



photovoltaic  
wind generators  
solar thermal

## Dear Phaesun Business Partner,

Phaesun GmbH is your global distributor for components and complete systems in the field of independent solar engineering, small wind power and thermal solar siphon equipment.

In order to remain successful in a market competition which has become continuously tougher, both enterprises and staff have to be flexible and work efficiently. Therefore you need a reliable, competent and efficient business partner to cooperate with. With Phaesun GmbH, you will find a partner who constantly makes any effort to provide you with the required solutions in the fields mentioned above, quickly, competent and at favourable prices. The Phaesun „One Stop Shop“ enables you to receive everything you need from one single supplier which in return will save you a lot of time and effort to make it available for the support of your clients.

We shall be pleased to continue being at your disposal as a „Solution Provider for Stand Alone Power Systems“ also in the business year of 2008.

Apart from the wide product range available for you in the most topical edition of the Phaesun Product Catalogue 2008, we offer you a large number of additional articles. In order to be able to supply you always with the latest state-of-the-art products, we constantly extend and improve our assortment, so you will benefit from a wide and refined product range to make you fit for a tough competition.

Please also find our entirely topical product assortment on our website [www.phaesun.com](http://www.phaesun.com). We are sure you will make a profit from this visit.

We wish you a successful business year of 2008 and are looking forward to a long-term cooperation.

Yours sincerely,



Tobias Zwirner  
Managing Director



Former shop of Phaesun Asmara

PS: You can easily find our latest main catalogue 2008 on CD ROM, or on our website under [www.phaesun.com](http://www.phaesun.com).

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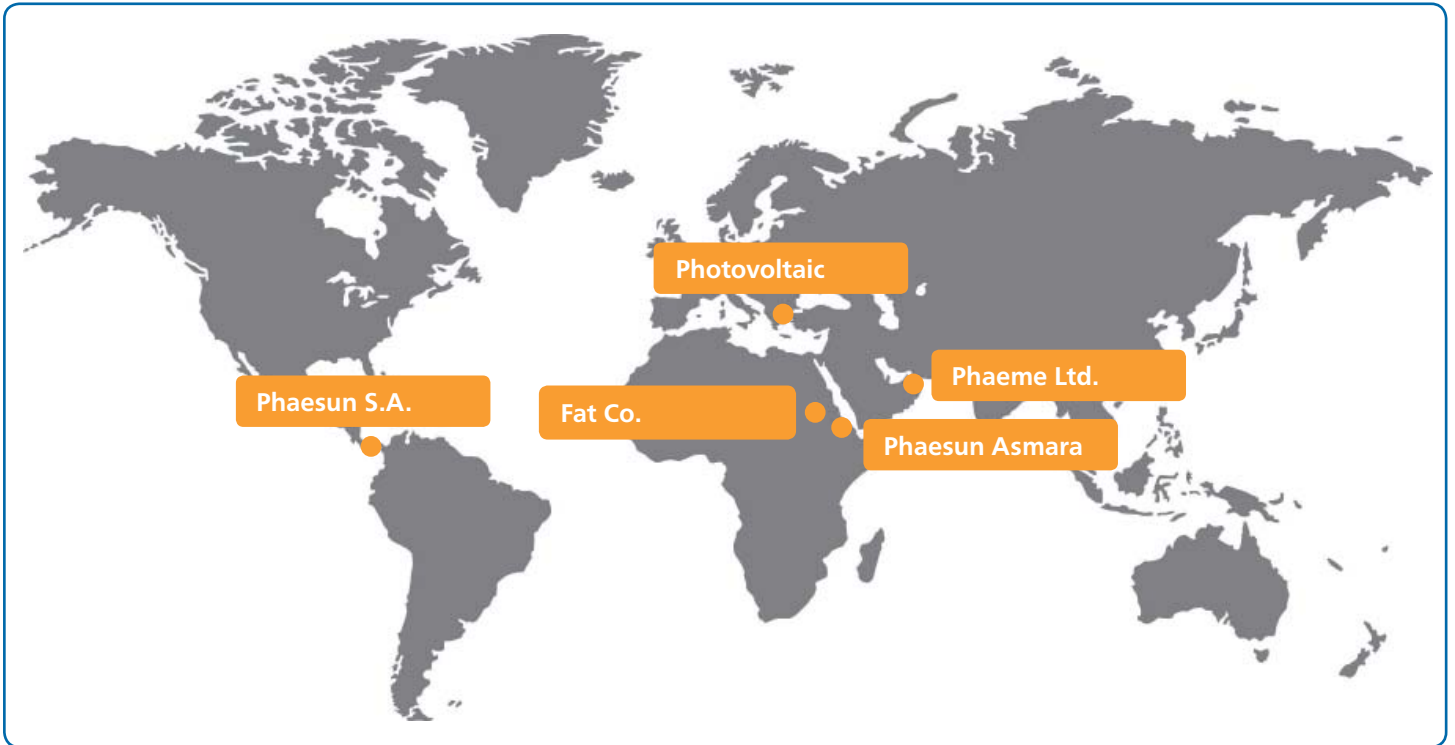


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## Phaesun Partner Companies

Phaesun is an international operating company! If you are interested, you can inform you about our partner companies all over the world...



**Fat Co.**  
Sudan



**Phaeeme Ltd.**  
U.A.E.



**Phaesun Asmara**  
Eritrea



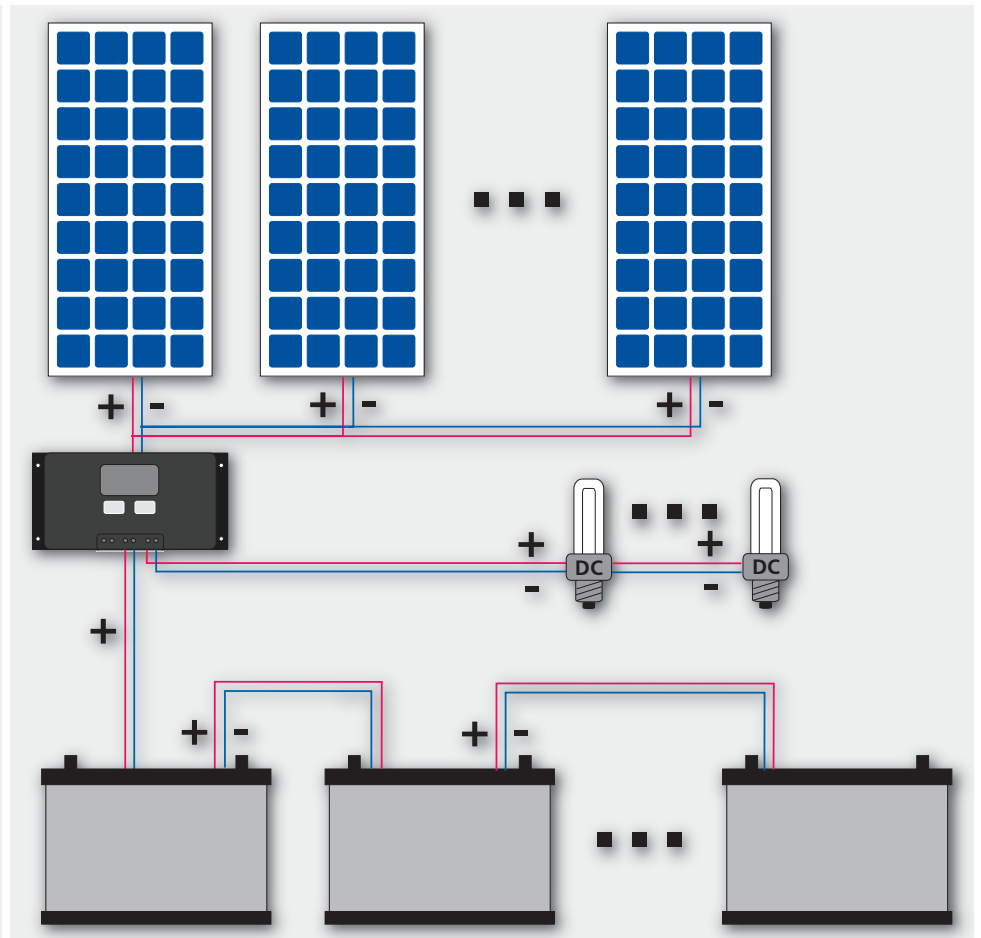
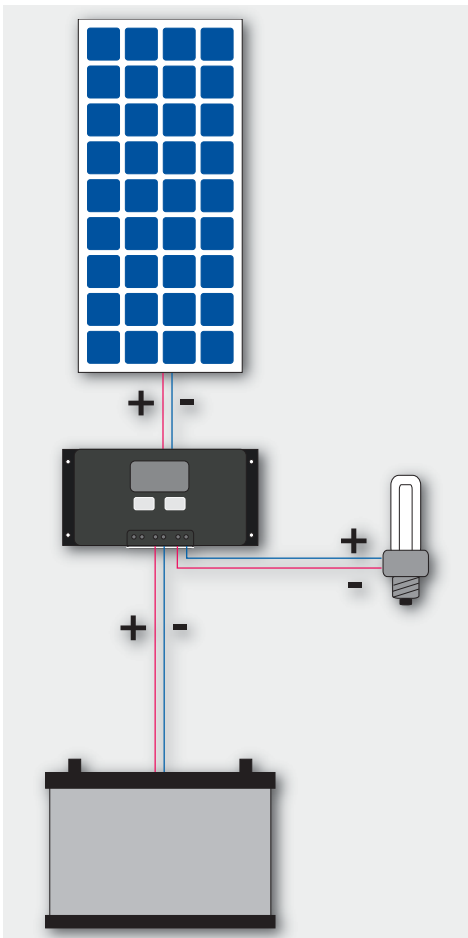
**Photovoltaic**  
Greece



**Phaesun S.A.**  
Panama

**Small DC Systems (SHS)**

**Large DC Systems**



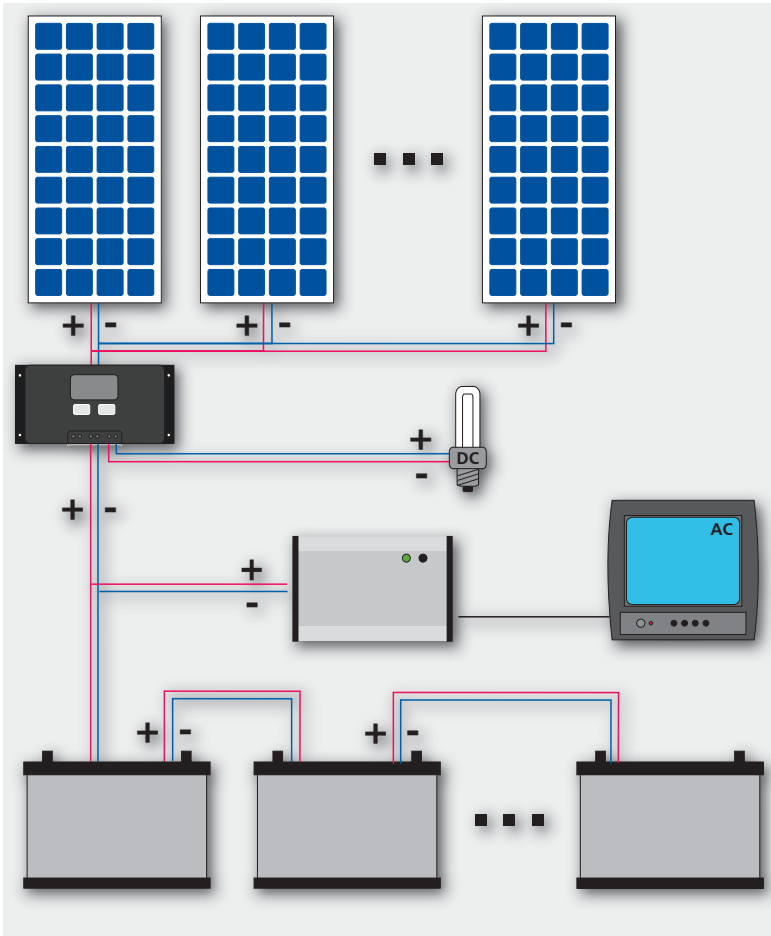
**Description:**

- > Telemetry uses
- > Home uses
- > Holiday houses
- > Garage lighting
- > Recreational uses

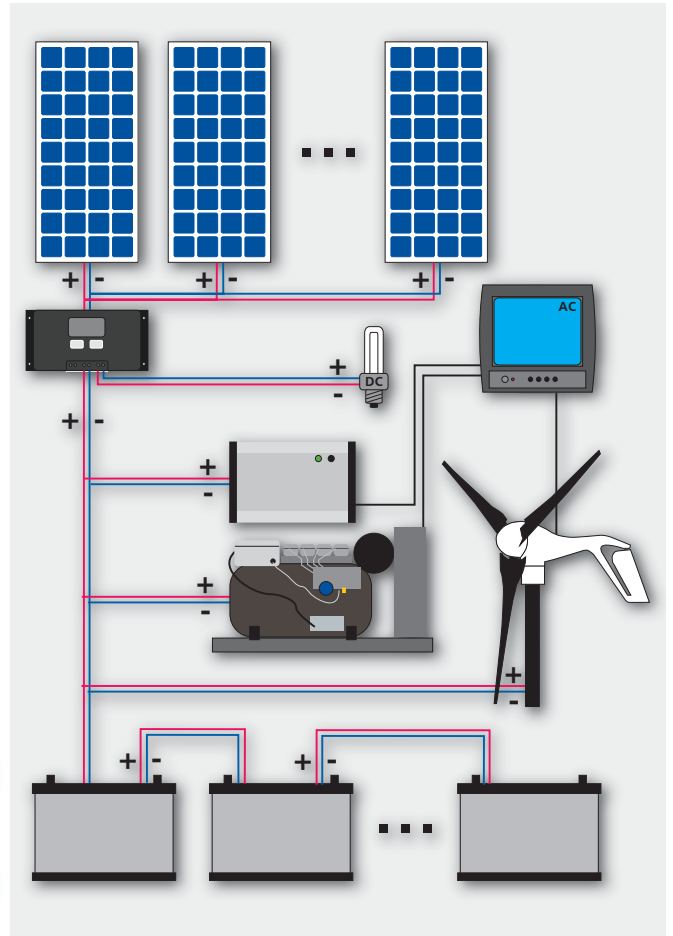
**Description:**

- > Industrial uses
- > Home uses
- > Recreational uses

## Independent Systems



## Hybrid Systems



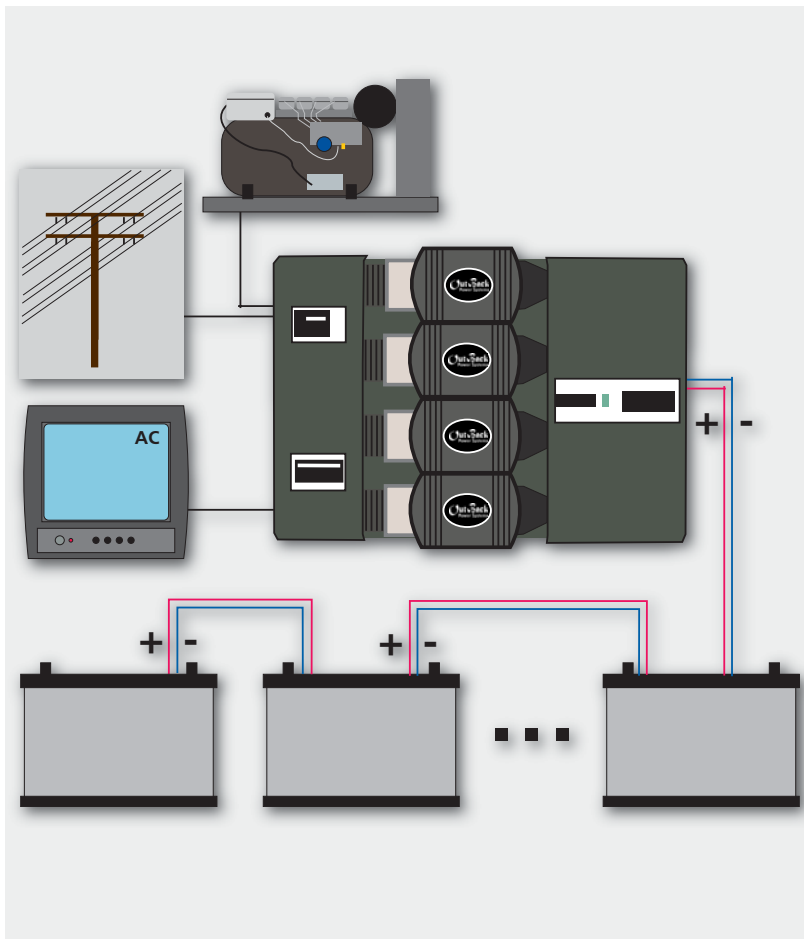
### Description:

- > DC and AC loads possible
- > Home uses
- > Industrial uses

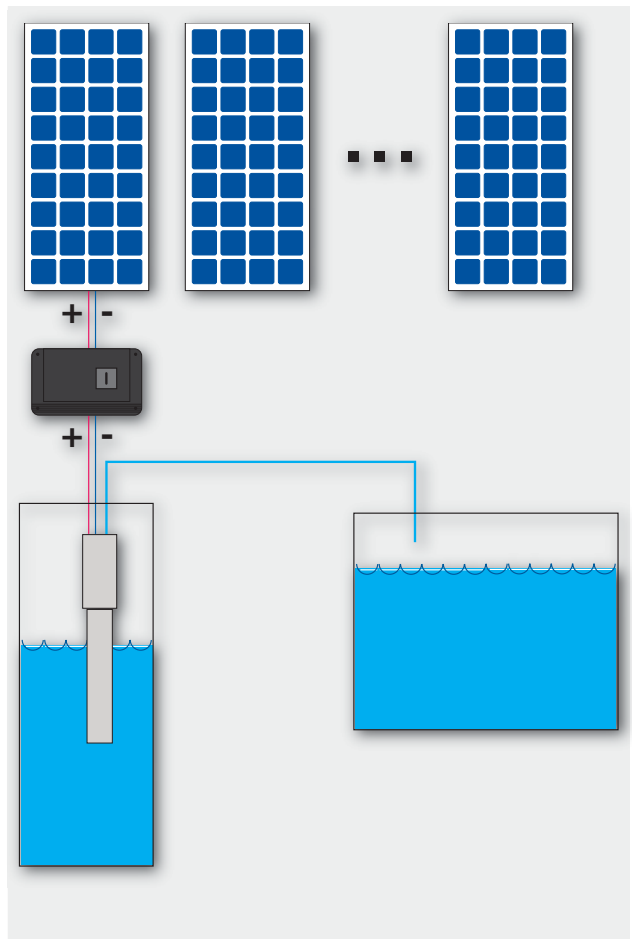
### Description:

- > PV and Generator or Wind Turbine
- > DC and AC loads possible
- > high reliability

## Backup System



## Pump System



### Description:

- > for regions with unreliable public grid
- > storage of the power from the public grid
- > in times of no public grid, power from the battery

### Description:

- > direct use of the power
- > no energy storage
- > Water pumping

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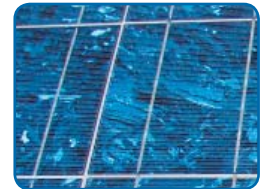
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## General Information

All technical data, descriptions and illustrations are not binding and subject to alterations.

The product illustrations can only be reference points.

We do not assume any liability for possible printing errors.

Deliveries are exclusively subject to the „General conditions“ applying to our house.

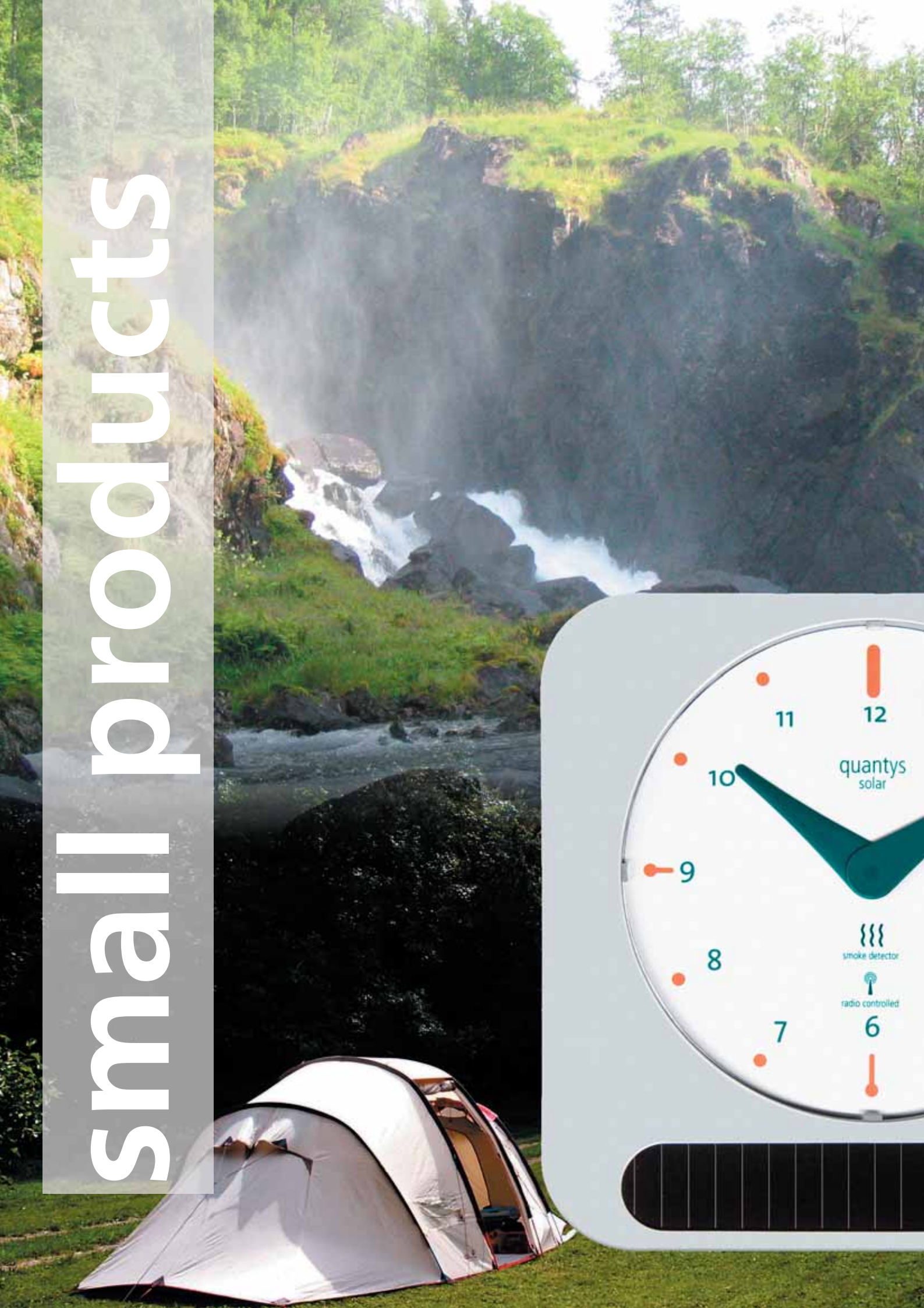
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# small products



# contents small products

### Phaesun Solar Mini Torch Comfort / Steel

The Phaesun Solar Mini Torch Comfort is a solar pocket lamp with a white LED (7,3 candela) with vanadium lithium accumulator for approx. 6 hours of lighting. It includes a on/off switch with auto-off and the case is made of waterproofed materials. The lifetime of the LED is more than 100.000 hours of burning and it is up to 10.000 times rechargeable. It has also got an integrated overcharge protection. The Phaesun Solar Mini Torch Steel is a solar pocket lamp with a white LED (23 candela) with vanadium lithium accumulator for approx. 6 hours of lighting. It includes a on/off switch with 10 min. auto-off and the case is made of waterproofed stainless steel. The lifetime of the LED is more than 100.000 hours of burning and it is up to 10.000 times rechargeable.

Phaesun Solar Mini Torch Comfort    Phaesun Solar Mini Torch Steel



Article	Description	Dimensions	Weight	Article No.
Phaesun Solar Mini Torch Comfort	(7,8 candela / Lithium accumulator)	23 x 55 x 10 mm	47 g	102.599
Phaesun Solar Mini Torch Steel	(23 candela / Lithium accumulator)	62 x 36 x 11,5 mm	30 g	301.005

### Phaesun Solar LED Torch

The Phaesun Solar LED Torch includes 7 super bright LEDs, provide 12 Lumen and is visible for up to 1 km. The LED technology radically reduces battery consumption for extended operation between charges. The casing is made of durable aluminum and by that small and light enough to easily fit into a pocket. It can be used up to 8 hours from a 5 hour charge.



Article	Description	Dimensions	Weight	Article No.
Phaesun Solar LED Torch	(7 LEDs / 12 Lumen)	Ø35 x 180 mm	25 g	301.009

### Osram Camping LED Lamp

The Osram Camping LED Lamp is a very small lantern, which fits in any pocket. The highpower GOLDEN DRAGON® LED is the brightest LED that OSRAM can currently offer. The light from the Camping LED can be dimmed to 25% of its full output simply by pushing the button. The batteries last - in dimmed mode - up to 100 hours of lighting.



Article	Description	Dimensions	Weight	Article No.
Osram Camping LED Lamp	(1,2W / 30.000 mLumen / 4 mignon AA batteries)	Ø50 x 143 mm	112 g	102.627
Osram Camping LED Lamp	(1,2W / 30.000 mLumen / incl. solar module)	Ø50 x 143 mm	112 g	102.628

### Phaesun LED Solar Lantern

The Phaesun LED Solar Lantern is a very well processed Lantern which uses LEDs as light source. By that it is very economical and has a very long lifetime of about 100.000 burning hours. This is a very long lifetime compared to halogen lamps (about 1.000 h) and u-type lamps (about 5.000 h). It includes a very stabil case, but also a very elegant looking design. The brightness of the LEDs is continuously adjustable. The Phaesun LED Solar Lantern can, besides the solar module, also be charged by the normal grid or by the 12 VDC car voltage with special, included adaptors.



Article	Description	Dimensions	Weight	Article No.
Phaesun Magic Lantern Set	(32 LEDs / 2,5 Watt / 12 V / 2,5 Ah)	Ø110 x 235 mm	0,85 kg	102.629

### Solar Clock with Smoke Detector (radio controlled)

Radio controlled Solar clock with smoke detector and long lasting battery. Recharging is not necessary. It includes an amorphous solar module, made in Germany and ventilation slots for smoke detection. The smoke detector and the clock are powered by a common rechargeable battery. The clock fully adjusts automatically summer/winter time.



Article	Description	Dimensions	Weight	Article No.
Quantys Solar Clock silver-black		276 x 276 x 46 mm	350 g	105.500
Quantys Solar Clock silver-white		276 x 276 x 46 mm	350 g	105.501

### Solar Alarm Clock (radio controlled)

Radio controlled solar clock with long lasting battery. Recharging is not necessary. It includes an amorphous solar module, made in Germany and ventilation slots for smoke detection. The clock is powered by a common rechargeable battery. The clock fully adjusts automatically summer/winter time. The alarm can be activated by an on/off switch at the side and the activated alarm is shown in the clockface as an orange spot. A snooze-alarm repeat of alarm every 5 minutes is possible.



Article	Description	Dimensions	Weight	Article No.
Quantys Solar Alarm Clock silver-white		13 x 95 x 50 mm	100 g	105.502
Quantys Solar Alarm Clock silver-black		13 x 95 x 50 mm	100 g	105.503
Quantys Solar Alarm Clock green-white		13 x 95 x 50 mm	100 g	105.504

### Solar Backpack & Messenger Voltaic

The Voltaic solar bag is designed to provide a mobile power supply for a wide range of portable electronic devices such as cell phones, PDA's, digital cameras, GPS's, MP3 players etc. The solar panels generate 4 watts of power, enough to charge most devices smaller than a laptop computer. They are lightweight, waterproof and UV resistant, but are tough enough to withstand the rigors of everyday use. The solar panels charge a 2200mAh Lithium Ion Battery Pack inside the front pouch. This stores any power generated by the panels, and delivers a smooth regulated flow of power to your devices, even when the sun is not shining. The battery pack can also be charged using the included AC (wall) charger, or car charger, which means the Voltaic backpack is convenient portable power reservoir, whether you are in the city or off the grid. Most small devices can be charged using a standard car charger, just plug them into the Car Charger Socket. We also include a USB adaptor, and a range of common phone and universal adaptors.



Article	Description	Dimensions	Weight	Article No.
Quantys Solar Backpack Voltaic	(30 l / 2,2 Ah / 4 Watt)	---	1,8 kg	105.505
Quantys Solar Business Bag Voltaic	(30 l / 2,2 Ah / 4 Watt)	---	1,8 kg	105.506

### Solar Charger e.GO!

The new, microprocessor-controlled universal battery charger e.GO! is smaller than a paperback book, designed for use both at home and on the move - and just handy. e.GO! is an universal battery charger that sources its energy through high-quality integrated solar cells. Portable appliances such as mobile phones, digital cameras, MP3 players, organizers, e.g. can either be operated directly from or recharged by e.GO!. Moreover, when the sun is shining, it is possible to store energy intermediately in its accumulators for use later, when it is needed. The e.GO! accumulators can also be removed and used with other devices. What is best about e.GO!: It is useful even throughout periods of bad weather, because it can also be used as a conventional battery charger. e.GO! loads accumulators via ordinary electrical outlets (100 V - 240 V) or the onboard power supply of cars (12 V). Using an adapter cord, small electronic devices (up to 4 W) can be operated, too.

#### Solar Charger e.GO Professional



Article	Description	Dimensions	Weight	Article No.
Solar Charger e.GO! Fun	(1,1 Watt / 12 V)	160 x 85 x 33 mm	300 g	105.507
Solar Charger e.GO! Master	(2,2 Watt / 12 V)	160 x 85 x 33 mm	300 g	105.508
Solar Charger e.GO! Professional	(2,6 Watt / 12 V)	160 x 85 x 33 mm	300 g	105.509

# photovoltaic



# contents photovoltaic



POWER FROM INNOVATION



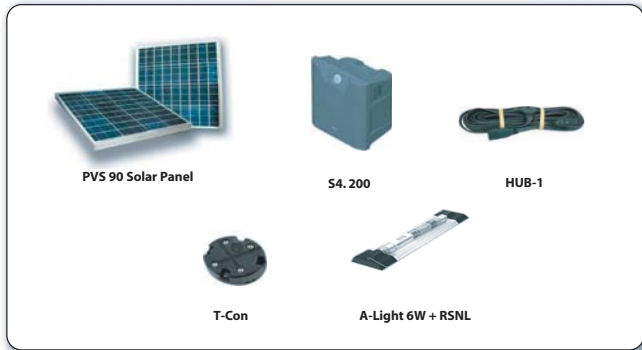
## Photovoltaic

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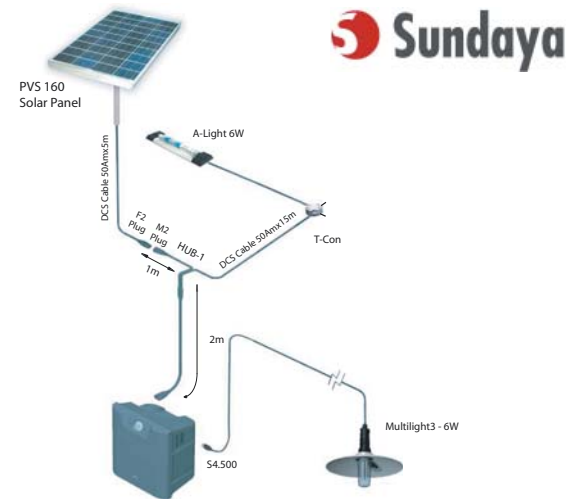
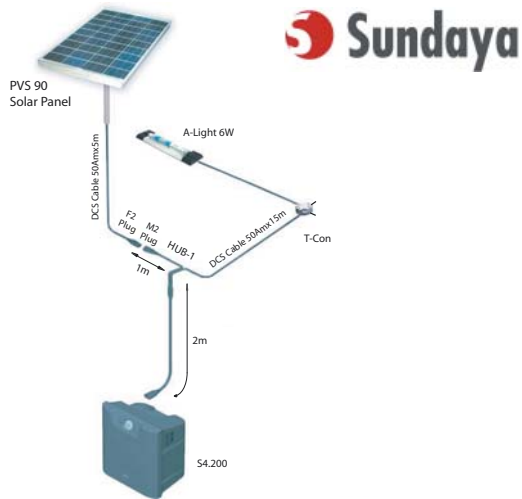
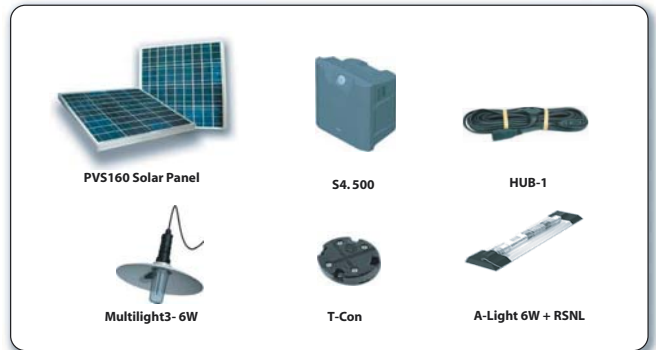
**Sundaya Solar Home Systems**

The Sundaya Solar Home Systems are made for the installation of a low-priced, but also nice designed illumination in your home. They are designed for a permanent illumination of rooms or the complete house. They are available with different components for different applications

**Solar Home System 1**



**Solar Home System 2**



Article	Description	Dimensions	Weight	Article No.
<b>Sundaya Solar Home System 1</b>		103 x 49 x 8 / 28 x 22 x 37 mm	15 kg	104.561
PVS90 Solar Panel Kit - 20 W				
S4.200set - 20 Ah				
A-light 6W + RS				
T-con				
<b>Sundaya Solar Home System 2</b>		93 x 71 x 13 / 28 x 22 x 37 mm	28 kg	104.562
PVS160 Solar Panel Kit - 40 W				
S4.500set - 55 Ah				
A-light 6W + RS				
Multilight 3 6W				
T-con				



### Phaesun Crystalline Solar Modules

The Phaesun solar module product line spans a range from 5 to 120 watts. All modules are designed and manufactured to meet international safety and performance certifications. The modules feature heavy duty anodized frames to give strength and convenient mounting access and weather resistant junction boxes for easy and safe field interconnection. Phaesun SM series offers high power performance for PV systems and withstands extreme operating conditions. The modules are produced on a high quality production line, operated by well-trained employees. They are equipped with a robust, clear anodized aluminum frame with pre-drilled holes for quick installation.



Article	Description	Dimensions	Weight	Article No.
Phaesun SM 050 M4	(50 Watt / 12V)	980 x 435 x 35 mm	5 kg	104.255
Phaesun SM 055 M4	(55 Watt / 12V)	980 x 435 x 35 mm	5 kg	104.256
Phaesun SM 060 M4	(60 Watt / 12V)	980 x 435 x 35 mm	5 kg	104.260
Phaesun SM 075 M5	(75 Watt / 12V)	1205 x 545 x 35 mm	2 kg	104.055
Phaesun SM 110 M5	(110 Watt / 12V)	1480 x 660 x 35 mm	12 kg	104.258
Phaesun SM 120 M5	(120 Watt / 12V)	1480 x 660 x 35 mm	12 kg	104.259

### ETSolar Crystalline Solar Modules

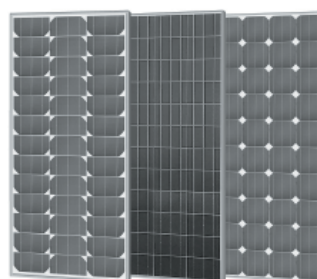
The ETSolar solar module product line spans a range from 5 to 280 watts. All modules are designed and manufactured to meet international safety and performance certifications. The modules feature heavy duty anodized frames to give strength and convenient mounting access and weather resistant junction boxes for easy and safe field interconnection. ET-M536 series offers high power performance for PV systems and withstands extreme operating conditions. The modules are produced on a high quality production line, operated by well-trained employees. They are equipped with a robust, clear anodized aluminum frame with pre-drilled holes for quick installation.



Article	Description	Dimensions	Weight	Article No.
ETSolar ET-M53605	(5 Watt / 12V)	401 x 176 x 34 mm	1,2 kg	104.270
ETSolar ET-M53610	(10 Watt / 12V)	283 x 299 x 34 mm	1,7 kg	104.271
ETSolar ET-M53620	(20 Watt / 12V)	662 x 299 x 34 mm	2,7 kg	104.272
ETSolar ET-M53925	(25 Watt / 12V)	633 x 427 x 34 mm	3,5 kg	104.273
ETSolar ET-M53930	(30 Watt / 12V)	633 x 427 x 34 mm	3,5 kg	104.274
ETSolar ET-M53640	(40 Watt / 12V)	838 x 427 x 34 mm	4,6 kg	104.275
ETSolar ET-M53645	(45 Watt / 12V)	838 x 427 x 34 mm	4,6 kg	104.276
ETSolar ET-M54050	(50 Watt / 12V)	719 x 555 x 34 mm	5 kg	104.277
ETSolar ET-M54055	(55 Watt / 12V)	719 x 555 x 34 mm	5 kg	104.278
ETSolar ET-M53670	(70 Watt / 12V)	1217 x 555 x 36 mm	8,2 kg	104.279
ETSolar ET-M53675	(75 Watt / 12V)	1217 x 555 x 36 mm	8,2 kg	104.280
ETSolar ET-M53680	(80 Watt / 12V)	1217 x 555 x 36 mm	8,2 kg	104.281
ETSolar ET-P636100	(100 Watt / 12V)	1482 x 676 x 35 mm	12 kg	104.282

### Helios Crystalline Solar Modules

The H/HT Series of Photovoltaic Modules are all manufactured in monocrystalline and multicrystalline silicon and they are suitable for home systems and other civil applications (cantilever roofs, road signs, hydraulic pumps, telecommunications, etc). It has been created to guarantee maximum and long-lasting efficiency, with the minimum space required. Thanks to the introduction of the I-Max technology, developed by Helios Technology for its high-efficiency modules range at the typical battery operating voltage (12,5V), it allow a remarkable increase of the current output (about 10-17%) compared to the traditional modules. The frame of the module is made of anodized aluminum and it is provided with 4 slotted holes, which allow a quick and easy installation of all Helios Technology's modules.



Article	Description	Dimensions	Weight	Article No.
Helios HT80	(80 Watt / 12V)	1210 x 538 x 34 mm	7,5 kg	105.590
Helios HT85	(85 Watt / 12V)	1210 x 538 x 34 mm	7,5 kg	105.591
Helios HT90	(90 Watt / 12V)	1210 x 538 x 34 mm	7,5 kg	105.592

**Suntech Crystalline Solar Modules**

High quality solar modules from Suntech. The modules are highly efficient and guarantee an 80% level of performance for 25 years. Suntech's emphasis on product quality and international management standards has not only helped Suntech obtain a range of operating certificates, meet a range of test standards including IEC 61215:1993, CE certification, TÜV certification, ISO 9001:2000 quality system certification but also established Suntech's reputation as a trusted PV manufacturer through out the region. Suntech has developed a line of PV cells with increased energy efficiency without increasing cell manufacturing costs.



Article	Description	Dimensions	Weight	Article No.
<b>Monocrystalline Solar Modules</b>				
Suntech STP 005S-12/Db	(5 Watt / 12 V)	210 x 306 x 18 mm	0,8 kg	106.401
Suntech STP 010S-12/Kb	(10 Watt / 12 V)	310 x 368 x 18 mm	1,5 kg	106.404
Suntech STP 020S-12/Cb	(20 Watt / 12 V)	656 x 306 x 18 mm	2,5 kg	106.410
Suntech STP 030S-12/Lb	(30 Watt / 12 V)	426 x 680 x 18 mm	3,2 kg	106.412
Suntech STP 045S-12/Rb	(45 Watt / 12 V)	537 x 668 x 30 mm	4,5 kg	106.417
Suntech STP 060S-12/Sb	(60 Watt / 12 V)	771 x 665 x 30 mm	6,2 kg	106.421
Suntech STP 070S-12/Sb	(70 Watt / 12 V)	771 x 665 x 30 mm	6,2 kg	106.423
Suntech STP 075S-12/Bb	(75 Watt / 12 V)	1195 x 541 x 30 mm	8 kg	106.424
Suntech STP 080S-12/Bb	(80 Watt / 12 V)	1195 x 541 x 30 mm	8 kg	106.425
Suntech STP 085S-12/Bb	(85 Watt / 12 V)	1195 x 541 x 30 mm	8 kg	106.426
Suntech STP 120S-12/Tb	(120 Watt / 12 V)	1482 x 676 x 35 mm	12 kg	106.427
Suntech STP 130S-12/Tb	(130 Watt / 12 V)	1482 x 676 x 35 mm	12 kg	106.428
<b>Multicrystalline Solar Modules</b>				
Suntech STP 005-12/Db	(5 Watt / 12 V)	216 x 306 x 18 mm	0,8 kg	106.437
Suntech STP 010-12/Kb	(10 Watt / 12 V)	310 x 368 x 18 mm	1,5 kg	106.440
Suntech STP 020-12/Cb	(20 Watt / 12 V)	656 x 306 x 18 mm	2,5 kg	106.446
Suntech STP 030-12/Lb	(30 Watt / 12 V)	426 x 680 x 18 mm	3,2 kg	106.454
Suntech STP 045-12/Rb	(45 Watt / 12 V)	537 x 665 x 30 mm	4,5 kg	106.459
Suntech STP 060-12/Sb	(60 Watt / 12 V)	771 x 665 x 30 mm	6,2 kg	106.469
Suntech STP 080-12/Bb	(80 Watt / 12 V)	1195 x 541 x 30 mm	8 kg	106.473
Suntech STP 085-12/Bb	(85 Watt / 12 V)	1195 x 541 x 30 mm	8 kg	106.474
Suntech STP 130-12/Tb	(130 Watt / 12 V)	1482 x 676 x 35 mm	12 kg	106.476

### Steca Solsum Solar Charge Controller

High performance microcontrolled „low cost“ charge controller with integrated deep discharge and over voltage protection, LED-state of charge display, temperature compensated overcharge protection by integrated sensor and battery charge according to IU-characteristic line. The Solsum X.0C are high performance microcontrolled „low cost“ charge controller as Solsum 6.6C and 8.8C with integrated total discharge warning (no deep discharge protection).



Article	Description	Dimensions	Weight	Article No.
Steca Solsum 6.6C	(6 A module current / 6 A load current / 12/24 V)	129 x 87 x 40 mm	164 g	105.418
Steca Solsum 8.8C	(8 A module current / 8 A load current / 12/24 V)	129 x 87 x 40 mm	164 g	105.419
Steca Solsum 10.10C	(10 A module current / 10 A load current / 12/24 V)	129 x 87 x 40 mm	164 g	101.462
Steca Solsum 5.0C	(5 A module current / 12/24 V)	129 x 87 x 40 mm	164 g	105.420
Steca Solsum 8.0C	(8 A module current / 12/24 V)	129 x 87 x 40 mm	164 g	105.421

### Steca PR 0303/0505 Solar Charge Controller

Modified PWM charging series regulator with electronic fuse and manual load switch. The LED display shows the charging by a solar module, the state of charge of the battery in three colors. Big terminals ensure an easy installation.



Article	Description	Dimensions	Weight	Article No.
Steca PR 0303	(3 A module current / 3 A load current / 12 V)	146 x 90 x 33 mm	160 g	101.260
Steca PR 0505	(5 A module current / 5 A load current / 12 V)	146 x 90 x 33 mm	160 g	101.261

### Steca PR & Solarix Solar Charge Controller

High performance microcontrolled charge controller, apart from the base functions deep discharge and overvoltage protection, this charge controller range offers a multitude of comfortable additional functions as e.g. LC-display, temperature compensation, exact state of charge (SOC) display (PR Series), compensation of voltage drop between battery and charge controller, hard and software fuse, automatic voltage adjustment (12/24V), etc.



Steca Solarix Series



Steca PR Series

Article	Description	Dimensions	Weight	Article No.
<b>Steca Solarix Series with LED</b>				
Steca Alpha	(8 A module current / 8 A load current / 12/24 V)	188 x 106 x 49 mm	375 g	101.204
Steca Gamma	(12 A module current / 12 A load current / 12/24 V)	188 x 106 x 49 mm	375 g	101.205
Steca Sigma	(20 A module current / 20 A load current / 12/24 V)	188 x 106 x 49 mm	375 g	101.206
Steca Omega	(30 A module current / 30 A load current / 12/24 V)	188 x 106 x 49 mm	375 g	101.207
<b>Steca PR Series with LCD</b>				
Steca PR 1010	(10 A module current / 10 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.514
Steca PR 1515	(15 A module current / 15 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.515
Steca PR 2020	(20 A module current / 20 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.516
Steca PR 3030	(30 A module current / 30 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.517

### Steca PR 2020-IP Solar Charge Controller

The PR 2020-IP design is based on Stecas PR charge controller series with a customer designed LCD which shows the accurate state of charge (SOC) in percent and as battery gauge symbol. The heart of the controller is the integrated circuit called ATONIC II, which contains the improved regulation software based on a self learning algorithm. The PR 2020-IP controller operates in harsh environments like salt, moisture and dust..



Article	Description	Dimensions	Weight	Article No.
Steca PR 2020-IP	(20 A module current / 20 A load current / 12 V)	122 x 55 x 147 mm	350 g	101.463

### Steca Solarix 2401/4401 Solar Charge Controller

The Steca Solarix 2401 and 4401 controllers complete the product range of the Omega 30 Amps controller to 40 Amps solar current, available in 12, 24 and 48 V. The load current is limited to 10 Amps. The charging procedures are based on voltage levels which can be individually adjusted by four buttons behind the front cover.



Article	Description	Dimensions	Weight	Article No.
Steca Solarix 2401	(40 A module current / 10 A load current / 12/24 V)	188 x 128 x 49 mm	550 g	101.464
Steca Solarix 4401	(40 A module current / 10 A load current / 48 V)	188 x 128 x 49 mm	550 g	101.465

### Steca PR 0606/1010N Solar Charge Controller

Solar charge controller with time controlled night light function contains all basic functions of a comfortable charge controller as deep discharge and over load protection, LED, etc. and additionally integrated programmable timer function for the time controlled switching of loads (e.g. lamps).



Article	Description	Dimensions	Weight	Article No.
Steca PR 0606N	(6 A module current / 6 A load current / 12/24 V)	146 x 94 x 28 mm	120 g	101.220
Steca PR 1010N	(10 A module current / 10 A load current / 48 V)	146 x 94 x 28 mm	120 g	101.221

### Steca Tarom Solar Charge Controller

The presently leading charge controller product range referring to equipment and performance. Apart from the basic functions of an ordinary solar charge controller (deep discharge and over load protection), this product range offers countless possibilities related to programmability, data processing, system configuration, unit-by-unit expansibility and performance. In addition to a lot of characteristics, a two lined LC-display, integrated data logger, PC connection, programmable operating points, exact state of charge (SOC) display, Ah counter and a lot more can be mentioned.



Article	Description	Dimensions	Weight	Article No.
Steca Tarom 235	(35 A module current / 35 A load current / 12/24 V)	188 x 128 x 49 mm	534 g	101.222
Steca Tarom 245	(45 A module current / 45 A load current / 12/24 V)	188 x 128 x 49 mm	534 g	101.223
Steca Tarom 440	(40 A module current / 40 A load current / 48 V)	188 x 128 x 49 mm	534 g	101.466

### Steca Power Tarom Solar Charge Controller

The presently leading charge controller product range referring to equipment and performance. Apart from the basic functions of an ordinary solar charge controller (deep discharge and over load protection), this product range offers countless possibilities related to programmability, data processing, system configuration, unit-by-unit expansibility and performance. In addition to a lot of characteristics, a two lined LC-display, integrated data logger, PC connection, programmable operating points, exact state of charge (SOC) display, Ah counter and a lot more can be mentioned. All technical data and features as with the above mentioned Tarom product group, but for considerably higher capacities IP 65 protection (splash water protection) for the outdoor assembly.



Article	Description	Dimensions	Weight	Article No.
Steca Power Tarom 2070	(70 A module current / 58 A load current / 12/24 V)	330 x 330 x 157 mm	10 kg	101.225
Steca Power Tarom 2140	(140 A module current / 116 A load current / 12/24 V)	360 x 330 x 157 mm	10 kg	101.226
Steca Power Tarom 4055	(55 A module current / 46 A load current / 48 V)	330 x 330 x 157 mm	10 kg	101.227
Steca Power Tarom 4110	(110 A module current / 92 A load current / 48 V)	360 x 330 x 157 mm	10 kg	101.228
Steca Power Tarom 4140	(140 A module current / 70 A load current / 48 V)	360 x 330 x 157 mm	10 kg	104.099

### Steca PL 2085 Solar Charging Station

The PL 2085 is a solar charging station which charges up to 8 leadacid batteries simultaneously. The microprocessor controlled charging station recognizes the connection sequence of the batteries. The battery which is connected first is charged first and as soon as the first battery is full, it switches over to the second battery etc. Every battery terminal of maximum 5 Amps is a separate DC / DC converter with maximum power point tracking (MPP) of the solar generator. Up to two battery terminals can be connected in parallel on the same battery. These terminals are protected against wrong polarity, short circuit, no load operation and overload. Batteries are charged to predefined IU constant current charging procedures until end of charge voltage is reached. Battery charging starts even from run down batteries at voltages higher than 5V. At night the charging station works in a energy saving mode and no battery data is lost.



Article	Description	Dimensions	Weight	Article No.
Steca PL 2085	(12 VDC / 5 A module current)	365 x 227 x 75 mm	2 kg	101.246

### Steca Solarix PRS Solar Charge Controller

The simplicity and high performance of the new Steca Solarix PRS solar charge controller make it particularly attractive. At the same time, it offers a modern design and a convenient display, all at an extremely attractive price. Several LEDs in various colours emulate a tank display, which gives information on the charge status of the battery. Here, Steca's latest algorithms are employed in order to guarantee optimal battery maintenance. The Solarix PRS charge controllers are equipped with an electronic fuse, thus ensuring the optimal protection. They operate on the serial principle, and separate the solar module from the battery in order to protect it against overcharging. The Solarix PRS charge controllers are universal charge controllers, which means they can be used with lead-acid batteries or gel batteries without the need for complex configuration settings. For larger projects, the charge controllers can also be equipped with special functions. These include the night light function, and selectable charging plateau and deepdischarge protection voltages.



Article	Description	Dimensions	Weight	Article No.
Steca PRS 1010	(10 A module current / 10 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	101.475
Steca PRS 1515	(15 A module current / 15 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	101.476
Steca PRS 2020	(20 A module current / 20 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	101.477
Steca PRS 3030	(30 A module current / 30 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	101.478

### Sundaya Apple Solar Charge Controller

The Apple is a charge discharge regulator with an unique battery forced health improvement feature (FHI© ). The apple is equipped with an alarm to warn the user when battery is close to forced disconnect . The Apple uses latest technology ultra efficient switching components which results in extreme low voltage drop and almost no heat generation. The unit has very sturdy terminals.



Article	Description	Dimensions	Weight	Article No.
Sundaya Apple 5	(12 VDC / 5 A module current / 5 A load current)	Ø120 x 40 mm	100 g	101.994
Sundaya Apple 10	(12 VDC / 10 A module current / 10 A load current)	Ø120 x 40 mm	100 g	101.995
Sundaya Apple 15	(12 VDC / 15 A module current / 15 A load current)	Ø120 x 40 mm	100 g	101.996
Sundaya Apple 20	(12 VDC / 20 A module current / 20 A load current)	Ø120 x 40 mm	100 g	104.537
Apple 5 & cable set	(12 VDC / 5 A module current / 5 A load current)	Ø120 x 40 mm	100 g	104.531
Apple 10 & cable set	(12 VDC / 10 A module current / 10 A load current)	Ø120 x 40 mm	100 g	104.532
Apple 15 & cable set	(12 VDC / 15 A module current / 15 A load current)	Ø120 x 40 mm	100 g	104.533

### Phaesun PR Series Solar Charge Controller

The most important difference to comparable products is a big graphical display. This shows all system information in a self explanatory manner with logical informative symbols. The integrated central processing unit called Atonic provides a charge controller with new functions. This type of controller is more than a protective device for a battery. It contains a self-learning algorithm, which gives detailed information on the battery's state of charge (SOC). This optimized state of charge algorithm is more precise than ever and is displayed similar to a fuel gauge. It adjusts itself to the battery's age and capacity. The SOC provides a basis for all control and regulatory functions. This new type of hybrid charge controller is much more efficient than conventional series and shunt controllers. Furthermore the controller is equipped with an electronic fuse with superior protection to a mechanical fuse. This offers more comfort and reliability to the user as it reconnects automatically. In addition a manual load switch is integrated.



Article	Description	Dimensions	Weight	Article No.
Phaesun PR 1010	(10 A module current / 10 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.507
Phaesun PR 1515	(15 A module current / 15 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.508
Phaesun PR 2020	(20 A module current / 20 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.509
Phaesun PR 3030	(30 A module current / 30 A load current / 12/24 V)	187 x 96 x 44 mm	350 g	104.510

### Phaesun EASY MPPT Charge Controller

Adopting advanced MPPT technology, the EASY MPPT photovoltaic charge controller is the key component in off-grid or stand alone solar power generation system. The EASY MPPT is tracking the maximum power point and charging all types of batteries. The build-in MPPT microprocessor enables the EASY MPPT to increase the charging current up to 30% compared to traditional charge controllers. Easy installation and designed for parallel operation, the EASY MPPT is the perfect solution for home systems and large solar system applications.



Article	Description	Dimensions	Weight	Article No.
Phaesun EASY MPPT	(40 A module current / 15 A load current / 12/24 V)	368 x 146 x 146 mm	2,5 kg	104.571

### OutBack PV MPPT Charge Controller

The Outback MX60 maximum power point tracking (MPPT) charge controller enables your PV system to achieve its highest possible performance. Rated for up to 60 amps of DC output current, the MX60 can be used with battery systems from 12 to 60 VDC with a PV open circuit voltage as high as 140 VOC. The MX60's setpoints are fully adjustable to allow use with virtually any battery type and charging profile. The MX60 allows you to use a higher output voltage PV array with a lower battery voltage - such as charging a 24 VDC battery with a 48 VDC PV array. The four line, 80 character, backlit LCD display is used for programming and monitoring of the system's operation including built-in Data Logging with 64 days of memory.



Article	Description	Dimensions	Weight	Article No.
OutBack MX60 Charge Controller	(60A / 12 - 60 VDC battery / 140 VOC)	150 x 150 x 370 mm	5,4 kg	107.022

### Solar Charge Controller Temperature Sensors

External temperature sensors including 3 m cable, cable coil, 8 or 10 mm removable cable clamp. For solar charge controllers of the following types:

101.204 - 101.211, 101.212 - 101.215



Article	Description	Dimensions	Weight	Article No.
Temperature Sensor TS 8	(8 mm cable coil)	---	---	101.236
Temperature Sensor TS 10	(10 mm cable coil)	---	---	101.237

External temperature sensors including cable coil, 8 or 10 mm cable clamp. For solar charge controllers of the following types:

101.216 - 101.219, 101.229 - 101.234



Article	Description	Dimensions	Weight	Article No.
Temperature Sensor KTY 881-8	(8 mm cable coil)	---	---	101.238
Temperature Sensor KTY 881-10	(10 mm cable coil)	---	---	101.239

External temperature sensors including 3,75 m cable, cable coil, 8 or 10 mm removable cable clamp. For solar charge controllers and special plug of the following types:

101.222 - 101.225



Article	Description	Dimensions	Weight	Article No.
Temperature Sensor TS 8 cable	(8 mm cable coil)	---	---	101.240
Temperature Sensor TS 10 cable	(10 mm cable coil)	---	---	101.241

### Steca PA EV200 DC Relay

Steca PA EV200 relay increases the switching capacity of the PA 15 remote control from 15 A to 200 A (up to 10kW). The relay is connected to the load output of the PA 15 and interrupts for example, the battery supply voltage from a back-up generator when the battery is full. The relay is hermetically sealed, intrinsically safe and operates in explosive & harsh environments like salt, moisture and dust with no oxidation or contamination of coils or contacts.



Article	Description	Dimensions	Weight	Article No.
Steca PA EV200 Type A	(12/24 V / 9 - 36V / 200 A)	63 x 80 x 72 mm	430 g	101.469
Steca PA EV200 Type B	(36/48 V / 32 - 95V / 200A)	63 x 80 x 72 mm	430 g	101.470

### Steca Taron PA 15 Receiver (for Steca Taron)

The PA 15 unit is able to receive the SOC (state of charge) signal from the charge controller (Taron product range) and depending on the configuration it cuts off loads or puts on additional generators. A charging management is the second feature of the PA 15 receiver. The programming of the PA 15 is made by a jumper connection terminal.



Article	Description	Dimensions	Weight	Article No.
Steca PA 15		---	---	101.247

### Steca PA IRS 1008/108 Motion Detector

The Steca PA IRS 1008/108 motion detector is connected to the load output of the night light charge controller. This supplies power to the light, which is then turned on for a few minutes when some movement is detected. The Steca IRS 1008/108 stands out, above all, through its extremely low own consumption, and is therefore optimal for use in solar power systems.

Article	Description	Dimensions	Weight	Article No.
Steca PA 15	(12 V / reach 7 m - 180° / IP 65)	---	100 g	105.472

### Steca PA Shunt Regulator

Intelligent hall shunt for Tarom and Power Tarom regulator. Contactless current sensor measuring of all battery currents. Potential free shunt. A RJ45 interface communication with Tarom controllers for exact SOC calculation. Parallel operation with several PA HS200 is possible.



Article	Description	Dimensions	Weight	Article No.
Steca PA HS 200		---	---	101.264

### Steca PA Tarcom Data Logger

Stecas data logger PA Tarcom is connected to the RJ45 data loop of the Tarom or Power Tarom charge controller or via the PA HS200 shunt. It is available in different versions as a simple RS232 serial interface (PA Tarcom 01) to log and read out data directly to a PC or laptop, as a data logger connected with integrated analogue modem (PA Tarcom RM), as a data logger with an optional telephone link for phone calls (PA Tarcom RMT) and as a datalogger with a built in GSM modem for remote monitoring (PA Tarcom GSM). The PA Tarcom data logger is shipped with software.



Article	Description	Dimensions	Weight	Article No.
Steca Tarcom 01 serial	(system 12/24/48 V / operation 8 - 65 V)	130 x 82 x 38 mm	150 g	101.269
Steca Tarcom RM/RMT	(system 12/24/48 V / operation 8 - 65 V)	130 x 82 x 38 mm	150 g	101.467
Steca Tarcom GSM	(system 12/24/48 V / operation 8 - 65 V)	130 x 82 x 38 mm	150 g	101.468



**Studer Stand Alone Inverter Line AJ**

Simple and reliable inverters with a pure sine wave for 230 or 115 V AC. These units can be used for multiple applications in cars, summer houses, on the road, in boats, etc. just in all places without net supply. Moreover, this product range shows multiple equipment features such as overheating protection, overcharge protection, short circuit protection, etc., as well as an integrated solar charge controller as an additional option.



Article	Description	Dimensions	Weight	Article No.
<b>Studer Inverter Lines AJ 275 / AJ 350 / AJ 400</b>				
Studer AJ 275-12	(WR 12 V / 220 V / IP30 / 200 W)	142 x 163 x 84 mm	2,3 kg	101.300
Studer AJ 275-12-S	(WR 12 V / 220 V / IP30 / 200 W / 7A SCC)	142 x 163 x 84 mm	2,3 kg	101.301
Studer AJ 350-24	(WR 24 V / 220 V / IP30 / 250 W)	142 x 163 x 84 mm	2,3 kg	101.302
Studer AJ 350-24-S	(WR 24 V / 220 V / IP30 / 250 W / 7 A SCC)	142 x 163 x 84 mm	2,3 kg	101.303
Studer AJ 400-48	(WR 48 V / 220 V / IP30 / 300 W)	142 x 163 x 84 mm	2,3 kg	101.304
<b>Studer Inverter Lines AJ 500 / AJ 600 / AJ 700</b>				
Studer AJ 500-12	(WR 12 V / 220 V / IP30 / 400 W)	142 x 240 x 84 mm	4,5 kg	101.305
Studer AJ 500-12-S	(WR 12 V / 220 V / IP30 / 400 W / 15 A SCC)	142 x 240 x 84 mm	4,5 kg	101.306
Studer AJ 600-24	(WR 24 V / 220 V / IP30 / 400 W)	142 x 240 x 84 mm	4,5 kg	101.307
Studer AJ 600-24-S	(WR 24 V / 220 V / IP30 / 400 W / 15 A SCC)	142 x 240 x 84 mm	4,5 kg	101.308
Studer AJ 700-48	(WR 48 V / 220 V / IP30 / 400 W)	142 x 240 x 84 mm	4,5 kg	101.309
<b>Studer Inverter Lines AJ 1000 / AJ 1300</b>				
Studer AJ 1000-12	(WR 12 V / 220 V / IP30 / 800 W)	142 x 428 x 84 mm	8,5 kg	101.310
Studer AJ 1000-12-S	(WR 12 V / 220 V / IP30 / 2000 W / 30 A SCC)	142 x 428 x 84 mm	8,5 kg	101.311
Studer AJ 1300-12	(WR 24 V / 220 V / IP30 / 800 W)	142 x 428 x 84 mm	8,5 kg	101.312
Studer AJ 1300-12-S	(WR 24 V / 220 V / IP30 / 2000 W / 30 A SCC)	142 x 428 x 84 mm	8,5 kg	101.313
<b>Studer Inverter Lines AJ 2100 / AJ 2400</b>				
Studer AJ 2100-12	(WR 12 V / 220 V / IP30 / 2000 W)	273 x 399 x 117 mm	19 kg	101.314
Studer AJ 2100-12-S	(WR 12 V / 220 V / IP30 / 2000 W / 30 A SCC)	273 x 399 x 117 mm	19 kg	101.315
Studer AJ 2400-24	(WR 24 V / 220 V / IP30 / 2000 W)	273 x 399 x 117 mm	19 kg	101.316
Studer AJ 2400-24-S	(WR 24 V / 220 V / IP30 / 2000 W / 30 A SCC)	273 x 399 x 117 mm	19 kg	101.317
<b>Remote control for inverters of the following types: 101.310 - 101.317</b>				
JT8 Remote control with 10m coverage		---	---	101.318

**Studer Stand Alone Inverter Line SI**

Innovative inverter line with a perfect, pure sine wave in a well-designed casing, with CE conform electronics working very silent and reliable. The cables necessary for a simple installation are already included. The option of a remote control, an alarm output and an integrated charge controller is a special feature of this product line. These inverters can be used as standard stand alone inverters, as well as in USB installations. The possibility of a use in parallel extends this product range from 0,4 to 10,5 KW.



Article	Description	Dimensions	Weight	Article No.
Studer SI 612	(WR 12 V / 230 V / IP20 / 600 W)	215 x 124 x 206 mm	6,9 kg	101.333
Studer SI 624	(WR 24 V / 230 V / IP20 / 600 W)	215 x 124 x 206 mm	6,9 kg	101.334
Studer SI 612S	(WR 12 V / 230 V / IP20 / 600 W / 16 A SCC)	215 x 124 x 206 mm	6,9 kg	101.335
Studer SI 624S	(WR 24 V / 230 V / IP20 / 600 W / 16 A SCC)	215 x 124 x 206 mm	6,9 kg	101.336
Studer SI 812	(WR 12 V / 230 V / IP20 / 800 W)	215 x 124 x 276 mm	10,4 kg	101.337
Studer SI 824	(WR 24 V / 230 V / IP20 / 800 W)	215 x 124 x 276 mm	10,4 kg	101.338
Studer SI 812S	(WR 12 V / 230 V / IP20 / 800 W / 16 A SCC)	215 x 124 x 276 mm	10,4 kg	101.339
Studer SI 824S	(WR 24 V / 230 V / IP20 / 800 W / 16 A SCC)	215 x 124 x 276 mm	10,4 kg	101.340

### Studer Stand Alone Inverter Line SI

Article	Description	Dimensions	Weight	Article No.
Studer SI 1212	(WR 12 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.341
Studer SI 1224	(WR 24 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.342
Studer SI 1248	(WR 48 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.343
Studer SI 1212TP	(Twinpower / WR 12 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.344
Studer SI 1224TP	(Twinpower / WR 24 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.345
Studer SI 1248TP	(Twinpower / WR 48 V / 230 V / IP20 / 1200 W)	215 x 124 x 391 mm	13,2 kg	101.346
Studer SI 2324	(WR 24 V / 230V / IP20 / 2300 W)	215 x 124 x 591 mm	22,8 kg	101.347
Studer SI 2348	(WR 48 V / 230V / IP20 / 2300 W)	215 x 124 x 591 mm	22,8 kg	101.348
Studer SI 2324TP	(Twinpower / WR 24 V / 230V / IP20 / 2300 W)	215 x 124 x 591 mm	22,8 kg	101.349
Studer SI 2348TP	(Twinpower / WR 48 V / 230V / IP20 / 2300 W)	215 x 124 x 591 mm	22,8 kg	101.350
Studer SI 3548	(WR 48 V / 230 V / IP20 / 3500 W)	215 x 124 x 791 mm	33,5 kg	101.351
Studer SI 3548TP	(Twinpower / WR 48 V / 230 V / IP20 / 3500 W)	215 x 124 x 791 mm	33,5 kg	101.352

### Steca Solarix Sinus Stand Alone Inverter Range

Innovative stand alone inverters with a pure sine wave and completely new performance characteristics. These inverters are available with and without integrated solar charge controller with the approved AtonIC-technology. AtonIC microcontrollers are especially characterized by a state of charge (SOC) of the accumulator which is unique in this price category.



Article	Description	Dimensions	Weight	Article No.
Steca Solarix 550 I	(WR 12 V / 230 V / 50 Hz / IP20 / 550 W)	320 x 244 x 120 mm	5,5 kg	101.319
Steca Solarix 550 I-60	(WR 12 V / 230 V / 60 Hz / IP20 / 550 W)	320 x 244 x 120 mm	5,5 kg	101.320
Steca Solarix 550 I-L60	(WR 12 V / 115 V / 60 Hz / IP20 / 550 W)	320 x 244 x 120 mm	5,5 kg	101.321
Steca Solarix 550 RI	(WR 12 V / 230 V / 50 Hz / IP20 / 550 W / 15 A SCC)	320 x 244 x 120 mm	5,5 kg	101.322
Steca Solarix 550 RI-60	(WR 12 V / 230 V / 60 Hz / IP20 / 550 W / 15 A SCC)	320 x 244 x 120 mm	5,5 kg	101.323
Steca Solarix 550 RI-L60	(WR 12 V / 115 V / 60 Hz / IP20 / 550 W / 15 A SCC)	320 x 244 x 120 mm	5,5 kg	101.324
Steca Solarix 900 I	(WR 24 V / 230 V / 50 Hz / IP20 / 900 W)	320 x 244 x 120 mm	7,5 kg	101.325
Steca Solarix 900 I-60	(WR 24 V / 230 V / 60 Hz / IP20 / 900 W)	320 x 244 x 120 mm	7,5 kg	101.326
Steca Solarix 900 I-L60	(WR 24 V / 115 V / 60 Hz / IP20 / 900 W)	320 x 244 x 120 mm	7,5 kg	101.327
Steca Solarix 900 RI	(WR 24 V / 230 V / 50 Hz / IP20 / 900 W / 15 A SCC)	320 x 244 x 120 mm	7,5 kg	101.328
Steca Solarix 900 RI-60	(WR 24 V / 230 V / 60 Hz / IP20 / 900 W / 15 A SCC)	320 x 244 x 120 mm	7,5 kg	101.329
Steca Solarix 900 RI-L60	(WR 24 V / 115 V / 60 Hz / IP20 / 900 W / 15 A SCC)	320 x 244 x 120 mm	7,5 kg	101.330

**Steca Solarix PI Sinus Stand Alone Inverter Range**

In developing the Solarix PI stand-alone inverter, Steca has brought about some innovations which are unprecedented in this form. These are, above all, parallel switching, the novel operating concept which uses a single rotary switch, direct communication in order to calculate the state of charge (SOC) with Tarom and Power Tarom, and the electronic fuse. Furthermore, our many years of experience have come into play for deploying these inverters specifically in photovoltaic systems. This comes through, for instance, in the way that a most diverse range of appliances is provided with a stable energy supply, while the inverter's own consumption remains low.



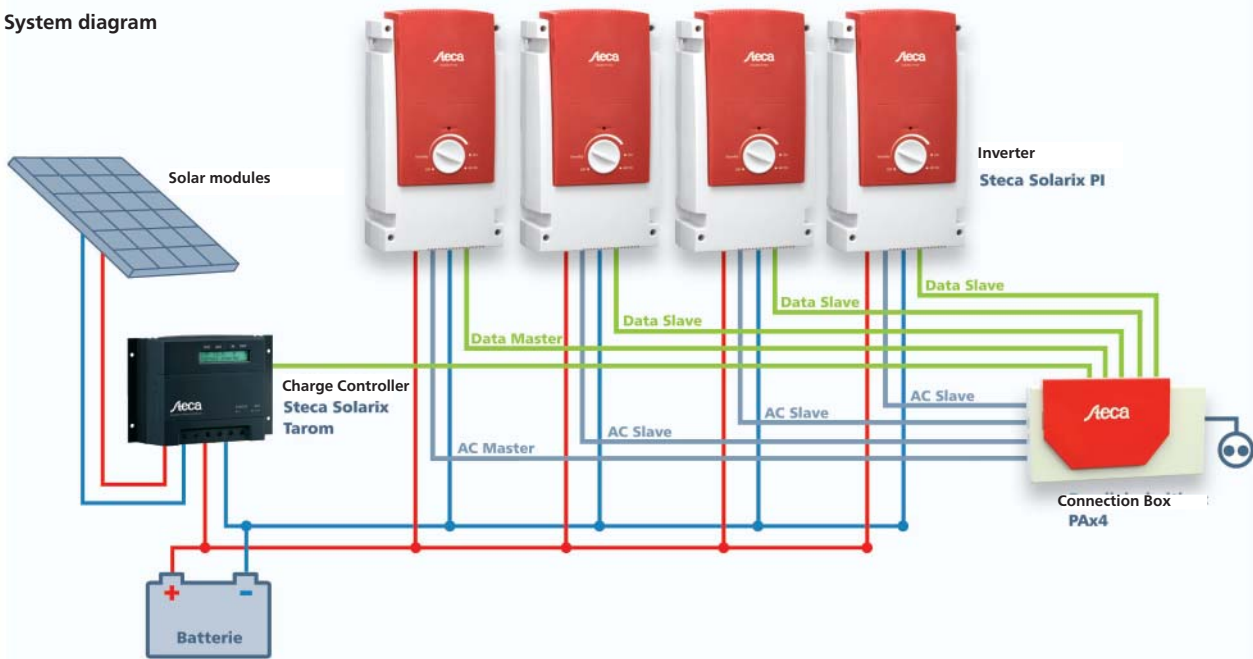
Steca Solarix PI 550



Steca PAX4 Connection Box



System diagram



Article	Description	Dimensions	Weight	Article No.
Steca Solarix PI 550	(WR 12 V / 230 V / 50 Hz / IP20 / 550 W)	400 x 215 x 130 mm	5,5 kg	101.490
Steca Solarix PI 1100	(WR 24 V / 230 V / 50 Hz / IP20 / 1100 W)	400 x 215 x 130 mm	8,5 kg	101.491
Steca PAX4 Connection Box	(for connection of 4 inverter)	---	---	101.492

**Phaesun Swing Stand Alone Inverter Range**

The series SWING pure sinewave inverter supplies a 230 VAC output voltage either from a 12 or 24 VDC power source. The shape is pure sinewave - as from the grid. The inverter design is based on proven 50 Hz-technology. Extra input and output filtering reduce EMI to extremely low levels. Reliability features include an input fuse, thermal shutdown, current limiting and output short circuit shutdown with automatic recovery. The input and output is fully isolated. The superb overload capability supplies short time peak power to start heavy equipment such as pumps and compressors. Remote ON/OFF function is easy to install with an external switch.



Article	Description	Dimensions	Weight	Article No.
Swing 150-230-12	(150 W / 230 VAC / 12 VDC / 50 Hz)	200 x 132 x 72 mm	2,7 kg	302.121
Swing 150-230-24	(150 W / 230 VAC / 24 VDC / 50 Hz)	200 x 132 x 72 mm	2,7 kg	302.122
Swing 300-230-12	(300 W / 230 VAC / 12 VDC / 50 Hz)	237 x 155 x 72 mm	3,5 kg	302.123
Swing 300-230-24	(300 W / 230 VAC / 24 VDC / 50 Hz)	237 x 155 x 72 mm	3,5 kg	302.124

### Phaesun Jazz Stand Alone Inverter Range

The series JAZZ pure sinewave inverter supplies a 230 VAC output voltage either from a 12, 24 or 48 VDC power source. The shape of the output voltage is pure sinewave - as from the grid. All new High Frequency Switching Design offers high power and reliability in a compact package and light weight. Extra input and output filtering reduce EMI to extremely low levels. Reliability features include an input fuse, thermal shutdown, current limiting and output short circuit shutdown with automatic recovery. The input and output is fully isolated. The superb overload capability supplies short time peak power to start heavy equipment such as pumps and compressors. It is equipped with a power save circuitry using the auto sense method to detect a load connected to the output. Optional features include a remote control.



Article	Description	Dimensions	Weight	Article No.
Jazz 700-230-12	(700 W / 230 VAC / 12 VDC / 50 Hz)	295 x 180 x 72 mm	2,9 kg	302.125
Jazz 700-230-24	(700 W / 230 VAC / 24 VDC / 50 Hz)	295 x 180 x 72 mm	2,9 kg	302.126
Jazz 700-230-48	(700 W / 230 VAC / 48 VDC / 50 Hz)	295 x 180 x 72 mm	2,9 kg	302.127
Jazz 1000-230-12	(1000 W / 230 VAC / 12 VDC / 50 Hz)	383 x 182 x 89 mm	4 kg	302.128
Jazz 1000-230-24	(1000 W / 230 VAC / 24 VDC / 50 Hz)	383 x 182 x 89 mm	4 kg	302.129
Jazz 1000-230-48	(1000 W / 230 VAC / 48 VDC / 50 Hz)	383 x 182 x 89 mm	4 kg	302.130
Jazz 1500-230-12	(1500 W / 230 VAC / 12 VDC / 50 Hz)	390 x 275 x 105 mm	7 kg	302.131
Jazz 1500-230-24	(1500 W / 230 VAC / 24 VDC / 50 Hz)	390 x 275 x 105 mm	7 kg	302.132
Jazz 1500-230-48	(1500 W / 230 VAC / 48 VDC / 50 Hz)	390 x 275 x 105 mm	7 kg	302.133

### Phaesun HipHop Stand Alone Inverter Range

The series HIP HOP pure sinewave inverter supplies a 230 VAC output voltage either from a 12, 24 or 48 VDC power source. The shape of the output voltage is pure sinewave - such as from the grid. All new High Frequency Switching Design offers high power and reliability in a compact package and light weight. Extra input and output filtering reduce EMI to extremely low levels. Reliability features include an input fuse, thermal shutdown, current limiting and output short circuit shutdown with automatic recovery. The input and output is fully isolated, The superb overload capability supplies short time peak power to start heavy equipment such as pumps and compressors. It is equipped with a power save circuitry using the auto sense method to detect a load connected to the output. Optional features include a remote control.



Article	Description	Dimensions	Weight	Article No.
Hip Hop 2000-230-12	(2000 W / 230 VAC / 12 VDC / 50 Hz)	422 x 208 x 160 mm	8,7 kg	302.134
Hip Hop 2000-230-24	(2000 W / 230 VAC / 24 VDC / 50 Hz)	422 x 208 x 160 mm	8,7 kg	302.135
Hip Hop 2000-230-48	(2000 W / 230 VAC / 48 VDC / 50 Hz)	422 x 208 x 160 mm	8,7 kg	302.136
Hip Hop 3000-230-24	(3000 W / 230 VAC / 24 VDC / 50 Hz)	452 x 208 x 166 mm	9,8 kg	302.139
Hip Hop 3000-230-48	(3000 W / 230 VAC / 48 VDC / 50 Hz)	452 x 208 x 166 mm	9,8 kg	302.140

### Phaesun Stand Alone Inverter Accessories

Article	Description	Dimensions	Weight	Article No.
<b>Phaesun Stand Alone Inverter Remote Controls</b>				
	Phaesun Remote Control 12 V Jazz (700/1000) + Hiphop	---	1 kg	302.142
	Phaesun Remote Control 24 V Jazz (700/1000) + Hiphop	---	1 kg	302.143
	Phaesun Remote Control Jazz 1500 Standard	---	1 kg	302.141
<b>Phaesun 3 way Socket for connecting loads directly to the Inverter</b>				
	Phaesun 3 Way Socket 2m (230 VAC)	20 x 60 x 40 mm	1 kg	102.527

### Studer Inverter / Charger Lines

Innovative inverter/charger line with a perfect, pure sine wave in a well-designed casing, with CE conform electronics working very silent and reliable. The cables necessary for a simple installation are already included. The option of a remote control, an alarm output and an integrated charge controller is a special feature of this product line. These inverters can be used as standard stand alone inverters as well as in USB installations. The possibility of a use in parallel extends this product range from 1,3 to 3,5 KW.



Article	Description	Dimensions	Weight	Article No.
<b>Studer Inverter/Charger line XPC</b>				
Studer XPC 1400-12	(WR 12 V / 230V / IP20 / 1100 W / BC 0 - 45 A)	410 x 215 x 124 mm	11,7 kg	101.375
Studer XPC 2200-24	(WR 24 V / 230 V / IP20 / 1600 W / BC 0 - 37 A)	410 x 215 x 124 mm	12,6 kg	101.376
Studer XPC 2200-48	(WR 48 V / 230 V / IP20 / 1600 W / BC 0 - 20 A)	410 x 215 x 124 mm	12,6 kg	101.377
Studer XPC 1400-12S	(WR 12 V / 230 V / IP20 / 1100 W / BC 0 - 45 A / SCC)	410 x 215 x 124 mm	11,7 kg	106.319
Studer XPC 2200-24S	(WR 24 V / 230 V / IP20 / 1600 W / BC 0 - 37 A / SCC)	410 x 215 x 124 mm	12,6 kg	106.320
Studer XPC 2200-48S	(WR 48 V / 230 V / IP20 / 1600 W / BC 0 - 20 A / SCC)	410 x 215 x 124 mm	12,6 kg	106.321
<b>Studer Inverter/Charger line C</b>				
Studer C 1600-12	(WR 12 V / 230 V / IP20 / 1300 W / BC 0 - 55 A)	480 x 215 x 124 mm	16 kg	101.353
Studer C 2600-24	(WR 24 V / 230 V / IP20 / 2300 W / BC 0 - 55 A)	480 x 215 x 124 mm	17,1 kg	101.354
Studer C 4000-48	(WR 48 V / 230 V / IP20 / 3500 W / BC 0 - 50 A)	480 x 215 x 124 mm	29,4 kg	101.355
Studer C 1600-12S	(WR 12 V / 230 V / IP20 / 1300 W / BC 0 - 55 A / SCC)	480 x 215 x 124 mm	16 kg	106.332
Studer C 2600-24S	(WR 24 V / 230 V / IP20 / 2300 W / BC 0 - 55 A / SCC)	480 x 215 x 124 mm	17,1 kg	106.333
Studer C 4000-48S	(WR 48 V / 230 V / IP20 / 3500 W / BC 0 - 50 A / SCC)	480 x 215 x 124 mm	29,4 kg	101.393
<b>Studer Inverter/Charger line HPC</b>				
Studer HPC 2800-12	(WR 12 V / 230 V / IP20 / 2500 W / BC 0 - 110 A)	480 x 290 x 230 mm	33 kg	101.356
Studer HPC 4400-24	(WR 24 V / 230 V / IP20 / 4000 W / BC 0 - 100 A)	480 x 290 x 230 mm	39 kg	101.367
Studer HPC 6000-48	(WR 48 V / 230 V / IP20 / 5000 W / BC 0 - 70 A)	480 x 290 x 230 mm	41 kg	101.357
Studer HPC 8000-48	(WR 48 V / 230 V / IP20 / 7000 W / BC 0 - 90 A)	500 x 288 x 242 mm	45 kg	106.325
<b>Studer Inverter/Charger line XTH</b>				
Studer XTH 3000-12	(WR 12 V / 230 V / IP20 / 2500 W / BC 0 - 160 A)	220 x 290 x 500 mm	34 kg	106.381
Studer XTH 5000-24	(WR 24 V / 230 V / IP20 / 4000 W / BC 0 - 120 A)	220 x 290 x 500 mm	40 kg	106.382
Studer XTH 6000-48	(WR 48 V / 230 V / IP20 / 5000 W / BC 0 - 100 A)	220 x 290 x 500 mm	42 kg	106.383
Studer XTH 8000-48	(WR 48 V / 230 V / IP20 / 7000 W / BC 0 - 100 A)	220 x 290 x 500 mm	46 kg	106.384

**OutBack FX Series**

The OutBack FX series is a modular „building block“ sine wave inverter/charger that can be used for both small and large power systems. Each FX inverter/charger is a complete power conversion system - DC to AC inverter, battery charger and AC transfer switch. The FX series is also available in a version with 230 VAC, 50 hz output that can be connected in parallel (230 VAC) or in three phase (230Y400 VAC) configurations. Our unique sealed, gasketed die-cast aluminum chassis protects and keeps the power conversion components cool - without requiring outside air to be blown through the sensitive electronics. The FX can be used in high ambient applications up to 60°C with reduced output ratings. It is designed to operate as a coordinated system with the other OutBack products.



Article	Description	Dimensions	Weight	Article No.
<b>OutBack FX 230 VAC Sinewave Inverter Charger</b>				
FX 2012 ET	(2000 W / 12 VDC / 230 VAC / 50 Hz / 100 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.301
FX 2024 ET	(2000 W / 24 VDC / 230 VAC / 50 Hz / 55 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.302
FX 2348 ET	(2300 W / 48 VDC / 230 VAC / 50 Hz / 35 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.303
<b>OutBack FX 120 VAC Sinewave Inverter Charger</b>				
FX 2024	(2000 W / 24 VDC / 120 VAC / 60 Hz / 55 A charger)	210 x 290 x 410 mm	27 kg	107.307
FX 2548	(2500 W / 48 VDC / 120 VAC / 60 Hz / 35 A charger)	210 x 290 x 410 mm	27 kg	107.308

**OutBack VFX Series**

The OutBack VFX series is a ventilated version of the original sealed FX series modular „building block“ sine wave inverter/charger that can be used for both small and large power systems. By allowing cooler outside airflow through the internal electronics, more AC power is available. Additional FX inverter/chargers can be connected at any time in either parallel (120 VAC), series (120/240 VAC), or three-phase (120Y208 VAC) configurations. The VFX series is also available in a version with 230 VAC, 50 hz output that can be connected in parallel (230 VAC) or in three phase (230Y400 VAC) configurations. The VFX is designed to survive harsh environments around the world. The VFX can be used up to 60°C (reduced output ratings). It is designed to operate as a coordinated system with the other OutBack products.



Article	Description	Dimensions	Weight	Article No.
<b>OutBack VFX 230 VAC Sinewave Inverter Charger</b>				
VFX 2612E	(2600 W / 12 VDC / 230 VAC / 50 Hz / 125 A charger / vented)	210 x 290 x 410 mm	28 kg	107.304
VFX 3024E	(3000 W / 24 VDC / 230 VAC / 50 Hz / 85 A charger / vented)	210 x 290 x 410 mm	28 kg	107.305
FX 2348 ET	(3000 W / 48 VDC / 230 VAC / 50 Hz / 45 A charger / vented)	210 x 290 x 410 mm	28 kg	107.306
<b>OutBack VFX 120 VAC Sinewave Inverter Charger</b>				
VFX 2812	(2800 W / 12 VDC / 120 VAC / 60 Hz / 125 A charger / vented)	210 x 290 x 410 mm	28 kg	107.309
VFX 3524	(3500 W / 24 VDC / 120 VAC / 60 Hz / 85 A charger / vented)	210 x 290 x 410 mm	28 kg	107.310
VFX 3648	(3600 W / 48 VDC / 120 VAC / 60 Hz / 45 A charger / vented)	210 x 290 x 410 mm	28 kg	107.311

### StecaGrid Inverter 300 / 500 Series

A string of solar panels can be connected to an inverter. Enlarge your system by simply adding more inverters and creating the system size you want. StecaGrid 300 can be combined up to a system size of 3600 Wac and the StecaGrid 500 up to a system size of 3500 Wac. Because the StecaGrid 300 and StecaGrid 500 use the MiniString concept, the maximum power point can be searched for each string. As a result, your solar such as partial shade, module temperature and module orientation. The low weight allows the installation by just one person (for indoor use).



StecaGrid 300/500      StecaGrid 300/500 whole system

Article	Description	Dimensions	Weight	Article No.
<b>with Tyco Solarlok DC connection cable</b>				
StecaGrid 300-T	(300 Wac / 45 - 135 VDC / 230 VAC / IP20)	242 x 186 x 71 mm	1,4 kg	106.360
StecaGrid 500-T	(500 Wac / 45 - 230 VDC / 230 VAC / IP20)	242 x 186 x 71 mm	1,4 kg	106.362
<b>with Multi-Contact MC 3 (Solarline 1) DC connection cable</b>				
StecaGrid 300-M	(300 Wac / 45 - 135 VDC / 230 VAC / IP20)	242 x 186 x 71 mm	1,4 kg	106.361
StecaGrid 500-M	(500 Wac / 45 - 230 VDC / 230 VAC / IP20)	242 x 186 x 71 mm	1,4 kg	106.363

### StecaGrid Guard (for StecaGrid 300 / 500 Series)

The StecaGrid Guard monitors the performance of your solar system, providing an overview of kWh's generated, system status and (optionally in StecaGrid Guard D) safety functions (ENS\*). Each solar system needs only one StecaGrid Guard. And because the StecaGrid Guard comes in the same sizes as the StecaGrid 300 and StecaGrid 500, you simply connect it to the righthand side of the inverter(s). All data is transferred via a data link between the inverter(s) and the StecaGrid Guard, which measures the performance of each inverter connected to it.

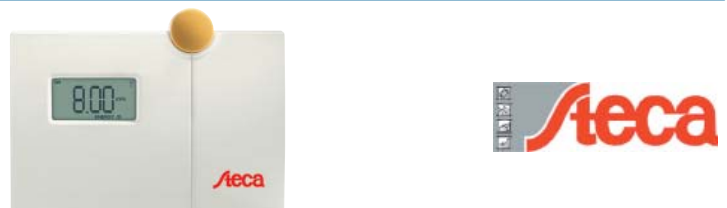


StecaGrid Guard      StecaGrid 300/500 whole system

Article	Description	Dimensions	Weight	Article No.
StecaGrid Guard D	(with ENS - German version)	250 x 175 x 70 mm	106.371	106.371
StecaGrid Guard N	(without ENS)	250 x 175 x 70 mm	106.370	106.370

### StecaGrid Guard (for StecaGrid 300 / 500 Series)

To complement the StecaGrid Guard, an external, wireless communication unit is available: the StecaGrid Remote. In addition to system status, the display gives an overview of the energy currently being generated, as well as historical data on energy generated over the previous day, week, month and year. StecaGrid Remote can be installed anywhere near the inverter system.



Article	Description	Dimensions	Weight	Article No.
StecaGrid Remote		---	---	106.372
StecaGrid Link	(integr. link RCD type B with cable)	---	---	106.373

### StecaGrid 2000 Series

The StecaGrid 2000 is available as a „Master“ and a „Slave“. The Master is a combination of a control unit plus an inverter and can be expanded by adding a further 1 or 2 separate inverters, or „Slaves“. Allowing the system to be upgraded flexibly from 2000 up to 6000 W. The StecaGrid are easy to install (low weight) as well as easy to install and suitable for outdoor installation through protection glass IP55.



StecaGrid 2000 Master    StecaGrid 2000 Slaves

Article	Description	Dimensions	Weight	Article No.
<b>with Tyco Solarlok DC connection cable</b>				
StecaGrid 2000 Master-T	(2000 Wac / 80 - 400 VDC / 230 VAC / IP55)	515 x 351 x 140 mm	11 kg	106.366
StecaGrid 2000 Slave-T	(2000 Wac / 80 - 400 VDC / 230 VAC / IP65)	515 x 226 x 140 mm	9 kg	106.369
<b>with Multi-Contact MC 3 (Solarline 1) DC connection cable</b>				
StecaGrid 2000 Master-M	(2000 Wac / 80 - 400 VDC / 230 VAC / IP55)	515 x 351 x 140 mm	11 kg	106.364
StecaGrid 2000 Slave-M	(2000 Wac / 80 - 400 VDC / 230 VAC / IP65)	515 x 226 x 140 mm	9 kg	106.368
<b>German version (with ENS) with Tyco Solarlok DC connection cable</b>				
StecaGrid 2000 D-Master-T	(2000 Wac / 80 - 400 VDC / 230 VAC / IP55)	515 x 351 x 140 mm	11 kg	106.367
<b>German vers. (ENS) with Multi-Contact MC3 DC connection cable</b>				
StecaGrid 2000 D-Master-M	(2000 Wac / 80 - 400 VDC / 230 VAC / IP55)	515 x 351 x 140 mm	11 kg	106.365

### StecaGrid Connect (for StecaGrid 2000 Series)

The StecaGrid 2000 Master Inverter can be expanded using StecaGrid Connect. StecaGrid Connect is a PC/network interface based on standard internet protocol. The standard StecaGrid Connect package provides HTML pages that can be opened with an Internet Browser and so actual power and energy yield of the inverter can be seen.

Article	Description	Dimensions	Weight	Article No.
StecaGrid Connect		---	---	106.374



**Phaesun Connection / Junction Boxes**

The GCB Generator Connection Boxes have been especially developed for the professional photovoltaic power supply in the fields of telecommunication, pumping, irrigation, pipeline control, etc. Using the GCB product line promises highest system reliability over years. The included components are selected for durable use and most comfortable installation. These products provide the highest operational safety through ABB circuit breakers during installation and maintenance.



Phaesun GJB Box



Phaesun GCB Box



Article	Description	Dimensions	Weight	Article No.
<b>Phaesun GCB Connection Boxes</b>				
<b>Phaesun GCB2 Connection Box</b>		304 x 400 x 111 mm	3 kg	103.628
for 2 modules / 48 V / 63 A / overvoltage protection ABB OT 45E4 connection terminal 4 mm <sup>2</sup> 8x / 16 mm <sup>2</sup> 4x / big cable glands				
<b>Phaesun GCB4 Connection Box</b>		270 x 410 x 110 mm	3 kg	103.611
for 4 modules / 48 V / 63 A / overvoltage protection ABB OT 45E4 connection terminal 4 mm <sup>2</sup> 8x / 16 mm <sup>2</sup> 4x / big cable glands				
<b>Phaesun GCB6 Connection Box</b>		270 x 410 x 110 mm	3,1 kg	103.613
for 6 modules / 48 V / 63 A / overvoltage protection ABB OT 45E4 connection terminal 4 mm <sup>2</sup> 8x / 16 mm <sup>2</sup> 4x / big cable glands				
<b>Phaesun GCB8 Connection Box</b>		270 x 410 x 110 mm	3,1 kg	103.685
for 8 modules / 48 V / 63 A / overvoltage protection ABB OT 45E4 connection terminal 4 mm <sup>2</sup> 8x / 16 mm <sup>2</sup> 4x / big cable glands				
<b>Phaesun GJB Junction Boxes</b>				
<b>Phaesun GJB2 Junction Boxes</b>	(5 Amp at 10m, 2 Amp at 25m length )	254 x 220 x 90 mm	1,3 kg	103.686
<b>Phaesun GJB4 Junction Boxes</b>	(5 Amp at 10m, 2 Amp at 25m length )	254 x 220 x 90 mm	1,3 kg	103.612
<b>Phaesun GJB6 Junction Boxes</b>	(5 Amp at 10m, 2 Amp at 25m length )	254 x 220 x 90 mm	1,5 kg	103.614
<b>Phaesun GJB8 Junction Boxes</b>	(5 Amp at 10m, 2 Amp at 25m length )	254 x 220 x 90 mm	1,6 kg	103.616

**Phaesun GCP Generator Coupling Box**



Article	Description	Dimensions	Weight	Article No.
<b>Phaesun GCP Generator Coupling Box</b>		354 x 400 x 179 mm	2 kg	103.624
connectable 6 GCP connection boxes / 48 V connection terminal 16 mm <sup>2</sup> 12x / 25 mm <sup>2</sup> 4x / big cable glands				

**Phaesun PTCC Control Cabinets**

The Phaesun PTCC Control Cabinets combine the power delivered by the solar modules via the connection boxes (Phaesun GCB2) and the generator coupling box (Phaesun GCB Generator Coupling Box) which is matched to the load voltage. It also contains the DC distribution and the necessary facilities for connecting solar generator coupling boxes, battery, load and the available options as external temperature sensor, data logger, remote control and modem for data transfer. With this features, the Phaesun PTCC Control Cabinet sets new standards in the field of professional power supply by photovoltaic systems. Just the best components available are used and covered by a heavy duty wall mounted control enclosure in IP54 with a security lockable transparent door. All components are chosen for comfortable mounting with big cable cross-sections up to 35 mm<sup>2</sup>. Special circuit breakers for the exclusive use in PV-systems complete the extensive equipment. The PTCC Control cabinet has been designed on the basis of an upgrade philosophy and can be improved on the customers demand easily.



Article	Description	Dimensions	Weight	Article No.
<b>Phaesun PTCC 48055 Control Cabinet</b>		600 x 640 x 230 mm	30 kg	103.640
	including solar controller type PowerTarom 4055 / system voltage 48V			
	max. input voltage 100 V connectable / rated module power of 3,5 kW			
	for 300 W continuous power output / max. input current 55A			
	max. continuous load current 1x 40 A or 1x 30 A or 1x 20 A			
<b>Phaesun PTCC 48110 Control Cabinet</b>		600 x 640 x 230 mm	32 kg	103.642
	including solar controller type PowerTarom 4110 / system voltage 48V			
	max. input voltage 100 V connectable / rated module power of 7 kW			
	for 600 W continuous power output / max. input current 110A			
	max. continuous load current 1x 40 A or 1x 30 A or 1x 20 A			
<b>Phaesun PTCC 48140 Control Cabinet</b>		600 x 640 x 230 mm	34 kg	103.655
	including solar controller type PowerTarom 4140 / system voltage 48V			
	max. input voltage 100 V connectable / rated module power of 8,5 kW			
	for 600 W continuous power output / max. input current 140A			
	max. continuous load current 1x 40 A or 1x 30 A or 1x 20 A			

## Hoppecke Lead Acid 2/6/12 V OPzS Batteries

OPzS batteries are used in a range of applications such as telecommunications centres, also signalling, control and regulating systems and standby power systems with long bridging times (> 1 hour).

They are greatly valued in practical use for their long useful life (over 16 years) and their corrosion resistant terminal bushing. A further key product benefit of OPzS batteries lies in their very high resistance to cycling, making them suitable not only for standby power duties but also for charge/discharge operation.



Article	Description	Dimensions	Weight	Article No.
<b>OPzS Dry Preloaded (TV)</b>				
Hoppecke 4 OPzS 200 G TV	(200 Ah (C10) / 2 V / dry preloaded)	105 x 208 x 420 mm	12,3 kg	104.967
Hoppecke 5 OPzS 250 G TV	(250 Ah (C10) / 2 V / dry preloaded)	126 x 208 x 420 mm	14,7 kg	104.968
Hoppecke 6 OPzS 300 G TV	(300 Ah (C10) / 2 V / dry preloaded)	147 x 208 x 420 mm	17,1 kg	104.969
Hoppecke 5 OPzS 350 G TV	(350 Ah (C10) / 2 V / dry preloaded)	126 x 208 x 535 mm	19 kg	104.970
Hoppecke 6 OPzS 420 G TV	(420 Ah (C10) / 2 V / dry preloaded)	147 x 208 x 535 mm	22,1 kg	104.971
Hoppecke 7 OPzS 490 G TV	(490 Ah (C10) / 2 V / dry preloaded)	168 x 208 x 535 mm	25,3 kg	104.972
Hoppecke 6 OPzS 600 G TV	(600 Ah (C10) / 2 V / dry preloaded)	147 x 208 x 710 mm	31,9 kg	104.973
Hoppecke 8 OPzS 800 G TV	(800 Ah (C10) / 2 V / dry preloaded)	215 x 193 x 710 mm	44,4 kg	104.974
Hoppecke 10 OPzS 1000 G TV	(1000 Ah (C10) / 2 V / dry preloaded)	215 x 235 x 710 mm	53,5 kg	104.975
Hoppecke 12 OPzS 1200 G TV	(1200 Ah (C10) / 2 V / dry preloaded)	215 x 277 x 710 mm	62,5 kg	104.976
Hoppecke 12 OPzS 1500 G TV	(1500 Ah (C10) / 2 V / dry preloaded)	215 x 277 x 855 mm	80,1 kg	104.977
Hoppecke 16 OPzS 2000 G TV	(2000 Ah (C10) / 2 V / dry preloaded)	215 x 400 x 815 mm	103,5 kg	104.978
Hoppecke 20 OPzS 2500 G TV	(2500 Ah (C10) / 2 V / dry preloaded)	215 x 490 x 815 mm	125 kg	104.979
Hoppecke 24 OPzS 3000 G TV	(3000 Ah (C10) / 2 V / dry preloaded)	215 x 580 x 815 mm	170 kg	104.980
Hoppecke 6V 4 OPzS 200 TV	(200 Ah (C10) / 6 V / dry preloaded)	272 x 205 x 385 mm	34 kg	104.986
Hoppecke 6V 5 OPzS 250 TV	(250 Ah (C10) / 6 V / dry preloaded)	380 x 205 x 385 mm	40 kg	104.987
Hoppecke 6V 6 OPzS 300 TV	(300 Ah (C10) / 6 V / dry preloaded)	380 x 205 x 385 mm	49 kg	104.988
Hoppecke 12V 1 OPzS 50 TV	(50 Ah (C10) / 12 V / dry preloaded)	272 x 205 x 385 mm	22 kg	104.983
Hoppecke 12V 2 OPzS 100 TV	(100 Ah (C10) / 12 V / dry preloaded)	272 x 205 x 385 mm	35 kg	104.984
Hoppecke 12V 3 OPzS 150 TV	(150 Ah (C10) / 12 V / dry preloaded)	380 x 205 x 385 mm	49 kg	104.985
<b>OPzS Filled &amp; Charged (GUG)</b>				
Hoppecke 4 OPzS 200 G GUG	(200 Ah (C10) / 2 V / filled & charged)	105 x 208 x 420 mm	17,2 kg	105.620
Hoppecke 5 OPzS 250 G GUG	(250 Ah (C10) / 2 V / filled & charged)	126 x 208 x 420 mm	20,8 kg	105.621
Hoppecke 6 OPzS 300 G GUG	(300 Ah (C10) / 2 V / filled & charged)	147 x 208 x 420 mm	24,3 kg	105.622
Hoppecke 5 OPzS 350 G GUG	(350 Ah (C10) / 2 V / filled & charged)	126 x 208 x 535 mm	26,9 kg	105.623
Hoppecke 6 OPzS 420 G GUG	(420 Ah (C10) / 2 V / filled & charged)	147 x 208 x 535 mm	31,5 kg	105.624
Hoppecke 7 OPzS 490 G GUG	(490 Ah (C10) / 2 V / filled & charged)	168 x 208 x 535 mm	36,1 kg	105.625
Hoppecke 6 OPzS 600 G GUG	(600 Ah (C10) / 2 V / filled & charged)	147 x 208 x 710 mm	44,8 kg	105.626
Hoppecke 8 OPzS 800 G GUG	(800 Ah (C10) / 2 V / filled & charged)	215 x 193 x 710 mm	61,3 kg	105.627
Hoppecke 10 OPzS 1000 G GUG	(1000 Ah (C10) / 2 V / filled & charged)	215 x 235 x 710 mm	74,8 kg	105.628
Hoppecke 12 OPzS 1200 G GUG	(1200 Ah (C10) / 2 V / filled & charged)	215 x 277 x 710 mm	88 kg	105.629
Hoppecke 12 OPzS 1500 G GUG	(1500 Ah (C10) / 2 V / filled & charged)	215 x 277 x 855 mm	114,3 kg	105.630
Hoppecke 16 OPzS 2000 G GUG	(2000 Ah (C10) / 2 V / filled & charged)	215 x 400 x 815 mm	151,5kg	105.631
Hoppecke 20 OPzS 2500 G GUG	(2500 Ah (C10) / 2 V / filled & charged)	215 x 490 x 815 mm	193 kg	105.632
Hoppecke 24 OPzS 3000 G GUG	(3000 Ah (C10) / 2 V / filled & charged)	215 x 580 x 815 mm	246 kg	105.633
Hoppecke 6V 4 OPzS 200 GUG	(200 Ah (C10) / 6 V / filled & charged)	272 x 205 x 385 mm	47 kg	105.637
Hoppecke 6V 5 OPzS 250 GUG	(250 Ah (C10) / 6 V / filled & charged)	380 x 205 x 385 mm	60 kg	105.638
Hoppecke 6V 6 OPzS 300 GUG	(300 Ah (C10) / 6 V / filled & charged)	380 x 205 x 385 mm	67 kg	105.639
Hoppecke 12V 1 OPzS 50 GUG	(50 Ah (C10) / 12 V / filled & charged)	272 x 205 x 385 mm	37 kg	105.634
Hoppecke 12V 2 OPzS 100 GUG	(100 Ah (C10) / 12 V / filled & charged)	272 x 205 x 385 mm	48 kg	105.635
Hoppecke 12V 3 OPzS 150 GUG	(150 Ah (C10) / 12 V / filled & charged)	380 x 205 x 385 mm	67 kg	105.636

## Hoppecke OPzV Batteries

OPzV batteries are used in telecommunication centres, and in control, signalling and UPS installations with long bridging times (in excess of an hour). They are available in versions 4 OPzV 200 to 24 OPzV 3000 with capacities ranging from 200 Ah to 3000 Ah. They may be used in both the vertical and the horizontal position. With their leakproof design and good resistance to deep discharge, they are a reliable type of battery, also characterised by low self-discharge.

<i>Article</i>	<i>Description</i>	<i>Dimensions</i>	<i>Weight</i>	<i>Article No.</i>
Hoppecke 4 OPzV 200	(236 Ah / 2 V cells / 105x208x420 mm)	105 x 208 x 420 mm	20 kg	104.727
Hoppecke 5 OPzV 250	(295 Ah / 2 V cells / 126x208x420 mm)	126 x 208 x 420 mm	24 kg	104.728
Hoppecke 6 OPzV 300	(354 Ah / 2 V cells / 147x208x420 mm)	147 x 208 x 420 mm	28 kg	104.729
Hoppecke 5 OPzV 350	(413 Ah / 2 V cells / 147x208x535 mm)	147 x 208 x 535 mm	31 kg	104.730
Hoppecke 6 OPzV 420	(496 Ah / 2 V cells / 147x208x535 mm)	147 x 208 x 535 mm	37 kg	104.731
Hoppecke 8 OPzV 490	(578 Ah / 2 V cells / 168x208x535 mm)	168 x 208 x 535 mm	42 kg	104.732
Hoppecke 6 OPzV 600	(708 Ah / 2 V cells / 147x208x710 mm)	147 x 208 x 710 mm	50 kg	104.733
Hoppecke 8 OPzV 800	(944 Ah / 2 V cells / 215x193x710 mm)	215 x 193 x 710 mm	68 kg	104.734
Hoppecke 10 OPzV 1000	(1180 Ah / 2 V cells / 215x235x710 mm)	215 x 235 x 710 mm	82 kg	104.735
Hoppecke 12 OPzV 1200	(1416 Ah / 2 V cells / 215x277x710 mm)	215 x 277 x 710 mm	97 kg	104.736
Hoppecke 12 OPzV 1500	(1717 Ah / 2 V cells / 215x277x855 mm)	215 x 277 x 855 mm	120 kg	104.737
Hoppecke 16 OPzV 2000	(2360 Ah / 2 V cells / 215x400x815 mm)	215 x 400 x 815 mm	160 kg	104.738
<b>Hoppecke power.bloc OPzV</b>				
Hoppecke 12 V 1OPzV 100	(100 Ah)	272 x 205 x 383 mm	170 kg	104.753
Hoppecke 12 V 1OPzV 150	(150 Ah)	380 x 205 x 383 mm	44 kg	104.754
Hoppecke 6 V 1OPzV 200	(200 Ah)	272 x 205 x 383 mm	56 kg	104.755
Hoppecke 6 V 1OPzV 250	(250 Ah)	380 x 205 x 383 mm	63 kg	104.756
Hoppecke 6 V 1OPzV 300	(300 Ah)	380 x 205 x 383 mm	35 kg	104.757

### Phaesun Solar Power Batteries

The special technical lay-out of the Phaesun lead-acid solar battery makes them ideal for photovoltaic systems. A high reliability, robust casing and a minimal selfconsumption are special features of this battery. The temperature range of the cycles ranges from -20 °C up to + 45 °C.



Article	Description	Dimensions	Weight	Article No.
<b>Phaesun Solar Power Batteries Dry Preloaded (TV)</b>				
Phaesun SP 55 TV	(55 Ah at C100 / 12 V / 3,1 l lead acid)	210 x 175 x 190 mm	9,2 kg	302.300
Phaesun SP 70 TV	(70 Ah at C100 / 12 V / 3,6 l lead acid)	246 x 175 x 190 mm	12 kg	302.301
Phaesun SP 90 TV	(90 Ah at C100 / 12 V / 4,2 l lead acid)	276 x 175 x 190 mm	14,5 kg	302.302
Phaesun SP 110 TV	(110 Ah at C100 / 12 V / 5,7 l lead acid)	359 x 175 x 190 mm	17,3 kg	302.303
Phaesun SP 120 TV	(120 Ah at C100 / 12 V / 7,6 l lead acid)	297 x 175 x 215 mm	20 kg	302.304
Phaesun SP 140 TV	(140 Ah at C100 / 12 V / 8 l lead acid)	513 x 189 x 223 mm	27 kg	302.305
Phaesun SP 200 TV	(200 Ah at C100 / 12 V / 10 l lead acid)	519 x 223 x 223 mm	35 kg	302.306
Phaesun SP 250 TV	(250 Ah at C100 / 12 V / 16 l lead acid)	516 x 276 x 242 mm	46,5 kg	302.307
Phaesun SP 280 TV	(280 Ah at C100 / 6 V / 6,3 l lead acid)	244 x 190 x 275 mm	22,5 kg	302.308
<b>Phaesun Solar Power Batteries Filled &amp; Charged (GUG)</b>				
Phaesun SP 55 GUG	(55 Ah at C100 / 12 V / 3,1 l lead acid)	210 x 175 x 190 mm	13,1 kg	302.320
Phaesun SP 70 GUG	(70 Ah at C100 / 12 V / 3,6 l lead acid)	246 x 175 x 190 mm	16,6 kg	302.321
Phaesun SP 90 GUG	(90 Ah at C100 / 12 V / 4,2 l lead acid)	276 x 175 x 190 mm	20 kg	302.322
Phaesun SP 110 GUG	(110 Ah at C100 / 12 V / 5,7 l lead acid)	359 x 175 x 190 mm	24,6 kg	302.323
Phaesun SP 120 GUG	(120 Ah at C100 / 12 V / 7,6 l lead acid)	297 x 175 x 215 mm	30 kg	302.324
Phaesun SP 140 GUG	(140 Ah at C100 / 12 V / 8 l lead acid)	513 x 189 x 223 mm	37 kg	302.325
Phaesun SP 200 GUG	(200 Ah at C100 / 12 V / 10 l lead acid)	519 x 223 x 223 mm	48 kg	302.326
Phaesun SP 250 GUG	(250 Ah at C100 / 12 V / 16 l lead acid)	516 x 276 x 242 mm	66 kg	302.327
Phaesun SP 280 GUG	(280 Ah at C100 / 6 V / 6,3 l lead acid)	244 x 190 x 275 mm	31 kg	302.328

### Phaesun Solar Gel Batteries

The advantages of Phaesun gel batteries over its conventional counterpart are numerous. They include being:

- 1. Maintenance Free**  
Phaesun gel batteries require absolutely no maintenance.
- 2. No leakage of liquid and gas**  
By a special sealing design, there is no leakage of liquid and gas, so it is safe for all application. Even when fully recharged, there is no possibility of leakage due to the recombination system which converts the gas into liquid.  
Phaesun batteries can be installed safely in equipment with no leakage occurring.
- 3. Low in self-discharge rate**  
Phaesun gel batteries have a low self-discharging rate and they also have a long life, because they use only rigidly selected lead, calcium-lead and refined electrolytes.
- 4. Able to operate in a wide temperature range**  
Phaesun gel batteries can be used in temperatures ranging from as low as -20°C to as high as 50°C
- 5. Economical and al long life**  
Phaesun gel batteries are guaranteed a longer life than conventional batteries, due to improved durability from our rigidly selected Pb-Ca alloy.
- 6. Designed for high-discharging purpose**  
Phaesun gel batteries are designed especially for high-discharge current. They also have low internal resistance with excellent voltage stability.



Article	Description	Dimensions	Weight	Article No.
Phaesun PNGB 12900 Solar	(90 Ah at C100 / 12 V)	342 x 174 x 239 mm	34 kg	104.790
Phaesun PNGB 121100 Solar	(115 Ah at C100 / 12 V)	332 x 174 x 239 mm	35 kg	104.791
Phaesun PNGB 121400 Solar	(140 Ah at C100 / 12 V)	500 x 180 x 225 mm	44 kg	104.792
Phaesun PNGB 121800 Solar	(180 Ah at C100 / 12 V)	500 x 260 x 225 mm	55 kg	104.793
Phaesun PNGB 122300 Solar	(230 Ah at C100 / 12 V)	500 x 260 x 225 mm	68 kg	104.794

### Newmax Maintenance Free AGM 12 V PNB Batteries

The Newmax batteries require absolutely no maintenance. Due to a special sealing design, there is no leakage of liquid and gas, so it is safe for all applications. Even when fully recharged, there is no possibility of leakage due to the recombination system which converts the gas into liquid. The Newmax batteries have a low self-discharging rate and they also have a long life, because they use only rigidly selected lead, calcium-lead and refined electrolytes. These batteries can be used in temperatures ranging from as low as -20°C to as high as +50°C.



Article	Description	Dimensions	Weight	Article No.
Newmax PNB 1212	(1,2 Ah / 12 V)	97 x 47,5 x 56 mm	0,57 kg	101.841
Newmax PNB 1272	(7,2 Ah / 12 V)	151 x 65 x 100 mm	2,80 kg	101.846
Newmax PNB 12120	(12 Ah / 12 V)	151 x 98 x 100 mm	4,25 kg	101.847
Newmax PNB 12190	(19 Ah / 12 V)	180 x 75 x 167 mm	6,5 kg	101.848
Newmax PNB 12260	(26 Ah / 12 V)	165 x 175 x 126 mm	8,7 kg	101.850
Newmax PNB 12340	(34 Ah / 12 V)	196 x 130 x 178 mm	11,5 kg	101.852
Newmax PNB 12420	(42 Ah / 12 V)	197 x 166 x 174 mm	15,1 kg	101.853
Newmax PNB 12700	(70 Ah / 12 V)	350 x 166 x 175 mm	23,7 kg	101.854
Newmax PNB 121000H	(100 Ah / 12 V)	342 x 174 x 239 mm	35 kg	101.856
Newmax PNB 121500	(150 Ah / 12 V)	500 x 260 x 225 mm	55 kg	101.859
Newmax PNB 122000	(200 Ah / 12 V)	500 x 260 x 225 mm	68 kg	101.860

### Newmax PNGB 2 V Gel Batteries

Article	Description	Dimensions	Weight	Article No.
Newmax PNGB 21000	(100 Ah / 2 V)	106 x 170 x 364 mm	9 kg	104.739
Newmax PNGB 21200	(120 Ah / 2 V)	106 x 170 x 364 mm	11 kg	104.740
Newmax PNGB 21500	(150 Ah / 2 V)	106 x 170 x 364 mm	13 kg	104.741
Newmax PNGB 22000	(200 Ah / 2 V)	106 x 170 x 364 mm	16 kg	104.742
Newmax PNGB 22500	(250 Ah / 2 V)	195 x 170 x 364 mm	20 kg	104.743
Newmax PNGB 23000	(300 Ah / 2 V)	195 x 170 x 364 mm	23 kg	104.744
Newmax PNGB 24000	(400 Ah / 2 V)	195 x 170 x 364 mm	29 kg	104.745
Newmax PNGB 25000	(500 Ah / 2 V)	289 x 171 x 364 mm	38 kg	104.746
Newmax PNGB 26000	(600 Ah / 2 V)	289 x 171 x 364 mm	44 kg	104.747
Newmax PNGB 27000	(700 Ah / 2 V)	382 x 171 x 364 mm	51 kg	104.748
Newmax PNGB 28000	(800 Ah / 2 V)	382 x 171 x 364 mm	56 kg	104.749
Newmax PNGB 29000	(900 Ah / 2 V)	471 x 171 x 364 mm	68 kg	104.750
Newmax PNGB 210000	(1000 Ah / 2 V)	471 x 171 x 364 mm	73 kg	104.751
Newmax PNGB 212000	(1200 Ah / 2 V)	471 x 171 x 364 mm	75 kg	104.752

### Rolls Solar 4000 Batteries

The Series 400 system of batteries, manufactured specifically for SOLAR and other renewable energy applications, are designed to offer up to 12 years of life. Each cell is self-contained in a high temperature-retardant, durable polypropylene case that is heat-density unbreakable polyethylene, giving you double protection against breakage or leakage. The heavier rezistox plates put more metal where it counts. This results in more resistance to corrosion and allows for a greater amount of active material. The exclusive multiplate engineering increases active plate surface by 33% for high discharge rates. Removable cells permit easy transportation, installation and removal. Likewise if a cell has to be replaced, it can be done without special tools or skills. Use of thickest plate, highest density active material in plate construction. Many of the batteries are constructed with structural foam containers. They feature enveloped Separators and increased liquid reserve.



*Rolls*

Rolls Solar 6 HHG 31PS

Article	Description	Dimensions	Weight	Article No.
Rolls Solar S-460	(460 Ah (C100) / 6 V)	311 x 181 x 425 mm	53,1 kg	104.860
Rolls Solar S-530	(530 Ah (C100) / 6 V)	311 x 181 x 425 mm	57,6 kg	104.861
Rolls Solar 6 HHG 31PS	(430 Ah (C100) / 6 V)	527 x 203 x 302 mm	57 kg	104.862
Rolls Solar 6 EHG 31PS	(512 Ah (C100) / 6 V)	527 x 203 x 302 mm	60 kg	104.863
Rolls Solar 8 HHG 31PS	(430 Ah (C100) / 8 V)	686 x 203 x 302 mm	76 kg	104.864
Rolls Solar 8 EHG 31PS	(512 Ah (C100) / 8 V)	686 x 203 x 302 mm	81 kg	104.865
Rolls Solar 24 HT 80	(106 Ah (C100) / 12 V)	279 x 171 x 241 mm	27,1 kg	104.877
Rolls Solar 30 H 108	(143 Ah (C100) / 12 V)	335 x 171 x 248 mm	33 kg	104.878
Rolls Solar T12 136	(180 Ah (C100) / 12 V)	335 x 171 x 286 mm	41 kg	104.879
Rolls Solar T12 250	(266 Ah (C100) / 12 V)	391 x 178 x 365 mm	64 kg	104.880

### Rolls Solar 5000 Batteries

The Series 500 system of batteries, manufactured specifically for SOLAR and other renewable energy applications, are designed to offer up to 20 years of life thanks in part to their „Non-Breakable“, dual container (modular) construction. The unique battery design features dual container construction. Each cell is self-contained in a high temperature-retardant, durable polypropylene case that is heat-density unbreakable polyethylene, giving you double protection against breakage or leakage. The heavier rezistox plates put more metal where it counts. This results in more resistance to corrosion and allows for a greater amount of active material. The exclusive multiplate engineering increases active plate surface by 33% for high discharge rates. Removable cells permit easy transportation, installation and removal. Likewise if a cell has to be replaced, it can be done without special tools or skills.



*Rolls*

Rolls Solar 5000 - 4 KS 21PS

Article	Description	Dimensions	Weight	Article No.
Rolls Solar 5000 - 2 KS 33PS	(2490 Ah (C100) / 2 V)	349 x 211 x 630 mm	94,3 kg	104.866
Rolls Solar 5000 - 2 YS 31PS	(3426 Ah (C100) / 2 V)	394 x 229 x 803 mm	130 kg	104.867
Rolls Solar 5000 - 4 CS 17PS	(770 Ah (C100) / 4 V)	365 x 209 x 630 mm	58,1 kg	104.868
Rolls Solar 5000 - 4 KS 21PS	(1557 Ah (C100) / 4 V)	400 x 238 x 463 mm	121,1 kg	104.869
Rolls Solar 5000 - 4 KS 25PS	(1900 Ah (C100) / 4 V)	400 x 269 x 628 mm	143 kg	104.870
Rolls Solar 5000 - 6 CS 17PS	(770 Ah (C100) / 6 V)	558 x 209 x 463 mm	100 kg	104.871
Rolls Solar 5000 - 6 CS 21PS	(963 Ah (C100) / 6 V)	558 x 247 x 463 mm	123 kg	104.872
Rolls Solar 5000 - 6 CS 25PS	(1156 Ah (C100) / 6 V)	558 x 285 x 463 mm	145 kg	104.873
Rolls Solar 5000 - 8 CS 17PS	(770 Ah (C100) / 8 V)	717 x 209 x 463 mm	134 kg	104.874
Rolls Solar 5000 - 8 CS 25PS	(1156 Ah (C100) / 8 V)	717 x 285 x 463 mm	193 kg	104.875
Rolls Solar 5000 - 12 CS 11PS	(503 Ah (C100) / 12 V)	558 x 285 x 463 mm	124 kg	104.876

### Exide Dryfit Solar Batteries

The Dryfit VRLA (Valve Regulated Lead Acid) Solar Batteries incorporating a lead-acid electrochemical system provide the highest reliability for the operator. Set the battery in position, connect up and you are ready to go. Dryfit Solar Batteries are maintenance-free during their complete service life. This means that mistakes in maintenance leading to a shortened service life or to irreparable battery damages cannot occur. Expensive, suitably equipped battery rooms are no longer needed. Dryfit Batteries are very long-lived, have very good cycling and extremely reliable depth-of-discharge characteristics. They are also low gassing which means that these batteries can be sited without any problems in living spaces. The Dryfit Solar completely maintenance-free, sealed VRLA batteries (Valve Regulated Lead Acid) in Dryfit technology. Dryfit solar batteries have been especially designed for low power demands in the leisure-time and consumer sectors and are especially determined for small solar systems. \* on request also available as G-pol type



Article	Description	Dimensions	Weight	Article No.
Exide S12/6,6 S	(6,6 Ah (C100) / 12 V)	151,7 x 65,5 x 98,4 mm	2,4 kg	101.804
Exide S12/17 SR*	(17,5 Ah (C100) / 12 V)	181 x 76 x 167 mm	6,7 kg	101.806
Exide S12/27 G5	(27 Ah (C100) / 12 V)	176 x 167 x 126 mm	8,8 kg	101.807
Exide S12/32 G6	(32 Ah (C100) / 12 V)	197 x 132 x 181 mm	11,6 kg	101.808
Exide S12/41 A*	(41 Ah (C100) / 12 V)	210 x 175 x 175 mm	12,3 kg	101.809
Exide S12/60 A	(60 Ah (C100) / 12 V)	261 x 135 x 230 mm	19 kg	101.810
Exide S12/85 A*	(85 Ah (C100) / 12 V)	381 x 175 x 190 mm	23,1 kg	101.811
Exide S12/90 A	(90 Ah (C100) / 12 V)	330 x 171 x 235,5 mm	33 kg	101.812
Exide S12/130 A	(130 Ah (C100) / 12 V)	284 x 267 x 230 mm	37 kg	101.813
Exide S12/230 A	(230 Ah (C100) / 12 V)	518 x 291 x 242 mm	70 kg	101.814

### Exide Dryfit Solarblock Batteries

Completely maintenance-free, sealed VRLA batteries (Valve Regulated Lead Acid) in Dryfit technology. Dryfit solar batteries have been designed for medium power requirements. Typical applications include: Weekend or holiday homes with a large number of electrical loads (lighting, refrigerator, TV, radio, etc.), medium solar systems for industrial applications, small solar and wind-driven power plants, offshore-buoys, yachts, etc.



Article	Description	Dimensions	Weight	Article No.
Exide SB12/60 A	(60 Ah (C100) / 12 V)	306 x 175 x 190 mm	20 kg	101.820
Exide SB12/75 A	(72 Ah (C100) / 12 V)	330 x 171 x 235,5 mm	30 kg	101.821
Exide SB12/100 A	(100 Ah (C100) / 12 V)	513 x 189 x 223 mm	39 kg	101.822
Exide SB12/130 A	(130 Ah (C100) / 12 V)	513 x 223 x 223 mm	48 kg	101.823
Exide SB12/185 A	(185 Ah (C100) / 12 V)	518 x 291 x 242 mm	64 kg	101.824
Exide SB6/200 A	(200 Ah (C100) / 6 V)	244 x 190 x 275 mm	31 kg	101.825
Exide SB6/330 A	(330 Ah (C100) / 6 V)	312 x 182 x 359 mm	48 kg	101.826

### Exide Dryfit A600 Solar Batteries

Completely maintenance-free, sealed VRLA batteries (Valve Regulated Lead Acid) in Dryfit technology. Dryfit A600 solar batteries have been designed for medium to large power requirements. Typical applications include: Solar- and wind-driven power plants, power supply utilities, postal applications, solar stations, radio telecommunications, railway operations. 2 volt cells, service life min. 10-15 years, 1600 IEC cycles

Article	Description	Dimensions	Weight	Article No.
Exide 4 OPzV 240	(240 Ah / 2 V cells)	105 x 208 x 398 mm	19,5 kg	101.827
Exide 5 OPzV 300	(300 Ah / 2 V cells)	126 x 208 x 398 mm	23,5 kg	101.828
Exide 6 OPzV 360	(360 Ah / 2 V cells)	147 x 208 x 398 mm	28 kg	101.829
Exide 5 OPzV 400	(400 Ah / 2 V cells)	126 x 208 x 513 mm	31 kg	101.830
Exide 6 OPzV 500	(500 Ah / 2 V cells)	147 x 208 x 513 mm	36,5 kg	101.831
Exide 7 OPzV 600	(600 Ah / 2 V cells)	168 x 208 x 513 mm	42 kg	101.832
Exide 6 OPzV 720	(720 Ah / 2 V cells)	147 x 208 x 688 mm	50 kg	101.833
Exide 8 OPzV 960	(960 Ah / 2 V cells)	215 x 193 x 688 mm	68 kg	101.834
Exide 10 OPzV 1200	(1200 Ah / 2 V cells)	215 x 235 x 688 mm	82 kg	101.835
Exide 12 OPzV 1400	(1400 Ah / 2 V cells)	215 x 277 x 688 mm	97 kg	101.836
Exide 12 OPzV 1700	(1700 Ah / 2 V cells)	215 x 277 x 838 mm	120 kg	101.837
Exide 16 OPzV 2300	(2300 Ah / 2 V cells)	215 x 400 x 815 mm	160 kg	101.838
Exide 20 OPzV 2900	(2900 Ah / 2 V cells)	215 x 490 x 815 mm	200 kg	101.839



**Battery Connection Accessories**



**Battery Terminal Clamps**



**Battery Cable with Fuse and Terminal Clamps**



**Battery Connection Cable**

Article	Description	Dimensions	Weight	Article No.
<b>Battery Terminal Clamps</b>				
Battery Terminal Angle Clamp Set Plus/Minus tin-plated brass		50 x 55 x 15 mm	100 g	103.721
<b>Battery Cable with Fuse and Terminal Clamps</b>				
Battery Cable with 15A Fuse	(H07 RN-F 2 x 2,5 mm <sup>2</sup> / terminal clamp)	[L] = 1500 mm	450 g	103.716
Battery Cable with 20A Fuse	(H07 RN-F 2 x 4,0 mm <sup>2</sup> / terminal clamp)	[L] = 1500 mm	600 g	103.715
Battery Cable with 30A Fuse	(H07 RN-F 2 x 6,0 mm <sup>2</sup> / terminal clamp)	[L] = 1500 mm	700 g	103.714
<b>Battery Cable with Ring Shoe</b>				
Battery Cable 2,5 mm <sup>2</sup>	(H07 RN-F 2 x 2,5 mm <sup>2</sup> / ring shoe)	[L] = 1500 mm	400 g	103.743
Battery Cable 4,0 mm <sup>2</sup>	(H07 RN-F 2 x 4,0 mm <sup>2</sup> / ring shoe)	[L] = 1500 mm	450 g	103.744
Battery Cable 16 mm <sup>2</sup>	(H07 RN-F 2 x 16,0 mm <sup>2</sup> / ring shoe)	[L] = 1500 mm	1,2 kg	103.740
Battery Cable 25 mm <sup>2</sup>	(H07 RN-F 2 x 25,0 mm <sup>2</sup> / ring shoe)	[L] = 1500 mm	1,4 kg	103.729
<b>Battery Connection Cable</b>				
Battery Connection Cable	(H07 RN-F 1 x 25,0 mm <sup>2</sup> / M8 cable shoe)	[L]= 400 mm	200 g	103.708

**Phaesun Battery Main Switch**

The Phaesun BMS Battery main switch includes a double pole 32A DC circuit breaker and a short circuit capacity of 20kA at a voltage of 60V per pole. It also includes a 4 x 1,5m H07RNF 16 mm<sup>2</sup> cable for the connection.



Article	Description	Dimensions	Weight	Article No.
Phaesun BMS 32A16		180 x 110 x 111 mm	2,5 kg	103.680
Phaesun BMS 60A16		180 x 110 x 111 mm	2,5 kg	103.681

**Phaesun Battery Boxes**

The Phaesun BBM battery boxes for optimum battery protection against solar radiation for outdoor applications. The fiber glass material is perfect for installations in all environmental conditions without additional special constructions. The boxes dispose of ventilation devices to allow gases to get out and to air the batteries. The lower part has holes (for PG 16 cable glands) to pass the connection wires. The material used for the fabrication is a well thermal isolator. The box includes one lateral closure for padlocks, to discourage manipulation by non authorised personnel.



**Phaesun BBM 3**



**Phaesun BBM 1**



**Phaesun BBM 2**

Article	Description	Dimensions	Weight	Article No.
Phaesun BBM 1	(internal dimensions: 1800 x 900 x 400 mm)	1822 x 1070 x 410 mm	35 kg	103.526
Phaesun BBM 2	(internal dimensions: 1800 x 1800 x 400 mm)	1972 x 1971 x 410 mm	60 kg	103.524
Phaesun BBM 3	(internal dimensions: 1650 x 1710 x 1000 mm)	1706 x 1956 x 1020 mm	99 kg	103.525

### Hoppecke AquaGen Recombination System

When the AquaGen® premium.top recombination system is used, the hydrogen and oxygen gases which evolve during water decomposition are fed into the AquaGen® recombination plugs. By means of an integral catalyst, these gases are recombined in the form of water vapour. This water vapour condenses on the sides of the AquaGen® premium.top vent plugs. The resultant drops of water flow downwards and are returned to the battery. Because of this level of efficiency, water refilling is drastically reduced, with even total freedom from maintenance being possible. Another benefit from the use of AquaGen® premium.top recombination plugs is a considerable reduction in the ventilation requirements according to EN 50272-2 / DIN VDE 0510 Part 2 (European standards). The recombination of hydrogen and oxygen is an exothermal process in which heat is released. With sealed batteries, this recombination takes place internally at the negative electrodes. The increased temperature in the interior of sealed batteries leads to life-reducing effects, especially at the electrodes. To minimise these negative side effects, the operation of sealed batteries is subject to various limitations. When AquaGen® premium.top is used, the recombination does not take place at the active components (electrodes) and not within the battery. The AquaGen® premium.top recombinator is fitted to the battery as an external component. This avoids any temperature rise inside the battery. The separation of the recombination process from the active components of the battery allows maximisation of freedom from maintenance, as for sealed batteries, without reducing life expectancy and with no restrictions on operation of the battery. The AquaGen® premium.top H version is available for capacities up to 340 Ah and for applications with restrictions due to dimensions (e.g. height with reference to battery erection, and depth with reference to cell size).



AquaGen premium.top H



AquaGen premium.top V

Article	Description	Dimensions	Weight	Article No.
AquaGen premium.top H	(for OPzS batteries with bayonet fixing 24 mm)	---	150 g	103.871
AquaGen premium.top V	(for OPzS batteries with bayonet fixing 24 mm)	---	250 g	103.872

**Steca 12 VDC Energy Saving Lamps**

Top quality energy saving lamps for co-current flow (12V) in package type design at an uncomparable cost-performance ratio. The lamp can be switched on many thousand times due to a well designed integrated ballast. The durability of these products is much higher compared with incandescent lamps.



Steca Solsum ESL 5



Steca Solsum ESL 7P Globe

Article	Description	Dimensions	Weight	Article No.
<b>Steca Solsum ESL 5</b>				
Steca Solsum ESL 5	(5 W / 12 V / warm tone K2700 / E27)	Ø47 x 123 mm	125 g	101.406
Steca Solsum ESL 5	(5 W / 12 V / cold tone K6400 / E27)	Ø47 x 123 mm	125 g	101.407
Steca Solsum ESL 5	(5 W / 12 V / cold tone K6400 / B22d)	Ø47 x 123 mm	125 g	101.408
<b>Steca Solsum ESL 7</b>				
Steca Solsum ESL 7	(7 W / 12 V / warm tone K2700 / E27)	Ø55 x 133 mm	125 g	101.403
Steca Solsum ESL 7	(7 W / 12 V / cold tone K6400 / E27)	Ø55 x 133 mm	125 g	101.404
Steca Solsum ESL 7	(7 W / 12 V / cold tone K6400 / B22d)	Ø55 x 133 mm	125 g	101.405
<b>Steca Solsum ESL 11</b>				
Steca Solsum ESL 11	(11 W / 12 V / warm tone light K2700 / E27)	Ø55 x 163 mm	135 g	101.400
Steca Solsum ESL 11	(11 W / 12 V / cold tone K6400 / E27)	Ø55 x 163 mm	135 g	101.401
Steca Solsum ESL 11	(11 W / 12 V / cold tone K6400 / B22d)	Ø55 x 163 mm	135 g	101.402
<b>Steca Solsum ESL 7P Globe</b>				
Steca Solsum ESL 7P	(7 W / 12 V / warm tone K6400 / E27)	Ø55 x 153 mm	150 g	101.417

**Sundaya Energy Saving Lamps**

The Ulite is a 12VDC instant start Compact Fluorescent Lamp with E17 Fitting. The Lamp has a lifetime of over 5.000 On/Off cycles and over 8.000 burning hours. The Ulite is available in 3 capacities from 3 up to 9 Watts.

The Qlite is a 12VDC preheat start Compact Fluorescent Lamp with E17 Fitting and replaceable tube. The Lamp has an extremely long lifetime of over 100.000 On/Off cycles and over 10.000 burning hours. The Qlite is available in 5 capacities from 3 up to 18 Watts.

Qlite Spare tube as replacement tube for the Qlite range.

E17 to E27 Adaptor see page 63



Sundaya E17 Ulite ESL



Sundaya E17 Qlite ESL



Sundaya Qlite Spare tube



Article	Description	Dimensions	Weight	Article No.
<b>Sundaya E17 Ulite ESL</b>				
Sundaya Ulite 3	(3 W / 12 V / cool daylight / 6800K / 120 lumen)	Ø47 x 108 mm	60 g	101.783
Sundaya Ulite 6	(6 W / 12 V / cool daylight / 6800K / 240 lumen)	Ø47 x 115 mm	64 g	101.784
Sundaya Ulite 9	(9 W / 12 V / cool daylight / 6800K / 360 lumen)	Ø47 x 135mm	72 g	101.785
<b>Sundaya E17 Qlite ESL</b>				
Sundaya Qlite 150	(3 W / 12 V / cool daylight / 6800K / 150 lumen)	Ø55 x 118 mm	78 kg	101.786
Sundaya Qlite 300	(6 W / 12 V / cool daylight / 6800K / 300 lumen)	Ø55 x 118 mm	78 kg	101.787
Sundaya Qlite 450	(9 W / 12 V / cool daylight / 6800K / 450 lumen)	Ø55 x 128 mm	82 kg	101.788
Sundaya Qlite 600	(12 W / 12 V / cool daylight / 6800K / 900 lumen)	Ø55 x 138 mm	86 kg	101.789
Sundaya Qlite 1000	(18 W / 12 V / cool daylight / 6800K / 1000 lumen)	Ø55 x 159 mm	94 kg	101.790
<b>Sundaya Qlite Spare tube for Qlite range</b>				
Sundaya Qlite 150/300 Spare tube	(for Qlite 150/300)	---	---	101.990
Sundaya Qlite 450 Spare tube	(for Qlite 450)	---	---	101.991
Sundaya Qlite 600 Spare tube	(for Qlite 600)	---	---	101.992
Sundaya Qlite 1000 Spare tube	(for Qlite 1000)	---	---	101.993

### Sundaya E17 Luna 12 VDC LED-lamps

The Luna is a White LED lamp with a power consumption of only 0,25 to 1 Watt; The Luna is very suitable as a reading lamp when combined with the Tablo and Pointer. Including the Sundaya E17 fitting. E17 to E27 Adaptor see page 63



Article	Description	Dimensions	Weight	Article No.
Sundaya Luna 100	(1,00 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.980
Sundaya Luna 50	(0,50 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.981
Sundaya Luna 25	(0,25 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.982

### Orion LED Lighting Strips

The Orion LED strip lights are the ultimate in versatility at a cost that won't break the bank. The 500mm length LED strip consists of 30 x high intensity LEDs, doubling to 60 LEDs for the 1000mm length strip, that are encapsulated in a weatherproof casing. The LEDs have a 70° lens that allows an excellent spread of light designed to illuminate even the darkest corners. At one metre the 500mm length Orion will give you a light reading of 35 lux, which is the equivalent to a 10W halogen measured at the same height, but the Orion will use 5 times less power than the halogen. The Orion LED strip has been launched as the most adaptable LED light unit available on the market today, so whether you are illuminating lockers, racking, steps or generally improving your interior lighting, the Orion is the perfect solution. The Orion LED strip can be installed in a variety of ways, from simply using an adhesive strip through to fixing clips or brackets..... the choice is left down to you.



Article	Description	Dimensions	Weight	Article No.
Orion 30 LED Strip	(30 LEDs / 12V / 2,2W / IP66)	500 x 14 x 20 mm	200 g	102.645
Orion 60 LED Strip	(60 LEDs / 12V / 2,2W / IP66)	1000 x 14 x 20 mm	350 g	102.646

### Phaesun Fluorescent Tube Lighting Unit

Phaesun low voltage lighting units utilise standard fluorescent tubes, operated from a DC battery supply by means of a transistor inverter. The inverter switches the power supply on and off thousands of times per second enabling it to be transformed to a higher voltage to operate the tube



Article	Description	Dimensions	Weight	Article No.
Phaesun RE 20-12	(18 W / 12 V / 1,5 A / aluminum case)	700 x 50 x 65 mm	150 g	101.550

### Sundaya A-Light Lighting Units

The A-light is the best price performance ratio lamp in the industry. The A-light uses a Philips 10W fluorescent tube and is equipped with the highest grade electronic components to ensure a long lifetime. The uniquely shaped UV-stabilized reflector takes care of a good diffusion of the light. The A-light displayed here produces 210 Lumens at 6W or 360 Lumens at 10W power consumption.



Article	Description	Dimensions	Weight	Article No.
<b>Sundaya A-light Regular</b>				
Sundaya A-Light 6 W	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.573
Sundaya A-Light 10 W	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.575
<b>Sundaya A-Light with built in Pull Switch (PS)</b>				
Sundaya A-Light 6 W + PS	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.577
Sundaya A-Light 10 W + PS	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.579
<b>Sundaya A-Light with built in Pull Switch and Night Light (PSNL)</b>				
Sundaya A-Light 6 W + PSNL	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.581
Sundaya A-Light 10 W + PSNL	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.583
<b>Sundaya A-Light with built in Rocker Switch (RS)</b>				
Sundaya A-Light 6 W + RS	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.585
Sundaya A-Light 10 W + RS	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.587
<b>Sundaya A-Light with built in Rocker Switch and Night Light (RSNL)</b>				
Sundaya A-Light 6 W + RSNL	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.589
Sundaya A-Light 10 W + RSNL	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.591

### 12 VDC Ceiling Fans

The Phaesun Ceiling Fans are high efficiency DC ceiling fans. Thanks to a thermal bridge concept the Phaesun ceiling fan for direct current outclasses AC fans by a factor of 4 to 6 in consumption and competing DC fans by more than a factor 2 when comparing the same air performance in the medium speed range. It is possible to use the Phaesun DC Ceiling Fans in 12 and 24 VDC systems and perfectly fit to these systems because of their low power consumption.



Article	Description	Dimensions	Weight	Article No.
Ceiling Fan DC12-103	(12 VDC / 4 steps / max. speed 156 rpm)	Ø1030 x 138 mm	3,9 kg	101.101

### 12/24 VDC Ceiling Fans

High efficiency DC ceiling fan

Power consumption:

N=11W @ U=12V, T=45°C

N=50W @ U=24V, T=45°C

Speed:

n=160 1/min @ U=12V, T=45°C

n=240 1/min @ U=24V, T=45°C

Diameter: 135 cm (52")

Air flow:

Q=4900 m<sup>3</sup>/h (2400 cfm) U=12V

Q=10300 m<sup>3</sup>/h (5000 cfm) U=24V



Article	Description	Dimensions	Weight	Article No.
DC Ceiling Fan BWB with brown wooden blades		Ø135 cm	5 kg	103.400
DC Ceiling Fan BWB with white wooden blades		Ø135 cm	5 kg	103.401
DC Ceiling Fan BWB with white aluminium blades		Ø135 cm	5 kg	103.402
Rheostatic Speed Control for DC Ceiling Fan		110 x 60 x 95 mm	200 g	103.403

### Sunfreezer Cooling Boxes and Refrigerator Cabinet

Well designed cooling boxes especially developed for the mobile use with a highly efficient operation mode due to an innovative adjustment to the demands of photovoltaic energy use. Due to the strong insulation and the use of an energy saving component, these boxes are perfectly suitable for the operation with solar energy. The high performance 12/24V Danfoss compressors are also used here.



Sunfreezer 30



Sunfreezer 50



Sunfreezer 60

Article	Description	Dimensions	Weight	Article No.
<b>Sunfreezer cooling boxes</b>				
Sunfreezer 30	(30 l / 12/24 V / refrigerator box)	370 x 420 x 515 mm	17,5 kg	101.710
Sunfreezer 50	(50 l / 12/24 V / refrigerator box)	450 x 695 x 475 mm	23,6 kg	101.711
<b>Sunfreezer refrigerator cabinet</b>				
Sunfreezer 60	(60 l / 12/24 V /cabinet)	615 x 486 x 470 mm	22,5 kg	101.712

### Steca SolarFridge

The new Steca SolarFridge product generation is perfectly optimized for the use in solar applications. Energy efficiency is the highest priority for such applications. The new A++ DC Fridge generation realizes a complete concept. Best isolation combined with a very efficient and silent DC compressor which is driven by a specially designed Steca electronic compressor regulation guarantee an optimum use of the available solar power within the system. Optionally the Steca SolarFridge coolers can be equipped with one of the well known Steca Solar charge regulators which interact optimally with the fridge functionality. In this case just a suitable battery and the solar module has to be connected to the Steca SolarFridge to start cooling. Especially the Steca SolarFridge as a top opener is optimally suited for applications under high ambient temperature as it protects the content of the fridge also while the cabinet is opened.



Article	Description	Dimensions	Weight	Article No.
Steca SolarFridge PF166	(166 l / 12/24 V)	917 x 872 x 709 mm	61 kg	101.768

### Solar Refrigerator and Icepack Freezer PS65

Combined Refrigerator with icepack freezer.

- > low cost / high efficiency
- > performance and flexibility for vaccine storage / ice pack freezing at low ambient temperature
- > independent freezer capability - saves energy
- > extended hold-over time

**WHO Standard**



Article	Description	Dimensions	Weight	Article No.
PS65	(66 l / 24l freezer / 12 V)	1140 x 640 x 940 mm	110 kg	101.735

**Osram PURITEC**

The Osram PURITEC germicidal lamp is the perfect and compact unit for the usual water purification. It works with UV light and is a great alternative to the purification with the help of chemical additives. The lamp can be screwed into fresh water tanks by the a screw cap. Because of that it offers the safety of purifying the water without any chemical additives wherever you are.



<i>Article</i>	<i>Description</i>	<i>Dimensions</i>	<i>Weight</i>	<i>Article No.</i>
Osram Puritec	(5 Watt / 12 V)	210 x 306 x 18 mm	0,8 kg	106.401



### Shurflo Submersible Pump 9300

Shurflo's 9300 pumps are backed by 25 years of research and engineering experience. Designed to be strong and yet lightweight, these pumps can be easily repaired in the field. Typical applications include drip irrigation, stock and wildlife watering, remote homes and cabins. The most common use is for remote homes and stock watering. For all but very shallow wells a pump controller should be used, or you can buy the complete kit which includes the 902-200 Shurflo controller as an alternative.

**Features:**

- Water blocked electrical connector.
- Quick disconnect - no splicing needed.
- Accepts a variety of jacketed cables.
- Strong, yet lightweight - only 6 pounds.
- Corrosion proof housing with stainless-steel fasteners.
- Dry running capability without pump damage.
- Internal bypass feature for pump protection.
- Long life, 24 volt DC operation.

**Technical Specifications:**

Positive displacement 3 chamber diaphragm pump  
 Motor: Permanent magnet, thermally protected,  
 24 volts DC, 4.1 amps maximum. (P/N 11-175-00)  
 Internal bypass: 105-110 PSI  
 Maximum lift: 230 feet (70 meters)  
 Maximum submersion: 100 feet (30 meters)  
 Outlet port: 1/2" (12.7 mm) barbed fitting for 1/2" ID tubing  
 Inlet: 50 mesh stainless steel screen



Article	Description	Dimensions	Weight	Article No.
Shurflo Submersible Pump 9300 Well		Ø95 x 305 mm	3,2 kg	102.316

### Shurflo 2088 12/24 V Pressure and Delivery Pumps

The Shurflo 2088 series pumps are considered the workhorse of the small diaphragm pumps. They are used in a variety of transfer and dispense-on-demand applications where flow up to 3.6 gallons per minute is required. Applications include RV's, remote homes and cabins, and marine. These pumps are not designed for continuous heavy duty use.

For added reliability the Heavy Duty Strainer (#252-3300) or the Twist-on Strainer (#170-061-09) can be used on the inlet port. Install the optional 4" heat sink (#34-007) for heavy duty applications where extra cooling is required. The 2088 is our most popular line of small delivery pumps.

**2088 Features:**

- Self priming up to 12 feet
- Can run dry without damage
- Optional motor cooling fins
- One way check valve prevents reverse flow
- Available for 12 VDC, 24 VDC
- Automatic operation with pressure demand switch.



Article	Description	Dimensions	Weight	Article No.
<b>Shurflo Deluxe 2088-443-144</b>		218 x 127 x 113 mm	2,18 kg	102.328
	Deluxe delivery pump / 3,5 GPM / 12 VDC / 30 m / 10 l/min 2,8 bar water pump / 7 A / 1/2" MPT port threads			
<b>Shurflo Premium 2088-514-145 w/Fin Cooled</b>		251 x 126 x 112 mm	3,1 kg	102.336
	Premium delivery pump with heatsink / 3,6 GPM / 12VDC / 30 m / 13,5 l/min 3,5 bar water pump / 6 A / 1/2" MSPT port threads			
<b>Shurflo Sealed Premium 2088-414-534</b>		251 x 126 x 112 mm	3,1 kg	102.337
	w/Splash-Proof ShurCoted Motor / delivery pump totally sealed /12 VDC 3,6 GPM / 30m, 13,5 l/min / 2,8 bar water pump / 6 A / 1/2" MSPT port threads			
<b>Shurflo Deluxe 2088-474-144</b>		251 x 126 x 112 mm	3,1 kg	102.338
	Deluxe delivery pump / 3,0 GPM / 24 VDC / 30m / 11,5 l/min 2,8 bar water pump / 7 A / 1/2" MSPT port thread			
<b>Shurflo Sealed Premium 2088-574-534</b>		251 x 126 x 112 mm	2,9 kg	102.339
	Premium delivery pump totally sealed / 3,6 GPM / 24 VDC / 30m / 13,5 l/min 3,5 bar water pump / 6 A / 1/2" MSPT port threads			

**Shurflo 902-200 Pump Controller (LCB-G) 12/24V**

The versatile 902-200 has all the features of the 902-100 and more. This controller is switch selectable for 12 VDC or 24 VDC operation and includes a manual on/off switch for easy pump maintenance. The controller comes with high / low water level sensors so the pump will not run when the well water is too low. Weather proof enclosure.

Linear current booster luxury model complete with dry well probes, 150 Watt max., 12/24VDC operation, weatherproof, with 75 m probe cables



<i>Article</i>	<i>Description</i>	<i>Dimensions</i>	<i>Weight</i>	<i>Article No.</i>
Shurflo LCB-G75		175 x 117 x 60 mm	1,5 kg	102.329

### Lorentz Submersible Pump Systems

The Lorentz PS200/600/1200 HR/C is a submersible water pump for solar operation with helical rotor(HR) or centrifugal (C) pump unit, allows lift up water up to a height of 240 m and has a flow rate up to 11 m<sup>3</sup>/h. It is also easy to install, maintenance free, very reliable and has got a high life expectancy. It also enables a cost efficient pumping and has a 2 year manufacturer's warranty against defects in material and workmanship.



Article	Description	Dimensions	Weight	Article No.
<b>Lorentz PS200 HR/C with PS200 Controller</b>				
Submersible Pump PS200 C-5-4	(to 15 m / flow rate 5,0 m <sup>3</sup> /h)	Ø96 x 527 mm	10 kg	302.203
Submersible Pump PS200 HR-04	(to 50 m / flow rate 0,8 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.200
Submersible Pump PS200 HR-07	(to 30 m / flow rate 1,2 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.201
Submersible Pump PS200 HR-14	(to 20 m / flow rate 2,7 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.202
<b>Lorentz PS600 HR/C with PS600 Controller</b>				
Submersible Pump PS600 C-BF-04	(to 20 m / flow rate 7,3 m <sup>3</sup> /h)	Ø96 x 565 mm	10 kg	302.213
Submersible Pump PS600 C-DF-03	(to 10 m / flow rate 11 m <sup>3</sup> /h)	Ø96 x 565 mm	10 kg	302.212
Submersible Pump PS600 HR-03	(to 140 m / flow rate 0,5 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.204
Submersible Pump PS600 HR-03H	(140 - 180 m / flow rate 0,5 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.205
Submersible Pump PS600 HR-04	(to 80 m / flow rate 0,8 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.206
Submersible Pump PS600 HR-04H	(80 - 140 m / flow rate 0,8 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.207
Submersible Pump PS600 HR-07	(40 - 90 m / flow rate 1,2 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.208
Submersible Pump PS600 HR-10	(30 - 60 m / flow rate 1,9 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.209
Submersible Pump PS600 HR-14	(to 50 m / flow rate 2,7 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.210
Submersible Pump PS600 HR-20	(to 30 m / flow rate 3,6 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.211
<b>Lorentz PS1200 HR/C with PS1200 Controller</b>				
Submersible Pump PS1200 C-BF-04	(to 25 m / flow rate 7,3 m <sup>3</sup> /h)	Ø96 x 565 mm	10 kg	302.222
Submersible Pump PS1200 C-DF-03	(to 15 m / flow rate 11 m <sup>3</sup> /h)	Ø96 x 565 mm	10 kg	302.223
Submersible Pump PS1200 HR-03	(to 140 m / flow rate 0,5 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.214
Submersible Pump PS1200 HR-03H	(140 - 240 m / flow rate 0,5 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.215
Submersible Pump PS1200 HR-04	(to 80 m / flow rate 0,8 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.216
Submersible Pump PS1200 HR-04H	(80 - 160 m / flow rate 0,8 m <sup>3</sup> /h)	Ø96 x 780 mm	11,2 kg	302.217
Submersible Pump PS1200 HR-07	(40 - 120 m / flow rate 1,2 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.218
Submersible Pump PS1200 HR-10	(30 - 80 m / flow rate 1,9 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.219
Submersible Pump PS1200 HR-14	(to 60 m / flow rate 2,7 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.220
Submersible Pump PS1200 HR-20	(to 40 m / flow rate 3,6 m <sup>3</sup> /h)	Ø96 x 771 mm	11,5 kg	302.221

### Lorentz PS600 BADU Top 12 Battery/Solar with PS600 Controller

The Lorentz PS600 BADU Top 12 Pump is a high volume surface centrifugal pump for solar operation with a flow rate up to 15 m<sup>3</sup>/h. It is also easy to install, maintenance free, very reliable and has got a high life expectancy. It also enables a cost efficient pumping and has a 2 year manufacturer's warranty against defects in material and workmanship.

Article	Description	Dimensions	Weight	Article No.
PS600 BADU Top 12	(to 13 - 14 m / flow rate 15 m <sup>3</sup> /h)	520 x 220 x 350 mm	14 kg	302.228

### Lorentz PS200 AIR with PS200 Controller

The Lorentz PS200 AIR is a solar operated piston surface pump for air pumping, with a flow rate of up to 4m<sup>3</sup>/h. It is also easy to install, maintenance free, very reliable and has got a high life expectancy. It also enables a cost efficient pumping and has a 2 year manufacturer's warranty against defects in material and workmanship.

Article	Description	Dimensions	Weight	Article No.
Surface Pump PS200 AIR	(pressure 0,6 bar / flow rate 4,0 m <sup>3</sup> /h)	520 x 220 x 350 mm	8,5 kg	302.227

### Lorentz PS150 Boost with PS150 Controller

The Lorentz PS150 Boost is a booster pump for solar operation, not submersible, but can draw water from shallow wells, springs, cisterns, tanks, ponds, rivers and streams and push it through miles of pipeline. Slow pumping minimizes the size and cost of the solar array-battery system. It also lifts water up to 120m, has maximum flow rate of 0,9 m<sup>3</sup>/h and is simple to install.

Article	Description	Dimensions	Weight	Article No.
Surface Pump PS150 BOOST-60	(12/24 V / 60 W)	260 x 175 x 100 mm	8,5 kg	302.224
Surface Pump PS150 BOOST-125	(12/24 V / 125 W)	260 x 175 x 100 mm	8,5 kg	302.225
Surface Pump PS150 BOOST-240	(12/24 V / 240 W)	260 x 175 x 100 mm	8,5 kg	302.226

### Lorentz Well Probe Sensor

The Lorentz well probe sensor is a water level sensor for dry run protection. Two wire reed switch probe with POM protection housing.

Article	Description	Dimensions	Weight	Article No.
Lorentz Well Probe Sensor		---	150 g	302.229

### Phaesun Pump Inverter PVPS 8503

This special inverter has been developed for the use in photovoltaic pump systems (PVPS) to drive centrifugal pumps as well as eccentric screw pumps making a battery back-up unnecessary. The inverter control circuitry contains a special start-up control, which can manage the tough start of eccentric screw pumps with a minimum on energy. Therefore, there is no maintenance personnel necessary to adjust the start parameters in relation to the connected drive and the hauling height. Through the choice of the pump the most efficient driving system consisting of a 3-phase motor together with the centrifugal or eccentric screw pump can be configured. This is especially important for deep wells and with photovoltaic systems in partial load operation, where the daily hauling amount can be increased by the use of eccentric screw pumps. The start-up control starts the MPP(Maximum-Power-Point)-regulation of the microcontroller circuitry of the inverter. This circuitry enables a most efficient use of the power supplied by the solar generator by automatically choosing the best possible motor frequency giving the maximum hauling power. In registering of the actual current and voltage values of the solar generator and the control algorithm, the control function remains unaffected by the temperature.



Article	Description	Dimensions	Weight	Article No.
Pump Inverter PVPS 8503	(5.5kW / 8.5kVA / 200 - 420VDC / 3 x 220VAC)	480 x 300 x 300 mm	24 kg	102.487

### Grundfos Pumps

Installing the SQFlex Solar requires no special tools as the Grundfos solar modules plug straight into the system. The SQFlex Solar can be run economically and remains virtually maintenance-free. SQFlex pumps have built-in protection features that protect the pump itself and in many cases the well. Among these features are:

- Protection against dry-running, overloading and overheating
- Automatic restart when water returns to the well or when the motor temperature returns to the safety range
- Continuous load condition and voltage monitoring

SQ Flex for horizontal and vertical mounting  
incl. Motor MSF3 1 x 90-240V, Rp 11/4  
-10%/+6%, 50/60 Hz, 2m motor cable  
with integrated MPP-Tracking



Article	Description	Dimensions	Weight	Article No.
Grundfos Submersible Pump SQ Flex 1.2-2		1225 x 74 mm	9,7 kg	102.318
Grundfos Submersible Pump SQ Flex 0.6-2		1185 x 74 mm	9,4 kg	102.332
Grundfos Submersible Pump SQ Flex 2.5-2		1247 x 74 mm	10 kg	102.342
Grundfos Submersible Pump SQ Flex 5A-3		815 x 101 mm	9,6 kg	102.343
Grundfos Submersible Pump SQ Flex 5A-6		875 x 101 mm	10,3 kg	102.344
Grundfos Submersible Pump SQ Flex 8A-3		920 x 101 mm	11 kg	102.345
Grundfos Submersible Pump SQ Flex 14A-3		975 x 101 mm	12,4 kg	102.346

### Grundfos Pump Control Unit

A user-friendly control unit that maintains two-way communication with the pump and monitors the operating conditions. Built-in diagnostics indicate faults and dry-running, display operating status power consumption and level switch input.



Article	Description	Dimensions	Weight	Article No.
Grundfos CU 200 Control Unit		263 x 199 x 92 mm	350 g	102.347

### Grundfos Pump Control Unit

The IO 100 Switch Box is a very simple and easy-to-use system with cable terminal connections interface and controlled by a manual on/off switch.

The IO 101 acts as an interface for powering back-up supplies, providing automatic change over. When changing from generator to solar energy e.g., the solar modules automatically power the system as soon as the fuel tank runs dry.



Article	Description	Dimensions	Weight	Article No.
Grundfos IO 100 Switch Box		263 x 199 x 92 mm	350 g	102.335
Grundfos IO 101 Switch Box		263 x 199 x 92 mm	350 g	102.348

### Rubber - Sheathed Cable H07RN-F

The H07RN-F Cable is intended for installations with moving equipment, electric appliances and for building sites. The cable may be rated 0,6/1 kV where the installation has built-in protection and for motors in lifting appliances - machine tools - etc. This cable can be used in refrigerating installations. It can be installed in open air or be buried, but with mechanical protection.



Article	Description	Dimensions	Weight	Article No.
H07 RN-F 1 x 2,5 mm <sup>2</sup>		Ø 7,9 mm	71 g/m	103.202
H07 RN-F 1 x 4,0 mm <sup>2</sup>		Ø 9,0 mm	100 g/m	103.210
H07 RN-F 1 x 6,0 mm <sup>2</sup>		Ø 9,6 mm	130 g/m	103.217
H07 RN-F 1 x 10,0 mm <sup>2</sup>		Ø 11,9 mm	230 g/m	103.204
H07 RN-F 1 x 16,0 mm <sup>2</sup>		Ø 13,4 mm	290 g/m	103.205
H07 RN-F 1 x 25,0 mm <sup>2</sup>		Ø 15,8 mm	420 g/m	103.206
H07 RN-F 1 x 35,0 mm <sup>2</sup>		Ø 17,9 mm	530 g/m	103.209
H07 RN-F 2 x 2,5 mm <sup>2</sup>		Ø 13,1 mm	200 g/m	103.207
H07 RN-F 2 x 4,0 mm <sup>2</sup>		Ø 15,1 mm	280 g/m	103.215
H07 RN-F 2 x 6,0 mm <sup>2</sup>		Ø 18,6 mm	330 g/m	103.208
H07 RN-F 2 x 16,0 mm <sup>2</sup>		Ø 25,6 mm	810 g/m	103.218

### Lapp Solar Cable

The Lapp Solar Cable high quality solar cable, with double isolation and a temperatur range of -40° up to 120°C. It is also UV and ozon resistant, made of rubber tube copper fine wire and certified by the German TÜV.

Article	Description	Dimensions	Weight	Article No.
Lapptherm Solar Plus 2,5 mm <sup>2</sup> black	(900/1500 V)	Ø 5,8 mm	50 g/m	103.232
Lapptherm Solar Plus 2,5 mm <sup>2</sup> blue	(900/1500 V)	Ø 5,8 mm	50 g/m	103.245
Lapptherm Solar Plus 2,5 mm <sup>2</sup> red	(900/1500 V)	Ø 5,8 mm	50 g/m	103.242
Lapptherm Solar Plus 4 mm <sup>2</sup> black	(900/1500 V)	Ø 5,8 mm	76 g/m	103.239
Lapptherm Solar Plus 4 mm <sup>2</sup> blue	(900/1500 V)	Ø 5,8 mm	76 g/m	103.246
Lapptherm Solar Plus 4 mm <sup>2</sup> red	(900/1500 V)	Ø 5,8 mm	76 g/m	103.243
Lapptherm Solar Plus 6 mm <sup>2</sup> black	(900/1500 V)	Ø 5,8 mm	107 g/m	103.240
Lapptherm Solar Plus 6 mm <sup>2</sup> blue	(900/1500 V)	Ø 5,8 mm	107 g/m	103.247
Lapptherm Solar Plus 6 mm <sup>2</sup> red	(900/1500 V)	Ø 5,8 mm	107 g/m	103.244
Lapptherm Solar Plus 10 mm <sup>2</sup> black	(900/1500 V)	Ø 5,8 mm	107 g/m	103.241

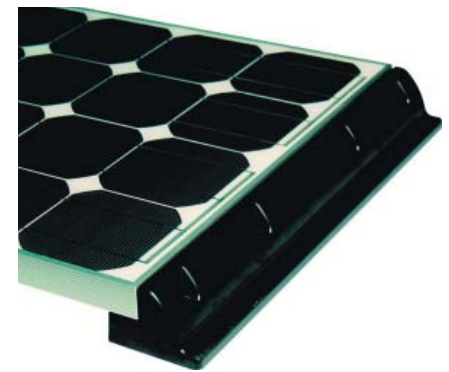
### Universal Module Fixture

Standard modules of Phaesun, Helios, Suntech, etc. can now be installed with the help of new Universal Assembly Fixtures. The assembly sets made of UV resistant PU plastics are optically attractive and can be assembled easily and quickly. An optimized back ventilation is also guaranteed by this system, especially with caravan vehicles and boots. Therefore, the module works more efficiently under direct irradiation during the summer months. The assembly sets are supplied in black. Junction profiles can be used for a better fastening of several modules. Additional spoiler profiles can be stucked alongside the total length which improve the aerodynamics of the assembled model and thus contribute to saving fuel.



Corner set MT-EP

Junction set MT-VP



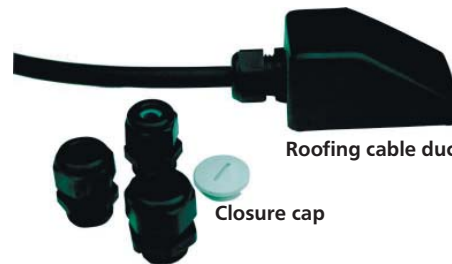
Spoiler set MT-SP XX

Article	Description	Dimensions	Weight	Article No.
<b>Corner set MT-EP</b>		150x150x66 mm	1,5 kg	102.701
	4 corner carriers / universally appropriate for all solar modules			
<b>Junction set MT-VP</b>		180x90x66 mm	0,8 kg	102.702
	2 junction carriers to link several modules in connection with corner/spoiler sets			
<b>Spoiler set MT-SP 33</b>		330x90x66 mm	1,2 kg	102.703
	2 fixing spoilers for solar modules with a lateral length of approximately 33 cm			
<b>Spoiler set MT-SP 43</b>		450x90x66 mm	1,5 kg	102.704
	2 fixing spoilers for solar modules with a lateral length of approximately 45 cm			
<b>Spoiler set MT-SP 53</b>		530x90x66 mm	1,95 kg	102.705
	2 fixing spoilers for solar modules with a lateral length of approximately 53 cm			
<b>Spoiler set MT-SP 65</b>		650x90x66 mm	2,15 kg	102.713
	2 fixing spoilers for solar modules with a lateral length of approximately 65 cm			

### Waterproof Roofing Cable Duct

This roofing cable duct which can be stuck on, solves any problem related to the cabling from outdoors to indoors. The case consists of PU high-resistance foam with impact strength, weathering and UV resistance. It is absolutely waterproof and is supplied as a unit ready for assembly. The case contains a thread where the screwed cable gland is installed in order to seal the cable that is led through. According to the respective cable diameters, there are screwed cable glands of three different sizes available: 3-7 mm, 6-12 mm and 10-14 mm

It is as well possible at any time to lead the cable back and seal the case safely with a closing cap when the installation is dismantled. We recommend the Sikaflex jointing compound to stick the cable duct.



Roofing cable duct case

Closure cap

PG screwed cable glands



MT - glueing set for 1 solar module

Article	Description	Dimensions	Weight	Article No.
	Roofing cable duct case	85x50x45 mm	50 g	102.706
	PG screwed cable gland 3 - 7 mm	32x20 mm	30 g	102.707
	PG screwed cable gland 6 - 12 mm	32x20 mm	30 g	102.708
	PG screwed cable gland 10 - 14 mm	32x20 mm	30 g	102.709
	Closure cap	Ø 12 mm	10 g	102.710
	MT - glueing set for 1 solar module	240x120x55 mm	0,65 kg	102.711
	MT - glueing set for 2 solar modules	240x120x55 mm	0,75 kg	102.712

### Phaesun Aluminum Support Structures

The Phaesun aluminum support structures are built under high quality standards and designed for maximum durability and corrosion resistance in all environmental areas. The lightweight Phaesun aluminum support structures are purpose-built for the stable mounting on the ground or a roof. They are available in variable sizes for different types of solar modules and different quantities of modules. We just need your module specifications or an engineering drawing, and the module support structure you need will be produced and delivered. Available as fixed angle or as tilt angle (20 - 60°).



### Phaesun Single Module Support Structure

The Phaesun SMS 1 is a single module support structure with a tilt angle from 0° to 45°. It is designed for the mounting of one solar module.



Article	Description	Dimensions	Weight	Article No.
Phaesun SMS 1		[L] = 490 mm	2 kg	102.750

### Lorentz Tracking Systems Etatrack

The Tracking units Etatrack have proven their reliability on all continents for years. They are made of single-axis technology with manually adjustable elevation angle (stepless 0 to 45°). They also feature a solid design and high life-expectancy without failures, as well as easy maintenance, thanks to quickly accessible drive. Up to 2.5 kWp, resp. 15 m<sup>2</sup> module surface for each tracking unit is possible. Wind speeds of up to 150 km/h wind speed do not destroy them. The Etatrack can be controlled as single installations or central (for solar parks with up to several MW). The output can be increased up to 20-40% (depending on location)



Article	Description	Dimensions	Weight	Article No.
Lorentz ETATRACK active 400	(angle East-West: 90° / elevation angle: 0° - 45°)	4 m <sup>2</sup> Module surface	44 kg	102.760
Lorentz ETATRACK active 1000	(angle East-West: 90° / elevation angle: 0° - 45°)	10 m <sup>2</sup> Module surface	346 kg	102.761
Lorentz ETATRACK active 1500	(angle East-West: 90° / elevation angle: 0° - 45°)	15 m <sup>2</sup> Module surface	400 kg	102.762



**Phaesun DC Installations**

The equipment has been developed for solar powered (battery) installations, rating from 12 to 48V DC. 10A - 2 pole, no earth. The socket outlet cover plates are made of thermosetting plastic. This DC equipment is totally polarized, e.g. the plug will fit only one way in the outlet, assuring correct polarity at all times. Consequently the plug has one thick and one thin pin - making the polarity unmistakable. Suitable equipment onboard for e.g. boats, yachts, campers, cottages etc. and areas without fully built-out electrical network that are dependant on rechargeable batteries based on solar energy.



DC Double Surface Socket



DC Flush Type Double Surface Socket



DC Plug No Earth



DC Junction Box



Toggle Switch



Drop Light Fitting E27

Article	Description	Dimensions	Weight	Article No.
DC Double Surface Socket 12 - 48 V		95 x 62 x 25 mm	86 g	103.710
DC Flush Type Double Surface Socket 12 - 48 V		95 x 85 x 30 mm	104 g	103.711
DC Plug No Earth 12 - 48 V		Ø36 x 45 mm	23 g	103.712
DC Junction Box		65 x 50 x 29 mm	40 g	103.713
Toggle Switch		63 x 63 x 36 mm	75 g	103.734
Drop Light Fitting E27 12 VDC		[L] = 70 cm	95 g	107.219

**CBI Circuit Breaker**



Article	Description	Dimensions	Weight	Article No.
QY-1 (13) D,U2, 10 A	(80 VDC / 10 A / 1 pole)	93 x 12 x 74 mm	100 g	102.892
QY-1 (13) D,U2, 16 A	(80 VDC / 16 A / 1 pole)	93 x 12 x 74 mm	100 g	102.893
QY-1 (13) D,U2, 20 A	(80 VDC / 20 A / 1 pole)	93 x 12 x 74 mm	100 g	102.894
QY-1 (13) D,U2, 40 A	(80 VDC / 40 A / 1 pole)	93 x 12 x 74 mm	100 g	102.895
QY-1 (13) D,U2, 50 A	(80 VDC / 50 A / 1 pole)	93 x 12 x 74 mm	100 g	102.896
QY-1 (13) D,U2, 60 A	(80 VDC / 60 A / 1 pole)	93 x 12 x 74 mm	100 g	102.897
QY-1 (13) D,U2, 32 A	(80 VDC / 32 A / 1 pole)	93 x 12 x 74 mm	100 g	102.920
D-Frame Circuit Breaker 180 A	(80 VDC / 180 A / 2 pole)	115 x 40 x 80 mm	300 g	107.220

**Lightboy Timer**

Article	Description	Dimensions	Weight	Article No.
Lightboy 12 V Timer		112 x 72 x 40 mm	300 g	103.805

**Lightboy Movement Sensor**

The Lightboy Movement Sensor is designed for wall or ceiling installation, has got a range of up to 10m and a assessment angle of 120°. The Lightboy Movement Sensor allows a stepless external adjustment of time, the value of dawn and range. It is easy to install and the sensor head is horizontally and vertically transversable.



Article	Description	Dimensions	Weight	Article No.
Lightboy Movement Sensor	(12 VDC / 10 A / 5 to 1000 Lux)	78 x 160 x 72 mm	200 g	103.806

### Fronius Battery Charger

Fronius offers a complete range of primary transistor-switched battery charging units specially for traction batteries. These units do not use conventional thyristors, but much smaller and lighter power-electronic components. Fronius has perfected his mastery of the technology of primary transistor-switched heavy-duty power sources over a period of nearly 20 years. This long standing experience guarantees a maximum of reliability amid the rough-and-tumble of industrial use.



Article	Description	Dimensions	Weight	Article No.
Fronius Selectiva Eco 1020	(charging current 20 A / output 12 V)	285 x 71 x 142 mm	2 kg	104.339
Fronius Selectiva Eco 1030	(charging current 30 A / output 12 V)	285 x 71 x 142 mm	2 kg	104.338
Fronius Selectiva Eco 2010	(charging current 16 A / output 24 V)	285 x 71 x 142 mm	2 kg	104.337
Fronius Selectiva Eco 2020	(charging current 80 A / output 24 V)	285 x 71 x 142 mm	2 kg	104.336
Fronius Selectiva Eco 2030	(charging current 50 A / output 24 V)	285 x 71 x 142 mm	2 kg	104.335
Fronius Selectiva Eco 3020	(charging current 20 A / output 36 V)	285 x 71 x 142 mm	2 kg	104.334
Fronius Selectiva Eco 4015	(charging current 15 A / output 48 V)	285 x 71 x 142 mm	2 kg	104.333
Fronius Selectiva Plus 2050E	(charging current 50 A / output 24 V)	312 x 200 x 110 mm	5 kg	104.332
Fronius Selectiva Plus 3050E	(charging current 50 A / output 36 V)	312 x 200 x 110 mm	5 kg	104.331
Fronius Selectiva Plus 4050E	(charging current 50 A / output 48 V)	312 x 200 x 110 mm	5 kg	104.330

### Studer Battery Charger

Chargers in the MBC range provide specific charging for 1, 2 or 3 banks of batteries in accordance with the battery manufacturers' specification. Entirely automatic with built-in charge distribution they can remain permanently connected to the batteries in complete safety and do not need to be disconnected when starting engine. MBC chargers are protected against polarity reversal and transient short-circuits.



Article	Description	Dimensions	Weight	Article No.
Studer MBC 12-06/1 IP65	(charging current 6 A / output 12 VDC)	155 x 80 x 36 mm	1 kg	103.342
Studer MBC 12-15/1 IP65	(charging current 15 A / output 12 VDC)	195 x 100 x 47 mm	2 kg	103.343
Studer MBC 24-03/1 IP65	(charging current 3 A / output 24 VDC)	155 x 80 x 36 mm	1 kg	103.344
Studer MBC 24-08/1 IP65	(charging current 8 A / output 24 VDC)	195 x 100 x 47 mm	2 kg	103.345
Studer MBC 12-25/3	(charging current 25 A / output 12 VDC)	200 x 270 x 120 mm	2,5 kg	103.346
Studer MBC 12-40/3	(charging current 40 A / output 12 VDC)	230 x 290 x 120 mm	4 kg	103.347
Studer MBC 12-60/3	(charging current 60 A / output 12 VDC)	280 x 360 x 135 mm	4 kg	103.348
Studer MBC 12-80/3	(charging current 80 A / output 12 VDC)	280 x 360 x 135 mm	5 kg	103.349
Studer MBC 24-12/3	(charging current 12 A / output 24 VDC)	200 x 270 x 120 mm	2,5 kg	103.350
Studer MBC 24-20/3	(charging current 20 A / output 24 VDC)	230 x 290 x 120 mm	4 kg	103.351
Studer MBC 24-30/3	(charging current 30 A / output 24 VDC)	280 x 360 x 135 mm	5 kg	103.352
Studer MBC 24-50/3	(charging current 50 A / output 24 VDC)	280 x 360 x 135 mm	5 kg	103.353
Studer MBC 24-60/3	(charging current 60 A / output 24VDC)	280 x 360 x 135 mm	5 kg	103.354

**OutBack Power System FLEXware 500**

OutBack Power offers compact enclosures for all the AC and DC components of a renewable energy power conversion system. The FLEXware 500 series saves time, money and space by combining the disconnects, over-current protection devices and control components into easy-to-install enclosures. Capable of supporting one or two OutBack FX series inverter/chargers, up to three MX60 charge controllers, a MATE system controller and all the associated AC and DC components. The OutBack FLEXware 500 series can be fully customized to your application and ordered pre-wired or as individual components for field assembly. The following chart is just for example. There are a lot more possibilities for OutBack Systems in 12, 24 and 48 V, with or without solar.



Article	Description	Dimensions	Weight	Article No.
OutBack 2 kVA/12 V Back-up System	(2 kVA / 12 V / FX 2012ET)	516 x 1117 x 400 mm	63 kg	107.123
OutBack 2 kVA/24 V Back-up System	(2 kVA / 24 V / FX 2024ET)	516 x 1117 x 400 mm	63 kg	107.116
OutBack 3 kVA/24 V Back-up System	(3 kVA / 24 V / VFX 3024E)	516 x 1117 x 400 mm	63 kg	107.110
OutBack 3 kVA/48 V Back-up System	(3 kVA / 48 V / VFX 3048E)	516 x 1117 x 400 mm	63 kg	107.118
OutBack 4 kVA/24 V Back-up System	(4 kVA / 24 V / 2x FX 2024E)	516 x 1117 x 400 mm	93 kg	107.117
OutBack 6 kVA/24 V Back-up System	(6 kVA / 24 V / 2x VFX 3024E)	516 x 1117 x 400 mm	93 kg	107.111
OutBack 6 kVA/48 V Back-up System	(6 kVA / 48 V / 2x VFX 3048E)	516 x 1117 x 400 mm	93 kg	107.119

**OutBack Power System FLEXware 1000**

The FLEXware 1000 series is the ideal AC and DC enclosure system for medium to large size renewable energy power conversion systems. The FLEXware is comprised of two compact enclosures for all of your systems's AC and DC components. It saves time, money and space by combining disconnects, over-current protection devices and control components into easy-to-install enclosures. The FLEXware 1000 is capable of supporting up to four OutBack FX series inverter/chargers, six MX60 charge controllers, a MATE system controller and all the required AC and DC components and wiring. The OutBack FLEXware 1000 system can be fully customized to your application and ordered pre-wired or as individual components for field assembly. It is also available as a 3-Phase system. Three inverter/chargers can be configured to provide 120/208 VAC or 230/400 VAC four wire „Wye/Star“ three phase AC power. An inverter/charger is used to power each of the three legs for 3-phase AC power. The loads on each of the inverters does not need to be kept balanced, each phase is independently voltage regulated. The following chart is just for example. There are a lot more possibilities for OutBack Systems in 12, 24 and 48 V, with or without solar.



Article	Description	Dimensions	Weight	Article No.
OutBack 6 kVA/24 V Back-up System 3-Phase	(6 kVA / 24 V / 3 x FX 2024E)	910 x 1260 x 400 mm	146 kg	107.120
OutBack 9 kVA/24 V Back-up System	(9 kVA / 24 V / 3 x VFX 3024E)	910 x 1260 x 400 mm	130 kg	107.121
OutBack 9 kVA/24 V Back-up System 3-Phase	(9 kVA / 24 V / 3 x VFX 3024E)	910 x 1260 x 400 mm	146 kg	107.115
OutBack 9 kVA/48 V Back-up System	(9 kVA / 48 V / 3 x VFX 3048E)	910 x 1260 x 400 mm	130 kg	107.112
OutBack 9 kVA/24 V Back-up System 3-Phase	(9 kVA / 48 V / 3 x VFX 3048E)	910 x 1260 x 400 mm	146 kg	107.114
OutBack 10,8 kVA/48 V Back-up System 3-Ph.	(10,8 kVA / 48 V / 3 x VFX 3648)	910 x 1260 x 400 mm	146 kg	107.122
OutBack 12 kVA/48 V Back-up System	(12 kVA / 48 V / 4 x VFX 3048E)	910 x 1260 x 400 mm	176 kg	107.113

**OutBack FX Series**

The OutBack FX series is a modular „building block“ sine wave inverter/charger that can be used for both small and large power systems. Each FX inverter/charger is a complete power conversion system - DC to AC inverter, battery charger and AC transfer switch. The FX series is also available in a version with 230 VAC, 50 hz output that can be connected in parallel (230 VAC) or in three phase (230Y400 VAC) configurations. Our unique sealed, gasketed die-cast aluminum chassis protects and keeps the power conversion components cool - without requiring outside air to be blown through the sensitive electronics. The FX can be used in high ambient applications up to 60°C with reduced output ratings. It is designed to operate as a coordinated system with the other OutBack products.



Article	Description	Dimensions	Weight	Article No.
<b>OutBack FX 230 VAC Sinewave Inverter Charger</b>				
FX 2012 ET	(2000 W / 12 VDC / 230 VAC / 50 Hz / 100 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.301
FX 2024 ET	(2000 W / 24 VDC / 230 VAC / 50 Hz / 55 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.302
FX 2348 ET	(2300 W / 48 VDC / 230 VAC / 50 Hz / 35 A charger / sealed)	210 x 290 x 410 mm	27 kg	107.303
<b>OutBack FX 120 VAC Sinewave Inverter Charger</b>				
FX 2024	(2000 W / 24 VDC / 120 VAC / 60 Hz / 55 A charger)	210 x 290 x 410 mm	27 kg	107.307
FX 2548	(2500 W / 48 VDC / 120 VAC / 60 Hz / 35 A charger)	210 x 290 x 410 mm	27 kg	107.308

**OutBack VFX Series**

The OutBack VFX series is a ventilated version of the original sealed FX series modular „building block“ sine wave inverter/charger that can be used for both small and large power systems. By allowing cooler outside airflow through the internal electronics, more AC power is available. Additional FX inverter/chargers can be connected at any time in either parallel (120 VAC), series (120/240 VAC), or three-phase (120Y208 VAC) configurations. The VFX series is also available in a version with 230 VAC, 50 hz output that can be connected in parallel (230 VAC) or in three phase (230Y400 VAC) configurations. The VFX is designed to survive harsh environments around the world. The VFX can be used up to 60°C (reduced output ratings). It is designed to operate as a coordinated system with the other OutBack products.



Article	Description	Dimensions	Weight	Article No.
<b>OutBack VFX 230 VAC Sinewave Inverter Charger</b>				
VFX 2612E	(2600 W / 12 VDC / 230 VAC / 50 Hz / 125 A charger / vented)	210 x 290 x 410 mm	28 kg	107.304
VFX 3024E	(3000 W / 24 VDC / 230 VAC / 50 Hz / 85 A charger / vented)	210 x 290 x 410 mm	28 kg	107.305
FX 2348 ET	(3000 W / 48 VDC / 230 VAC / 50 Hz / 45 A charger / vented)	210 x 290 x 410 mm	28 kg	107.306
<b>OutBack VFX 120 VAC Sinewave Inverter Charger</b>				
VFX 2812	(2800 W / 12 VDC / 120 VAC / 60 Hz / 125 A charger / vented)	210 x 290 x 410 mm	28 kg	107.309
VFX 3524	(3500 W / 24 VDC / 120 VAC / 60 Hz / 85 A charger / vented)	210 x 290 x 410 mm	28 kg	107.310
VFX 3648	(3600 W / 48 VDC / 120 VAC / 60 Hz / 45 A charger / vented)	210 x 290 x 410 mm	28 kg	107.311

**OutBack Communication Accessories**

The OutBack Hub-4 and Hub-10 system communication managers allows the interconnection of up to ten OutBack power conversion devices with the MATE. The Hub-4 / -10 allows the MATE to control any combination of 4 / 8 FX inverter/chargers and MX60 MPPT charge controllers.



Article	Description	Dimensions	Weight	Article No.
<b>OutBack Communication Manager</b>				
Hub-4	(with 2 cables a 90 cm and 2 cables a 180 cm)	---	---	107.312
Hub-10	(with 2 cables a 90 cm and 4 cables a 180 cm)	---	---	107.313
<b>OutBack CAT5 Communication Cables</b>				
OBcatV-3	(90 cm CAT5 cable with RJ45 connectors)	---	---	107.314
OBcatV-6	(180 cm CAT5 cable with RJ45 connectors)	---	---	107.315
OBcatV-50	(15 m CAT5 cable with RJ45 connectors)	---	---	107.316

**OutBack FX Series Adaptor**

FX-DCA: Aluminium conduit adapter for mounting an FX inverter/charger to an OutBack Power System or to a 2" conduit. Required when mounting an VFX/FX inverter/charger to an OutBack PS2DC or PSDC for a NEC compliant installation.  
 FX-ACA: AC wiring compartment extension and 2" conduit adapter. Required when mounting a VFX/FX inverter/charger to an PS2AC or PSAC.



Article	Description	Dimensions	Weight	Article No.
FX-DCA Adaptor		---	---	107.318
FX-ACA Adaptor		---	---	107.319

**OutBack PV MPPT Charge Controller**

The Outback MX60 Maximum Power Point Tracking (MPPT) charge controller enables your PV system to achieve its highest possible performance. Rated for up to 60 amps of DC output current, the MX60 can be used with battery systems from 12 to 60 vdc with a PV open circuit voltage as high as 140 voc. The MX60's setpoints are fully adjustable to allow use with virtually any battery type and charging profile. The MX60 allows you to use a higher output voltage PV array with a lower battery voltage - such as charging a 24 vdc battery with a 48 vdc PV array. The four line, 80 character, backlit LCD display is used for programming and monitoring of the system's operation including built-in Data Logging with 64 days of memory.



Article	Description	Dimensions	Weight	Article No.
OutBack MX60 Charge Controller	(60A / 12 - 60 VDC battery / 140 VOC)	150 x 150 x 370 mm	5,4 kg	107.322

### OutBack FLEXware 250 System

For applications with modest power requirements such as cabins, remote communication sites and back-up power systems. The FLEXware 250 accommodates all of the essential protective devices in the smallest possible space at the lowest installed cost. Utilizing an extremely compact design and unique mounting features, one or two FLEXware 250 enclosures can be mounted on each end of a single FX Series Inverter/Charger. The FLEXware 250 enclosure is constructed of power-coated aluminum and has been ETL listed. It provides breaker spaces for battery, PV array or PV GFP breakers and mounting locations for AC GFCI outlet, AC breakers and even an Input-Output-Bypass Assembly. In keeping with the philosophy of FLEXware, the FLEXware 250 flexibility is evident in the generous number of knock-outs allowing the installation of conduit, cable glands and other installation accessories.



Article	Description	Dimensions	Weight	Article No.
OutBack Flexware 250 System	(up to eight 1 to 80 Amp, one 175 or 250 Amp)	191 x 165 x 218 mm	2,3 kg	107.331

### OutBack FLEXware 250 AC Input-Output-Bypass Assemblies

Field installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides over-current protection.

Article	Description	Dimensions	Weight	Article No.
FW-IOB-S-120VAC	(120VAC output 60 A 7,2kW / 3 x 60A, 120VAC breakers)	---	100 g	107.326
FW-IOB-S-230VAC	(230VAC output 30 A 6,9kW / 3 x 30A, 230VAC breakers)	---	100 g	107.327

### OutBack FLEXware 500 System

For applications with medium power requirements such as homes, light commercial or larger back-up power systems. The FLEXware 500 system architecture is capable of supporting up to two OutBack FX Series Inverter/Chargers, up to two MX60 Charge Controllers and all the associated AC and DC components. Thanks to a very compact design, FLEXware 500 AC and DC enclosures mount with a FLEXware MP in either a horizontal or vertical orientation to allow installation in more space limited locations for a fast and professional looking wall-mounted installation. The FLEXware 500 accommodates all of the essential protective devices in two enclosures.



Article	Description	Dimensions	Weight	Article No.
OutBack FLEXware 500-DC System	(500 A DC shunt / ground bus bar)	462 x 290 x 307 mm	6,8 kg	107.332
OutBack FLEXware 500-AC System	(Ground bus bar / DIN mounting bracket)	462 x 290 x 307 mm	6,8 kg	107.334

### OutBack FLEXware 500 AC Input-Output-Bypass Assemblies

Field installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides over-current protection.

Article	Description	Dimensions	Weight	Article No.
FW-IOB-D-120/240VAC	(120/240VAC output 60A 14,4kW / 6 x 60A breaker)	---	100 g	107.328
FW-IOB-D-120VAC	(120/240VAC output 60A 14,4kW / 6 x 60A breaker)	---	100 g	107.329
FW-IOB-D-230VAC	(230VAC output 60A 13,8kW / 6 x 30A breaker)	---	100 g	107.330

### OutBack FLEXware 1000 System

For applications with medium power requirements such as homes, light commercial or larger back-up power systems. The FLEXware 500 system architecture is capable of supporting up to two OutBack FX Series Inverter/Chargers, up to two MX60 Charge Controllers and all the associated AC and DC components. Thanks to a very compact design, FLEXware 500 AC and DC enclosures mount with a FLEXware MP in either a horizontal or vertical orientation to allow installation in more space limited locations for a fast and professional looking wall-mounted installation. The FLEXware 500 accommodates all of the essential protective devices in two enclosures.



Article	Description	Dimensions	Weight	Article No.
OutBack FLEXware 1000-DC System	(1000 A DC shunt / ground bus bar)	978 x 290 x 307 mm	9,5 kg	107.324
OutBack FLEXware 1000-AC System	(Ground bus bar / 2 DIN mounting bracket)	978 x 290 x 307 mm	9,5 kg	107.323

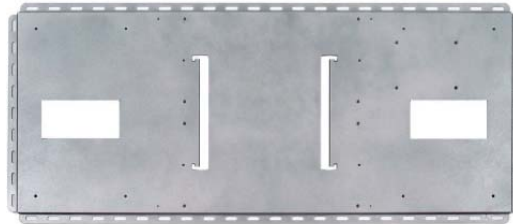
### OutBack FLEXware 1000 AC Input-Output-Bypass Assemblies

Field installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides over-current protection.

Article	Description	Dimensions	Weight	Article No.
FW-IOB-Q-120/240VAC	(120/240VAC output 120A 28,8kW / 12 x 60A breaker)	---	100 g	107.335
FW-IOB-Q-120VAC	(120VAC output 240A 28,8kW / 12 x 60A breaker)	---	100 g	107.336
FW-IOB-Q-230VAC	(230VAC output 120A 27,6kW / 12 x 30A breaker)	---	100 g	107.337
FW-IOB-T-120/208VAC 3Phase	(120/208VAC output 60A 21,6kW)	---	100 g	107.338
FW-IOB-T-230/400VAC 3Phase	(230/400VAC output 30A 20,7kW)	---	100 g	107.339

### OutBack FLEXware Mounting Plate MP

The FLEXware MP is a one piece, powder-coated aluminum mounting plate for FLEXware 500 and FLEXware 1000 enclosures. Utilizing stainless steel mounting hardware, the integrated locating bolts make installation quick and easy by providing guides to line up enclosures and inverterchargers. A single FLEXware MP is designed to accommodate a FLEXware 500 while two FLEXware MPs are utilized in a FLEXware 1000 configuration.



Article	Description	Dimensions	Weight	Article No.
FLEXware Mounting Plate FW-MP		516 x 1176 x 21 mm	6,4 kg	107.340

### OutBack Power Systems PS2 - PS2DC Charge Controller Bracket

Allows 2 OutBack MX60s to be mounted on either side of the PS2DC enclosure with matching knockouts.

Article	Description	Dimensions	Weight	Article No.
Charge Controller Bracket CCB		---	---	107.338

**OutBack Mate Remotes**

The OutBack Mate is a complete system controller and display for theFX/VFX and the MX60. It provides a display of the operation as well as allows adjustment of the setpoints. The Mate also coordinates the operation of the entire system to maximize performance and to prevent multiple products from conflicting.



Article	Description	Dimensions	Weight	Article No.
Mate white	(incl. 15 m cable)	146 x 108 x 51 mm	454 g	107.349
Mate black	(incl. 15 m cable)	146 x 108 x 51 mm	454 g	107.350
Mate 2	(with RS232 / black)	146 x 108 x 51 mm	454 g	107.351
Mate 2M	(RV/Marine / simple mobile menu structure)	146 x 108 x 51 mm	454 g	107.352

**OutBack FLEXware PVPS Array Combiner**

The rainproof PSPV is a solar array combiner which can be used with a wide variety of system configurations and solar module types. Approved for installation on both vertical and angled surfaces with a slope as little as 3-in-12 pitch - or pole mounted (brackets not included), the PSPV is designed to provide NEC code compliant series over-current protection of the wiring of multiple PV modules or sub arrays for connection to charge controllers, inverters or other system components. The PSPV is easily field configurable to match your PV system design and amperage requirements. For negative or positive grounded PV systems.



Article	Description	Dimensions	Weight	Article No.
PV Combiner Enclosure	(up to 12 OBPV breaker or 8 FHs)	341 x 224 x 86 mm	2,3 kg	107.360

**OutBack DC Breakers**

The PSR includes mounting space for up to 5 of the small 3/4" PV disconnect breakers or one DC-GFP and two PV disconnect breakers and one large 175 or 250 amp inverter/battery disconnect breaker.



Article	Description	Dimensions	Weight	Article No.
Breaker DC-5	(5 A / 125 VDC / small size / 0,75" wide)	---	---	107.360
Breaker DC-10	(10 A / 125 VDC / small size / 0,75" wide)	---	---	107.361
Breaker DC-15	(15 A / 125 VDC / small size / 0,75" wide)	---	---	107.362
Breaker DC-20	(20 A / 125 VDC / small size / 0,75" wide)	---	---	107.363
Breaker DC-60	(60 A / 125 VDC / small size / 0,75" wide)	---	---	107.367
Breaker DC-70	(70 A / 125 VDC / small size / 0,75" wide)	---	---	107.368
Breaker DC-100	(100 A / 125 VDC / medium size / 1,0" wide)	---	---	107.369
Breaker DC-175	(175 A / 125 VDC / large size / 1,5" wide)	---	---	107.370
Breaker DC-250	(250 A / 125 VDC / large size / 1,5" wide)	-----	---	107.371



### Sundaya AC Grid Charger DC10

The DC10 can be used in combination with S3/S4 and almost any 220 VAC power source to form a powerful continuous power supply (CPS) system. It provides a stable 12VDC output, straight to the application, or to the S3/S4. The unit is capable of handling a maximum load of 10A. In areas with bad electricity grid a CPS provides the comfort and security of never failing lamps and applications.



Article	Description	Dimensions	Weight	Article No.
Sundaya DC10	(160 - 280 V input range / 10 A charging current)	244 x 118 x 55 mm	724 g	101.997

### Sundaya S3 Series with included Hub 1

The Sundaya Storage System (S3) is a unique solution for installing your solar Home System in a neat and easy way. The S3 integrates battery, charge-discharge controller, battery condition indicator, switch panel and DC outlets in one enclosure which can either be mounted to a wall or put on a table. The unit is typically suitable lighting, television, audio-equipment etc. which can be powered 12VDC appliances. In general any size of 12V PV panel/array from 10 to 100 Wp can be connected to the unit. The unit is available in six sizes.



Article	Description	Dimensions	Weight	Article No.
Sundaya S3.200	(12 VDC / 6 A module / 6 A load / for 26 Ah battery)	205 x 195 x 380 mm	1,3 kg	104.501
Sundaya S3.400	(12 VDC / 6 A module / 6 A load / for 35 Ah battery)	255 x 195 x 380 mm	1,7 kg	104.513
Sundaya S3.600	(12 VDC / 10 A module / 10 A load / for 50 Ah battery)	305 x 195 x 380 mm	1,9 kg	104.518
Sundaya S3.800	(12 VDC / 10 A module / 10 A load / for 70 Ah battery)	350 x 195 x 380 mm	2,0 kg	104.519
Sundaya S3.1200	(12 VDC / 14 A module / 14 A load / for 100 Ah battery)	450 x 195 x 380 mm	2,3 kg	104.520
Sundaya S3.1500	(12 VDC / 14 A module / 14 A load / for 120 Ah battery)	560 x 195 x 380 mm	2,7 kg	104.521

### Sundaya S4 Series

The S4 is a completely sealed and maintenance free 12VDC electricity storage system that can be charged directly from any size solar panel ranging from 10 up to 120 Wp or from other powersource like the Sundaya DC10. The unit is equipped with a unique electronic battery state of charge display (LCD) and a buzzer to warn user when battery is running low. It is completely Plug and Play and comes with a standart cable set that can be plugged into the S4.



Article	Description	Dimensions	Weight	Article No.
Sundaya S4.200	(200 Wh capacity / 10 A at 12 VDC)	275 x 210 x 295 mm	15 kg	104.522
Sundaya S4.500	(500 Wh capacity / 10 A at 12 VDC)	275 x 210 x 295 mm	18 kg	104.523

### Sundaya Apple Solar Charge Controller

The Apple is a charge discharge regulator with a unique battery forced health improvement feature (FHI©). The apple is equiped with an alarm to warn the user when battery is close to forced disconnect. The Apple uses latest technology ultra efficient switching components which results in extreme low voltage drop and almost no heat generation. The unit has very sturdy terminals.



Article	Description	Dimensions	Weight	Article No.
Sundaya Apple 5	(12 VDC / 5 A module current / 5 A load current)	Ø120 x 40 mm	100 g	101.994
Sundaya Apple 10	(12 VDC / 10 A module current / 10 A load current)	Ø120 x 40 mm	100 g	101.995
Sundaya Apple 15	(12 VDC / 15 A module current / 15 A load current)	Ø120 x 40 mm	100 g	101.996
Sundaya Apple 20	(12 VDC / 20 A module current / 20 A load current)	Ø120 x 40 mm	100 g	104.537
Apple 5 & cable set	(12 VDC / 5 A module current / 5 A load current)	Ø120 x 40 mm	100 g	104.531
Apple 10 & cable set	(12 VDC / 10 A module current / 10 A load current)	Ø120 x 40 mm	100 g	104.532
Apple 15 & cable set	(12 VDC / 15 A module current / 15 A load current)	Ø120 x 40 mm	100 g	104.533

### Sundaya Multilight 1

The Multilight 1 is a sturdy waterproof (submersible to 25m) lamparmature with poly carbonate lamp cover. The Multilight has a preheat start inverter and is equipped with a replaceable Ulux tube. The lamp has a lifetime of over 100.000 On/Off cycles and over 10.000 burning hours.



Article	Description	Dimensions	Weight	Article No.
Sundaya Multilight 1 6W	(6 Watt / 12 V)	Ø260 x 64 mm	400 g	101.546
Sundaya Multilight 1 9W	(9 Watt / 12 V)	Ø260 x 64 mm	400 g	101.561

### Sundaya Multilight 2

The Multilight 2 is a sturdy lamparmature with an extremely durable melamine lamp shade. The Multilight 2 has a preheat start inverter and is equipped with a replaceable Ulux tube. The lamp has a lifetime of over 100.000 On/Off cycles and over 10.000 burning hours.



Article	Description	Dimensions	Weight	Article No.
Sundaya Multilight 2 6W	(6 Watt / 12 V)	Ø260 x 300 mm	680 g	101.566
Sundaya Multilight 2 9W	(9 Watt / 12 V)	Ø260 x 300 mm	680 g	101.567

### Sundaya Multilight 3

The Multilight 3 is a sturdy waterproof (submersible to 25m) lamparmature with mounting bracket and extremely durable melamine lamp shade. The Multilight 3 has a preheat start inverter and is equipped with a replaceable Ulux tube. The lamp has a lifetime of over 100.000 On/Off cycles and over 10.000 burning hours.



Article	Description	Dimensions	Weight	Article No.
Sundaya Multilight 3 6W	(6 Watt / 12 V)	Ø260 x 300 mm	870 g	101.568
Sundaya Multilight 3 9W	(9 Watt / 12 V)	Ø260 x 300 mm	870 g	101.569

### Sundaya A-Light Lighting Units

The A-light is the best price performance ratio lamp in the industry. The A-light uses a Philips 10W fluorescent tube and is equipped with the highest grade electronic components to ensure a long lifetime. The uniquely shaped UV-stabilized reflector takes care of a good diffusion of the light. The A-light displayed here produces 210 Lumens at 6W or 360 Lumens at 10W power consumption.



Article	Description	Dimensions	Weight	Article No.
<b>Sundaya A-light Regular</b>				
Sundaya A-Light 6 W	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.573
Sundaya A-Light 10 W	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.575
<b>Sundaya A-Light with built in Pull Switch (PS)</b>				
Sundaya A-Light 6 W + PS	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.577
Sundaya A-Light 10 W + PS	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.579
<b>Sundaya A-Light with built in Pull Switch and Night Light (PSNL)</b>				
Sundaya A-Light 6 W + PSNL	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.581
Sundaya A-Light 10 W + PSNL	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.583
<b>Sundaya A-Light with built in Rocker Switch (RS)</b>				
Sundaya A-Light 6 W + RS	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.585
Sundaya A-Light 10 W + RS	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.587
<b>Sundaya A-Light with built in Rocker Switch and Night Light (RSNL)</b>				
Sundaya A-Light 6 W + RSNL	(6 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.589
Sundaya A-Light 10 W + RSNL	(10 Watt / 12 V)	428 x 125 x 51 mm	280 g	101.591

### Sundaya E17 Ulite Energy Saving Lamps

The Lumi is a small light armature with 2 incandescent light bulbs of 0.5 and 2 Watt. The Lumi has two switches; one switch for On/Off and one switch for switching between 0.5 and 2 Watt lightbulbs. The Lumi is most suitable in a bedroom or as a cosy light in your living room. The Lumi is available in 3 colors.

E17 to E27 Adaptor see page 63



Article	Description	Dimensions	Weight	Article No.
Sundaya Ulite 3	(3 W / 12 V / cool daylight / 6800K / 120 lumen)	Ø47 x 108 mm	60 g	101.783
Sundaya Ulite 6	(6 W / 12 V / cool daylight / 6800K / 240 lumen)	Ø47 x 115 mm	64 g	101.784
Sundaya Ulite 9	(9 W / 12 V / cool daylight / 6800K / 360 lumen)	Ø47 x 135 mm	72 g	101.785

### Sundaya E17 Qlite Energy Saving Lamps

The Qlite is a 12 VDC preheat start Compact Fluorescent Lamp with E17 Fitting and replaceable tube. The Lamp has an extremely long lifetime of over 100.000 On/Off cycles and over 10.000 burning hours. The Qlite is available in 5 capacities from 3 up to 18 Watts. Qlite Spare tube as replacement tube for the Qlite range.

E17 to E27 Adaptor see page 63



Sundaya E17 Qlite ESL



Sundaya Qlite Spare tube



Article	Description	Dimensions	Weight	Article No.
<b>Sundaya E17 Qlite ESL</b>				
Sundaya Qlite 150	(3 W / 12 V / cool daylight / 6800K / 150 lumen)	Ø55 x 118 mm	78 kg	101.786
Sundaya Qlite 300	(6 W / 12 V / cool daylight / 6800K / 300 lumen)	Ø55 x 118 mm	78 kg	101.787
Sundaya Qlite 450	(9 W / 12 V / cool daylight / 6800K / 450 lumen)	Ø55 x 128 mm	82 kg	101.788
Sundaya Qlite 600	(12 W / 12 V / cool daylight / 6800K / 900 lumen)	Ø55 x 138 mm	86 kg	101.789
Sundaya Qlite 1000	(18 W / 12 V / cool daylight / 6800K / 1000 lumen)	Ø55 x 159 mm	94 kg	101.790
<b>Sundaya Qlite Spare Tube for Qlite range</b>				
Sundaya Qlite 150/300 Spare tube	(for Qlite 150/300)	---	---	101.990
Sundaya Qlite 450 Spare tube	(for Qlite 450)	---	---	101.991
Sundaya Qlite 600 Spare tube	(for Qlite 600)	---	---	101.992
Sundaya Qlite 1000 Spare tube	(for Qlite 1000)	---	---	101.993

### Sundaya E17 Luna 12 VDC LED-lamps

The Luna is a White LED lamp with a power consumption of only 0,25 to 1 Watt; The Luna is very suitable as a reading lamp when combined with the Tablo and Pointer. Including the Sundaya E17 fitting

E17 to E27 Adaptor see page 63



Article	Description	Dimensions	Weight	Article No.
Sundaya Luna 1.00	(1,00 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.980
Sundaya Luna 0.50	(0,50 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.981
Sundaya Luna 0.25	(0,25 W / 12 V / white light / E17)	Ø120 x 73 mm	69 g	101.982

### Sundaya Extender

The extender is a flexible cable assembly to turn your ceiling lamp into a hanging ceiling lamp. The cable clip that is included allows you to adjust different length. The extender has E17 fittings that can fit all Sundaya lamps (Ulite, Ulux and Luna) together with all available E17 shades.



Article	Description	Dimensions	Weight	Article No.
Sundaya Extender 1	(30 - 60 cm length)	[L] = 600 mm	115 g	101.593
Sundaya Extender 2	(70 - 120 cm length)	[L] = 1200 mm	199 g	101.595
Sundaya Extender 3	(130 - 180 cm length)	[L] = 1800 mm	218 g	101.597

### Sundaya Apollo

The Apollo is the e17 fitting Lamp base with extremely rigid terminals to ensure good electrical conductivity which is very important in low voltage DC installations.



Article	Description	Dimensions	Weight	Article No.
Sundaya Apollo		Ø95 x 50 mm	49 g	101.774

### Sundaya Pointer

The pointer is a cable assembly with a solid bendable cable to direct the light in your desired direction. The pointer has a length of 60cm and can be used in combination with the Apollo fixed on the wall or as a table lamp with the Apollo fixed on the Table.



Article	Description	Dimensions	Weight	Article No.
Sundaya Pointer		Ø60 x 600 mm	130 g	101.776

### Sundaya Tablo

The Tablo is a Lamp base for a table lamp with a built in switch and cable with DC plug. The Tablo can be completed with the Pointer and Ulite Ulux or Luna with a Halo or Skirt shade.



Article	Description	Dimensions	Weight	Article No.
Sundaya Tablo		Ø175 x 20 mm	800 g	101.778

### Sundaya E17 Lamp Shades

The Halo is a durable UV-stabilized lampshade that focusses the light downwards over a widespread area. The Halo is suitable for use as a hanging or standing table lamp or general purpose lamp in the living room.

The Wally is a durable UV-stabilized lampshade that can be mounted to the wall for indoor or outdoor lighting purposes.

The Skirt is a durable unbreakable polycarbonate lampshade to be used for a hanging or table lamp. The Skirt distributes the light nicely to create a cozy atmosphere.



Sundaya Halo



Sundaya Wally

Sundaya Skirt



Article	Description	Dimensions	Weight	Article No.
Sundaya Halo		Ø222 x 33 mm	72 g	101.773
Sundaya Wally		212 x 210 x 115 mm	117 g	101.772
Sundaya Skirt Natural	(clear color)	Ø115 x 180 mm	121 g	101.599
Sundaya Skirt Red	(red color)	Ø115 x 180 mm	121 g	101.770
Sundaya Skirt Green	(green color)	Ø115 x 180 mm	121 g	101.771

### Sundaya C- and D-Plug

The D-Plug is the male part of the Sundaya 12 VDC shock-proof plug system. It's Design is comparable to a 230 VAC shock-proof plug, but in difference to the 230 V version it has got plugging poles with a square profile instead of round. And the poles are arranged in different directions - because of that a wrong polarisation is impossible. The C-Plug is the female counterpart to the D-Plug. Both are designed for currents up to 10 Ampere.



Sundaya C-Plug



Sundaya D-Plug

Article	Description	Dimensions	Weight	Article No.
Sundaya D-Plug	(12 VDC / 10 A / male)	70 x 20 x 10 mm	50 g	101.999
Sundaya C-Plug cable	(12 VDC / 10 A / female / incl. cable)	[L] = 1 m	100 g	104.535
Sundaya D-Plug cable	(12 VDC / 10 A / male / incl. cable)	[L] = 1 m	100 g	104.536

### Sundaya F<sup>2</sup>Plug - M<sup>2</sup>Plug Cable

Sundaya's M<sup>2</sup>Plug delivers the electricity from a Sundaya solar module, DC10 or a grid generating system. The F<sup>2</sup>Plug is the counterpart and goes on to the input of a solar charge controller. This plugset also includes the unique Sundaya shape to ensure the right polarisation.



Article	Description	Dimensions	Weight	Article No.
Sundaya F <sup>2</sup> Plug - M <sup>2</sup> Plug cable	(12 VDC / 10 A / female - male)	[L] = 4 m	250 g	101.798

### Sundaya DCS Cable

Sundaya's DCS cables have a unique shape to differentiate the Positive and Negative wire. The DCS cable in combination with all Sundaya electrical accessories will ensure a highly reliable installation in shortest possible time. Rule : Current(A) x Length(m) should not exceed 50(Am). Sundaya supplies the cable in standard lengths of 10, 15, 30, 50 or 100 m.



Article	Description	Dimensions	Weight	Article No.
Sundaya DCS Cable 50 Am x 10 m	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	101.980
Sundaya DCS Cable 50 Am x 15 m	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	101.981
Sundaya DCS Cable 50 Am x 30 m	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	101.982
Sundaya DCS Cable 30 Am x 10 m	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	101.983
Sundaya DCS Cable 30 Am x 15 m	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	101.984
Sundaya DCS Cable 30 Am x 30 m	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	101.985
Sundaya DCS Cable 15 Am x 10 m	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	101.986
Sundaya DCS Cable 15 Am x 15 m	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	101.987
Sundaya DCS Cable 15 Am x 30 m	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	101.988

### Sundaya Voltage Converter D-Con 12-X

Especially solar home systems of 12 V or 24 V require smaller voltages to supply loads as radios, cassette recorders or mobile phones. The Sundaya Voltage Converter VR12-X are designed for supplying a large range of consumer electronics with voltages of 9 or 6 V.



Article	Description	Dimensions	Weight	Article No.
Sundaya Voltage Converter D-Con 12-6	(12 VDC input / 6 VDC output)	[L] = 1 m	50 g	101.909
Sundaya Voltage Converter D-Con 12-9	(12 VDC input / 9 VDC output)	[L] = 1 m	50 g	101.910

### Sundaya Double C-Plug Socket

The Sundaya Double C-Plug socket is a built-in socket for the connection of up to two D-Plugs into the socket. It is designed for the use in vehicles (campmobiles, cars, etc.) and houses (tenements, summerhouses, etc.) The connection is very simple, by the help of a luster terminal.



Article	Description	Dimensions	Weight	Article No.
Sundaya Double C-Plug Socket	(12 VDC / 10 A / female)	65 x 25 x 25 mm	30 g	104.596

### Sundaya DCS Cable 4-way Socket

Sundaya's DCS cable 4 way sockets allow the connection of up to 4 cables with D-Plug to one power source as the case may be C-Plug. It is comparable to a 230 VAC multiway connector. It is available in different lengths and with T-Con or D-Plug.



Article	Description	Dimensions	Weight	Article No.
Sundaya 4-way Socket + T-Con 5 m	(12 VDC / 10 A)	[L] = 5 m	300 g	104.541
Sundaya 4-way Socket + T-Con 3 m	(12 VDC / 10 A)	[L] = 3 m	300 g	104.540
Sundaya D-Plug 4-way Socket 3 m	(12 VDC / 10 A)	[L] = 3 m	300 g	104.597
Sundaya D-Plug 4-way Socket 1,5 m	(12 VDC / 10 A)	[L] = 1,5 m	300 g	104.598
Sundaya D-Plug 4-way Socket 0,75 m	(12 VDC / 10 A)	[L] = 0,75 m	300 g	104.599

### Sundaya DCS Cable with Plug

Sundaya's DCS cables have a unique shape to differentiate the Positive and Negative wire. The DCS cable in combination with all Sundaya electrical accessories will ensure a highly reliable installation in shortest possible time. Rule : Current(A) x Length(m) should not exceed 50(Am). Sundaya supplies the cable in standard lengths of 10, 15, 30, 50 or 100 m. The following cables include also a connected D- and C-Plug and are used as extension cables.



Article	Description	Dimensions	Weight	Article No.
DCS Cable 50 Am x 10 m C- & D-Plug	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	104.553
DCS Cable 50 Am x 15 m C- & D-Plug	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	104.552
DCS Cable 50 Am x 30 m C- & D-Plug	(5 Amp at 10 m, 2 Amp at 25 m length)	2 x 2,5 mm <sup>2</sup>	---	104.551
DCS Cable 30 Am x 10 m C- & D-Plug	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	104.556
DCS Cable 30 Am x 15 m C- & D-Plug	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	104.555
DCS Cable 30 Am x 30 m C- & D-Plug	(3 Amp at 10 m, 1 Amp at 30 m length)	2 x 1,5 mm <sup>2</sup>	---	104.554
DCS Cable 15 Am x 10 m C- & D-Plug	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	104.559
DCS Cable 15 Am x 15 m C- & D-Plug	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	104.558
DCS Cable 15 Am x 30 m C- & D-Plug	(1,5 Amp at 10 m, 1 Amp at 15 m length)	2 x 0,75 mm <sup>2</sup>	---	104.557

### Sundaya Hub 1 / 3

The Hub 1 and 3 are cables designed to keep your DC installation neat, with only 1 cable connecting both Charger and Load to your Storage System. Only one cable instead of numerous cables running up and down the wall.



Article	Description	Dimensions	Weight	Article No.
Sundaya Hub 1	(PVC fire retardant 2 m 3x2,5 mm <sup>2</sup> + 11 m 2x2,5 mm <sup>2</sup> )	375 x 135 mm	1,1 kg	101.792
Sundaya Hub 3	(PVC fire retardant 2,5 m 5x2,5 mm <sup>2</sup> + 30 m 2x1,5 mm <sup>2</sup> )	50 x 41 x 16 mm	2 kg	101.791

### Sundaya S-Con & T-Con

The T-Con and S-Con are connecting devices that can be used to make a T or a cross connection to create either 1 or 2 branches from the main distribution cable. They also prevent the possibility of a reverse polarity connection and the installation is very simple. The difference between S- and T-Con is that the S-Con is used to connect the load to a switch.



T-Con



S-Con



Article	Description	Dimensions	Weight	Article No.
Sundaya S-Con		Ø50 x 23 mm	33 g	101.795
Sundaya T-Con		Ø50 x 23 mm	30 g	101.794

### Sundaya Cable Nail

Sundaya's DCS cable can be nailed to the wall by just driving a nail through the center of the cable. The special cable nails supplied for DCS type cable are extremely strong and can penetrate all types of wall material. One pack of 20 pcs is sufficient for neatly mounting 5 meters of cable.



Article	Description	Dimensions	Weight	Article No.
Sundaya Cable Nail Pack	(20 pcs)	Ø5 x 15 mm	5 g	101.799

**Sundaya Switches**



Sundaya Broco Switch



Sundaya Pullite



Sundaya Pull-On



Article	Description	Dimensions	Weight	Article No.
Sundaya Broco Switch	(on / off switch)	60 x 60 x 50 mm	50 g	101.793
Sundaya Pull-On	(pull switch)	Ø90 x 110 mm	100 g	101.797
Sundaya Pullite	(pull switch)	Ø90 x 700 mm	200 g	101.796

**Sundaya Universal Mobile Phone Charger**

Allows to charge many mobile phone types of well known suppliers like BenQ, Nokia, SonyEricsson and more. The 12 VDC power of the input is converted to 6 VDC for the accumulator of the mobile phone.



Article	Description	Dimensions	Weight	Article No.
Universal Mobile Phone Charger	(12 VDC input / 6 VDC output)	[L] = 1 m	50 g	101.911

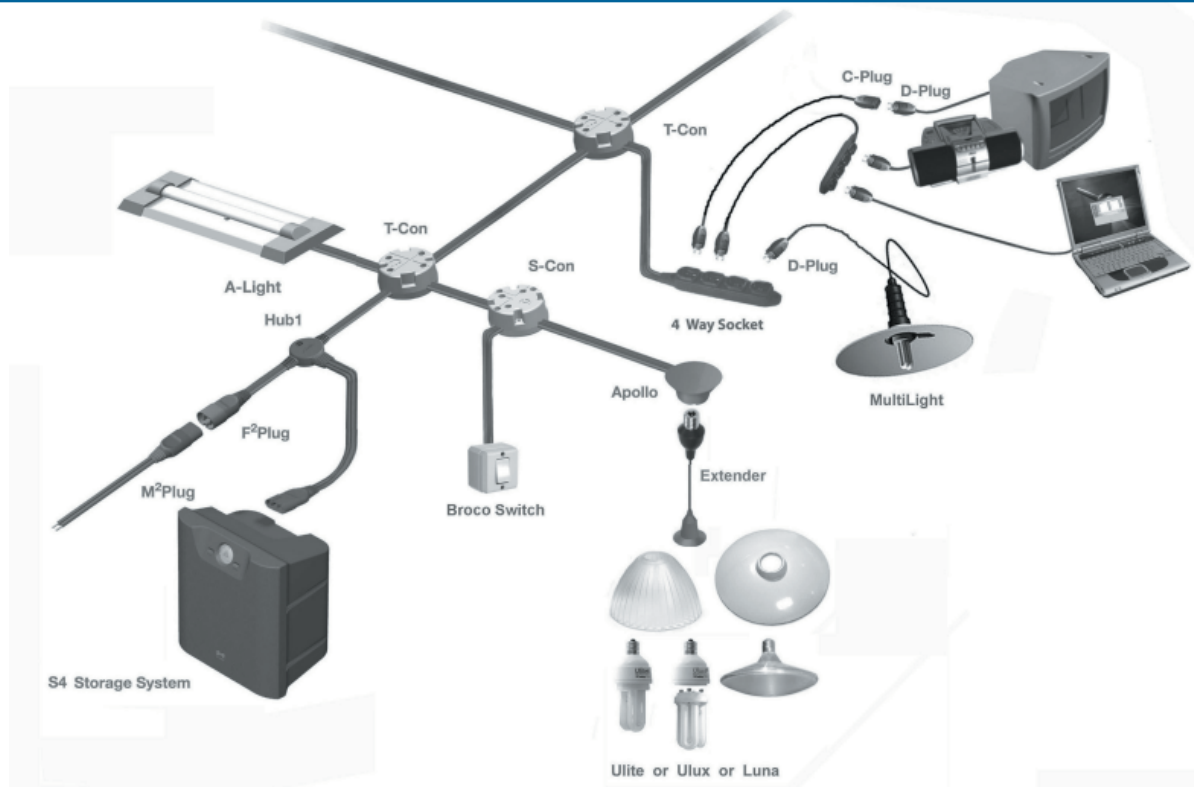
**E27 to E17 Adapter**

Allows to put the Sundaya ESL Lighting Units into an european standard socket. E27 Medium can be „made“ to an E17 Intermediate adapter.



Article	Description	Dimensions	Weight	Article No.
E27 to E17 Adapter		Ø25 mm	100 g	104.098

**Sundaya System Overview**



# street lighting





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**Solar Street Lighting**

**Solar Bill Board**

**Solar Street Lights**

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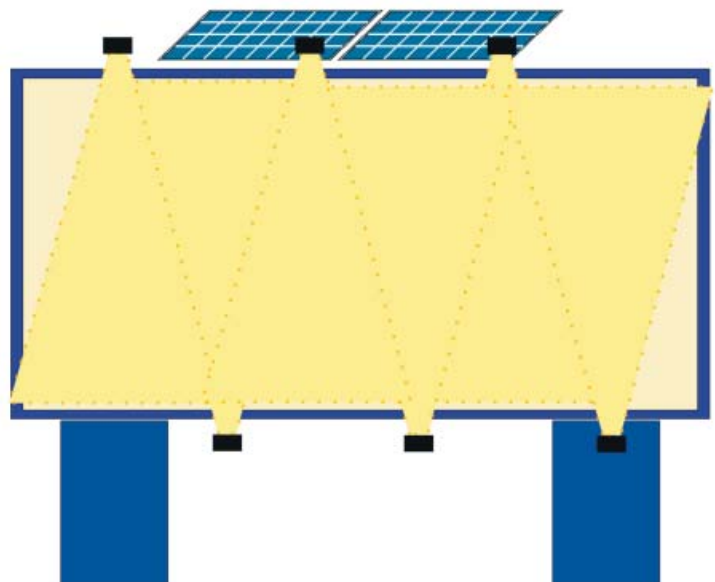
**74 - 76**

**Istar Solar Bill Board MIRAM**

Among the wide range of complete systems, Istar Solar introduces MIRAM on the market : the only autonomous solar system used for the lighting of billboards: MIRAM. This system is composed by special innovative lamps of new generation and very low consumption, developed and manufactured by Istar Solar after many years of studies and researches in the field of high intensity Led lighting. These lamps are powered by photovoltaic modules. The big advantages of this system like : the complete independence from grid, the lifetime of lamps (100.000 hours 22 working years!), the long lasting of photovoltaic modules (over 30 years), low working voltage (12VDC) so not dangerous, no need of works for excavations and cables connections, very white light and low consumption, no maintenance, no bills to pay, etc... make the cost of the whole system amortizable in just few years, with a high profit. Additional information on cost reductions and pay-back time of the system, can be found on the comparative table. The completely autonomous functioning makes the system very efficient : during the day the modules charge the batteries (sized for 3 days of autonomy no sun) and in the evening the charge controller Rigel 12(manufactured by Istar Solar) with built-in morning light function switches on the lamps that will be switched off automatically at sunrise for 12 hours per night. With this built-in function there is no need to install an external morning-light function. Moreover, with this charge controller it is possible to set up the switch on of lamps up to a maximum delay of 2 hours after sunset.

MIRAM is composed of:

- 2 PV Modules IS110P 110Wp 12V
- 6 Led lamps high luminous intensity, complete of IP65 arm
- 2 Lead acid dry batteries 230Ah 12Volts
- 1 Charge controller Rigel 12A 12/24Volts



**Specifications MIRAM:**

Lamp:	LED 8 W white light
Luminous intensity:	450 Lux
LED Lamp average lifetime:	100.000 hrs (22 years)
Working temperature:	-20 a +60°C
2 Photovoltaic modules:	IS110P 110 Wp 12 V
Charge controller:	Rigel 12
2 Lead acid dry batteries:	230 Ah
Morning light function:	electronic
System voltage:	12 V

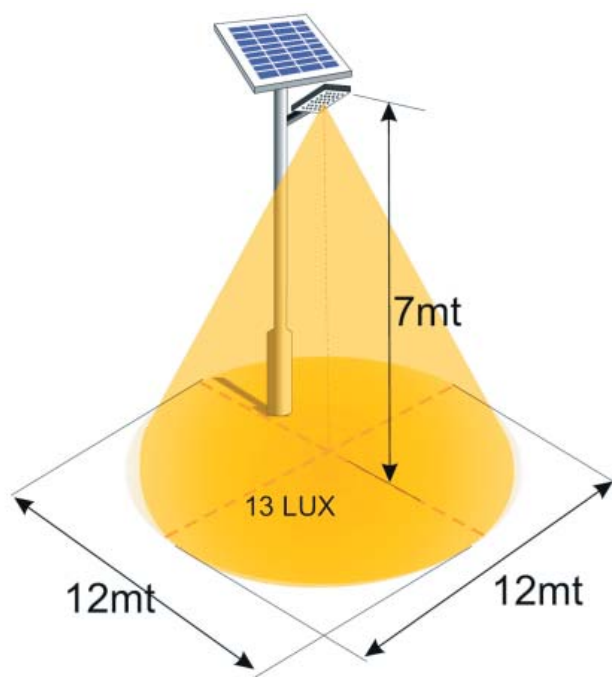
Article	Description	Dimensions	Weight	Article No.
Istar Solar Bill Board MIRAM	(12 V / 220 W)	---	---	105.580

**Istar Solar Streetlight ATIK**

The newest solar streetlight ATIK is the latest generation system for road lighting developed by Istar Solar after many years of studies and researches. This is a very efficient and autonomous system, that can light up streets, crossings, parking areas, gardens and many other places where the grid is missing or where people cannot make excavations or cables connections, with many advantages in comparison with the traditional streetlights with Sox lamp. The innovative led lamp with very high luminous efficiency, white light : 13 Lux and low consumption, only 8W, with an average lifetime of 100.000 hours (22 working years) is the result of our researches on the field of led lighting. Thanks to this, we can offer a small system with high performances, reduced weight, space, number of modules, batteries and components needed, and therefore with lower costs. In fact this streetlight needs only 1 module 60Wp and just a 55Ah battery, instead of Sox lamp that needs at least 2 modules 75-90Wp and 2 x 110Ah batteries. Additional information on cost reductions and amortization of the system can be found on the comparative table. During the day the PV module produces energy that is stored into the battery. After sunset the energy is used to switch on the led lamp. The lighting time is assured for a minimum of 12 hours/night. Switch on at sunset and switch off at sunrise are automatic by means of a morning-light device already built-in on the charge controller Rigel 12. This Rigel 12 has a microchip to set up the switch on of the lamp up to 2 hours after sunset, according to the needs. The Charge controller 12 has been properly studied for lighting and for stand alone systems, and is equipped with all main useful functions necessary for a proper functioning of the system : charge controller with check of state of charge of battery, boost and float charge, morning-light function, temperature compensation. All these functions are contained inside a unique charge controller and enable this system to be very efficient and easy to manage, thus avoiding to add other components to the streetlight. In fact the lamp doesn't need the electronic ballast that "increase the consumptions". The streetlight ATIK is very easy to install and it's a very useful efficient and completely autonomous system in case of black out.

ATIK is composed of:

- 1 PV Module IS60P 60Wp 12V
- 1 Charge controller Rigel 12
- 1 Led lamp complete of arm and lamp bracket
- 1 Lead acid dry battery 55Ah
- 1 Top of pole mount structure, inside diameter 6,5cm with adjustable tilt and azimuth (Tilt 10° - 30° - 45°)



**Specifications ATIK:**

Lamp:	LED 8 W white light
Luminous intensity:	13 Lux
LED Lamp average lifetime:	100.000 hrs (22 years)
Typ. installation from ground:	6 - 7 m
Diameter of light cone:	12 m
Working temperature:	-20 a +60 °C
Photovoltaic module:	IS60P 60 Wp 12 V
Charge controller:	Rigel 12
1 Lead acid dry battery:	55 Ah

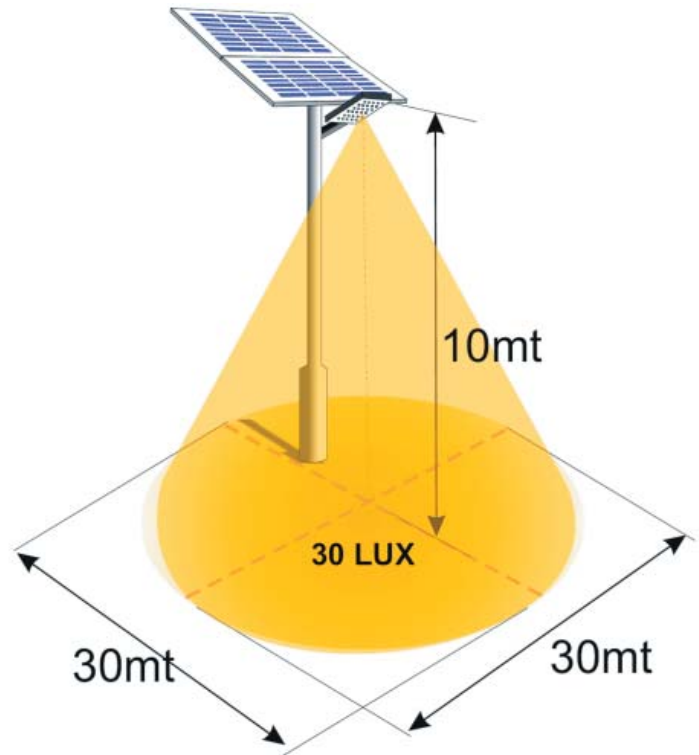
Article	Description	Dimensions	Weight	Article No.
Istar Solar Streetlight ATIK	(12 V / 60 W)	---	---	105.581

**Istar Solar Streetlight SHEDIR**

SHEDIR™ is the newest solar system for big lightings. The very high luminous intensity of this system, equal to 2.850 (\*) LUX, is obtained thanks to continuous studies and researches made by Istar Solar® on the field of high intensity led lighting. The great result of this development is the brightness increase and the considerable reduction of consumptions. In fact SHEDIR™ consumes only 36Wh and can take the place of big powerful lights (1.000-1.500 Watt) commonly used to light big areas such as tennis grounds, football grounds, squares, industrial sheds and areas, recreational places, camping, seaside, concert halls, etc... It's completely autonomous and intelligent functioning is powered by only 2 photovoltaic modules IS90P 90Wp 12V that during the day charge the batteries, sized for an autonomy of 3 days no sun. In the evening the morning-light function already built-in on the charge controller Istar Solar® Rigel™12 switches on the lamp that will then be switched off at sunrise. Thanks to this built-in device there is no need to add an external morning-light sensor. The charge controller can also set up the switch on of lamps up to a maximum delay of 2 hours after sunset. The big advantages of this system like : the complete autonomy to the grid, the average lifetime of our lamps (100.000 hours equal to 22 working years), the long lifetime of our photovoltaic modules (over 30 years), the 12Volts functioning and therefore any risk during handling or installation, high savings of money and time due to the absence of works for excavations and cables connections, white light and low consumption, no maintenance, no bills to pay, etc... make the pay-back time of this system very short and quick.

SHEDIR is composed of:

- 2 PV Modules IS90P 90Wp 12V
- 1 Led lamp high luminous intensity, complete of IP65 arm
- 1 Lead acid dry battery 230Ah 12Volts
- 1 Charge controller Rigel 12A 12/24Volts



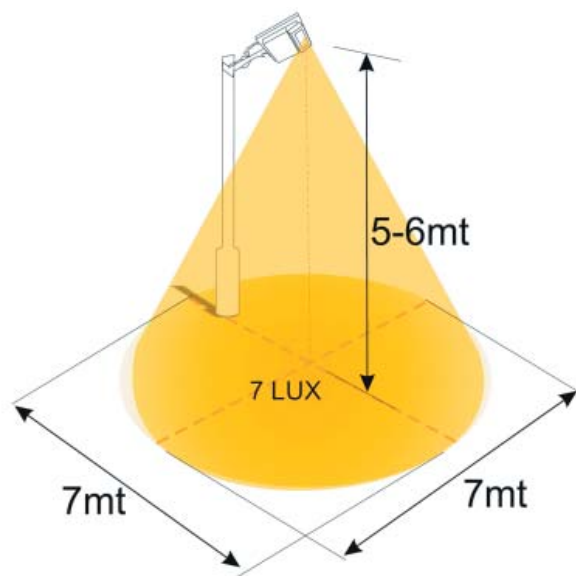
**Specifications ATIK:**

Lamp:	LED 36W white light
Luminous intensity:	30 Lux
LED Lamp average lifetime:	100.000 hrs (22 years)
Typ. installation from ground:	10 - 12 m
Diameter of light cone:	30 m
Working temperature:	-20 a +60 °C
Photovoltaic module:	IS90P 90 Wp 12 V
Charge controller:	Rigel 12
1 Lead acid dry battery:	230 Ah

Article	Description	Dimensions	Weight	Article No.
Istar Solar Streetlight SHEDIR	(12 V / 180 W)	---	---	105.582

**Istar Solar Streetlight REGOLO**

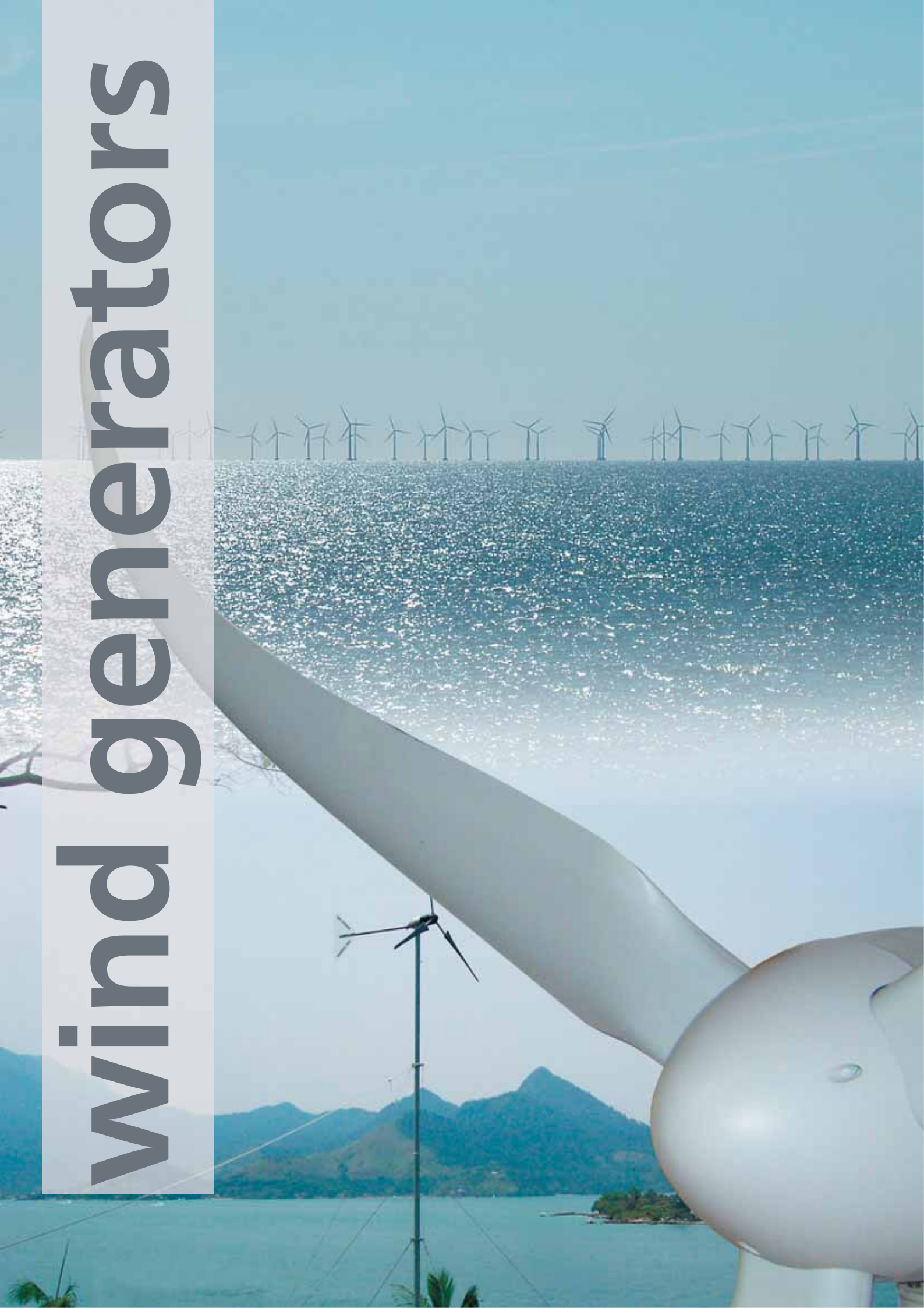
Istar Solar® is glad to launch the newest innovative and exclusive solar lighting system REGOLO™ on the market. REGOLO™ is the first lighting system in the world all in one, which groups various exclusive components produced only by Istar Solar®. It has been studied with full details in order to be very useful and cost-effective. This system integrates a photovoltaic module of small dimensions to an innovative lamp with a self-stabilizer circuit developed by Istar Solar® after many years of studies and researches in the field of high intensity led lighting. The special white light led lamp has a high lighting efficiency which reaches 7 Lux at about 6 mt with a luminous cone of 7mt. In addition to this, its very low consumption makes necessary the use of only a small PV module for the battery recharging. Batteries are placed in an IP56 box together with the electronic circuit Rigel™12 (also made by Istar Solar®) with microprocessor control, that improves the performances of the whole system by checking the state of charge and discharge of battery. REGOLO™ is a very small and practical system, handy, portable, lightweight (only 10Kg) and most of all versatile. It can be easily installed by one person without any need of tools nor the help of skilled technician for electrical connections, excavations, runner cups, custom poles, etc...as any maintenance is needed. It's easy anchorage structure has been specifically studied to be fixed to different sizes of poles, rounds or squares, to railings, grates, gates, balconies, as well as fix installation at walls. Another very important feature is that REGOLO™ can be used worldwide at any latitude and angle, thanks to 2 joints, one horizontal and one vertical, so that the best orientation can be set according to the place of installation. In addition to this, REGOLO™ can be turned on its telescopic axis in order to further put it in the best working place. The led lamp is also rotary, in order to direct the ray of light in the desired area. REGOLO™ functioning is completely autonomous : it automatically switches on at sunset and switched off at sunrise thanks to the morning-light function built in on the charge controller Rigel™12. The system has been studied to grant up to 12 hours of light/night and up to 4 days no sun. REGOLO™ is also equipped with a special anti-theft stainless cable with key, that is hooked at the support (pole, railing, etc...) thus granting a higher protection against theft. This is therefore a perfect system useful to light parking areas, crossings, paths, gardens, country-houses, landings, entrances, etc... Thanks to its reduced dimensions of 82cm x 35.5cm x 8cm, REGOLO™ can be easily removed and transported by car, carrying it to mountains, camping, seashores, camper, to always have a light source available in case of need.



<b>Specifications ATIK:</b>	
Lamp:	LED 3 W white light
Luminous intensity:	7 Lux
LED Lamp average lifetime:	100.000 hrs (22 years)
Typ. installation from ground:	5 - 6 m
Diameter of light cone:	7 m
Working temperature:	-20 a +60 °C
Photovoltaic module:	IS18P 18 Wp 12 V
Charge controller:	Rigel 12
1 Lead acid dry battery:	12 Ah

<b>Article</b>	<b>Description</b>	<b>Dimensions</b>	<b>Weight</b>	<b>Article No.</b>
Istar Solar Streetlight REGOLO	(12 V / 18 W)	820 x 355 x 80 mm	---	105.583

# wind generators



# contents wind generators

## Wind Generators

**Air X Series**

**79**

**Whisper Series**

**79 - 80**

**Skystream**

**80**

**Southwest Windpower Air X Wind Generators**

The AIR is designed to be used in combination with photovoltaic modules to balance the system energy output during times of seasonal fluctuations. The AIR has been developed to be mounted on a rooftop, no tower is required. The exclusive out-brake feature slows the AIR to silent spin when the batteries are charged thus extending bearing life and reducing noise. Features include an internal battery charge regulator, safety protection electronics, variable-pitch aeroplastic carbon matrix blades, aircraft quality aluminium alloy castings and only two moving parts. 3-year warranty.



**Specifications Air X:**

Start up wind speed:	3,6 m/s
Pipe mount:	47,6 mm
Rated power:	400 W at 12,5 m/s

Article	Description	Dimensions	Weight	Article No.
<b>Air X Land</b>				
Air X Land, with built-in regulator 12 V	(12 V)	rotor Ø1,15 m	5,8 kg	102.437
Air X Land, with built-in regulator 24 V	(24 V)	rotor Ø1,15 m	5,8 kg	102.438
Air X Land, with built-in regulator 48 V	(48 V)	rotor Ø1,15 m	5,8 kg	102.439
<b>Air X Marine</b>				
Air X Marine, with built-in regulator 12 V	(12 V)	rotor Ø1,15 m	5,8 kg	102.440
Air X Marine, with built-in regulator 24 V	(24 V)	rotor Ø1,15 m	5,8 kg	102.441
Air X Marine, with built-in regulator 48 V	(48 V)	rotor Ø1,15 m	5,8 kg	102.442
<b>AIR X Towers</b>				
29' EZ Tower		[h] = 8,83 m	---	102.567
27' AIR Guyed Tower Kit		[h] = 8,23 m	---	102.573
45' AIR Guyed Tower Kit		[h] = 13,72 m	---	102.574

**Southwest Windpower Whisper 100/200 Wind Generators**

Electric power from a Whisper wind generator can easily provide the normal requirements of a sailboat, cabin, rural home, small farm or business without power lines. Solar panels complement the wind by providing electricity during the calm between weather fronts and during seasonal low wind months. Each system includes an EZ-Wire system center, a wiring center, load center, monitor and control device. The EZ-Wire system center is a universal overcharging controller. The EZ-Wire features a bright LED display to monitor batteries, wind output, solar output, and DC load; circuit breaker; stop switch and a diversion load option. The WHI-100/WHI-200 are factory setted 24V, but adjustable to 12, 36 and 48V.



**Specifications Whisper 100:**

Start up wind speed:	3,4 m/s
Pipe mount:	73 mm
Rated power:	900 W at 12,5 m/s
Voltage	12/24/36/48 V

**Specifications Whisper 200:**

Start up wind speed:	3,1 m/s
Pipe mount:	73 mm
Rated power:	1000 W at 12,5 m/s
Voltage	12/24/36/48 V

Article	Description	Dimensions	Weight	Article No.
<b>Whisper 100</b>				
WHI100, includes EZ wind/pv controller		rotor Ø2,1 m	21 kg	102.462
WHI100, without controller		rotor Ø2,1 m	21 kg	102.463
WHI100 MARINE, includes EZ wind/pv controller		rotor Ø2,1 m	21 kg	102.464
WHI100 MARINE, without controller		rotor Ø2,1 m	21 kg	102.465
<b>Whisper 200</b>				
WHI200, includes EZ wind/pv controller		rotor Ø2,8 m	30 kg	102.466
WHI200, without controller		rotor Ø2,8 m	30 kg	102.467
WHI200 MARINE, includes EZ wind/pv controller		rotor Ø2,8 m	30 kg	102.468
WHI200 MARINE, without controller		rotor Ø2,8 m	30 kg	102.469
WHI200 PUMP, includes pump controller		rotor Ø2,8 m	30 kg	102.559
WHI200 PUMP MARINE, includes pump controller		rotor Ø2,8 m	30 kg	102.560
WHI200 HIGH VOLTAGE, without controller		rotor Ø2,8 m	30 kg	102.541



**WHI100 / WHI200 Towers**

Article	Description	Dimensions	Weight	Article No.
24' Whisper Guyed Tower Kit		[L] = 7,2 m	---	102.473
30' Whisper Guyed Tower Kit		[L] = 9 m	---	102.550
50' Whisper Guyed Tower Kit		[L] = 15 m	---	102.445
65' Whisper Guyed Tower Kit		[L] = 19,5 m	---	102.551
80' Whisper Guyed Tower Kit		[L] = 24 m	---	102.552

**Southwest Windpower Whisper 500 Wind Generators**

**Specifications Whisper 200:**

Start up wind speed:	3,1 m/s
Pipe mount:	141 mm
Rated power:	3000 W at 10,7 m/s
Voltage	24/36/48 V



Article	Description	Dimensions	Weight	Article No.
WHI500, includes EZ wire wind/pv controller 24 V		rotor Ø4,5 m	70 kg	102.470
WHI500, includes EZ wire wind/pv controller 48 V		rotor Ø4,5 m	70 kg	102.471
WHI500, without controller 24/48 V		rotor Ø4,5 m	70 kg	102.472
WHI500 High Voltage, includes EZ wire wind/pv controller 24 V		rotor Ø4,5 m	70 kg	102.540

**WHI500 Towers**

Article	Description	Dimensions	Weight	Article No.
30' Whisper Guyed Tower Kit		[L] = 9 m	---	102.553
42' Whisper Guyed Tower Kit		[L] = 14 m	---	102.554
70' Whisper Guyed Tower Kit		[L] = 21 m	---	102.555

**Skystream 3.7**

Skystream 3.7 is a breakthrough in a new generation of RPAs (Residential Power Appliances) that will change the energy landscape of how homes and small businesses receive electricity. Skystream is the first fully integrated system that produces energy for less than the average cost of electricity in the United States and it produces usable energy in exceptionally low winds. Skystream is available on towers ranging from 35' (10.67m) to 110' (33.5m). Its universal inverter will deliver power compatible with any utility grid from 110-240 VAC. Skystream will efficiently and quietly provide up to 100% of the energy needs for a home or small business. Any extra energy is fed into the grid spinning the meter backward.

**Specifications Skystream 3.7:**

Rated wind speed:	9 m/s
Rated capacity:	1,8 kW



Article	Description	Dimensions	Weight	Article No.
Skystream 3.7 Land 240V Complete		rotor Ø3,72 m	77 kg	102.588
Skystream 3.7 Marine 240V Complete		rotor Ø3,72 m	77 kg	102.591

# solar thermal



# contents solar thermal

**Solar Thermal Systems**

Solar Siphon Systems

Accessories

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**Solar Water Heater SD 165**

All Solar Design solar water-heaters are made of 3 main parts:

- The tank made of stainless steel with variable capacities
- the glass tube collector, on all our SD models with vacuum tubes, measuring each 1500 mm length and 58mm diameter; the ideal size to optimize the ratio size/yield of solar water-heaters.
- the 100% aluminium structure. The structure is available in five different angles: 8°, 20°, 25°, 38° and 45°.Solar Design solar water-heaters are suitable for roofs made of tiles or metal..



Article	Description	Dimensions	Weight	Article No.
Solar Water Heater SD 165	(130 l tank / total 163 l / 15 tubes)	1970 x 1320 mm	50 kg	107.250

**Solar Water Heater SD-HE 165**

All Solar Design solar water-heaters are made of 3 main parts:

- The tank made of stainless steel with variable capacities
- the glass tube collector, on all our SD models with vacuum tubes, measuring each 1500 mm length and 58mm diameter; the ideal size to optimize the ratio size/yield of solar water-heaters.
- the 100% aluminium structure. The structure is available in five different angles: 8°, 20°, 25°, 38° and 45°.Solar Design solar water-heaters are suitable for roofs made of tiles or metal..

SD-HE solar water-heaters have same features with SD models and equipped with a heat exchanger. The heat exchanger is placed inside the tank and made of a single copper pipe. It ensures to use water directly from the network; water which is instantly warmed up and not stocked in the tank.

The heat exchanger is a single copper coil (Ø14mm×1mm) included between 22 and 60 metres (base). It is fixed by a stainless steel frame soldered in the tank and can resist a pressure of 9 bars. This pipe heats up cold water from the network efficiently and quickly thanks to copper conduction. The water in the tank and tubes is independent from the network water.



Article	Description	Dimensions	Weight	Article No.
Solar Water Heater SD-HE 165	(130 l tank / total 163 l / 15 tubes)	1970 x 1320 mm	55 kg	107.251

### Copper Filling Valve SD SD-CVA

In order to complete the range of SD and SD-HE models and to facilitate their installation, Universal Energy proposes its copper filling valve SD-CVA. Adaptable on all the Solar Design solar water heaters, this valve ensures to fill up the level of the water in the tank automatically.



Article	Description	Dimensions	Weight	Article No.
Copper Filling Valve SD-CVA	(size 1/2 / max 4 bar)	---	0,6 kg	107.252

### Reducing Pressure Valve SD SD-PRV

For installations with pressure higher than 4 bars, Universal Energy propose a reducing pressure valve SD-PRV.



Article	Description	Dimensions	Weight	Article No.
Reducing Pressure Valve SD SD-PRV 15	(size 1/2 / max 16 bar)	---	0,6 kg	107.253
Reducing Pressure Valve SD SD-PRV 20	(size 3/4 / max 16 bar)	---	0,6 kg	107.254

### Thermal PVC insulator SD SD-PR



Article	Description	Dimensions	Weight	Article No.
SD-PR 16-9	(Diameter inside 16 mm / Thickness 9 mm)	---	---	107.257
SD-PR 16-15	(Diameter inside 16 mm / Thickness 15 mm)	---	---	107.258
SD-PR 16-20	(Diameter inside 16 mm / Thickness 20 mm)	---	---	107.259
SD-PR 20-9	(Diameter inside 20 mm / Thickness 9 mm)	---	---	107.260
SD-PR 20-15	(Diameter inside 20 mm / Thickness 15 mm)	---	---	107.261
SD-PR 20-20	(Diameter inside 20 mm / Thickness 20 mm)	---	---	107.262

**Electrical backups SD SD-EB**



Article	Description	Dimensions	Weight	Article No.
SD-EB 1500	(1500 W / 230 V)	[L] = 60 cm	2 kg	107.255
SD-EB 2000	(2000 W / 230 V)	[L] = 60 cm	2 kg	107.256

**Sacrificial Magnesium Anode SD SD-SMA**



Article	Description	Dimensions	Weight	Article No.
Sacrificial Magnesium Anode SD SD-SMA	(Size 3/4 / Diameter 20 mm)	[L] = 300 mm	3 kg	107.263

**Brass Ball Valve**



Article	Description	Dimensions	Weight	Article No.
Brass Ball Valve	(Size 1/2 / Diameter 15 mm / max 16 bar)	---	---	107.268

**Gaskets and Tips**



SD-BAG 58 Black aesthetic gasket



SD-BT 58 Black tip

<i>Article</i>	<i>Description</i>	<i>Dimensions</i>	<i>Weight</i>	<i>Article No.</i>
SD-BAG 58 Black aesthetic gasket		---	---	107.264
SD-WWTG 58 white water tightness gasket		---	---	107.265
SD-BT 58 Black tip		---	---	107.266
SD-WT 58 White tip		---	---	107.267



service



# contents service

## Service

Checklist for PV Systems

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Checklist for Pump Systems

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Cable Sizing Diagram

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### Typical Power Consumption of Electrical Appliances

<i>Appliance</i>	<i>Avarage Wattage (VAC Type)</i>	<i>Avarage Wattage (VDC Type)</i>
<b>Lighting</b>		
Filament (Incandescent) Bulbs	40 - 150	5 - 20
Compact Fluorescent Lamps	7 - 23	7, 9, 11, 13, 20
Straight Fluorescent Tubes	40 - 100	8, 13, 18, 20
Street Lights	35 - 150	11, 18 26, 35
LED lamp	---	0,35 - 5
<b>Kitchen Appliances &amp; Equipment</b>		
Refrigerator	150 - 300	60
Freezer	300 - 500	60
Dishwasher	1.000 - 1.300	---
Foodmixer	150 - 1.000	---
Microwave Oven	600 - 1.500	600
Coffee Filter	500	500
<b>Other Household Items</b>		
Air Conditioner	500 - 5.000	---
Battery Charger (NiCd)	20	15
Battery Charger (Trace SB option)	3.500	---
Cassette Deck	30	12
Central Heating Pump	60 - 1.00	---
Fan (desk)	20	15
Radio	50	15
Tape recorder	25 - 75	25
B&W Television	50	28
Colour Television	100 - 300	60
Washing Machine	500 - 4.000	---
Iron	1.250	---
Ceiling Fan	100 - 200	35 - 50
<b>Office Equipment</b>		
Telephone Answering Machine	15	10
Cordless Phone	10	5
Laptop Computer	20 - 100	25
Desktop Computer	100 - 300	---
Fax Machine	50	---
Printer (Inkjet)	8 - 30	---
Printer (dot matrix)	30 - 100	---
Printer (laser)	500 - 1.000	---
Photocopier	500 - 1.500	---
Electric Typewriter	35	---
<b>Power Tools</b>		
Angle Grinder	600 - 1.000	---
Drill(3/8")	250 - 750	---
Circular Saw	500 - 1.000	---
Soldering Iron	25 - 50	25

Please note that cordless tools and appliances, with internal NiCd rechargeable batteries are often a more efficient alternative for use with solar power systems.

## Checklist for Customer Enquiries on Pump Systems

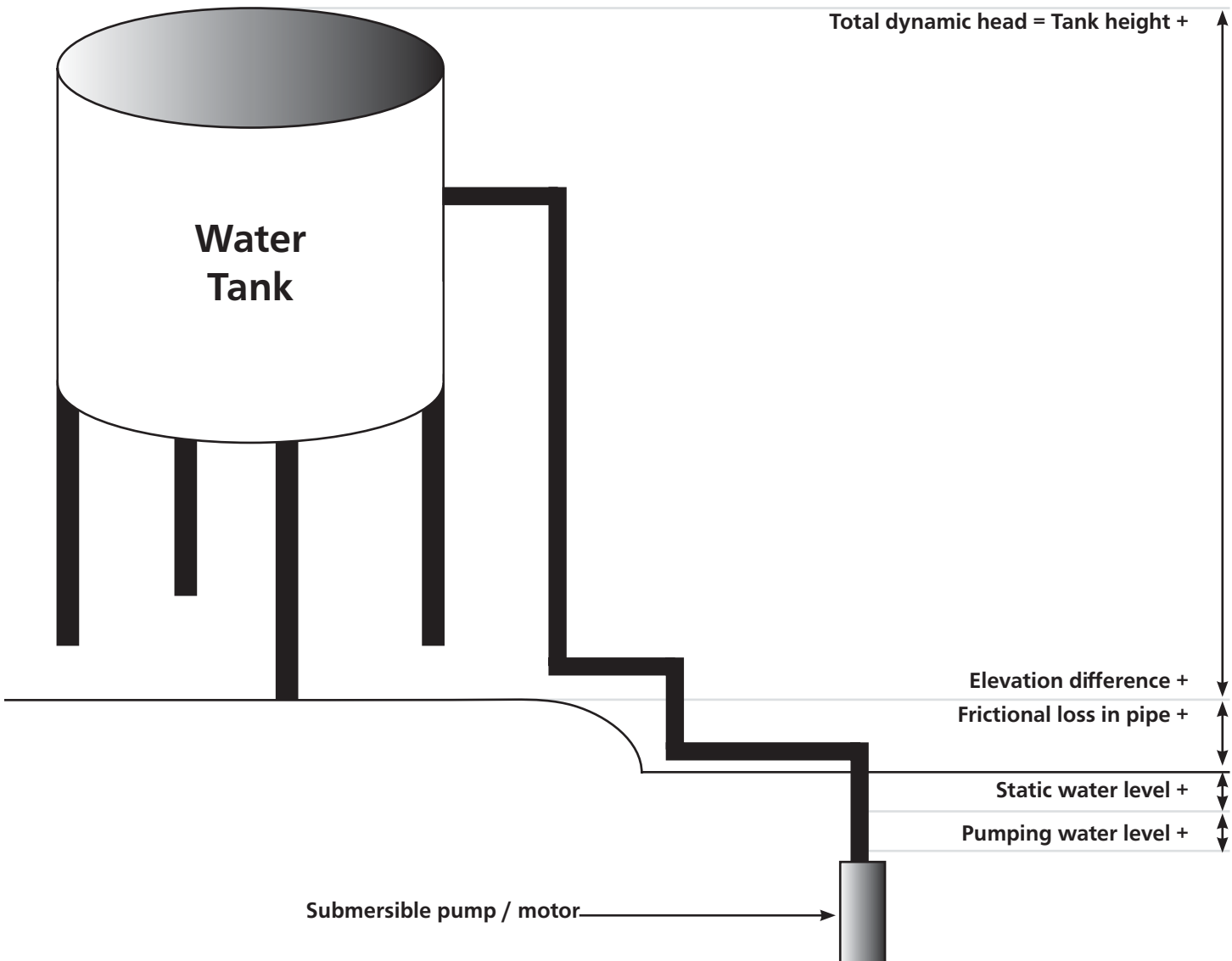
### Customer Data

Company name			
Contact person			
Company address			
Phone No.		Fax No.	
Email		www	

### Location of the Pump System

Nearest town/country			
Latitude		Longitude	

### Pump System Overview



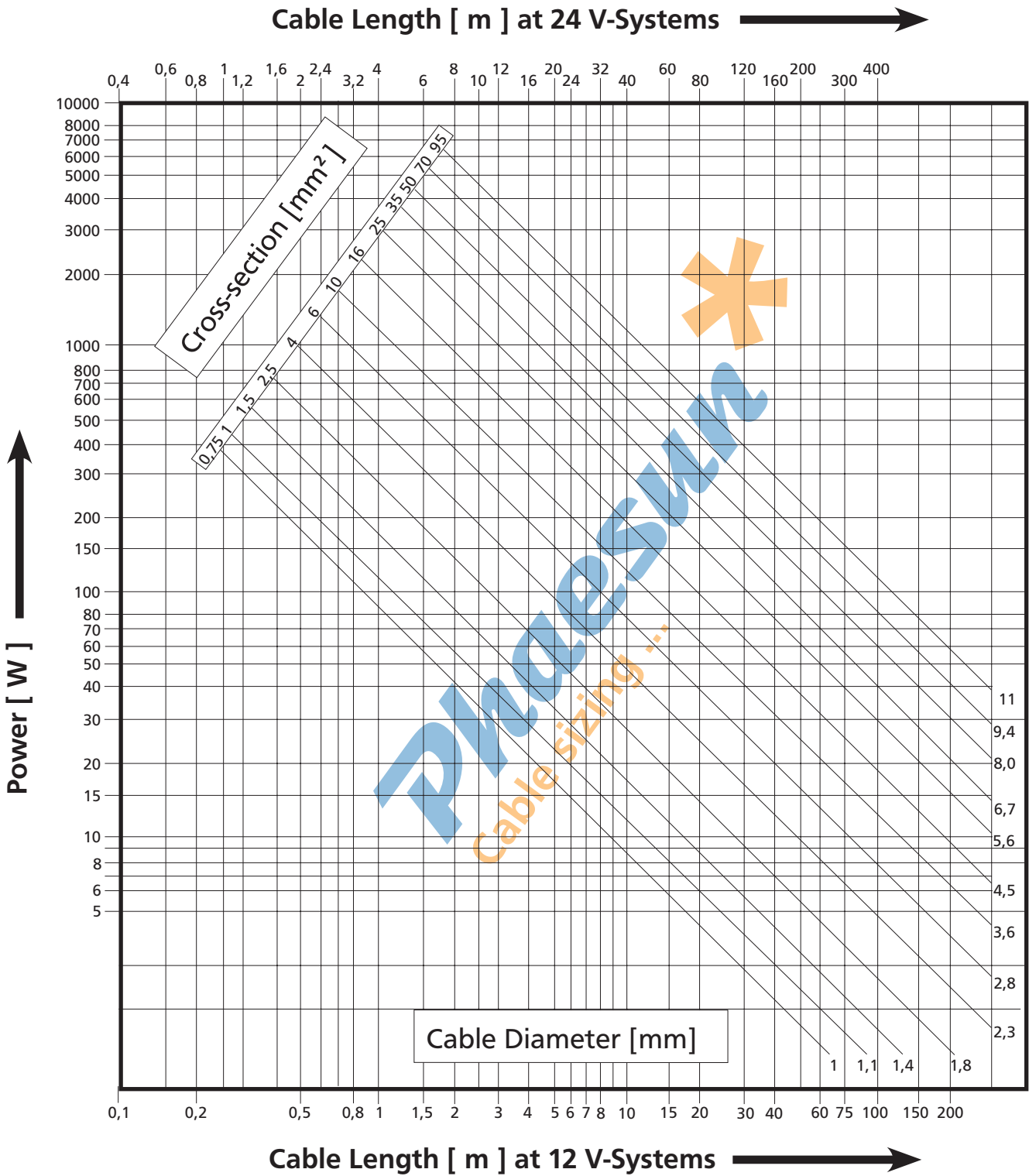
**Well**

Static water level [m]			
Dynamic well characteristics [m]		at [m <sup>3</sup> /h]	
Well diameter [inch]			
Water quality data			

**Others**

Tank height [m]			
Tank volume [m <sup>3</sup> ]			
Volume of water required a day [m <sup>3</sup> ]			
Horizontal distance between well and tank [m]			
Piping on site	Total length [m]		
	Diameter [inch]		
Deviation North / South direction	North		South
Watermeter required	Yes		No
Well head offer	Yes		No
Support structure offer	Ground SGM		No
Piping offer	Yes		No
Information on utilization of the system	Min. water output of a certain month (month)		
	Optimization all year round		
Intended use of water	MinDrinking water		
	Field irrigation		

**Cable Sizing Diagram**



## General Conditions - 01. January 2006

### I. General conditions

1. The scope of the supplies or services (hereinafter called "Supplies") shall be defined by the written declarations of both parties to the contract. General terms and conditions of the Purchaser shall apply only where expressly accepted in writing by the supplier or service provider (hereinafter called "Supplier").
2. For cost estimates, drawings and other documents (hereinafter called "Documents"), the Supplier reserves all rights, right, title and interest in the property and the copyright. Such Documents may not be made available to third parties without the prior consent of the Supplier and they shall, upon request, be immediately returned to the Supplier if he is not awarded the contract. Sentences 1 and 2 shall apply reciprocally to Purchaser's Documents; however, these may be made available to those third parties to whom the Supplier may transfer Supplies.
3. The Purchaser shall have the non-exclusive right to use standard software in unchanged form with the stipulated performance characteristics for the agreed equipment. The Purchaser is allowed to make two back-up copies without the Supplier's express consent.
4. Partial Supplies shall be permissible where they can be reasonably expected of the Supplier.

### II. Prices and terms of payment

1. Prices shall be ex works and shall exclude packing and the sales tax payable under the applicable law.
2. If the Supplier has undertaken the assembly or erection, the Purchaser shall bear all required incidental costs in addition to the agreed contract price unless otherwise agreed.
3. Payments shall be made free at Supplier's paying office.
4. The Purchaser may set off only those claims that are undisputed or have been finally determined in a legally binding manner.

### III. Retention of title

1. The items of Supplies (Secured Goods) shall remain the property of the Supplier until each and every claim against the Purchaser to which the Supplier is entitled under this business relationship has been duly satisfied. If the value of all security rights of the Supplier exceeds the value of all secured claims by more than 20%, the Supplier shall release a corresponding part of the security rights at the Purchaser's request.
2. For the duration of the retention of title, the Purchaser is prohibited from giving the items of Supplies in pledge or as security, and resale shall be permissible only to resellers in the ordinary course of business and only on condition that the reseller receives payment from his customer or retains title so that the property is transferred to the customer only after fulfillment of his obligation to pay.
3. In case of seizure or other acts or interventions by third parties, the Supplier shall be immediately informed thereof in writing by the Purchaser.
4. In cases of fundamental non-performance of contractual obligations by the Purchaser, especially a delay in payment, the Supplier shall be entitled to take back the goods following a demand for payment. The Purchaser shall be obliged to return the purchased goods. The taking back, the assertion of the retention of title or the seizure of the Secured Goods by the Supplier does not mean termination of the contract except if expressly stated by the Supplier.

### IV. Time for delivery and delay

1. Observance of the stipulated time for delivery is conditional upon the timely receipt of all documents, necessary permits and releases, especially of plans to be provided by the Purchaser, as well as fulfillment of the agreed terms of payment and other obligations by the Purchaser. Unless these conditions are fulfilled on time, the time for delivery will be extended accordingly except where the Supplier is responsible for the delay.
2. If non-observance of the time for delivery is due to force majeure such as mobilization, war, riot or similar events, e.g. strike or lockout, such time shall be extended accordingly.
3. If the Supplier is responsible for a delay in delivery, the Purchaser who can establish credibly that he suffered a loss from such delay may claim agreed compensation of 0,5% for every completed week of delay but in no event shall the aggregate of such compensation exceed a total of 5% of the price of that part of the Supplies which, because of the delay, could not be put to the intended use.
4. Purchaser's claims for compensation which exceed the limits specified in para. IV.3. shall be excluded in all cases of delayed delivery even after expiry of an extension of time that may have been granted to the Supplier. This exclusion shall not apply where in cases of wilful misconduct or gross negligence there is a legally binding liability on the part of the Supplier. No change in the burden of proof to the detriment of the Purchaser is involved. Purchaser's right to terminate the contract shall remain unaffected after the expiry of an extension granted to the Supplier that did not result in delivery.

If dispatch or delivery is delayed at Purchaser's request by more than one month after notice was given of the readiness for dispatch, the Purchaser may be charged storage costs for each month thereafter to the amount of 0,5% of the price of the supplied goods but in no event shall the aggregate storage charges exceed a total of 5% of the price. The parties to the contract are at liberty to furnish proof of higher or lower storage costs.

### V. Transfer of risk

1. Even where "carriage paid" delivery has been agreed, the risk shall pass to the Purchaser as follows:
  - a) If the supply does not include assembly or erection, when goods have been delivered to or picked up by carrier. At the Purchaser's request and expense, Supplies shall be insured by the Supplier against the ordinary risks of transport.
  - b) If the supply includes assembly or erection, the day on which they are taken over into Purchaser's own service or, if so stipulated, after a satisfactory trial run.
2. If the dispatch, the delivery, the beginning or completion of assembly or erection, the taking over into Purchaser's own service or the trial run is delayed for reasons within the Purchaser's responsibility, or if the Purchaser has failed for other reasons to accept delivery, the risk shall pass to the Purchaser.

### VI. Assembly and erection

Unless otherwise agreed in writing, assembly and erection shall be subject to the following provisions:

1. The Purchaser shall provide at his own expense and in a timely manner:
  - a) all earth-moving and construction work and other ancillary services not specific to the Supplier's trade as well as the necessary skilled and unskilled labour, materials and tools,
  - b) the equipment and materials necessary for assembly, erection and commissioning such as scaffolds, lifting equipment etc., fuels and lubricants,
  - c) energy and water at the point of use, including connections, heating and lighting,
  - d) suitable, dry and lockable rooms of sufficient size at the site for the storage of machine parts, apparatus, materials, tools etc. and adequate working and recreation rooms for the assembly personnel including appropriate sanitary facilities. Furthermore, the Purchaser shall take all measures he would take for the protection of his own property to safeguard the property of the Supplier and of the assembly personnel,
  - e) protective clothing and protective devices which are needed because of particular conditions on the site.
2. Before the start of assembly or erection, the Purchaser shall make available of his own accord all necessary information concerning the location of concealed electric power, gas and water lines or of similar installations as well as the required data concerning statics and underlying conditions of the site.
3. Before the beginning of assembly or erection, the necessary materials and equipment to start work must be provided at the site and all preparations must have advanced to such a point that the assembly or erection can be started as agreed and carried out without interruption. Access roads and the site itself must be level and clear.
4. If the assembly, erection or commissioning is delayed by circumstances for which the Supplier is not responsible, the Purchaser shall bear an appropriate amount of the costs of waiting periods and of any additional travelling of the Supplier or the assembly personnel that may be necessary.
5. The Purchaser shall attest to the Supplier at weekly intervals the hours worked by the assembly personnel and he shall immediately confirm in writing the completion of assembly, erection or commissioning.
6. If, after completion, the Supplier requests acceptance of the Supplies, it shall be carried out by the Purchaser within two weeks of the Supplier's request, failing which acceptance is deemed to have taken place. Acceptance is also deemed to have taken place if after completion of any agreed test phase the Supplies are put to use.

### VII. Taking delivery

Deliveries, even with minor defects, have to be accepted by the Purchaser.

### VIII. Warranty

For defects which include the absence of expressly warranted characteristics, the Supplier shall be liable as follows:

1. The Supplier shall, at his option and expense, repair, replace or newly provide any parts or services whose usefulness

is impaired more than insignificantly within 12 months from the date of the transfer of risk – regardless of the period of operation – owing to circumstances that existed before the transfer of risk.

2. Warranty claims are subject to a limitation period of 12 months after notification of the defect. Notice in writing shall be given to the Supplier immediately after discovery of the defect.
3. In case of notification of a defect, Purchaser's payments may be withheld in reasonable proportion to the notified defect. If the contract pertains to the conduct of a Purchaser's business, the Purchaser can withhold payments only if the legitimacy of the asserted complaint can be established beyond doubt.
4. The Supplier shall be given adequate time and opportunity to remedy the defect. If he is refused these, the Supplier shall have no liability for the defect.
5. If an adequate extension granted to the Supplier expires without the defect being remedied, the Purchaser shall have the right to demand cancellation of the contract or a reduction of the purchase price.
6. The warranty does not cover natural wear and tear or damage arising, after the transfer of risk, from faulty or negligent handling, excessive strain, unsuitable equipment, defective workmanship, inappropriate foundation soil or from particular external influences not assumed under the contract, or from non-reproducible software errors. The warranty does not cover modifications or repairs carried out improperly by the Purchaser or by third parties.
7. The warranty period for repairs or replacement Supplies (of goods or services) shall be 6 months. It shall be the later of: (1) 6 months from the date of repair or replacement; or (2) the remaining length of the original warranty period for the Supplies. For those parts which cannot be put to the intended use because of the interruption of service, the warranty period shall be extended by the period of service interruption caused by the repair or replacement supply.
8. The periods specified in paras 1., 2. and 7. shall not apply where longer periods are provided by law according to § 638 BGB.
9. Except as provided above, any other warranty claims of the Purchaser against the Supplier and the Supplier's agent shall be excluded. However, clause XI (Further liability) shall remain unaffected.

### IX. Industrial property rights and copyright

1. If a third party, because of an infringement of an industrial property right or copyright (hereinafter called "Property Rights") by products furnished by the Supplier and used in conformity with the contract, asserts legitimate claims against the Purchaser, the Supplier shall be liable to the Purchaser as follows:
  - a) At his own option and expense, the Supplier shall either obtain a right to use the product, modify the product so as not to infringe the Property Rights or replace the product. If this is not possible to the Supplier on acceptable terms, he shall have to take back the product and refund the purchase price.
  - b) Supplier's aforesaid obligations shall exist only on condition that the Purchaser immediately notifies the Supplier in writing of the claims asserted by the third party, that he does not acknowledge an infringement and that all countermeasures and settlement negotiations are reserved to the Supplier. If the Purchaser stops using the product to reduce the damage or for other important reasons, he shall be obliged to make it clear to the third party that the suspended use does not mean acknowledgment of an infringement of Property Rights.
2. Claims of the Purchaser shall be excluded if he is responsible for an infringement of Property Rights.
3. Claims of the Purchaser shall also be excluded if the infringement of Property Rights was caused by specific demands of the Purchaser, by a use of the product not foreseeable by the Supplier or by the product being altered by the Purchaser or being used together with products not provided by the Supplier.
4. Further claims against the Supplier shall be excluded. However, Clause XI (Further liability) shall remain unaffected and so shall be Purchaser's right to terminate the contract.

### X. Impossibility of performance, contract adaptation

1. If it is impossible for the Supplier to carry out the Supplies for reasons for which he is responsible, the Purchaser shall be entitled to claim damages but the Purchaser's claim for damages shall be limited to 10% of the value of that part of the Supplies which, owing to the impossibility, cannot be put to the intended use. This shall not apply where in cases of wilful misconduct, of gross negligence or of initial impossibility, there is a legally binding liability. No change in the burden of proof to the detriment of the Purchaser is involved. Purchaser's right to terminate the contract shall remain unaffected.
2. Where unforeseeable events as described in Clause IV, para 2., substantially change the economic importance or the contents of the Supplies or considerably affect the Supplier's business, the contract shall be adapted accordingly with due regard to the principle of good faith. Where this is not economically reasonable, the Supplier shall have the right to terminate the contract. If the Supplier wants to make use of this right of termination, he shall notify the Purchaser in writing immediately after becoming aware of the significance of the event. This shall apply even where at first an extension of the delivery time had been agreed with the Purchaser.

### XI. Further Liability

Except as provided herein, any other claims for damages of the Purchaser shall be excluded regardless of whether they are based on positive breach of contractual obligations, violation of obligations in contract negotiations, breach of warranty, tort or other legal theory. This exclusion shall not apply where e.g. under the product liability law or in cases of wilful misconduct, of gross negligence, of the absence of warranted characteristics or of the fundamental non-performance of contractual obligations, there is a legally binding liability. However, liability for damages arising from the fundamental non-performance of contractual obligations shall be limited to the foreseeable damage normally covered by a contract except in cases of wilful misconduct or gross negligence. This limitation does not imply a change in the burden of proof to the detriment of the Purchaser.

### XII. Choice of forum

1. If the Purchaser is a businessman, the sole forum for all disputes arising directly or indirectly out of the contract shall be the place of the Supplier's head or branch office at the Supplier's option.
2. All relations arising out of the contract shall be governed by German law not including the United Nations Convention on Contracts for the International Sale of Goods (CISG).

### XIII. Validity of the contract

Even in case of legal invalidity of individual items, the remaining parts of the contract shall remain binding save where adherence to the contract would mean an undue hardship on one of the parties.



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