

# SOLEIL 10TL PV Inverter

Installation and Operation Manual



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### Read this User Manual before you start



Congratulations on purchasing your SOLEIL 10TL Grid PV-Inverter (referred to in this manual as "PV-Inverter", or simply the "device"). This PV-Inverter is a highly reliable product due to its innovative design and excellent quality control. The device is dedicated to high demand, 3 phase grid-linked PV systems. Additionally this product is IP65 rated for dusty or humid environments and is suitable for outdoor use.

This manual contains important information regarding installation and safety operation of this unit. Be sure to read this manual carefully before using your PV-Inverter.

If you encounter any difficulties during installation or operation, please refer to this manual before contacting your local dealer or representative. Thank you for choosing our product. Please keep this manual on hand for quick reference. Start enjoying SOLEIL 10TL and your life!

### **1. Safety Instructions**



#### **Risk of Electric Shock:**

Alternating Current (AC) and Direct Current (DC) sources are terminated in this device. To prevent risk of electric shock during maintenance or installation please ensure that all AC and DC terminals are disconnected. Be sure to secure the Ground line to the Grid's Ground, and double check the Line and Neutral are not confused with Ground.



#### Handling your PV-Inverter:

Only qualified service personnel should handle the PV-Inverter. When the PV-panel is exposed to sufficient radiation and connected to the device, it generates a DC voltage to charge the DC link capacitors.

After disconnecting the PV-Inverter from the power supply and PV-panel, electrical charge can still reside in the DC link capacitors. Before handling the device, please allow at least 60 minutes after the power is disconnected.

#### Public Utility only:

The PV-Inverter is designed to feed AC power directly to the public utility power grid. Do not connect the AC-output of this device to any private AC equipment.



#### Hot Surfaces:

Although designed to meet international safety standards, the PV-Inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

Maintaining and Servicing your PV-Inverter:

Only authorized personnel are allowed to open the inverter for service purpose.



CAUTION – Risk of electric shock from energy stored in capacitor, do not remove cover until  $\underline{8}$  minutes after disconnecting all sources of supply.

#### Unpacking and Installation:

The SOLEIL 10TL PV-Inverter weighs <u>37</u> kg (81.5 lb). To avoid injury and for safety purpose, be sure to use proper lifting techniques and secure the help of someone to assist in the unpacking and installation of the inverter.

### 2. Limited Warranty

SOLEIL 10TL PV-Inverter comes with a <u>5</u>-year warranty. An optional extended warranty may be available by special request before delivery. This warranty covers all defects due to design, manufacturing and components. This warranty does not cover damages resulting from:

- Seal on the product is broken
- Improper transportation and delivery
- Unqualified persons opening the unit
- Improper installation
- Unauthorized modification, test or repairing
- Use and application beyond the definition in this manual
- Application beyond the scope of safety standards (e.g. VDE and DK)
- Acts of nature such as lightning, fire, storm etc.

Repairs and/or replacement of parts or the device are made at the manufacturer's discretion. Defective parts or malfunction discovered during installation should be presented in a written report for confirmation before applying for replacement or repair. The damage report must be issued within seven working days after receiving the PV Inverter. Manufacturer is not responsible for damages beyond the scope of this warranty.

### 3. Overview

### 3.1 Introducing the Grid PV System

The Grid PV System is mainly composed of 4 parts: the PV-panels, the PV-Inverter, the AC-Connection Unit (the connection Interface) and a connection to the Public Utility. When a PV-panel is exposed to sufficient irradiation and connected to an inverter, it generates DC power. The PV-Inverter converts DC to AC and feeds in to the Public Utility via the AC-Connection unit.

The following figure shows the PV-Inverter in the Grid PV System.



# 3.2 Introducing SOLEIL 10TL Inverter

Your SOLEIL 10TL grid-connected PV inverter converts direct current (DC) power generated by a PV panel into alternating current (AC), which is compatible with the local electricity distribution network; also called the public utility, or grid system.

# 3.2.1 Dimensions of SOLEIL 10TL Inverter

The dimension is in millimeters.



### 3.2.2 Identification

On the left side of SOLEIL 10TL shows the type plate of the inverter. The type plate shows the Type, Specifications, and the Serial Number of the inverter. When encounter any difficulties during installation or operation, please record the Serial Number (SN) before contacting your local dealer or representative.

### 3.2.3 Specific Parts of SOLEIL 10TL Inverter

The descriptions of the major parts of SOLEIL 10TL Inverter are indicated below:



(1) 3 Pairs of DC-Input Terminals: Each input pair consists of positive and negative terminals. Refer to *Installation Section* for set-up information.

(2) Cooling Fan: The inverter is equipped with 3 air cooling fans to eject heat dissipated by the heat sink. When the temperature of heat sink reaches  $50^{\circ}$ C the fans automatically turn on.

(3) **RS232 Interface:** Connect this port directly to your PC via an RS232 serial cable.

(4) AC-Output Cable Gland: The cable gland is for securing the AC power wires L1 (Line 1), L2 (Line 2), L3 (Line 3), N (Neutral), Gnd (PE): 4/6mm<sup>2</sup>

**(5) Ground (PE) Cable Gland:** The cable gland is for securing the Ground (PE) wire for safety purpose. Refer to *Installation Section* for set-up information. G (Ground, PE): 10mm<sup>2</sup> wires.

(6) Communication Slot and Cover: The cover behind is a slot is to accommodate the RS485 MODBUS converter card.

(7) Graphic Data Logger: This device displays and records useful information about the inverter operating status.

# 3.3 Introducing Graphic Data Logger

To show the information of inverter, there is a graphic Data Logger in the unit. This Data Logger can show various information of the inverter such as operational status and warning message. In addition, it can be removed from its slot to a place user prefers. A standard 1.8-meter cord is attached with the Data Logger. If the user wishes to extend the length, a standard RS232 (DB9) cable of maximum 15 meters in length can be use for communication purpose.<sup>\*</sup>



\* This only applies to inverter with removable data logger. IV317E Rev.00 Date 2010-06-18

# 3.3.1 Configuration

The following table indicates the main specification of the Data Logger:

LCD	Monochrome
Displayed	Each I/P power, O/P power, Operation mode and warning
Information	message
Storage Period	3 years
Storage Media	SD card
Data Download	Via mini USB

### 3.3.2 Features

#### Removable Data Logger \*

The Data Logger is removable from its inverter. The display is a module designed so that users can remove and put back the module easily. Between the display module and inverter, there is a standard DB9 RS232 cable at length of 1.8m in-between. The display can be mounted on wall after taking out from its slot at inverter.

#### Multicolored back light

The backlight of the LCD changes according to its status. There are 3 colors and their indications are:

- **Green:** Start-up and normal status
- Red: Fault Status. In this status, inverter disconnected from grid due to system fault or inverter failure. These faults and failures are defined in "error message table" later on.
- Yellow: Warning Status. Inverter disconnected from grid due to system fault for the past 48 hours, but inverter reconnected again.

#### Data download

You can download and access logger data with a PC via mini USB cable and manage internal data. For detail information, please refer to 8. Downloading Data inside Data Logger.

### 3.3.3 Connection

The Data Logger can be either located on the inverter or remotely mounted on a wall. A 1.8-meter cord connects the display module and the main inverter unit.\*

<sup>\*</sup> This only applies to inverter with removable data logger IV317E Rev.00 Date 2010-06-18

### 3.3.4 Appearance

• LCD: 128 x 64 graphic, monochrome



• Navigation Pad: " $\uparrow$ ", " $\downarrow$ ", " $\rightarrow$ ", " $\leftarrow$ " and "OK" in the center.



• Back light: 3 colors



### 4. Features

- Transformerless design
- Euro efficiency ≥ 95% at nominal DC input
- Islanding detection methods: passive and active
- MPPT efficiency >99%
- Firmware update capability
- GFCI embedded
- Lead-free, RoHS complied
- 3 MPP trackers
- Graphic data logger

# 5. Installation

### 5.1 Inside the Package

The following items are included in the SOLEIL 10TL Package:

- (1) PV-Inverter x 1
- (2) Installation and Operation Manual x 1
- (3) Mounting Screws x 4 and Snap Bushings x 4
- (4) Safety-lock screws x 2
- (5) Mounting Bracket for the inverter x 1
- (6) Service Card x 1
- (7) Mounting plate of the data logger x 1
- (8) Screws for mounting the data logger x 2
- (9) AC Output Cover x 1
- (10) Rubber Bushing for AC connection (2 types)
- (11) DC connector (3 pairs)

### 5.2 Mounting your SOLEIL 10TL



To obtain optimal results from your PV-Inverter, please consider the following guidelines before installing the device:



Do not expose the PV-Inverter to direct sunlight. Direct sunlight increases the internal temperature that may reduce conversion efficiency.

- ✓ Check the ambient temperature of installation is within specified range  $-20 \sim +55^{\circ}$ C.
- ✓ Check the altitude of installation is less than 2000m.
- ✓ The AC grid voltage is 400Vx3, -15% +10%, 50Hz.
- ✓ Electric utility company has approved the grid connection.
- ✓ Qualified personnel are performing the installation.
- ✓ Adequate convection space surrounds the inverter.
- $\checkmark$  Inverter is being installed away from explosive vapors.
- $\checkmark$  No flammable items are to be near the inverter.
- ✓ No mounting on wooden flammable surface.



SOLEIL 10TL can be installed and operated at locations where the ambient temperature is up to 55°C. However, for optimal operation, it is recommended that SOLEIL 10TL is installed where the ambient temperature is between 0~40°C.

To mount the inverter to a wall, please follow the steps:

- (1) It is recommended to choose a dry place, out of direct sunlight with ambient temperature between 0 and 40°C
- (2) Select a wall or solid vertical surface which is strong enough to support the inverter.
- (3) The PV-Inverter requires adequate cooling space for heat dissipation. Reserve at least 20cm above and 20cm (measured start from the bottom of the AC cover) below the inverter. Each inverter should have minimum of 20cm space to each other for multiple inverters installation.



- (4) Fix the Bracket by using Outer Mounting Holes:
  - (a) To install the device to a wall, mark 4 outer holes at the back of the bracket as illustrated below.



#### Using the outer Mounting Holes

- (b) Drill the 4 marked holes in the wall, and then drive in the 4 Snap Bushings. Now insert the screws, and tighten.
- (c) Mount the PV-Inverter onto the base plate as illustrated below.



(5) Fix the Bracket by Using Central Mounting Holes:



(a) To install the device to a narrow upright, mark 3 central holes at the back of the bracket as illustrated below.

(b) Drill the 3 marked holes in the wall, and then drive in the 3 Snap Bushings. Now insert the screws, and tighten.

(c) Mount the PV-Inverter onto the base plate as illustrated below.



(6) Mount the PV-Inverter onto the bracket as illustrated:



- (7) Insert the Safety Lock screws to fix the PV-Inverter in place.
- (8) Ensure the device is properly fixed to the bracket.



(9) Users can install Data Logger separately from the main unit. The mounting plate of the data logger and 2 screws are included in the accessories package:  $\dot{}$ 

(a) Fix the mounting plate of the data logger by 2 screws.



(b) Drill 2 holes in the wall, insert the screws, and tighten to fix the Data Logger in place.



\* This section applies only to inverter with removable data logger. IV317E Rev.00 Date 2010-06-18

# 5.3 Connecting the AC-Output Cable

Connect your PV-Inverter to the AC-Junction box via the AC-output cable and Ground cable as shown in the following steps:

 (1) Find the recommended AC-output cable size: Do not use cables where losses will exceed 1%, see Appendix 1 L1 (Line 1), L2 (Line 2), L3 (Line 3), N (Neutral), Gnd (PE): 4/6mm<sup>2</sup> cross-sectional area wire

Gnd (PE): 10mm<sup>2</sup> cross-sectional area wire

- (2) Remove the rubber plug from inside the AC and Ground connector socket.
- (3) Insert AC cables to the left side of the connection lock, rubber bushing in the accessory package, and AC-output cover. Then, insert Ground cable to the right side of the connection lock, rubber bushing, and AC-output cover.
- (4) The choice of cable together with the way it is routed, the ambient temperatures the inverter operates at, and other underlying conditions determines the maximum AC fuse protection used for the inverter. See Appendix 2



(5) Insert the AC-output cables; Brown wire to L1, the Black wire to L2, the Grey wire to L3, the Blue wire to N (Neutral), and the Yellow-Green wire to Gnd (PE) of the terminal block.





- (6) Fix the L1, L2, L3, N, and Gnd (PE). Please note that all 5 wires should be firmly connected.
- (7) Fix the other  $10 \text{ mm}^2$  Gnd (PE) wire firmly.



(8) Fix the AC output cover back with a screwdriver.



(9) Twist on the connector cable gland to lock the bushing and cable.



### 5.4 AC Output Connector Seal (only for DK5940 models)

1. Screw the AC output plate in position on the right side and using tower screws with holes on the left side.

2. Insert the steel wire through both holes of the tower screws and seal the ends of the steel wire with the sleeve.



### 5.5 Connecting the PV-Panel

For connecting the DC input, the connected strings must consist of modules of the same type. The number, orientation, and tilt of the panels may differ for different application usage. The following are the specification of the plug connectors.

Connector Type	Cable connection dimension	Max. Rated Current
Female panel receptacle	Ø 3mm connecting system	20A
Male panel receptacle	Ø 3mm connecting system	20A

### Suggestions before connecting the PV Panel

To obtain optimal results from your PV-Inverter, please consider the following guidelines before connecting the PV Panel to the device:

(1) First make sure the maximum open circuit voltage (Voc) of each PV string is below  $800V_{DC}$  under any condition.

(2) Always connect PV-Panel **positive (+) terminal** to PV-Inverter DC positive (+) terminal, and PV-Panel **negative (-) terminal** to PV-Inverter DC negative (-) terminal.



- (3) Each set of PV-Inverter DC terminal converts maximum DC input current of 13A. As a result, 3 pairs of PV-Inverter DC terminals can take a combined input current of up to 39A.
- (4) Methods to detach MC4 connector:

Two ways of using the same tool to detach the MC4 connector can be seen in Fig. 1 and Fig. 2:



The following diagrams show the PV system with/without SOLEIL 10TL DC Switch (DCW 10-3-3).



Illustration of the PV System with SOLEIL 10TL DC Switch (DCW 10-3-3):



#### • Illustration of the PV System without SOLEIL 10TL DC-Switch:

#### **Caution:**

If you wish to disconnect the DC input cable from the inverter for maintenance or other purpose, please make sure you disconnect the cable on the AC terminal side first. Failure to do so might cause the PV panels to damage due to reverse current or sudden over voltage.

# 5.6 Connecting to the Line Circuit Breaker

The AC line circuit breaker is an interface between your PV-Inverter and the Public Utility. It may consist of an electrical breaker, fuse and terminals for connection to both the PV-Inverter and the Public Utility. This AC line circuit breaker must be designed by a qualified technician to comply with local safety standards.



### **5.7 Installation Checklist**



(1) High voltages exist when the PV-Panel is exposed to the Sun. Exposed terminals of the PV-Panel are under tension, and can cause electric shock. Avoid making physical contact with those parts of the device.

(2) After the PV-Panels are connected to the PV-Inverter, the output voltage is greater than  $300V_{DC}$  and when the AC grid is not connected to the inverter, the Data Logger LCD displays the following:



(3) Check the connection between your PV-Inverter and the AC Connection System, and then check the connection between the Public Utility and the AC junction box. Close the AC breaker or fuse in the unit.

(4) Under normal operation, the Data Logger LCD shows the following as an example:

Pac:0W				
TEMPERATURE:42.8				
Iac:0.0/0.0/0.0A				
Vac:219.4/219.3/219.3V				
STATUS:Normal				
02/12/09 15:59				

(5) When the display is green, the inverter is feeding power to the grid. Under such condition, you have installed the inverter successfully.



Before connecting PV-Panels to DC terminals, make sure the polarity of each connection is correct. An incorrect connection could permanently damage the device.

# 6. Operation of SOLEIL 10TL

### 6.1 Auto Power-up

The PV-Inverter starts up automatically once the DC-power from the PV Panel is sufficient and the fuse is closed.

### 6.2 Operating Modes

There are 4 modes of operation. For each mode, there is a corresponding color and text to indicate the status.

#### (1) Normal

In this mode, inverter continuously converts energy from solar generator to grid (utility). The corresponding color of LCD is green in this case.



#### (2) Recovery from Fault

In some situations such as abnormal voltage and frequency, the inverter has to disconnect from grid. After the situations are cleared, inverter recovers to normal condition. For the coming 48 hours, the LCD backlight will be yellow as following picture. If there is no further abnormal event after 48 hours of operation, the color switches back to green again.



#### (3) During Fault

During grid fault or system failure (refer to "error message table" for further information) the inverter disconnects from the grid, the backlight turns red, and alarm is ON to notify user. User can press "OK" button on navigation pad to clear fault notification. In this condition, please check the message. If the fault notification can not be cleared, please contact with your local service.



#### (4) Shutdown

During night and very dark day, the inverter automatically shuts down. In this condition, Data Logger and the navigation pad are inactive.

#### (5) Three Operating States:

• **Standby**: During normal operation, the PV-Inverter is in "standby" state and the open circuit voltage is between 200V to 300V.

Pac:0W
TEMPERATURE:42.8
Iac:0.0/0.0/0.0A
Vac:219.4/219.3/219.3V
STATUS: STANDBY
02/12/09 15:59

• **Waiting**: Between 300V and 350V in DC side, the device is in "waiting" state, in the meanwhile, the inverter is checking both DC And AC conditions and waiting for connection.

Pac:0W				
TEMPERATURE:42.8				
Iac:0.0/0.0/0.0A				
Vac:219.4/219.3/219.3V				
STATUS:Waiting				
02/12/09 15:59				

• **Normal**: To be in "normal" state, voltage on DC side must be above 350V. To check the DC wire connection, this inverter tries to disturb its input power for every starting-up. During the process, user can see the DC power reading drift.

Pac:0W
TEMPERATURE:42.8
Iac:0.0/0.0/0.0A
Vac:219.4/219.3/219.3V
STATUS:Normal
02/12/09 15:59

# 6.3 Using the LCD Display and Data Logger

### 6.3.1 Operation

#### (1) Keys on the data logger:

On the data logger, there are 5 keys used to change and operate. Generally, the functions of keys are defined as followings.

- "→": View the lower layer (1<sup>st</sup> to 2<sup>nd</sup>) or move the cursor right "←" : View upper layer (2<sup>nd</sup> to 1<sup>st</sup>) or move the cursor left
- "

  ^": View the previous screen or move the cursor up
- "L" : View the next screen or move the cursor down
- "OK": Set or confirm

#### (2) Back light of LCD

As described in previous section, the color of backlight changes according to operation status. To save power, the light remains illuminated only for 3 minutes after last operation. However, in case a failure or error occurs, other than the backlight goes red, the backlight flashes every second until user presses the key according to instruction on the LCD.

#### (3) Audio Alarm

To inform the user, data logger will emit audio alarm in cases of following:

- (a) Inverter failure
- (b) Memory capacity of data logger is less than 5%
- (c) Convection fan is not able to rotate for any reason

This alarm also can be turned "off" by setting in the "System Display". To do this, please refer to "System Display" section afterwards.

#### (4) Behavior in case memory is full

Once the capacity of memory is less than 5%, data logger will emit audible alarm. At that moment, user should manage the data inside and try to clear the memory by using a PC. In case user ignores the warning and does not clear the memory, after memory is 100% full, the latest data will overwrite the earlier ones.

# 6.3.2 Display on LCD

#### (1) Startup

After the inverter starts up, the LCD shows logo and firmware version. The frame lasts for 3 seconds and changes to text information below.

#### (2) Text display

The display shows four measurements and one status. The bottom-right part of the display shows the time and date. On occurrence of a "warning" or "error" message, the bottom line "Status" is automatically replaced by the error message.

The user can change the four monitoring parameters.

- (a) Press "→" to high-light the monitoring parameter at the first line. By using "↑" and "↓", the user can shift to the next line.
- (b) Press "OK" to begin setting the monitoring parameter.
- ( c ) Press " $\uparrow$ " or " $\downarrow$ " to select the monitoring parameter of the line.
- (d) Press "OK" to confirm.



#### (3) Daily graph

By pressing the " $\downarrow$ " key in text display, screen on LCD is transformed to daily graph as below. The graph indicates the AC power trend of a specified date. Further explanations are stated below:

- Time-axis (x-axis): On the frame, the longest period is 12 hours. The number represents the hour. The first recorded data of a day is plotted on the left most point. In case the recorded data of a day is longer than 12 hours, press "OK" first and then press "→" and "←" to move the graph to time interested. Press "OK" again to terminate the moving.
- **Power-axis (y-axis):** From 0 to 13KW. Each point is the averaged power during 6-minute interval.
- Date: On the upper right corner, the date of present display is shown.
   To see daily graph of expected day, press "→" and "←" to select



#### (4) Weekly graph

Press the " $\downarrow$ " of daily display, LCD changes to the "Weekly Display" as below. For further explanations, see below:

- **Time-axis (x-axis):** 7 days from Sunday of a week. The left most point is the data for Sunday.
- **Generated KWh (Y-axis):** The amount in kWh of that day. Ranged from 0 to 130kWh.
- Week change: Press "←" and "→" to switch to the week interested. The corresponding dates on the upper-right corner can also be changed.



#### (5) Error history

By pressing " $\downarrow$ " again on the "Weekly Display", the LCD changes to "Error Message" as shown below. The LCD displays two recorded error events for each page.

ERROR HISTORY	
El:Isolation fault	
@ 02/12/09 2:44	
VALUE=N/A	
E2:Grid fault	
@01/12/09 10:21	

#### (6) System Information

By pressing " $\downarrow$ " again on "Error History", the LCD changes to the information of your inverter including serial number of the inverter, firmware version, etc... as shown below.



The following are the monitoring parameters shown in "System Display":

- SN: The serial number of the inverter
- Version: The firmware version of the inverter
- Memory: The memory status of the Data Logger
- Date: The date setting of the inverter
- Time: The time setting of the inverter
- Audio Alarm: "On" or "Off", the status of the setting
- Language: The language setting of display

To change the Date, Time, Audio and Language settings:

- ( a ) Press " $\rightarrow$  " and then press" $\uparrow$  " or " $\downarrow$  " to change the parameter to the desired setting.
- ( b ) Press "OK" to confirm. Use " $\uparrow$ " and " $\downarrow$ " to alter the value
- (c) Press "OK" to confirm.

# 6.3.3 Data Logger Function Tree:



The following is the summary of the operation:

# 6.4 Display Messages

Operating conditions	In English	In German	In Spanish	In Italian	Description		
Normal Working Statu	Normal Working Status						
Power off	No display	No display	No display	No display	In case of input voltage < 200V, PV inverter is totally shutdown		
Standby	Status: Standby	Status: Standby	ESTADO: ENCENDIDO	Stato: Standby	Input voltage range: 200V ~ 260V		
Initialization & waiting	Status: Waiting	Status: Warten	ESTADO: PREPARADO	Stato: In attesa	Input voltage range: 260 ~ 350V		
Check grid	Status: Checking xxxs	Status: Netz-Prüf xxxs	ESTADO: TEST xxxs	Stato: Ricerca MPP xxxs	In case of PV voltage > 350V, inverter is checking feeding conditions		
Feeding grid, MPPT	Status: Normal	Status: Normalbetriebe	ESTADO: CONECTADO RED	Stato: Conneso Normale	Inverter is feeding power. After 10 seconds of this display, LCD will show wattage.		
Waiting for reconnect to grid	Status: Reconnect xxxs	Status: Kontakt xxxs	ESTADO: RECONEX xxxs	Stato: Connes.Retexxxs	The time for reconnect to grid		
FLASH	Status: FLASH	Status: FLASH	ESTADO: FLASH	Stato: Aggiornamento	FLASH firmware		
SLAVE FLASH	Status: SLAVE FLASH	Status: SLAVE FLASH	ESTADO: FLASH SEC	Stato: Aggiorn. Slave	SLAVE FLASH firmware		
FAULT	Status: Fault	Status: Fehler	ESTADO: FALLO	Stato: errore	See "System Fault", "Inverter Fault" to know the fault detail		
Monitoring Parameters							
Instantaneous Input power	Pdc: xxxx/xxxx/xxxxW	Pdc: xxxx/xxxx/xxxxW	Pdc: xxxx/xxxx/xxxxW	Pdc: xxxx/xxxx/xxxxW	The individual DC input power		

Operating conditions	In English	In German	In Spanish	In Italian	Description
Instantaneous Output power	Pac: xxxxxW	Pac: xxxxxW	Pac: xxxxxW	P.Istant.: xxxxxW	The real time output power in xxxx W
Accumulated energy information	Etot: xxxxxxxxxx.xkWh	E-tot: xxxxxxxxxx.xkWh	Etot: xxxxxxxxx.xkWh	Etot: xxxxxxxxxxkWh	Total energy to has been fed to grid since inverter was installed
3-phase Grid voltage	Vac: xxx.x/xxx.x/xxx.xV	Uac: xxx.x/xxx.x/xxx.xV	Vac: xxx.x/xxx.x/xxx.xV	VAC: xxx.x/xxx.x/xxx.xV	Grid voltage in xxx.x VAC for 3 phases
Grid frequency	Frequency: xx.xHz	Frequency: xx.x Hz	Fac: xx.x Hz	Frequenza: xx.x Hz	Grid frequency in xx.x Hz
Feeding current	lac: xx.x/xx.x/xx.xA	lac: xx.x/xx.x/xx.xA	lac: xx.x/xx.x/xx.xA	IAC: xx.x/xx.x/xx.xA	Feeding current amount in xx.x A
PV array voltage	Vdc: xxx/xxx/xxxV	Udc: xxx/xxx/xxxV	Vdc: xxx/xxx/xxxV	VDC: xxx/xxx/xxxV	Input voltage of PV array, xxx VDC
PV array current	ldc: xx.x/xx.x/xx.xA	ldc: xx.x/xx.x/xx.xA	ldc: xx.x/xx.x/xx.xA	IDC: xx.x/xx.x/xx.xA	Input DC current of tracker n
Daily Energy	Etoday: xxx.xkWh	E-Heute: xxx.xkWh	Ehoy: xxx.xkWh	Oggi: xxx.xkWh	The accumulated kWh of that day
Working Hour	H-total: xxxxxhr	h-Gesamt: xxxxxhr	Hfun: xxxxxx	Ore tot. Funz.: xxxxxx	Total working hours of inverter
Internal Temperature	Temperature: xx.x°C	Temperatur: xx.x⁰C	TEMPERATURA: xx.x°C	Tempo.Interna: xx.x°C	Temperature is indicated in Celsius
System Fault					
Isolation failure	Isolation Fault	Isolationsfehler	ERR AISLAMIENTO	Err.Isolameto	Earth fault of the PV-panels or failure of surge voltage protection
GFCI active	Ground I Fault	Fehlerstrom	ERR DERIVACION	Disp.terra alta	Leakage current on ground conductor is too high

Operating conditions	In English	In German	In Spanish	In Italian	Description
Grid failure	Grid Fault	Netzfehler	ERR RED	Dati rete insuf.	Grid measured data is beyond the specification (voltage & frequency)
Relay failure	Relay Failure	Relaisfehler	ERR CONTACTOR AC	Err.impedenza	The output relay is out of order
No utility	No Utility	Kein Netz	SIN RED	No rete	Utility is not available
Input voltage too high	PV over voltage	DC-Überspg	SOBRETENSION DC	SovravoltaggioPV	Input voltage higher than 800V
Inverter Fault					
Consistent failure	Consistent fault	Konsistenzfehler	ERR MICROS	Err.processore	The readings of 2 microprocessors are not consistent. It could be caused by CPU and/or other circuit do not function well.
Temperature too high	Over temperature	Übertemperatur	SOBRETEMPERATURA	Temp.in eccesso	The internal temperature is higher than normal value
Output DC injection too high	DC INJ High	DC INJ zu hoch	NIVEL DC ALTO	Uscita DC alta	Output DC injection is too high
EEPROM problem	EEPROM failure	EEPROM Fehler	ERR EEPROM	Err EEPROM	Reading/writing of EEPROM failed
Communication failure between microprocessors	Sci Failure	CPU Fehlfunktion	ERR COM	Err.accesso dati	The communication between MCU inside is abnormal
DC bus voltage is too high	High DC Bus	U/dc bus zu hoch	NIVEL BUS ALTO	DC Bus alto	The DC BUS inside is higher than expected
DC bus voltage is too low	Low DC Bus	U/dcbus zu klein	NIVEL BUS BAJO	DC Bus basso	The DC BUS inside is lower than expected
Output DC sensor abnormal	DC Sensor Fault	DC Sensor Fehler	ERR SENSOR DC	Err.Sensore DC	The output DC sensor is abnormal

Operating conditions	In English	In German	In Spanish	In Italian	Description
GFCI detection problem	GFCI Failure	FI-Fehler	ERR DIFERENCIAL	Err.Sens.Terra	The GFCI circuit is abnormal
Master and Slave firmware mismatch	M-S Ver. Fault	M-S Ver. Fault	ERR VER MICRO	FW incompatibile	Firmware mismatch between Master and Slave
Memory card full	Memory Full	Memory Full	MEMORIA LLENA	Memoria piena	There is not enough space to store data
System Information					
Serial Number	SN: xxxxxxxxxxxxxxxxx	SN: xxxxxxxxxxxxxxx	S/N: xxxxxxxxxxxxxxx	Seriale: xxxxxxxxxxxxxxxxxx	16 characters, unique serial number
Firmware version	Version: xx.xx-xx.xx	Version: xx.xx-xx.xx	FIRMWARE: xx.xx-xx.xx	Ver.FW: xx.xx-xx.xx	The Master and Slave CPU F/W version information
SD card memory	Memory: xx.x%	Speicher: xx.x%	MEMORIA: xx.x%	Utilizzo mem: xx.x%	Memory utilization percentage on SD card
Date display	Date: DD/MM/YY Sun	Datum: DD/MM/YY Son.	FECHA:DD/MM/YY DOM	DATA:DD/MM/YY Dom.	Date display
Date display	Date: DD/MM/YY Mon	Datum:DD/MM/YY Mon.	FECHA:DD/MM/YY LUN	DATA:DD/MM/YY Lun.	Date display
Date display	Date: DD/MM/YY Tue	Datum:DD/MM/YY Die.	FECHA:DD/MM/YY MAR	DATA:DD/MM/YY Mar.	Date display
Date display	Date: DD/MM/YY Wed	Datum:DD/MM/YY Mit.	FECHA:DD/MM/YY MIE	DATA:DD/MM/YY Mer.	Date display
Date display	Date: DD/MM/YY Thu	Datum:DD/MM/YY Don.	FECHA:DD/MM/YY JUE	DATA:DD/MM/YY Gio.	Date display
Date display	Date: DD/MM/YY Fri	Datum:DD/MM/YY Frei.	FECHA:DD/MM/YY VIE	DATA:DD/MM/YY Ven.	Date display

Operating conditions	In English	In German	In Spanish	In Italian	Description
Date display	Date: DD/MM/YY Sat	Datum:DD/MM/YY Sam.	FECHA: DD/MM/YY SAB	DATA: DD/MM/YY Sab.	Date display
Time display	Time: HH/MM/SS GMT+xx	Zeit:HH/MM/SS GMT+xx	HORA: HH/MM/SS GMT+xx	Ora: HH/MM/SS GMT+xx	Time display
Audible alarm setting on	Audible Alarm: On	Alarm: An	ALARMA SONORA: ON	Allarme: attivo	Set up audible alarm
Audible alarm setting off	Audible Alarm: Off	Alarm: Aus	ALARMA SONORA: OFF	Allarme: disattivato	Set up audible alarm
Setting Language	Language: English	Sprache: Englisch	IDIOMA: ENG	Lingua: ENG	Set up of the display language
Setting Language	Language: ESP	Sprache: ESP	IDIOMA: ESP	Lingua: Spagnolo	Set up of the display language
Setting Language	Language: German	Sprache: Deutsch	IDIOMA: GER	Lingua: Tedesco	Set up of the display language
Setting Language	Language: ITA	Sprache: ITA	IDIOMA: ITA	Lingua: Italiano	Set up of the display language
Warning Message					
Memory is to be full	Memory left xx.x%	memory left xx.x%	MEMORIA LIBRE xx.x%	Memoria rimasta xx.x%	When the memory space of card is less than 5%, this warning should be displayed in the status.
Fan Lock	Fan Lock FanLock ERR VENTILADOR BloccoVentil.		BloccoVentil.	The fan for heat dissipation is stopped abnormally	
Other Message					
Initial screen	Ver xx.xx	Ver xx.xx	Ver xx.xx	Ver xx.xx	LCD Firmware version

Operating conditions	In English	In German	In Spanish	In Italian	Description
USB connection	USB CONNECT	USB angeschlossen	CONEXION USB	USB Connessa	Connect to PC with USB
Daily graph	No Daily Records	Keine Tagesaufz.	NO HAY DATOS	Giorno: Nessun dato	No data for daily graph display
Daily graph	Please Wait	Bitte warten	ESPERE POR FAVOR	Attendere prego	data processing
Weekly graph	No Weekly Records	Keine Wochenaufz.	NO HAY DATOS	Settim: Nessun Dato	No data for weekly graph display
Error history	Error History	Fehlergeschichte	NO HAY DATOS	Archivio errori	banner
Error history	No Error History	Keine Fehlergeschi.	NO HAY DATOS	Nessun Dato	No data for error history display
Error history	Value= N/A	Value= N/A	VALOR= SIN VALOR	Valore= N/D	fault value is not available
Error history	Value= xxxx xxxx xxxx	Value= xxxx xxxx xxxx	VALOR= xxxx xxxx xxxx	Valore= xxxx xxxx xxxx	display fault value
System display	SYSTEM INFORMATION	Systemanzeige	INFORMACION SISTEMA	Informazioni sistema	banner
Display after error	Press OK to Clear	Presse OK zum Löschen	PULSE OK PARA BORRAR	tasto OK per tomare	Press OK to clear fault message box
Auto Test*	PRESS OK TO START	PRESS OK TO START	PRESS OK TO START	tasto OK per tomare	Press OK to start Auto Test

Note: Auto test function is required by DK5940. The test includes maximum and minimum AC voltage threshold, and maximum and minimum AC frequency threshold. If all of the above tests have been performed, the display shows the message TEST PASSED.

### 7. Communication Interface

### 7.1. RS-232 (on inverter)

Your PV-Inverter is equipped with a versatile communications interface. Use SOLEIL 10TL "Pro Control" to monitor the status of multiple inverters. Firmware upgrades are also available via this interface. SOLEIL 10TL is integrated with a DB9 socket for the RS-232 interface. Open the DB9 socket cover before use. Pin assignment of this DB9 socket is stated as below:



Pin	SignalAssignment
1	N.C.
2	TxD
3	RxD
4	N.C.
5	Common
6	N.C.
7	N.C.
8	N.C.
9	N.C.

### 7.2. Communications slot for RS-485 ModBus Converter Card

Your PV-Inverter has an extended slot for the communication interface. A SOLEIL 10TL RS-485 ModBus card is fitted to extend the communication functions of the inverter. To use this slot, please use a screwdriver to open the cover, insert the card into the slot and wire through the rubber bushing. For further information, refer to manual of related interface card.



### 7.3. USB (on Data Logger)

The Data Logger comes with a mini USB connector for your PC USB host interface. Open the mini USB socket cover before use.

# 8. Downloading Data inside Data Logger

To manage the data inside the Data Logger, please take out the Data Logger from inverter and access its internal data via USB cable. The Data Logger is powered directly by the PC's USB port.

# 8.1. How to eject / inject the Data Logger

(1) Unscrew the LCD panel and then take the data logger out of the chassis.



(2) After taking out, you can see a cable between Data Logger and inverter, unbind the cable if necessary. The cable can be extended to 1.8m at most. To get further extension, you can use a standard RS-232 cable to do that. To separate the Data Logger from inverter, disconnect RS-232 connector on it.



(3) When you want to place back the Data Logger, please use the tie provided to bind the cable as shown above. Then, cram the cable and slide the Data Logger into the inverter, slightly push the Data Logger on the side, the Data Logger will be locked.

\* This section only applies to inverter with removable data logger. IV317E Rev.00 Date 2010-06-18

### 8.2. How to Access and Manage Log Data

(1) Remove the Data Logger from the inverter and disconnect the RS-232 cable. Unscrew and take off the cover of mini-B USB port.\* For PC with Windows ME, 2000, and XP, it is not necessary to install driver to access the data logger. For PC with Windows 98, to access the data logger, driver for the data logger is needed. \*\*Do not remove the data Logger while the inverter unit is working.\*\*



(2) Connect the mini USB to Data Logger and Type A USB to PC. LED will show "USB CONNECT" when Data Logger is connected to PC properly.



(3) Click "My Computer" – "Removable Disk" in your PC.

 <sup>\*</sup> This section applies to inverter with removable data logger. For inverters with embedded data logger, you can find the mini USB connector at the side of the inverter for accessing the data.
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Devices	with	Removable	• Storage
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- (4) Copy the "DAILY" folder in the "Removable Disk" and paste it on the "Desktop."
- (5) Execute Pro-Control program. Then, click "File", select "Export/Import".



Please contact your local dealer or representative for the installation for this program.

🙀 Pro Control	
File Setting Inverter Record Ez-Log	ger View Help
Export/Import Error History Exit	🥝 📁 🌖 🔐
<ul> <li>□ → Root</li> <li>□ → 3927070187(99% Free)</li> <li>□ ▲ RQT0712004</li> <li>□ ▲ RQT0712251</li> <li>□ ▲ RQT0712253</li> <li>□ ▲ RQT0712255</li> </ul>	RQT0712004           Pac         9872 W           Vac         225.1 V           Error

( 6 ) Select "Date from" and "Date to" the period which you prefer. Then, click "Import" button.



(7) Select "DAILY.dat" file under your previous saved DAILY folder. Then, click "Open" button.

)pen			? ×
Look in: 🔂	DAILY		* 💷 *
File <u>n</u> ame:	DAILY		<u>O</u> pen
	Files (* dat)		Cancel
Files of type.	Tries ( .uar)	100	Cancer

(8) Click "View" button and the log data will be processed by Pro-Control software in few seconds.

File	Export	Import										×
File	t, .	nd Sett	tings\jeff_wu	v桌面vDAIL	Y'DAILY.D	AT	Date From	m: 2007/	1/22 🕂	To: 2007/ 1	/29 🕂	
F		Time	Temp-In	Vpv(V)	lac(A)	Vac(V)	Fac(Hz)	Pac(VV)	Zac(mOhm)	E-Total(KW	h-Total(h)	VI
							1					1001
			1.04					-				
0	bading	U recor	rds OK			-	Print	View		ort Expo	urt Ok	

### (9) Click "Export" button

:eff_wu	V桌面/HistLo	g\Daily\7FIP	650001.da	it	Date From	n: 2006/	1/22 🛨 T	o: 2007/ 1/	29 🛨	
Time	Temp-In	Vpv(V)	lac(A)	Vac(V)	Fac(Hz)	Pac(VV)	Zac(mOhm)	E-Total(KVV	h-Total(h)	8
6/11/17 16:20:50	119.8	345.2	1.2	218.7	60.03	201	308	3691.6	2774	1
6/11/17 16:23:50	119.9	334.3	1.1	219.0	60.02	190	312	3691.6	2774	
6/11/17 16:26:50	120.0	338.2	1.2	218.5	60.00	184	304	3691.6	2774	
6/11/17 16:29:51	120.1	332.3	1.0	218.8	60.05	168	314	3691.6	2774	
6/11/17 16:32:51	120.2	326.4	0.9	219.0	60.05	137	355	3691.6	2774	
6/11/17 16:35:51	120.2	319.2	0.7	219.0	60.01	95	373	3691.6	2774	
6/11/17 16:38:51	120.3	292.0	0.5	219.0	60.04	70	390	3691.6	2774	
6/11/17 16:41:51	120.3	245.0	0.4	218.8	60.03	52	386	3691.6	2774	
6/11/17 16:44:51	120.3	259.7	0.3	219.2	60.05	46	394	3691.7	2774	
6/11/17 16:47:51	120.4	251.3	0.3	219.5	60.03	41	419	3691.7	2774	
7/01/04 11:09:32	31.1	350.7	5.6	217.2	60.01	1189	262	3939.6	3167	
7/01/04 11:12:32	31.6	354.7	8.3	218.2	60.04	1804	285	3939.6	3167	
7/01/04 11:15:32	32.2	353.2	7.7	217.8	60.02	1648	272	3939.7	3167	
7/01/04 11:18:32	32.3	346.3	6.9	217.0	60.08	1467	257	3939.8	3167	
7/01/04 11:21:32	32.5	344.1	5.8	217.5	60.04	1240	265	3939.9	3167	
7/01/04 11:24:32	32.5	348.2	6.6	217.5	60.05	1398	270	3940.0	3167	
7/01/04 11:27:32	32.5	345.1	5.6	217.8	60.02	1178	260	3940.0	3168	
7/01/04 11:30:32	32.2	348.6	3.9	217.2	60.02	817	252	3940.1	3168	1
									>	

(10) Click "Save" button. Then, log data will be saved in .CSV format in your preferred directory in your PC

Save As			? ×
Save jn: 🗔	DAILY	• <del>•</del> • •	* 💷 -
Ella annai	ISAN 2		
rile <u>n</u> ame:	JUAILY		Save
Save as type:	CSV Files (*.csv)	-	Cancel

(11) Click "OK" button.

:rmany)	Mr Korner (1	)\1-12-200	7\Daily.dat		Date Fro	m: 2006/	1/22 🛨 To	: 2007/ 1/	29 🛨	
Time	Temp-In	Vpv(V)	lac(A)	Vac(V)	Fac(Hz)	Pac(VV)	Zac(mOhm) E	-Total(KVV	h-Total(h)	Π
06/12/02 08:18:00	18.4	231.3	0.2	406.5	49.98	0	0	76.6	49	1
06/12/02 08:18:30	18.4	389.3	0.2	406.5	49.98	0	0	76.6	49	
06/12/02 08:19:00	18.4	507.7	0.2	405.4	49.98	0	0	76.6	49	
06/12/02 08:19:30	18.4	517.7	0.3	403.9	49.97	0	0	76.6	49	
06/12/02 08:20:00	18.4	525.3	0.3	404.2	49.97	0	0	76.6	49	
06/12/02 08:20:30	18.5	522.8	0.3	405.3	49.98	0	0	76.6	49	
6/12/02 08:21:00	18.5	526.0	0.2	405.4	49.97	0	0	76.6	49	
6/12/02 08:21:30	18.5	386.7	0.3	404.5	49.98	0	0	76.6	49	
6/12/02 08:22:00	18.5	543.2	0.2	404.2	49.97	0	0	76.6	49	
6/12/02 08:22:30	18.5	545.9	0.2	403.3	49.97	0	0	76.6	49	
6/12/02 08:23:00	18.5	499.8	0.3	403.5	49.97	0	0	76.6	49	
6/12/02 08:23:30	18.6	441.3	0.2	404.7	49.97	0	0	76.6	49	
6/12/02 08:24:00	18.6	554.9	0.3	404.8	49.98	0	0	76.6	49	
06/12/02 08:24:30	18.6	553.8	0.2	404.6	49.99	0	0	76.6	49	
06/12/02 08:25:00	18.7	387.7	0.3	404.7	49.98	0	0	76.6	49	
06/12/02 08:25:30	18.7	564.0	0.4	404.8	49.98	0	0	76.6	49	
06/12/02 08:26:00	18.7	415.3	0.4	404.6	49.98	0	0	76.6	49	
06/12/02 08:26:30	18.7	565.8	0.4	405.2	49.97	0	0	76.6	49	
									>	11

(12) Double click "DAILY.CSV" file in your preferred directory in your PC. After that, you can manipulate the log data with Microsoft Excel.

## 9. Troubleshooting

Your PV-Inverter requires very little maintenance. When unexpected situation occurs, please refer to the following table for quick troubleshooting before contacting your local service. The following table lists common fault messages and ways to cope with the fault or error.

	Fault	Fault definition		Possible Causes	Pr	oposed Actions for		Proposed Actions for
	Message	The success	4	Obeteele kunsiditu	4	End-user	4	Professionals
		The ground	1.	Obstacle, numidity	1.	Disconnect AC	1.	Disconnect AC side of
		current detected		or water exits		connection of inverter	l	inverter by opening AC
		by inventer is		and/or NEUTRAL to		by opening AC	2	Disconnect the DC side
		threshold		earth around	2	Check the AC	Ζ.	from the invertor
		unesnolu	2	Obstacle humidity	۷.	iunction box and	3	Check both the AC and
			2.	or water exits		wiring of system	0.	DC wiring and insulation
	Ground I			between AC LINE		Clear obstacle ONLY	4.	Reconnect AC connection.
	Fault			and/or NEUTRAL to		IN SAFE	1	check the status of
				earth ground in the		CONDITIONS	l	inverter
				junction box	3.	Reconnect AC	5.	If the problem persists,
			3.	The Insulation of		connection, check the	l	please
				AC wires is broken		status of inverter	۶	Update the firmware
				that could be bit by	4.	If the problem	l	according to instructions,
				rat or any animals		persists, call local		or Devices the investor
			4.	Inverter is abnormal	4	Service	2	Replace the inverter
		data is boyond	1.	voltago is	1.	IT this problem	1.	connection including
		the specification		beyond/under the		as 1 time a day) no	l	polarities and security first
		(voltage &		setting of inverter		action is necessary	2.	Find the devices with high
		frequency)	2.	The detected AC	2.	If the problem occurs	l	power consumption near
				frequency is		frequently, do the	l	the AC system
				beyond/under the		actions below	3.	Consult the utility power
				setting of inverter	3.	Find the device with	l	supplier, understand the
			3.	AC connection is		high power		grid conditions
			4	Crid condition in		consumption near	4.	Use inverter software to
÷			4.	weak or unstable	4	Use inverter	l	voltage
aul			5.	Other high-power		software to check	5.	If the measured data
Ш				consumption device		the setting of		beyond the setting, under
en				is affecting the grid		inverter. The setting	l	the permission of utility
yst				system		should be in the	l	supplier, use the software
S	Grid Fault		6.	The setting of		range listed in		to change parameters
				inverter is deviated	-	specification	6.	If the situation is not
					э.	If the settings are not	l	narameters, please
			7	Inverter is abnormal		service for changing	$\triangleright$	Undate the firmware
					6.	Use inverter	ĺ	according to instructions.
					-	software or	l	or
						monitoring device to	۶	Replace the inverter
						collect data. Send	l	
						the data to	l	
						protessionals for	l	
					7	Consult your utility	l	
					<i>′</i> .	nower supplier	l	
						understand the grid	l	
						conditions	l	
					8.	Ask help of your	l	
						installer	⊢	
		Inverter is not	1.	Grid is not available	1.	Make sure the	1.	Make sure the breaker
		able to detect	Ζ.	AC connection is		preaker and switch	l	and switch on AC side are
		AC voltage	R		0	Check the AC wiring	b	Close
			5.	inverter and utility	<u>к</u> . З	If the problem	£. B	If the problem continues
	No Utility		ĺ	is not ON	ſ.	continues, call vour		replace the inverter
			4.	AC fuse and/or		local service	l	
			ĺ	breaker is open			l	
			5.	Inverter is			l	
		1	i i	abnormal			i.	

#### **Fault Analysis and Actions**

	Fault	Fault definition	Possible Causes	Proposed Actions for	Proposed Actions for	
	Message	The detected	1 The DV array	End-user	Professionals	
	PV over Voltage	PV voltage is higher than specification	voltage is too high 2. Inverter is abnormal	<ol> <li>Open DC connection of inverter and reconnect</li> <li>If the fault continues, call your local service</li> </ol>	<ol> <li>Check the open PV voltage, and see if it is more than or too close to specification</li> <li>If PV voltage is much less than specification and the problem still occurs, please replace the inverter</li> </ol>	
	Consistent Fault	The readings of 2 microprocessors are inconsistent	<ol> <li>Software problem</li> <li>Circuits inside inverter are abnormal</li> <li>Inverter is abnormal</li> </ol>	<ol> <li>Open all DC connections of inverter</li> <li>Wait for 3 minutes</li> <li>Reconnect DC connection and check</li> <li>If the fault continues, call your local service</li> </ol>	<ol> <li>Open all DC connections of inverter</li> <li>Wait for 3 minutes</li> <li>Reconnect DC connection and check</li> <li>If the fault continues         <ul> <li>&gt; Update the firmware according to instructions, or</li> <li>&gt; Replace the inverter</li> </ul> </li> </ol>	
	Over Temperature	The detected temperature is high	<ol> <li>Ambient temperature is too high</li> <li>Heat dissipation problem</li> <li>Inverter is abnormal</li> </ol>	<ol> <li>Make sure the ambient temperature of installation is less than 55°C</li> <li>Check the space near the heat sink</li> <li>Remove any obstacle that block the heat dissipation near heat sink</li> <li>Call local service if the problems persists</li> </ol>	<ol> <li>Make sure the ambient temperature of installation is less than 55°C</li> <li>Check the space near the heat sink</li> <li>Remove any obstacle that block the heat dissipation near heat sink</li> <li>If the problem persists, replace it</li> </ol>	
Inverter Failure	Relay Failure	The checking of AC relay is abnormal	Inverter is abnormal	<ol> <li>Disconnect ALL PV (+) and PV (-)</li> <li>Wait for 1 minutes</li> <li>After no display on LCD, reconnect again and check</li> <li>If the message appears again, call your local service</li> </ol>	<ol> <li>Make sure installation is under specification of each model for "High DC Bus"</li> <li>Do the same actions as left column again</li> <li>If the problem persists, please try to         <ul> <li>&gt; Upgrade the latest firmware according to instruction or firmware release note, or</li> <li>&gt; Replace the unit</li> </ul> </li> </ol>	
	DC INJ High	DC current component in AC output is higher than permission	<ol> <li>The AC sensor at output is abnormal</li> <li>Grid DC current is higher than the permissible value.</li> <li>Inverter is abnormal</li> </ol>	<ol> <li>Observe the faulty condition for 1 minute.</li> <li>If it does not restore to normal operation, please call service.</li> </ol>	<ol> <li>Reconnect DC connection and check</li> <li>If the fault continues         <ul> <li>&gt; Update the firmware according to instructions, or</li> <li>&gt; Replace the inverter</li> </ul> </li> </ol>	
	EEPROM Failure	EEPROM inside inverter is abnormal	<ol> <li>Software problem</li> <li>Circuits inside inverter are abnormal</li> <li>Inverter is abnormal</li> </ol>	<ol> <li>Disconnect PV (+) and PV (-) from the input, start the unit again.</li> <li>If it does not work, please call service.</li> </ol>	<ol> <li>Do the same actions as left column again</li> <li>If the fault continues         <ul> <li>Update the firmware according to instructions, or</li> <li>Replace the inverter</li> </ul> </li> </ol>	
	SCI Failure	Communication between the two CPUs is abnormal	<ol> <li>Software problem</li> <li>Circuits inside inverter are abnormal</li> <li>Inverter is abnormal</li> </ol>	<ol> <li>Disconnect PV (+) and PV (-) from the input, start the unit again.</li> <li>If it does not work, please call service.</li> </ol>	<ol> <li>Do the same actions as left column again</li> <li>If the fault continues</li> <li>&gt; Update the firmware according to instructions, or</li> <li>&gt; Replace the inverter</li> </ol>	
	High DC Bus	DC BUS voltage inside inverter is higher than expectation	Inverter is abnormal	<ol> <li>Disconnect PV (+) and PV (-) from the input, start the unit again.</li> <li>If so, please call service.</li> </ol>	<ol> <li>Do the same actions as left column again</li> <li>If the fault continues</li> <li>&gt; Update the firmware according to instructions, or</li> <li>&gt; Replace the inverter</li> </ol>	

Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
Low DC Bus	DC BUS voltage inside inverter is lower than expectation	Inverter is abnormal	<ol> <li>Disconnect PV (+) and PV (-) from the input, start the unit again.</li> <li>If it does not work,</li> </ol>	<ol> <li>Do the same actions as left column again</li> <li>If the fault continues</li> <li>&gt; Update the firmware according to inclusive action</li> </ol>
DC Sensor Fault	at output is abnormal		please call service.	Replace the inverter
GFCI Failure	The GFCI detection circuit is abnormal			

Warning: Dangerous high voltage exists on both DC and AC wires and connections. For the end-user: Please do NOT touch any live parts.

# **10. Specifications**

Model	SOLEIL 101L		
Nominal AC output power	10000W		
Max. AC output power in 10	11000W		
minutes			
Input	0.401.4		
Nominal DC voltage	640V <sub>DC</sub>		
Maximum PV power / Tracker	5500W per tracker		
Maximum PV open voltage	800 V <sub>DC</sub>		
Full load rated voltage range	320 ~ 720V <sub>DC</sub>		
MPPT voltage range	245 ~ 720V <sub>DC</sub>		
Operating voltage range	200 ~ 800V <sub>DC</sub>		
Maximum DC input current /	13 A <sub>DC</sub>		
Tracker			
Output			
Operational voltage	400V , -15% +10%		
Operational frequency range	47.5~50.2 Hz (VDE0126-1-1)		
operational nequency range	49.7-50.3 Hz (DK5940)		
Maximum AC-current	17.5A <sub>RMS</sub> (under11000W)		
Nominal AC-current	14.5A <sub>RMS</sub> (under 10000W)		
AC wiring system	3-phase, 4 wire		
Current distortion	< 3% > 0.99 96.5% 95% @ nominal input		
Power factor			
Conversion efficiency(max)			
European efficiency			
System			
Protection degree	Chassis: IP65; Fan: IP55		
Operational temperature range	-20 to 55°C		
Continuous full power	-20 to 40°C		
temperature range			
Humidity	0 to 95%, non-condensing		
Heat Dispersal	Air force cooling, variable fan speed control		
Manufacturing process	Lead free complied with PoHS CP2		
	< 50dB		
Communication & Factures			
Communication & reatures			
Display	128X64 Graphic LCD		
Comm. Interfaces	Standard RS-232, RS-485 ModBUs		
F/W upgrade	Yes, via RS-232		
Mechanical			
WxDxH (mm)	444.0 x 155.2 x 584.6		
Weight (kg)	37kg		

\*The product's specifications are subject to change without notice.

### **11. Compliance of Standards**

#### EMC:

DIN EN 61000-6-3 (VDE0839-6-3, EMV-interference emission) (class B) DIN EN 61000-6-2 (VDE 0839-6-2, EMV-interference immunity) 2004/108/EC (CE)

#### **Grid Interface Regulation:**

VDE0126-1-1 (2006) DK5940

#### Safety:

DIN EN 50178 (4.98) (VDE 0160) (IEC62103)

### 12. Load Graph and Efficiency Graph

The relationship between PV input voltage (String voltage,  $V_{PV}$ ) and input power ( $P_{MPP}$ ) is shown in the following example. Once the PV input voltage is less than 423V, the relation of  $V_{PV}$  and power is:

 $P_{PV}(W) = 0.0205 \text{ x } V_{PV}^2 + 4.8 \text{ x } V_{PV}$ (under condition: 423V > String voltage,  $V_{PV}$  > 200V)

For example:  $V_{PV}$  is 400V<sub>DC</sub>, the maximum power converted by the inverter in one string is 5200W.



Allowable String DC Power v.s. String Voltage

The typical efficiency chart related to  $V_{DC}$  and  $P_{AC}$  is as shown below.

Results may vary due to test equipment tolerances and product differences.



#### SOLEIL 10TL conversion efficiency curve





The following maximum cable lengths are possible for the different cable cross-sections:

Cable	4.0mm2	6.0mm2
cross-section		
Max. cable length	34m	51m

# Appendix II: SELECTING THE LINE CIRCUIT BREAKERS

- the maximum possible nominal current for the cable used and the maximum possible fuse protection for the SOLEIL 10TL limit the maximum possible nominal current for the line circuit breaker
- additionally, check the thermal suitability of the line circuit breakers

When selecting line circuit breakers, a number of load factors needs to be taken into account. These can be found in the respective datasheets. For example, one manufacturer's circuit breaker may be designed for an ambient temperature of **50°C**.

Rev.	Data Modifica	Descrizione modifica	Compilato	Verificato	Emesso
000	2010-06-18	- Prima emissione. Allineato a REV1.1 ITA	C. Carminati	E Rusconi	P. Baggi
			Dominiar, sering		Viet Dag



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