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1. NOTES ON THIS MANUAL

1.1 Customer Notice

Please before using the inverter check the fixing engineer using PV groupware like electricity, voltage, power are suit for the product specification and it, the fittings belong to the setting box. If the inverter cannot work normally because of the problems below, it's not the quality problem and our company will not take any responsibility, the problems are follows:

- the inverter damaged because larger PV electricity and voltage which cause the inverter cannot be operated
- the inverter damaged because didn't use our company's DC and AC terminals.
- Inverter fixing angle not consistent, not fixing according to the specification for example: lie low, hang back, buckle back.
- Inverter damaged during inverter fixing process.



NOTICE

After purchase this product, please return the guarantee slip and One Commissioning Sheet per installation by mail company, or by taking pictures of the electric upload photos to the company's Web site, are effective in two ways, when our company receive guarantee slip and One Commissioning Sheet per installation, our company can supply the services for the customer, otherwise the company will not take any responsibility

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Shanghai,P.R.China

Consignee: SHANGHAI MACSOLAR POWER CO.,LTD

website: www.macsolar-power.com



1.2 Scope of Validation

The main purpose of this User's Manual is to provide instructions and detailed procedures for operating, maintaining, and troubleshooting the following Macsolar Grid Tie Solar Inverter:

- Macsol-TL1.5K
- Macsol-TL2K

Please keep this manual all time available in case of emergency.

All the illustrated pictures in this Manual concerning Macsolar Grid Tie Solar Inverter derive from the simulated model of Macsol-TL2K.

In the event that dimensions and parameter of products have varied, please take the latest document as standard. Further notification will not be issued.

1.3 Symbols Used



DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

WARNING indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.



CAUTION

CAUTION indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.



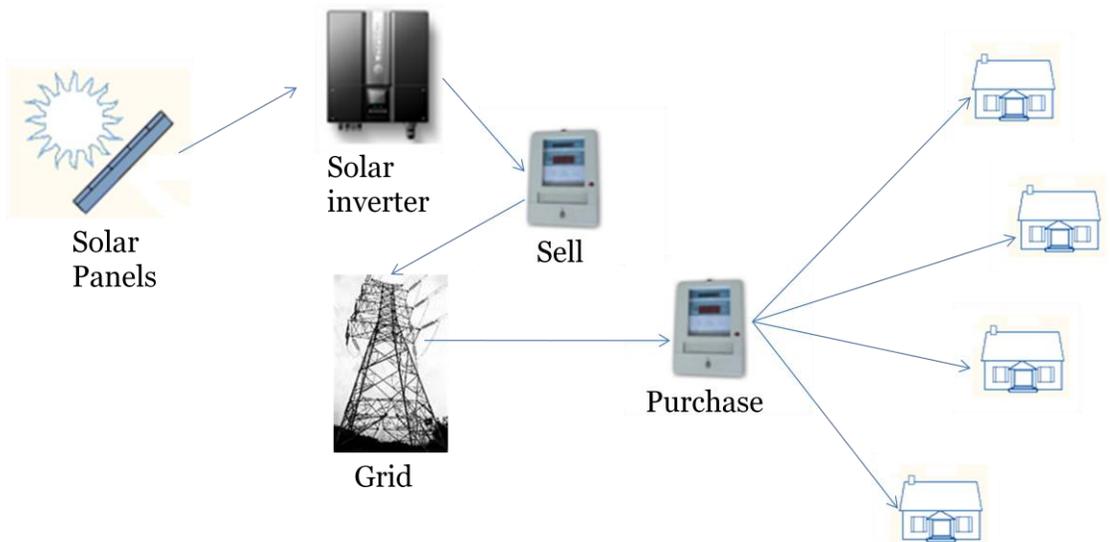
NOTICE

NOTICE indicates a situation that can result in property damage, if not avoided.

2. PREPARATION

2.1 System Demonstration

Solar energy generation systems, based on photovoltaic modules, nowadays represent the most suitable solution, in particular for domestic power levels, to reduce the energy consumption produced by oil and gas. Moreover in different European countries, electricity companies are providing money incentives for the energy produced by renewable sources and injected into the utility grid.



The solar inverter is a critical component in a solar energy system. It performs the conversion of the variable DC output of the PV modules into a clean sinusoidal 50 or 60 Hz AC current that is then applied directly to the commercial electrical grid or to a local grid electrical network. Typically, communications capability is included so users can monitor the inverter and report on power and operating conditions, provide firmware updates and control the inverter grid connection. Depending on the grid infrastructure wired (RS-485, CAN, Power Line Communication, Ethernet) or wireless (Bluetooth, ZigBee/IEEE802.15.4, 6LoWPAN) networking options can be used.



2.2 Safety Instructions



DANGER

DANGER due to electrical shock and high voltage

DO NOT touch the operating component of the inverter, it might result in burning or death.

TO prevent risk of electric shock during installation and maintenance, please make sure that all AC and DC terminals are plugged out.

DO NOT touch the surface of the inverter while the housing is wet, it might lead to electrical shock.

DO NOT stay close to the instruments while there are severe weather conditions including storm, lighting, and etc.



WARNING

The installation, service, recycling and disposal of the inverters must be performed by qualified personnel only in compliance with national and local standards and regulations. Please contact your dealer to get the information of authorized repair facility for any maintenance or repairmen.

Any unauthorized actions including modification of product functionality of any form will affect the validation of warranty service, MacSolar may deny the obligation of warranty service accordingly.



CAUTION

The PV inverter will become hot during operation, please don't touch the heat sink or peripheral surface during or shortly after operation.

Risk of damage due to improper modifications.

Never modify or manipulate the inverter or other components of the system.



NOTICE

Public utility only

The PV inverter designed to feed AC power directly to the public utility power grid, do not connect AC output of the device to any private AC equipment.



2.3 Explanations of Symbols on Inverter

Symbol	Description
	Dangerous electrical voltage This device is directly connected to public grid, thus all work to the inverter shall only be carried out by qualified personnel.
	DANGER to life due to high electrical voltage! There might be residual currents in inverter because of large capacitors. Wait 10 MINUTES before you remove the front lid.
	NOTICE, danger! This device directly connected with electricity generators and public grid.
	Danger of hot surface The components inside the inverter will release a log of heat during operation, DO NOT touch aluminum housing during operating.
	A record has occurred Please go to Chapter 5.4.3 “Further information for the Event” to remedy the record.
	This device SHALL NOT be disposed of in residential waste Please go to Chapter 8 “Recycling and Disposal” for proper treatments.
	Without Transformer This inverter does not use transformer for the isolation function.
	CE Mark Equipment with the CE mark fulfils the basic requirements of the Guideline Governing Low-Voltage and Electromagnetic Compatibility.
	Unauthorized Any unauthorized perforations or modifications are strictly forbidden, if any damage (device/person) is occurred, Macsolar shall not take any responsibility for it.

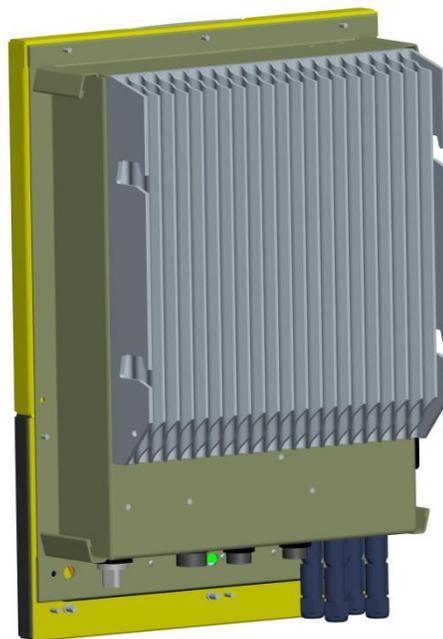
3. PRODUCT INFORMATION

3.1 Overview

Industrial Layout



Negative Layout





3.2 Major Characteristics

MacSolar inverter has following characteristics which make MacSolar inverter “High Efficiency, High Reliability, High Cost Effective Ratio”

- High DC input voltage makes the inverter connect with more PV panels well.
- Wide MPPT voltage range makes the inverter fit in different locations and various weather conditions.
- High MPP tracking accuracy makes the inverter catch most of energy from panels and then converts into money to your pocket.
- Complete protection methods setting.

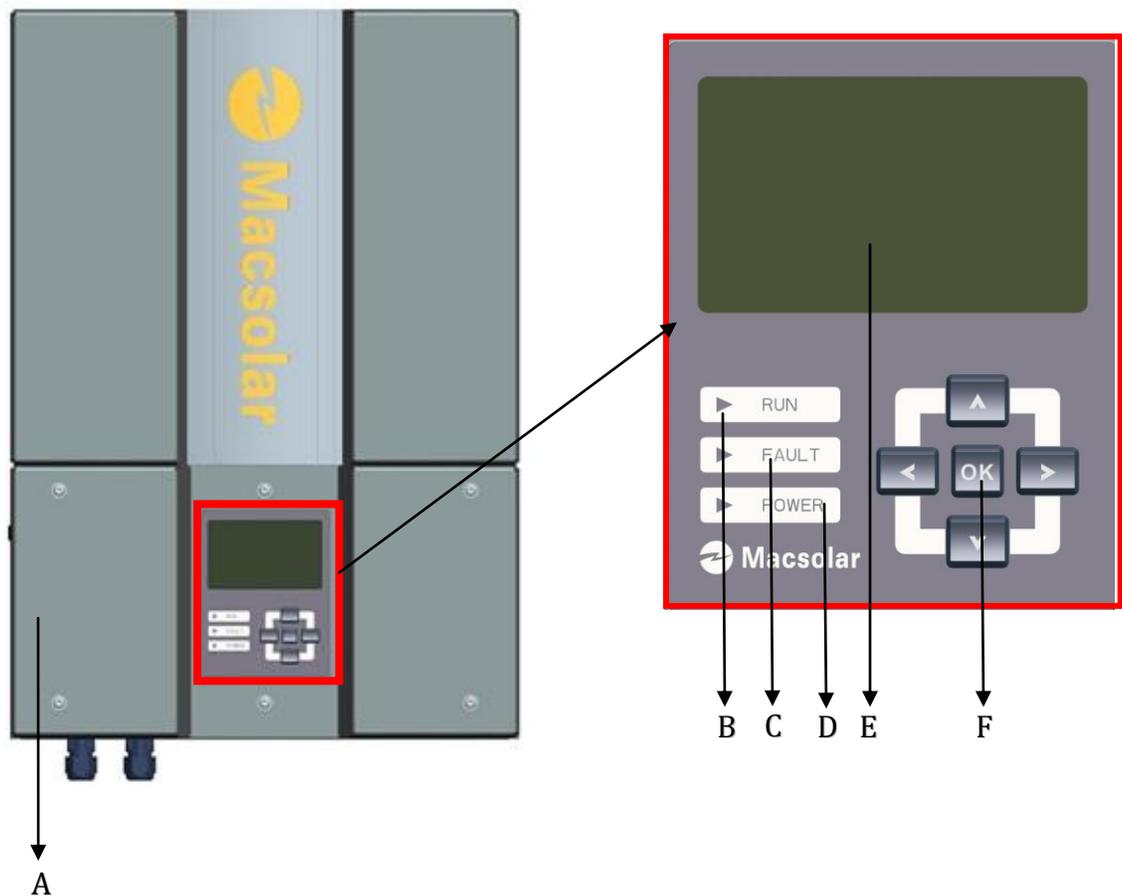
Also, following protection methods are integrated in MacSolar inverter:

- Internal overvoltage
- DC insulation monitoring
- Ground fault protection
- Grid monitoring
- Ground fault current monitoring
- DC current Injection monitoring

4. UNPACKING

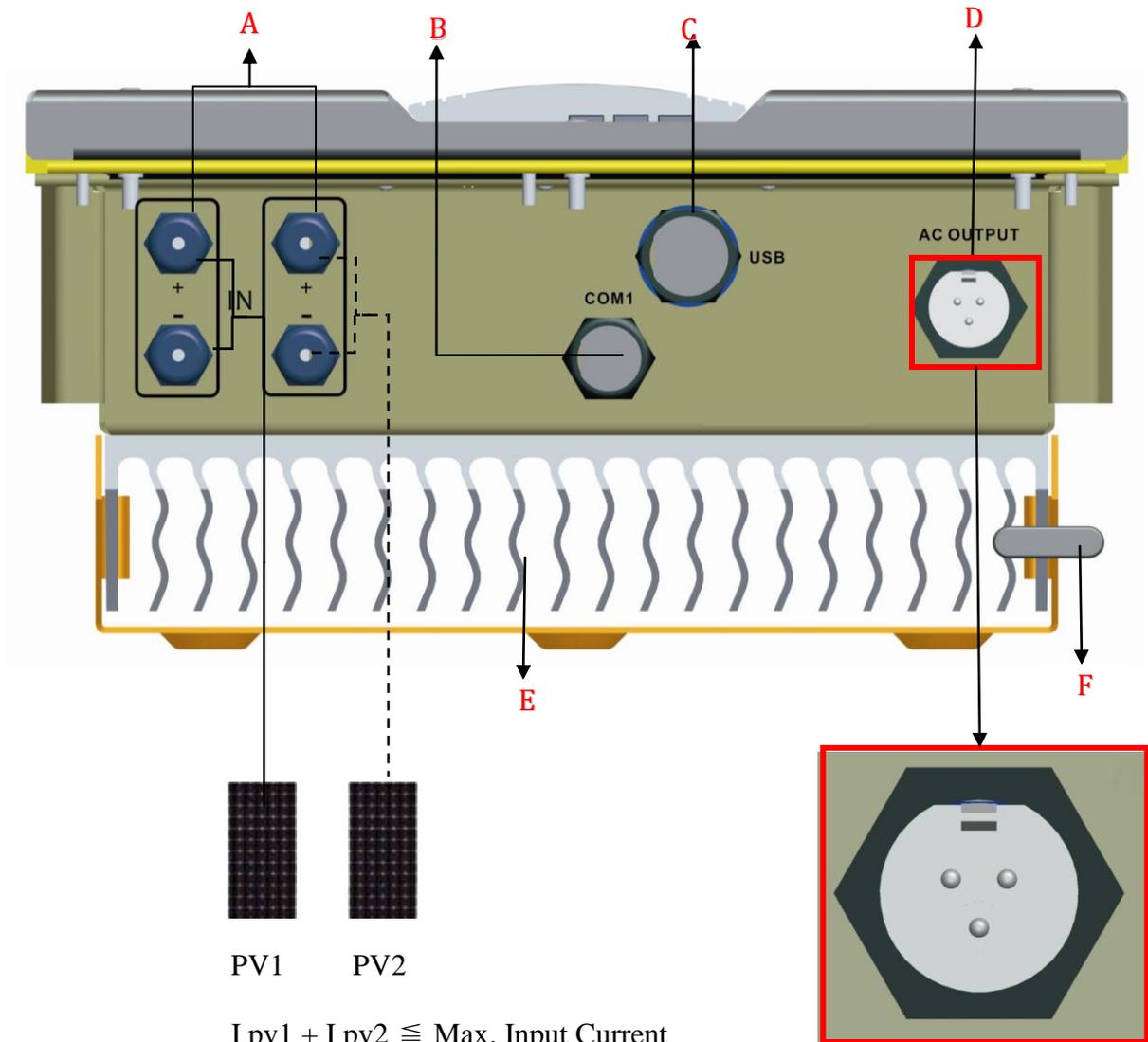
4.1 Product Appearance

Front:



Object	Description
A	Removable front lid for potential maintenance and repair
B	LED light-RUN
C	LED light-FAULT
D	LED light-POWER
E	LCD screen for checking the operating status and configuration
F	Control keyboard for displays and configuration of parameters

Bottom:



$$I_{pv1} + I_{pv2} \cong \text{Max. Input Current}$$

$$U_{pv1} = U_{pv2} \cong \text{Absolute DC Voltage}$$

Object	Description
A	DC input (1 set for Macsol-TL1.5K and 2 sets for Macsol-TL2K), Anode



	connected with anode ,cathode connected with cathode, PV1 Input Current +PV2 Input Current \cong Max.Input Current , PV1 Voltage =PV2 Voltage \cong Absolute DC Voltage .
B	Plugs for connecting the RS485 communication module. Among them COM1 must be equipped, but COM2 is an optional (Customized, using for connect with the inverters)
C	USB plug for connecting the inverter to a PC directly via USB connection(Optional)
D	AC output
E	Heat sink
F	Extra lock

4.2 Product Identification

You can identify the inverter by the side type label. Information such as serial number (SN.), type of the inverter, as well as inverter specifications are specified on the side type label. The type label is on the middle part of the right side of the inverter housing.

(Side type label example as on Macsol-TL1.5K)


Mac solar
Made in China

www.macsolar-power.com

Type:Macsol-TL1.5K

	DC :	
	V _{DC} max:	480V
	V _{DC} nom:	360V
	V _{DC} MPP:	125-480V
	P _{DC} max:	1800W
	I _{DC} max:	12A
	AC :	
	V _{AC} nom:	230V
	f _{AC} nom:	50Hz
	P _{AC} nom:	1500W
P _{AC} max :	1650W	
I _{AC} nom:	6.5A	
cos φ :	0.99	
IP 65 -20°C to +60°C Protection Class I Overvoltage Cat.III VDE0126-1-1, IEC62109-1; C10/11 AS4777.2/3 , AS3100; G83/1 ENEL Guide ; RD1663		












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201201, Shanghai
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S/N



4.3 Further Information

If you have any further questions concerning the type of accessories or installation, please check our website www.macsolar-power.com or contact our service hotline.

5.CONFIGURATION

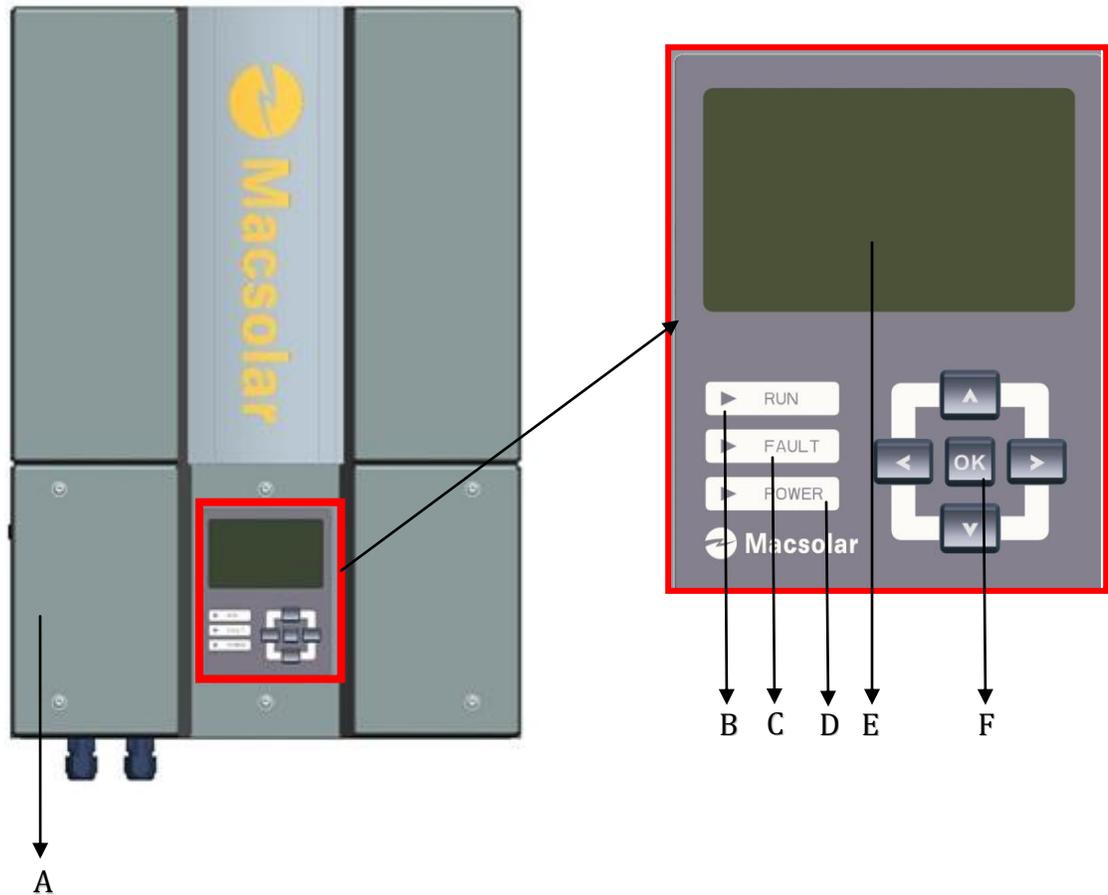
5.1 Fixing Complete

After the inverter fixed by the engineer, the display screen shows :

- Verify that the inverter has been installed on the customer specified location.
- DC terminal has been connected with PV.
- AC terminal has been connected with GRID.
- Inverter LCD operate normally.
- When the inverter starts, the RUN LED lights up after 2 seconds. The inverter exports energy to grid.



5.2 LCD Overview



Object	Description
A	Removable front lid for potential maintenance and repair
B	LED light-RUN
C	LED light-FAULT
D	LED light-POWER
E	LCD screen for checking the operating status and configuration
F	Control keyboard for displays and configuration of parameters

5.2.1 LED Display

The inverter is equipped with three LEDs including “Green”, “Yellow” and “Red” which provide information about various working status.

Green LED:

The green LED lighting indicates the inverter is working normally.

Generally, this LED begins to light up in the morning when the sunshine intensity is enough and goes out when it gets dark.

Yellow LED:

The yellow LED lighting indicates the inverter is exporting energy to grid.

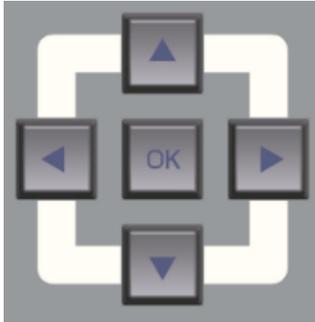
Red LED:

The red LED lighting indicates the grid abnormal or the inverter abnormal, and the corresponding faulty will display on LCD at the same time.

LED	STANDBY	EXPORTING ENERGY	ALARM	PERMANENT FAULT	RESTORABLE FAULT
POWER LED	ON	ON	ON	ON	ON
RUN LED	OFF	ON	ON	OFF	OFF
FAULT LED	OFF	OFF	BLINK (1Hz)	ON	BLINK (1Hz)

5.2.2 LCD Display

Press any key from the control keyboard to illuminate the LCD screen.



Item	Function
	“Right” key Depending on the selection: Navigate right Navigate to the next level menu
	“Down” key Depending on the selection: Navigate down Change to the next number
	“Left” key Depending on the selection: Navigate left Navigate to the previous level menu
	“Up” key Depending on the selection: Navigate up Change to the previous number
	“OK” key Depending on the selection: Confirm a selection Enter the main menu



NOTICE

Mac solar inverter is not an aligned measuring instrument for current, voltage or power consumption. A slight deviation of a few percent points is intrinsic to the system, the results from the inverter cannot be used for grid balance calculations. An aligned meter will be required to make calculations for the utility company.

5.3 Setup

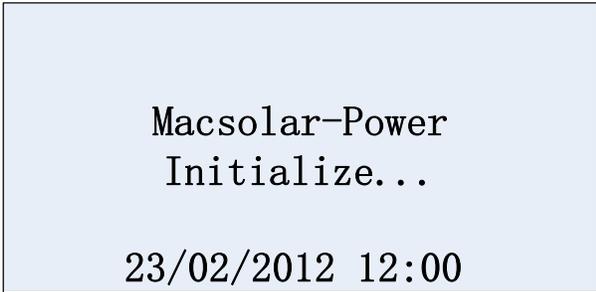


NOTICE

Make sure the DC switch “ON”, otherwise Macsolar inverter cannot work due to the power shortage.

Display

After the inverter has started, programs will be initialized with the screen showing as follows;



MacSolar-Power
Initialize...
23/02/2012 12:00



Now in this interface you can check all necessary information about the system:

Macsolar-Power	
Pac	xxW
Fgrid	x.xHz
Vgrid	x.xV
23/02/2012 12:00	

After reviewing all information relevant to the system, you are able to enter the main menu by pressing the “OK” button on display panel and acquire any parameter concerning the product which interests you, such as yield power, record info. etc.

Macsolar-Power	
▷	Yield Power
	Actual Value
	Record Info
	History Data
	Configuration
	Device Info
23/02/2012 12:00	

Yield Power

Select “Yield Power” option to enter the submenu and the cumulated power generation by Day will be presented on the screen;

Yield Power	
Today	0.08kWh
Total	0.16kWh
23/02/2012 12:00	



NOTICE

LCD display's power is for reference only and can not be used as the basis of measurement

Actual value

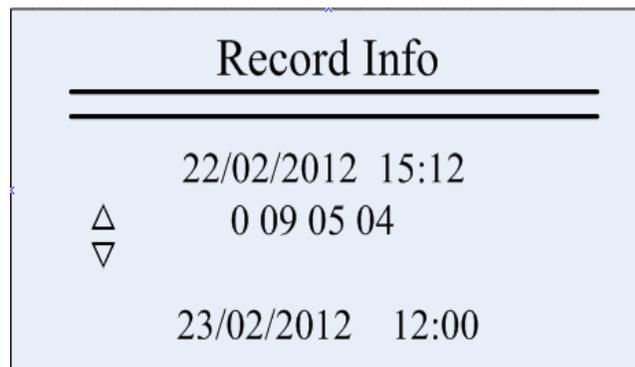
Press “Left” key to exit from the submenu and back to main menu. Press the “down” key to select the “Actual Value” option with “OK” for confirmation. Subsequently, you have the free choice to check the actual value from the corresponding objects PV string1 or AC through operation of “up” and “down” button.

PV String1	
P :	8W
▽ U :	10V
I :	0.8A
23/02/2012 12:00	

AC	
P :	8W
V :	0.2V
△ F :	49.99Hz
23/02/2012 12:00	

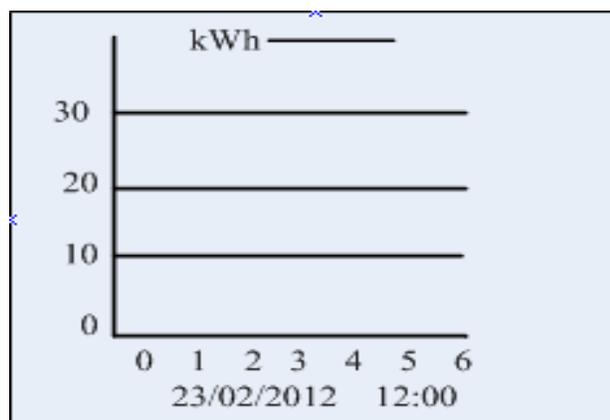
Record info.

Press “Left” key to exit from the submenu and back to main menu. Press the “down” key to select the “Record Info.” option with “OK” for confirmation. You are able to check all record information generated at different moments during the running of inverter. The complete record information including Record code, and definition are summarized in section 5.4.2. You can also learn about the specific record description according to the corresponding event No. by referring to chapter 5.4.3 “Further information for the Event”.



History info.

Press “Left” key to exit from the submenu and back to main menu. Press the “down” key to select the “History Info.” option with “OK” for confirmation. By virtue of the displayed graphic diagram you can check the power generation in last 7 days.

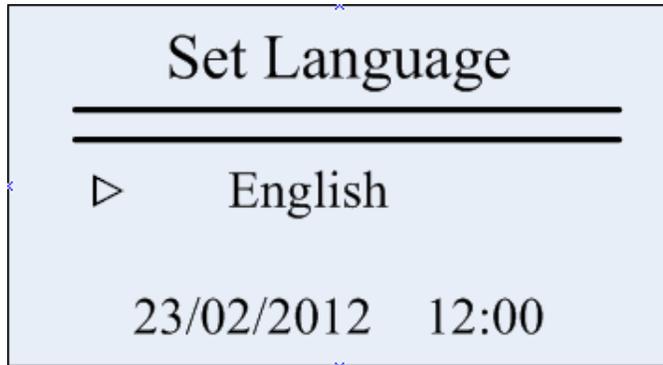




Configuration

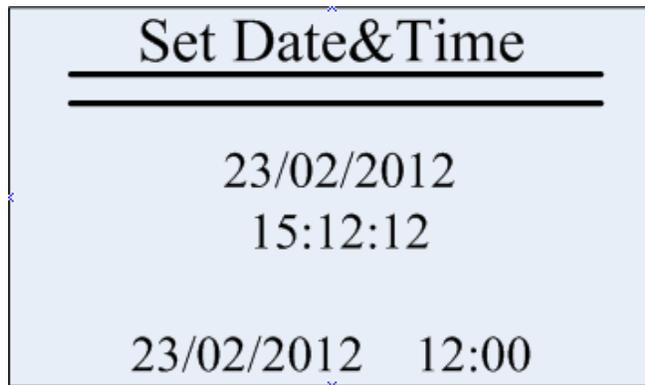
Press “Left” button to exit from the submenu and back to main menu. Press the “down” key to select the “Configuration” option with “OK” for confirmation. Subsequently, you are eligible to set up the “Language”, “Date/Time”, “Address”, “Safe Type” through manipulation of “up” and “down” button.

“Language” Setup:



“Date/Time” Setup:

Use “Up/Down” key to set the number and confirm the settings by “OK” button;



“Address” Setup:

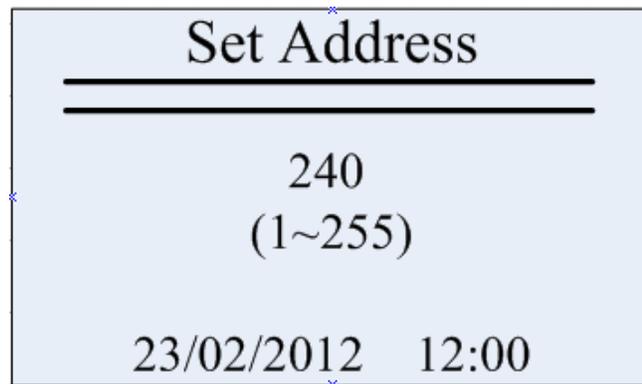
Use “Up/Down” key to set the number and confirm the settings by “OK” button;



NOTICE

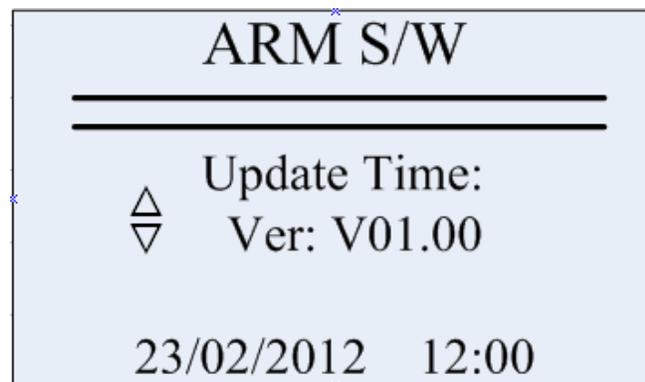
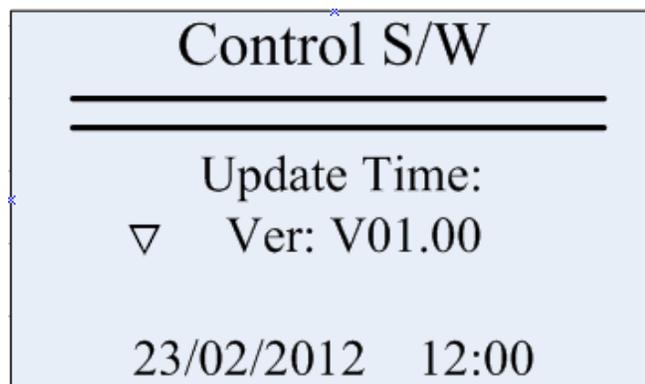
Possible communication failure due to wrong configuration

Selection of the inverter’s address will directly affect the performance of the data logger.



Device info.

Press “Left” key to exit from the submenu and back to main menu. Press the “down” key to select the “Device Info.” option with “OK” for confirmation. Then you can get access to system information involving control software, ARM software, serial number, machine type and safety type.



Serial Number

11-45-45-34-
△
▽ 34-34-45-45

23/02/2012 12:00

Machine&Safe

MachineType: 1.5K
Safe Type:
△ AS4777

23/02/2012 12:00

The above screen display information should have trivial distinctions according the different software version. Display in kind practicality

5.4 FAQ(Frequently asked questions)

When the PV plant doesn't work normally, we recommend the following solutions for quick troubleshooting. If there is a fault, the fault LED will lights up.

5.4.1 Fault level Definition

According to the severity of the failure of the inverter level grades and divided into three levels, respectively, with A, B, and C, while LED lights displayed in a different way to the user, please refer to the following table, the specific description.

Fault gra-des	Description	Power (Green LED)	Run (Yellow LED)	Fault (Red LED)
A	Inverter failures Stop generate power Unrepairable Unpowerable	On	Off	On
B	Inverter failures Stop generate power Repairable Unpowerable	On	Off	Flash (1Hz)
C	Non inverter failure, Generate power Repairable Powerable	On	On	Flash (1Hz)

5.4.2 Fault logic Definition

Event NO.	Information	Fault Grade
0	Grid Voltage Fault	B
01	Grid Overvoltage.10min Fault	B
02	Grid Frequency Fault	B
03	Grid Voltage Loss	B
04	DC Bus Overvoltage	B
05	GFCI Fault	B
06	Inverter Overheat	B
07	Varistor Fault	C
08	PV Overvoltage	B
09	Consistence Fault	B
10	Isolation Fault	A
11	DC Injection Fault	B
12	Device Fault	A
13	GFCI Device Fault	A
14	Comm.Disturbed	A
15	Current Sensor Fault	A
16	CPU Ref 2.5V Fault	A
17	EEPROM R/W Fault	A
18	DC Injection Device Fault	A
19	Relay Fault	A
20	AC Over Current	B
21	ARM-Ctrl Comm Fault	A

5.4.3 Further information for the Event

Event No.	Description	Corrective Measurements
0	<p>“Grid Voltage Fault”</p> <p>The grid voltage has exceeded the permitted range according to local grid regulations.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Grid voltage is out of the range rating. – Sudden change to the grid. – Grid impedance at the terminal of the inverter is too high. <p>For safety consideration, the inverter will disconnect from the grid for a short time till the grid return to normal.</p>	<p>– Check the grid voltage.</p> <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
01	<p>“Grid Overvoltage 10min Fault”</p> <p>The average grid voltage in 10 minutes has exceeded the permitted range according to local grid regulations.</p> <p>Following condition might lead to this error:</p> <ul style="list-style-type: none"> – Grid voltage is too high. <p>For safety consideration, the inverter will disconnect from the grid for a short time till the grid return to normal.</p>	<p>– Check the grid voltage.</p> <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
02	<p>“Grid Frequency Fault”</p> <p>The grid voltage has exceeded the permitted range according to local grid regulations.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Grid frequency is out of the range rating. – Sudden change to the grid.. – Incorrect safety guide setting. <p>For safety consideration, the inverter will</p>	<p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>

	<p>disconnect from the grid for a short time till the grid return to normal.</p>	
03	<p>“Grid Voltage Loss”</p> <p>The inverter has detected an error in the cabling and cannot connect to the grid.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Network connection installation is inappropriate. – Cabling inappropriate. – Grid power-off. – AC output fuse open. <p>Event 0 and event 2 may be reported additionally.</p>	<ul style="list-style-type: none"> – Check AC installation. – Check network connection. – Check fuse. <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
04	<p>“DC Bus Overvoltage”</p> <p>The voltage of the DC Bus is too high.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – The input voltage of the PV string is too high. – The DC to DC function is out of control. <p>For safety consideration, the inverter will disconnects itself from the grid.</p>	<ul style="list-style-type: none"> – Please immediately disconnect the inverter from the PV strings (see User Manual Installation chapter 2.6 “DC side Disconnection”). – Measure the DC voltage of the strings to find out whether the value is in the range of specified DC voltage from datasheet. If the voltage is still too high, please make consultation with the system installer. Otherwise, please contact your franchiser.
05	<p>“GFCI Fault”</p> <p>The inverter has detected a ground fault in the PV system.</p>	<ul style="list-style-type: none"> – Please refer to the PV system installer to renovate the ground fault. <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
06	<p>“Inverter Overheat”</p>	<ul style="list-style-type: none"> – Please ensure sufficient ventilation.

	<p>The temperature of the heat sink is too high.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Sensor of the temperature defective. – Overheating inside. – Not sufficient ventilation. <p>For safety consideration, the inverter will disconnect from the grid until the temperature return to normal.</p>	<p>If this event occurs continuously and the inverter doesn't work, Please contact your franchiser.</p>
07	<p>“Varistor Fault”</p> <p>The varistor on the DC side is defected.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Varistor is burst due to high voltage surge such as thunder lightning. – Varistor is ageing invalid 	<p>If this event occurs:</p> <ul style="list-style-type: none"> – Please check the varistors as User Manual Installation chapter 1.8 “Check Varistors”. <p>If this error is not solvable, please contact your franchiser.</p>
08	<p>“PV Overvoltage”</p> <p>The DC input voltage which connects to the inverter is too high.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – The open-circuit voltage of the PV generator is higher than the maximum DC input voltage of the inverter. – Sudden DC surge. – Junction temperature of solar panel too low. <p>Event 8 may be reported additionally.</p>	<ul style="list-style-type: none"> – Please immediately disconnect the inverter from the PV strings (see User Manual Installation chapter 2.6 “DC side Disconnection”). – Check the DC voltage of the strings for adherence to the maximum input voltage of the inverter, before you reconnect the inverter to the PV strings.
09	<p>“Consistence Fault”</p> <p>Internal fault has occurred for the inverter.</p>	<p>If this event occurs continuously and the inverter doesn't work, Please contact your franchiser.</p>

10	<p>“Isolation Fault”</p> <p>The isolation resistance between the DC side to earth is too low.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – The isolation of the PV panel is not so good. – Internal fault of the inverter. <p>The inverter will not feed power to the grid when this event occurs.</p>	<ul style="list-style-type: none"> – Check the isolation of the PV panel. <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
11	<p>“DC Injection Fault”</p> <p>The direct current injecting to the grid exceeds the permitted range.</p> <p>Following conditions might lead to this error:</p> <ul style="list-style-type: none"> – Sudden input power change due to cloud. – Internal fault of the inverter. 	<p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
12	<p>“Device Fault”</p> <p>A fault has occurred in one or more major components of the inverter.</p> <p>For safety consideration, the inverter will shutdown.</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
13	<p>“GFCI Device Fault”</p> <p>A fault has occurred to the GFCI detecting circuit.</p> <p>For safety consideration, the inverter will shutdown.</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
14	<p>“Comm. Disturbed”</p> <p>A fault has occurred in the internal</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work ,

	<p>communication of the inverter.</p> <p>For safety consideration, the inverter will shutdown.</p>	<p>please write the feedback information form, connect with supplier.</p>
15	<p>“Current Sensor Fault”</p> <p>A fault has occurred in one or more current sensor of the inverter.</p> <p>For safety consideration, the inverter will shutdown itself.</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
16	<p>“CPU Ref 2.5V Fault”</p> <p>The CPU voltage that detected by internal sensor is deviating the pre-set 2.5V reference line.</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
17	<p>“EEPROM R/W Fault”</p> <p>Internal device fault.</p> <p>For safety consideration, the inverter will shutdown .</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
18	<p>“DC Injection Device Fault”</p> <p>A fault has occurred to the DC current inject detecting circuit.</p> <p>For safety consideration, the inverter will shutdown .</p>	<p>If this event occurs:</p> <ul style="list-style-type: none"> – If alarm frequently and the machine cannot work , please write the feedback information form, connect with supplier.
19	<p>“Relay Fault”</p> <p>A fault has occurred to the grid-connecting relay.</p> <p>For safety consideration, the inverter will shutdown.</p>	<ul style="list-style-type: none"> – Please disconnect the DC input then reconnect after a short while. <p>If this event occurs continuously and the inverter doesn’t work, Please contact your franchiser.</p>
20	<p>“AC Over Current”</p> <p>The detected AC current has exceeded the</p>	<ul style="list-style-type: none"> – Check the AC network to find out the short circuit, then restart the inverter manually.

	<p>pre-set Max. AC Current.</p> <p>Following causes might lead to this error:</p> <ul style="list-style-type: none"> - Short circuit happens in the grid. 	<p>If this event occurs continuously and the inverter doesn't work, Please contact your franchiser.</p>
21	<p>“ARM-Ctrl Comm Fault”</p> <p>because no communication between ARM board and Control board so the fault keeping exist</p> <p>Following causes might lead to this error:</p> <ul style="list-style-type: none"> - board fall off with control board 	<p>If this event occurs continuously and the inverter doesn't work, Please contact your franchiser.</p>

6. RECYCLING AND DISPOSAL



WARNING



This device SHALL NOT be disposed of in residential waste.

To comply with European Directive 2002/96/EC on waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer required must be returned to your dealer or you must find an approved collection and recycling facility in your area.

Ignoring this EU Directive may have severe effects on the environment and your health.

7. GUARANTEE SCOPE AND GUARANTEE SERVICE

7.1 Macsolar Factory Guarantee Scope

This guarantee declaration is solely applied to the following Macsolar Grid Tie Solar Inverter:

- Macsol-TL1.5K
- Macsol-TL2K

For the above named products, you will receive a Macsolar factory warranty card which will valid for 5 years from the date of purchase. The Macsolar factory warranty covers any costs which you incur for repair or replacement parts during the agreed period beginning at the date of purchase of the device, subject to the conditions listed below. This is not associated with a durability warranty.

You have the possibility of purchasing an extension of this Macsolar factory warranty within the 5 year term of the Macsolar factory warranty. The prices are based on the respective Macsolar price list valid at the time the warranty extension was signed.

7.2 Guarantee Conditions

This guaranty declaration is solely applied when any defect of Macsolar inverter is detected.

If a device defected during the Macsolar guaranty period, and it is proved that further functional performance is impossible, the device will be, as selected by Macsolar:

- Repair the defect at the factory within the guaranty period.
- Replace a be selected device of equivalent value according to model and age.

If it is the latter case, the remainder of the warranty entitlement will be automatically transferred to the replacement device. In this case, you will not receive a new certificate since your entitlement is already documented at Macsolar.



NOTICE

If replace a device of equivalent value according to model and age is needed. The defected unit must, if possible, be returned with its original or equivalent packaging.

MacSolar will only perform guarantee service when the user provides a copy of invoice which was issued to the user by the dealer and a completed warranty card. If either of them missing, MacSolar has the right to deny the guarantee service or only provide paid service.

7.3 Guarantee Exclusion

Guarantee declaration is excluded in the following cases:

- Transport damage
- Improper installation and installation that does not comply with standards
- Use of the devices in ways not intended
- Improper operations without following the user manual
- Operation of units with defective protective equipment which might lead to damage
- Unauthorized modifications to the units or repair attempts
- Influence of foreign objects and force majeure (lightning, grid overvoltage, severe weather, fire)
- Insufficient ventilation of the unit
- Failure to observe the relevant safety regulations

If the device becomes defective in any of the above cases, MacSolar will not perform guarantee service and the user shall take all the responsibility for the defects.



8. CONTACT

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www.macsolar-power.com

Serviceline

Email: service@macsolar-power.com
www.macsolar-power.com

9. SYSTEM COMMISSIONING CONFIRMATION REPORT

This report confirms successful commissioning of a Photovoltaic-Inverter System connected to the public electricity distribution network.

This after installed, Commissioning Sheet must be returned to the Authorized Distributor to activate any and all inverter warranty. Failure to return this Commissioning Report may void all inverter warranty.

Site Details

Address of Installation:	
No:	
Street:	
Town:	
State:	
Post Code:	
Address Telephone Number:	
Distribution Network Operator:	

Contact Details

Inverter Owner:	
Contact Person:	
Contact Telephone Number:	
Contact E-mail Address:	

Mac solar Inverter Details

Inverter Model:		
Inverter Serial Number:		
Software Version Numbers:	(a)Control Software:	
	(b)Display Software:	
Inverter Rating(kW):		
Number of Inverter MPPT Inputs:		
Location of Inverter Within Installation:	Place a × in the appropriate box 	×
	Outside Under Array	
	Outside Exposed to Weather	
	Outside Under Cover	
	Inside Building	
	Other	
Location of dc array isolator:		

Installed Photovoltaic Modules

	Array String	1	2	3	4
	Number Of Modules/String				
String 1 Module Details					
MPPT Input:	✓ the MPPT number	1	2		
Module Brand and Type:					
Module Nominal Power (Wp) :					
Voc @ 25Deg.C(V dc):					
Isc @ 25Deg.C(A dc):					
Max Power @ 25Deg.C(W):					
No. of Cells in module:					
String 2 Module Details					
MPPT Input:	✓ the MPPT number	1	2		
Module Brand and Type:					
Module Nominal Power (Wp) :					
Voc @ 25Deg.C(V dc):					
Isc @ 25Deg.C(A dc):					
Max Power @ 25Deg.C(W):					
No. of Cells in module:					
String 3 Module Details					
MPPT Input:	✓ the MPPT number	1	2		
Module Brand and Type:					
Module Nominal Power (Wp) :					
Voc @ 25Deg.C(V dc):					
Isc @ 25Deg.C(A dc):					
Max Power @ 25Deg.C(W):					
No. of Cells in module:					
String 4 Module Details					
MPPT Input:	✓ the MPPT number	1	2		
Module Brand and Type:					
Module Nominal Power (Wp) :					
Voc @ 25Deg.C(V dc):					
Isc @ 25Deg.C(A dc):					
Max Power @ 25Deg.C(W):					
No. of Cells in module:					
		String1	String2	String3	String4
String Test:					
Voc (V):					
Isc (A):					
Sun Intensity When Measured:	High		Medium		Low

Wiring and Connection to Grid

Protective Device (dc Side):					
Type:					
Rating (A dc):					
Rating (V dc):					
Capacity (kA dc):					
Array Wiring:		mm ²			
Earth:		mm ²			
Polarity and Insulation					
Array Insulation Test Voltage:		V dc			
Positive Earth (MΩ):					
Negative Earth (MΩ):					
Protective Device (ac Side):					
Type:					
Rating (A ac):					
Rating (V ac):					
Capacity (kA ac):					
AC wiring:		mm ²			
Earth:		mm ²			

PV System – Installation Check List**General installation**

- Equipment compliant with standards. correctly selected & not damaged
- Equipment accessible for operation, inspection & maintenance
- Equipment and accessories correctly connected
- Particular protective measures for special location
- Equipment and protective measures appropriate to external influences
- System installed to prevent mutual detrimental influence
- Conductors connected and identified
- Conductors selected for current carrying capacity and voltage drop
- Conductors routed in safe zone or protected against mechanical damage
- Presence of fire barriers, seals and protection against thermal effects

General installation (mechanical)

- Ventilation provided behind array to prevent overheating/fire risk
- Array frame & material corrosion proof
- Array frame correctly fixed and stable; Roof fixings weatherproof
- Cable entry weatherproof

Protection against overvoltage/electric shock

- Live parts insulated, protected by barrier/enclosure, placed out of reach or Class II
- Array frame equipotential bonding present (only relevant if required)
- Surge protection devices present (only relevant if required)
- RCD provided (only relevant if required)
- Frame correctly integrated with existing LPS installation

DC System

- Physical separation of ac and dc cables
- Dc switch disconnect fitted
- Dc cables – protective and reinforced insulation (only relevant if required)
- All dc components rated for operation at max dc system voltage ($V_{oc} \text{ stc} \times 1.25$)
- PV strings fused or blocking diodes fitted (only relevant if required)

AC System

- Ac isolator lockable in off position only
- Inverter protection settings to local regulations

Labeling & identification

- General labeling of circuits, protective devices, switches and terminals
- PV system schematic displayed on site
- Protection setting & installer details displayed on site
- Emergency shutdown procedure displayed on site
- Ac isolator clearly labeled
- Ac isolator / junction boxes suitably labeled
- Signs & labels suitably affixed and durable

Installer**Company Name:**

Registration No.:

Installation Supervisor Name:

Contractor License Number.:

Contact Telephone:

Email Address:

Date Installed:

Signature:

Name:

Date:

ABBREVIATION

LCD	Liquid Crystal Display
LED	Light Emitting Diode
MPPT	Maximum Power Point Tracking
PV	Photovoltaic
GFCI	Ground Fault Circuit Interrupter
Vdc	Voltage at the DC side
Vac	Voltage at the AC side
Vmpp	Voltage at the Maximum Power Point
Imp	Amperage at Maximum Power Point
Voc	Open Circuit Voltage
Isc	Short Circuit Current
AC	Alternating Current (Form of electricity supplied by Utility Company)
DC	Direct Current (Form of electricity generated by PV modules)
VDE 0126-1-1	German standards for establishing suitability for Grid Connection of the Inverter.
DC Switch	Switch in the DC Circuit. Disconnects DC source from Inverter. May be integrated or external to Inverter.