

# SOLAR ENERGY KIT MODEL: SEM-C1HAT21000



## Introduction:

SITECNO solar energy kit is hybrid PV system with batteries or off grid applications, which provide energy in all unforeseen circumstances. A complete solution which generates electrical energy from sun light for self-consumption and feed surplus energy in to the batteries and also in to the grid as per legislation of the country. Solar PV panels generates DC electric power when exposed in sun light. High efficiency MPPT Hybrid PV inverter converts DC electric power in to AC electric power for consumption in load. Grid power supply is connected in parallel circuit with PV inverter AC output. Solar generated electric power has first priority for consumption in load and surplus power store in battery bank. If load is higher than solar generation power than additional power can be retrieved from the grid supply if required. If the grid is off or unstable than additional power will be retrieved from the battery bank. Different battery bank packages are available. Solar energy system can be hybrid with diesel generator for the operation as PV-diesel hybrid system. Solar energy system is useful for saving in electricity bill, saving in diesel fuel consumption and source of income by selling surplus energy to the grid.

## PV System output :

21000	Wp	Solar hybrid Kit PV Power
100,8	kWh	Energy generation per day (average)
3024	kWh	Energy generation per month (average)
28560	VAH	1 Hour full load backup battery bank

## Available sizes of battery bank in this PV system:

55440	VAH	2 Hour full load backup battery bank
83200	VAH	3 Hour full load backup battery bank
110400	VAH	4 Hour full load backup battery bank
136800	VAH	5 Hour full load backup battery bank

## Equipment and components list:

Quantity	Description
84	250 Wp Solar photovoltaic Si-polycrystalline panels
3	6 kW Solar hybrid T inverters with built-in battery charge controller
17	140 Ah Battery bank power.com GEL-ESS 12V @C10 or equivalent
84	unit Aluminium support structure for solar panels
198	m DC cables 6mm R1000 PV panel to inverter
4	m DC cables R1000 battery to hybrid inverter
17	m DC cables battery interconnection
17	unit DC cables battery interconnection thimble
5	m AC cable 2 core inverter to main breaker
21	pair Solar connector MC4
1	set Aluminium support structure installation tools
1	set Instructions manual for installation
1	set Electrical design layout

## SYSTEM WARRANTY\*:

Solar modules production:	25 years
Inverters:	3 years standard, (extendible to 25 years)
Battery:	GEL: 2 years (life 10 years) / AGM (GEL -ESS): 1 year (life 15 years)

## Quality of Components:

Manufactured in EU.

All components in the kit are high quality with CE standard.

### ***Kits advantages***

- Easy to organize the order through a unique code and provider.
- Compatibility between all components secured.
- Measurement of energy flows installation.
- CE highest quality components.
- Aluminium support structure with pre-design to facilitate plug & play mounting installation.

### ***Function of the system***

1. The load consume the solar energy produced by photovoltaic modules during the day hours time, plus the excess energy can be stored in to batteries and also feed in to the grid as per legislation of the country.
2. The diesel generator connection is an other option when the load does not get enough solar energy, battery bank is at low level and there is instability in the grid supply network. In these situations the customer consumes energy from diesel generator.
3. Battery bank can be increased according to the requirement of autonomy time.

### ***Modular system***

These systems are modular type and can be installed as per your space and requirement. You can ask for additional services as state-of-the-art designing, drawings, engineering and installation of your projects.

Solar kits with modular system can be extended to MW size projects

### ***Solar Kit Applications***

- Schools
- Restaurants
- Gymnasium
- Gardens
- Markets
- Electric vehicle charging stations
- Administration buildings
- Hospitals
- Resorts
- Service centres
- Multi story buildings
- Shopping malls
- Hotels
- Scout camps
- Petrol Stations
- Old houses
- Public service offices
- Parking Areas

### ***Additional Accessories***

Ask for additional accessories for extension at your installation or shifting of your PV system to another place.

### ***Installation Training Services***

Training of installation is offered for technical persons on time to time basis. Schedule of the training session announce on web site.

### ***Operation and maintenance services***

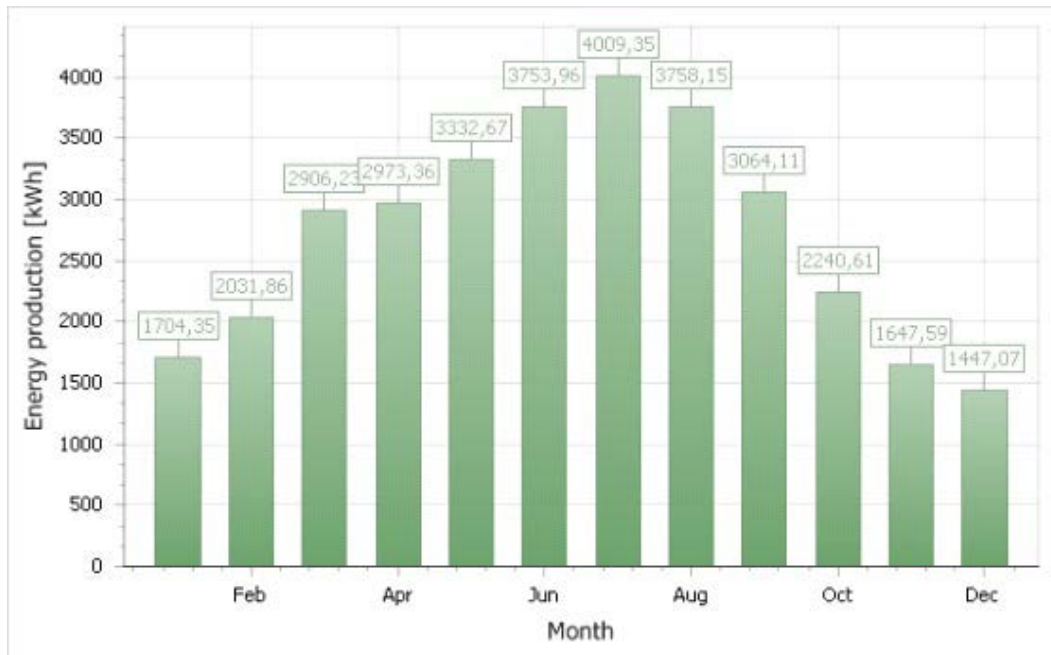
Operation and maintenance services offered for the valued customers for efficient operation of the system. Customers may ask for O&M service contract with the company.

### ***Monitoring services***

In order to monitor solar power generation and consumption from PV system, data can be transmitted to remote locations. For communication between the solar inverter and monitoring devices, SITECNO provides two basic choices: Wireless or Blue-tooth and wired variants.

# ANNUAL ENERGY PRODUCTION by SOLAR ENERGY KIT MODEL: SEM-CIHAT21000

(Annual global direct irradiation 2,97 kWh/m<sup>2</sup> in Madrid. Ref: source NASA-SSE)



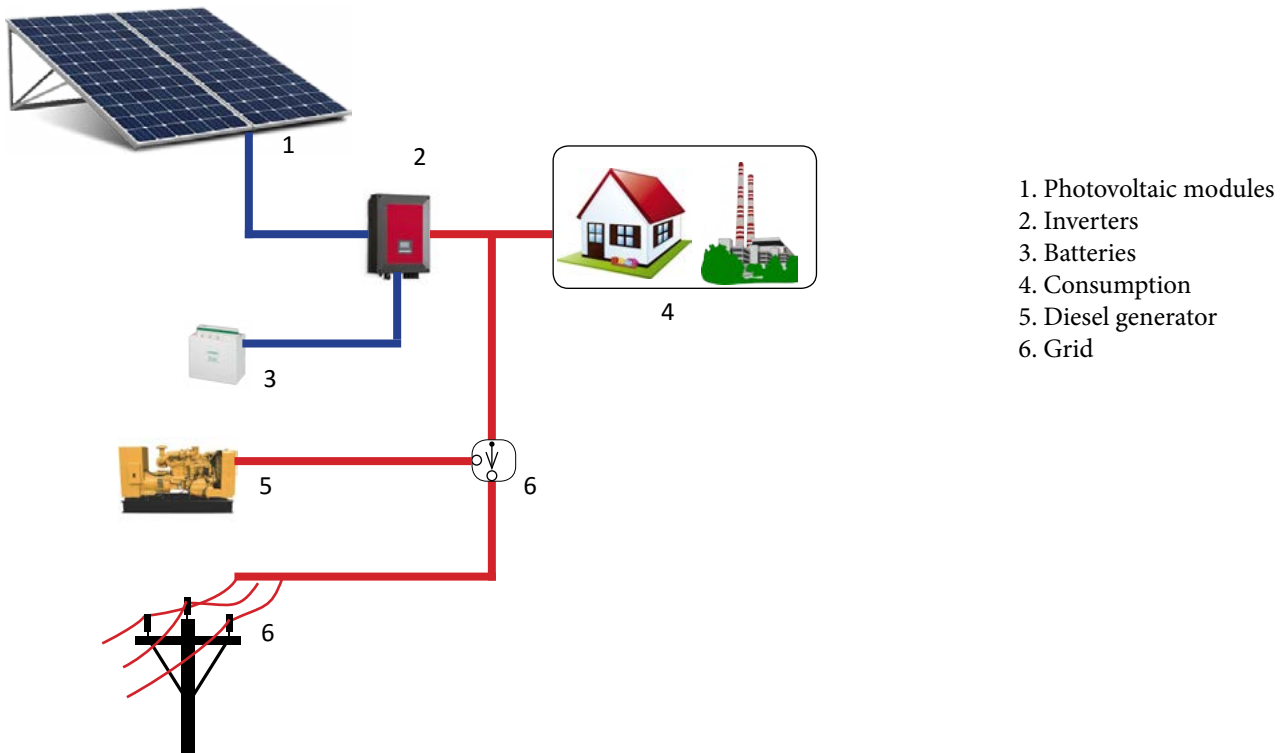
## INSTALLATION APPLICATION

- Solar system with batteries and hybrid with external generator (on grid)
- Solar system hybrid with batteries (off grid)
- Solar system with batteries and hybrid with external generator (off grid)

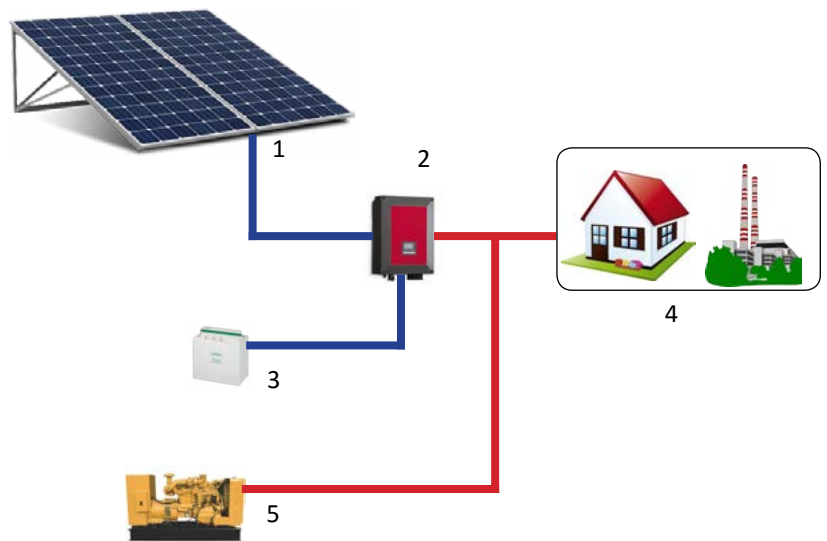


# SINGLE LINE ELECTRICAL DIAGRAM

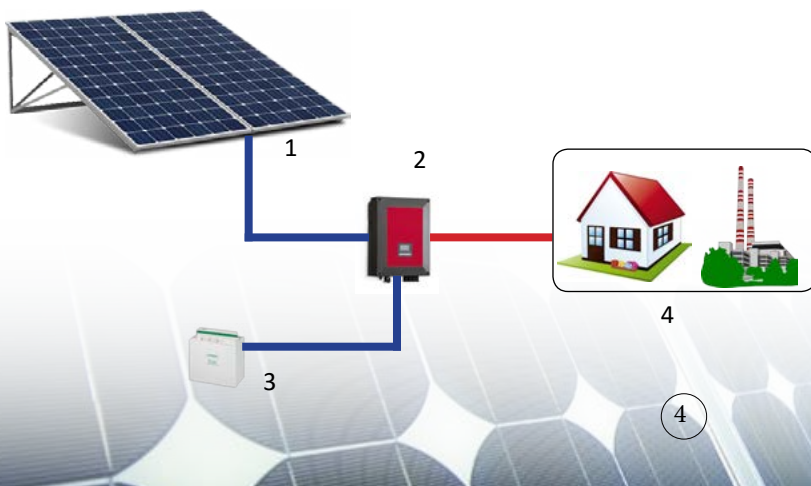
## SCHEMATIC DIAGRAM FOR PV PANEL + DIESEL GENERATOR + BATTERY + GRID



## SCHEMATIC DIAGRAM FOR PV PANEL + DIESEL GENERATOR + BATTERY



## SCHEMATIC DIAGRAM FOR PV PANEL + BATTERY



## POLYCRYSTALLINE SOLAR PANEL 250W

SITECNO Solar Photovoltaic Panels stand for quality, durability and most importantly, high performance. Our experience, capacity of research, continuing development and improvement have turned us into a company recognized in the sector by the high value offered to our clients.

Due to their engineered hollow section frame and its 4mm special textured glass with AR coating, SITECNO modules meet the maximum demands with regard to stability and corrosion resistance.

Thanks to their high performance SITECNO modules are prepared for changes in legislation. These panels will produce 5% more than any other of the same features.

The performance warranty is for 25 years, after 12 years, modules still produce a minimum 90% of their nominal performance. After 25 years module still produce a minimum 80% of their nominal performance.

### Electrical Characteristics:

MODEL	SI-60P250
Nominal Power (Pmax)	250W
Open Circuit Voltage ( $V_{oc}$ )	37,5V
Short Circuit Current ( $I_{sc}$ )	8,76A
Voltage at Nominal Power ( $V_{mp}$ )	30,3V
Current at Nominal Power ( $I_{mp}$ )	8,24A
Module Efficiency (%)	15,20

### Mechanical Characteristics:

Cell type	Polycrystalline 156x156mm
Number of cells	60 (6x10)
Module dimension	1660 x 990 x 50mm
Weight	20kg
Front cover	TSG low-iron tempered glass
Frame	Aluminium alloy
Junction box	IP65, 3diodes
Cable length	1200mm (+) , 800mm(-)
Connector	PV-JM601



### Temperature Coefficients:

Nominal Operating Cell Temperature	25°C ±2°C
Temperature Coefficients of Pmax	-0.43% / °K
Temperature Coefficients of Voc	-0.31% / °K
Temperature Coefficients of Isc	0.04% / °K
Operating Temperature	-40 °C to +85 °C
Maximum System Voltage	1000V DC
Reverse current load	15A

## SOLAR HYBRID INVERTER 6KW WITH TRANSFORMER

The SUN STORAGE 1Play battery inverter generates an off-grid AC network and manages the power achieving an optimum balance between production, storage and consumption. To do so, it controls all the time the energy flow between the grid and the batteries.

This new inverter features 4 operating modes:

### ***Stand-alone mode:***

The inverter generates an AC grid and the renewable energy source is used to feed the loads and to charge the batteries. The auxiliary source (a diesel gen-set or the public grid) is only connected when the batteries' state of charge is lower than certain threshold. As a special operating case, it is possible to implement the Direct Panel Mode, for those installations without an energy storage system. In this mode, the system only operates when the solar resource is available.

### ***Back-up mode:***

The battery inverter is connected to the public grid when it is present. Thus, if there is an energy surplus, it could be injected into the grid. The energy stored would only be used when the public grid is not available. This mode makes it possible to implement peak shaving strategies in order to reduce the contracted power.

### ***Self-consumption mode:***

The inverter operates as a grid-tied one. If there is an energy surplus, it will be used to charge the batteries or it may be injected into the grid if the batteries are fully charged. If the loads demand more energy than the one produced by the renewable source, the batteries will satisfy the demand, increasing the self-consumption ratio. This mode makes it possible to implement peak shaving strategies in order to reduce the contracted power.

### ***Grid support mode:***

In combination with the EMS Manager, the battery inverter is able to adapt the output power from the PV plant to a pre established value in order to maintain a constant power output or to control the ramp rate.



## PROTECTIONS

AC over voltages.

Insulation faults.

Output short circuits and overloads.

## OPTIONAL ACCESSORIES

Inverter communication via RS-485 and Ethernet.

PV input.

DC switch for the PV field.

AC pre-charge system.

## ACCESSORIES SUPPLIED AS STANDARD

- 2 configurable potential-free outputs, some for the connection and disconnection of the back-up gen-set.
- Battery temperature measurement circuit built-in. PT100 (3-wire) needed.
- DC pre-charge system.

## PV INVERTER TECHNICAL SPECIFICATION

### **PV Input (DC)**

PV array max. power	10 kWp
Voltage range MPP	300 - 450 V
Voltage range(1)	300 - 550 V
Maximum current	30 A
Inputs	2
MPPT	1

### **Battery Input (DC)**

Rated Battery voltage(2)	96 - 300 V
Extended battery voltage(3)	96 - 420 V
Minimum operation voltage(2)	40 V
Maximum charge / discharge current	50 A
Battery type	Lead, Ni-Cd, Li-ion

### **Generator / Grid Input (AC)**

Rated voltage	230 V
Voltage range	172 - 264 V
Rated frequency	50 / 60 Hz
Frequency range	40 - 70 Hz
Charge current range	0 - 26 A
Generator or grid maximum power	11,500 W

### **Output (AC)**

Rated power(4)	6 kW
Power (25 °C) 30 min, 2 min, 3 s (5)	6,400 / 6,900 / 7,900 W
Current	26 A
Rated voltage(6)	220 - 240 V
Rated frequency (6)	50 / 60 Hz

### **Efficiency**

Maximum efficiency	96%
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### **General Information**

Stand-by consumption	<10 W
Ambient temperature	-20 °C to +65 °C
Relative humidity (non-condensing)	0 - 95%
Protection class	IP65
Compliance with standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-12, EN 61000-3-11, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS 3100, RD1699/2011, DIN V VDE V 0126-1-1, EN 50438, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2(7), AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, IEEE 929, Thailand MEA & PEA requirements.

Notes: (1) Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures (2) The inverter's maximum power will be the battery voltage multiplied by the maximum discharge current (50 A) (3) Only possible if PV energy is not present (4) AC power up to 40 °C ambient temperature (5) This power is only available if the battery voltage multiplied by the maximum discharge current reaches these values (6) This parameter is configurable through the display (7) Related only to inverters up to 16 A.

## SOLAR BATTERY BLOC OPzV SOLAR POWER GEL

The OPzV bloc solar.power batteries are sealed stationary batteries with fixed electrolyte in gel. The construction as sealed batteries makes OPzV bloc solar.power batteries maintenance free relating to re-filling of water.

Using tubular plates in combination with gauntlets at their positive tubular plates, OPzV bloc solar.power batteries offer an extreme high cycling expectancy. So they are optimal for application in sectors with high charge and discharge operation load like solar and off-grid applications. The electrolyte of OPzV bloc solar.power batteries is fixed in gel what causes even the option of a horizontal assembly (optional).

The shock resistant and strengthened Polypropylene housing offers an easy to clean surface and is resistant against all established cleaners. The flat lid with its integrated handle guaranties a very good handling and an easy assembly

HOPPECKE batteries of the OPzV bloc solar.power type series have a cycling expectancy from up to 4500 discharges with 30% discharge level.

Your benefits with OPzV bloc solar.power batteries

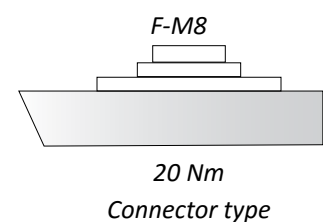
- **Maximum cycle stability and durability** in particular during PSoC operations
- **Minimum maintenance costs with maximum safety** maintenance-free<sup>2</sup> due to sealed Gel-technology
- **Highest reliability** for remote off-grid applications
- **High resistance against mechanical stress** reinforced impact-proof polypropylene housing
- **Highest project flexibility** provided by excellent stocking capability
- **Optimal environmental compatibility** - Closed loop for recovery of materials in an accredited recycling system



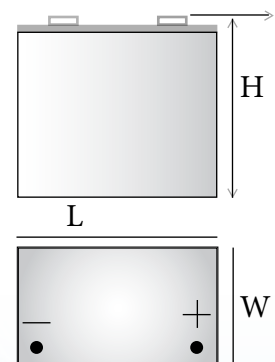
### Type of Battery:

Standards:	<b>OPzV bloc solar.power</b> IEC 60896, IEC 61427, DIN 40744
Capacity Range:	70-370 AH
Normal Voltage range:	12V/6V
Container Material:	PP, talcum
Grid alloy (+ive, -ive)	Pb + <1% Ca
Plates (+ive, -ive)	Tubular, Grid
Electrolyte:	H <sub>2</sub> SO <sub>4</sub> , GEL
Application:	Solar
Connector design:	bolted connector
Design life up to	10 years
Cycles up to @ 30% DoD:	1.300
Operating temperature:	-20°C to +40°C

Battery



Voltage	Capacity	Weight	Size (L X W X H)
12 V	70 AH	40 Kg	272 X 206 X 283
12 V	120 AH	52.5 Kg	272 X 206 X 283
12 V	180 AH	75.5 Kg	380 X 206 X 383
6 V	250 AH	51 Kg	272 X 205 X 383
6 V	300 AH	66 Kg	380 X 206 X 383
6 V	370 AH	73 Kg	380 X 205 X 383





## SOLAR BATTERY POWER.COM AGM (GEL-ESS TECHNOLOGY)

HOPPECKE power.com SB batteries are based on using flat plate technology and fixing the electrolyte inside glass mats (AGM) which even take the separating function. The high energy density of HOPPECKE power.com SB batteries causes small footprint and a very good use of space. The central degassing integrated in the battery lid can, by using optional tubes, be used to carry out all occurring gases. The flat lid with integrated handle and the easy to clean surface guaranty an easy and comfortable handling by assembly as well as in operation. Optional this battery even can be delivered for horizontal assembly.

This characteristic of HOPPECKE power.com SB batteries makes HOPPECKE power.com SB batteries usable in a wide applications spectrum. Mostly HOPPECKE power.com SB batteries are used in emergency current-, IT/ Telecom- and safety light applications.

HOPPECKE power.com SB batteries offer a design life from more then 12 years and are classified as “Long Life” following EUROBAT.

Your benefits with HOPPECKE power.com SB

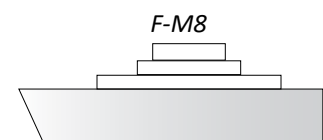
- Maintenance-free regarding water refilling - Due to innovative GEL-ESS technology
- Good high-current capability
- Low investment costs due to innovative electrode structure
- Optimal space utilization - due to horizontal arrangement
- Optimum operational safety
- Integrated backfire protection and central degassing system
- Higher short-circuit safety even during the installation - Based on HOPPECKE system connectors
- Easy assembly and installation - battery lid with integral handle



Battery

### Type of Battery:

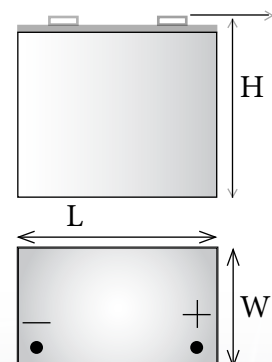
Standards:	<b>power.com SB</b> IEC 60896, IEC 61427, DIN 40744
Capacity Range:	50-600 AH
Normal Voltage range:	12V/6V/2V
Container Material:	PP, talcum
Grid alloy (+ive, -ive)	Pb + <1% Ca
Plates (+ive, -ive)	Tubular, Grid
Electrolyte:	H <sub>2</sub> SO <sub>4</sub> , AGM
Application:	Solar
Connector design:	bolted connector
Design life up to	15 years
Cycles up to @ 30% DoD:	1.000
Operating temperature:	-20°C to +40°C



20 Nm

Connector type

Voltage	Capacity	Weight	Size (L X W X H)
12 V	50 AH	26 Kg	229 X 177 X 230
12 V	60 AH	26.5 Kg	229 X 177 X 230
12 V	80 AH	37.5 Kg	344 X 177 X 230
12 V	100 AH	38 Kg	344 X 177 X 230
12 V	110 AH	52 Kg	498 X 177 X 230
12 V	130 AH	52.5 Kg	498 X 177 X 230
12 V	140 AH	54.5 Kg	242 X 170 X 275



## KIT COMPONENTS

### **Design**

Technical feature

Weight

Loads

Test certificate

### **Modular type**

Aluminium

10 years warranty

Tamper proof nut bolt

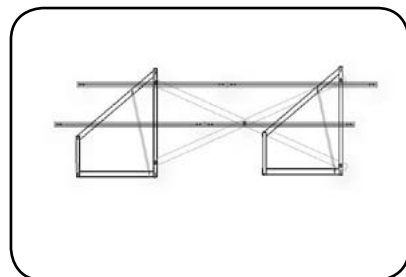
100% recyclable material

A2 Stainless steel bolts

2,49kg/m

wind, snow

CE Certifies



*Support structure*

### **Cable:**

· Model:

· Rated Voltage:

· Rating Current:

· Cable Size:

· Proof Voltage:

· Protection Class:

· Temperature Range:

· Flame class:

SI-MC4-F

TUV 1500V DC / UL 600V DC

20-30A

2.5-4.0-6.0, 10-12-14AWG

TUV 1500V AC, 1 min

Class II

-40 to 85°C

UL94-V0



*Cable with connector*

### **Connector:**

Flexible conductor,

Maximum service temperature:

Estimated lifetime

UV Resistant UV Resistant

Grease & mineral oils resistance:

Grease & mineral oils resistance:

class 5

120°C

30 years.

excellent

excellent



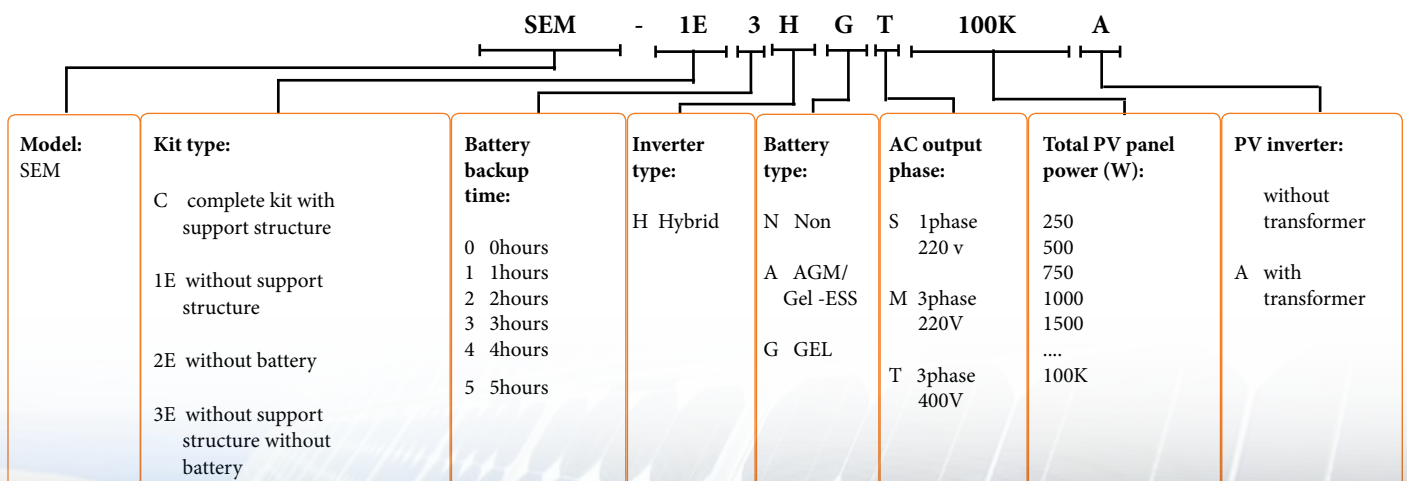
*Cable connector MC4*

## 21000 W SOLAR ENERGY HYBRID KITS

### Complete systems including all accessories with following options

REF#	MODEL#	Option details:
19024	SEM-3E0HNT21000	-without battery and without aluminium support structure
19124	SEM-2E0HNT21000	-without batteries
19224	SEM-1E1HAT21000	-AGM (GEL-ESS) battery backup 1 hour and without aluminium support structure
19324	SEM-1E2HAT21000	-AGM (GEL-ESS) battery backup 2 hours and without aluminium support structure
19424	SEM-1E3HAT21000	-AGM (GEL-ESS) battery backup 3 hours and without aluminium support structure
19524	SEM-1E4HAT21000	-AGM (GEL-ESS) battery backup 4 hours and without aluminium support structure
19624	SEM-1E5HAT21000	-AGM (GEL-ESS) battery backup 5 hours and without aluminium support structure
19724	SEM-1E1HGT21000	-GEL battery backup 1 hour and without aluminium support structure
19824	SEM-1E2HGT21000	-GEL battery backup 2 hours and without aluminium support structure
19924	SEM-1E3HGT21000	-GEL battery backup 3 hours and without aluminium support structure
20024	SEM-1E4HGT21000	-GEL battery backup 4 hours and without aluminium support structure
20124	SEM-1E5HGT21000	-GEL battery backup 5 hours and without aluminium support structure
20224	SEM-C1HAT21000	-AGM (GEL-ESS) battery backup 1 hour
20324	SEM-C2HAT21000	-AGM (GEL-ESS) battery backup 2 hours
20424	SEM-C3HAT21000	-AGM (GEL-ESS) battery backup 3 hours
20524	SEM-C4HAT21000	-AGM (GEL-ESS) battery backup 4 hours
20624	SEM-C5HAT21000	-AGM (GEL-ESS) battery backup 5 hours
20724	SEM-C1HGT21000	-GEL battery backup 1 hour
20824	SEM-C2HGT21000	-GEL battery backup 2 hours
20924	SEM-C3HGT21000	-GEL battery backup 3 hours
21024	SEM-C4HGT21000	-GEL battery backup 4 hours
21124	SEM-C5HGT21000	-GEL battery backup 5 hours

#### Solar Energy Kit Model Configuration:



Your contribution to reduce CO<sub>2</sub> for sustainable earth



**SITECNO S.A.**

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