SegenSolar (Pty) Ltd

solis inverters

NEW S5 RANGE 3PHASE INVERTERS

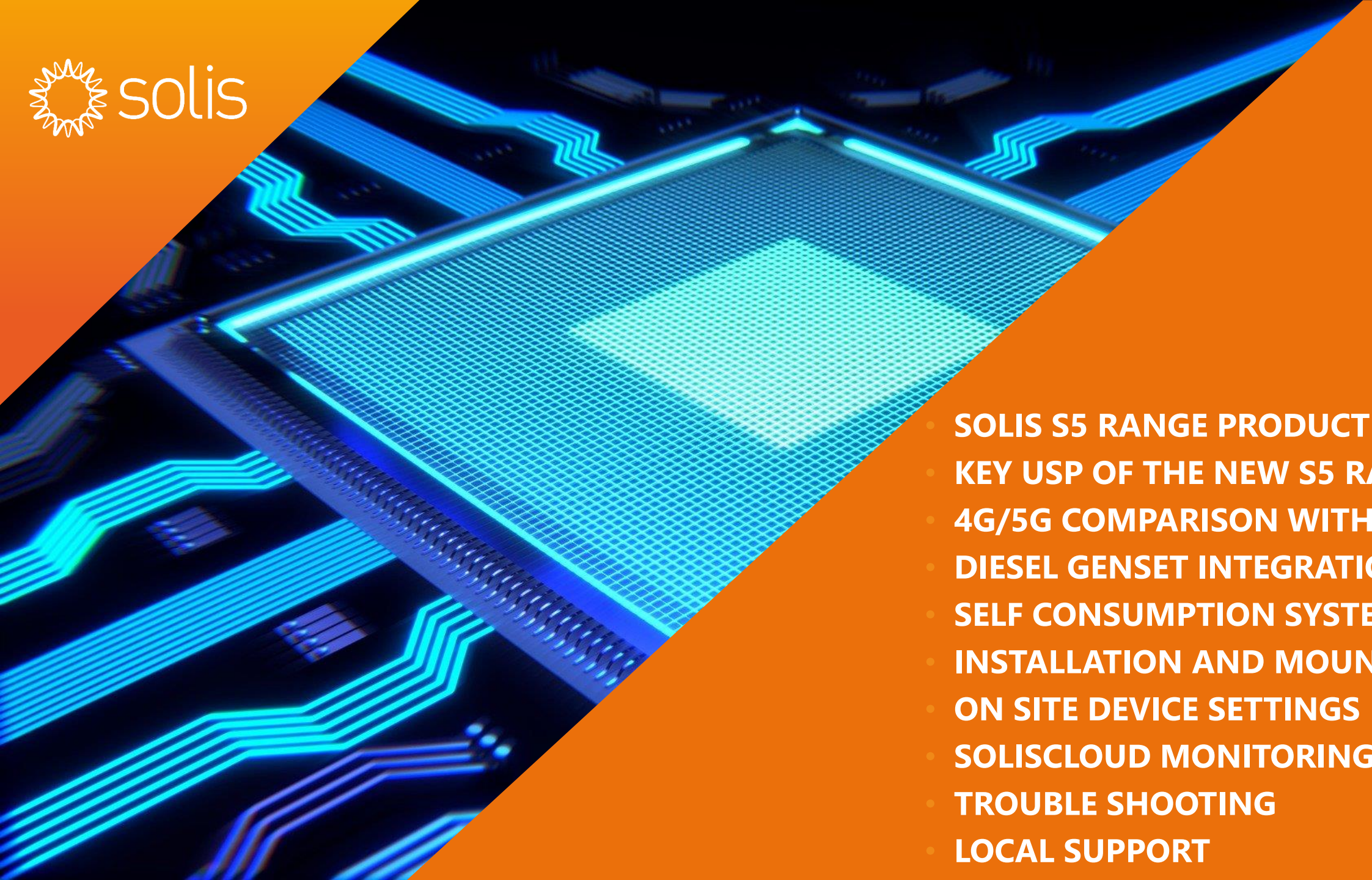








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- SOLIS S5 RANGE PRODUCT OVERVIEW
- KEY USP OF THE NEW S5 RANGE
- 4G/5G COMPARISON WITH S5 RANGE
- DIESEL GENSET INTEGRATION
- SELF CONSUMPTION SYSTEM LAYOUT
- INSTALLATION AND MOUNTING
- ON SITE DEVICE SETTINGS
- SOLISCLOUD MONITORING SETUP
- TROUBLE SHOOTING
- LOCAL SUPPORT

S5 3PHASE MODEL RANGE

S5-5-20K



6 Models in range
- 6kW
- 8kW
- 10kW
- 12kW
- 15kW
- 20kW

S5-25-40K



4 Models in range
- 25kW
- 30kW
- 36kW
- 40kW

S5-50-60K



2 Models in range
- 50kW
- 60kW

S5-110K



1 Model (currently)
- 110kW

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S5 3PHASE MODEL RANGE

KEY USP'S

- Max Efficiency **98,7%**
- Wide Operating Voltage
- Low Start Up voltage
- Support Export Power Control
- Increased AC/DC ratio vs 4G/5G versions
- Increased String Current Capacity
- Integrated AFCI Function
- Automatic Voltage Stabilization for weaker grid conditions
- Increased Ingress Protection



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RANGE OVERVIEW

PRODUCT FEATURES

- **Intelligent string monitoring**, smart I-V curve scan
- **QR code scan functionality** to register on the SolisCloud platform
- Supports **remote** firmware upgrades and settings configuration
- **Supports high power modules** for lower installation costs
- **Automatic voltage stabilization technology** in weak grid conditions
- **Multiple MPPTs** – supports multi-orientation roof system designs



solis inverters S5-5-20K

MODEL	S5-GR3P 6K	S5-GR3P 8K	S5-GR3P 10K	S5-GR3P 12K	S5-GR3P 15K	S5-GR3P 20K
	DC INPUT					
Recommended Max. PV Power	9kW	12kW	15kW	18kW	22.5kW	30kW
Max. Input Voltage (Voc)	1100Vdc					
Rated Voltage (Vmp)	600Vdc					
Start-up Voltage	180Vdc					
MPPT Voltage Range	160 – 1000Vdc					
Max. Input Current	16A / 16A			32A / 32A		
Max. Short Circuit Current	25A / 25A			50A / 50A		
MMPT Number/Max. Input Strings	2 / 2			2 / 4		
	AC OUTPUT					
Rated Output Power	6kW	8kW	10kW	12kW	15kW	20kW
Max. Apparent Output Power	6.6kVA	8.8kVA	11kVA	13.2kVA	16.5kVA	22kVA
Rated Grid Voltage @ Frequency	3/N/PE, 220 V / 380 V, 230 V / 400 V [50Hz]					
Rated Grid Output Current	9.1A/8.7A	12.2A/11.5A	15.2A/14.4A	18.2A/17.3A	22.8A/21.7A	30.4A/28.9A
Power Factor	>0.99 (0.8 leading – 0.8 lagging)					
THDi	<2%					

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solis inverters S5-25-40K

MODEL	S5-GC25K	S5-GC30K	S5-GC36K	S5-GC40K
	DC INPUT			
Recommended Max. PV Power	37.5kW	45kW	54kW	60kW
Max. Input Voltage (Voc)	1100Vdc			
Rated Voltage (Vmp)	600Vdc			
Start-up Voltage	180Vdc			
MPPT Voltage Range	200 – 1000Vdc			
Max. Input Current	32A / 32A / 32A		4 x 32A	
Max. Short Circuit Current	50A / 50A / 50A		4 x 50A	
MMPT Number/Max. Input Strings	3 / 6		4 / 8	
	AC OUTPUT			
Rated Output Power	25kW	30kW	36kW	40kW
Max. Apparent Output Power	27.5kVA	33kVA	39.6kVA	44kVA
Rated Grid Voltage @ Frequency	3/N/PE, 220 V / 380 V, 230 V / 400 V [50Hz]			
Rated Grid Output Current	38A / 36.1A	45.6A / 43.3A	54.7A / 52A	60.8A / 57.7A
Power Factor	>0.99 (0.8 leading – 0.8 lagging			
THDi	<3%			

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S5-50-60K

MODEL	S5-GC50K	S5-GC60K
	DC INPUT	
Recommended Max. PV Power	75kWp	90kWp
Max. Input Voltage (Voc)	1100Vdc	
Rated Voltage (Vmp)	600Vdc	
Start-up Voltage	195Vdc	
MPPT Voltage Range	180 – 1000Vdc	
Max. Input Current	5 x 32A	6 x 32A
Max. Short Circuit Current	5 x 50A	6 x 50A
MMPT Number/Max. Input Strings	5 / 10	6 / 12
	AC OUTPUT	
Rated Output Power	50kW	60kW
Max. Apparent Output Power	55kVA	66kVA
Rated Grid Voltage @ Frequency	3/N/PE, 220 V / 380 V, 230 V / 400 V [50Hz]	
Rated Grid Output Current	76A / 72.2A	91.2A / 86.6A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)	
THDi	<3%	

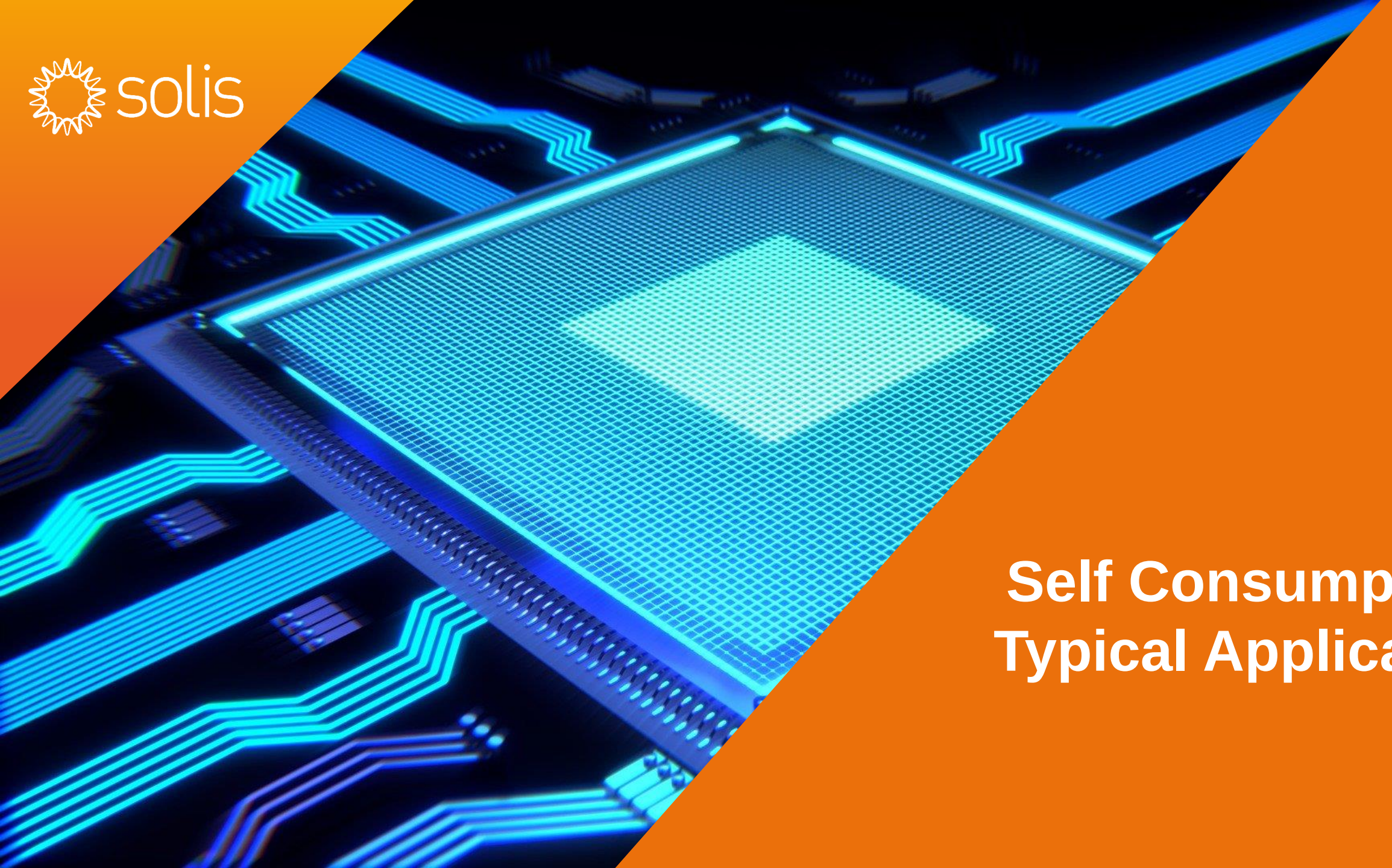
solis inverters S5-110K

MODEL	S5-GC110K
	DC INPUT
Recommended Max. PV Power	165kWp
Max. Input Voltage (Voc)	1100Vdc
Rated Voltage (Vmp)	600Vdc
Start-up Voltage	195Vdc
MPPT Voltage Range	180 – 1000Vdc
Max. Input Current	10 x 32A
Max. Short Circuit Current	10 x 50A
MMPT Number/Max. Input Strings	10 / 20
	AC OUTPUT
Rated Output Power	110kW
Max. Apparent Output Power	121kVA
Rated Grid Voltage @ Frequency	3/N/PE, 220 V / 380 V, 230 V / 400 V [50Hz]
Rated Grid Output Current	167.1A / 158.8A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)
THDi	<3%

4G/5G vs S5 COMPARISON

Apart from some other updates – Inverters have to keep up with the ever increasing power of the PV Solar Modules. Continuous development in regard is an ongoing R&D task.

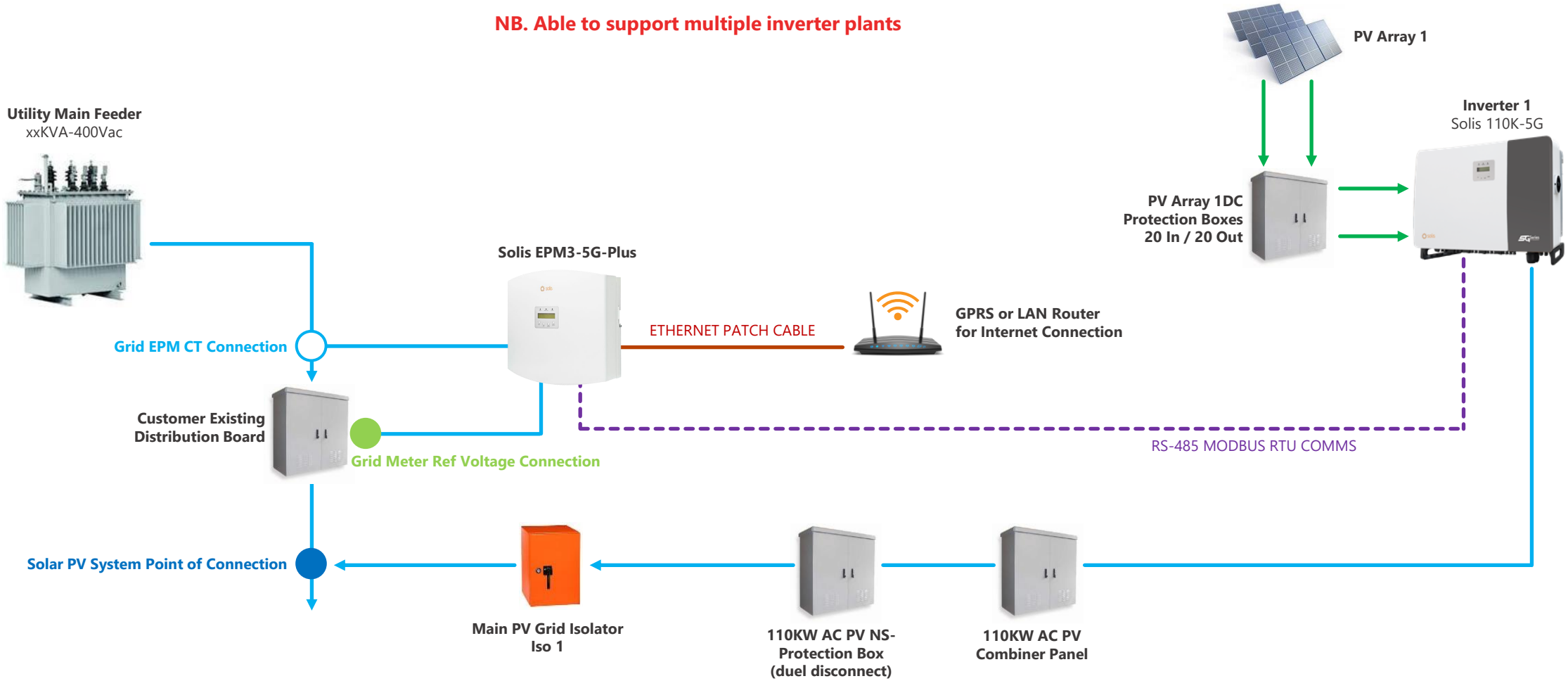
FEATURE	4G & 5G VERSION	NEW S5 VERSION	COMMENT
Max kWp vs AC capacity	4G -120% & 5G – 140%	150%	30% increase DC capacity
Max PV string current	11A per string	16A per string	Support for high power modules and bifacial modules
IP rating	IP65	IP66	
Max DC MPP operating voltage	850Vdc	1000Vdc	Observe regulatory maximum (1000Vdc-Voc)
Support for DTSD 1352 Acrel meter	YES – 5-20kW 24H consumption monitoring 25-40K-5G – PV production only	YES – 24H consumption monitoring	1 inverter application only – EPM3-5G-PLUS for multiple inverter application
Remote control – Solis technical support only	Limited	YES	Certain Functions not possible with EPM installed on site
AFCI	Certain firmware versions only	All released model firmware versions	



Self Consumption
Typical Application

SELF CONSUMPTION AND EXPORT LIMITING SIMPLIFIED CONNECTION

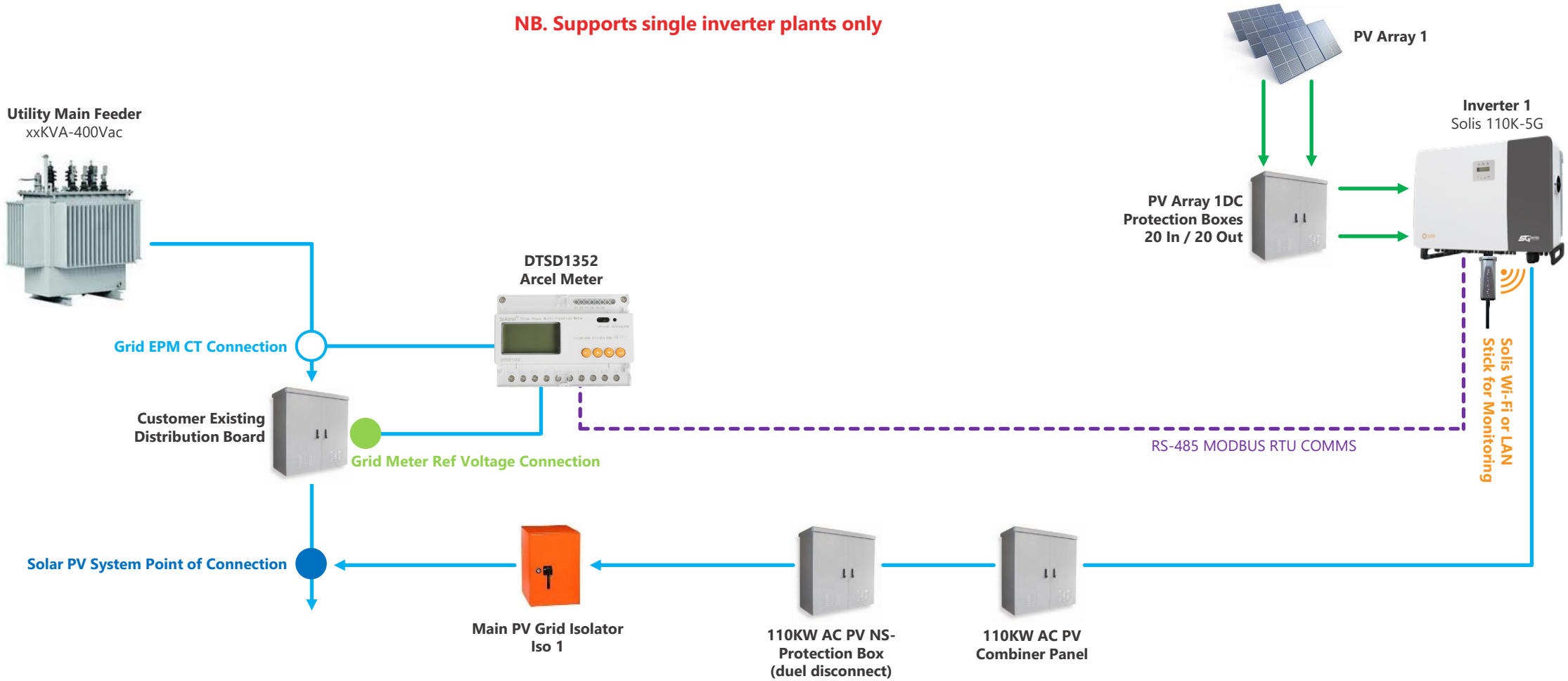
NB. Able to support multiple inverter plants

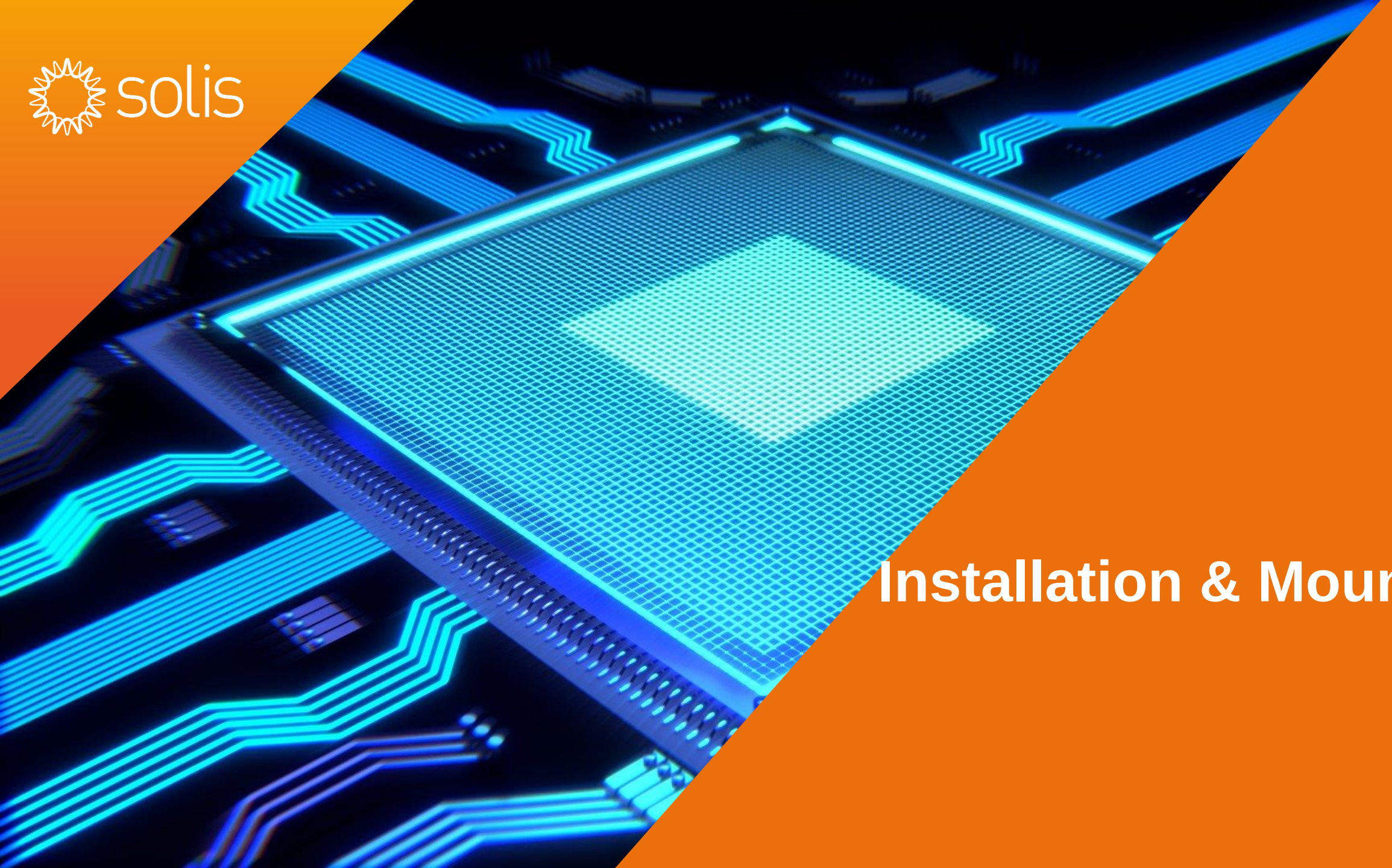


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SELF CONSUMPTION AND EXPORT LIMITING SIMPLIFIED CONNECTION

NB. Supports single inverter plants only

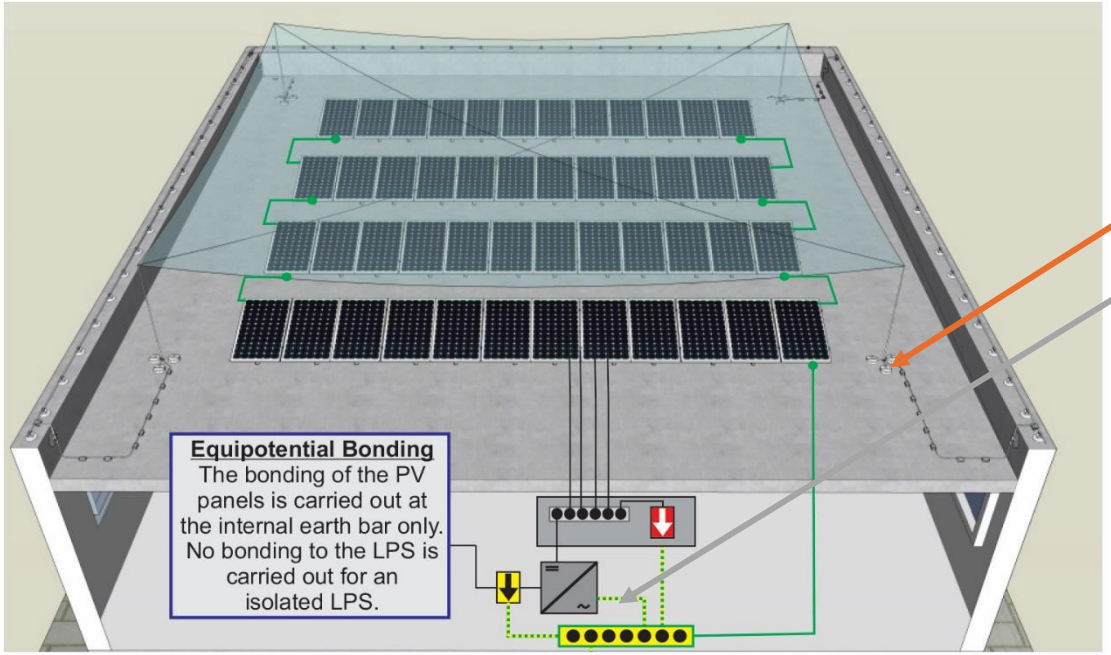




Installation & Mounting

Technical Installation Requirements – Solis Commercial Systems

Solar Panel and Lightning Protection System Earthing



NB:
Solis requires that the LPS earth and the Inverter earth be **isolated** From each other

Technical Installation Requirements – Solis Commercial Systems

Inverter Earthing

3. Installation

3.4.1 Grounding

To effectively protect the inverter, two grounding methods must be performed.
Connect the AC grounding cable (Please refer to section 3.4.3)
Connect the external grounding terminal.

To connect the grounding terminal on the heat sink, please follow the steps below:

1) Prepare the grounding cable: recommend to use the outdoor copper-core cable. The grounding wire should be at least half size of the hot wires.

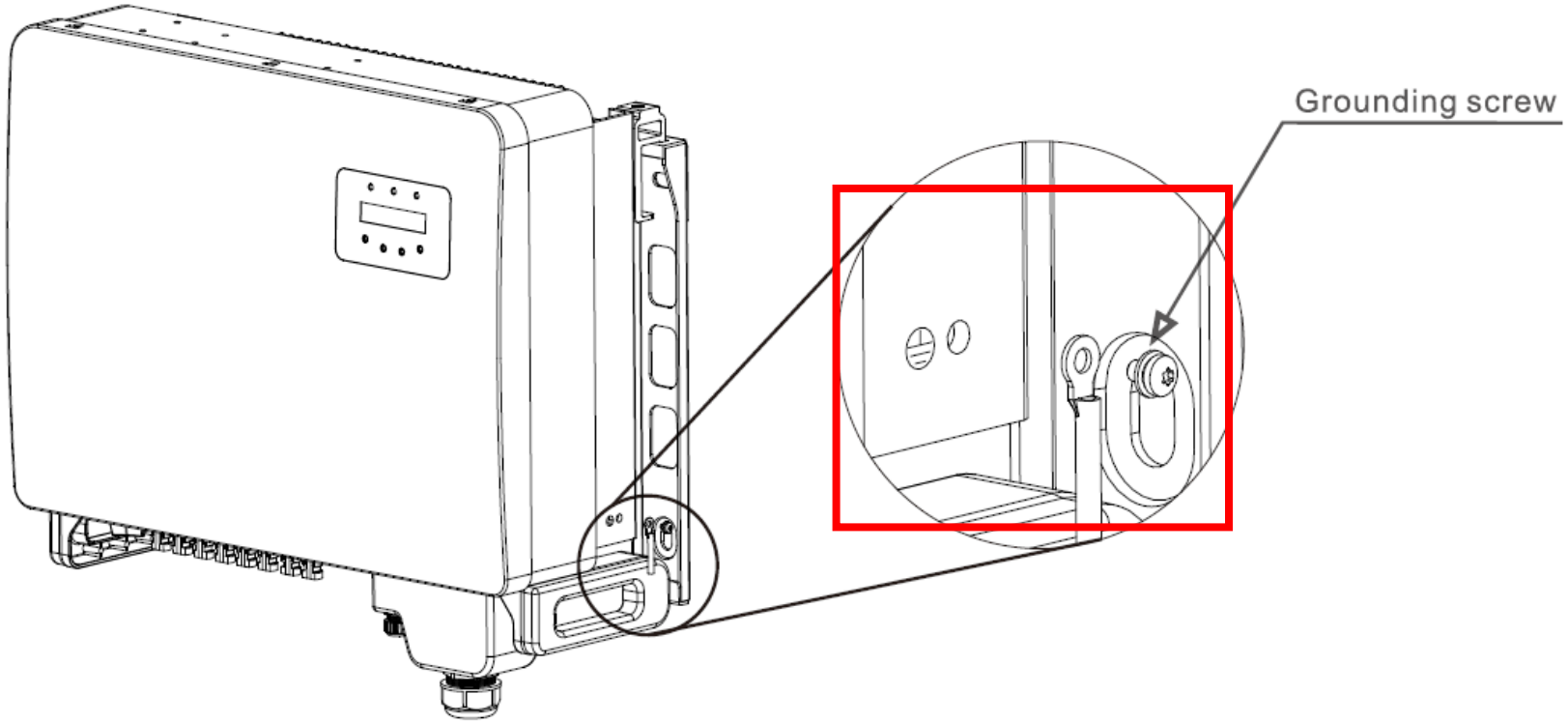
2) Prepare OT terminals: M10.



Important:
For multiple inverters in parallel , all inverters should be connected to the same ground point to eliminate the possibility of a voltage potential existing between inverter grounds.

Technical Installation Requirements – Solis Commercial Systems

Inverter Earthing



Technical Installation Requirements – Solis Commercial Systems

Inverter Earthing

It cannot be stressed enough the importance of a good, solid and compliant earthing System.
A cable tray cannot be used as an earth conductor- this is not allowed!!

SANS 10142 clearly states under following regulation:

6.12.1.3 A wireway shall not be used as an earth continuity conductor.

Visited a number of sites where the inverter earth and SPD earth is simply bonded to The cable tray – this is NON COMPLIANT

Technical Installation Requirements – Solis Commercial Systems

Disconnecting PV strings from the inverter

When disconnecting a pv string or strings from an inverter please ensure the following:

1. The AC Isolator or circuit breaker is turned OFF first
2. Allow enough time for the internal capacitors to discharge- recommended 5-10 min
3. Measure with a clamp tester that the max current on the string is below 0,5A
4. If the current is higher that this DO NOT operate the inverter DC switch as this will cause dc switch failure and serious inverter damage
5. It is important to not the regulation requires external isolation of all sources feeding a device

SANS 10142 clearly states under following regulation:

6.9.3 Disconnecting devices for equipment

6.9.3.1 An appliance or equipment that is not supplied from a socket-outlet, including equipment automatically or remote controlled, shall be capable of being disconnected from the supply by an easily accessible switch-disconnector. The disconnector shall be mounted (if not specified elsewhere in this part of SANS 10142, but excluding luminaire circuits) (see also 6.16.1.4)

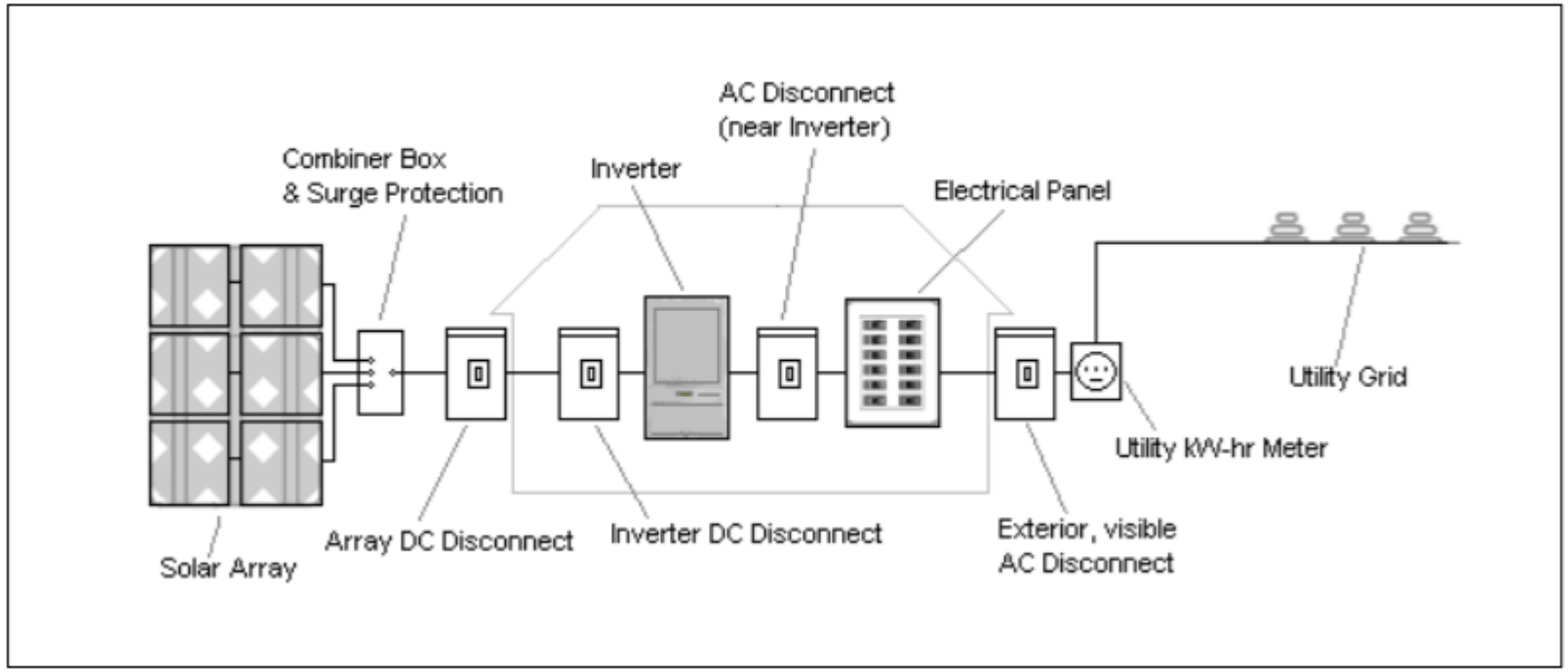
a) within arm's reach from the terminals of the appliance, or

b) in a distribution board, if the device is capable of being locked in the open position.

Technical Installation Requirements – Solis Commercial Systems

Protection System requirements

As we can see from the previous slides external AC and DC protection and isolation
Is mandatory for PV installations
System overview- Major parts:



Technical Installation Requirements – Solis Commercial Systems

Protection System requirements- Cable installation

1. It is prohibited to install AC, DC and communication cables in the same cable trunking system

   SANS 10142 clearly states:

> **6.1.10** Conductors that form part of a d.c. installation shall not be run in the same wireway as conductors that form part of an a.c. installation.

2. Separate trunking should be applied to each power and communication section
3. Ensure surge protection devices are also installed on all communication cables that connects to the PV system- LAN and RS 485 modbus communication cables should be individually protected from surges

PLEASE NOTE: LIGHTNING and SURGE damage is not covered by the inverter warranty

Technical Installation Requirements – Solis Commercial Systems

EPM3-5G Installation

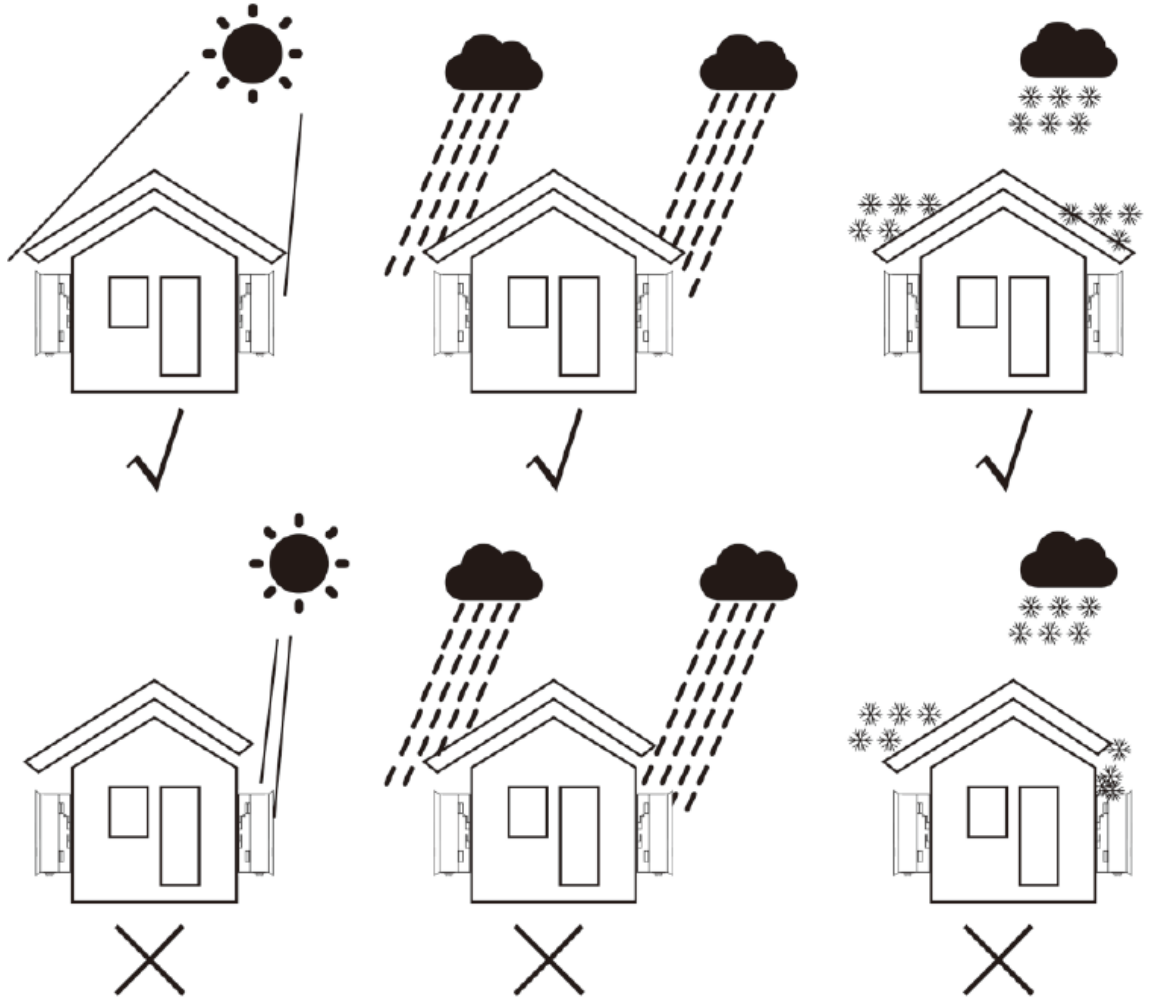
Important Notes for Export Power Manager

- Modbus address For EPM is always 1
- Modbus address for 1st inverter connected to EPM is also always 1
- Time and Date on Inverters and EPM to be set the same
- Solis All inverters (4G range) connecting to 5G EPM range Requires firmware This is to initialise the use of the “FAILSAFE” Function
- Important display Information
- “+” before Phase Power value indicates power is being exported
- “-” before Phase Power value indicates power is being imported
- If the inverter is not producing power and you see a plus- means CT’s are the wrong way around
- Remember the following RS 485 alarms (EPM display will show)
- RS485 ALL FAIL – Communication lost to all inverters
- RS485 FAIL – Communication lost to some inverters
- IMPORTANT- Set the number of inverters correctly, that is connected to the EPM

INVERTER INSTALLATION

MOUNTING POSITION

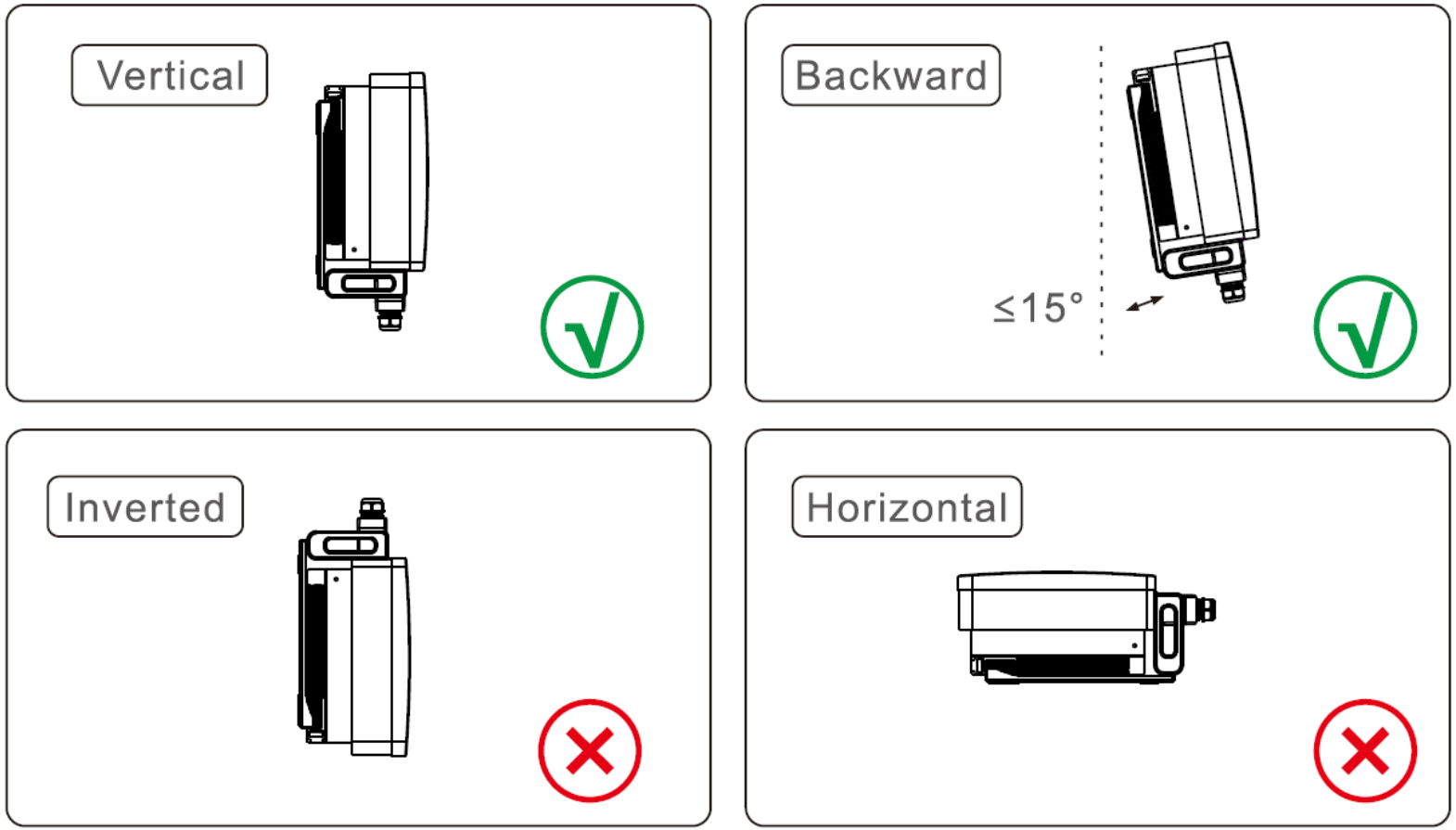
1. Do not install in small, sealed spaces where air cannot circulate
2. Always ensure that the airflow around the inverter is not restricted
3. Exposure to direct sunlight will increase the inverters operating temp and may cause output power limiting
4. It is not recommended to install the inverters in direct sunlight and rain
5. To avoid overheating the ambient temperature must be considered and ventilation must be considered.



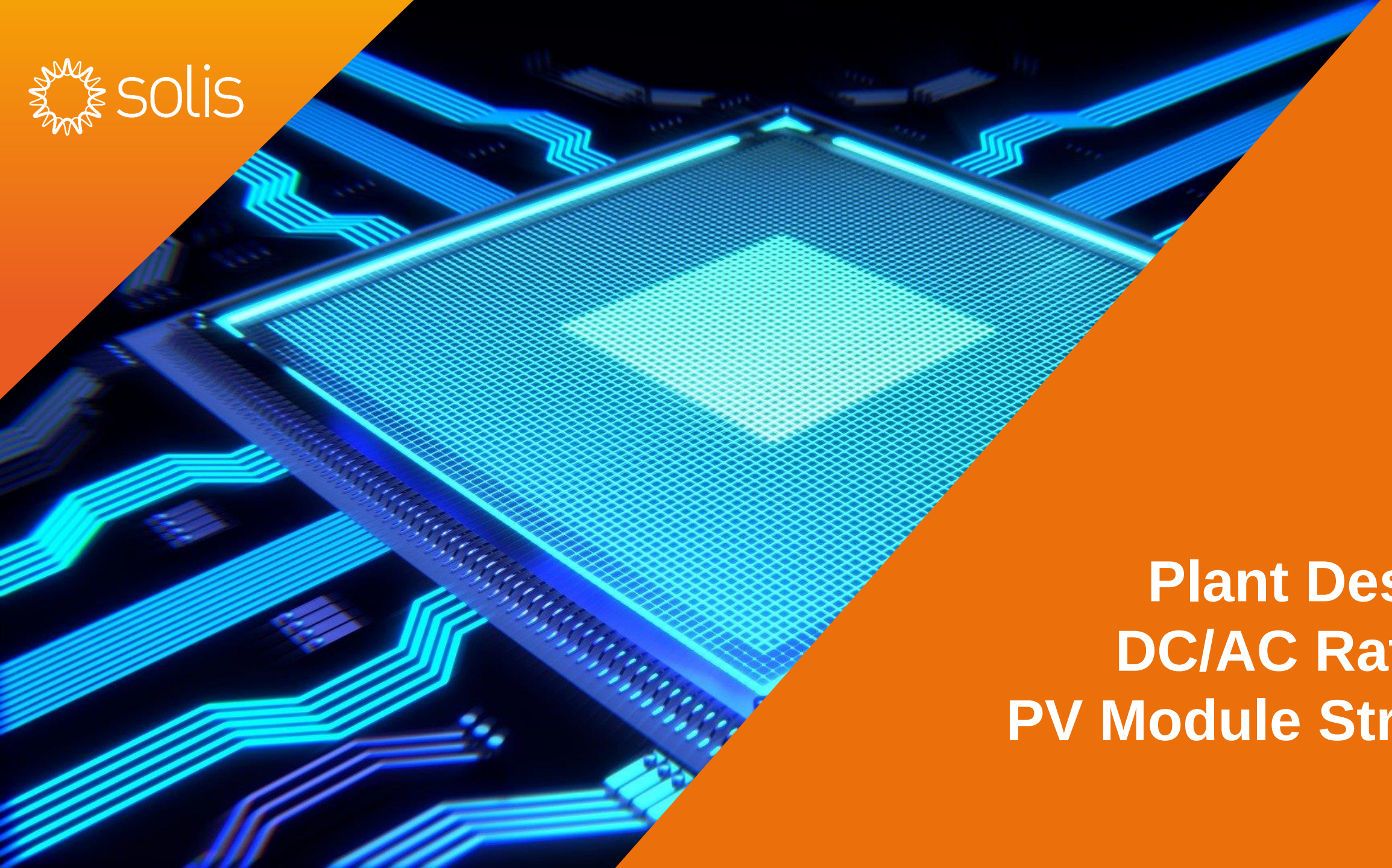
INVERTER INSTALLATION

MOUNTING AND CLEARANCE

1. Always install on a vertical surface or structure capable of bearing the inverters weight.
2. The inverter may be tilted backwards to 15° from vertical.
3. A clearance of 500mm should be kept between other inverters and any other equipment or walls
4. The inverter should be at least 500mm from the ground or floor
5. Visibility of the LED status lights and HMI should be considered.



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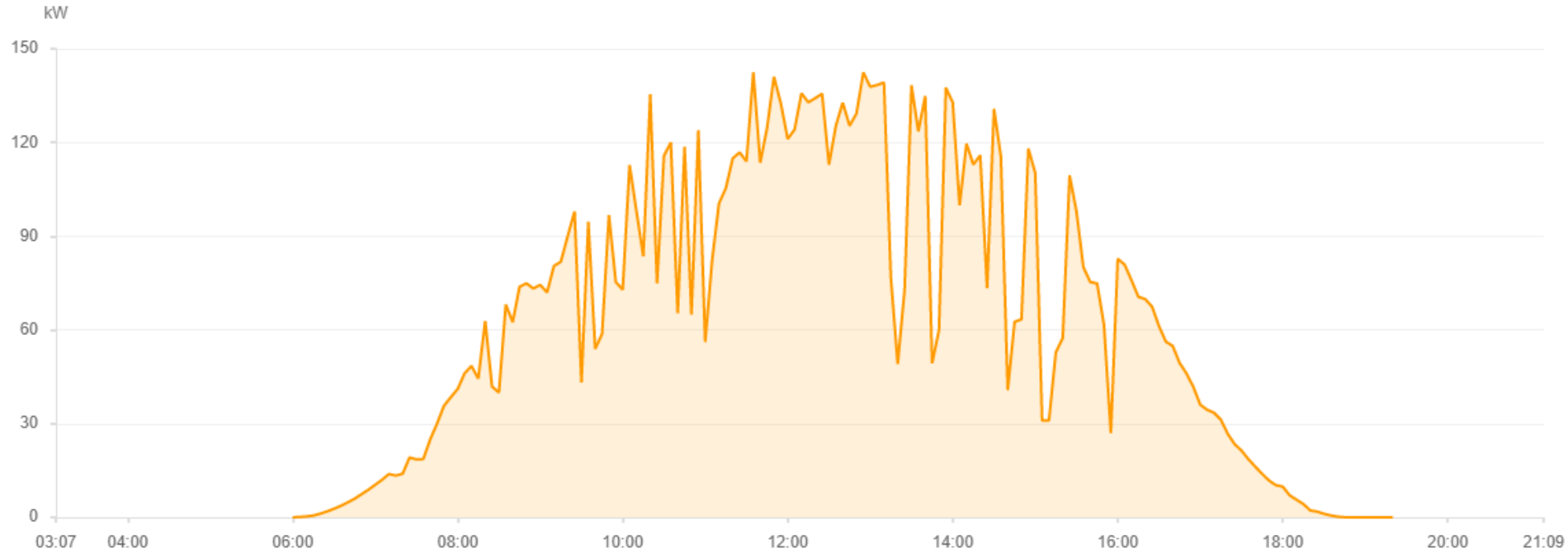


Plant Design: DC/AC Ratio & PV Module Strings

DC/AC Ratio & PV Oversizing

Primary Function

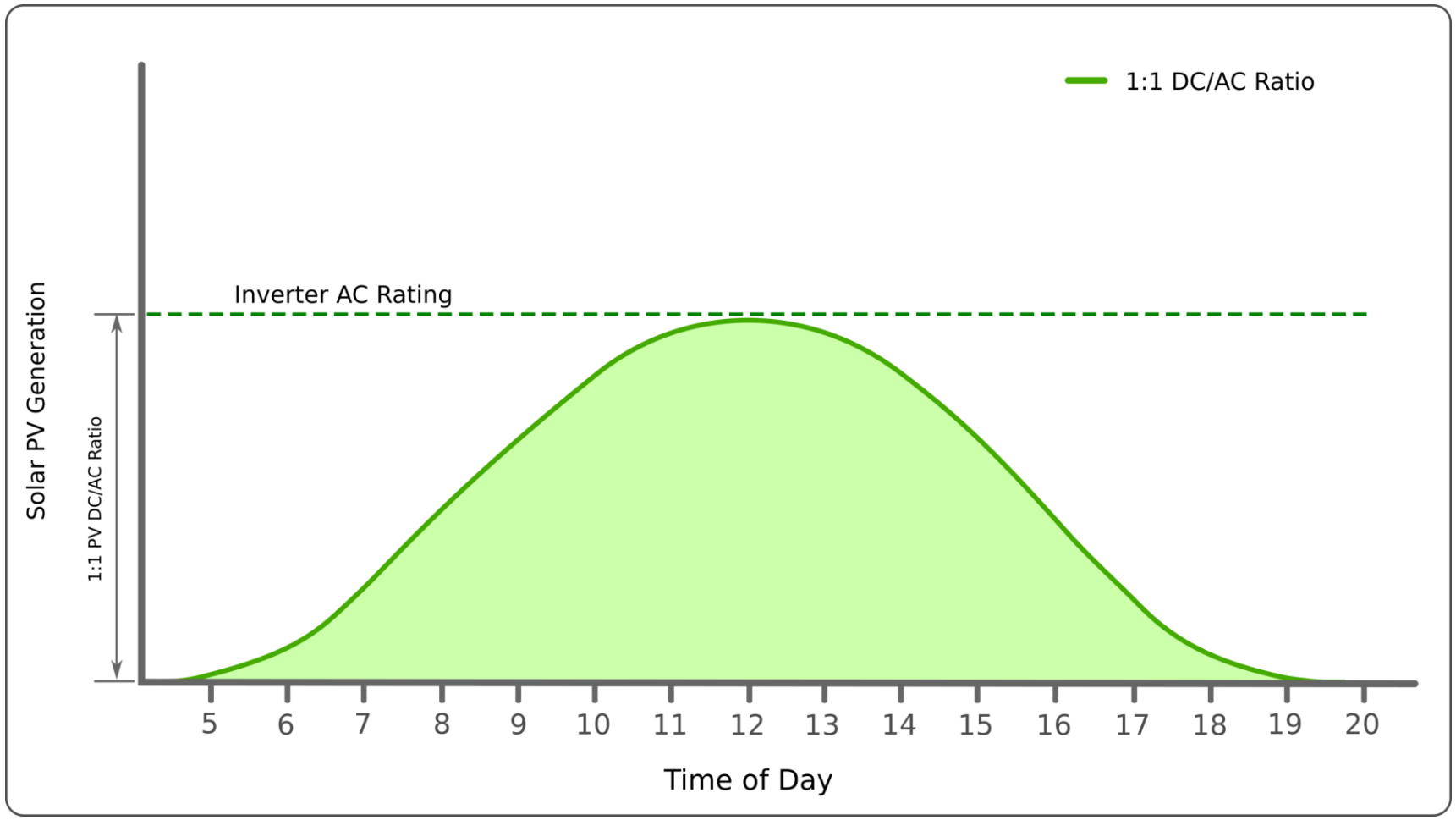
- A grid-tied inverter is primarily an **Energy (kWh)** producing device.
- The inverter should not be used as a Demand (kVA) producing device.



A Grid-Tied plants generated kVA is irregular and not consistent throughout the day

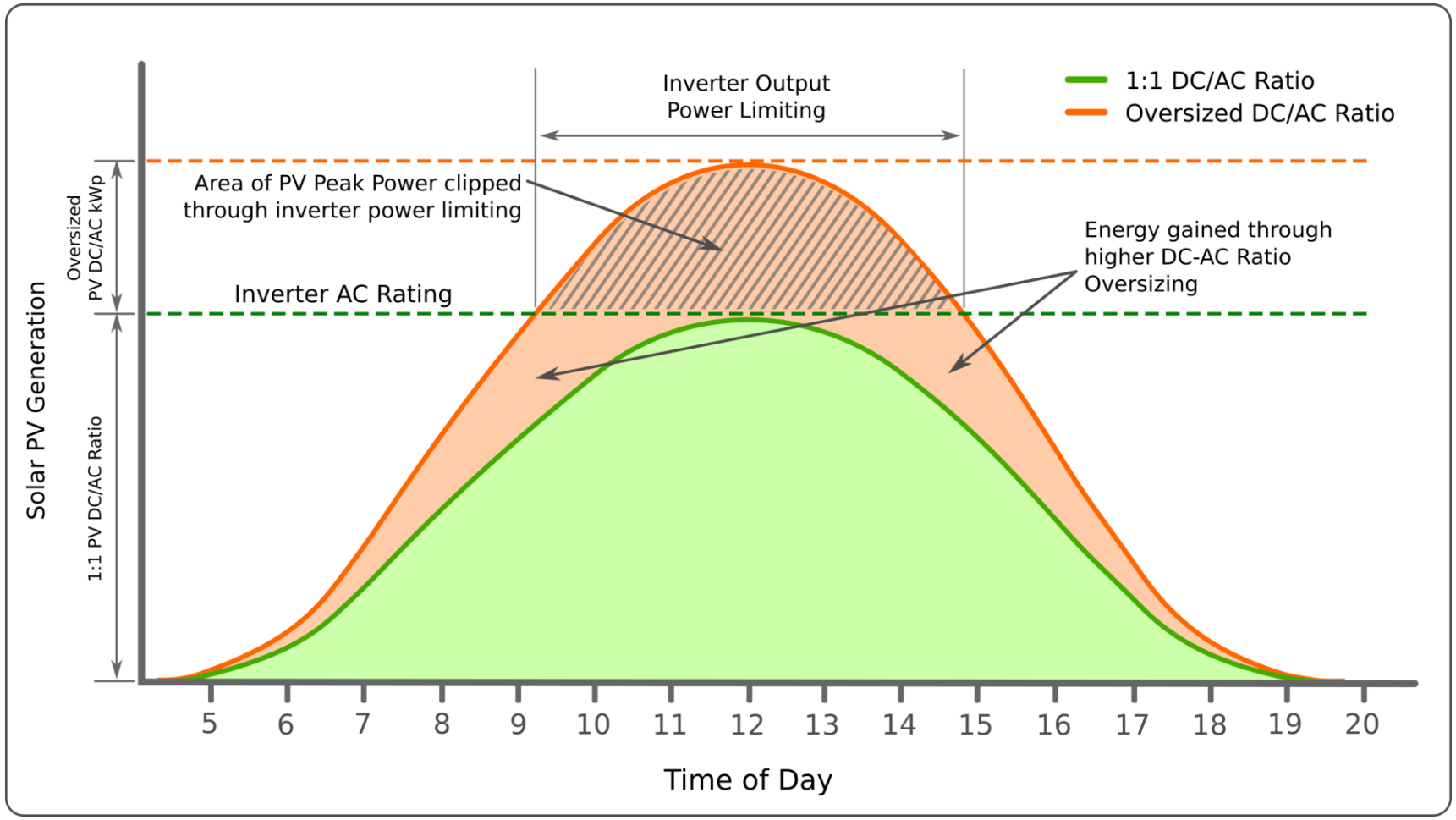
DC/AC Ratio & PV Oversizing

DC/AC Ratio at 1:1



DC/AC Ratio & PV Oversizing

Oversized DC/AC Ratio



DC/AC Ratio & PV Oversizing

PV Module MPPT Stringing

1. Not Every MPPT or PV String input needs to be used or full
2. For peak plant efficiency use the **Rated Voltage (Vmp)** value as the target string voltage
3. Always take into account the strings temperature compensation using the panels temp. coefficients for min Vmp
4. Never exceed 1000V Voc using the same temp. compensation simulations for roof top solar as per NRS097-2 > 4.1.1.16

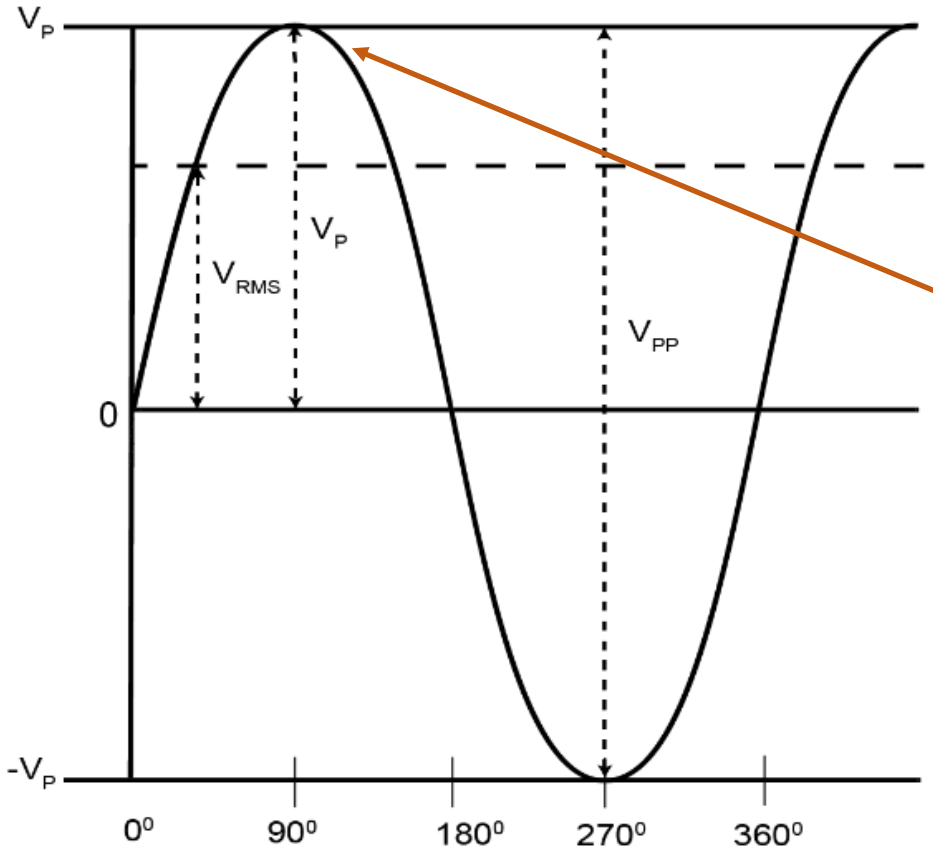
	DC INPUT
Recommended Max. PV Power	165kWp
Max. Input Voltage (Voc)	1100Vdc
Rated Voltage (Vmp)	600Vdc
Start-up Voltage	195Vdc
MPPT Voltage Range	180 – 1000Vdc

Rated MPPT Vmp Voltage vs. MPPT Voltage Range

DC/AC Ratio & PV Oversizing

PV Module Vmp vs. Grid Voltage

- **3 phase line to line grid voltage = 410Vrms > 579,82Vp**



PV Vmp String Voltage is used to generate the complete grid sinewave and not just the RMS portion as read by a standard multimeter.

DC/AC Ratio & PV Oversizing

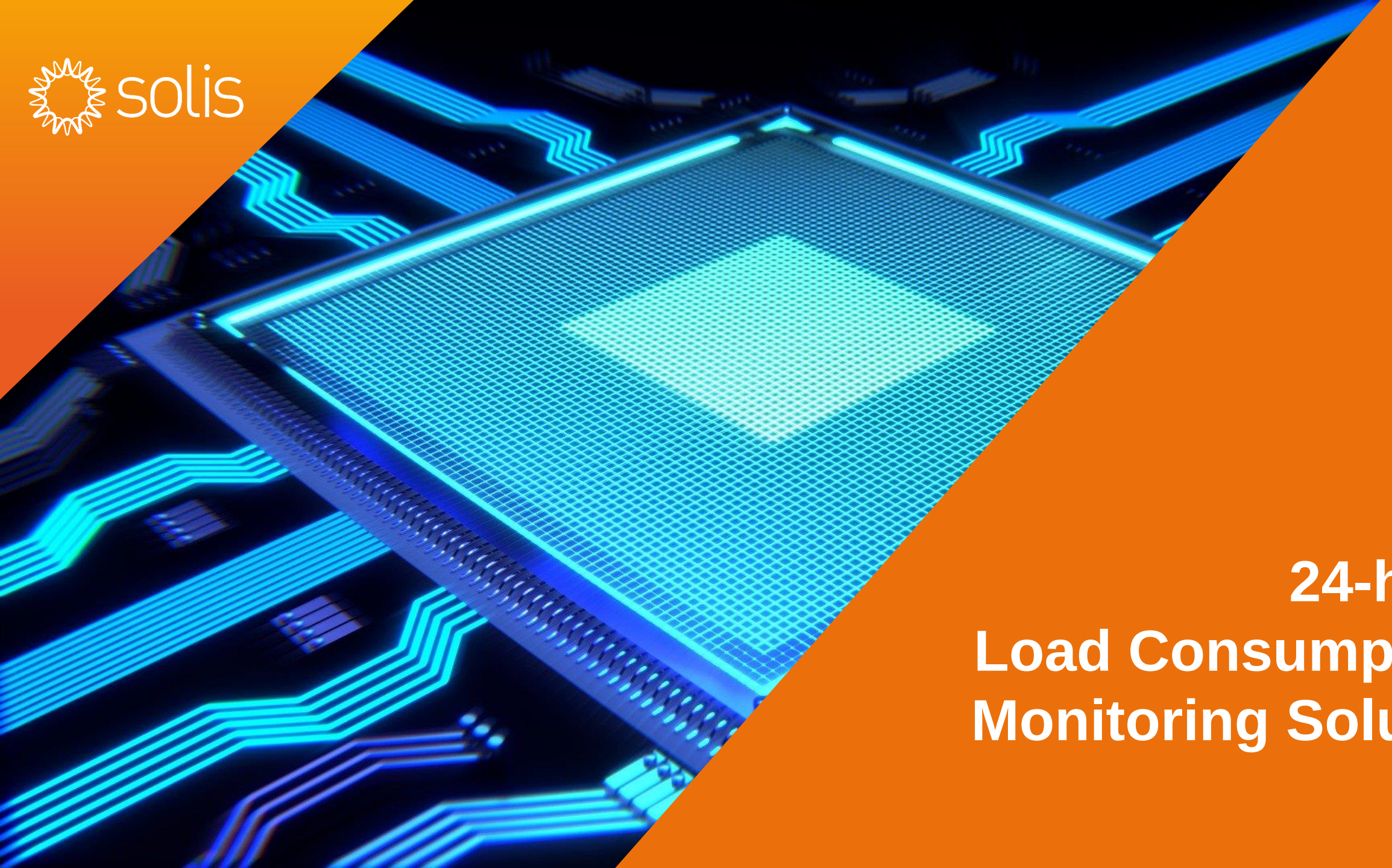
PV Module MPPT String Simulation Example

Minimum and maximum PV string voltage simulations using the example panel specs

	15x Module String	18x Module String
Voltage Vmp @ STC (25°C)	**627,0Vmp**	**752,40Vmp**
Minimum Vmp @ (70°C)	**528,25Vmp**	**633,90Vmp**
Maximum Voc @ (-10°C)	**818,08Voc**	**981,69Voc**

PV Module Specs Example	
Rated Pmax	545Wp
Open Circuit Voltage (Voc) [V]	49,75
Max Power Voltage (Vmp) [V]	41,80
Short Circuit Current (Isc) [I]	13,93
Max Power Current (Imp) [I]	13,04
Temp Coefficient of Isc	+0,045%/°C
Temp Coefficient of Voc	-0,275%/°C
Temp Coefficient of Pmax	-0,350%/°C

solis



24-hour Load Consumption Monitoring Solution

CONTENTS

01 Function

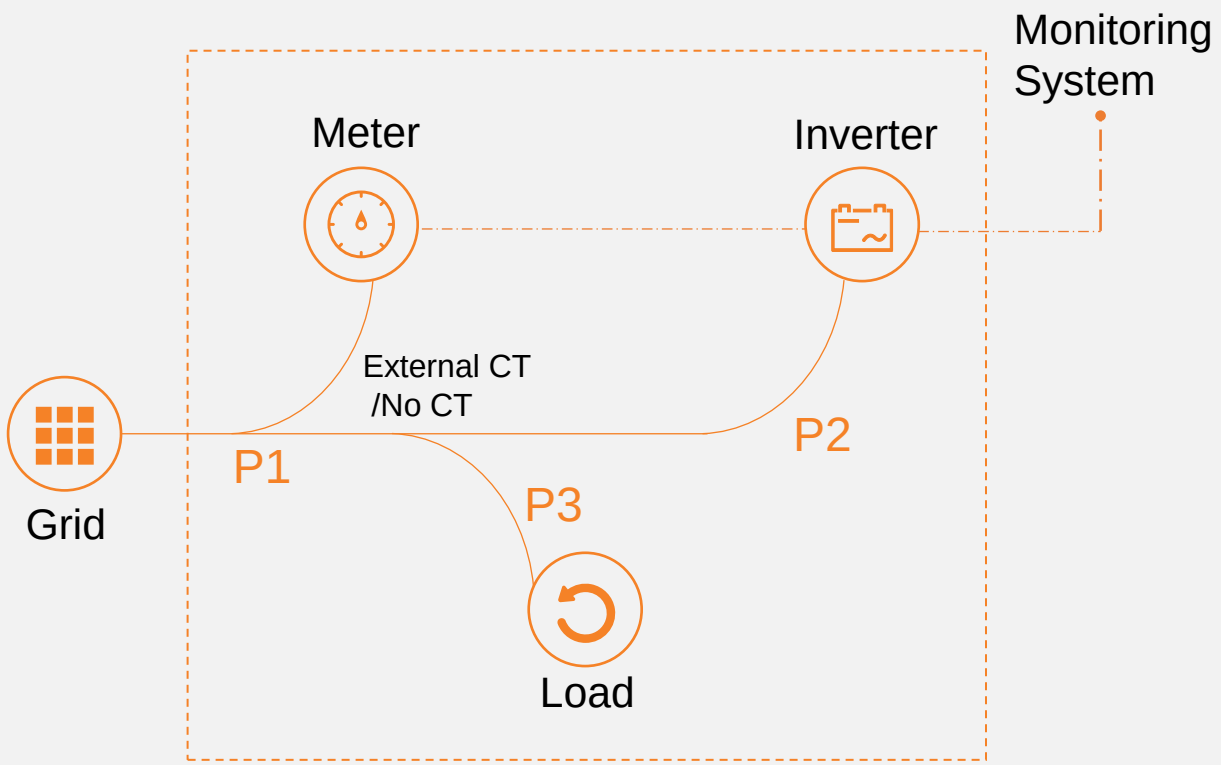
02 Accessory

03 Note

04 Schedule

Function

Monitor the load consumption for the whole day as long as the AC is available



“Meter In Grid” Configuration is required

During the day

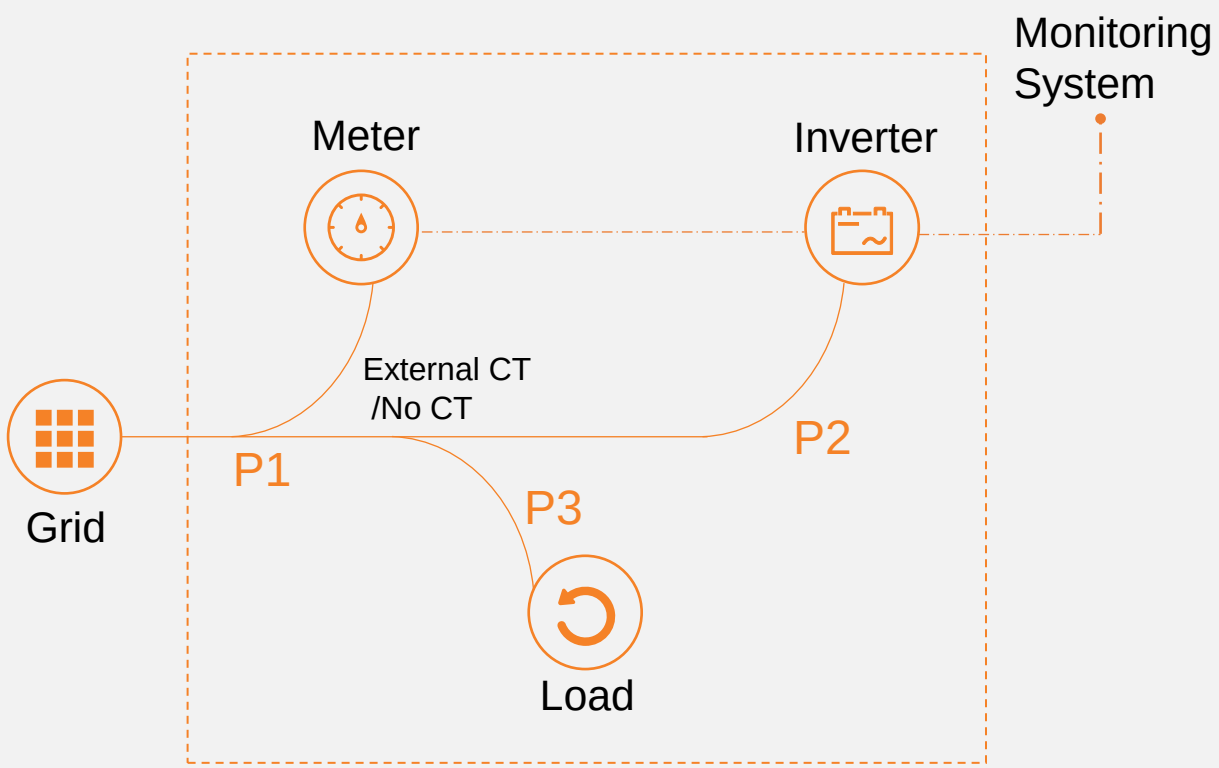
- Meter is able to monitor the power flow at the grid connection point P1
- Inverter has generation of P2
- Both data will be uploaded to the monitoring system through the inverter datalogger. Calculation is done by the monitoring system, load consumption power P3 is obtained. Furthermore, load consumption energy is obtained.

At night

- With the 24hour consumption monitoring function enabled(AC relay keeps closed), part of the internal circuit of the inverter (HMI board) is energized with the monitoring function still in active. Data can still be uploaded to the monitoring system.
- All day consumption monitoring is achieved

Function

Monitor the load consumption for the whole day as long as the AC is available



Following series of inverters are going to have this function:

- Solis-mini-(700-3600)W-4G
- Solis-1P(2.5-6)K-4G
- Solis-1P(7-8)K-5G
- Solis-3P(5-20)K-4G

Function | How to enable the function?

Step 1: Meter connected

- Refer to the next slides to connect the smart meter.
- Meter is located at the grid connection point
- Communication cable between the meter and the inverter is connected.
- There are 2 types of 1ph meter and 2 types of 3ph meter



1PH Meter
Direct Insert



1PH Meter
External CT



3PH Meter
Direct Insert



150A:5A

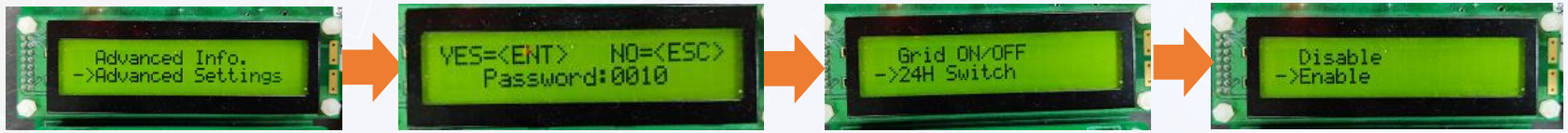
3PH Meter
External CT

Function | How to enable the function?

Step 2: Turn on the function through LCD

1. Advanced Setting -> Password:0010 -> 24H Switch -> Enable

   This setting is to keep the AC relays closed even at night, to ensure the data can still be uploaded to the monitoring system



2. **(Only for 1ph inverters, skip this step if it is a 3ph inverter)**

   Advanced Setting -> Password:0010 -> Internal EPM Set-> Meter Select -> 1PH Meter -> DDSD1352-C OR ACR10RD16TE

   1ph meters include two series which requires the correct setting for communication. No need for 3ph meters



3. Advanced Setting -> Password:0010 -> Internal EPM Set-> Mode Select-> Consumption Monitor

   If customer only need the 24hour consumption monitoring, choose the “Consumption Monitor”

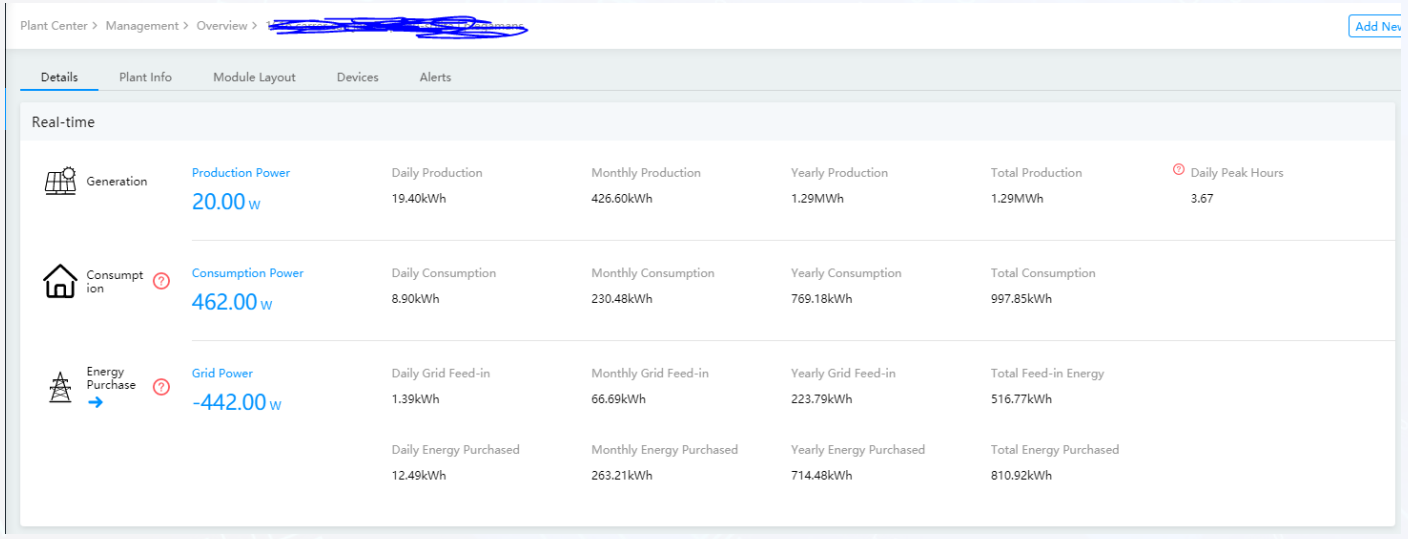
   If customer need both 24hour consumption monitoring AND the built-in export power function, choose the “Meter in Grid”



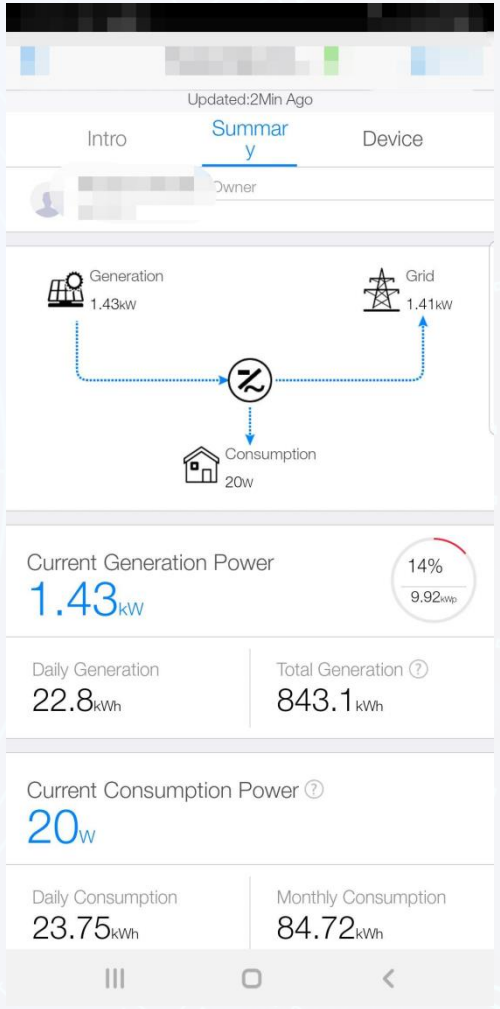
Function | How to enable the function?

Step 3: Get the inverter on the monitoring system

WiFi LAN GPRS



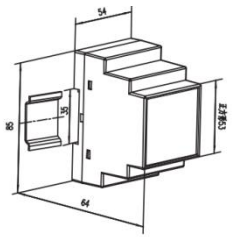
Web

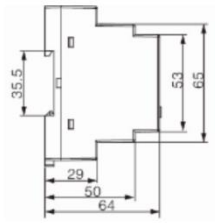


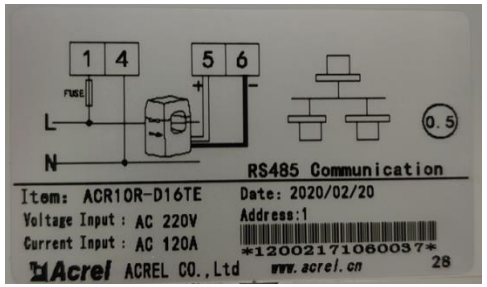
APP

Accessory

Single Phase Meter – With External CT





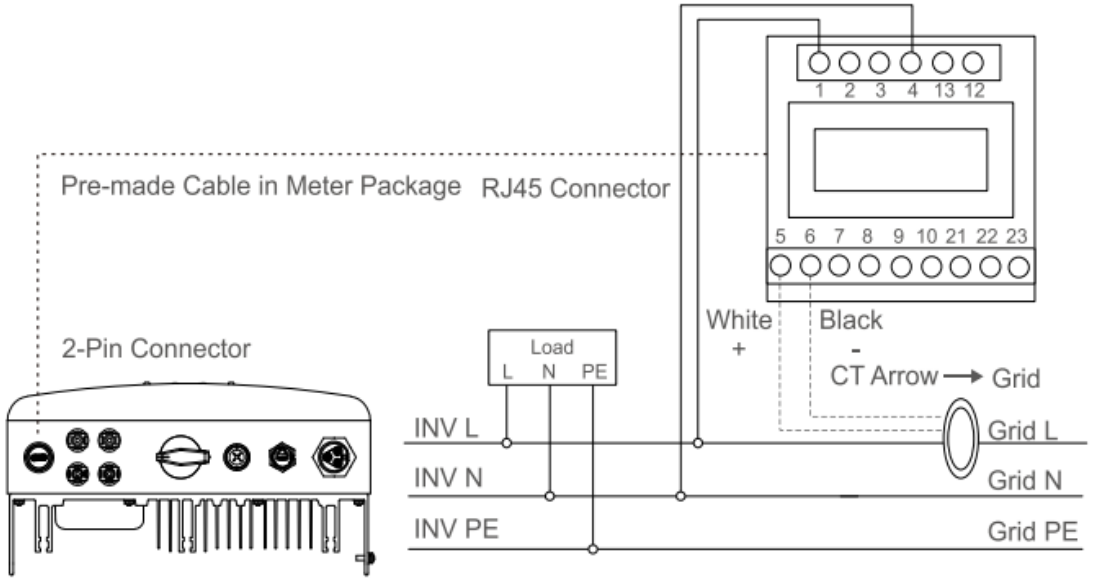


Model:

Solis-mini-(700-3600)W-4G

Solis-1P(2.5-6)K-4G

Solis-1P(7-8)K-5G



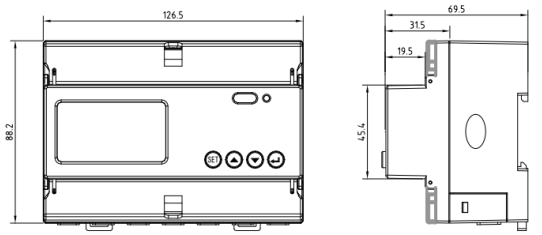
Acrel ACR10R-D16TE

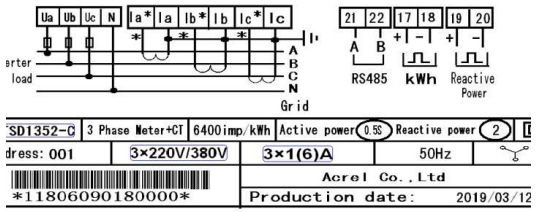
10M COM cable included
120A/40mA CT included
(Hole Diameter 16mm)



Accessory

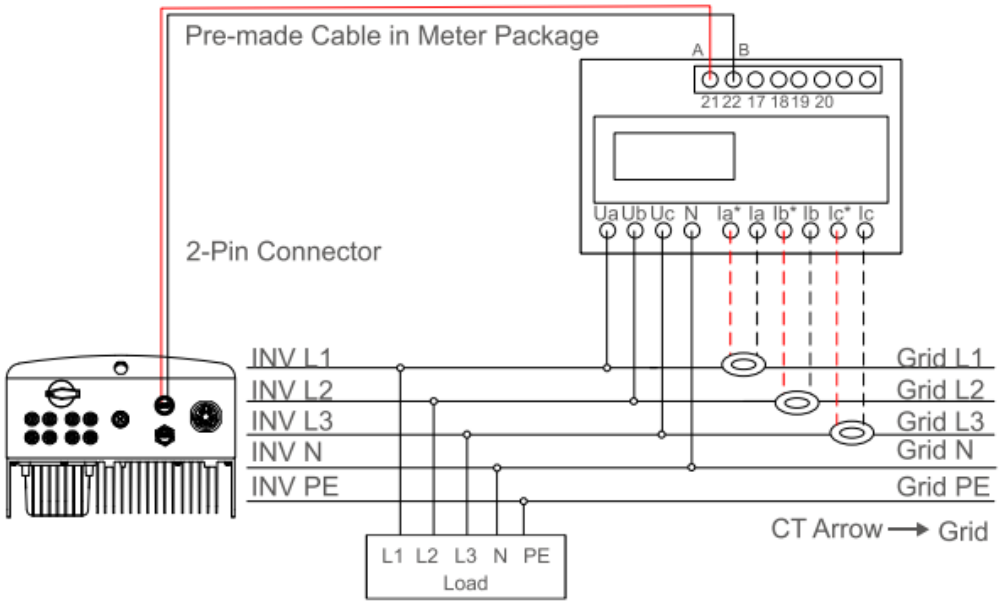
Three Phase Meter – With External CT





Model:
Solis-3P(3-20)K-4G

***** Solis-(25-50)K-5G also compatible, but only EPM function, not 24hour consumption monitoring



Acrel DTSD1352 3*1(6)A

10M COM cable included, 3 sets of 150A/5A CT included





150A:5A

Note

- Meter is required to be installed on the grid side
- “24hour consumption monitoring” and the “Internal EPM Function” can be both turned ON or individually turned ON.
- Meter is an accessory which needs to be ordered separately.
- All the meters are preset. No need onsite modifications on the meter, simple plug and play.
- Unauthorized setting change on the meter is forbidden. Avoid difficulties on troubleshooting.
- Hybrid Inverters don’t have the settings for this function, but they have a battery connected which can inherently achieve 24hour consumption monitoring.
- EPM1-5G/EPM3-5G/EPM3-5G-Plus is AC powered and the data uploading is not depending on the inverters. They can help the system achieve 24hour consumption monitoring as well.

Schedule

Model	Function Release Date	Firmware Upgrade
Solis-mini-(700-3600)W-4G	Ready. (7-8K-5G, end of July)	Both HMI and DSP need upgrade. HMI 30+, can do remote upgrade
Solis-1P(2.5-6)K-4G		
Solis-1P(7-8)K-5G		
Solis-3P(3-20)K-4G	Ready	Both HMI and DSP need upgrade. Can do remote upgrade

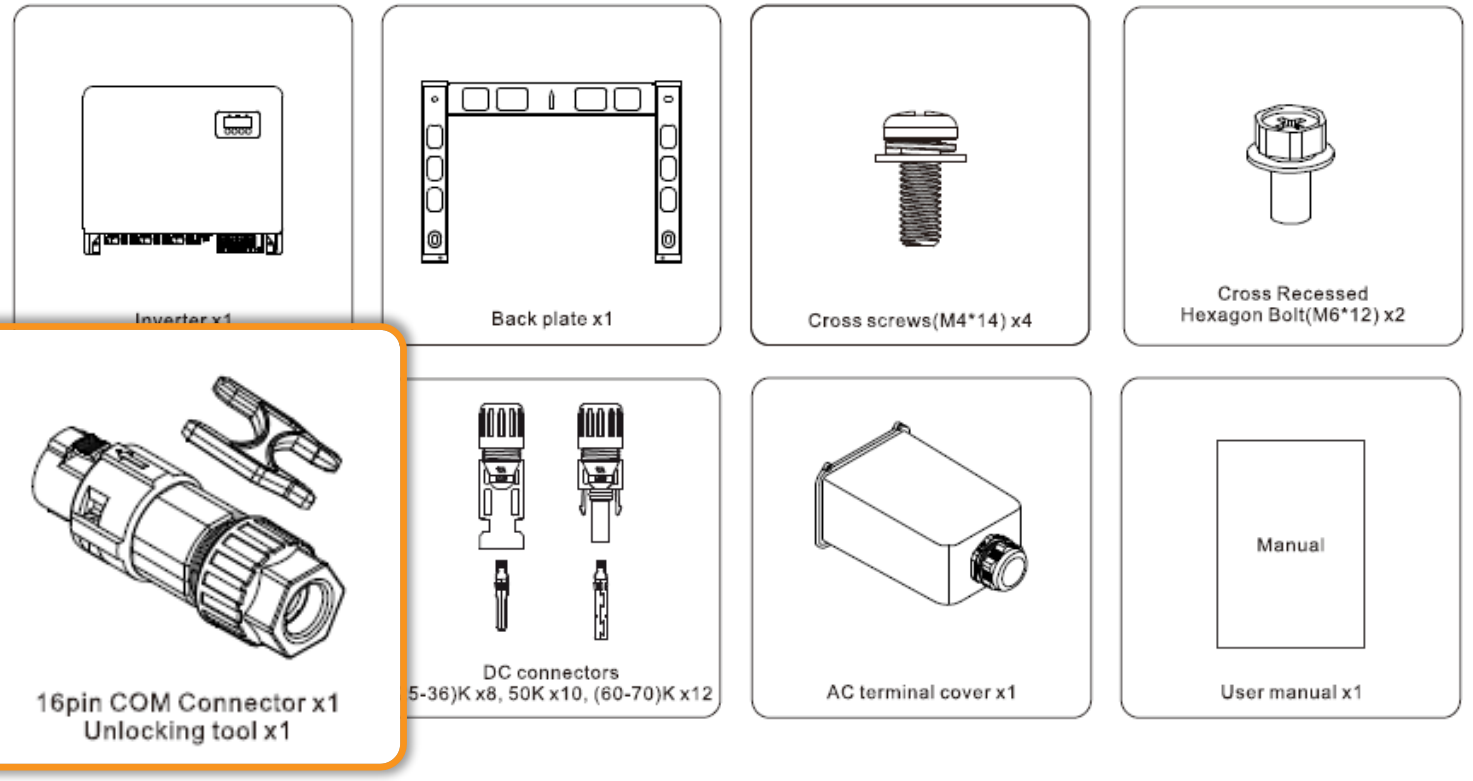
INSTALLATION & CHANGES

INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

STANDARD ACCESSORIES

UNPACKING AND STORAGE

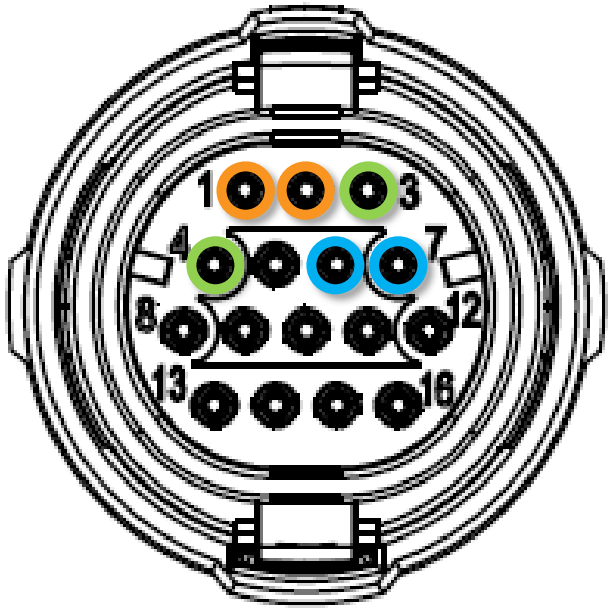
- When you receive the inverter, please ensure that all the parts listed are included



NEW 16 PIN COMMUNICATION CONNECTION PLUG

INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

NEW 16 PIN COMMUNICATION PLUG



- **Pin1 – Meter RS485-A**
- **Pin2 – Meter RS485-B**

  For connection of DTSD 1352 Modbus comms cable (24H consumption monitoring possible)
- **Pin3 – COM1 485-A**
- **Pin4 – COM1 485-B**

  For connection from I.E. EPM3-5G-PLUS Export Power Manager
- Pin5 - /
- **Pin6 – COM2 485-A**
- **Pin7 – COM2 485-B**

  For connection from I.E. Inverter 1 to Inverter 2 (Pin3 and Pin4)
- Pin8 - /
- Pin9 – DRM 1/5
- Pin10 – DRM 2/6
- Pin11 – DRM 3/7
- Pin12 – DRM 4/8
- Pin13 – RefGen
- Pin14 – Com/DRM0
- Pin15 – V+, 12V
- Pin16 – V-, GND

Contact SegenSolar (PTY) Ltd | **Email: info@segensolar.co.za | Tel: 011 085 2600**

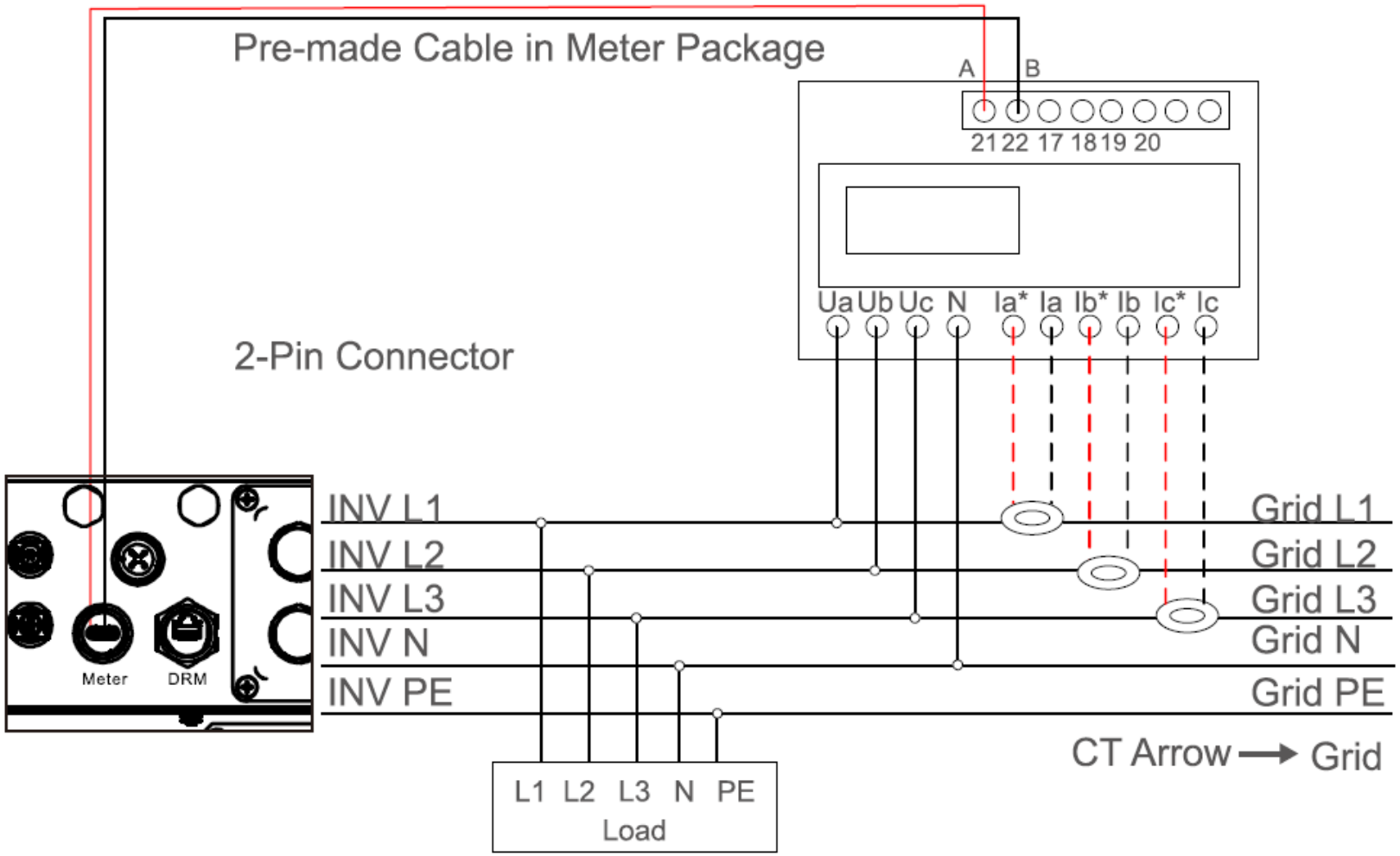
INSTALLATION CHANGES

Solis 3-Phase Meter

Meter: DTSD1352
Includes: 3x 150A:5A CTs
Part No: SOL-METER-3PH-CT3

For use with 1x S5 Solis Inverter

Full monitoring for PV production, consumption and net usage energy



INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

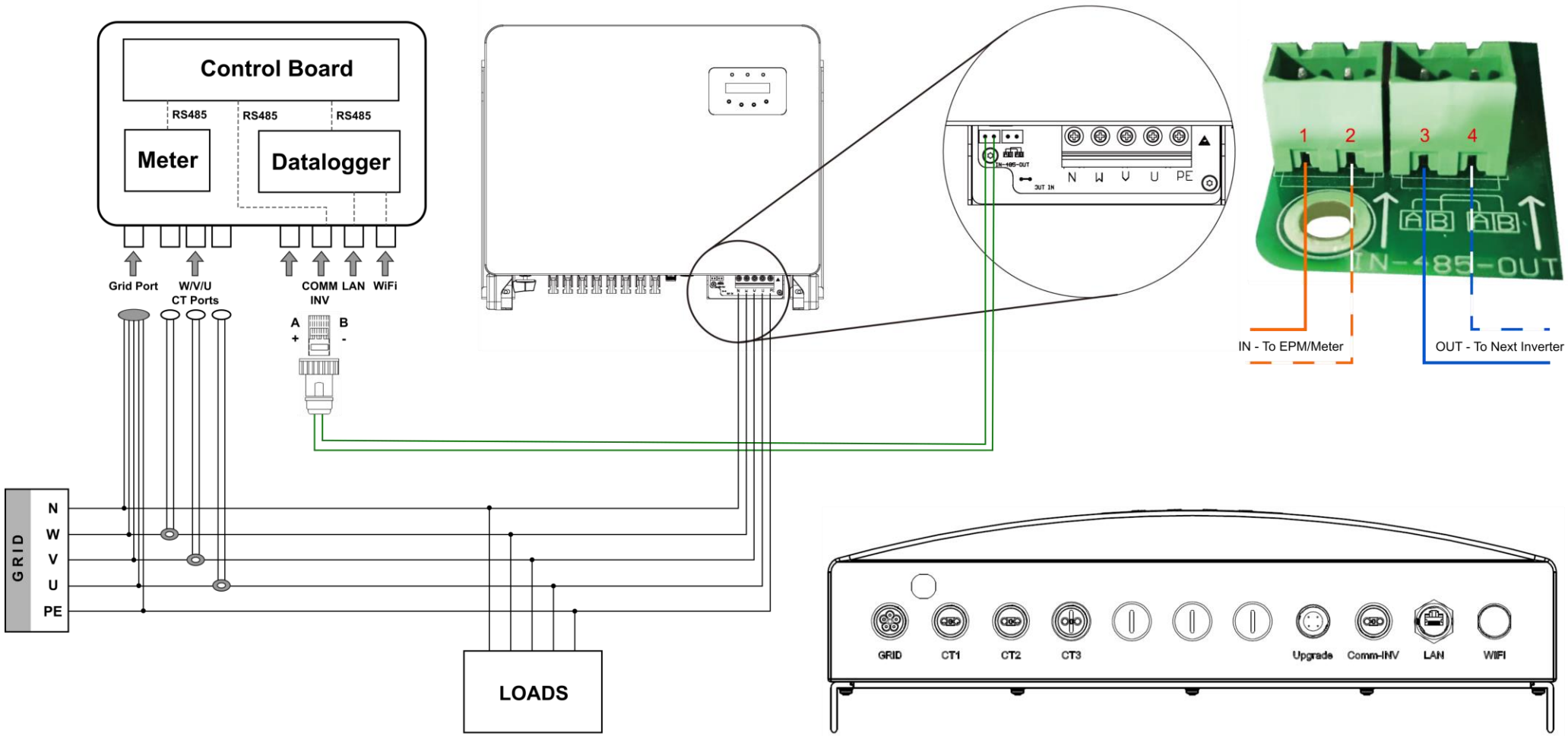
NEW 16 PIN COMMUNICATION PLUG

Connection of Solis DTSD 1352 External Meter (1 Inverter Application Only)



INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

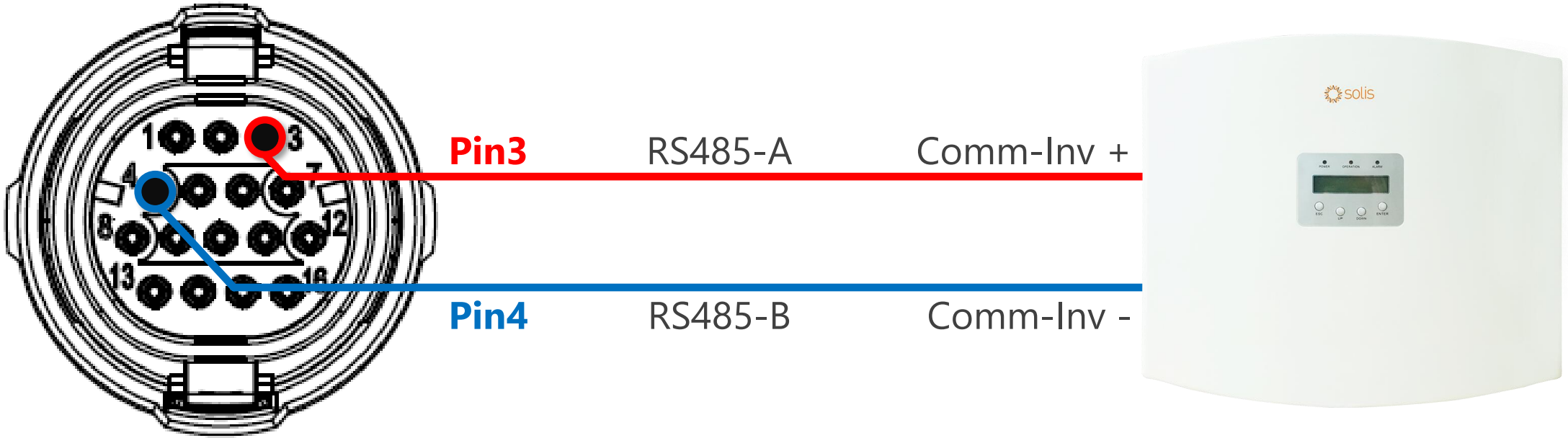
EPM and Inverter Comm Connection



INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

NEW 16 PIN COMMUNICATION PLUG

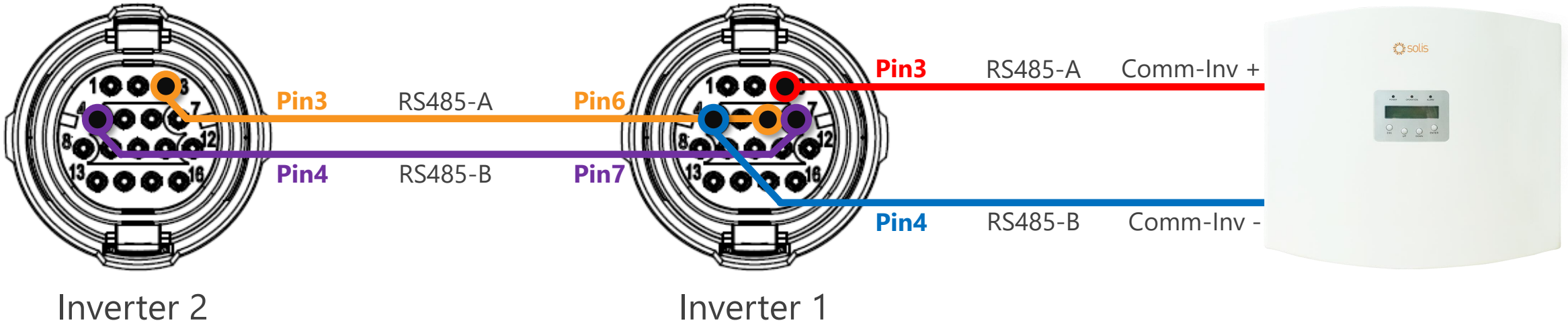
Connection of EPM3-5G-PLUS to Inverter 16 Pin Comm Plug



INSTALLATION CHANGES APPLICABLE TO SC-GC50/60K INVERTERS

NEW 16 PIN COMMUNICATION PLUG

Connection of EPM3-5G-PLUS to Inverter 1 – 16 Pin Comm Plug and Inverter 2 – 16 Pin Comm Plug



INVERTER/EPM SYSTEM SETTINGS

SYSTEM SETTINGS

EPM 3-5G-PLUS SITE SETTINGS

1. Set **Date and Time** of the EPM unit - Must be the same as the inverter date and time in the setting menu - EPM address always set to 01
   - Advanced settings- **Password 0010**
2. Inverter **QTY set** - Enter the total number of inverters connected to the EPM
3. Backflow Power - Set to **0000W** for no export- set a buffer (-1000W) to throttle the before it reaches the Zero export point - May differ depending on plant size
4. PELD - Set to **'ON'**, this will activate the export limitation function
5. Set meter CT - **Set the CT ratio**: IE. 200Amp CT with 5 A secondary output - *Calculate as follows: 200 divided by 5=40 CT ratio is 40: 1*
6. Failsafe - Set Failsafe to **'ON'** (RUN)
7. Set **EPM Regulator** - Set total AC output capacity of connected inverters. IE: 4 x 50KW inverters - Set the value to 200000W
8. Backflow **Work Mode**: Select work mode 1 or mode 2 - For lowest phase limitation, select work mode 2

Inverter Setting: Advanced settings > External EPM set > Select 5G-EPM > Failsafe > 'ON'

If only one inverter on site - Inverter address should be set to 01

SYSTEM SETTINGS

Slow Ramp Rate Setting

NRS097-2-1 specifies that a PV Plant greater than 100kVA should have a Slow Ramp to full power. This helps to protect grid infrastructure, keep grid voltages stable and protect the solar equipment from a poor-quality grid.

1. Enter into the inverters **Advanced Settings** using **password 0 0 1 0**
2. Scroll down and select **STD. Mode Settings** and Enter
3. Select **Power Rate Limit**
4. Select **Power Rate: 600%**
5. Use up arrow until a value of **10%** is reached
6. Press ESC X2
7. Select Save & Send

NRS097-2-1:2017 – Annex G

G.1 Generation management network security management

G1.3 Embedded generation systems with a power output capability of 100 kVA or more shall be able to control the output power in steps of 10 % or less of the rated active power.

Nb. Inverters produced from Nov - Dec 2022 should be supplied standard with this setting enabled.

SYSTEM SETTINGS

Power Factor Compensation (pf)

When a new PV plant is initially commissioned it is very important to know and set the consumers actual power factor (pf) before allowing the plant to freely generate PV power.

Solis inverters are delivered out of the box in an operational mode called “Q MODE” which generates power at a fixed pf of unity or 1.

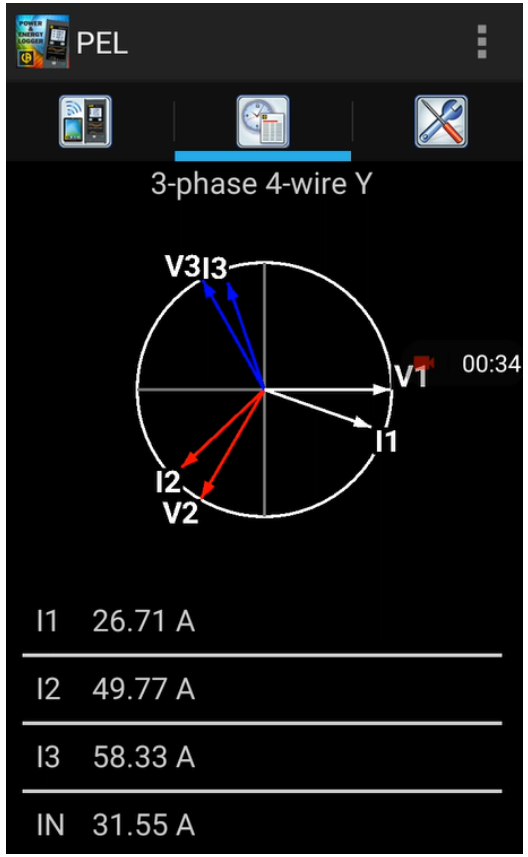
Generating power at unity or 1 with the consumers actual power factor less or more than unity will cause the resulting phase angle to become excessively worse resulting in power being exported back into the grid.

After correctly setting the inverter/EPM operation mode the consumers power factor will not be affected and in some circumstances the power factor could even be corrected.

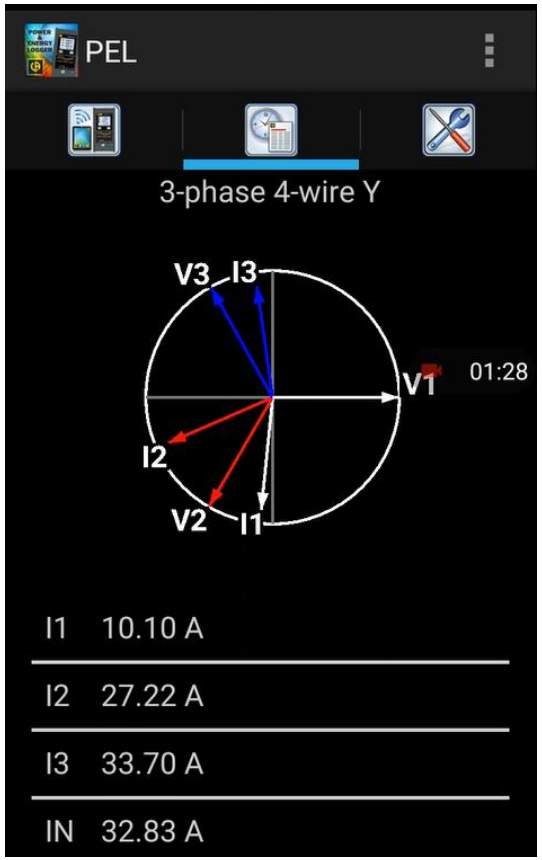
Nb. Failure to adjust pf can cause adverse conditions and power being exported to the municipal grid.

SYSTEM SETTINGS

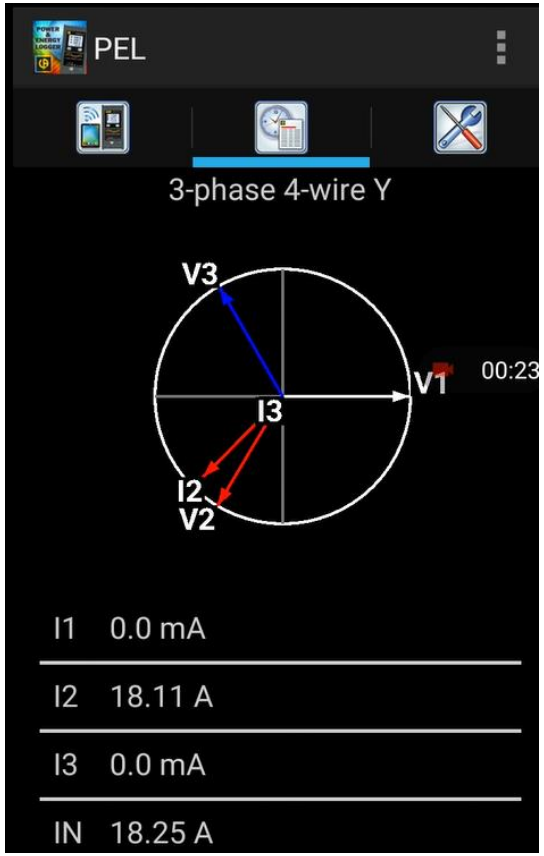
Power Factor Compensation (pf)



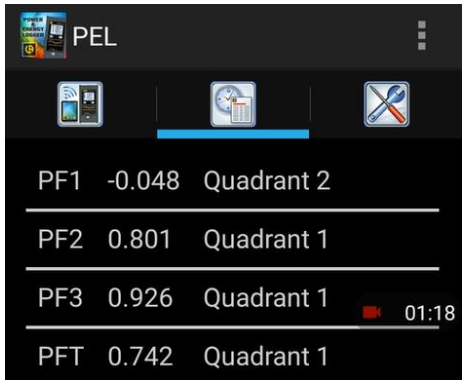
Normal Phase Angle before PV



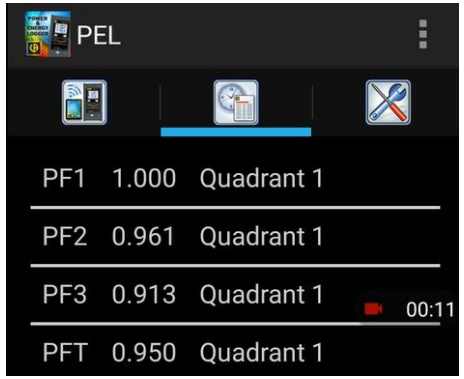
Resulting Phase Angle with PV



Phase Angle after adjustment.



Resulting Phase Angle with PV



Phase Angle after adjustment.

SYSTEM SETTINGS

Power Factor Compensation (pf)

Setting Overview:

There are 2 Modes of pf adjustment that can be used:

1. Inverter Adjustment: This is a static adjustment that does not follow actual consumer pf. The settings also need to be manually done on each inverter in the plant.
2. EPM SGV Setting: This setting is a dynamic adjustment, the EPM will dynamically vary the inverters pf based on the consumers pf. This will adjust all inverters connected to the EPM.

Both these modes are discussed in our Fixed pf Adjust SOP technical note. Please contact us directly for a copy of the procedure.

Nb. Failure to adjust pf can cause adverse conditions and power being exported to the municipal grid.

COMMERCIAL SYSTEMS - COMMON FAULTS

IMPORTANT NOTES

1. It is important to always check the Alarm and warning screen of the inverter
2. This will guide you to determining and resolving the inverter fault
3. We will discuss some of the most common on-site Alarm conditions and the potential remedies for these conditions



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

DISPLAY BLANK

CAUSE:

- Input voltage low/missing
- Polarity reversed
- LCD damaged

TEST – DC switch OFF – Cable OFF

- Check **PV connections**
- Check **polarity**
- Check **voltage > Startup voltage**



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

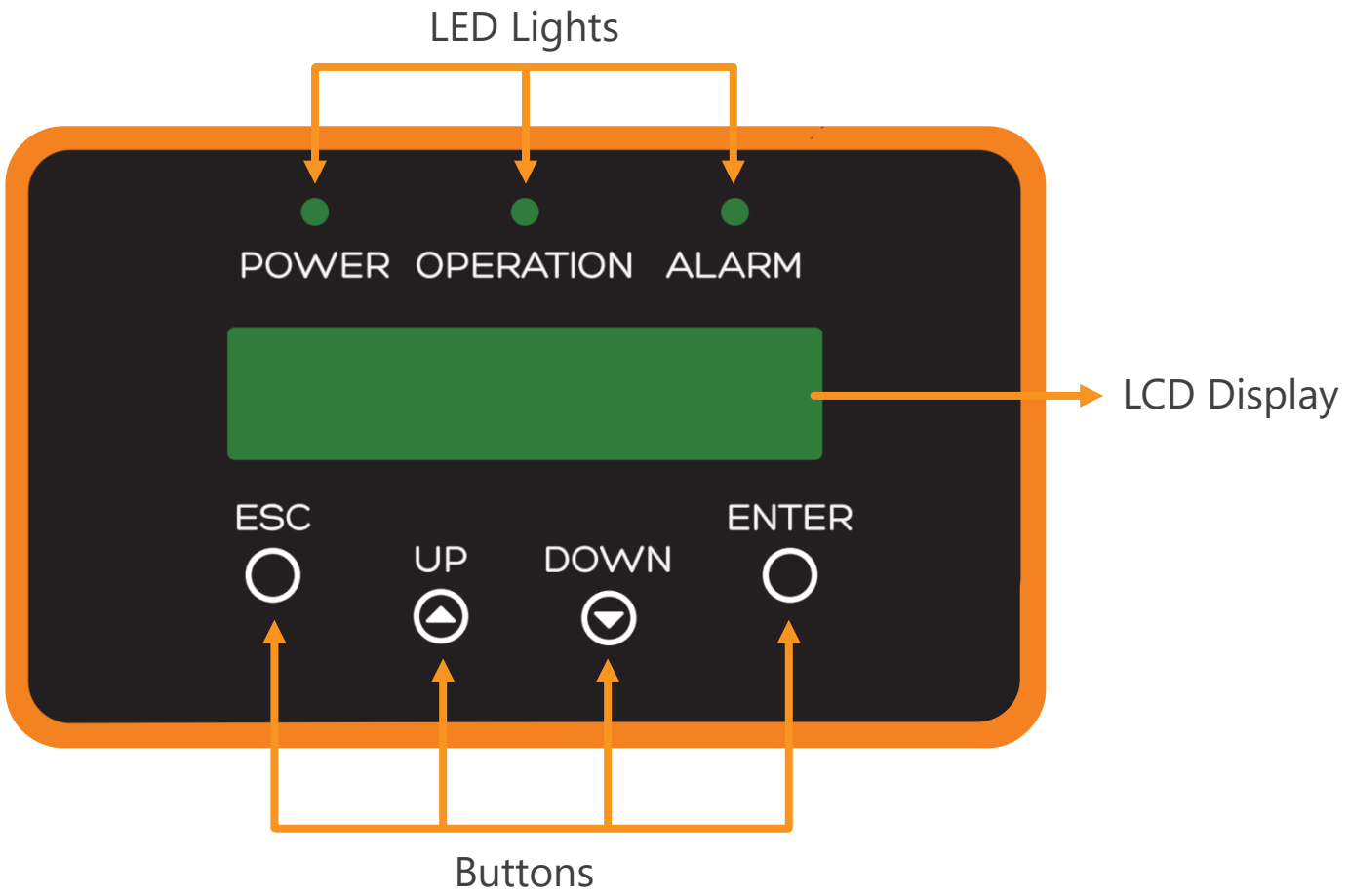
STUCK IN "SOFTRUN"

CAUSE:

- Inverter HMI haven't received the control signal from the DSP board

SOLUTION:

- **Restart the inverter** to see if it recovers
- A cable may have been damaged or loosened in shipping, replace inverter



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

OV-G-V01/OV-G-V02

CAUSE:

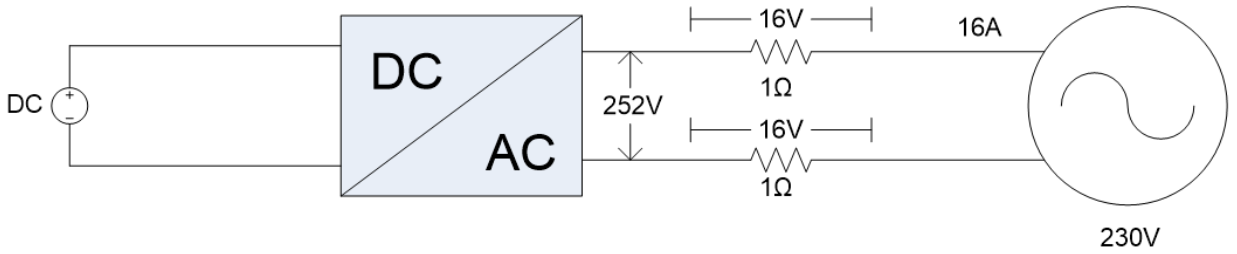
- Incorrect grid standard was selected
- AC cable is undersized / too long
- Measurement error
- AC cable are not correctly inserted

CHECK:

- Go to **'Advanced Info' > 'Running Message' > 'Standard'** - Check if it is the grid standard that your local network requires.
- Go to **'Information' – Check the V_A, V_B, V_C**. See if they are the same with actual measured values from a multimeter.
- Check the **AC terminal** to see if it has the correct polarity. For example, N and L1 are not reversed.

SOLUTION:

- Advanced settings: **'Compensation Set' > 'SetVoltage' > voltage may be set + or – 5 volts on each phase**





Solis-3P(5-10)K-4G AC Terminal

COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

UN-G-V01/UN-G-V02

CAUSE:

- Low grid voltage is detected

TEST - DC switch OFF:

- Check **AC at the inverter**
- If AC is low and grid standard is correct, adjust lower limit ***with permission from utility***.

SOLUTION – DC switch ON:

- Check grid standard
- Replace inverter



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

OV-G-F/UN-G-F

CAUSE:

- High/Low grid frequency is detected

TEST - DC switch OFF:

- Check **frequency at the inverter AC**
- If frequency measures high/low, adjust upper/lower limit ***with permission from utility***.

SOLUTION – DC switch ON:

- Check grid standard (50Hz or 60Hz standard)
- Replace inverter



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

NO GRID

CAUSE:

- Inverter does not detect the grid

TEST - DC switch OFF:

- Check **AC at the inverter**
- Check all: Live-Live, Live-GND

SOLUTION – DC switch ON:

- Check grid standard
- Replace inverter



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

OV-DC

CAUSE:

- Inverter detects high DCV

TEST - DC switch OFF – CABLE OFF:

- Check **DC at the inverter**
- If DCV is high, too many panels in the string

SOLUTION – DC switch ON:

- Check LCD reading, may be bad measurement circuit
- Replace inverter

Note: *DC arcs sometimes may also trigger the OV-DC alarm. Check if the DC connectors are fastened.*



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

OV-BUS/UN-BUS

CAUSE:

- Inverter detects high/low DCV on internal bus capacitors

TEST:

- Check **DC and AC voltage**
- Compare with LCD

SOLUTION – Replace Inverter:

- Internal component damaged by DC overvoltage or lightning strike



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

UNB-BUS

CAUSE:

- Inverter detects unbalanced voltages on the bus capacitors

SOLUTION – Replace Inverter:

- Internal component damage

Note: *Serious lightning strikes may lead to this damage and alarm.*



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

Temp-PRO

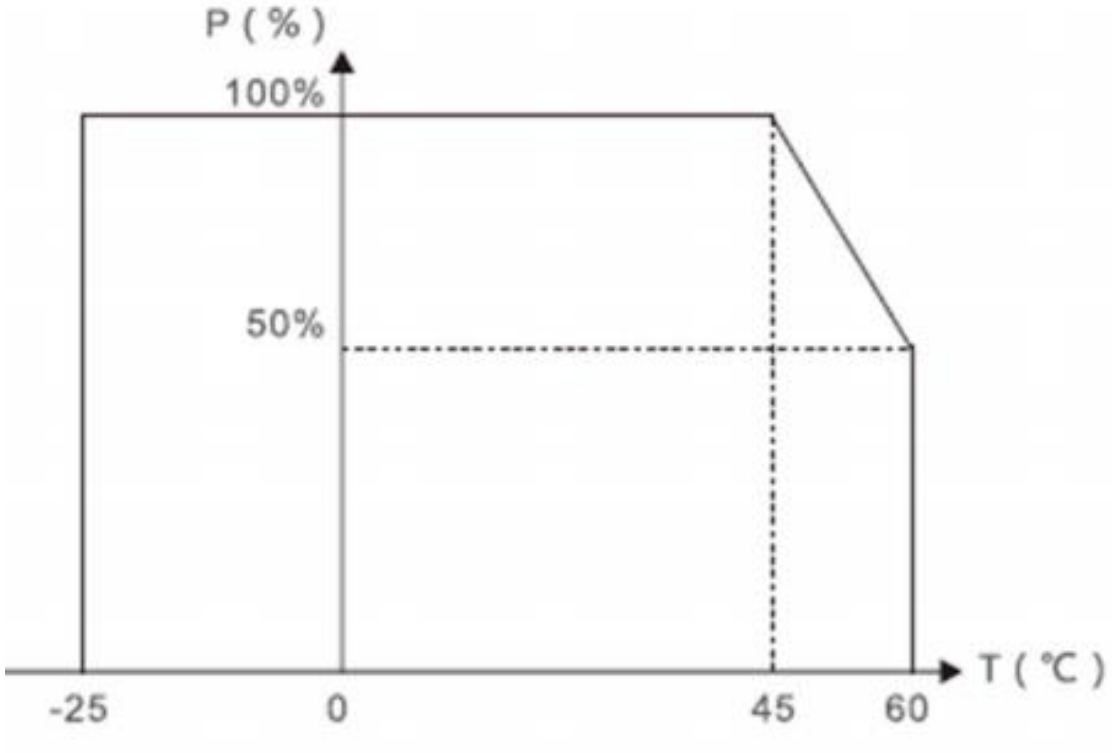
CAUSE:

- Inverter detects high temperature

SOLUTION – Inspect Installation:

- Check heatsink for **obstructions/ventilation**
- **Is inverter in direct sunshine?** Move to another location.

Note: *The "Temperature" in the "Running Message" in LCD indicates the temperature near the IGBT.*
(IT IS NOT the Ambient Temperature)



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

PV-ISO

CAUSE:

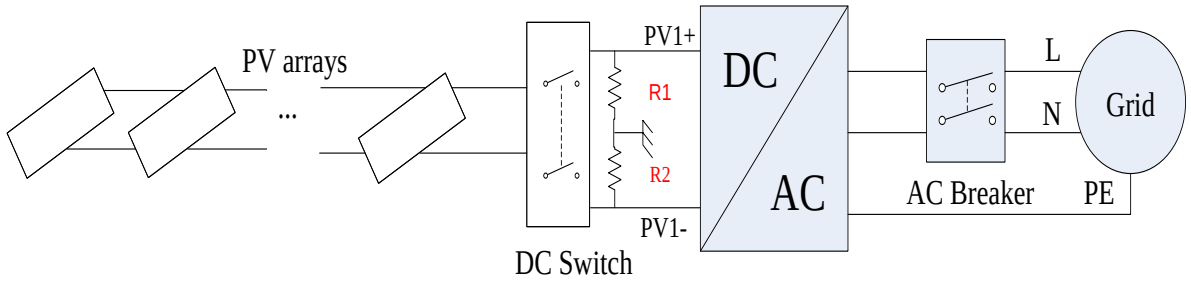
- The inverter detects low DC insulation resistance

SOLUTION – IF IT DOESN'T RECOVER:

- Try to inspect the **DC circuit insulation resistance** like cables, switches, etc.
- **Disconnect all PV strings**, connect one of the strings and see if the inverter works fine. Then try another.
- Until you find the string that causes the PV-ISO
- Check if that string cable has any broken insulation cover

SOLUTION – IF IT HAPPENES OCCASIONALLY:

- Weather condition will affect the DC insulation resistance, like early morning, raining days etc.
- Contact After-sale department for further assistance



COMMON ALARM CODES AND SOLUTIONS GRID-TIED INV

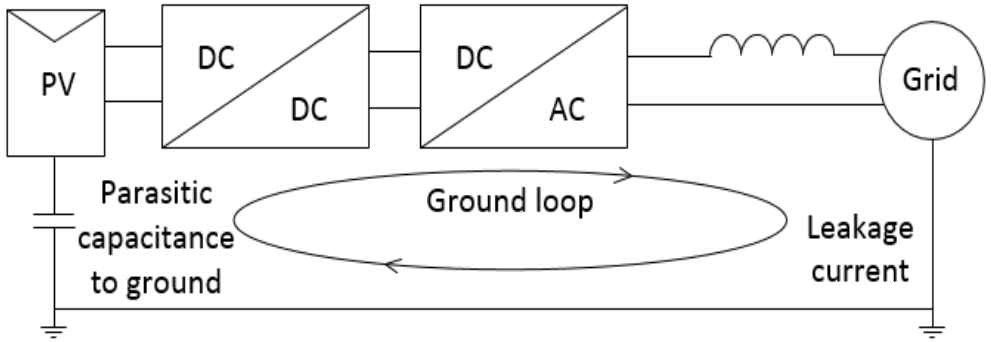
ILEAK-PRO

CAUSE:

- The inverter detects leakage current higher than limits

SOLUTION:

- Try inspect the DC system
- Similar to PV-ISO, **broken insulation on DC side** will cause this



Ileak-pro 01: transient leakage current over 30mA, disconnect 0.3s

Ileak-pro 02: transient leakage current over 60mA, disconnect 0.15s

Ileak-pro 03: transient leakage current over 150mA, disconnect 0.04s

Ileak-pro 04: transient leakage current over 300mA, disconnect 0.3s

REMOTE MONITORING

The series 5 inverters can be monitored remotely through the use of either the **external EPM 5G or the datalogging stick**.

The EPM5G contains the export power control and an internal datalogger.

If the site does not have an EPM but remote monitoring is needed, then the datalogger (depicted on the far-right) can be used.



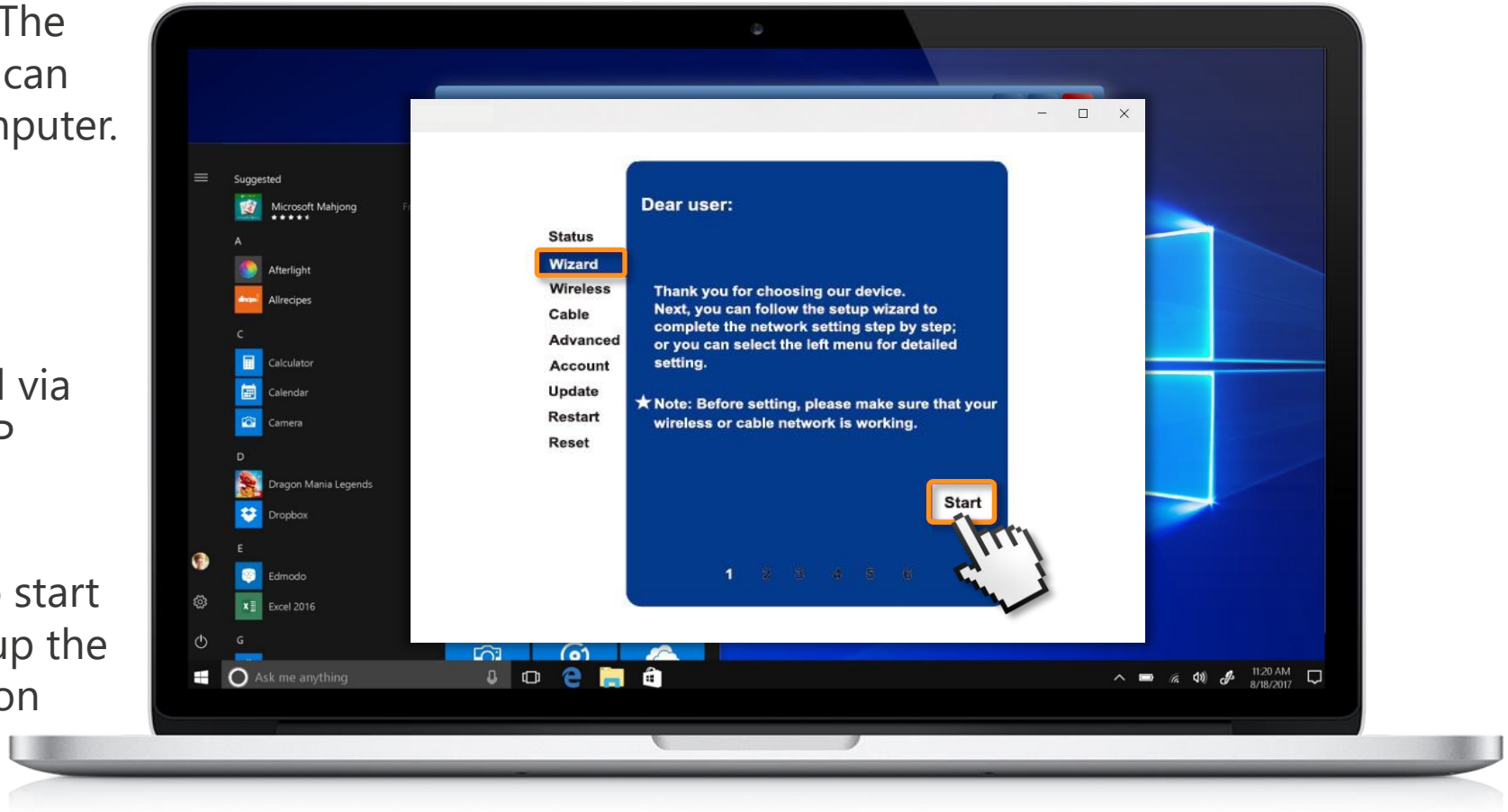
REMOTE MONITORING

When the EPM is powered up or the datalogger inserted on the inverter. The **logger emits a Wi-Fi network** that can be picked by a smartphone or a computer.

The Wi-Fi name contains **the datalogger's serial number**.

The Wi-Fi stick can then be accessed via the web browser using this default IP Address – **10.10.100.254.**

Thereafter, press the **'Wizard'** tab to start the step-by-step process of linking up the Wi-Fi stick to the main Wi-Fi router on site.



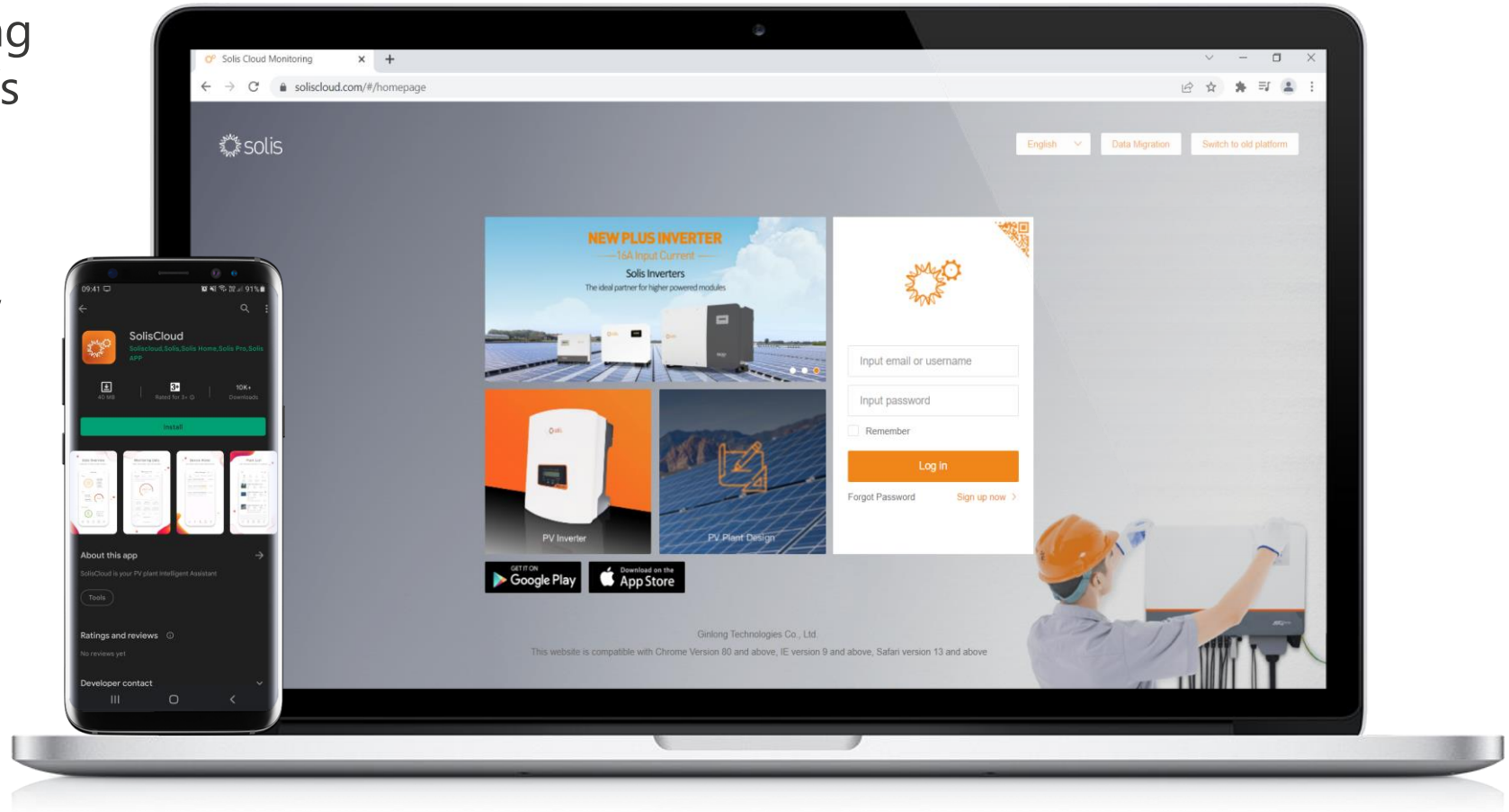
REMOTE MONITORING

SolisCloud is the main monitoring platform for all Solis inverters. It's accessible from the web-based platform www.soliscloud.com

Or via a mobile app "SolisCloud" that can be downloaded on:

GET IT ON Google Play

Download on the App Store



Contact SegenSolar (PTY) Ltd | **Email: info@segensolar.co.za | Tel: 011 085 2600**

LOCAL SUPPORT

FOR PRE-SALES & POST-SALES (RELATING TO COMMISSIONING AND TROUBLESHOOTING OF MALFUNCTIONING UNITS) TECHNICAL SUPPORT **PLEASE CONTACT YOUR RESPECTIVE TECHNICAL SUPPORT AGENT.**



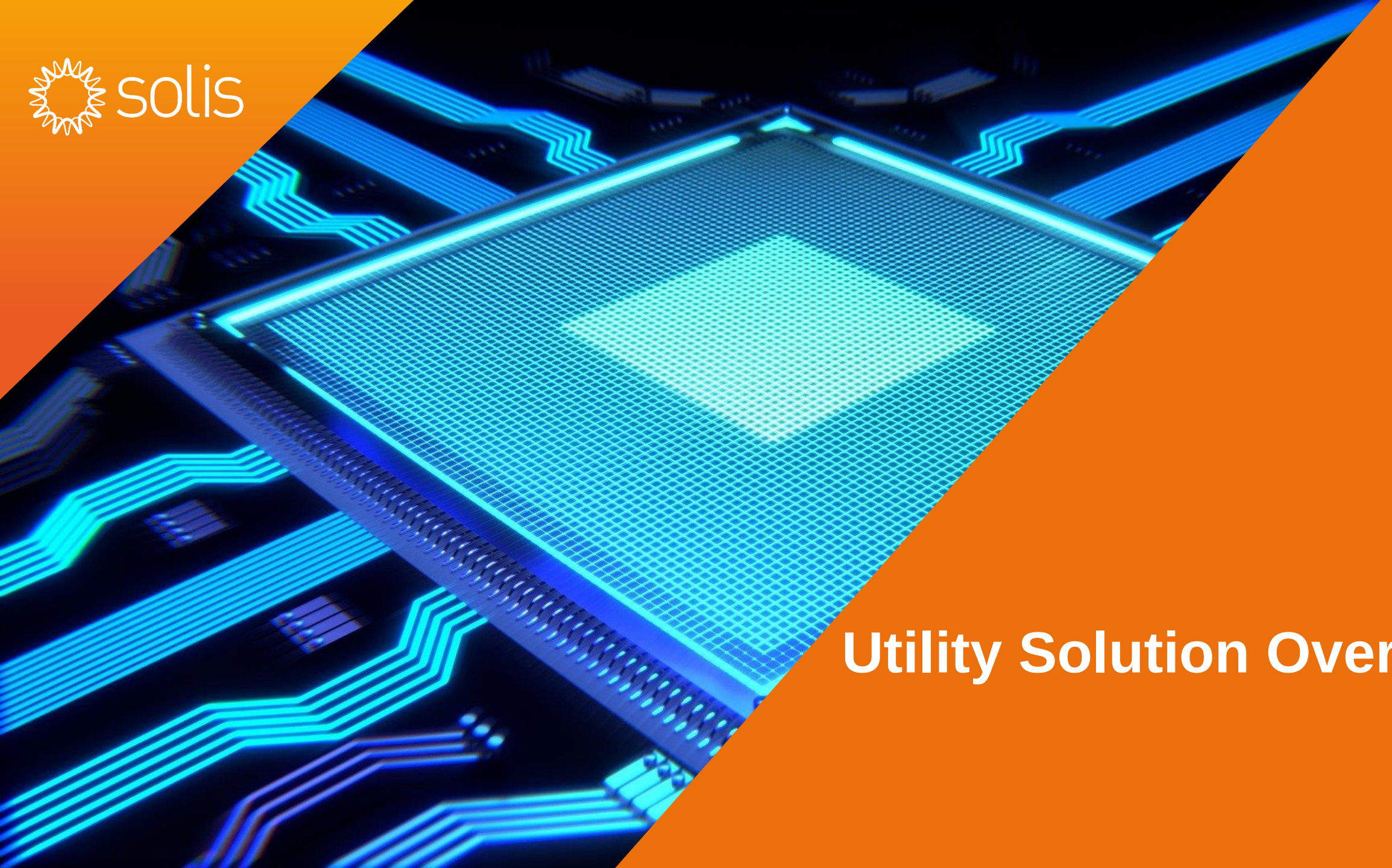
LOCAL SUPPORT

IN ORDER TO PROVIDE A FAST AND USEFUL FEEDBACK TO THE AFTER-SALE INQUIRES, IT IS BETTER FOR YOU TO PROVIDE THE FOLLOWING INFORMATION FOR US:

- Inverter **SN number**
- Inverter **Firmware Version**
- Alarm **Code**
- A short **description of the fault**
- A short video of the **"Information" screens** on the inverter HMI
- A short video of the **"Running Message" screens** on the inverter screens
- System Configuration (PV Array, Panel type, etc)



solis

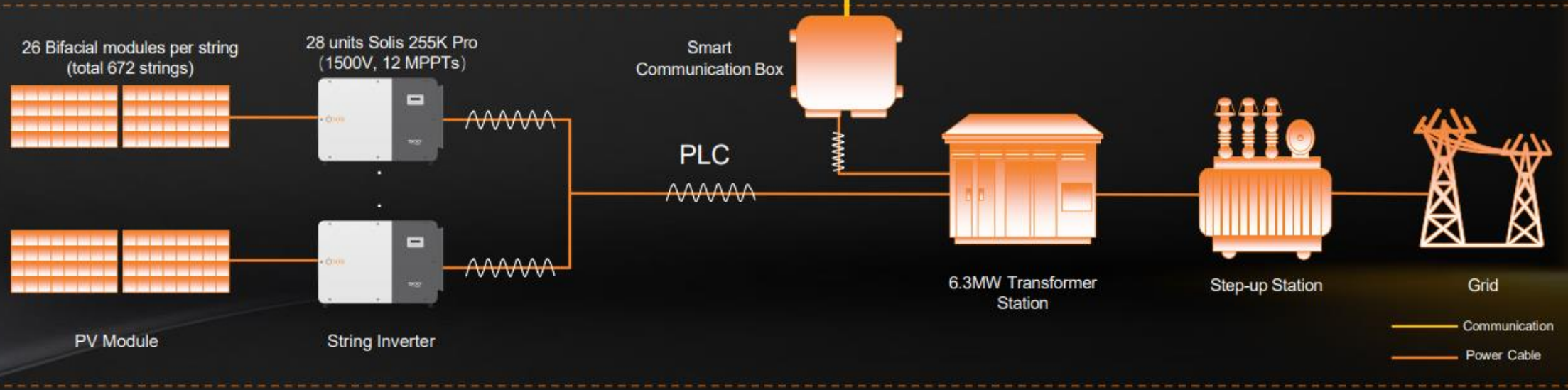


Utility Solution Overview

Utility Solution Overview

solis





High DC/AC Ratio

- 12 MPPTs design
- Support 200% DC/AC ratio

High Yield

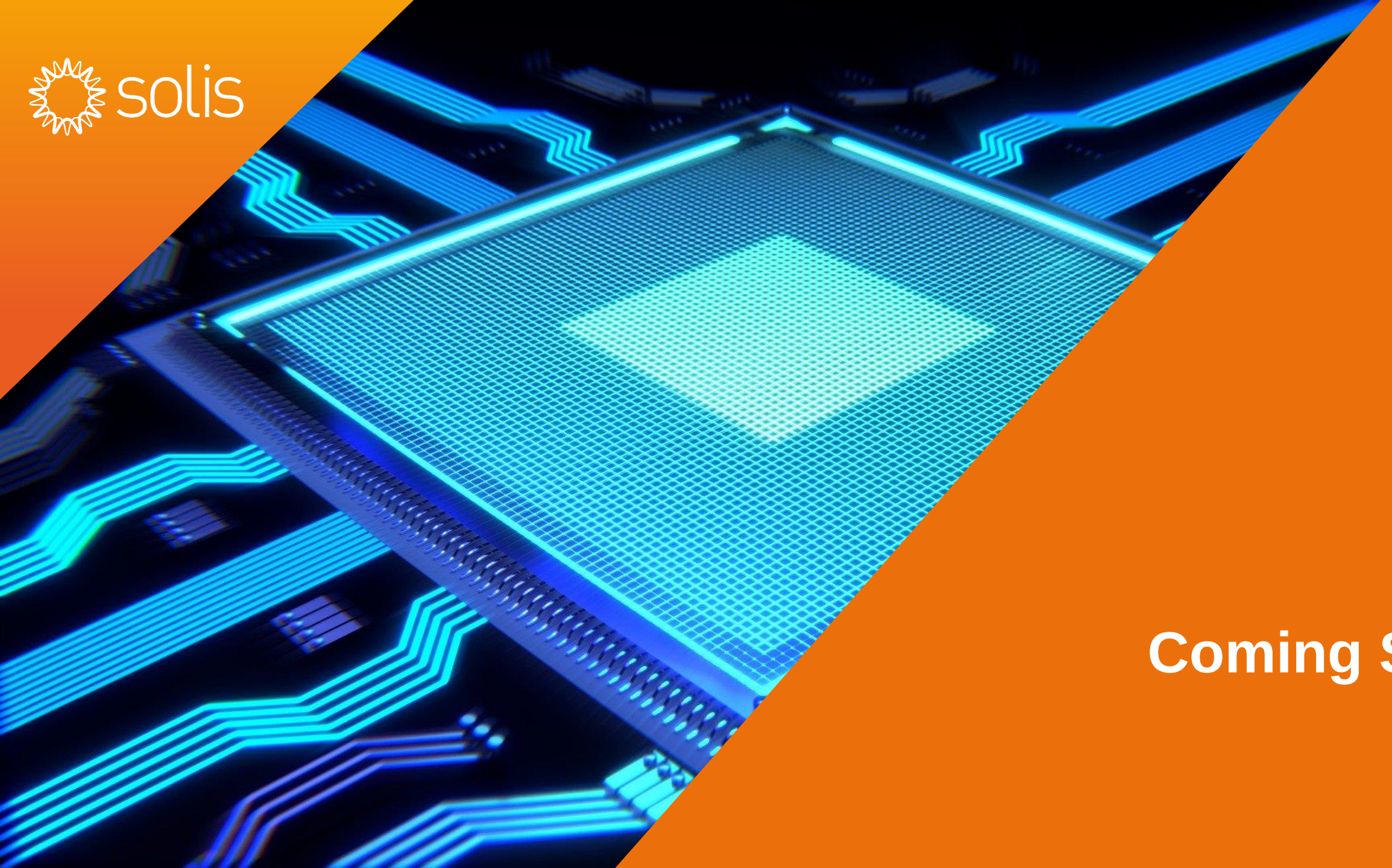
- 53 MPPT/MW high tracking density, support bifacial modules
- High temperature continuous output capability, 220kW@50℃

Smart O&M

- String-level monitoring & I/V curve scan
- Broadcast support, batch one-key setting and maintenance



solis



Coming Soon



Data Logging Stick: S2-WL-ST

Leading Features

- Support WiFi and LAN communication
- Fault alarm, real-time monitoring
- RESET button, one key to send data, convenient debugging
- One-key assignment of inverter address, efficient and labor-saving
- Plug and play, quick installation
- Status indicator, easy to display working status
- Support Bluetooth nearby connection and debugging

Solis 6th Generation 3PH Residential Hybrid Storage Product



◆ S6-EH3P10K-H

- **10 kW over 3 phases**
- **Parallel function in testing**
- **4 x MMPT's and 2 MPPT versions available**
- **Unbalanced Load Support _ Grid & Back Up Port**
- **Bluetooth Setup and configuration**

Solis 6th Generation 1PH Residential Hybrid Storage Product



◆ S6-EH1P10K-L

- 6 kW on Grid-Tied Side
- 5kW on Backup Port
- Parallel function in testing
- 2 MPPT version with 2 string inputs
- Bluetooth setup and configuration

Solis S5 1PH Residential Hybrid Storage Product



◆ S5-EO-1P5K-48

- **5 kW Single Phase inverter**
- **Parallel up to 10 inverters**
- **1 MPPT 2 Strings - max PV 6kW**
- **Grid-Interactive functionality**
- **Individual or Shared battery banks**

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solis inverters

THANK YOU

FOR A RECAP OF TODAY'S WEBINAR **PLEASE VISIT OUR PORTAL**









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