or 24)
 - Vout (230 or 115Vac)
- Serial Number: factory serial number, including manufacturing week & year.
- Firmware revision:
 - DSP Software release for the DC-DC stage.
 - DSP Software release for the DC-AC stage.
 - DSP Software release for the Controller stage.

Input Power Requirements and DC Input Wire Sizing

The DC source must meet the requirements given in Table A-1 below.

Model	Nominal Voltage	Minimum Cut-OFF / Alarm Voltage	Maximum Voltage	Rated Current at Nominal Voltage	Peak Current
SLI-48-XXX	48VDC	36 - 40VDC	72VDC	34A	60A
SLI-24-XXX	24VDC	18 - 20VDC	36VDC	70A	120A

Table A-1 Input Requirements

The minimum recommended input wire sizes vs. distance from input source and P/N of terminals (type: AMP TERMINYL®) are given in Table A-2 below.



NOTE The table specifies standard wire size that will provide 200mV max. voltage drops at low-line input voltage and rated output power.

Model	Less than 1m		Less than 2m		Less than 3m		Less than 4m	
	Wire	P/N	Wire	P/N	Wire	P/N	Wire	P/N
SLI-48-XXX	8 AWG	324082	5 AWG	324047	3 AWG	324050 or 330966	2 AWG	324053
SLI-24-XXX	2 AWG	324053	2 x 2 AWG	324053	2 x 1 AWG	324053	2 x 0 AWG	55822-1

Table A-2 Input Wire Size

Manual Bypass

Manual bypass function may be useful for isolating the inverter to allow maintenance without dangerous high voltage presence.

It is also recommended to use a double pole rotor switch if different implementations of same concept may exist without a rotor switch; in this case proper sequence must be scrupulously followed.

A typical Manual Bypass application is described by the following schematic.

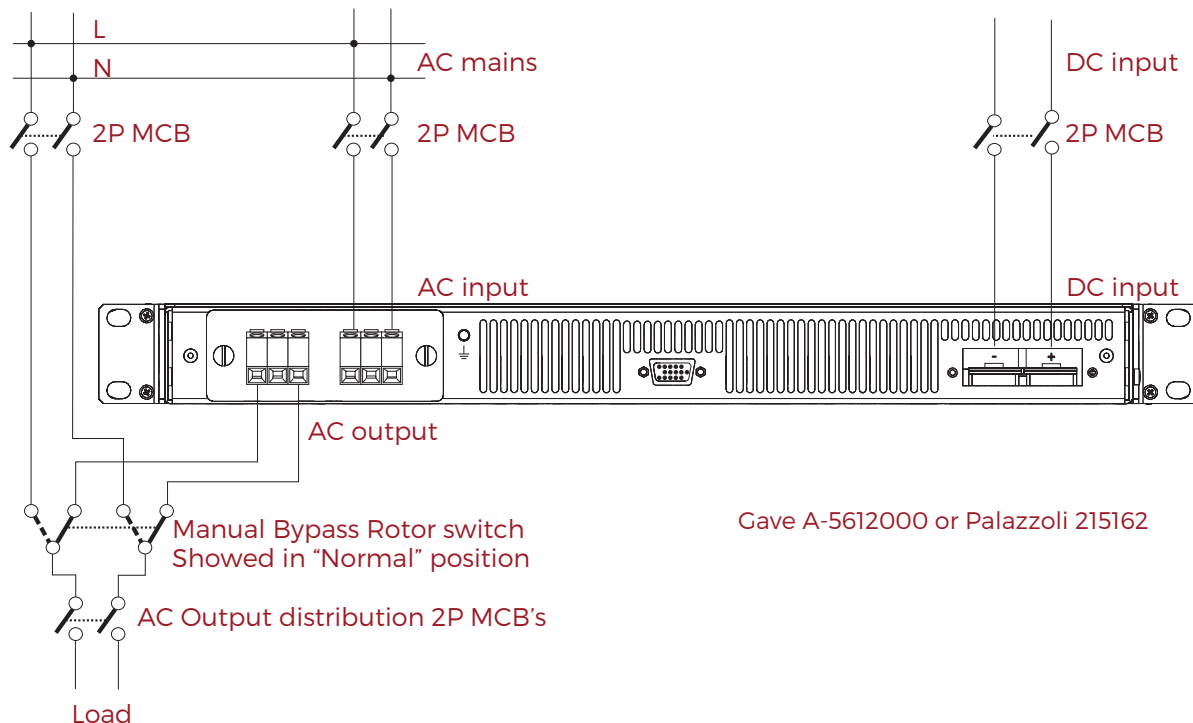


Figure B-1 Manual Bypass Schematic

To switch to maintenance mode

- ensure AC input MCB to the inverter is ON.
- move the rotor switch to the position Manual Bypass to keep the load powered.
- disconnect by the relative MCB the AC input to the inverter.
- disconnect by the relative MCB the DC input to the inverter.

To return to normal operation

- connect by the relative MCB the DC input to the inverter.
- connect by the relative MCB the AC input to the inverter.
- press ON/OFF button to turn the inverter on.
- move the rotator switch to the position Normal.



WARNING Different sequencing from the above may result in severe damage of the unit.

Grounding Restrictions Summary

STS option	Mode	Grounding Restriction	Remark
With STS	Standalone	Neutral grounding is possible just internally, by the factory, on the STS board. Caution: do not short Neutral to Ground outside of the inverter.	See picture at page 4-7 of the engineering specification.
	Parallel	Neutral grounding is possible only by using an isolation transformer before the AC input. Neutral to Ground can be connected by the factory with an internal connection or at the inverter output.	See schematic below.
Without STS	Standalone	NO grounding restrictions. Neutral to Ground can be connected by the factory with an internal connection or at the inverter output.	
	Parallel	NO grounding restrictions. Neutral to Ground can be connected by the factory with an internal connection or at the inverter output.	

Table C-1 Grounding Restrictions

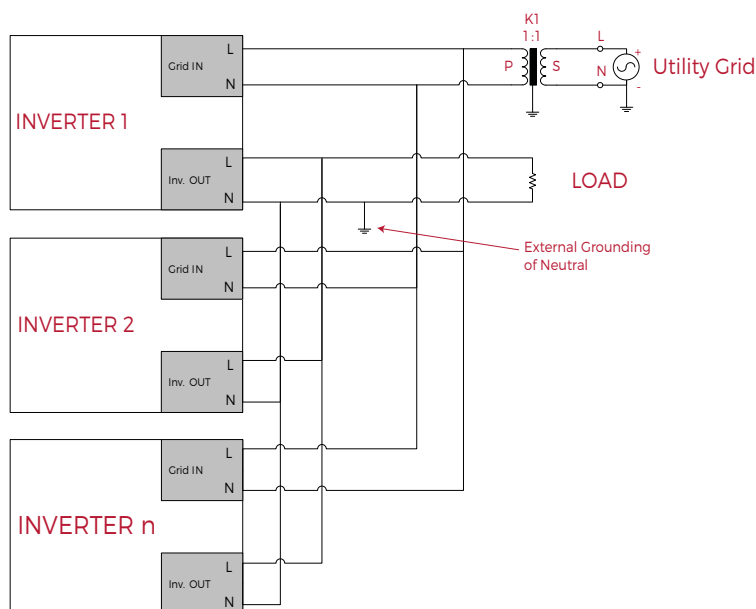


Figure C-1 Grounding of Neutral for Inverters with Transfer Switch

The SERVICE menu

Access to the SERVICE sub-menu should be reserved to authorized operators only, because it allows altering of critical system parameters.

To get access to the SERVICE sub-menu enter the SETTINGS menu with the 1ST level password (default “0000”), select the sub-menu SERVICE and enter the 2ND level password (default “1111”).

Once in the SERVICE sub-menu it is possible to conduct the following tasks:

1. Change the operating mode

- Stand-alone mode (default) → set the “X” = 0 on the 2ND Level Sub-Menu in Fig.A.1.
- Parallel mode → set the “X” = 2 on the 2ND Level Sub- Menu in Figure D-1.

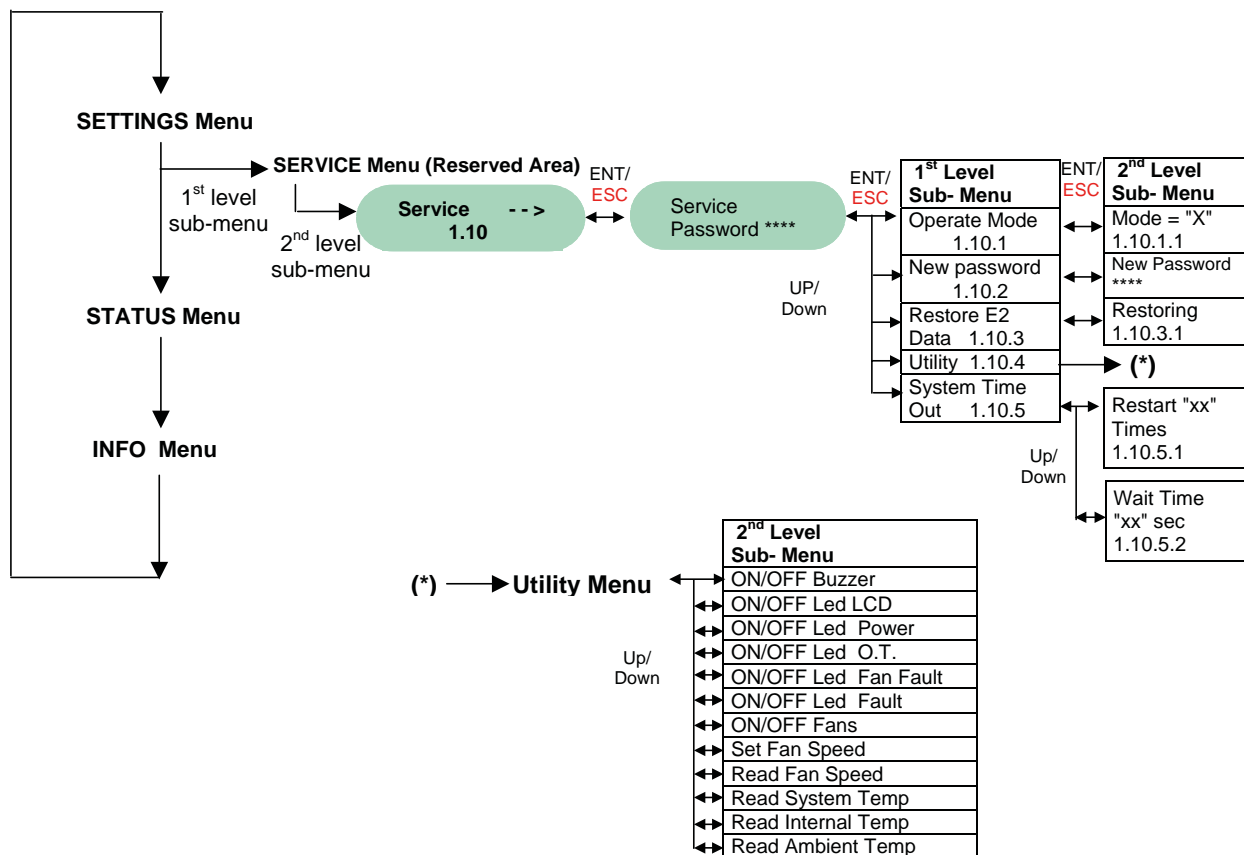


Figure C-1 SERVICE sub-menu structure

2. Change the 2ND level Password

Define a new password for the “SERVICE” Menu. The password length is 4 digits. Use the <UP> and <DOWN> keys to type the characters on the display. Press <ENTER> to confirm.

3. Restore the factory settings

With this option you can restore all the factory settings (see “Appendix E”).

Select the items “Restore E2 data” and press <ENTER>. The screen “Restoring” appears on the display.

Press <ENTER> to restore the factory settings.

4. UTILITY

This sub-menu is reserved for manufacturer’s personnel for testing the operative condition of the LED’s and fans, as well as to monitor the temperature.

Do not change the factory settings in this sub-menu.

5. Set the Time Out

The Time Out is the time the unit waits before attempting to start again after a general fault has occurred.

Restart mode

The “Restart Mode” can be the “Restart xx times” mode or the “Restart always” mode.

The unit tries to restart a certain number (“xx”) of times, after which the unit latches up.

Set “xx” from 1 to 10 using <UP> and <DOWN> keys. Press <Enter> to confirm. Factory setting = 5 times.

Set “xx” >10 and press the <ENTER> to have the unit continuously try to restart.

The default protection mode for all protections is Restart 5 times.

Wait Time

The Wait Time is the time between two restart attempts (only for the “Restart xx times” mode).

The Wait Time can be defined in the following range: 2sec to 60sec. Factory setting = 5 sec.

Default Factory Settings

SETTINGS MENU		
Parameter	Default Setting	
Password	0000	
Vout	115Vac	230Vac
Frequency	60Hz	50Hz
Ilimit	14Apk	8Apk
Display light length	20 sec.	
Key click ON/OFF	ON	
Auto-start ON/OFF	Auto-start OFF	
Remote ON/OFF	Remote OFF	

PROTECTIONS MENU (Sub-Menu of SETTINGS MENU)	
Mode	Auto-restart (all protections)
Restart Attempts	5 times
Wait Time (between 2 attempts)	5 sec.

TRANSFER SWITCH MENU (Sub Menu of SETTINGS MENU)	
Voltage Mask	15% Vout
RMS Voltage Tolerance	10% Vout
Frequency Tolerance	2% of nominal frequency
Restore Time	10 sec.
Operat. Mode	"On-Line " = "Mode 1"

SERVICE MENU (Sub-Menu of SETTINGS MENU)	
Password	1111
Operat. Mode	"Stand-alone" = "Mode 0"
System Time-out	
Mode	Auto-restart
Restart Attempts	5 times
Wait Time (between 2 attempts)	5 sec.

Table E-1 Factory Settings

Error State Behavior

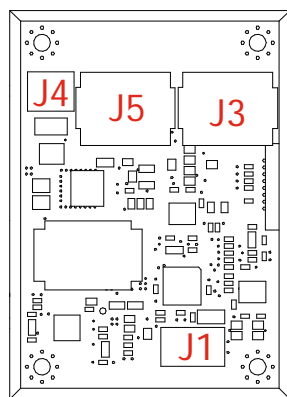
State	Note
3 - Inverter ERROR, Bulk O.V.	Restart by toggling the On/Off button or remote On/Off signal
4 - MASTER INVERTER protection INDICATOR ERROR	Restart by toggling the On/Off button or remote On/Off signal
5 - DC/DC Under Voltage	Auto Restart or Latch OFF *
6 - DC/DC Over Voltage	Auto Restart or Latch OFF *
7 - Low Input	Auto Restart or Latch OFF *
8 - DC/DC Over Current	Auto Restart or Latch OFF *
9 - DC/DC Ramp Fail	Auto Restart or Latch OFF *
10 - Inverter ERROR, LOW Bulk	Restart by toggling the On/Off button or remote On/Off signal
11 - Environment Over Temp. (jump occurred from STATE 1)	Auto Restart
12 - Environment Over Temp. (jump occurred from STATE 2)	Auto Restart
13 - Inverter ERROR, Invalid mode	Latch OFF
14 - Checksum ERROR on communication SPI DSP Inverter	Auto Restart or Latch OFF *
15 - Inverter ERROR writing/reading wrong VARIABLES	Latch OFF
16 - Internal Over Temp. (jump occurred from STATE 1)	Auto Restart
17 - Internal Over Temp. (jump occurred from STATE 2)	Auto Restart
18 - Parameters passed to DSP Inverter DRIVERS	Latch OFF
19 - Output O.C.	Auto Restart or Latch OFF *
20 - Output U.V.	Auto Restart or Latch OFF *
21 - CALIBRATION Parameters not received	Auto Restart or Latch OFF *
22 - Breaker OFF	Switch breaker ON to restart
23 - Output O.V.	Auto Restart or Latch OFF *
24 - OUTPUT SYNC ERROR	Auto Restart or Latch OFF *
25 - Transfer Switch write/read ERROR, wrong VARIABLES	Auto Restart or Latch OFF *
26 - Transfer Switch checksum ERROR on communication	Auto Restart or Latch OFF *
27 - Over Current MED t. Switch current absorbed by load too high	Restart by toggling the On/Off button or remote On/Off signal
28 - Over Current MAX t. Switch current absorbed by load too high	Restart by toggling the On/Off button or remote On/Off signal
29 - Inverter Communication ERROR	Auto Restart or Latch OFF *
30 - Internal ERROR V_SENSE FAIL (read output voltage DSP Inverter Failed)	Auto Restart or Latch OFF *

* Mode can be programmed by user.

SLI15 to ACX Translator

To install SLI15 inverters with a Guardian Access 5U/6U rack-mount system use the following steps. The same is true when adding inverters into an existing Guardian cabinet system.

1. Install the inverters as described in the main body of this manual.
2. Install the SLI15 to Guardian Translator to the DIN rail at the rear of the distribution module of the Guardian system. See the appropriate Guardian System Manual for details of how to access the relevant area.
3. Using the cables supplied with the translator connect the translator card as follows:



Connector	Function
J1	SLI input signal
J4	DC power
J3, J5	System RS485

Figure F-1 SLI to ACX Translator Connectors

- Plug one end of the RJ45 patch cable (27.5" | 0.7m) into J3 or J5 on the translator card and plug the other end into a spare RJ45 connector on the rear of one of the rectifier power shelves. This connects the translator to the Guardian System's internal RS485 bus.
- Plug the 3-wire signal cable (47.2" | 1.2m) into J1 on the translator board and connect the other end to the SLI inverter signal connector or paralleling adapter according to the setup that has been installed, see Table F-1.

Installation Type	Translator	Inverter / Adapter	Function
Using the inverter signal connector	J1 pin 2	J1 pin 2	+T/R
	J1 pin 3	J1 pin 3	-T/R
	J1 pin 1	J1 pin 4	Signal Return
Using the paralleling adapter card or hot-swap sub-rack	J1 pin 2	Orange pin 4	+T/R
	J1 pin 3	Orange pin 6	-T/R
	J1 pin 1	Orange pin 3	Signal Return

Table F-1 SLI to ACX Translator Signal Connections



NOTE When connection to 2 to 6 inverters configured for parallel operation it is only necessary to make this connection to one inverter/sub-rack.

- Plug in the DC power cable (59" | 1.5m) and wire the other end to connector XC4 on the system internal connection board as shown in table F-1 below.

System Voltage	Translator J4	System XC4	Voltage
-48V	pin 1	pin 1	0V
	pin 2	pin 2	-48V
+24V	pin 2	pin 2	0V
	pin 1	pin 1	+24V

Table F-2 SLI to ACX Translator Power Connections

To install SLI15 inverters with an Aspiro 1U, Aspiro 2U, Guardian Access 2U or Guardian Access 3U rack-mount system use the following steps.

1. Install the inverters as described in the main body of this manual.
2. Install the SLI15 to Guardian Translator to a suitable DIN rail which should be mounted on the relay rack or cabinet as close to the DC power system as is practical.
3. Making reference to the appropriate Aspiro or Guardian System Manual to enable access to the relevant connection points continue as in step 3 above taking note of the following system specific recommendations:

Aspiro 1U (M35)

- Connect the RJ45 patch cable into the RS485 port on the rear of the chassis.
- Connect the DC power cable to X10 pins 17 (-Vsys.) and 18 (+Vsys.) on the rear of the chassis.

Aspiro 2U (M23/MS23)

- Connect the RJ45 patch cable into a spare RJ45 on the rear of the rectifier sub-rack.
- Connect the DC power cable to XC8 pins 4 (-Sys. Voltage Out) and 5 (+Sys. Voltage Out) on the alarm interface.

Guardian Access 2U (MS28)

- Connect the RJ45 patch cable into a spare RJ45 on the rear of the rectifier sub-rack.
- Connect the DC power cable to XC8 pins 4 (-Sys. Voltage Out) and 5 (+Sys. Voltage Out) on the alarm interface.

Guardian Access 3U (MS27)

- Connect the RJ45 patch cable into a spare RJ45 on the rear of the rectifier sub-rack.
- Connect the DC power cable to XC8 pins 4 (-Sys. Voltage Out) and 5 (+Sys. Voltage Out) on the alarm interface.

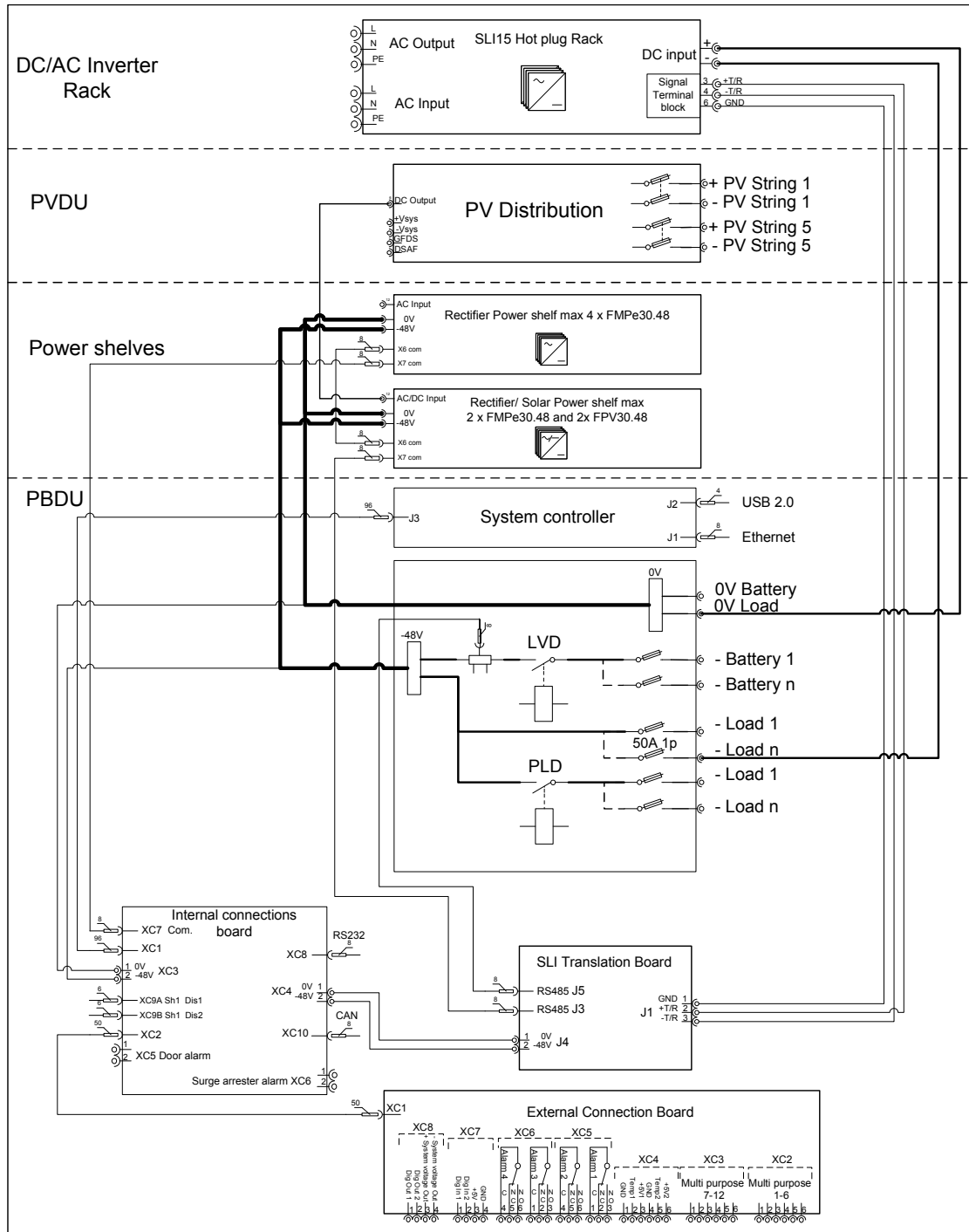


Figure F-2 Typical System Schematic

This document is believed to be correct at time of publication and UNIPOWER LLC accepts no responsibility for consequences from printing errors or inaccuracies. Specifications are subject to change without notice.



USER GUIDE SLI 15 INVERTER

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1 The Display



Function of keys

<UP> / <DOWN> keys

Use to scroll through menus



<UP> key



<DOWN> key

<ESC> key

Use to exit from the current menu



<ENTER> key

Use to confirm a selection or value

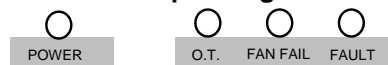


<ON/OFF> key

Use to turn ON or Stand-by (OFF) the unit.



LEDs for operating status



Four front-panel LED's show inverter status

"POWER" (green)

- The "POWER" LED is lighted on as soon as the unit starts supplying power to the load
- It indicates normal operation.

"O.T." (red)

- When lighted on it indicates that the internal temperature is approaching the thermal shutdown threshold. In addition to the visual indication, the unit sounds audibly.

"O.T." and "FAULT" (red)

- The thermal shutdown threshold has been exceeded.
Note: The thresholds are factory set and not changeable (see "Factory Settings" on "Appendix B").

"FAN FAIL" (red)

- The "FAN FAIL" LED is lighted on when the speed of one of the fan falls below its nominal value.

"FAULT" and "FAN FAIL"

- They are lighted up at the same time if more than one fan has stopped or a general malfunction is detected. The unit continues to work until an OT is detected.

"FAULT" (red)

- "FAULT" LED is lighted on when a general failure happens. (for general fault conditions see table below)

GENERAL FAILURE CONDITIONS
- Failure of at least 2 fans
- Over Temperature
- Output Over Current (the protective output breaker on front panel, trips and a "Breaker OFF" state is indicated on the display.)
- Output Over Voltage
- Output Under Voltage
- Dc input voltage out of range (UV or OV)
- DC Input Over Current

2 Startup sequence and the Standby Status

The STAND BY status shows the DC source is connected; loads are disconnected by two internal relays.

As soon as the DC input voltage is applied, "STANDBY..." is displayed.

Three operations are possible (see Fig.1):

- Press <ESC> to enter into the SETTINGS menu's first page, or
- Press <ENTER> to visualize the configuration mode of the unit. Two screens are presented automatically within a few seconds. The first **(1)** shows the mode of the unit (Stand Alone or Parallel mode). In case of Parallel mode the screen tells whether the unit is master or slave. In case of Stand Alone mode the unit is always a master. The second screen **(2)** shows if the unit has the optional Static Transfer Switch. Pressing the "ESC" key shows the SETTINGS menu's first page, or
- Press <ON/OFF> to power up the unit. The display shows "STARTING..." and the screen **(3)** appears automatically after a few seconds. Using <UP> / <DOWN> keys it is possible to scroll six screens on the display and visualize the electrical parameters (Vout/Iout, Vout/Freq, Iout/Pout,...). Pressing <ENTER> the screen **(1)** is visualized for short time, then the display goes back to the previous screen automatically. Pressing <ESC> the SETTINGS menu is displayed.

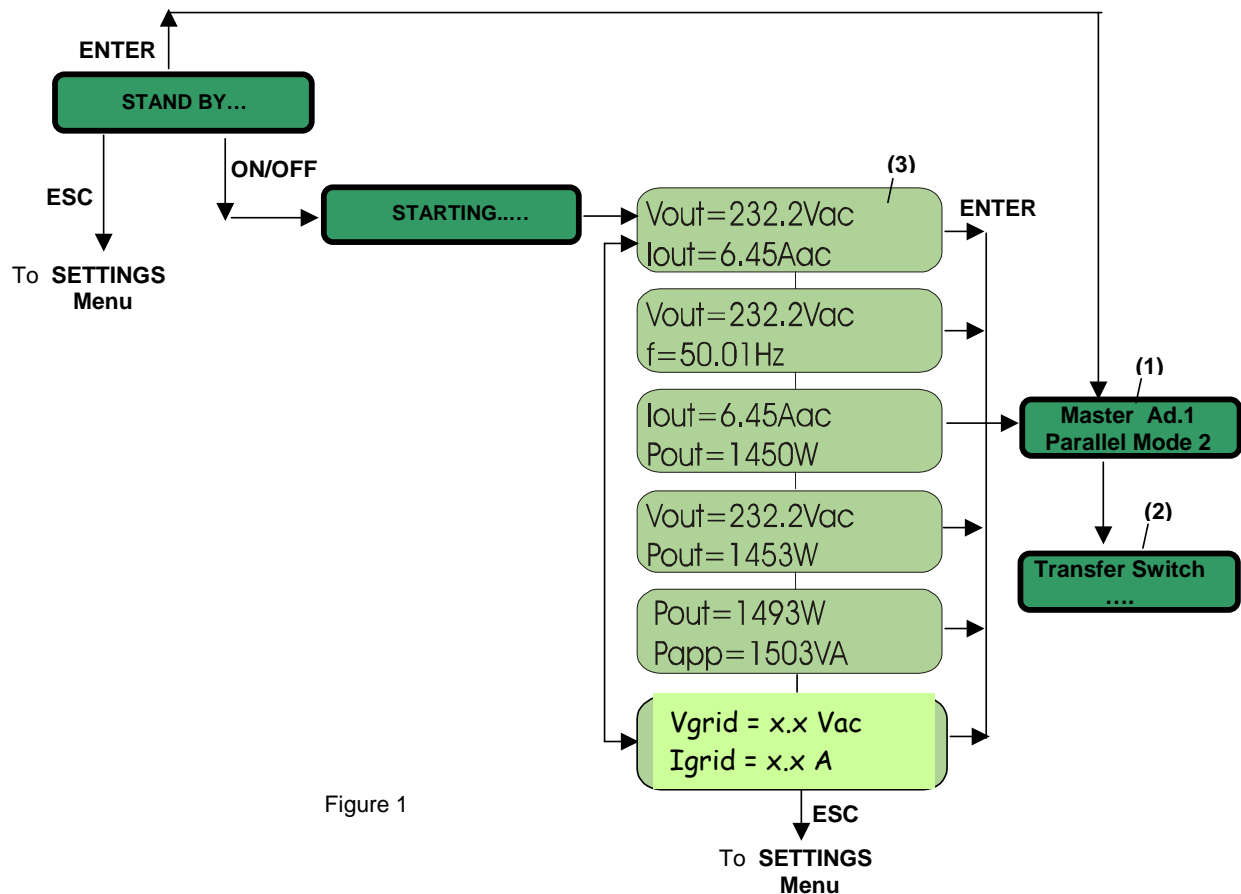


Figure 1

3 Operating modes

The unit has two operating modes:

- Stand Alone mode: there is only one inverter in the system
- Parallel mode: there are several inverters working in parallel (max. number of parallelable units: 8)

The default mode is Stand-Alone.

Trained personnel should set the operating mode before the system starts supplying the load (see SERVICE menu on "Appendix A").

It is possible but not recommended to change the operating mode while the inverter is operating.

ATTENTION: incorrect unit setting may lead the system to latch up

Notes

- When the unit work in Parallel mode it is not possible to change the following parameters in the SETTINGS menu: Vout, Iout, Frequency. The access to these parameters is locked to avoid system conflicts (see also Notes on page 8).

4 Controller status

When operating in Parallel mode the controller inside each unit can operate in two modes:

- Master: provides the commands for the whole system of paralleled inverters. There is only one master.
- Slave: it follows the commands of the Master

When working in Stand Alone mode the status of the unit is Master.

Controller statuses are assigned automatically and cannot be changed by the user. In case of failure of the master in a parallel configuration a new master is selected automatically and control of the system of paralleled inverters is transferred automatically to the new master.

5 Main menus

There are 3 main Menu (Fig.2):

- The **SETTINGS** menu
- The **STATUS** menu
- The **INFO** menu

6 The SETTINGS menu

6.1 Overview

Through this menu it is possible to set several parameters of the unit. To avoid problems make sure you know how the parameters will affect the load.

To access the SETTINGS menu contents a 1ST level password must be provided.

For increased protection certain sensitive parameters are protected by a 2ND level password that an Authorized operator must provide.

Settings changeable by Generic operator (1ST level password)

- Unit Serial Port Address, V_{out} , I_{limit} , Frequency.
- Protections (AutoRestart or Latched types)
- Display Light (ON/OFF), Time Display Light ON and Key Click
- Autostart, Remote ON/OFF
- New Password 1ST level only

Settings changeable by Authorized operator (2ND level password)

These settings are accessible via the SERVICE submenu whose access is protected by the 2ND level password.

- Operating mode, 2ND levelPassword, Restore data, Utility menu, System Time-out.

These settings are contained in the UTILITY submenu contained in the SERVICE submenu (no password needed to access UTILITY from SERVICE, see Fig.2 and also Appendix A).

- Change the Led Status (ON/OFF)
- Set the Buzzer (ON/OFF)
- Set the Fans (ON/OFF) and the Fan Speed
- Read fan Speed, System Temperature, Internal Temperature and Ambient Temperature

NOTE:

- **The SERVICE submenu should be accessed by trained personnel only. An error in these settings could seriously damage the system.**
- **To avoid potential conflicts during the operating procedures, it is preferable to keep the unit in STANDBY status before accessing and acting on the SERVICE submenu.**

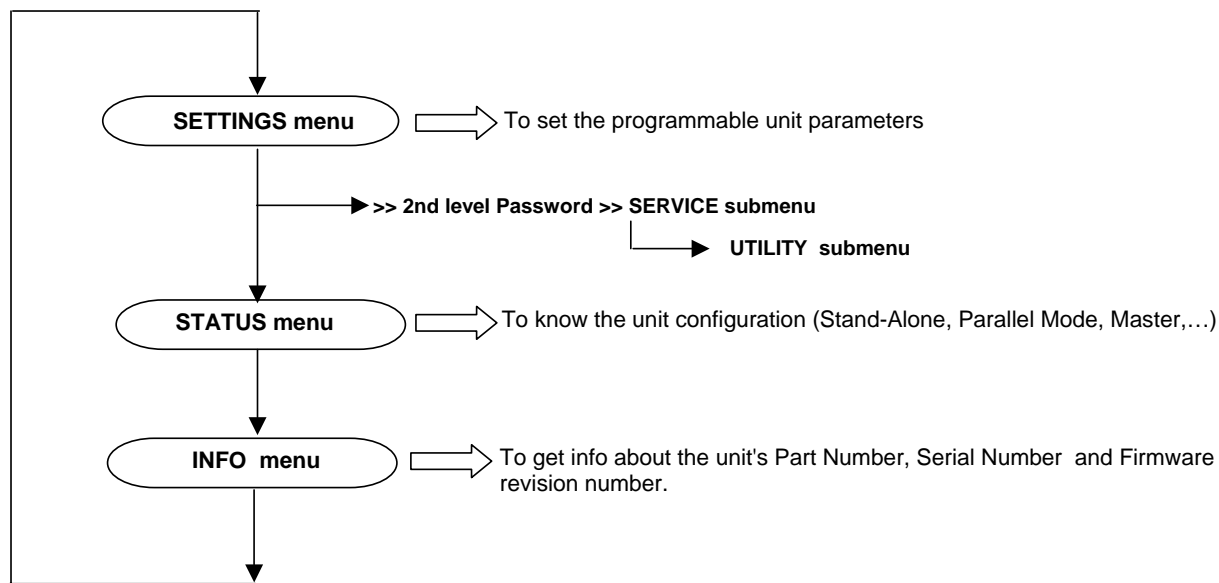
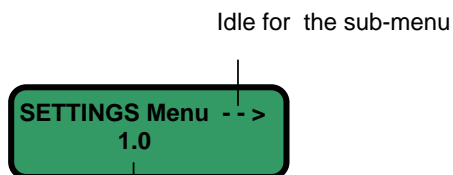


Figure 2

6.2 Navigating the SETTINGS menu



Navigator

Gives the current position on the menu and sub menu map

X.0 : shows the main menu start page.

X = 1 for SETTINGS menu

X = 2 for STATUS menu

X = 3 for INFO menu.

X.1 or **X.2** or **X.3** etc.

numbers coming after the point indicate any 1ST level submenu items

X.1.1 or **X.1.2** or **X.1.3** etc.

numbers coming after the second point, mark any 2ND level submenu items

Example:

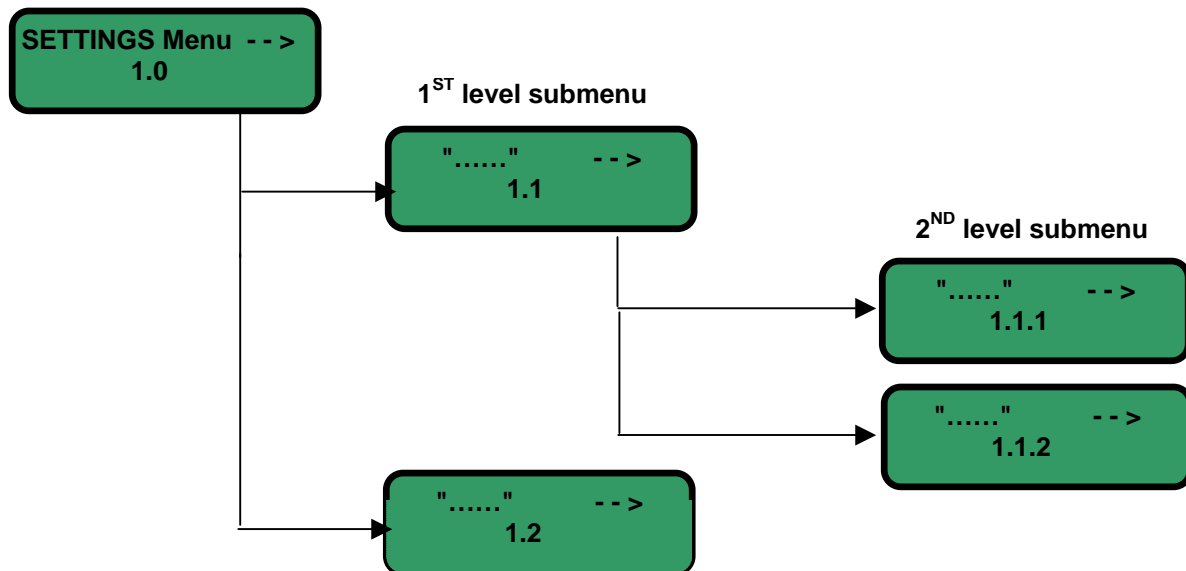


Figure 3

6.3 Structure of the SETTINGS menu

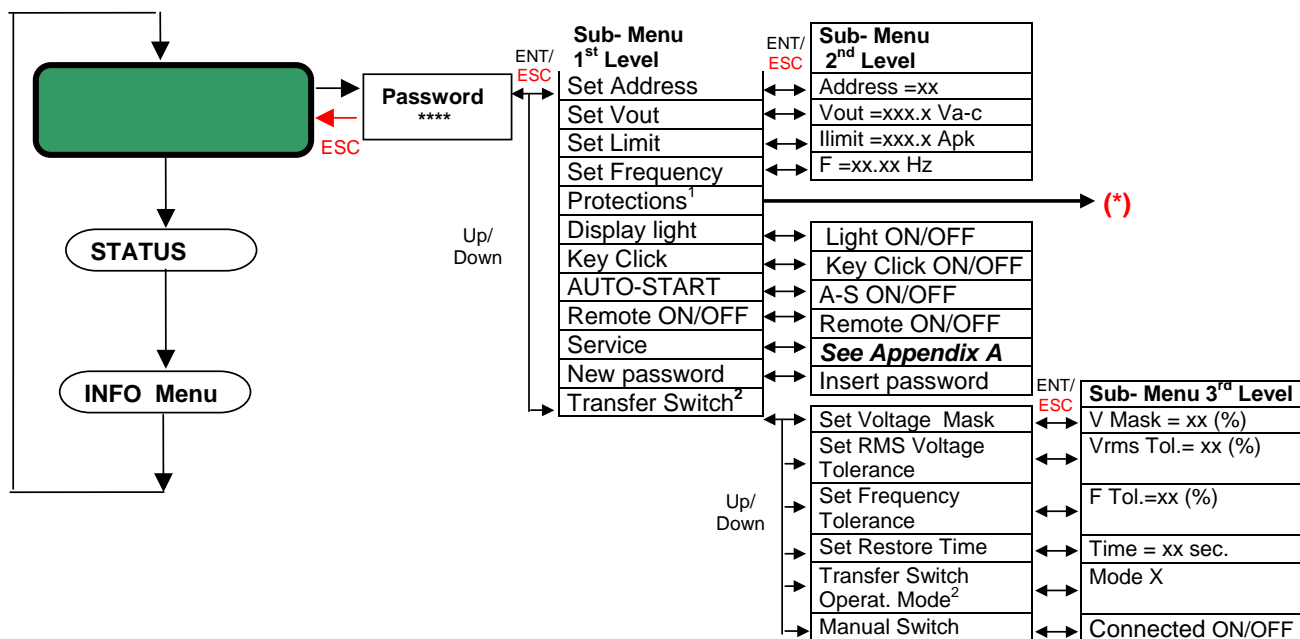


Figure 4

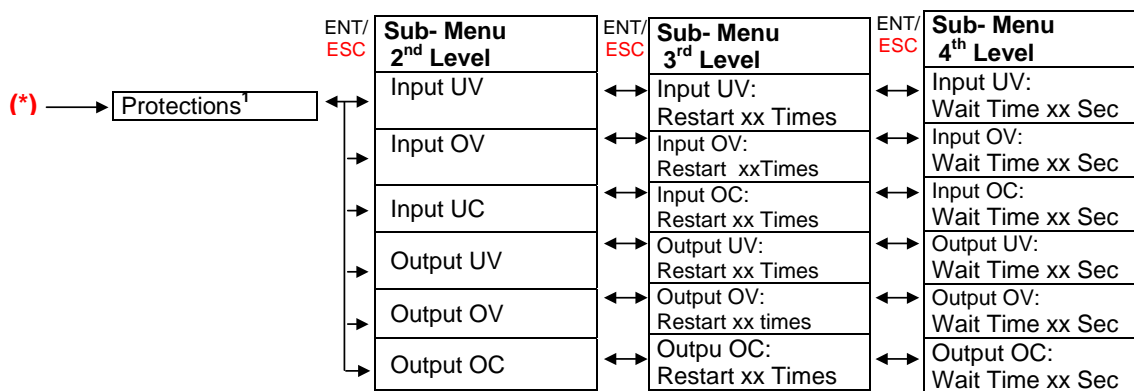


Figure 4.1

¹ For the Protections operating procedure, please see page 12.

² For the Transfer Switch operating procedure, please see page 13.

6.4 SETTINGS menu: access and submenus

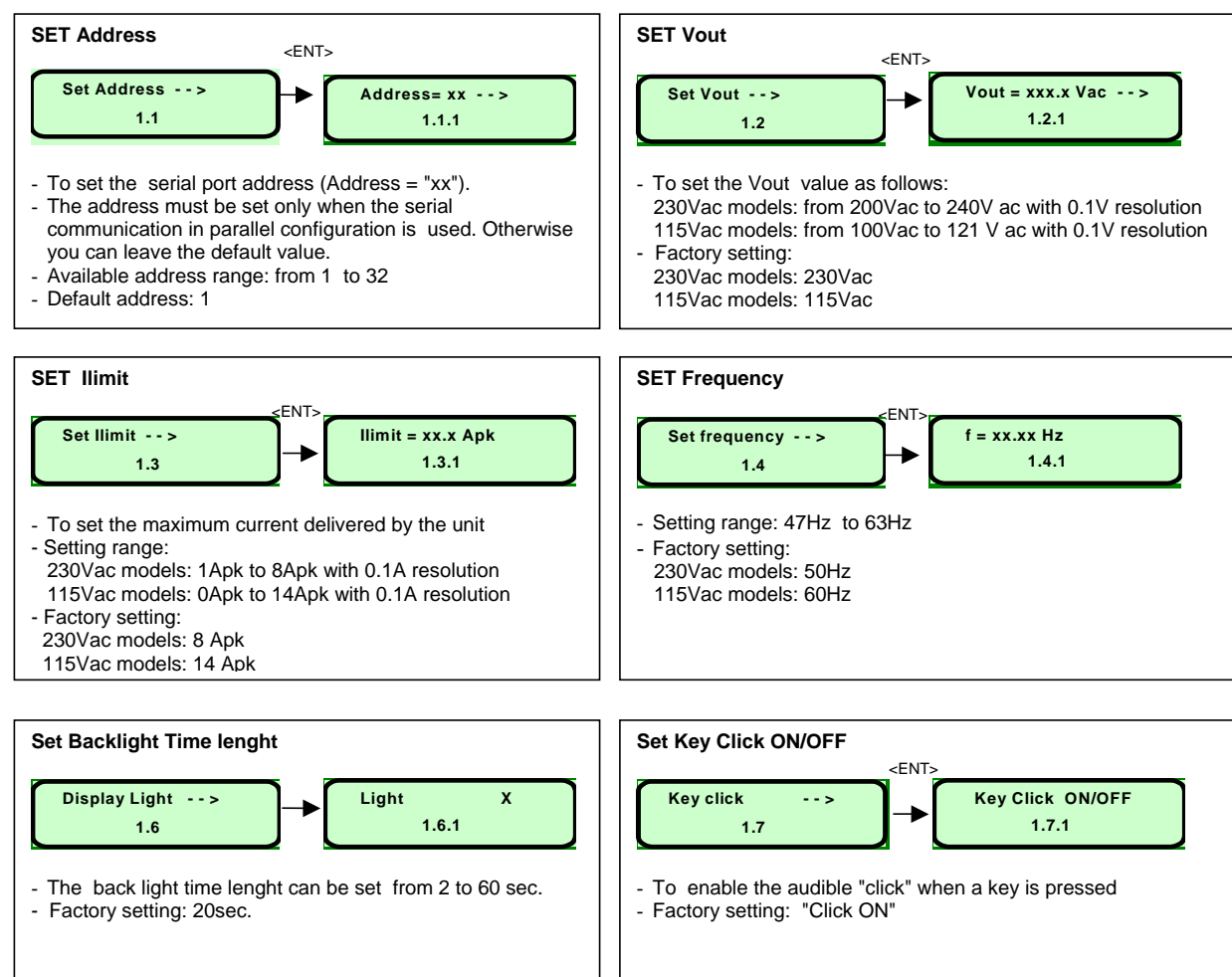
You can access the SETTINGS menu starting from the STAND BY... status just by pressing the <ESC> key or, alternatively, the <ENTER> key: see Fig.1 on page 3.

The access is protected by the 1ST level password. The default password is "0000". To insert the "0" character press the <ENTER> key on front panel.

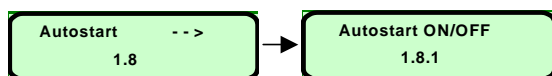
With the <UP> and <DOWN> keys you can scroll all the sub-menus listed in Fig.4. Use <ENTER> to select one of them.

The sequence of the 1ST level submenus with the setting parameters is described below (PROTECTIONS and SERVICE submenus are addressed on the following pages).

Use <UP> and <DOWN> keys to set the "xx" parameters at the desired value. Then press <ENTER> to confirm.

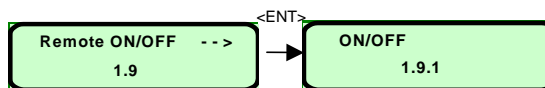


Set Autostart Mode



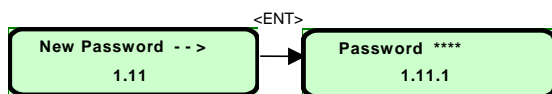
- Auto-Start ON \Rightarrow the unit starts up as soon as the DC input source connection is made. In this case there is no need to press the <ON/OFF> key on front panel.
- Auto-Start OFF \Rightarrow The unit starts up only after <ON/OFF> key has been pressed.
- Factory setting: Auto-Start OFF

Set Remote ON/OFF



- Remote ON \Rightarrow It is possible to turn ON /OFF the unit remotely provided that a switch or relay is connected between pins 6 and 7 of the signal connector on the back side of the unit. Refer to the Installation Manual".
- Factory Setting: Remote "OFF"

Set New Password



- This option allows to change the current password. To set the new password digits use the <UP> and <DOWN> keys.
- Max. Password length: 4
- Factory setting: "0000"

NOTES

The following settings are not accessible when the current configuration unit mode is the **Parallel mode**. That is to avoid conflicts within the system. Set V_{out} , Set I_{LIMIT} , Set Frequency, Set Remote ON/OFF.

If the user wants to make changes when operating in Parallel mode, he unit must first of all set to Stand-Alone mode using the following procedure (to be repeated for each unit working in parallel):

1. Set the unit to Stand-alone mode:
 - on the SETTINGS menu select the SERVICE submenu. Press <Enter> to confirm the choice.
 - Insert the 2nd level password (default password is "1111"; use the <UP> and <DOWN> keys to select the digits. Press <Enter> to confirm.
 - Select the OPERATING MODE submenu and press <Enter>.
 - Change "Mode = 2"(parallel mode) into "Mode =0"(stand-alone mode). Use the <UP> key to insert the character "0".
2. Change the V_{out} , I_{LIMIT} , Frequency and Remote ON/OFF settings like explained before.
3. After the changes are done restore the parallel mode with the same procedure described in step 1.

It is strongly recommended to set all units with identical V_{out} , I_{LIMIT} , Frequency and Remote ON/OFF values when working in parallel.

6.5 SETTINGS menu: the PROTECTIONS submenu

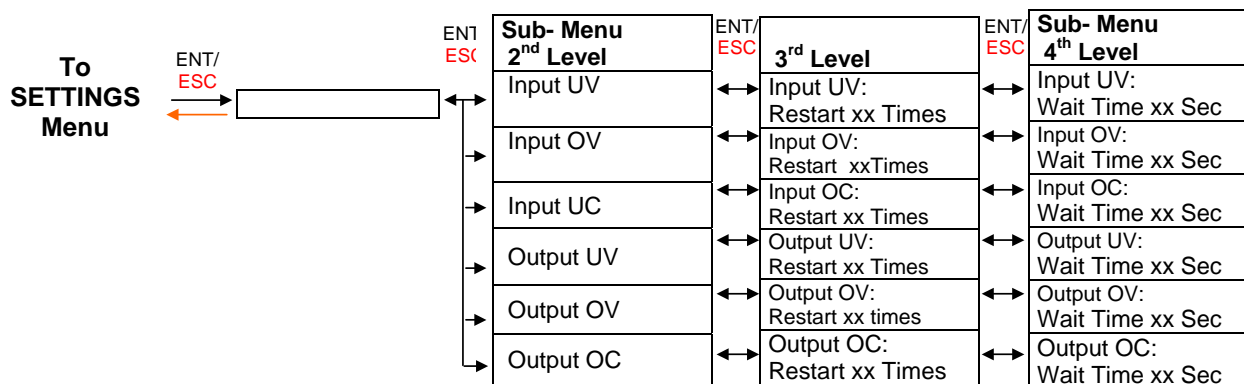


Figure 5

Each type of protection listed on the table in Fig.5 (Input UV, Input OV, Input UC, Output UV, Output OV, Output OC) , can be customized from the front panel.

After selecting an item listed in the PROTECTIONS submenu (Fig. 5) it is possible to choose between two types of protection mode: "Restart mode" or "Latch up mode".

Restart mode

The unit tries to restart a certain numbers ("xx") of times, after which the unit latches up.

Set "xx" from 1 to 10 using <UP> and <DOWN> keys. Press <Enter> to confirm. Factory setting = 5 times.

Set "xx" >10 and press the <ENTER> to have the unit continuously try to restart.

Latch up mode

6.6 SETTINGS menu: the TRANSFER SWITCH submenu

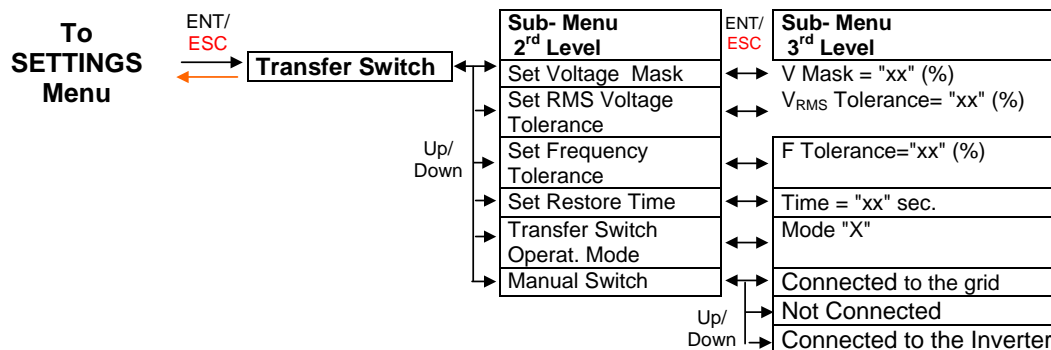
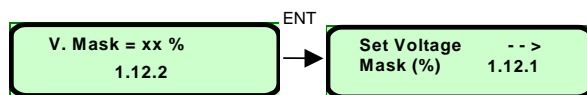


Figure 6

With the TRANSFER SWITCH submenu you can set the Static-Transfer Switch (STS) operation mode for and define the tolerance of electrical parameters such as voltage and frequency for the operation with the STS.

Use <UP> and <Down> keys to set the "xx" parameters at the desired value. To confirm: press <ENTER> .

SET Voltage Mask



The Voltage Mask defines the range of V_{out} values for which the STS does not operate.

The Voltage Mask limits are expressed as a percentage "xx" of the V_{out} (see Set V_{out} on page 8). For instance, if you set V_{out} = 230Vac and the Voltage Mask at 20% then the STS will activate only V_{out} falls outside the 184-276Vac range (voltage mask width in Fig.7).

The settable percentage range is 15% to 50% of V_{out}. Factory setting: 15%

Example

Assuming that the current setting for STS mode is the ON-Line mode (the inverter is the primary source for the load), and that the output voltage is within the limits of the voltage mask, then the STS remains open (the load connected to the inverter). Otherwise, when the V_{out} lies beyond the voltage mask limits, the STS commutes the load to the grid (which is the secondary or back-up source in this case).

The check of the V_{out} is made on its peak values.

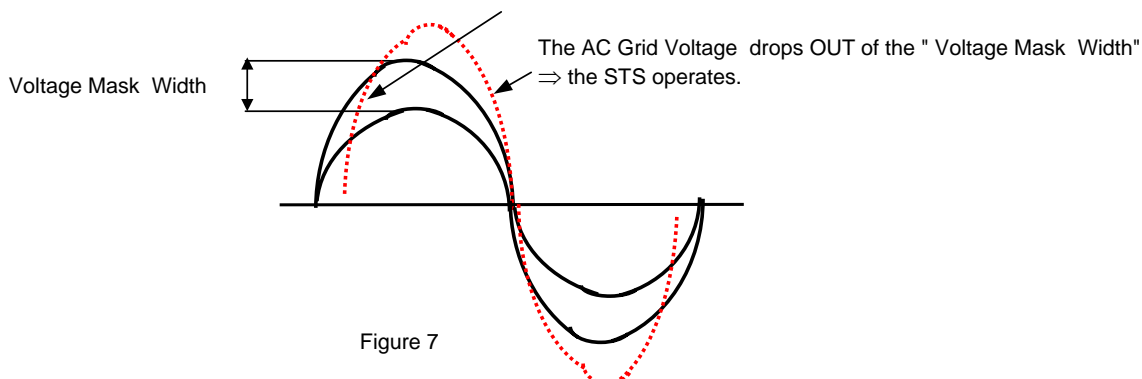
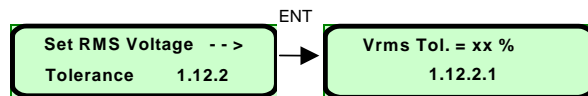


Figure 7

SET Vrms

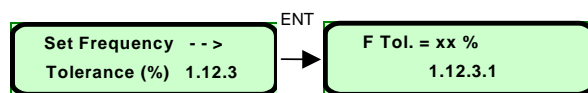


The STS can operate not only based on the peak value of V_{out} but also based on the RMS value. With the "Set V_{RMS} " screen you can define a percentage "xx" of the V_{out} within which the STS does not operate.

For instance, if $V_{out} = 230V_{ac}$ and $V_{RMS} = 10\%$ then the STS is activated only if the output RMS value V_{RMS} falls outside the 253-207Vac range.

The percentage range is 5% to 50% of V_{out} . Factory setting: 10%

SET Frequency Tolerance

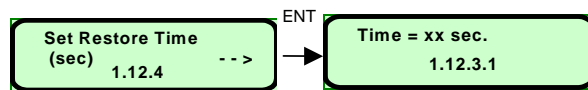


- With this screen you can define the max. frequency over which the STS is activated.
- The allowed range is 1 to 10% of the nominal frequency set by the SETTINGS menu (see pag.8: SET frequency screen). Factory setting: 2%

Example

If the frequency is set on 50Hz in the SETTINGS menu and the Frequency tolerance is set at 3% then the STS changed state only if the frequency of the primary source exceeds 51.5Hz or falls below 48.5 Hz.

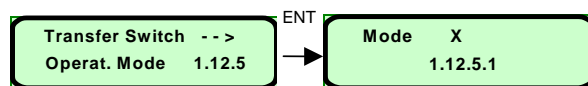
SET Restore Time



The Restore Time is the time "xx" elapsed after the STS is activated and before the STS attempts to restore the previous mode. During this time the STS checks the system parameters (V_{out} , V_{GRID} , Frequency,...) to verify if they all have returned to the normal range, so that the load can be switched back safely to the primary source.

The Restore time range is 10 - 7200 sec with in increments of 5 seconds. Factory setting: 10seconds.

Set Transfer Switch Mode



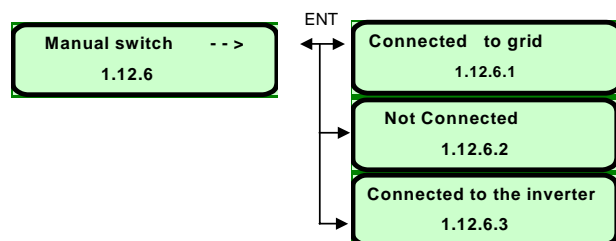
The STS can operate in the following modes:

- Mode 0 ("X"=0): "OFF Mode": the STS is NOT CONNECTED.
- Mode 1 ("X"=1): On Line mode: the STS normally remains open (the load is connected to the inverter output), and connects the load to the grid when it closes.
- Mode 2 ("X"=2): Off Line mode: the STS normally remains closed (the load is connected to the grid), and connects the load to the inverter when it is opens.
- Mode 3 ("X"=3): Manual mode: the STS status is configured by Set Manual Switch screen.

Factory setting: Mode 1 (On-Line mode)

Set Manual Switch

The MANUAL SWITCH submenu is enabled by the selecting the Mode 3 (Manual mode) setting in the TRANSFER-SWITCH-MODE submenu.



With this setting it is possible to force the STS to be connect the load to the grid to the inverter or to maintain the load disconnected.

7 The STATUS menu

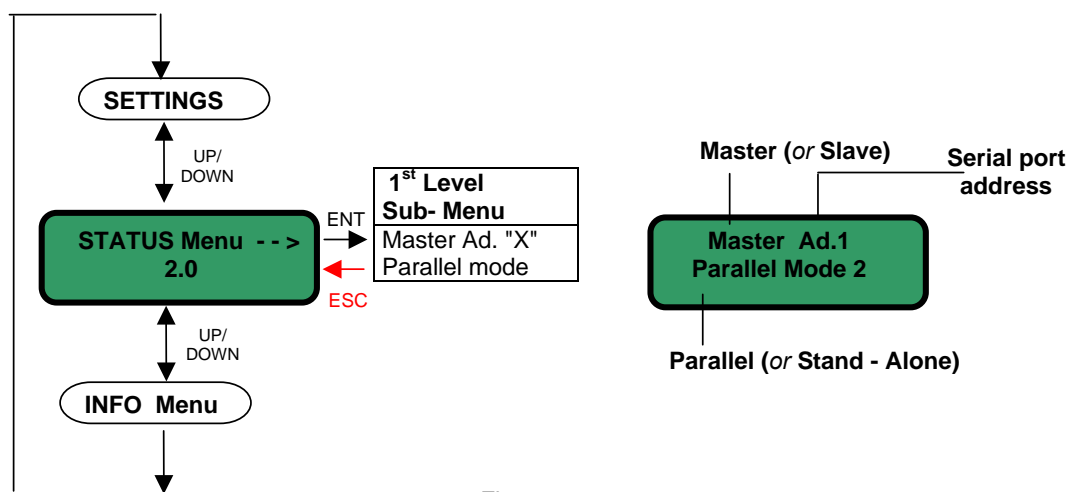


Figure 8

The STATUS menu shows:

- the current status (**Master or Slave**)
- the current configuration mode (**Stand Alone mode or Parallel mode**)
- the serial port address

8 The INFO menu

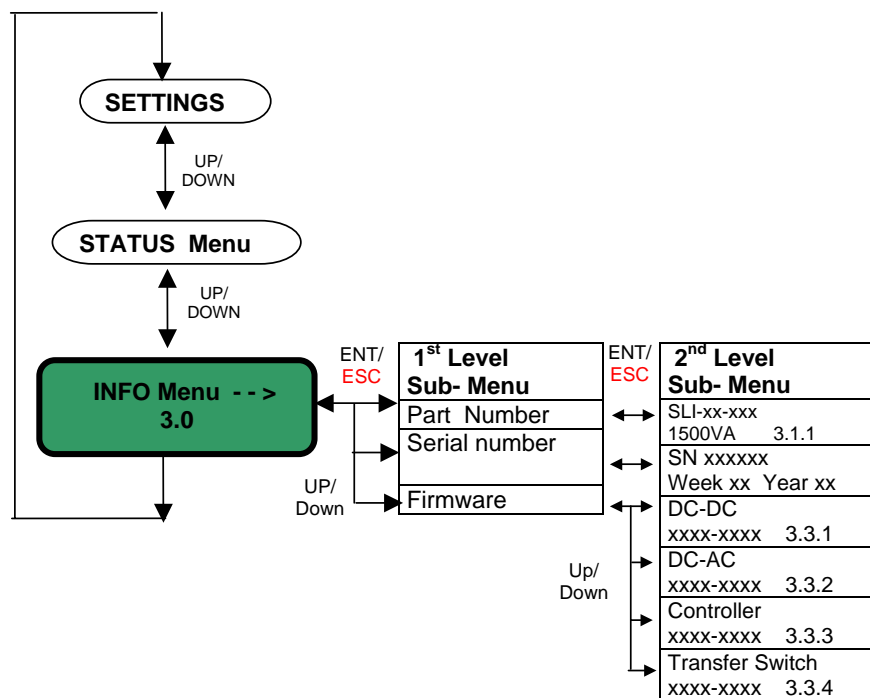


Figure 9

With the INFO menu you can obtain information about:

- **Model Number** : SLI - xx - xxx

Factory description code Vinput (48 or 24) Vout (230 or 115Vac)

- **Serial Number**: factory serial number, including manufacturing week & year

- **Firmware revision**

DSP Software release for the DC-DC stage
 DSP Software release for the DC-AC stage
 DSP Software release for the Controller stage

Appendix A : The SERVICE menu

The access to the SERVICE submenu should be reserved to authorized operators only because it allows to operate on critical system parameters.

To get the access at the SERVICE submenu you have to enter the SETTINGS menu with the 1ST level password (default password: "0000"), select the sub-menu SERVICE and insert the 2ND level password (default password: "1111").

Once entered the SERVICE submenu it is possible to conduct the following tasks:

1. Change the operating mode
 - Stand-alone mode (default mode) ⇒ set the "X" = 0 on the 2ND Level Sub- Menu on Fig.A.1
 - Parallel mode ⇒ set the "X" = 2 on the 2ND Level Sub- Menu on Fig.A.1

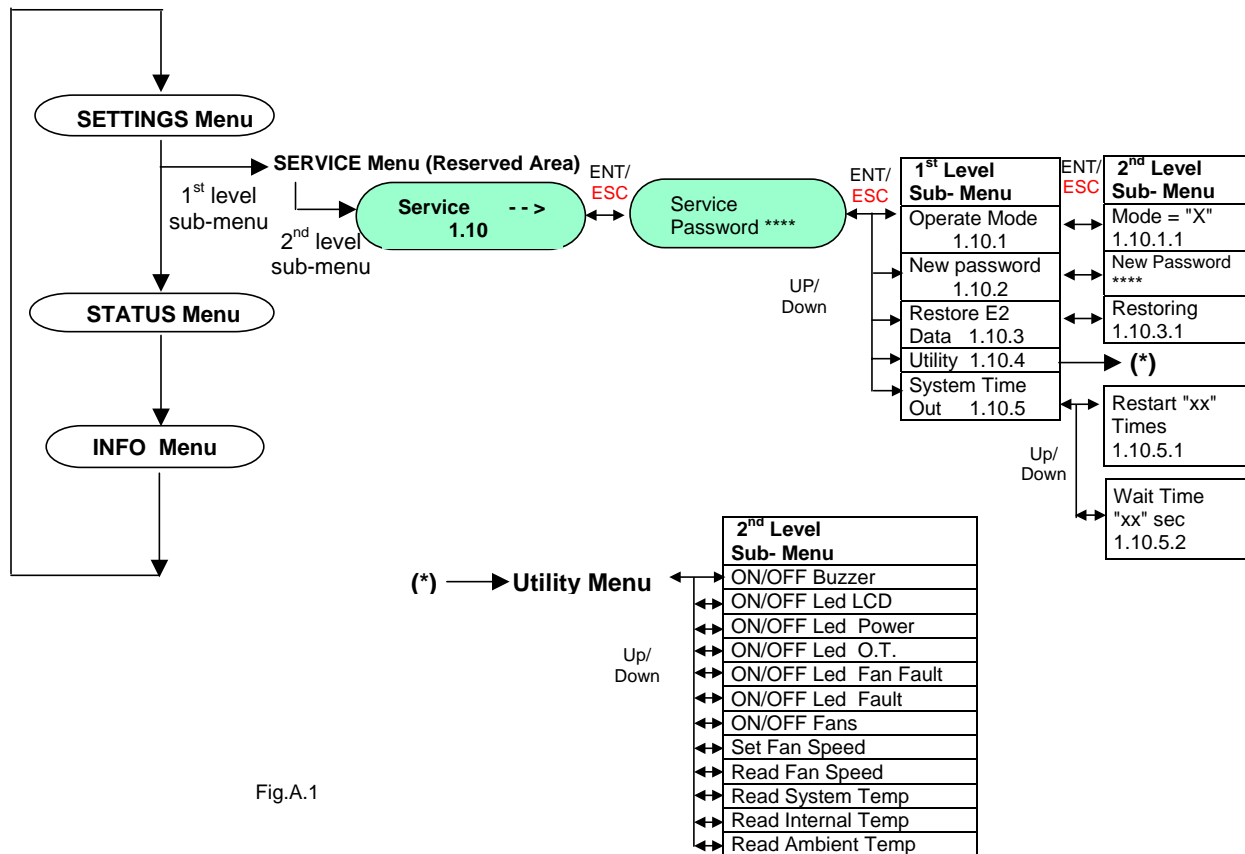


Fig.A.1

1. Change the 2ND level Password
Define a new password for the "SERVICE" Menu. The password length is 4 digits. Use the <UP> and <DOWN> keys to type the characters on the display. Press <ENTER> to confirm.
2. Restore the factory settings
With this option you can restore all the factory settings (see "Appendix B").
Select the items "Restore E2 data" and press <ENTER>. The screen "Restoring" appears on the display. Press <ENTER> to restore the factory settings.

3. UTILITY

This submenu is reserved to manufacturer's personnel for testing the operative condition of the LED's and fans, as well as to monitor the temperature. We recommend you do not change the factory settings in this submenu.

4. SET THE TIME OUT

The Time Out is the time waited by the unit before attempting to start again after a general fault is occurred.

Restart mode

The "Restart Mode" can be the "Restart xx times" mode or the "Restart always" mode.
The unit tries to restart a certain numbers ("xx") of times, after which the unit latches up.

Set "xx" from 1 to 10 using <UP> and <DOWN> keys. Press <Enter> to confirm. Factory setting = 5 times.

Set "xx" >10 and press the <ENTER> to have the unit continuously try to restart.

The default protection mode for all protections is *Restart 5 times*.

Wait Time

The Wait Time is the time between two restart attempts (only for the "Restart xx times" mode).
The Wait Time can be defined in the following range: 2sec to 60sec. Factory setting = 5 sec.

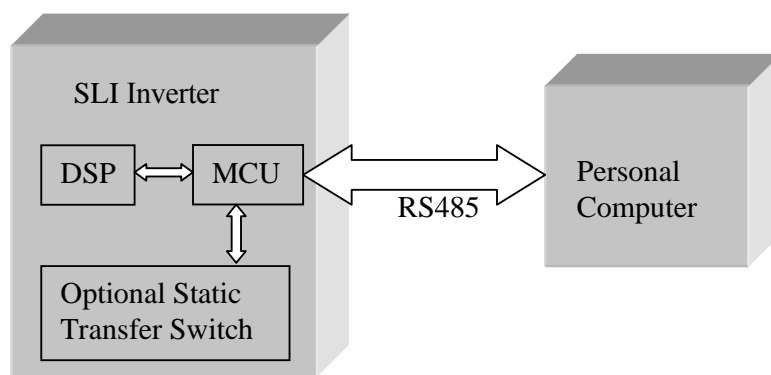
Appendix B: factory settings

FACTORY SETTINGS TABLE (values on brackets refer to the 115Vac Inverter Version)	
SETTINGS MENU	
Options	Default assignments
- Password	0000
- Vout	230Vac (115Vac)
- Frequency	50Hz (60Hz)
- Ilimit	8Apk (14Apk)
- Display light length	20 sec.
- Key click ON/OFF	ON
- Auto-start ON/OFF	Auto-start OFF
- Remote ON/OFF	Remote OFF
-	
PROTECTIONS MENU (Sub-Menu of SETTINGS MENU)	
- Mode	Auto-restart (all protections)
- Restart Attempts	5 times
- Wait Time (between 2 attempts)	5 sec.
-	
TRANSFER SWITCH MENU (Sub Menu of SETTINGS MENU)	
- Voltage Mask	15% Vout
- RMS Voltage Tolerance	10% Vout
- Frequency Tolerance	2% of nominal frequency
- Restore Time	10 sec.
- Operat. Mode	"On-Line " = "Mode 1"
-	
SERVICE MENU (Sub-Menu of SETTINGS MENU)	
- Password	1111
- Operat. Mode	"Stand-alone" = "Mode 0"
System Time-out	
- Mode	Auto-restart
- Restart Attempts	5 times
- Wait Time (between 2 attempts)	5 sec.

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COMMUNICATIONS MANUAL

SLI 15 & SLI 50 INVERTERS



WARNING This RS-485 interface is used also during the manufacturing process to write calibration and manufacturing data into internal EEPROM memory. You may damage your unit or loose calibration data by sending wrong commands. Be careful especially if you send write commands.

Contents

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1 Communication

The communication between the PC and the SLI unit is via RS485 serial interface. The user PC application sends commands and works as a master. SLI unit returns requested data or status commands. Parameters of the communication line are 9600 baud rate, 8 data bits, no parity, 1 stop bit.

1.1 Command

The communication protocol uses fixed-length command (8Bytes + 2B of Checksum) structured as follows:

Address	Command	Par.1	Par.2	Par.3	Par.4	Par.5	Par.6	CRC_L	CRC_H
---------	---------	-------	-------	-------	-------	-------	-------	-------	-------

Address	1 Byte (01 to 31)	- unit address on the RS-485 network. For single unit use default "01"							
Command	1 Byte	- assigned number to a command, see list of commands							
Par.1 – Par.6	6 Bytes	- parameters of a command, e.g. value to write							
CRC_H,L	2 Bytes	- CRC value of the 8 Byte command							

1.2 Response

The structure of the answer is fixed length (6Byte + 2B of Checksum)

Outcome Command	Unit Status	Par.1	Par.2	Par.3	Par.4	CRC_L	CRC_H
-----------------	-------------	-------	-------	-------	-------	-------	-------

Outcome Command	1 Byte	-response of the unit to the latest command						
------------------------	--------	---	--	--	--	--	--	--

00 = Command Accepted
 50 = Checksum error
 51 = Command does not exist
 52 = Variable does not exist
 53 = Wrong data (variable value is not accepted or out of range)
 54 = Unit is busy
 55 = Internal unit communication Error (comm. error between MCU and DSP)
 57 = Function disabled

Unit Status	1 Byte	-indicates the status of the unit when questioned, the detail is specified in the description of the commands						
Par.1 – Par.4	4 Bytes	- return values, e.g. Output Voltage						
CRC_L,H	2 Bytes	- CRC of the returned message						

2 List of Commands

If a byte in the sending command is not specified (‘ ’), it has to be any value or zero. But you have to send always 8Bytes + 2 Bytes of CRC.

All values below are in decimal form.

2.1 Status Commands

Command 50 - Request Inverter Status

Unit address	50	‘ ‘	‘ ‘	‘ ‘	‘ ‘	‘ ‘	‘ ‘	CRC_L	CRC_H
--------------	----	-----	-----	-----	-----	-----	-----	-------	-------

Response:

Outcome Command	Unit Status	Status DSP	System Fault	Fan Fault	Status T.Switch	CRC _L	CRC _H
-----------------	-------------	------------	--------------	-----------	-----------------	--------	--------

Unit Status :

- 0 = standby
- 1 = starting
- 2 = run
- 3 = bulk OV
- 4 = master indicator error
- 5 = input UV
- 6 = input OV
- 7 = input low (before turn on)
- 8 = input OC
- 9 = reserved
- 10 = reserved
- 11 = ambient over temperature
- 12 = ambient under temperature
- 13 = reserved
- 14 = reserved
- 15 = reserved
- 16 = internal over temperature
- 17 = reserved
- 18 = reserved
- 19 = output OC
- 20 = output UV
- 21 = reserved
- 22 = breaker off
- 23 = output OV
- 24 = transfer sync. error

Status DSP :

- 0 = standby
- 1 = starting
- 2 = run
- 3 = bulk over voltage
- 4 = output over current
- 5 = output under voltage
- 6 = master indicator ERROR
- 7 = internal error of DSP
- 8 = Calibration parameters not received
- 9 = V bulk low
- 10 = V bulk over voltage

System Fault :

- 0 = System Status OK
- 1 = System Status FAULT

Fan Fault :

- 0 = FANs OK
- 1 = Fan n.1 Error
- 2 = Fan n.2 Error
- 4 = Fan n.3 Error
- 8 = Fan n.4 Error
- 3 = Fan n.1 & Fan n.2 Error
- etc... etc...

Status Transfer Switch

0 = Initialization / no transfer switch present

Off Line Mode

- 1 = Load Connected to the Grid(T.S High; Grid OK)
- 2 = Load sequence connection to Inverter
- 3 = Load Connected to the Inverter (T.S. Low; Grid ERROR)
- 4 = Waiting for T.S. High
- 5 = Load sequence connection to grid

On Line Mode

- 11 = Load Connected to Inverter (T.S. High; Inverter OK)
- 12 = Load sequence connection to grid
- 13 = Load Connected to the Grid (T.S Low; Inverter ERROR)
- 14 = Waiting for T.S. High
- 15 = Load sequence connection to the Inverter

Manual Mode

- 20 = Waiting for commands
- 21 = All Relays Transfer Switch OFF
- 22 = Load connected to the Inverter
- 23 = Load connected to supply

- 31 = Threshold Peak Current Override (65 Amp)
- 32 = Over Current Limit
- 33 = Waiting for enable after Over Current

- 40 = Parameters initialization

Command 51 - Turn On Inverter

Turns on the unit from Standby to Starting - > Running

Unit Address	51	“	“	“	“	“	“	CRC_L	CRC_H
--------------	----	---	---	---	---	---	---	-------	-------

Response:

Outcome Command	Unit Status	“	“	“	“	CRC_L	CRC_H
-----------------	-------------	---	---	---	---	-------	-------

Command 52 - Turn Off The Inverter

Turns off the unit into Standby mode

Unit Address	52	“	“	“	“	“	“	CRC_L	CRC_H
--------------	----	---	---	---	---	---	---	-------	-------

Response:

Outcome Command	Unit Status	“	“	“	“	CRC_L	CRC_H
-----------------	-------------	---	---	---	---	-------	-------

2.2 Read and Write Variables



Use only variables from the list below. There are also other numbers of variables which may not be used by user. Be careful especially at write commands.

List of available variables

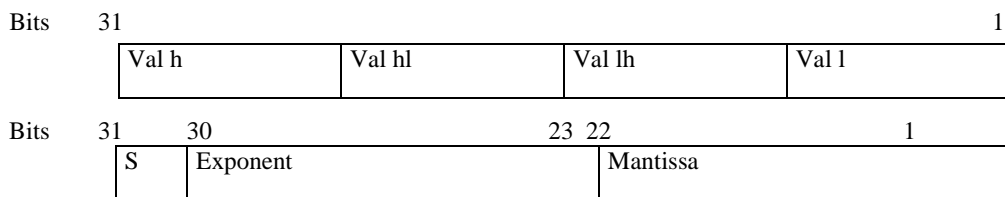
Number	Description
4	Output voltage setting reference
5	Mode of Operation
	0 = Stand Alone , 1* = Stand Alone 3 phase,
	2 = Parallel Mode , 3* = Parallel Mode 3phase
6	Confirmation Parameters OK
9	Master Indicator signal
10	Frequency setting reference
11	Current limit setting reference
14*	Phase setup

*3 phase models only

Variables nr. 5, 6, 14 are 16 bit values

Variables nr. 4,10,11,14 are 32 bit float values

32 bit float format



Command 56 - Read Variable

Unit Address	56	Variable nr.	Variable type	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	----	--------------	---------------	-----	-----	-----	-----	-----	-------	-------

Use variable type =1 for 32bit float format variables or !=1 for 16 bit format variables according to the list.

Response:

Variable type = 1 : 32 bit float format

Outcome Command	Unit Status	Val. Hh	Val. Hl	Val Lh	Val Ll	CRC_L	CRC_H
-----------------	-------------	---------	---------	--------	--------	-------	-------

Variable type != 1 : 16 bit format

Outcome Command	Unit Status	Val. (H)	Val. (L)	' '	' '	CRC_L	CRC_H
-----------------	-------------	----------	----------	-----	-----	-------	-------

Command 55 - Write Variable

16 bit format variable

Unit Address	55	Variable nr.	Val. (H)	Val. (L)	' '	' '	' '	CRC_L	CRC_H
--------------	----	--------------	----------	----------	-----	-----	-----	-------	-------

32 bit float format variable

Unit Address	55	Variable nr.	Val. (Hh)	Val. (Hl)	Val. (Lh)	Val. (Ll)	' '	CRC_L	CRC_H
--------------	----	--------------	-----------	-----------	-----------	-----------	-----	-------	-------

Response:

Outcome command	Unit Status	' '	' '	' '	' '	CRC_L	CRC_H
-----------------	-------------	-----	-----	-----	-----	-------	-------

Command 57 - Store Variable into EEPROM

16 bit format variable

Unit Address	57	Variable nr.	Val. (H)	Val. (L)	‘ ‘	‘ ‘	‘ ‘	CRC _L	CRC _H
--------------	----	--------------	------------	------------	-----	-----	-----	--------	--------

32 bit float format variable

Unit Address	57	Variable nr.	Val. (Hh)	Val. (Hl)	Val. (Lh)	Val. (Ll)	‘ ‘	CRC _L	CRC _H
--------------	----	--------------	-------------	-------------	-------------	-------------	-----	--------	--------

Response:

Outcome command	Unit Staus	‘ ‘	‘ ‘	‘ ‘	‘ ‘	CRC_L	CRC_H
-----------------	------------	-----	-----	-----	-----	-------	-------

2.3 Measurement

Command 59 - Measurement of DSP

Unit Address	59	Measured Param.	Type of Response	‘ ‘	‘ ‘	‘ ‘	‘ ‘	CRC_L	CRC_H
--------------	----	-----------------	------------------	-----	-----	-----	-----	-------	-------

Measured parameter:

1	=	Read Voltage
2	=	Read Current
3	=	Read Power
5	=	Read Voltage Grid
6	=	Read Current Grid

Type of Response:

-can be selected 1 for 16 bit value format or !=1 for 32 bit float format

Response:

Type of Response != 1 : 32 bit float format response

Outcome Command	Unit Status	Val h	Val hl	Val Lh	Val L	CRC_L	CRC_H
-----------------	-------------	-------	--------	--------	-------	-------	-------

See 32 bit float format of variables

Type of response = 1 : 16 bit format response

Outcome command	Unit Status	Val. (H)	Val. (L)	' '	' '	CRC_L	CRC_H
--------------------	-------------	---------------	---------------	-----	-----	-------	-------

To calculate measured parameter use following equations:

Output Voltage:

Models 230Vac : $V_{out} = 410 * \sqrt{\text{val_int}/32768}$, where 'sqrt' indicates square root

Models 115Vac : $V_{out} = 205 * \sqrt{\text{val_int}/32768}$

Output Current:

Models 230Vac : $I_{out} = 30.91 * \sqrt{\text{val_int}/32768}$

Models 115Vac : $I_{out} = 61.82 * \sqrt{\text{val_int}/32768}$

Output Power:

$$P_{out} = 12673.1 * (\text{val_int}/32768)$$

Models with Static Transfer Switch

Voltage Grid:

$$V_{Grid} = 396.5 * \sqrt{\text{val_int}/32768}$$

Current Grid:

$$I_{Grid} = 100.0 * \sqrt{\text{val_int}/32768}$$

2.4 Read Manufacturing Data

Command 63 - Read Serial Number

Unit Address	63	' '	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	----	-----	-----	-----	-----	-----	-----	-------	-------

Response:

Char. 6	Char. 5	Char. 4	Char. 3	Char. 2	Char. 1	CRC_L	CRC_H
---------	---------	---------	---------	---------	---------	-------	-------

Char. 6 = MSB (Most significant Byte) of S/N

Char. 1 = LSB (Last significant Byte) of S/N

Command 65 - Read week and year of production

Unit Address	65	' '	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	----	-----	-----	-----	-----	-----	-----	-------	-------

Response:

Outcome Command	Unit Status	Week2	Week1	Year2	Year1	CRC_L	CRC_H
-----------------	-------------	-------	-------	-------	-------	-------	-------

Week 2 = MSB of the week

Week 1 = LSB of the week

Year 2 = MSB of the year

Year 1 = LSB of the year

Command 100 - Read unit Model and Firmware revisions

Unit Address	100	Par.	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	-----	------	-----	-----	-----	-----	-----	-------	-------

Par. = 0 Unit Model

Par. = 1 MCU Firmware revision

Par. = 2 DSP Inverter Firmware revision

Par. = 3 DSP DC/DC Firmware revision

Par. = 4 Transfer Switch Firmware revision (Models with STS)

Response: Example Par = 0

Outcome Command	'3'	'C'	'3'	'5'		CRC_L	CRC_H
-----------------	-----	-----	-----	-----	--	-------	-------

2.5 Static Transfer Switch

Command 66 - Static Transfer Switch Relay

Manual mode of operation

Unit Address	66	Relay State	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	----	-------------	-----	-----	-----	-----	-----	-------	-------

Relay State = 0 (off) Turn the load Off

Relay State = 1 (on line) Inverter connected to the load

Relay State = 2 (off line) Grid connected to the load

Response:

Outcome Command	Unit Status	' '	' '	' '	' '	CRC_L	CRC_H
-----------------	-------------	-----	-----	-----	-----	-------	-------

2.6 Restory factory default settings

Command 99 - Restore EEPROM to factory default setting

Unit Address	99	0xAA	' '	' '	' '	' '	' '	CRC_L	CRC_H
--------------	----	------	-----	-----	-----	-----	-----	-------	-------

0xAA – Hexadecimal format value

Response:

Outcome Command	'O'	'K'				CRC_L	CRC_H
-----------------	-----	-----	--	--	--	-------	-------

3 CRC calculation

The checksum used to validate the transmission Rs485 is as following standardized by the CCITT CRC polynomial:

$$B_n = N^{16} + N^{12} + N^5 + B_{n-1}$$

In practice define New as a byte to be processed, Tmp as a temporary byte and BccLo and BccHi as the lower and upper part of the checksum word. Run the following algorithm:

- A. Initialize BccLo=0xFF, BccHi=0xFF
- B. For each byte to transmit or receive repeat the following steps:
 1. New = New XOR BccLo
 2. Tmp=New << 4
 3. New=Tmp XOR New
 4. Tmp=New >> 5
 5. BccLo=BccHi
 6. BccHi= New XOR Tmp
 7. Tmp= New << 3
 8. BccLo= BccLo XOR Tmp
 9. Tmp= New >> 4
 10. BccLo= BccLo Xor Tmp
- C. Negation bit to bit BccLo and BccHi : CRC_L=~BccLo CRC_H=~BccHi

C Language code example

```
void CRC_calc(unsigned char* crc_data,unsigned char length,unsigned char* crc_lo,unsigned char* crc_hi)
{
    int i;
    unsigned char New,
        BccLo= 0xFF,
        BccHi= 0xFF,
        Tmp;

    //Loop
    for (i=0;i<length;i++){
        New = crc_data[i];
        New ^=BccLo;
        Tmp = New <<4;
        New ^= Tmp;
        Tmp = New >> 5;
        BccLo = BccHi;
        BccHi = New ^ Tmp;
        Tmp = New << 3;
        BccLo = BccLo ^ Tmp;
        Tmp = New >> 4;
        BccLo = BccLo ^ Tmp;
    }
    //Return CRC values
    *crc_hi = ~BccHi;
    *crc_lo = ~BccLo;
}
```

Run function from main program:

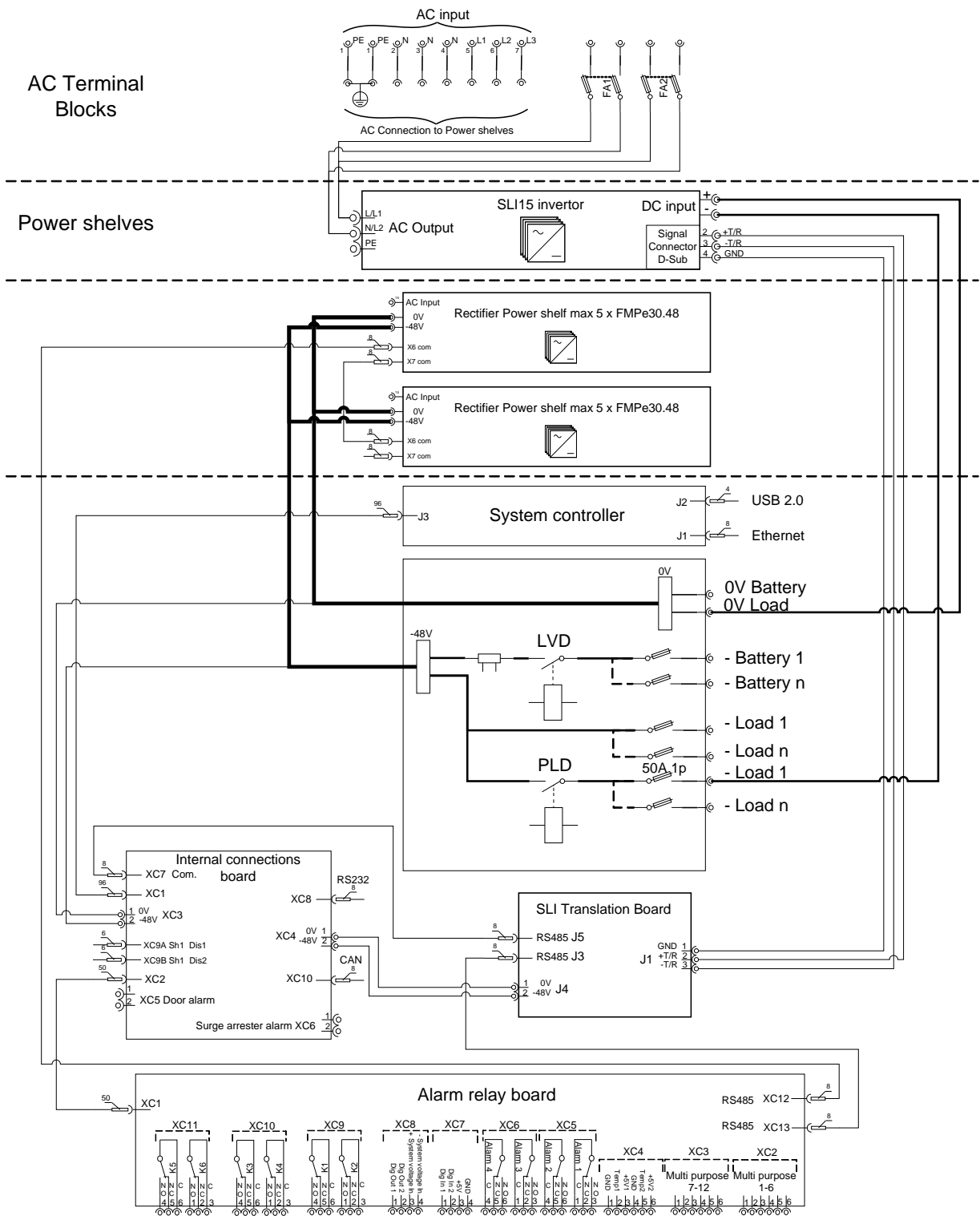
```
CRC_calc(Data,data_length,&CRC_L,&CRC_H);
```

Data – 8bit unsigned variable array with data bytes to calculate CRC checksum

data_length – data length = number of bytes

CRC_L, CRC_H – 8 bits unsigned variables of CRCchecksum

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START HERE

This Quick Install Guide includes basic steps for installation of the SLI 15 Inverter into Guardian Power Supply Systems (1-M00024G*700037 and YSS.00163).

Disclaimer

UNIPOWER is not responsible for system problems that are the result of incorrect installation or modification of the instructions provided in this guide.

WARNING!

There are potential hazards related to the installation of this system. It is recommended to carefully read and understand the contents of the System Safety Chapter before performing this installation.

WARNING!

There are potential hazards related to this installation. It is strongly recommended to TURN OFF the Power System before performing this installation.

SLI 15 Connection Kit

No.	Description	Item
1	Translation Board	YTM.00007
2	Signal Cable for SLI 15	ZLH.00673
3	DC Input Cable	ZLH.00206
4	AC Output Cable	ZLH.00627
5	Grounding Cable	1-155020-G
6	RJ45 Patch Cable	1-120807-G
7	Supply Cable	ZLH.00756
8	Plastic Cover	833C3162002-G
9	Plastic Insulation	833C3188000
10	Screw 4.2 x 9.5mm	1-114816-G
11	Polarity Labels	8153A27E010
12	M6 Screw	1-101656-G

1

SLI 15 Overview

The SLI 15 Inverter is designed for 19 inch rack mounting. Prior to mounting the SLI Inverter into the cabinet perform all connections according to this guide.

Figure - 1 - Side & Front View (Dimensions)

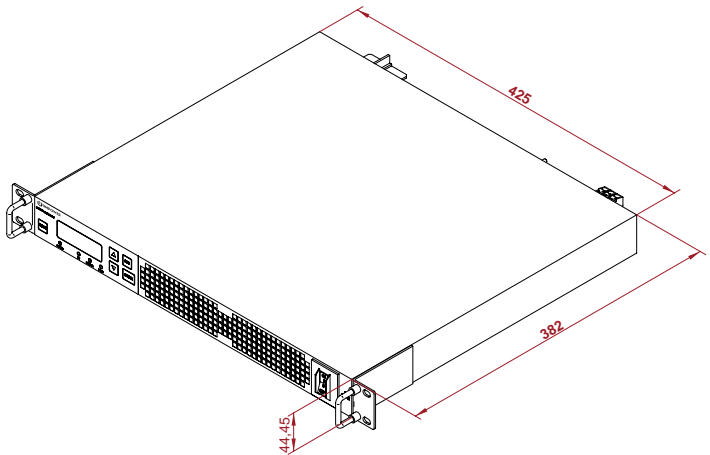
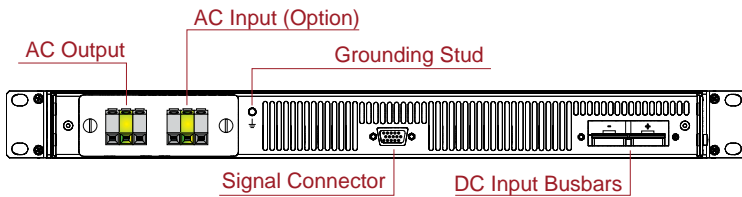


Figure - 2 - Rear View Connections

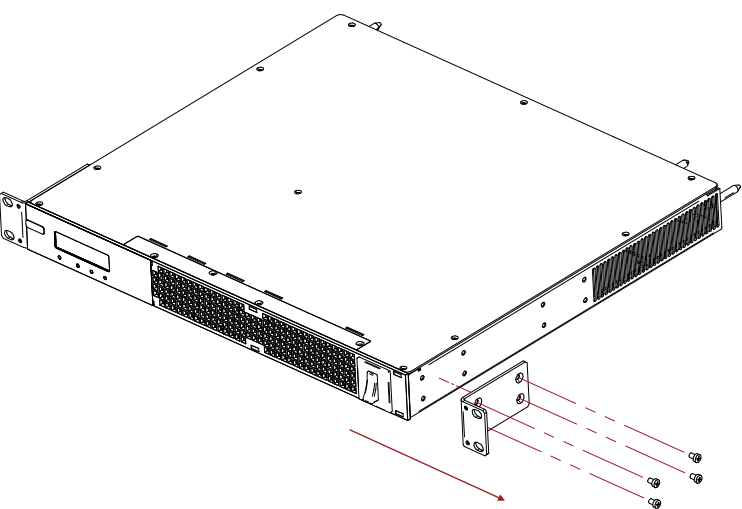


2

SLI Bracket Adjustment

Remove the SLI Brackets loosening four screws on each side.

Figure - 3 - SLI Bracket Removal



Technical Support

For technical support please visit:
<http://www.unipowerco.com/contact>

Contact Telephone numbers are:
North America: +1-954-346-2442
Latin America: +1-954-905-1078
Europe: +44-1903-768200

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Document Number: BCG.00134.0

Revision: B

Attach the Brackets back to the SLI according to the requirements of the system.

Figure - 4 - M24*700037

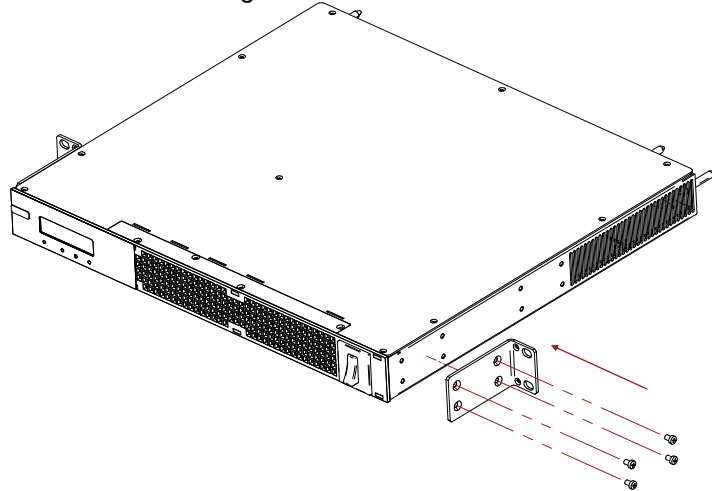
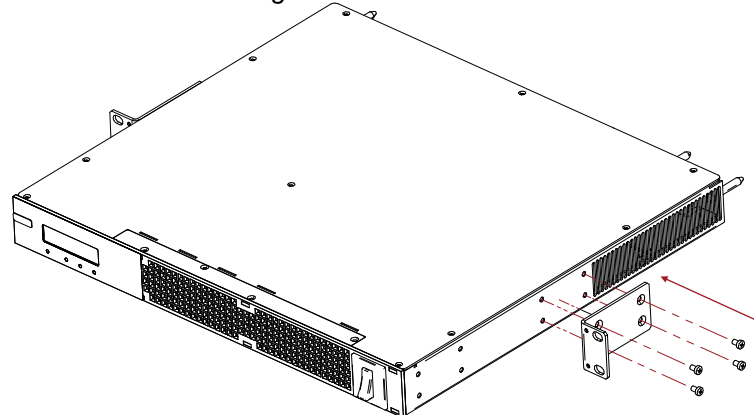


Figure - 5 - YSS.00163



3 Grounding Connection

WARNING

Prior to installation to the system the SLI 15 must be properly grounded.

Connect the Grounding cable to the Grounding stud on the rear side of SLI Inverter (cable lug M5). Route the cable to the grounding terminal of corresponding cabinet, see Figures 6 & 7.

Figure - 6 - Top Right Side of the Cabinet
M24*700037

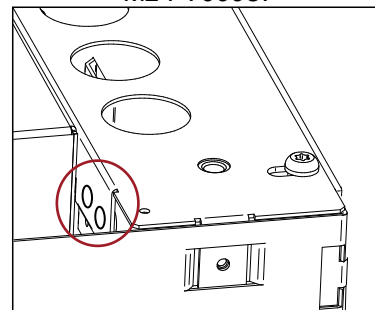
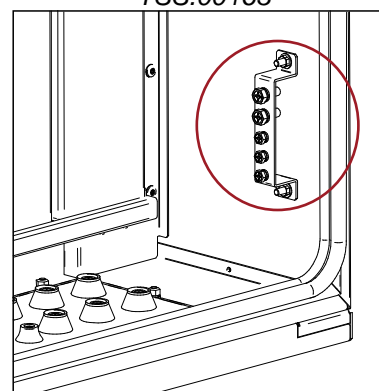


Figure - 7 - Bottom Right Side of Cabinet
YSS.00163



4 DC Input Connection

Untighten two screws and remove existing plastic insulation from DC busbars. Attach the new plastic insulation (9) and tighten with original screws.

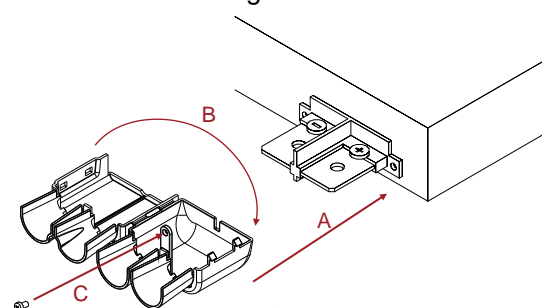
Connect the Negative (blue) and the Positive (black) cables (3) to the SLI DC Input busbar (Figure 2) using M6 screws. Route the cables to DC Distribution and connect the Negative (blue) cable to 50A Breaker and Positive (black) to 0V Busbar.

NOTE

For correct selection of breakers, see Distribution layout in Appendix A of Instruction Manual.

Attach the plastic cover (8), used for insulating the DC Input, to the DC Input Busbar (A), close (B) and tighten with screw (10) (C). Stick the polarity labels (11) on the plastic cover and insulation (9).

Figure - 8



5 Communication Interface

NOTE

All connections must be performed according to Schematic diagram on page 4 of this Quick Install Guide.

1. Install the SLI Translation Board (1) onto the DIN rail next to the AC Mains Terminal Block (rear wall of cabinet M24*700037 or rear side of PBDU - YSS.00163). See Figure 9.
2. Connect the Signal Cable (2) to the Signal Connector (type D-sub) on the rear side of the SLI and tighten with two screws M2.5.
3. Connect the other end of the Signal Cable to the SLI Translation Board (J1) (2).
4. Connect the 48V supply cable (7) from the Internal Connection Board (XC4) to the SLI Translation Board (J4).
5. Disconnect the RS485 communication cable from the Internal connection board (XC7) and connect it to the SLI Translation Board (J5). Connect RS485 communication cable to SLI Translation Board (J3) and the other end to Internal connection board (XC7).

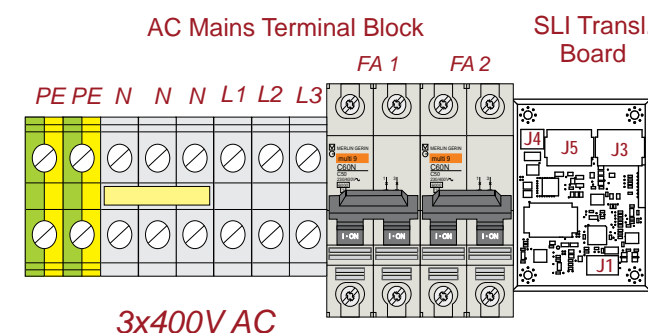
WARNING

The SLI Translation Board must be supplied with system voltage (48V) otherwise the power source for the RS485 might be damaged.

6 AC Output Connection

Connect the output cable (4) from the SLI AC Output terminals to the AC Load Breaker (FA1 and FA2) situated on the AC Mains Input Terminal Block (Figure 9).

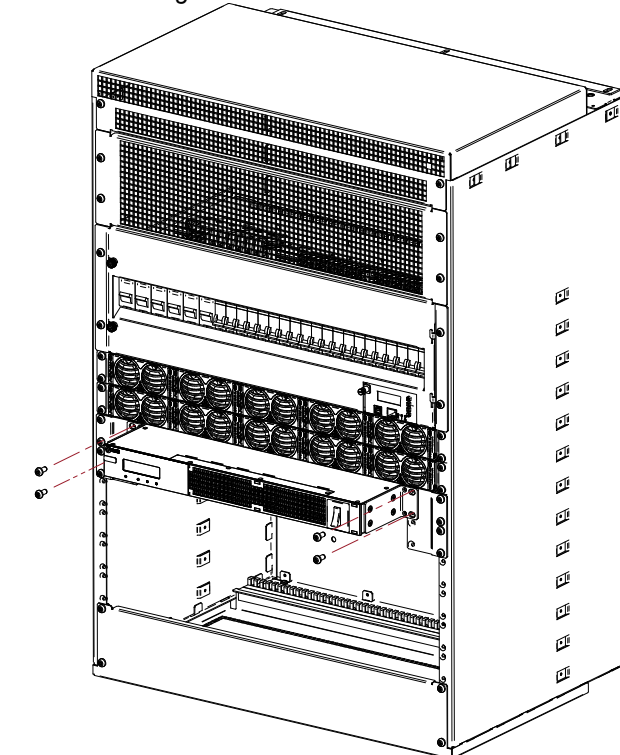
Figure - 9



7 SLI Mounting to the Cabinet

Mount the SLI unit into the cabinet and tighten with four M6 screws (12).

Figure - 10 - M24*700037 shown



8 SLI Commissioning

NOTE

It is highly recommended to read through the SLI 15 Series User Guide for correct SLI unit settings.

NOTE

Make sure all connections are made according to the Schematic diagram on page 4.

1. Switch ON the Power System and the SLI unit (Battery breaker, AC Input Breaker, SLI Input breaker on the PBDU and also the SLI front panel switch).
2. Check the output parameter settings on the SLI panel.
3. Verify the output voltage on the AC Load breaker.
4. Switch ON the FA4 breaker and connect the load.
5. Connect the PC to the control unit via the PowCom™ software and verify the SLI reading (voltage, current, power and alarms). The SLI data can be verified via SNMP or directly on the ACC Extended (ACX) Controller front panel.

SLI15 SERIES INVERTERS

1U x 19" | 24V or 48VDC INPUT
 115 or 230VAC | 1500W OUTPUT

DESCRIPTION

The SLI15 Inverter Series provides an ideal solution for telecom, IT, and industrial applications. Due to innovative technology solutions, the SLI15 inverters pack 1500 watts of power into a light (5.6 kg) and compact package that is mountable in 19" racks and is only one rack unit high.

The SLI15 1.5kVA Inverter Series offers four models for different input (24 and 48 VDC) and output (115 and 230 VAC) voltage combinations.

An integrated controller, along with an optional internal Static Transfer Switch (STS) enable flexible and scalable systems which are truly "plug and play", and require no external subsystems. The inverters can be stacked up to the power level needed by each application up to a maximum of 6 units and also have the capability to be configured for generating a 3-phase voltage source.

Electrical performance of the SLI15 is exemplary of a top-of-the-market product with efficiency that peaks at 93% and a patent-pending control algorithm that compensates current harmonics on the DC side without using bulky and expensive filters.

The SLI15 includes a powerful on-board Digital Signal Processor (DSP) that allows easy programming of main parameters through use of its front-panel keypad and LCD display. In addition, the SLI15 can be interfaced with an RS-485 serial communications link and this in turn can be interfaced with most Aspiro and Guardian DC Power Systems using a translator board.

TWO-YEAR WARRANTY

SAFETY COMPLIANCE

UL60950-1 2nd Edition
 CSA22.2, No. 60950-1 2nd Edition
 EN60950-1 2nd Edition



LVD2006/95/EC
 EMC2004/108/EC
 ROHS2011/65/EU

FEATURES

- ◆ 1U height x 19" width x 14.94" depth; 19" rack-mount
- ◆ Input isolated from ground for positive or negative ground connection at 24VDC or 48VDC
- ◆ High efficiency: up to 93%
- ◆ True sine wave output
- ◆ Parallelable output with current share and synchronization of up to 6 inverters working in parallel
- ◆ Front panel LCD display to monitor and set the main parameters
- ◆ RS-485 serial link
- ◆ Constant input current sink from battery for extended life
- ◆ Optional hot-swappable configuration
- ◆ Optional internal Static Transfer Switch
- ◆ In the -STS version, ON line (primary source to the load) or OFF line mode (UPS mode)
- ◆ Configurable for being used as Three Phase source (3 units required, see page 6 for further details)
- ◆ Can be integrated into Guardian Access Power Systems

STANDARD MODELS

MODEL *	INPUT VOLTAGE	OUTPUT VOLTAGE NOMINAL	OUTPUT VOLTAGE RANGE
SLI-24-115-I	24VDC	115VAC	100-120VAC
SLI-24-230-I		230VAC	200-240VAC
SLI-48-115-I	48VDC	115VAC	100-120VAC
SLI-48-230-I		230VAC	200-240VAC

* Output isolated from ground.

OPTIONS

(see ordering guide on page 7)

Code	Function
-STS	Built-in Static Transfer Switch
-SC	Terminal Block AC Output
-HP	Hot-Plug (requires 1U sub-rack)

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SPECIFICATIONS

Input

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX
Input Voltage	Input is fully floating and may be connected to +Ve or -Ve ground DC source as required	20VDC 40VDC	24VDC 48VDC	36VDC 72VDC
Input Current	24 VDC Models @ 18 VDC: 48 VDC Models @ 36 VDC:		67(24V) 36(48V)	100A 48A
Inrush Current				<10A

Output

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX
Output Power				1500W 1600VA
Output AC Voltage	Standard is VAC floating from Ground; -GN version is available with Neutral connected to Ground (Grid Input shall be supplied by means of an isolation transformer)	100VAC 200VAC	115VAC 230VAC	120VAC 240VAC
Frequency	50Hz / 230VAC, 60Hz / 115VAC	50Hz		60Hz
Efficiency				93%
Load Power Factor	Lagging or leading	0.33		1
Crest Factor	Ip/Imrms		4	
Regulation in single mode	Load: over full operating range (R-Load) Line: over full operating range (R-Load)	-3.0% -0.1%		+1.0% +0.1%
Regulation in parallel mode	Load: over full operating range (R-Load)	115VAC 230VAC -8.5% -6.0%		0% 0%
Total Harmonic Distortion	On Resistive Load			<2%

Protection

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX
Input Overcurrent	24VDC Models; Internal Fuse. 48VDC Models; Internal Fuse.		140A 70A	
Input Overvoltage	24VDC Models: 48VDC Models:		37.5VDC 74VDC	
Input Undervoltage	24VDC Models: 48VDC Models:		18VDC 36VDC	
Output Overload	115VAC Models: 230VAC Models:		1610W 1840W	
Output Surge	115VAC Models for 200 ms: 230VAC Models for 200 ms:		1750VA 2300VA	
Output Overvoltage		113%	115%	117%
Output Undervoltage		83%	85%	87%
Output Overcurrent	Load: over full operating range (R-Load)	115VAC 230VAC		10A 15A
Output Short-circuit	Peak current type protection	115VAC 230VAC		60A 30A
Overtemperature	Visual and acoustic indication 5°C before shutdown at Tamb >65°C and at Tint >100°C.			
Protection Restore Modes	The restore mode of each protection can be individually selected to "latch" or "auto-restart".			

Static Transfer Switch Functions (only applicable with STS option is fitted)

PARAMETER	DESCRIPTION / CONDITION
On-Line (Inverter mode)	Output is normally from the inverter and switches to the utility supply if the inverter output goes out of tolerance or fails completely. (Limits are set through the settings menu on the front panel.)
Off-Line (UPS mode)	Output is normally from the utility supply and switches to the inverter if the utility supply goes out of tolerance or fails completely. (Limits are set through the settings menu on the front panel.)
Transfer Time	<2.5mS

Interface & Control Signals

PARAMETER	DESCRIPTION / CONDITION	
LCD Panel	2-line LCD panel with keypad for menu navigation.	
LED Indicators (Front panel)	GREEN LED indicates:	Inverter is ON
	RED LED indicates a generic fault such as:	Overtemperature (OT) Fan fail Input or Output OV, UV, OC
General Alarm Signal	Activated by an open photo-relay if in fault mode, available at rear signal connector	
Serial link	RS485 port, 500VDC isolated, available at rear signal connector. Can be used to communicate between single or paralleled inverters and Guardian systems ACC Extended controller, YTM.00007 translator required (see page 6).	

Safety, Regulatory and EMC

PARAMETER	DESCRIPTION / CONDITION	CRITERION
Safety Certifications	EN60950-1/A11:2009; IEC60950-1:2005. (CB Report); UL/CSA 60950-1 2nd Ed.; CE Mark for LVD	
Insulation	Primary-to-Secondary: Primary-to-Ground: Secondary-to-Ground: Signal-to-Ground:	3000Vrms 1000Vrms 1500Vrms 0Vrms

Environmental

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX
Altitude	Operating: Non-Operating:			13K ft 40K ft
Operating Temperature	@ full load; Power Derating: 75W/°C: +55°C to +65°C	-25°C		+65°C
Storage Temperature		-40°C		+85°C
Relative Humidity	@ 40 °C, non-condensing			90%
Output Voltage Temperature Coefficient	@ rated load			0.02% per °C
MTBF	@ 40°C excluding fan	250k hrs		

Mechanical

PARAMETER		
Dimensions	19" Width x 1.71" Height x 14.94" Depth	482.6mm Width x 43.5mm Height x 379.5mm Depth
Weight	12.34 lb	5.6 kg

Connections

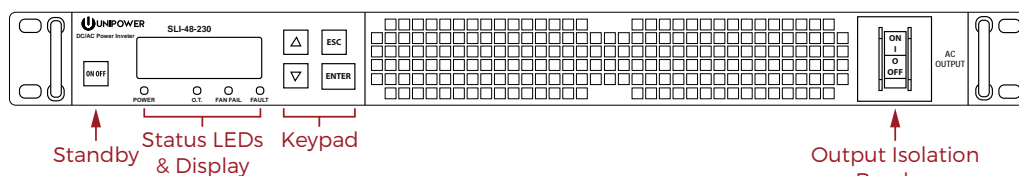
PARAMETER	DESCRIPTION / CONDITION
DC Input (Located at rear left)	+Ve and -Ve bus bars with one 6mm diameter hole; hot plug version (-HP option) has PCB bars with pre-charging system, see page 5 for details of sub-rack.
AC Output (Located at rear right)	IEC320 plug. For screw terminal blocks specify option "-SC".
AC Input (-STS option) (Located at rear right)	IEC320 socket marked "Grid Input".
Signals * (Located at rear center)	Female Sub-D15 connector, Molex 89263-6062 or equivalent. (Provides general failure alarm, serial port, synch. for paralleling or three phase, remote on/off.)

* NOTE: It is possible to connect up to 6 inverters in parallel. In order to do this it is necessary to purchase a paralleling kit (see page 1).

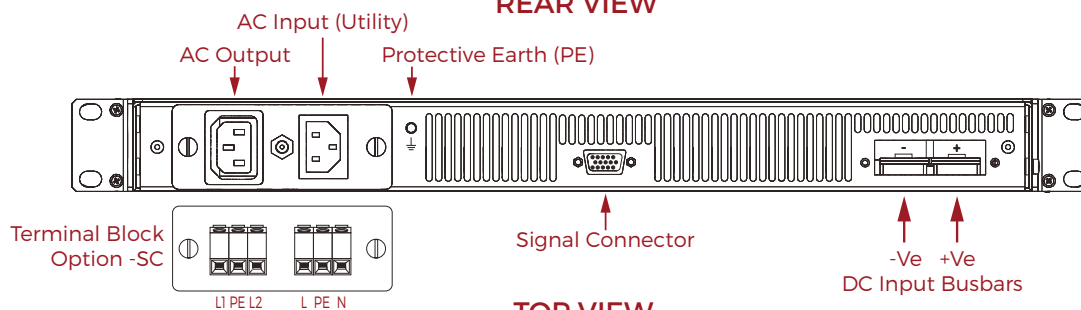
IMPORTANT: -STS and -GN options are compatible just supplying Grid Input by means of an isolation transformer, same indication if Neutral is tied to Ground on user side.

Panel Description & Mechanical Outline

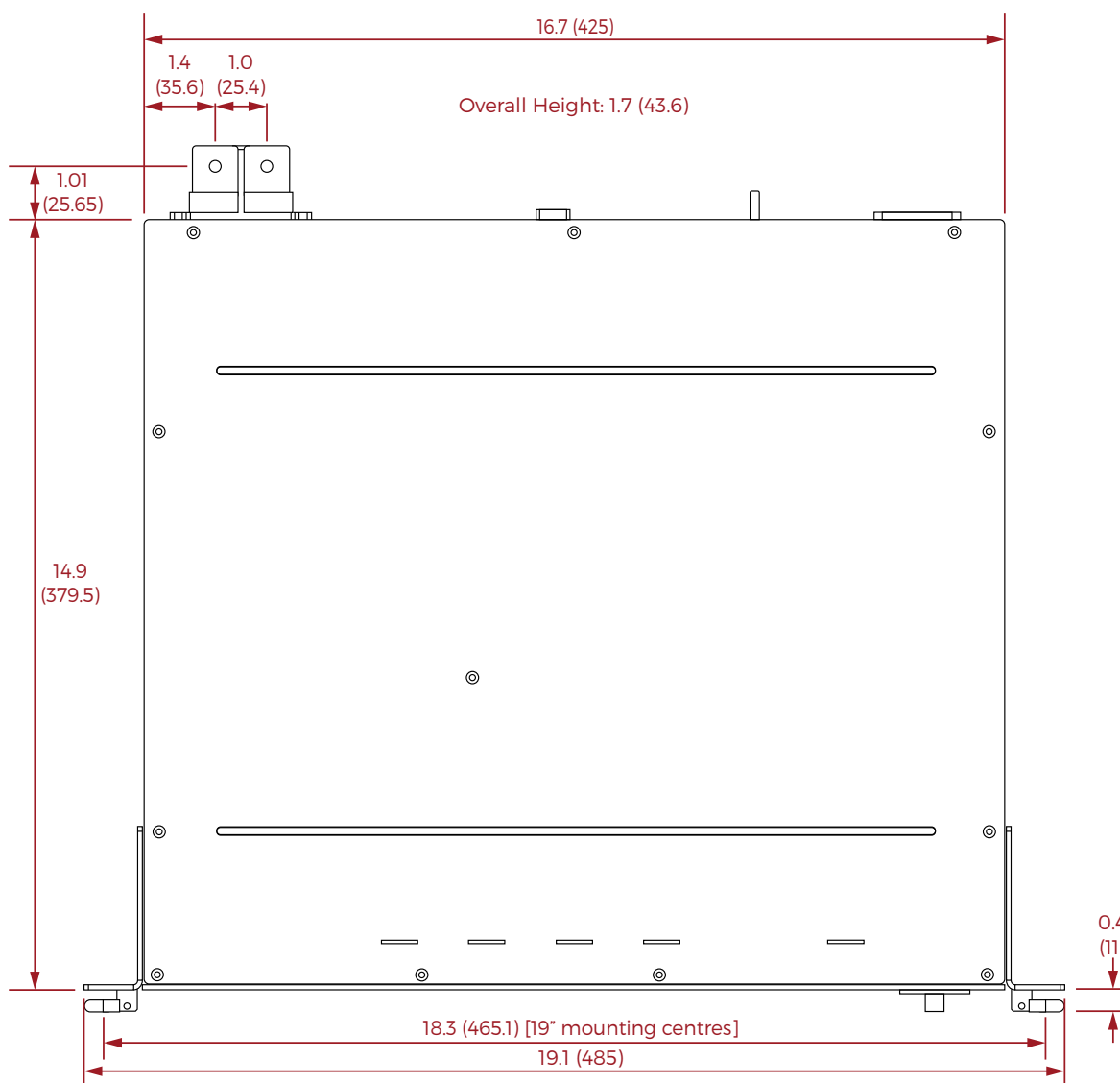
FRONT VIEW



REAR VIEW



TOP VIEW



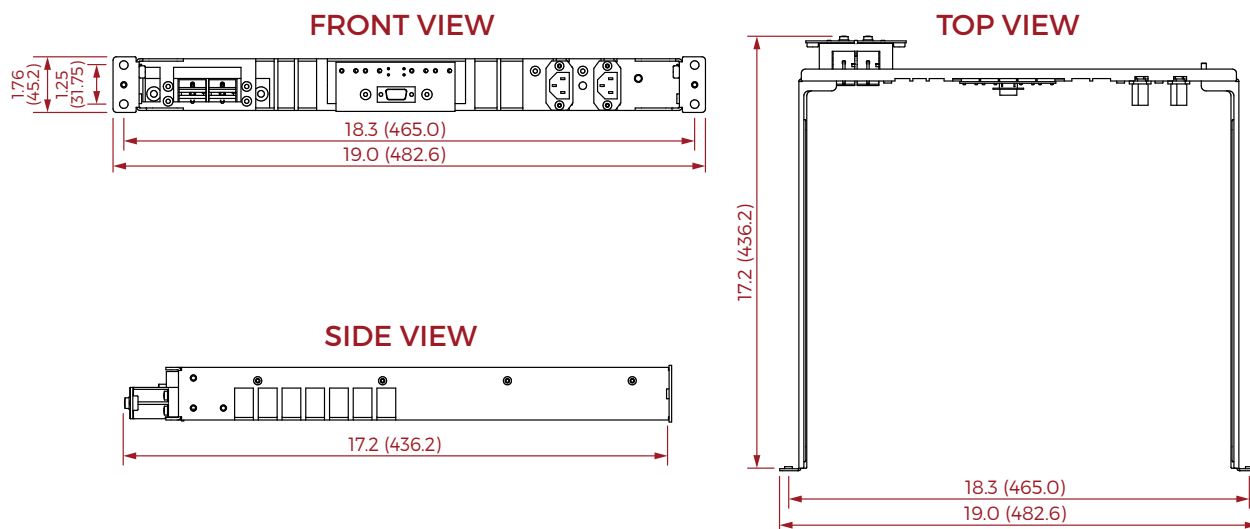
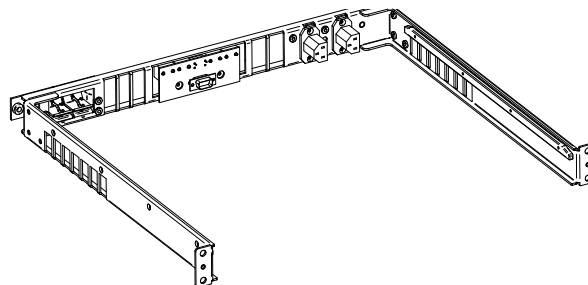
Hot-Plug Subrack

The SLI15 hot-plug subrack is designed for hot-plugging of SLI 15 Inverters to the power system without significant interruption to system operation.

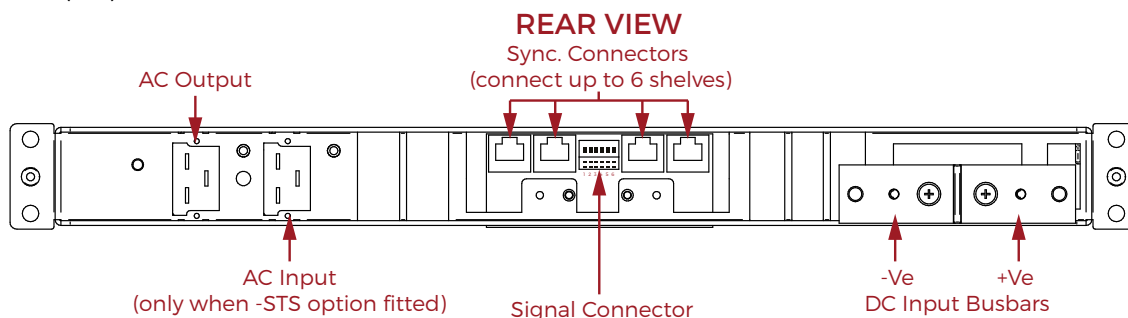
There are two versions available:

- Hot Plug Subrack for models without an STS
- Hot Plug Subrack for models with an STS

They differ only in the number of connectors at the rear. See the ordering guide on page 7.



Dimensions in inches (mm)



Signal Connector Details

Module				Subrack	
Pin	Function	Pin	Function	Pin	Function
1	General Failure (GF)	6	Sync & Remote On/Off Rtn *	11	Transfer Sync (-STS option)
2	+T/R (RS485)	7	Remote On/Off	12	Output Sync
3	-T/R (RS485)	8	Sync-120	13	Sync-240
4	GF & RS485 Rtn	9	-	14	Sync
5	Master Indicator	10	-TR/I (Reserved)	15	+TR/I (Reserved)
				1	Remote On/Off
				2	GND
				3	+T/R (RS485)
				4	-T/R (RS485)
				5	General Failure
				6	GND-EXT

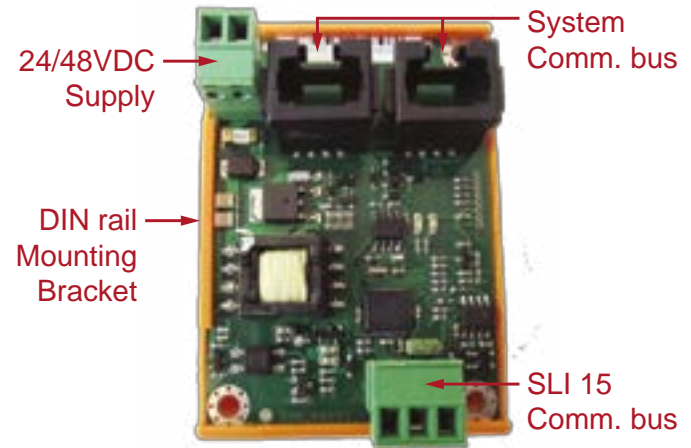
* Also Chassis Ground

NOTE: Module pins not shown on subrack signal connector are distributed to the 'sync' connectors on the subrack/standalone parallel boards.

SLI15 to ACC Translator

The SLI15 to ACC Translator converts the data that is transmitted on the SLI15 RS485 interface into a format that can be understood by the HCC and ACC Extended controllers used in the Aspiro and Guardian DC and Hybrid Power Systems. It can be internally installed in systems using the 4U distribution module such as the Guardian Access 5U/6U and cabinet systems. When deployed with an Aspiro or Guardian 2U or 3U system it has to be separately mounted.

When one or a paralleled set of SLI15 inverters and this adaptor are installed with an Aspiro or Guardian system the following data is available via the system controller:



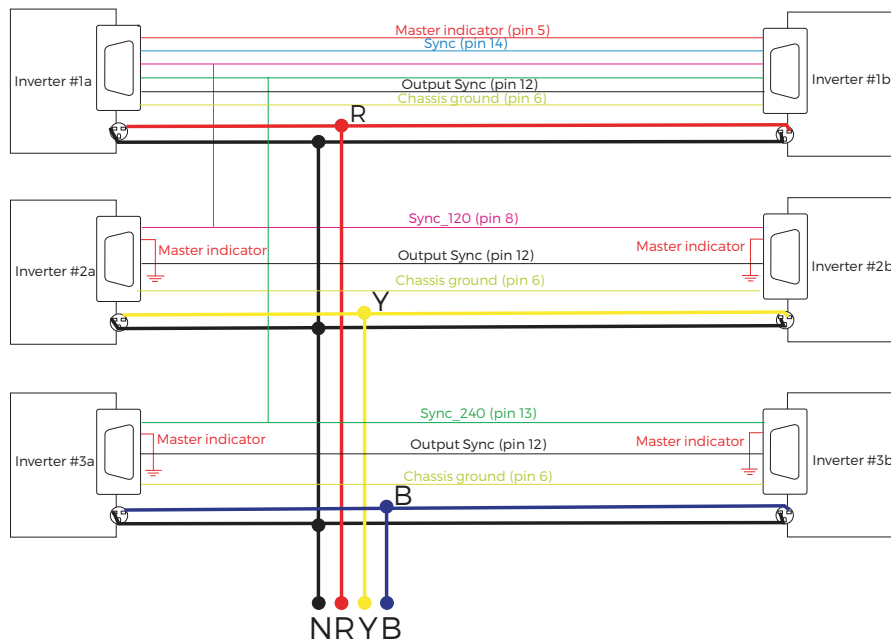
Signal	Menu / PowCom	SNMP
Grid Voltage (V)	STS version only	STS version only
Grid Current (I)	STS version only	STS version only
Voltage (V)	Yes	Yes
Current (I)	Yes	Yes
Power (W)	Yes	Yes
Unit Status	No	Yes

Signal	Menu / PowCom	SNMP
DSP Status	No	Yes
STS Status	No	Yes
System Fault	Yes	Yes
Fan Fault	No	Yes
Version	Yes	No
Serial number	Yes	Yes

One SLI15 to ACC Translator is required for each standalone or paralleled set of inverters. When ordered for retrofit or as an accessory it comes as a kit including all required cables (See the ordering guide on page 7).

Generating a 3-phase Y voltage

It is possible to generate a 3-phase voltage by connecting either 3 or 6 inverters into a Y configuration. The adjacent diagram shows an example of the necessary connections. Note that 3-phase configuration needs to be enabled in the "service" menu. See the installation and operating manual for more details.



Ordering Guide

The following table details the available models. For combinations of options not shown please contact sales.

Model Number	Part Number (UNIPOWER use only)	Input Voltage	Output Voltage	Static Transfer Switch	Terminal Block AC output	Hot-Plug ²	N-G Internally Connected
SLI-24-115-I ¹	3C32991F200G	24VDC	115VAC				
SLI-24-115-I-HP	3C32991F500G	24VDC	115VAC			✓	
SLI-24-115-I-SC	3C32991F21CG	24VDC	115VAC		✓		
SLI-24-115-I-SC-ST5	3C32991FT0CG	24VDC	115VAC	✓	✓		
SLI-24-115-I-ST5	3C32991FT00G	24VDC	115VAC	✓			
SLI-24-230-I ¹	3C34991F200G	24VDC	230VAC				
SLI-24-230-I-HP	3C34991F500G	24VDC	230VAC			✓	
SLI-24-230-I-SC	3C34991F20CG	24VDC	230VAC		✓		
SLI-24-230-I-SC-ST5	3C34991FT0CG	24VDC	230VAC	✓	✓		
SLI-24-230-I-ST5	3C34991FT00G	24VDC	230VAC	✓			
SLI-48-115	3C33991F300G	48VDC	115VAC				✓
SLI-48-115-I ¹	3C33991F200G	48VDC	115VAC				
SLI-48-115-I-HP	3C33991F600G	48VDC	115VAC			✓	
SLI-48-115-I-SC	3C33991F500G	48VDC	115VAC		✓		
SLI-48-115-SC-ST5	3C33991FT0CG	48VDC	115VAC	✓	✓		✓
SLI-48-115-I-ST5	3C33991FT00G	48VDC	115VAC	✓			
SLI-48-115-I-ST5-HP	3C33991FT0HG	48VDC	115VAC	✓		✓	
SLI-48-230-HP	3C35991F20CG	48VDC	230VAC			✓	✓
SLI-48-230-I ¹	3C35991F200G	48VDC	230VAC				
SLI-48-230-I-HP	3C35991F500G	48VDC	230VAC			✓	
SLI-48-230-I-SC	3C35991F20CG	48VDC	230VAC		✓		
SLI-48-230-I-SC-ST5	3C35991FT0CG	48VDC	230VAC	✓	✓		
SLI-48-230-I-ST5	3C35991FT00G	48VDC	230VAC	✓			
SLI-48-230-I-ST5-HP	3C35991FTHPG	48VDC	230VAC	✓		✓	

Notes:

1. Standard base models.

2. Hot-Plug units require a suitable 1U sub-rack which must be ordered separately, see below.

Accessories (order separately)

HOT-PLUG SUB-RACKS (see page 5 for details)

Order pt. no.: 3E969910001 - must be ordered with each hot-plug inverter without the Static Transfer Switch option fitted.

Order pt. no.: 3E969910000 - must be ordered with each hot-plug inverter with the Static Transfer Switch option fitted.

PARALLELING KITS

Order pt. no.: 3C35000KIT7G - for standalone units (one for each inverter).

Includes one board assembly and one cable/ferrite assembly.



Order pt. no.: 3C3500KITHPG - for hot-plug units (one for each inverter less one, i.e. N-1).

Includes one cable/ferrite assembly (board is part of hot-plug sub-rack).



SLI to ACC TRANSLATOR & CABLE KIT

Order pt. no.: YTM.00007 for translator board only.

Order pt. no.: YGA.01209 for complete kit including standard cable set.



DC INPUT COVER KIT (for standalone units only)

Order pt. no.: 3C31000KIT5.

23" MOUNTING KIT (for standalone units only)

Order pt. no.: 3C3100KIT23.