POWER SUPPLY SYSTEMS

SPM

MONOCRYSTALLINE PHOTOVOLTAIC MODULES

SPM20 - SPM40 - SPM90 SPM175 - SPM360

High efficiency monocrystalline cells

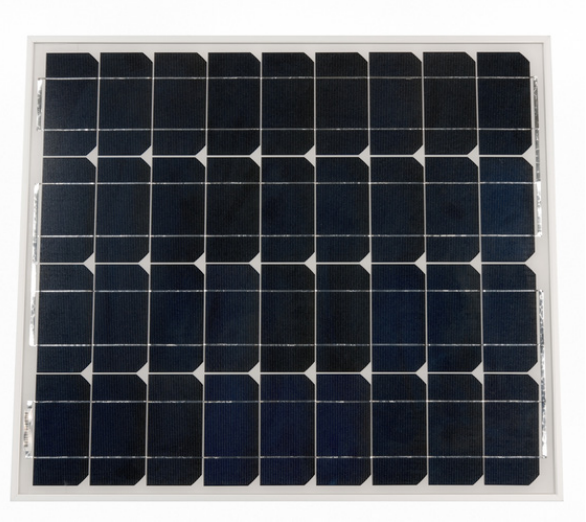
SPM photovoltaic modules are composed by high-efficiency monocrystalline cells and high sensibility to the light in the whole solar spectrum.

Maximum light concentration and diffusion in the cells

Encapsulation of cells is made between a high-transmission tempered glass layer. The encapsulant cover the photovoltaic cells inside the sheets, protecting from exterior. Texturization applied to the glass allows a maximum concentration and diffusion of the light in the cells.

Optimal module protection against climate agents.

This allows to guarantee a better performance, energy, and operating capacity, even with low solar levels. Back layer of ethylene vinyl acetate, with triple back blades layer, contributes to a better protection of the module and the electric contacts against climate agents' actions, as humidity and saline environment.



FEATURES

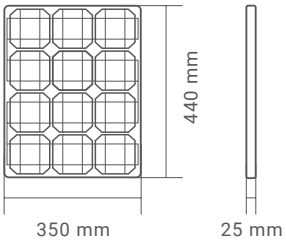
- *The SPM modules use an anodized transparent and reinforced aluminium frame, highly resistant to marine conditions.*
- *Composed by 36 to 72 polycristalline cells.*
- *Isotropic texturization and antireflecting coating.*
- *IP 65 watertightness degree. The modules are totally sealed to prevent water ingress.*
- *High performance, even under low sunlight levels.*
- *Maximum concentration and diffusion of light on the solar cells.*
- *High-transmission tempered glass.*
- *Cell protection through EVA encapsulation.*
- *Work temperature from -40 to 85° C.*

SPM

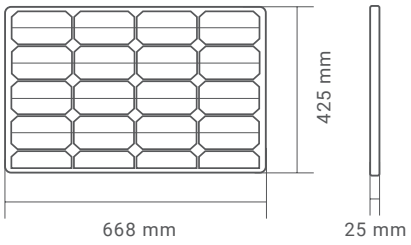
Standard specifications

MODEL	SPM20	SPM40	SPM90	SPM175	SPM360
Nominal power (P_{mpp})	20 W	40 W	90 W	175 W	360 W
Nominal voltage (V)	12 V				24 V
Maximum power current (I_{mpp})	1.09 A	2.19 A	4.59 A	9.03 A	9.38 A
Maximum power voltage (V_{mpp})	18.5 V	18.3 V	19.6 V	19.4 V	38.4 V
Temperature range	From -40º to +85ºC				
Dimensions	440 x 350 x 25 mm	425 x 668 x 25 mm	780 x 668 x 25 mm	1485 x 668 x 30 mm	1956 x 992 x 40 mm
Weight	1.9 kg	3.1 kg	6.1 kg	11 kg	22 kg
Open circuit current (V_{oc})	22.6 V	22.45 V	24.06 V	23.7 V	47.4 V
Short circuit current (I_{sc})	1.19 A	2.4 A	5.03 A	9.89 A	10.24 A
Number of monocrystalline cells	36				72

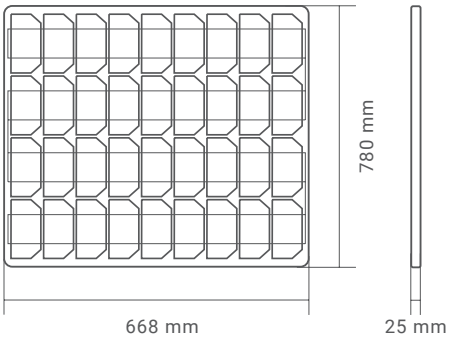
SPM20



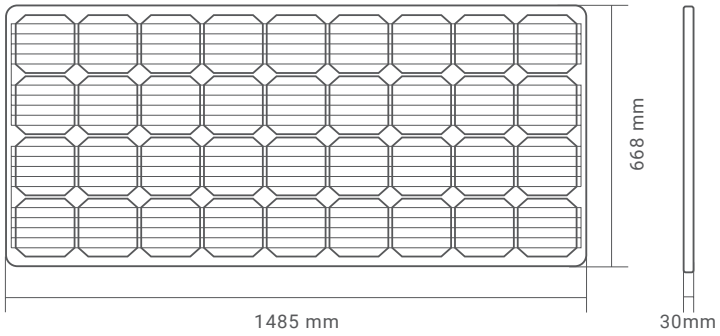
SPM40



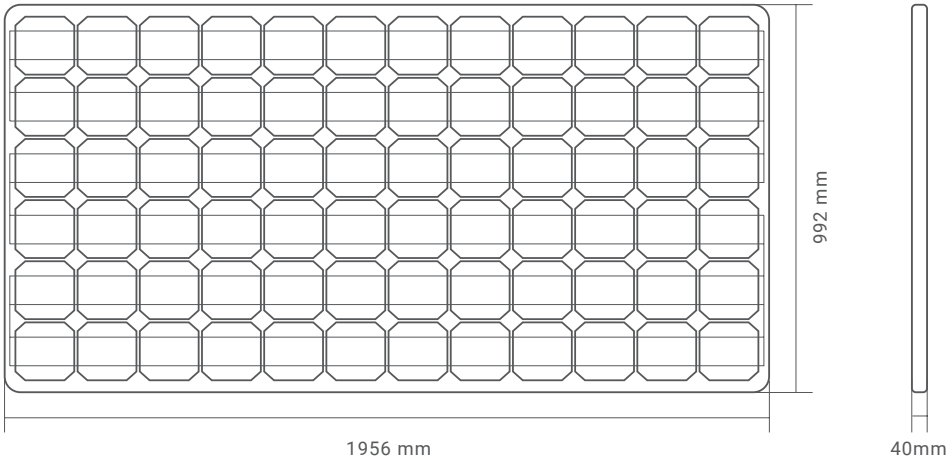
SPM90



SPM175



SPM360



Specifications subject to change without previous notice.

MSM

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POWER SUPPLY SYSTEMS

STECA PR

SOLAR CHARGE CONTROLLERS

Steca PR

Designed for difficult environments

The STECA PR Solar Charge Controllers have been specially designed for operation in difficult environments with high salt, moisture and dust contents.

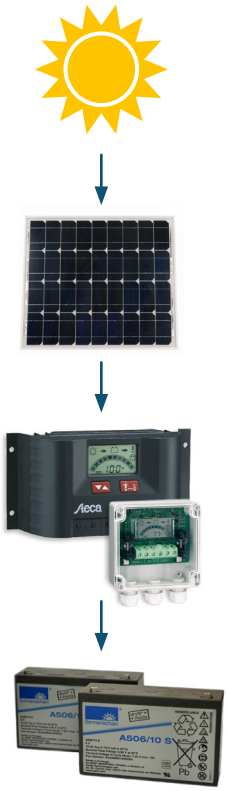
PR 2020 IP is equipped with LCD display

The PR 2020 IP is equipped with a large LCD display that shows the current state of charge (SOC) as a percentage and graphically in the form of a tank. This visual representation also provides operating parameters, failure messages and self-test.

Optimal battery control

The "auto-adaptive" state of charge algorithm results in optimal battery maintenance and control over the module output of up to 480 Wp, which can be connected to it.

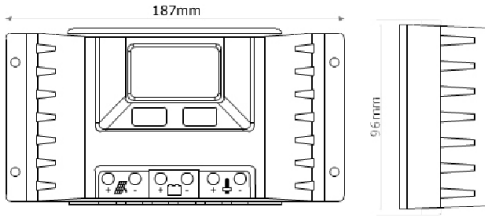
Manufactured according to ISO 9001 and 14001, RoHS, European Standards and DIN IEC 68 part 2-30 (use in tropical areas).



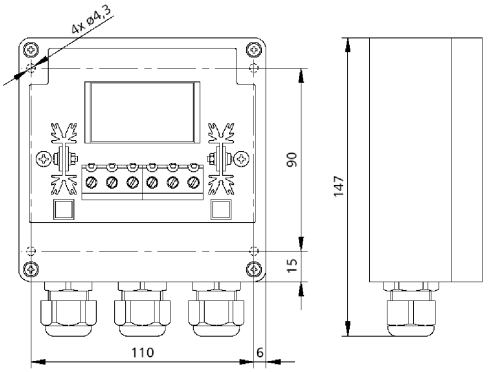
FEATURES

- *Hybrid controller.*
- *State of charge determination with Steca AtonIC (SOC).*
- *Automatic detection of voltage.*
- *PWM control.*
- *Multistage charging technology.*
- *Load disconnection depending on SOC.*
- *Automatic load reconnection.*
- *Temperature compensation.*
- *Common grounding on one or several positive terminals, or negative grounding on one terminal.*
- *Integrated data logger.*
- *Integrated self test.*
- *Monthly maintenance charge.*
- *Integrated energy meter.*

STECA PR



PR Controller



PR2020 IP Controller

Certifications

	PR2020 IP	PR
European Standards CE	✓	✓
DIN EN ISO 9001:2000	✓	✓
DIN EN ISO 14001	✓	✓
DIN IEC 68, part 2-30 (use in tropical areas)	✓	✗
RoHS	✓	✗

Electronic protections

Overcharge.
Deep discharge.
Load disconnection against over-discharging.
Reverse polarity protection of solar modules.
Reverse polarity protection of load and battery.
Short-circuit protection of solar modules.
Short-circuit protection of load.
Over-temperature.
Over-voltage.
Varistor protection against electromagnetic discharges.
Open circuit protection.
Reverse current protection at night.

MODEL	PR2020 IP	PR1010	PR1515	PR2020	PR3030
System voltage	12 V (24 V)				
Module current (input side)	20 A	10 A	15 A	20 A	30 A
Load current (output side)	20 A	10 A	15 A	20 A	30 A
Self-consumption	<12 mA				
End of charge voltage (float)	Liquid 13.9 V (27,8 V)	Gel 14.1 V (28.2 V)			
Boost charge voltage	14.4 V (28.8 V)				
Compensation charge (disabled for gel batteries)	14.7 V (29.4 V)				
Reconnection voltage (SOC/LVR)	>50% SOC/12.6 V (25.2 V)				
Deep discharge protection (SOC)	>30% SOC/11.1 V (22.2 V)				
Ambient temperature	From -10º to +50ºC				
Terminal size (single/fine wire)	16 mm² / 25 mm²	AWG 6/4			
Degree of protection	IP 65	IP 32			
Weight (gr)	350	350	350	350	350
Dimensions (mm)	122 x 147 x 55	187 x 96 x 44			

Specifications subject to change without previous notice.

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POWER SUPPLY SYSTEMS

SUNSAVER 10/20

SOLAR CHARGE CONTROLLERS

SunSaver 10/20

Small solar charge controller

The Morningstar SunSaver is the market's leading small solar charge controller for both professional and consumer applications.

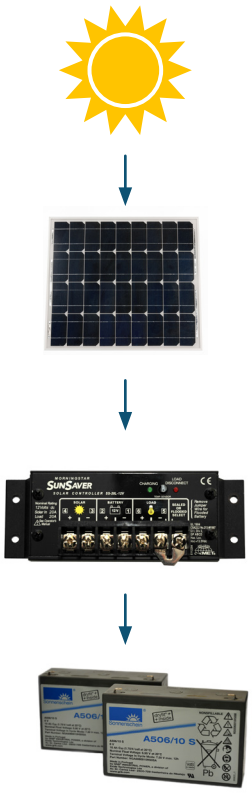
Outstanding performance

Its technology provides an exceptional reliability, a PWM battery charging and a consistent high quality. The SunSaver's advanced design delivers outstanding performance with an economical price.

Low cost

Its low cost is made possible by Morningstar's unique approach to design and manufacturing:

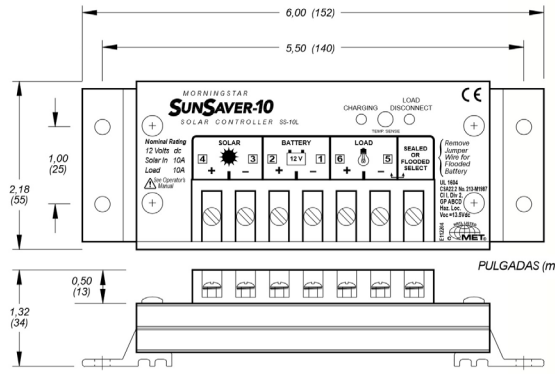
- Quality programs ISO 9002.
- Latest power electronic technologies.
- Latest control and logic technologies.

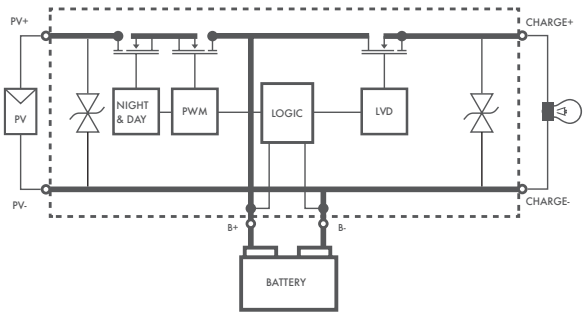


FEATURES

- *100% solid state.*
- *Series design (not shunt).*
- *True 0 to 100% PWM duty cycle.*
- *Low Voltage Disconnect LVD output.*
- *Setpoint accuracy to 35 mV.*
- *Rated for 25% overloads.*
- *Fully encapsulated in epoxy resin.*
- *Marine rated terminals/anodised enclosure.*
- *Temperature compensation.*
- *Gelled/flooded battery selection.*
- *Parallel connection for 40 A or more.*
- *Green charging and red LVD indicators.*
- *Approved for use in hazardous locations Class 1, Division 2, Groups A, B, C, D.*

SUNSAVER 10/20





Mechanical specifications

Wire size:	5.2 mm² (#10 AWG).
Enclosure material:	Anodised aluminium.
Terminal material:	Marine rated stainless steel.
Encapsulation material:	Epoxy resin.
Weight:	0.23 Kg.

Electrical specifications

Electrical specifications	12 V	24 V
Rated solar input	10/20 A	
Rated solar load	10/20 A	
25% current overload	5 min.	
Regulation voltage:		
·Gelled battery	14.1 V	28.2 V
·Flooded battery	14.4 V	28.8 V
Load disconnection	11.5 V	23.0 V
LVD reconnection	12.6 V	25.2 V
Temperature Compensation (mV/°C)	-28	-56
Self-consumption	From 6 to 10 mA	
Operating temperature	From -40 to +85°C	

** LVD: Low Voltage Disconnect.*

MODEL	SOLAR RANGE (A)	LOAD RANGE (A)	LVD	SYSTEM VOLTAGE
	0 10 20	0 10 20		12 V 24 V
SS-10				
SS-10L				
SS-10-24V				
SS-10L-24V				
SS-20L				
SS-20L-24V				

Specifications subject to change without previous notice.

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SOLAR SERIES

Solar Series

Designed for solar applications

The SOLAR series batteries are especially designed for medium and small performance solar applications. They use gelled electrolyte.

Ideal for Marine Aids to Navigation installations

These batteries are ideal for their use in Marine Aids to Navigation installations, as they allow deep discharges, do not emit any gases and can be installed in any position, without disrupting their operation when installed on buoys.

Minimum discharge rate

The advantages of the "maintenance-free" VRLA batteries are enhanced by the worldwide excellent reputation and technical image of the DRYFIT technology. Their minimum discharge rate provides a high storage autonomy, without recharge, up to 2 years.

Designed in accordance with IEC 61427 and IEC 60896-21/22 Standards.

Nominal Capacity
6.60 - 230 Ah C_{100}

Battery block

Grid plate

Recyclable

Valve Regulated Lead Acid Battery

Proof against deep-discharge.

Free-maintenance
(does not require filling)

800 cycles at 60% DoD C_{10}

FEATURES

- *DRYFIT technology ensuring a free-maintenance, gelled, leak-proof battery.*
- *Grid plate of high cycling performance: 800 cycles at 60%.*
- *Nominal capacity from 6.6 to 230 Ah C100 (20°C).*
- *Minimum operating service life of 5 years.*
- *Completely recyclable due to the low CO2 footprint.*
- *Possibility of storage without recharge up to 2 years.*
- *Robust design resilient in harsh conditions.*
- *Protection valves against over-pressures, protecting cells against the atmosphere.*
- *Proof against deep-discharge.*
- *Easy installation.*
- *Trouble-free transport: no restrictions for rail, road, sea and air transportation (IATA, DGR clause A67).*

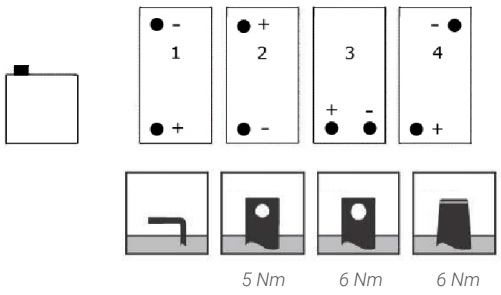
SOLAR SERIES

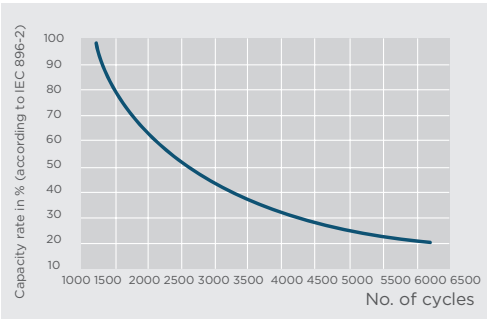
Type	Nominal voltage (V)	Nominal capacity C_{100} 1.80 V/C (Ah)	Length max. (mm)	Width max. (mm)	Height up to top of cover max. (mm)	Height including connectors max. (mm)	Approx. weight (kg)	Terminal	Terminal position
S12/6,6 S	12	6.6	152	65,5	94.5	98.4	2.6	S-4.8	3
S12/17 G5	12	17.0	181	76	-	167	6.1	G-M5	1
S12/27 G5	12	27.0	167	176	-	126	9.6	G-M5	1
S12/32 G6	12	32.0	197	132	160	184	11.1	G-M6	2
S12/41 A	12	41.0	210	175	-	175	14.6	A-Terminal	1
S12/60 A	12	60.0	261	136	208	230	19.0	A-Terminal	1
S12/85 A*	12	85.0	353	175	-	190	26.8	A-Terminal	1
S12/90 A	12	90.0	330	171	213	236	30.0	A-Terminal	2
S12/130 A	12	130.0	286	269	208	230	39.8	A-Terminal	4
S12/230 A	12	230.0	518	274	216	238	67.0	A-Terminal	3

Capacities C_1 - C_{100} (20°)

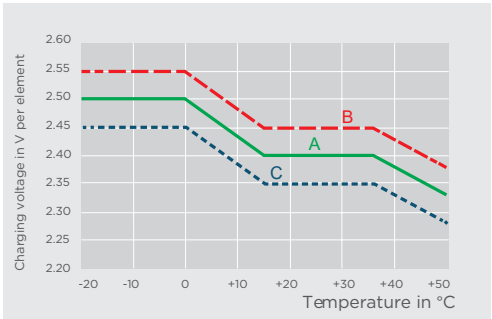
Type	C_1 1.70 V/C	C_5 1.70 V/C	C_{10} 1.70 V/C	C_{20} 1.75 V/C	C_{100} 1.80 V/C
S12/6,6 S	2.9	4.6	5.1	5.7	6.6
S12/17 G5	9.3	12.6	14.3	15.0	17.0
S12/27 G5	15.0	22.1	23.5	24.0	27.0
S12/32 G6	16.9	24.4	27.0	28.0	32.0
S12/41 A	21.0	30.6	34.0	38.0	41.0
S12/60 A	30.0	42.5	47.5	50.0	60.0
S12/85 A	55.0	68.5	74.0	76.0	85.0
S12/90 A	50.5	72.0	78.0	84.0	90.0
S12/130 A	66.0	93.5	104.0	110.0	130.0
S12/ 230 A	120.0	170.0	190.0	200.0	230.0

Drawings with terminal position, terminal and torque.





Endurance in cycles according to IEC 986-2.



1) With switch regulator (two-step controller).
Charge on **curve B** (max. charge voltage) for max. 2 hrs/day, then switch over to continuous charge - **curve C.**

2) Standard charge (without switching) - **curve A**.

3) Boost charge (equalizing charge with external generator).
Charge on **curve B** for max. 5 hrs/month, then switch over to **curve C**.

Specifications subject to change without previous notice.

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SOLAR BLOCK SERIES

Solar Block Series

Designed for solar applications

Thanks to their high-resistance and reliability, the SOLAR BLOCK series batteries are ideal for their use in installations under the harshest conditions.

Ideal for Marine Aids to Navigation installations

This range of batteries offered by Mediterráneo Señales Marítimas is ideal for their use in Marine Aids to Navigation installations, as they allow deep discharges, do not emit any gases and can be installed in any position, without disrupting their operation when installed on buoys.

Free-maintenance

Manufactured with high and proved DRYFIT technology. Electrolyte is immobilized in gel form, assuring a completely free-maintenance battery.

Designed according to Standards IEC 61427 and IEC 60896-21/22 Standards.

Nominal Capacity
60 - 330 Ah C_{100}

Battery block

Grid plate

Recyclable

Valve Regulated Lead Acid Battery

Proof against deep-discharge.

Free-maintenance
(does not require filling)

1,200 cycles at 60% DoD C_{10}

FEATURES

- *DRYFIT technology ensuring a free-maintenance, gelled, leak-proof battery.*
- *Grid plate of exceptional cycling performance: 1,200 cycles at 60%.*
- *Nominal capacity from 60 to 330 Ah C100 (20°C).*
- *Minimum operating service life of 7 years.*
- *Completely recyclable due to the low CO2 footprint.*
- *Possibility of storage without recharge up to 2 years.*
- *Robust design resilient in harsh conditions.*
- *Protection valves against over-pressures, protecting cells against the atmosphere.*
- *Proof against deep-discharge.*
- *Easy installation.*
- *Trouble-free transport: no restrictions for rail, road, sea and air transportation (IATA, DGR clause A67).*

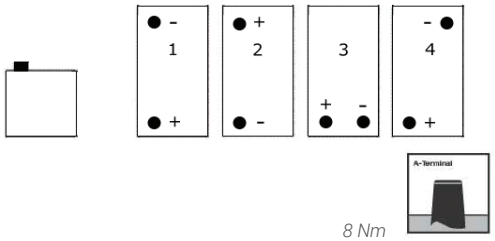
SOLAR BLOCK SERIES

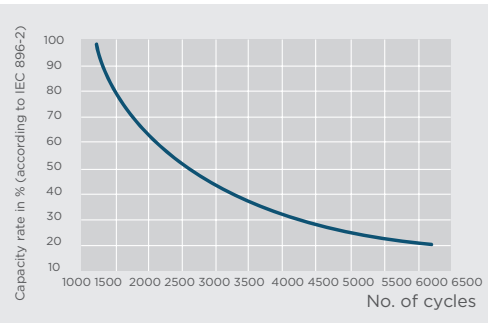
Type	Nominal voltage (V)	Nominal capacity C_{100} 1.80 V/C (Ah)	Length max. (mm)	Width max. (mm)	Height up to top of cover max. (mm)	Height including connectors max. (mm)	Approx. weight (kg)	Terminal	Terminal position
SB12/60 A	12	60	278	175	-	190	19	A-Terminal	1
SB12/75 A	12	75	330	171	214	236	26.5	A-Terminal	2
SB12/100 A	12	100	513	189	195	223	36.5	A-Terminal	3
SB12/130 A	12	130	513	223	195	223	45.5	A-Terminal	3
SB12/185 A	12	185	518	274	216	238	62.5	A-Terminal	3
SB6/200 A	6	200	246	192	254	275	29	A-Terminal	4
SB6/330 A	6	330	312	182	337	359	47	A-Terminal	4

Capacities C_1 - C_{100} (20°)

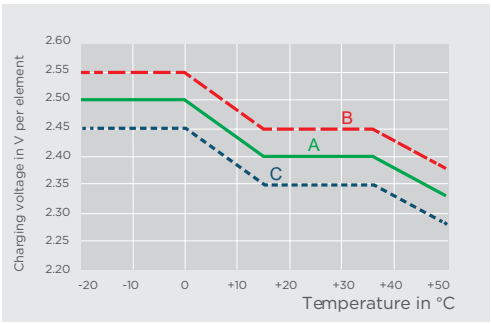
Type	C_1 1.70 V/C	C_5 1.70 V/C	C_{10} 1.70 V/C	C_{20} 1.75 V/C	C_{100} 1.80 V/C
SB12/60 A	34	45	52	56	60
SB12/75 A	48	60	66	70	75
SB12/100 A	57	84	89	90	100
SB12/130 A	78	101	105	116	130
SB12/185 A	103	150	155	165	185
SB6/200 A	104	153	162	180	200
SB6/330 A	150	235	260	280	330

Drawings with terminal position, terminal and torque.





Endurance in cycles according to IEC 986-2.



1) With switch regulator (two-step controller).
Charge on **curve B** (max. charge voltage) for max. 2 hrs/day, then switch over to continuous charge - **curve C.**

2) Standard charge (without switching) - **curve A.**

3) Boost charge (equalizing charge with external generator).
Charge on **curve B** for max. 5 hrs/month, then switch over to **curve C.**

Specifications subject to change without previous notice.

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A600 SOLAR SERIES

A600 Solar Series

Performance and reliability

A600 SOLAR batteries offer the highest performance and reliability under the harshest environmental conditions.

Maintenance free

The electrolyte is fixed in gel, what guarantees the battery to be completely maintenance free. In contrast to conventional batteries, this type offers the advantage of an horizontal mounting. The required room for the battery system can be minimized to one third.

Ideal for the use in Marine Aids to Navigation installations

This range of batteries offered by Mediterráneo Señales Marítimas is ideal for their use in Marine Aids to Navigation installations, as they allow deep discharges, do not emit any gases and can be installed in small rooms or places without ventilation.

Designed according to Standards IEC 61427 and IEC 60896-21/22 Standards.

Nominal Capacity
294 - 3919 Ah C_{120}

Single cell

Grid plate

Recyclable

Valve Regulated Lead Acid Battery

Proof against deep-discharge.

Free-maintenance
(does not require filling)

3,000 cycles at 60%
DoD C_{10}

FEATURES

- *DRYFIT technology ensuring a free-maintenance, gelled, leak-proof battery.*
- *Robust tubular plates, optimising its for high corrosion resistance.*
- *Exceptional cycling performance: 3,000 cycles at 60%.*
- *Remarkable cost efficiency. 30% less overhead cost compared to conventional batteries.*
- *Nominal capacity from 294 to 3919Ah C120 (20°C).*
- *Minimum operating service life of 15 years(20°C).*
- *Completely recyclable due to the low CO_2 footprint.*
- *Possibility of storage without recharge up to 2 years.*
- *Screw connection for easy and safe assembly, maintenance free, with excellent conductivity.*
- *Protection valves against over-pressures, protecting cells against the atmosphere.*
- *Trouble-free transport: no restrictions for rail, road, sea and air transportation (IATA, DGR clause A67).*

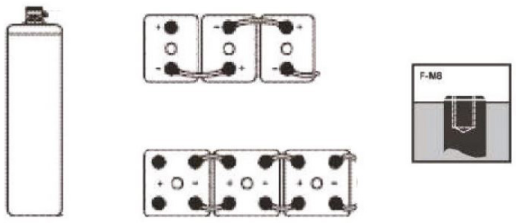
A600 SOLAR SERIES

Type	Nominal voltage (V)	Nominal capacity C_{100} 1.80 V/C (Ah)	Lenght max. (mm)	Width max. (mm)	Height up to top of cover max. (mm)	Height including connectors max. (mm)	Approx. weight (kg)	Terminal	Terminal position
A602/295 Solar	2	286	105	208	357	399	19	F-M8	1
A602/370 Solar	2	357	126	208	357	399	23	F-M8	1
A602/440 Solar	2	429	147	208	357	399	27	F-M8	1
A602/520 Solar	2	505	126	208	473	515	30	F-M8	1
A602/625 Solar	2	606	147	208	473	515	35	F-M8	1
A602/750 Solar	2	707	168	208	473	515	39	F-M8	1
A602/850 Solar	2	829	147	208	648	690	49	F-M8	1
A602/1130 Solar	2	1,105	212	193	648	690	66	F-M8	2
A602/1415 Solar	2	1,382	212	235	648	690	80	F-M8	2
A602/1695 Solar	2	1,658	212	277	648	690	95	F-M8	2
A602/1960C Solar	2	1,937	212	277	717	759	115	F-M8	2
A602/2600 Solar	2	2,547	216	400	775	816	160	F-M8	3
A602/3270 Solar	2	3,184	214	489	774	816	198	F-M8	4
A602/3920 Solar	2	3,821	214	578	774	816	238	F-M8	4

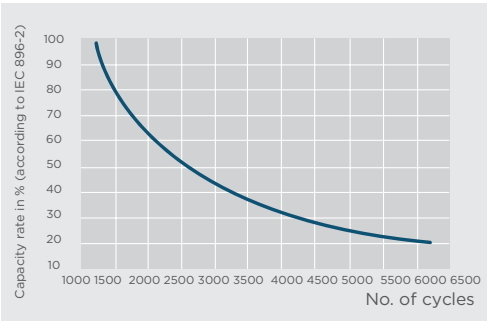
Capacities C_1 - C_{100} (20°)

Type	C_1 1.67 V/C	C_3 1.75 V/C	C_5 1.77 V/C	C_{10} 1.80 V/C	C_{20} 1.85 V/C	C_{100} 1.85 V/C
A602/295 Solar	123	167	193	218	286	294
A602/370 Solar	154	209	241	272	357	367
A602/440 Solar	185	251	290	326	429	440
A602/520 Solar	229	307	342	380	505	519
A602/625 Solar	275	369	410	456	606	623
A602/750 Solar	321	431	479	532	707	727
A602/850 Solar	367	513	626	681	829	848
A602/1130 Solar	489	684	834	908	1,105	1,131
A602/1415 Solar	612	855	1,043	1,135	1,382	1,413
A602/1695 Solar	734	1,026	1,252	1,363	1,658	1,695
A602/1960C Solar	824	1,209	1,359	1,573	1,937	1,959
A602/2600 Solar	1,047	1,548	1,782	2,025	2,547	2,613
A602/3270 Solar	1,309	1,935	2,228	2,532	3,184	3,266
A602/3920 Solar	1,571	2,322	2,673	3,038	3,821	3,919

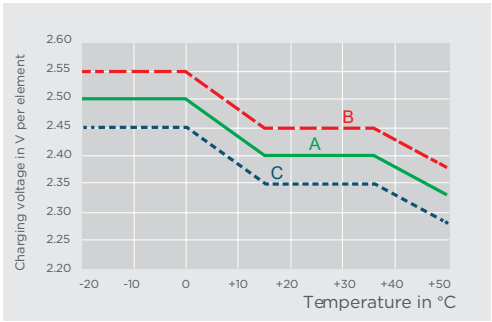
Drawings with terminal position, terminal and torque.



Specifications subject to change without previous notice.



Endurance in cycles according to IEC 986-2.



1) With switch regulator (two-step controller).
Charge on **curve B** (max. charge voltage) for max. 2 hrs/day, then switch over to continuous charge - **curve C.**

2) Standard charge (without switching) - **curve A.**

3) Boost charge (equalizing charge with external generator).
Charge on **curve B** for max. 5 hrs/month, then switch over to **curve C.**

MSM

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Windside

Wide range wind turbines

MSM offers its wide range of vertical wind turbines WINDSIDE as ideal complement for battery charging, making wind energy into electricity wherever energy is needed. They are specially suitable for offshore installations, buoys, small islands, vessels, ..., under the harshest marine conditions.

Autocontrolled rotational speed

WINDSIDE wind turbines provide highest efficiency and durability with a minimum maintenance. One of the main advantage of its vertical axe construction is its autocontrolled rotational speed, also in conditions of extreme wind.

Soundless (0 dB)

Also characterised by their respect for the environment due to their soundless (0 dB), ensuring a safe installation in population centres, public spaces, natural areas, etc.

FEATURES

- *Vertical wind turbine based on sailing engineering principles.*
- *The turbine rotor is rotated by two spiral-formed vanes.*
- *Operating in harmony with nature and environment.*
- *No need to stop or secure during storms.*
- *No need to be turned to wind direction.*
- *Stands snow, frost, heat and humidity.*
- *Composite re-enforced fibre glass propellers.*
- *Marine-grade aluminium generator casings.*
- *Stainless-steel hardware.*
- *Top quality lubricated bearings.*
- *Depending on its use and the weather conditions, we offer various models to ours customers.*

WINDSIDE

Model	WS-0,15B	WS-0,30B	WS-0,30A8	WS-2B	WS-2AK	WS-4B	WS-4A
Weight	38 kg	46 kg	98 kg	550 kg	1,000 kg	800 kg	1,200 kg
Swept area	0.15 m^2	0.30 m^2	0.30 m^2	2 m^2	2 m^2	4 m^2	4 m^2
Voltage	12/24 V	12/24 V	12/24 V	12/24 V	12/24 V	12/24/48 V	12/24/48 V
Max. power	71/132 W	97/190 W	102/201 W	420/792 W	432/864 W	420/840/1,632 W	500/900/1,680 W
Regulator	WGU 22	WGU 22	WGU 22	WGU 25-50	WGU 25-50	WGU 50	WGU 50
Fixings	6 uds. M12	6 uds. M12	8 uds. M20-M16	8 uds. M30	20 uds. M20	8 uds. M30	8 uds. M30
Wind load	50 kg	100 kg	100 kg	500 kg	500 kg	1,000 kg	1,000 kg

Materials and environment

Fibre glass vanes.

Aluminium fixings.

Chrome coated steel or stainless steel shaft, depending on model.

Generator and generator end plates from marine grade aluminium or hot-dip galvanized steel, depending on model.

Stainless-steel (A4 o A2) or hot-dip galvanized steel (Zn) bolts.

Produces maximum amount of energy in storms.

Soundless (0 dB), measured in 2 meters distance from the vane.

Long service life.

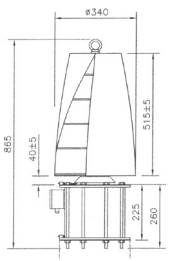
Minimum maintenance, only lubrication.

Safe to people, animals and nature.

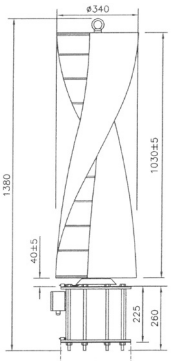
Approximate annual power production / Annual average wind speeds (KWh/year)

m/s	WS-0,15	WS-0,30	WS-2	WS-0,4
4	15	30	120	400
5	40	80	700	2,000
8	96	192	1,800	5,200
10	206	413	3,900	11,100

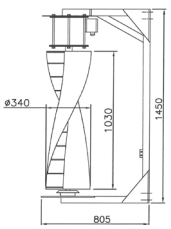
WS-0,15B



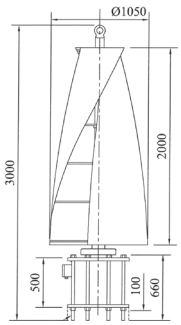
WS-0,30B



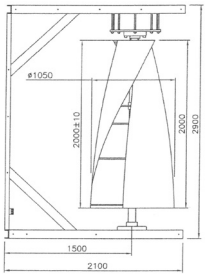
WS-0,30A8



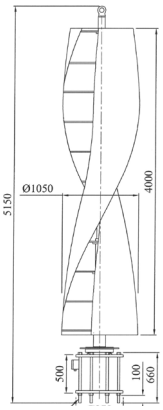
WS-2B



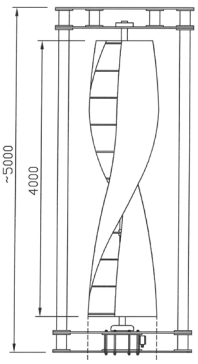
WS-2AK



WS-4B



WS-4A



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Blue Smart IP 65/67

Automatic optimization of the charging process

The BlueSmart Battery Chargers feature a microprocessor controlled “adaptive” technology which controls the charge of the battery. The “adaptive” features will automatically optimise the charging process based on the battery duty cycle.

Ideal for it use in Marine Aids to Navigation installations

This charger is ideal for it use in Marine Aids to Navigation installations as a power supply complement. Completely encapsulated in resin, thus providing a high resistance under harsh humidity and salinity conditions.

Automatic charging cycle

Adaptive 3- or 4-stage charge characteristic, depending on model.

FEATURES

- Waterproof, ignition protected and shockproof:
  - Water, hydrocarbons or dirt will not damage the charger.
  - The enclosure is made from cast aluminium and the electronics are moulded in resin.
- Protected against overheating:
  - Can be used in hot environment such as machine room, battery boxes or maritime towers.
  - Output current will be reduced when temperature increases (up to 60°C), but the charger will not fail.
- 92% efficiency or better. Once the battery is fully charged, power consumption reduces to less than 1 Watt.
- Adaptive 4-stage charge: bulk - absorption - float - storage. The “adaptive” feature will automatically optimise the charging process based on the battery duty cycle (12/7 model, 3-stage charge).
- Two LEDs for status indication:
  - LED yellow: bulk charge.
  - LED green: float mode, battery charged.
  - LED yellow and green: absorption charge.
- The “storage” mode prevents stratification of the electrolyte and sulphation, major cause of early battery failure.

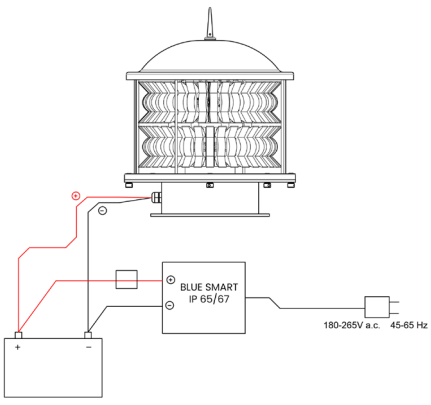
BLUE SMART

Standard specifications

BLUE SMART CHARGER	12/7	12/17	12/25	24/8	24/12
Input voltage range and frequency	200-265V a.c. 45-65 Hz	180-265V a.c. 45-65 Hz	180-265V a.c. 45-65 Hz	180-265V a.c. 45-65 Hz	180-265V a.c. 45-65 Hz
Efficiency	92%	94%	92%	95%	93%
No load power consumption	0.5 W	0.5 W	0.5 W	0.5 W	0.5 W
Charge voltage 'absorption' (V d.c.)	14.4	14.4	14.4	28.8	28.8
Charge voltage 'float' (V d.c.)	13.7	13.7	13.7	27.4	27.4
Charge voltage 'storage' (V d.c.)	-	13.2	13.2	26.4	26.4
Charge current (A)	7	17	25	8	12
Charge algorithm	3-stage with 18-hour limited absorption.	4-stage adaptive.			
Can be used as power supply	✓				
Protections	Battery reverse polarity, short circuit and over temperature.	Battery reverse polarity, short circuit, over temperature and transient overvoltage.			
Operating temp. range	From -20º to +60ºC (full rated output up to 40ºC).				
Humidity	Up to 100%.				

Enclosure

Material & Colour	Aluminium (blue RAL 5012)			
Battery-connection	Black and red cable of 1.5 m			
230 V a.c.-connection	Cable of 1.5 m with CEE 7/7 plug			
Protection category	IP 65		IP 67	
Weight (kg)	1.1	2.4	2.4	2.4
Dimensions (mm)	43 x 80 x 155		99 x 219 x 65	



Standards

Safety	EN 60335-1	EN 60335-2-29
Emission/ Immunity	EN 55014-1-2 EN 60555-2-3	EN 55014-1 EN 61000-6-3 EN 61000-3-2

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Phoenix

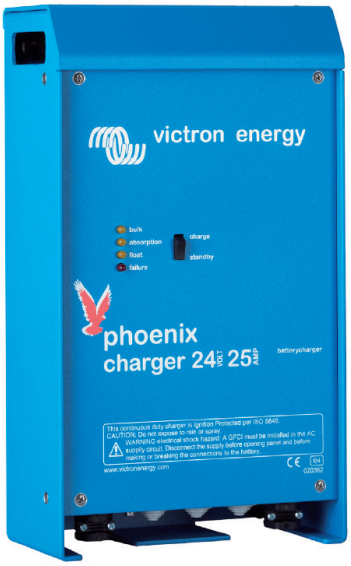
Automatic optimization of the charging process

The Phoenix Battery Chargers feature a microprocessor controlled 'adaptive' battery management system that can be preset to suit different types of batteries. The 'adaptive' feature will automatically optimise the process based on the battery duty cycle.

Adaptive 4-stage charge system

Adaptive 4-stage charge system: bulk – absorption – float – storage. Three outputs, two complete and one of 4 amps.

Universal 90-265V input, 45-65 Hz.



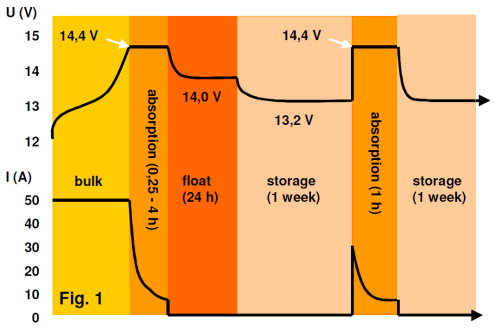


Fig. 1

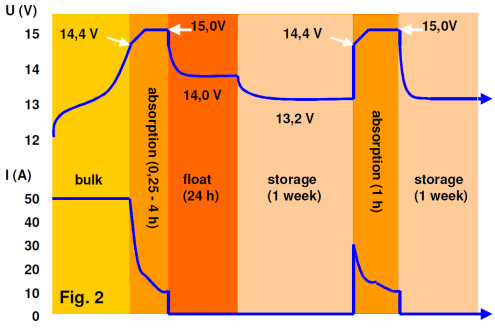


Fig. 2

FEATURES

- Adaptive 4-stage charge: bulk - absorption - float - storage.
- The right amount of charge: variable absorption time. To prevent overcharging of the battery, the absorption time is kept short when only shallow discharges occur. After a deep discharge the absorption time is automatically increased to make sure that the battery is completely recharged.
- Every charger comes with a battery temperature sensor. When connected, charge voltage will automatically decrease while increasing battery temperature. This feature is especially recommended for gelled batteries and/or when important fluctuations of battery temperature are expected.
- Battery voltage sense, so that the battery always receives the correct charge voltage. This feature allows to compensate voltage losses due to cable resistance.
- The "storage" mode prevents stratification of the electrolyte and sulphation, major cause of early battery failure.
- Ready to communicate with a PC through its RS-485 serial port (wire not included).

PHOENIX

Standard specifications

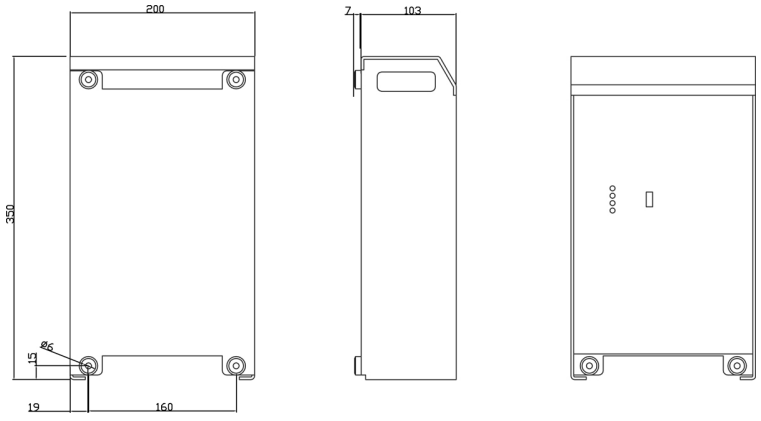
PHOENIX BATTERY CHARGER	12/30	12/50	24/16	24/25
Input voltage range (V a.c.)	90-265			
Input voltage range (V d.c.)	90-400			
Frequency (Hz)	45-65			
Power factor	1			
Charge voltage 'absorption' (V d.c.)	14.4	14.4	28.8	28.8
Charge voltage 'float' (V d.c.)	13.8	13.8	27.6	27.6
"Storage" voltage (V d.c.)	13.2	13.2	26.4	26.4
Charge current starter batt. (A)	4	4	4	4
Charge characteristic	4 stage adaptive			
Battery capacity (Ah)	100-400	200-800	100-200	100-400
Temperature sensor				
Forced cooling				
Can be used as power supply				
Protections	Output short-circuit, reverse polarity, over-temperature and transient overvoltage.			
Operating temp. range	From -20º to +60ºC			
Humidity (non condensing)	max. 95%			

Enclosure

Material & colour	Aluminium (blue RAL 5012)
Battery-connection	M6 bolts.
230V a.c.-connection	4 mm² clamps (AWG 6).
Protection category	IP 21.
Weight (kg)	3.8
Dimensions (mm)	350 x 200 x 108

Standards

Safety	EN 60335-1	EN 60335-2-29
Emission/ Immunity	EN 55014-1	EN 61000-3-2
Vibration	IEC68-2-6:10-150Hz/1.0G	



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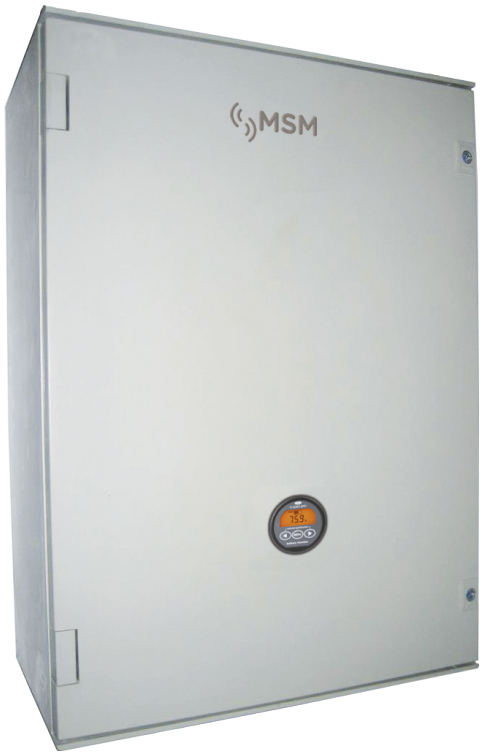
SCU

SOLAR CONTROL UNIT

SCU

Ideal for medium-sized solar installations

SCU Solar Control Unit is an ideal device for its use in Aids to Navigation solar installations of medium size or any other system.



Overvoltage, overcharge and deep discharge protection

SCU provides a total overvoltage, overcharge and deep discharge protection of batteries, and also protects installation by interconnecting solar modules, battery and charge.

The SCU unit integrates a precision meter, which checks the battery state of charge.

Protection against atmospheric discharges

It is equipped with protection devices against lightning, surge and short-circuit protection of the installation.

FEATURES

- Charge controller:
  - This controller is responsible for controlling the battery charging by using the solar power system.
  - The drive has an up to 60 Amp capacity of current of the photovoltaic array (FV) to 12, 24 or 48V.

- Discharge controller:
  - This controller has the function of controlling the discharge of the battery, cutting the consumption current if the battery voltage is too low.
  - It prevents damages of the battery by over-discharges.

- Battery display:
  - LCD display allows to show the state of battery:
    - Battery voltage (V).
    - Charge and discharge current (A).
    - Amp-hour counter (Ah).
    - Battery state of charge (%).
  - PC connection to download historic data.

- Overvoltage protection:
  Located at solar module inputs to protect installation against transient overvoltage caused by storms.

SCU

Standard Specifications

SPECIFICATIONS	SCU 4020	SCU 6030
Max. current charge	40 A	60A
Max. current discharge	20 A	30 A
Fuses: Battery Solar modules	46 A (Type NH) 2 x 25 A (14 x 51 mm)	63 A (Type NH) 2 x 32 A (14 x 51 mm)
Common	Negative	
Weight	25 kg	32 kg
Dimensions	54 x 43 x 20 cm	64 x 43 x 25 cm
Voltage	12/24V	12/24/48V
Temperature sensor	External, optional	
Protections	Over-currents, over-voltages and short circuits	
Watertightness degree	IP 66 (IEC 60529)	
Battery temperature sensor	Optional	

Indicators / Parameters

- Battery voltage (V).
- Solar charge current (A).
- Operating current (A).
- Charge counter (Ah).
- Discharge counter (Ah).
- Disconnection alert from deep discharge.
- Voltage disconnection.
- Current (A).
- Charge status (%).
- Time-to-go (h): battery time-to-go with the current load.
- Temperature (ºC).

Options

Charge controller with MPPT tracker system of maximum power.

ATEX versions for hazardous areas.

Stainless-steel housing.

Other powers and configurations available.

Specifications subject to change without previous notice.

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LEAD CRYSTAL

Lead Crystal

Designed for stationary and cyclical applications

LEAD CRYSTAL® batteries are specially designed for stationary and cyclical applications.

Optimal performance in buoys

These batteries are suitable for Aids to navigation, because they admit deep discharges, can be installed in any position, and do not emit gases, not being altered their operation when they are installed on buoys. LEAD CRYSTAL® batteries offered by Mediterraneo Señales Marítimas S.L.L. are composed by lead and liquid acid plates Si02 as electrolyte which replace sulfuric acid in traditional lead acid batteries.

Minimum discharge rate

Thanks to the minimum discharge rate, these batteries provide a high storage autonomy, without need of charge in two years.

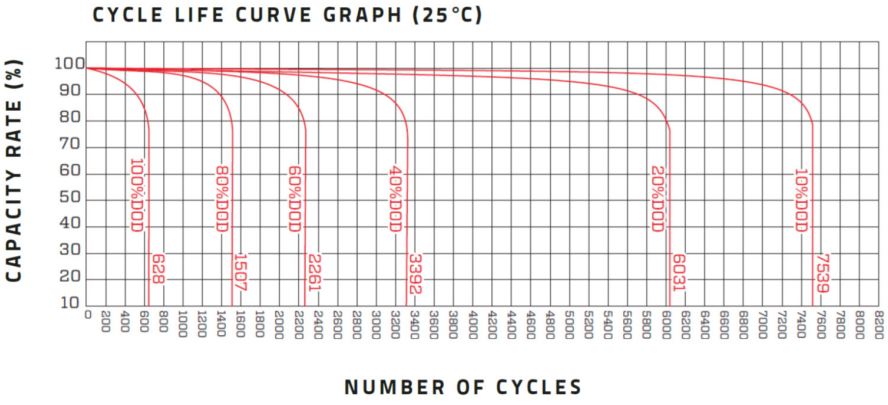
FEATURES

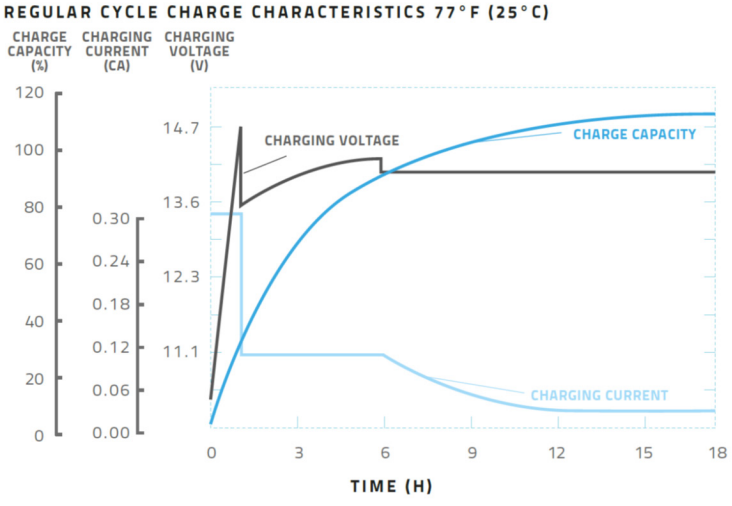
- *Battery sealed with a new type of electrolyte: Si02 non-corrosive acid.*
- *Non-toxic technology, that ease the ions exchange and avoid humidity losses, sulphation of plates and loss of materials.*
- *Hermetic battery, free-maintenance.*
- *It produces a combined reaction which do not allow hydrogen and oxygen leak and prevent spills, so it can be installed in any position except face down.*
- *Charge and discharge cycles higher than a liquid lead or gel battery. Allows between 2000 and 3100 effective cycles and up to 6400 cycles in 10% of discharge of the total capacity (compared to the traditional batteries which allows 300 and 400 cycles).*
- *Extremely low discharge rate. It allows its storage without use up to 2 years, and still would be 80% of its nominal capacity.*
- *Sealed battery. Intrinsic characteristic of its crystal technology of not containing liquids or producing any kind of gases.*
- *Superior capacity of energy storage.*
- *Suitable use for stationary and cyclical applications, covering maritime sector needs perfectly.*

LEAD CRYSTAL

Technical specifications

Model	Nominal voltage (V)	Capacity 120h (Ah) C_{120}	Total Height (mm) up to terminals	Height (mm)	Length (mm)	Width (mm)	Weight (Kg)	Maximum output current (A) - a 25º
LEAD CRYSTAL 12/14	12 V	16.9 Ah	104 mm	98 mm	151 mm	99 mm	4.35 kg	120 A
LEAD CRYSTAL 12/28	12 V	33.6 Ah	125 mm	125 mm	176 mm	166 mm	9 kg	280 A
LEAD CRYSTAL 12/40	12 V	48 Ah	172 mm	172 mm	198 mm	166 mm	13 kg	400 A
LEAD CRYSTAL 12/65	12 V	78 Ah	175 mm	175 mm	348 mm	167 mm	21 kg	650 A
LEAD CRYSTAL 12/90	12 V	108 Ah	240 mm	206 mm	306 mm	174 mm	28 kg	900 A
LEAD CRYSTAL 12/120	12 V	144 Ah	234 mm	211 mm	408 mm	172 mm	36.5 kg	1200 A
LEAD CRYSTAL 12/150	12 V	180 Ah	240 mm	215 mm	530 mm	205 mm	45 kg	1500 A
LEAD CRYSTAL 12/200	12 V	240 Ah	223 mm	219 mm	522 mm	240 mm	64 kg	2000 A
LEAD CRYSTAL 2/500	2 V	600 Ah	335 mm	330 mm	244 mm	175 mm	31.5 kg	5000 A
LEAD CRYSTAL 2/1000	2 V	1200 Ah	340 mm	330 mm	475 mm	175 mm	61 kg	10000 A





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SMART SOLAR

MPPT CHARGE CONTROLLERS

MPPT Charge Controller Smart solar

Optimization of solar panels efficiency

SMART SOLAR charge controllers are conceived to maximise solar panels efficiency, in high performance applications or when solar generation is limited. Especially in case of low-light conditions, MPPT controller will improve energy harvest by up to 30% compared to PWM charge controllers.

Integrated Bluetooth

Also, thanks to the integrated Bluetooth, it is possible to set up, monitor and update the controller with a smartphone.

Maximising the battery lifespan

The Battery Life algorithm monitors continuously the state of charge of the battery and modulates the load disconnect level maximasing the battery lifespan.

FEATURES

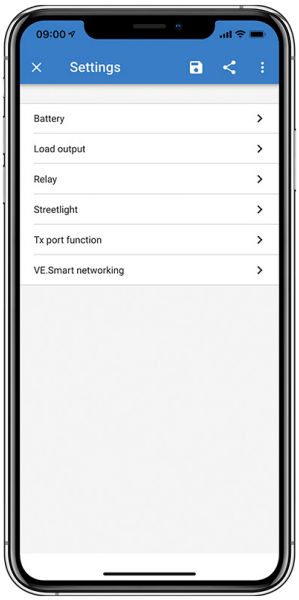
- *Charge controller:*
  - This controller manages the battery charge by the solar power supply.
  - This controller has a capacity up to 290 W photovoltaic (PV) power in 12 or 24 V.
- *Discharge controller:*
  - This controller has the function of supervise the discharge of the battery, regulating in a smart way the discharge, which maximize the lifetime of the battery.
- *Battery display:*
  - The App and Bluetooth connection allows the monitoring of every parameter of the system:
  · Battery voltage (V).
  · Charge and discharge current (A).
  · Amp hour meter (Ah).
  · Battery charge status (%).
  · Historical data.
- *Overvoltages protection:*
  - Protection over solar module inputs to protect the installation against transient overvoltages due to lighting storms.

SMART SOLAR

MPPT Smart Solar Controller

MPPT SMART SOLAR CONTROLLER	MPPT 75/10	MPPT 75/15	MPPT 100/15	MPPT 100/20
Battery Voltage (V)	Automatic selection 12/24V			
Rated Load Current (A)	10 A	15 A	15 A	20 A
Nominal PV power @ 12 V	145 W	220 W	220 W	290 W
Nominal PV power @ 24 V	290 W	440 W	440 W	580 W
Max. PV open circuit voltage	75 V		100 V	
Peak efficiency	98%			
Self-consumption	10 mA			
Charge voltage “Absorption”	14,4V / 28,8V (adjustable)			
Charge voltage “Floating”	13,8V / 27,6V (adjustable)			
Charge algorithm	multi-stage adaptive			
Protection	"Reverse polarity of the battery (fuse) / Output short circuit / Over temperature"			
Operating temperature	De -30 a +60 °C (potencia nominal completa hasta los 40°C)			
Weight	0,5 kg		0,6 kg	0,65 kg
Dimensions (h x w x d)	100 x 113 x 40 mm		100 x 113 x 50 mm	100 x 113 x 60 mm

APP



Specifications subject to change without previous notice.

MSM

Mediterráneo Señales Marítimas, S.L. / +34 96 276 10 22 / msm@mesemar.com / www.mesemar.com

STECA SOLARIX

MPPT CHARGE CONTROLLERS

MPPT Charge Controller Steca Solarix

Maximum power point tracking

Steca Solarix MPPT are solar charge controllers with maximum power point tracking. These are suitable for all common module technologies and are optimally suited for solar systems with module voltages higher than the battery voltage.

Maximum efficiency

They are especially suitable in locations where it is very important to maximasing the efficiency of the installed solar power, or in combination with large solar panels that are normally designed to work on the grid. Steca's efficient MPP tracking algorithm always provides the maximum usable power of the module.

Smart charge/discharge management

Additionally, these controllers provide a maximum battery durability, thanks to smart charge/discharge management and their remarkable protection features. The MPPT Steca Solarix Controllers have an intuitive LCD screen with menu guidance and push buttons.

Steca Solarix MPPT 3020

Steca Solarix MPPT 5020

FEATURES

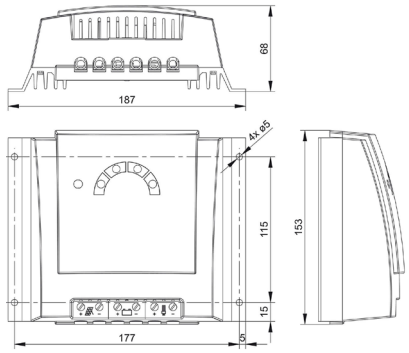
- *Maximum power point tracking (MPPT).*
- *Push buttons and LCD screen integrated, allowing the visualization of operating parameters and alarms.*
- *Voltage and current automatic regulation.*
- *Overtemperature compensation functions.*
- *Protections against overcharge, deep discharge, reverse polarity, short circuit, etc.*
- *LED functional display with operating states, state of charge and fault messages.*

STECA SOLARIX

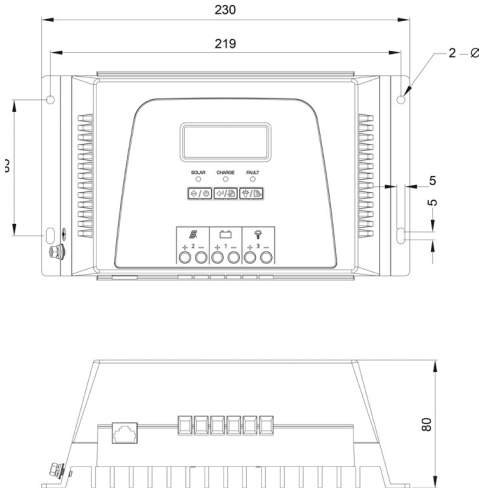
MPPT Steca Solarix Controller

MPPT STECA SOLARIX CONTROLLER	SOLARIX MPPT 1010	SOLARIX MPPT 2010	SOLARIX MPPT 3020	SOLARIX MPPT 5020
System voltage (V)	12 / 24 V			12 / 24 /48 V
Max. PV power (W)	125 / 250 W	250 / 500 W	450 / 900 W	750 / 1500 / 3000 W
Peak efficiency (%)	98%			
Self-consumption	10 mA			
Max. Voltage PV	75 V	100 V		150 V
DC Output load current	10 A		20 A	
Charge current battery	10 A	20 A	30 A	50 A
End-of-charge voltage	13.9 / 27.8 V		14.1 / 28.2 V	14.1 / 28.2 / 56.4 V
Boost charge voltage	14.4 / 28.8 V		14.4 / 28.8 V	14.4 / 28.8 / 57.6 V
Operating temperature	- 25 a + 40°C			
Dimensions	187 x 153 x 68 mm		230 x 130 x 80 mm	250 x 230 x 85 mm
Weight	900 g		1370 g	3140 g

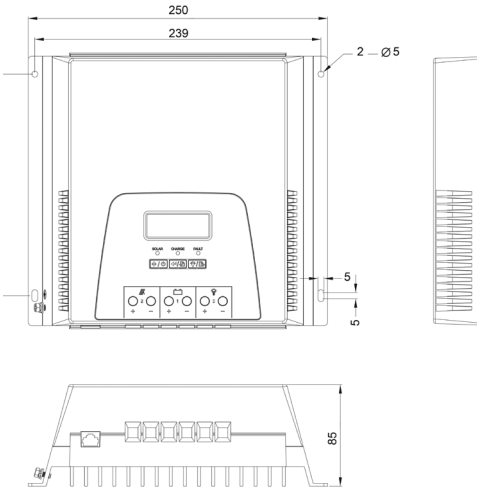
Steca Solarix MPPT 1010 / 2010



Steca Solarix MPPT 3020



Steca Solarix MPPT 5020



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