

# SOLAR ENERGY KIT MODEL: SEM-C1HAT100KA



## 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 :

100000 Wp Solar hybrid Kit PV Power  
 480 kWh Energy generation per day (average)  
 14400 kWh Energy generation per month (average)  
 130560 VAH 1 Hour full load backup battery bank

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

260040 VAH 2 Hour full load backup battery bank  
 391200 VAH 3 Hour full load backup battery bank  
 523200 VAH 4 Hour full load backup battery bank  
 652800 VAH 5 Hour full load backup battery bank

## Equipment and components list:

Quantity	Description
400	250 Wp Solar photovoltaic Si-polycrystalline panels
1	100 kW Solar PV ongrid inverter with transformer O/P 380-400V, 50Hz
1	unit String controller 160 with RS485
1	100 kW Battery inverters with built-in battery charge controller
128	170 Ah Battery bank power.com GEL-ESS 6V @C10 or equivalent
400	unit Aluminium support structure for solar panels
830	m DC cables 6mm R1000 PV panel to inverter
4	m DC cables R1000 battery to hybrid inverter
128	m DC cables battery interconnection
128	unit DC cables battery interconnection thimble
5	m AC cable 2 core inverter to main breaker
22	pair Solar connector MC4
1	set Aluminium support structure installation tools
1	set Instrcutions manual for installation
1	set Electrical design layout

## SYSTEM WARRANTY\*:

Solar modules production: 25 years  
 Aluminium support structure: 10 years  
 Inverter: 5 years standard, (extendible to 25 years)  
 Battery Inverter: 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*

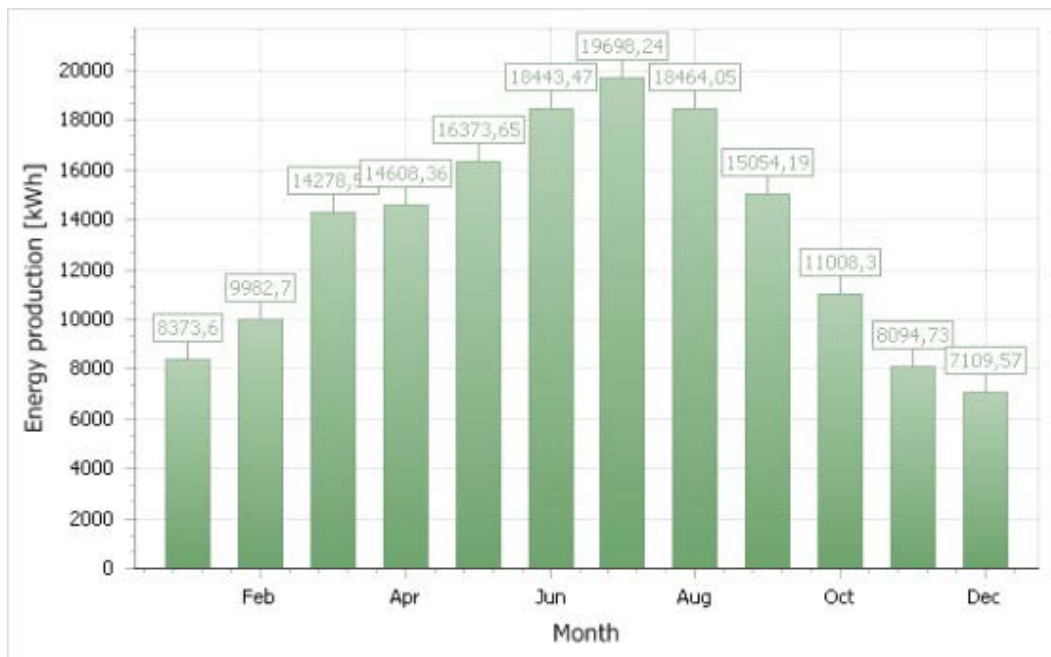
Operation and maintenance services offered for the valued customers for efficient operation of the system. Customers may ask for O&M service contract with the company.

### *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.

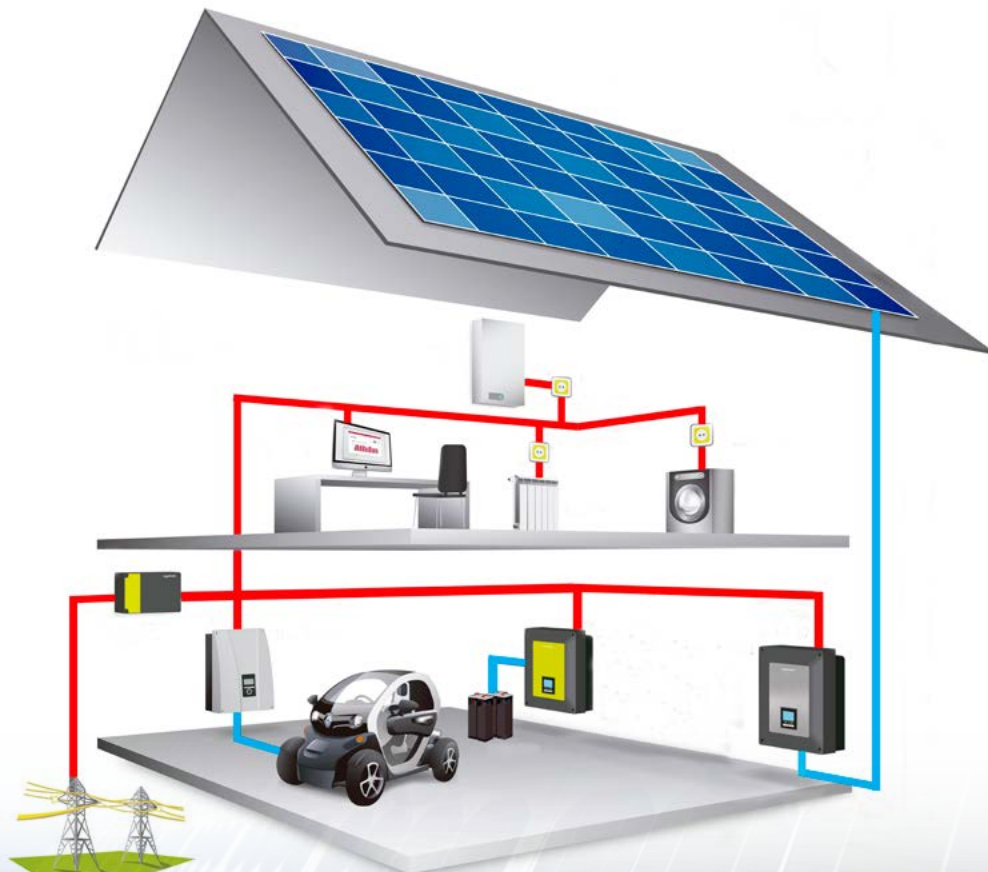
# ANNUAL ENERGY PRODUCTION by SOLAR ENERGY KIT MODEL: SEM-CIHAT100K-A

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



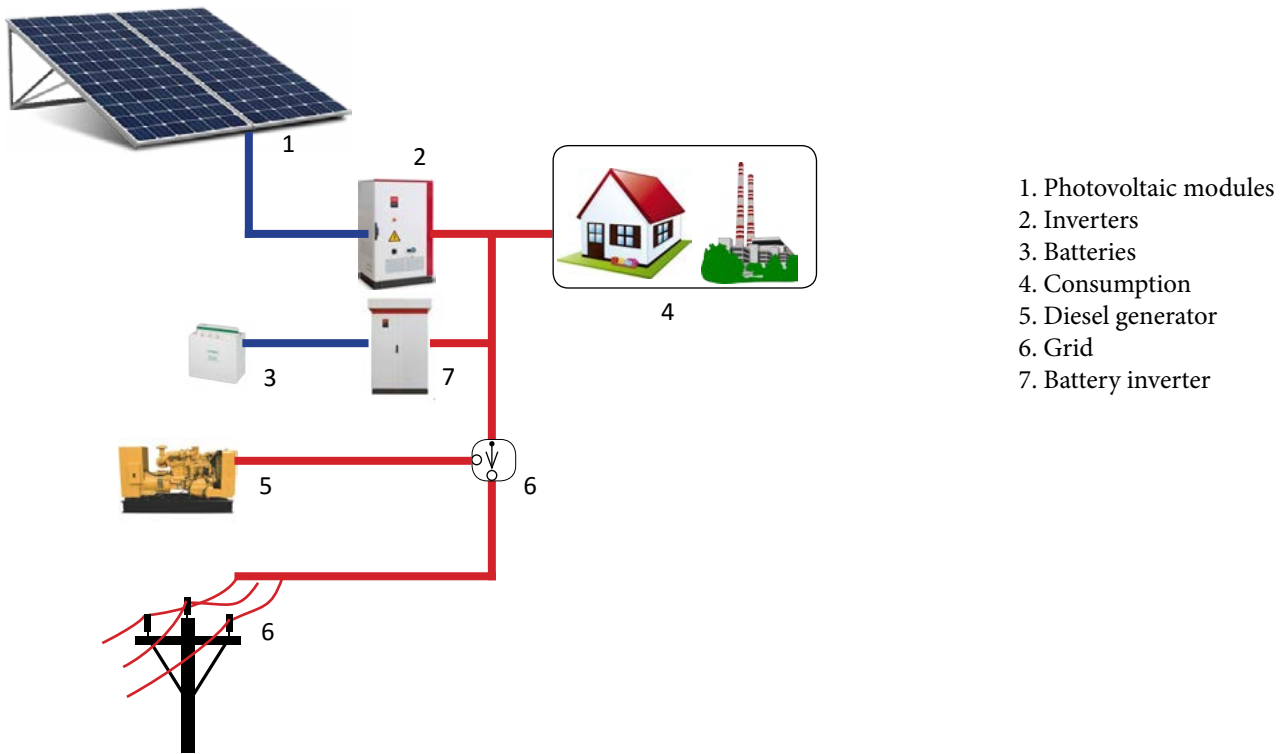
## INSTALLATION APPLICATION

- 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)

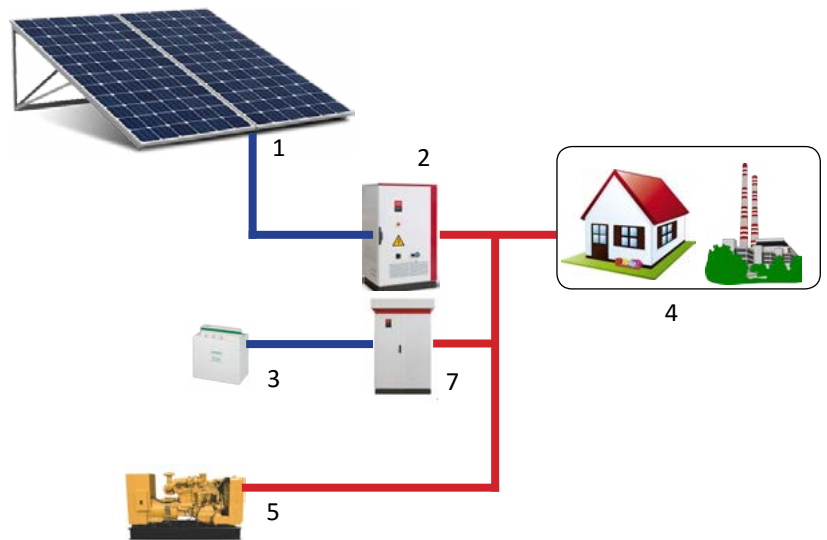


# SINGLE LINE ELECTRICAL DIAGRAM

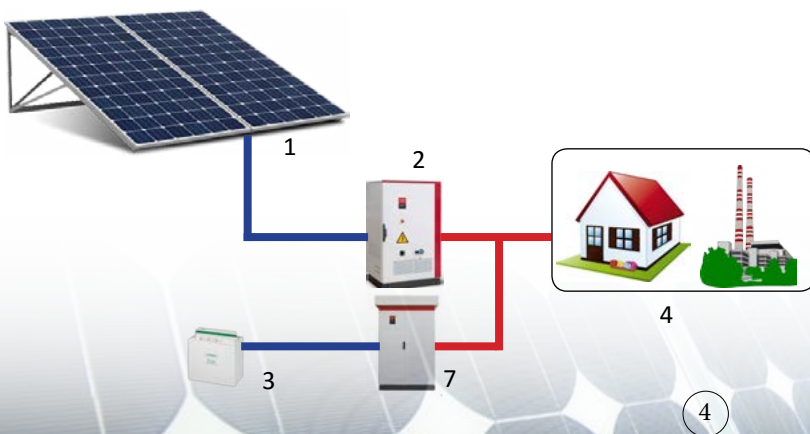
## SCHEMATIC DIAGRAM FOR PV PANEL + DIESEL GENERATOR + BATTERY + GRID



## 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

## SUN Power 100 kW with transformer

Three phase inverter for medium and large power outputs on-roof applications and also for ground-based multi-megawatt applications

### Maximum efficiency at high temperatures

Advanced maximum power point tracker system (MPPT). Low voltage ride through capability, active power control and reactive power control. Suitable for medium voltage installations

### Easy to install

No additional items are required. Manual disconnection from the grid. Complete electrical protection equipment supplied as standard.

### Easy to maintain

Internal data logger for up to 3 months data storage. Control from either a remote PC or on-site from the inverter front key pad. Status and alarm LED indicators. LCD Screen. Useful life of more than 20 years.

### Software included

Included at no extra cost are the SUN Manager, SUN Monitor and its Sun Monitor smart phone version for monitoring and recording the inverter data over the internet.

- **Standard 5 year warranty, extendable for up to 25 years**

The SUN Power three-phase inverters offer rated capacities from 50 to 250 kW and are designed for installation on large-scale industrial rooftops and also ground-based PV plants. The SUN100 is the PV inverter with the highest efficiency level of the whole market in its power range (98.9%).



Designed for ease of maintenance, offering high performance at high temperatures and featuring full electrical protections as a standard supply, this inverter family is one of the most popular among the SUN range.

### PROTECTIONS

- Galvanic isolation between the DC and AC side.
- Reverse polarity.
- Output short-circuits and overloads.
- Insulation failures.
- Anti-islanding with automatic disconnection.
- DC switch.
- DC fuses.
- AC circuit breaker.
- DC and AC surge arresters type 2.

### OPTIONAL ACCESSORIES

- Inter-inverter communication via RS-485, Ethernet or Bluetooth.
- GSM / GPRS remote communication.
- PV array string current monitoring. SUN String Control.
- Grounding kit if required for the PV modules.

## INVERTER TECHNICAL SPECIFICATION

### **Input (DC)**

Recommended PV array power range <sup>(1)</sup>	104 - 130 kW <sub>p</sub>
Voltage range MPP	405 - 750 V
Maximum voltage <sup>(2)</sup>	900 V
Maximum current	260 A
Inputs	4
MPPT	1

### **Output (AC)**

Rated power <sup>(3)</sup>	110 kW
Maximum current	161 A
Rated voltage	400 V
Frequency	50 / 60 Hz
Phi Cosine <sup>(4)</sup>	1
Phi Cosine adjustable	Yes. S <sub>max</sub> =110 kVA
THD <sup>(5)</sup>	<3%

### **Efficiency**

Maximum efficiency	96.8%
Euro-efficiency	95%

### **General Information**

Refrigeration system	Forced ventilation
Air flow	2600 m <sup>3</sup> /h
Stand-by consumption <sup>(6)</sup>	30 W
Consumption at night	1 W
Ambient temperature	-25 °C to 65 °C
Relative humidity (non-condensing)	0 - 95%
Protection class	IP20
Marking	CE
EMC and security standards	EN 61000-6-1, EN 61000-6-2, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12, EN 62109-1, EN 62109-2, IEC62103, EN 50178, FCC Part 15, AS3100
Grid connection standards	IEC 62116, RD1699/2011, DIN V VDE V 0126-1-1, CEI 0-16 Ed. III, CEI 0-21, G59/2, VDE-AR-N 4105:2011-08, BDEW-Mittelspannungsrichtlinie:2011, P.O.12.3, South African Grid code, Chilean Grid Code, Romanian Grid Code, IEEE929, Thailand MEA & PEA requirements, IEC61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, CGC China, DEWA (Dubai) Grid Code, Jordan Grid Code

**Notes:** 1) Depending on the type of installation and geographical location (2) Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures (3) AC Power for 40 °C ambient temperature. For each °C of increase, the output power will be reduced at the rate of 1.8% (4) For P<sub>out</sub>>25% of the rated power (5) For P<sub>out</sub>>25% of the rated power and voltage in accordance with IEC 61000-3-4 (6) Consumption from PV field.

## SUN STORAGE POWER 100 kW

SUN STORAGE Power battery inverter is a three-phase, two way unit that can either be used in off-grid systems or connected to the general supply network. This inverter offers a high power density in a single power block, providing a choice of configurable operating modes.

### **Battery management**

The SUN STORAGE Power features high-tech battery management in order to maximise the useful life of the storage system. The battery temperature can be monitored at all times, guaranteeing a correct operation.

### **Back-up genset**

Furthermore, the SUN STORAGE Power permits the connection of a back-up generator, should this be necessary. It is possible to startup the inverter by using the genset, in order to charge the batteries.

### **Operating modes:**

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

The SUN STORAGE Power generates a stand-alone AC grid and acts as a grid manager, guaranteeing the correct balance between generation, consumption and the storage system. To achieve this, the SUN STORAGE Power is able to control the energy flows between the grid and the batteries, based on the status at any given time. The SUN STORAGE Power inverter allows a solar energy source to be integrated into the grid, through the use of SUN inverters.



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

This operating mode has been designed for grid-connected systems, where grid outages are long and frequent, meaning that a back-up power source is required. The SUN STORAGE Power inverter operates through a connection to the AC grid. In order to guarantee a power source, the inverter maintains the batteries charged. During a grid outage, the battery inverter generates the AC network and the energy stored in the batteries is used to power the loads. If any renewable energy sources are connected to the grid and the energy generated is greater than that demanded, then the surplus could be injected into the grid. Furthermore, this mode also makes it possible to implement peak shaving strategies, in order to shave consumption peaks and reduce the contracted power.

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

This operating mode is conceived for grid-connected systems with renewable energy sources, in order to minimise grid consumption. If the energy generated is greater than demand, then any surplus energy could charge the batteries or, if they are fully charged, the energy could be injected into the grid. If the loads demand more energy than that produced by the renewable sources, then the batteries would cover this demand, increasing the self-consumption ratio. This mode also allows for the implementation of peak shaving strategies in order to shave consumption peaks and lower the electricity bill.

### **PROTECTIONS:**

- Galvanic isolation between the DC, and AC sides.
- Short-circuits and overloads at the output.
- Insulation faults.
- DC switch.
- AC circuit breaker.



## BATTERY INVERTER TECHNICAL SPECIFICATION

### **Batteries (DC)**

Nominal power	≥ 103 kW
Voltage range	330 - 820 V
Minimum voltage <sup>(1)</sup>	1,000 V
Maximum current	318 A
Inputs	4
Type of battery	Lead, Ni-Cd, Li-ion

### **Input (AC)**

Rated voltage	400 V
Voltage range	320-480 V
Frequency	50 / 60 Hz
Frequency range	40 -70 Hz
Charging current range	0 - 160 A
Maximum power	250 kW

### **Output (AC)**

Rated power <sup>(2)</sup>	100 kW
Maximum current	160 A
Rated voltage	400 V
Frequency	50 / 60 Hz

### **Efficiency**

Maximum efficiency	96.8%
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### **General Information**

Galvanic isolation	Yes
Air flow	2600 m <sup>3</sup> /h
Stand-by consumption	30 W
Ambient temperature	-20 °C to +65 °C
Relative humidity (non-condensing)	0 - 95%
Maximum altitude <sup>(3)</sup>	3000
Protection class	IP20
Weight	1,162 kg

Compliance with standards:	EN 61000-6-1, EN 61000-6-2, EN 61000-6-4, EN 61000-3-12, EN 61000-3-11, EN 62109-1, EN 62109-2, IEC 62103, EN 50178, FCC Part 15, EN 50438, IEC 62116, IEC 61727, VDE 0126-1-1
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- Notes: (1) Above 820 V, the maximum current decreases gradually  
(2) AC Power for 40 °C ambient temperature  
(3) Over 1,000 m temperature for rated power is reduced at the rate of 4.5 °C for each 1,000 m.

### **ACCESSORIES SUPPLIED AS STANDARD:**

- RS-485 communication.
- CAN communication for smart batteries.
- Configurable potential free inputs.
- Configurable potential-free outputs, some for the connection and disconnection of a back-up genset
- DC pre-charge system.
- Type 2, AC surge arresters.

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

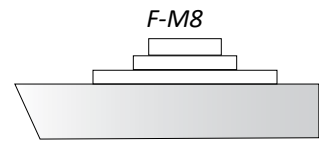
- Maintenance-free regarding water refilling - Due to innovative GEL-ESS technology
- Good high-current capability
- Low investment costs due to innovative electrode structure
- Optimal space utilization - due to horizontal arrangement
- Optimum operational safety
- Integrated backfire protection and 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

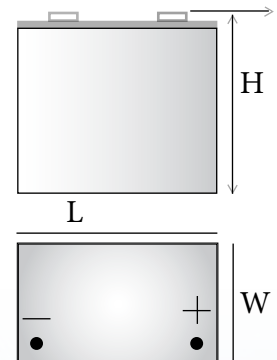
**Type of Battery:**

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	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 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

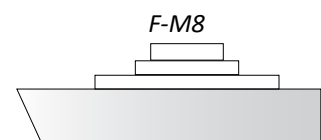


Battery

### Type of Battery:

Standards:	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

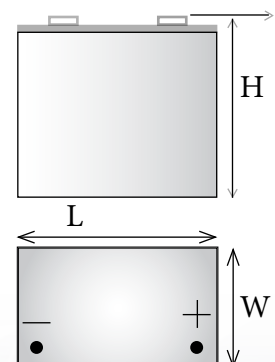
### OPzV bloc solar.power



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

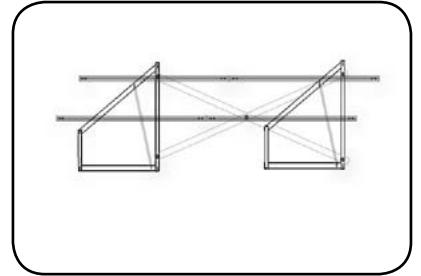
100% recyclable material

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*

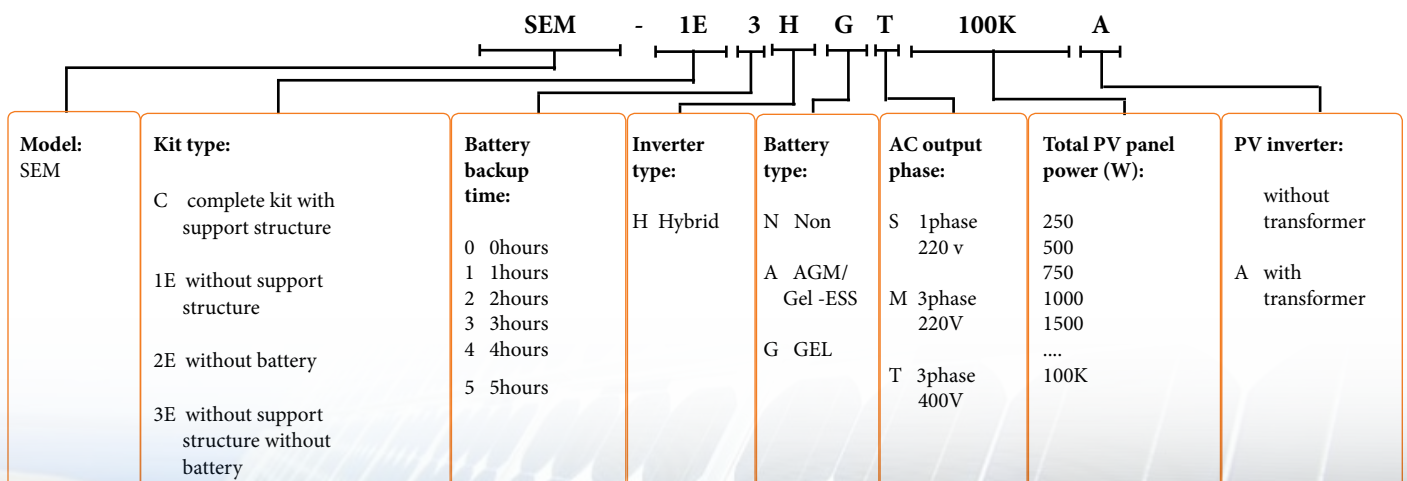


## 100KW A SOLAR ENERGY HYBRID KITS

### Complete systems including all accessories with following options

REF#	MODEL#	Option details:
19053	SEM-3E0HNT100KA	-without battery and without aluminium support structure
19153	SEM-2E0HNT100KA	-without batteries
19253	SEM-1E1HAT100KA	-AGM (GEL-ESS) battery backup 1 hour and without aluminium support structure
19353	SEM-1E2HAT100KA	-AGM (GEL-ESS) battery backup 2 hours and without aluminium support structure
19453	SEM-1E3HAT100KA	-AGM (GEL-ESS) battery backup 3 hours and without aluminium support structure
19553	SEM-1E4HAT100KA	-AGM (GEL-ESS) battery backup 4 hours and without aluminium support structure
19653	SEM-1E5HAT100KA	-AGM (GEL-ESS) battery backup 5 hours and without aluminium support structure
19753	SEM-1E1HGT100KA	-GEL battery backup 1 hour and without aluminium support structure
19853	SEM-1E2HGT100KA	-GEL battery backup 2 hours and without aluminium support structure
19953	SEM-1E3HGT100KA	-GEL battery backup 3 hours and without aluminium support structure
20053	SEM-1E4HGT100KA	-GEL battery backup 4 hours and without aluminium support structure
20153	SEM-1E5HGT100KA	-GEL battery backup 5 hours and without aluminium support structure
20253	SEM-C1HAT100KA	-AGM (GEL-ESS) battery backup 1 hour
20353	SEM-C2HAT100KA	-AGM (GEL-ESS) battery backup 2 hours
20453	SEM-C3HAT100KA	-AGM (GEL-ESS) battery backup 3 hours
20553	SEM-C4HAT100KA	-AGM (GEL-ESS) battery backup 4 hours
20653	SEM-C5HAT100KA	-AGM (GEL-ESS) battery backup 5 hours
20753	SEM-C1HGT100KA	-GEL battery backup 1 hour
20853	SEM-C2HGT100KA	-GEL battery backup 2 hours
20953	SEM-C3HGT100KA	-GEL battery backup 3 hours
21053	SEM-C4HGT100KA	-GEL battery backup 4 hours
21153	SEM-C5HGT100KA	-GEL battery backup 5 hours

### Solar Energy Kit Model Configuration:



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



**SITECNO S.A.**

C/ Can balmes 1, Zona industrial,  
Santa. M<sup>a</sup>. de Palautordera,  
08460 Barcelona, Spain.  
Tel: +34 938482544  
Fax: +34 938480439  
info@sitecnosolar.com  
www.sitecnosolar.com



*Authorised distributor:*

