

## HIGH PERFORMANCE SOLAR MODULES

# REC PEAK ENERGY SERIES

REC Peak Energy Series modules are the perfect choice for building solar systems that combine long lasting product quality with reliable power output. REC combines high quality design and manufacturing standards to produce high-performance solar modules with uncompromising quality.



**MORE POWER  
PER M<sup>2</sup>**



**ROBUST AND  
DURABLE DESIGN**

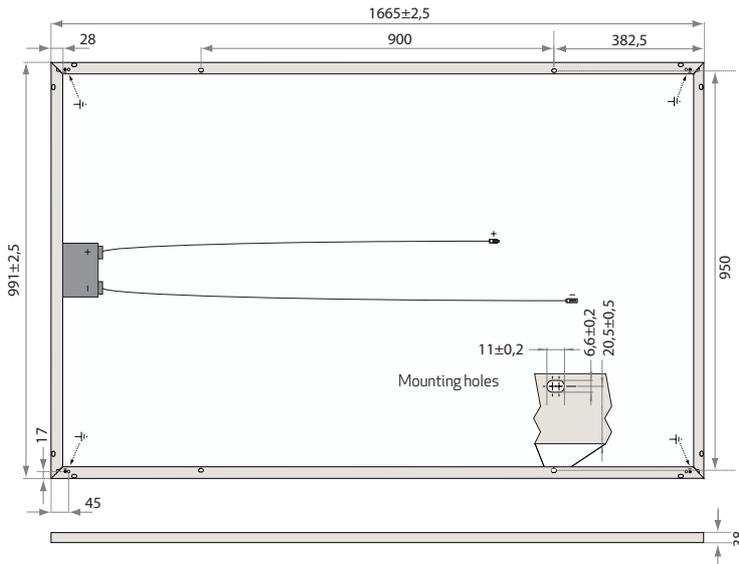


**ENERGY PAYBACK  
TIME OF ONE YEAR**



**OPTIMIZED FOR ALL  
SUNLIGHT CONDITIONS**

# REC PEAK ENERGY SERIES



Measurements in mm.

## ELECTRICAL DATA @ STC

	REC235PE	REC240PE	REC245PE	REC250PE	REC255PE	REC260PE
Nominal Power - $P_{MPP}$ (Wp)	235	240	245	250	255	260
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - $V_{MPP}$ (V)	29.5	29.7	30.1	30.2	30.5	30.7
Nominal Power Current - $I_{MPP}$ (A)	8.06	8.17	8.23	8.30	8.42	8.50
Open Circuit Voltage - $V_{OC}$ (V)	36.6	36.8	37.1	37.4	37.6	37.8
Short Circuit Current - $I_{SC}$ (A)	8.66	8.75	8.80	8.86	8.95	9.01
Module Efficiency (%)	14.2	14.5	14.8	15.1	15.5	15.8

Analysed data demonstrates that 99.7% of modules produced have current and voltage tolerance of  $\pm 3\%$  from nominal values. Values at standard test conditions STC (airmass AM1.5, irradiance 1000 W/m<sup>2</sup>, cell temperature 25°C). At low irradiance of 200 W/m<sup>2</sup> (AM1.5 and cell temperature 25°C) at least 97% of the STC module efficiency will be achieved.

## ELECTRICAL DATA @ NOCT

	REC235PE	REC240PE	REC245PE	REC250PE	REC255PE	REC260PE
Nominal Power - $P_{MPP}$ (Wp)	179	183	187	189	193	197
Nominal Power Voltage - $V_{MPP}$ (V)	27.5	27.7	28.1	28.3	28.5	29.0
Nominal Power Current - $I_{MPP}$ (A)	6.51	6.58	6.64	6.68	6.77	6.81
Open Circuit Voltage - $V_{OC}$ (V)	34.2	34.4	34.7	35.0	35.3	35.7
Short Circuit Current - $I_{SC}$ (A)	6.96	7.03	7.08	7.12	7.21	7.24

Nominal operating cell temperature NOCT (800 W/m<sup>2</sup>, AM1.5, windspeed 1 m/s, ambient temperature 20°C).

## CERTIFICATION



IEC 61215 & IEC 61730, IEC 62716 (ammonia resistance) & IEC 61701 (salt mist - severity level 6).



Member of PV Cycle

## WARRANTY

10 year product warranty  
25 year linear power output warranty  
(max. degradation in performance of 0.7% p.a.)  
See warranty conditions for further details.

15.8% EFFICIENCY

10 YEAR PRODUCT WARRANTY

25 YEAR LINEAR POWER OUTPUT WARRANTY

## TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	45.7°C ( $\pm 2^\circ\text{C}$ )
Temperature Coefficient of $P_{MPP}$	-0.40 %/°C
Temperature Coefficient of $V_{OC}$	-0.27 %/°C
Temperature Coefficient of $I_{SC}$	0.024 %/°C

## GENERAL DATA

Cell Type:	60 REC PE multi-crystalline 3 strings of 20 cells with bypass diodes
Glass:	3.2 mm solar glass with anti-reflection surface treatment
Back Sheet:	Double layer highly resistant polyester
Frame:	Anodized aluminium (silver)
Junction Box:	IP67 rated 4 mm <sup>2</sup> solar cable, 0.9 m + 1.2 m
Connectors:	MC4 (4 mm <sup>2</sup> ) MC4 connectable (4 mm <sup>2</sup> ) Radox twist lock (4 mm <sup>2</sup> )

## MAXIMUM RATINGS

Operational Temperature:	-40 ... +80°C
Maximum System Voltage:	1000 V
Maximum Snow Load:	550 kg/m <sup>2</sup> (5400 Pa)
Maximum Wind Load:	244 kg/m <sup>2</sup> (2400 Pa)
Max Series Fuse Rating:	25 A
Max Reverse Current:	25 A

## MECHANICAL DATA

Dimensions:	1665 x 991 x 38 mm
Area:	1.65 m <sup>2</sup>
Weight:	18 kg

**Note!** Specifications subject to change without notice.

REC is a leading global provider of solar electricity solutions. With nearly two decades of expertise, we offer sustainable, high-performing products, services and investment opportunities for the solar and electronics industries. Together with our partners, we create value by providing solutions that better meet the world's growing electricity needs. Our 2,300 employees worldwide generated revenues of more than NOK 7 billion in 2012, approximately EUR 1 billion.



www.recgroup.com

## Limited Warranty Certificate for REC Peak Energy Modules<sup>1</sup>

(valid as of September 1, 2011)

This Limited Warranty covers all modules with the REC Peak Energy name (as defined above) sold after September 1, 2011 and is valid in all member states of the European Union, the European Economic Area, countries belonging to the Eastern European Group<sup>2</sup> and further countries as listed below<sup>3</sup>.

REC MODULES PTE. LTD. (hereafter the 'Warrantor' or 'REC') issues the following voluntary warranty to the end-user who purchased the Product in one of the states mentioned above and put the Product into use for the first time (the 'Original End-User'). In addition to the rights under this Limited Warranty, the Original End-User may be entitled to statutory warranty rights under applicable national laws which shall not be affected or limited in any way by this Limited Warranty.

### I. Product Warranty

Subject to the terms and conditions of this Limited Warranty, REC warrants that the Products:

- Are free from defects in material and workmanship for a period of 10 years from the date of purchase by the Original End-User (not exceeding a maximum period of 10.5 years from the date of production as identified on the Product) (the 'Warranty Period') if installed and used in accordance with the installation instructions available to download from [www.recgroup.com](http://www.recgroup.com).
- Will remain safe and operational if cable and connector plugs are installed professionally and are not permanently positioned in water; provided however, that damage to the cable caused by abrasion on a rough surface due to insufficient fixing or to unprotected running of the cable over sharp edges is excluded. Damage caused by animals is also excluded.
- Will not experience freezing up of the aluminum frames if installed correctly.

The outer appearance of the Product, including scratches, stains, rust, mould, discoloration and other signs of normal wear and tear, which occurred after delivery or installation, do not constitute defects, provided the functionality of the Product is not affected. Glass breakage constitutes a defect only if not caused by any external influence.

If a defect occurs during the Warranty Period affecting the functionality of the Product, REC will, at its sole option:

- Repair the defective Product.
- Replace the Product with an equivalent product.
- Refund the current market price of an equivalent product at the time of the claim.

### II. Power Output Warranty

Subject to the terms and conditions of this Limited Warranty, REC warrants that the actual power output of the Product will reach at least 97% of the nameplate power output specified on the Product during the first year (calculated from the date of production as identified on the Product). From the second year, the actual power output will decline annually by no more than 0.7% for a period of 24 years, so that by the end of the 25th year, an actual output of at least 80.2% of the nameplate power output specified on the Product will be achieved.

**This Power Output Warranty covers only reduced performance due to natural degradation of the glass, the solar cell, the embedding foil, the junction box and interconnections under normal use.**

If the Product does not reach the warranted power output levels set out above when measured by the Warrantor or by an independent measuring institute agreed to prior to testing by the Warrantor, under standard test conditions (IEC 61215) and taking into account a  $\pm 3\%$  tolerance range, then REC will, at its sole option:

- Repair the Product
- Replace the Product with an equivalent product or to supply additional modules as necessary to achieve the warranted percentage of specified power output.
- Refund the current market price of an equivalent product at the time of the claim

### III. Warranty Conditions, Limitations and Exclusions

1. This Limited Warranty is not transferable by the Original End-User, except to a subsequent owner of the solar power facility at which the Product was originally installed and remains installed, provided that this solar power facility has not been altered in any way or moved from the structure or property at which it was originally installed.

<sup>1</sup> Excluding modules showing "Q3" as part of the product name.

<sup>2</sup> As defined by the regional groups of Member States to the United Nations General Assembly ([www.un.int](http://www.un.int)).

<sup>3</sup> This Limited Warranty also includes the countries of Andorra, Israel, Liechtenstein, Monaco, San Marino, Switzerland, Turkey and the Vatican City.

2. Notification of a warranty claim hereunder must be given without undue delay after detection of the defect and prior to the expiration of the applicable Warranty Period and in accordance with the procedure as set out in section IV below.
3. **Please note that this Limited Warranty does not cover, nor will the Warrantor reimburse, any on-site labor or other costs incurred in connection with the de-installation or removal of defective Products, transport or the re-installation of replaced or repaired Products or any components.**
4. The Warrantor may use remanufactured or refurbished parts or products when repairing or replacing any Products under this Limited Warranty. Any exchanged or replaced parts or Products will become the property of REC. The Warranty Periods set out in sections I. and II. above will not be extended in any way in the event of a replacement or repair of a Product.
5. This Limited Warranty requires that the Product is installed according to the latest safety, installation and operation instructions provided by REC and does not apply to damage, malfunction, power output or service failures which have been caused by: (a) repair, modifications or removal of the Product by someone other than a qualified service technician; (b) any improper attachment, installation or application of the Product or (c) abuse, misuse, accident, negligent acts, power failures or surges, lightning, fire, flood, accidental breakage, actions of third parties and other events or accidents outside REC's reasonable control and/or not arising under normal operating conditions.
6. This Limited Warranty is provided voluntarily and free of charge and does not constitute an independent guarantee promise. Therefore, if any defect materially affects the functionality of the Product or results in a power output below the warranted levels, the Original End-User's remedies are limited exclusively to the remedies set out under sections I. and II. in the warranty cases specified herein. REC assumes no warranties, express or implied, other than the warranties made herein and specifically disclaims all other warranties, merchantability or fitness for a particular purpose. REC excludes all liabilities for any special, incidental, consequential or punitive damages from the use or loss of use of the Products to perform as warranted; including but not limited to damages for loss of power, lost profits or savings nor expenses arising from third-party claims. This does not apply to the extent the Warrantor is liable under applicable mandatory product liability laws or in cases of intent or gross negligence on the part of the Warrantor.
7. This Limited Warranty shall be governed by and construed in accordance with the laws of Germany irrespective of its choice of law principles. The United Nations Convention on Contracts for the International Sale of Goods (1980) shall not apply to or govern this Limited Warranty or any aspect of any dispute arising there from. REC hereby irrevocably submits to the jurisdiction of the courts of Germany for the determination of any disputes arising under this Limited Warranty.

#### **IV. Warranty Claim Procedure**

Claims under this Limited Warranty must be made by notifying the authorized distributor or seller where the Product was first purchased. A claim may be registered at:

[www.recgroup.com/warranty](http://www.recgroup.com/warranty)

For a Warranty Claim to be processed, proof of the original purchase of the Product and any subsequent sales including transfer of this Warranty need to accompany the claim. The claim must include a description of the alleged defect(s) as well as the Product's serial number(s). Prior to returning any Products or components to REC, an RMA (Return Merchandise Authorization) number is required, which may be obtained by contacting REC via the aforesaid address.

This warranty is valid for Products sold on or after September 1, 2011.

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# REC WINS PHOTON TEST

REC solar modules shine in real life conditions with best performance in Photon laboratory's field test 2011.



In the real world, dust, clouds, rain, heat, sleet and snow all affect solar module performance. Designed for maximum power output and optimized for all weather conditions, REC modules finished first in Photon's full-year test.

- **First place position in 2011**
- **Leading position for the last 24 months**
- **6% more power produced than test average**



**MORE  
POWER  
PER M<sup>2</sup>**



**ROBUST  
AND  
DURABLE  
DESIGN**



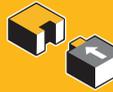
**ENERGY  
PAYBACK  
TIME OF  
ONE YEAR**



**25-YEAR  
POWER  
OUTPUT  
GUARANTEE**



**OPTIMIZED  
FOR ALL  
SUNLIGHT  
CONDITIONS**

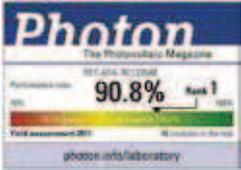


**EASY  
TO  
INSTALL**

# REAL LIFE, REAL RESULTS

The Photon field test helps consumers select the best module supplier based on product performance in the field. The 2011 results demonstrate the excellent performance of REC modules and their best-in-class return on investment.

## ABOUT THE PHOTON TEST



The test is conducted by the independent laboratory of the leading industry magazine Photon, and is currently the most recognized yield performance test comparing

international module brands over several years, during different seasons and in different light conditions.

Since 2005, Photon Lab has operated an ongoing test that monitors the energy yield of solar modules from leading manufacturers. This test compares the energy produced per kilowatt of installed power of the participating modules, under identical conditions.

The test is carried out at a facility in Aachen, Germany. The test records the current-voltage (IV) curve at the module's output eliminating the possibility of false inverter adjustments. The test module's yield is fed into the grid via an inverter. Solar irradiation is recorded along with weather data such as ambient temperature, wind speed, precipitation and barometric pressure. All the test data is collected in one second intervals and stored in synchronized and secure databases that allow precise correlation.

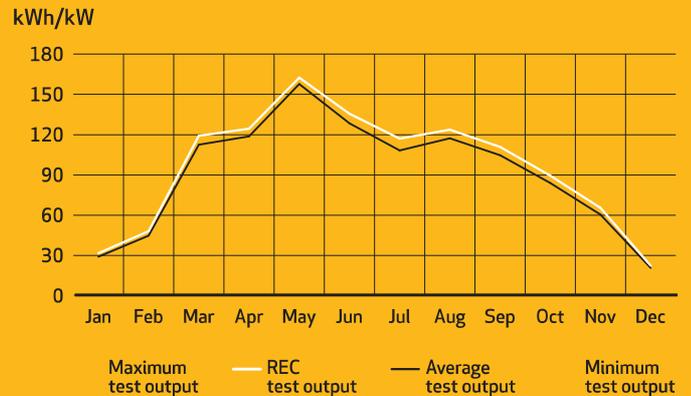


Installation of Photon Lab's outdoor module test. Photo: photon-pictures.com

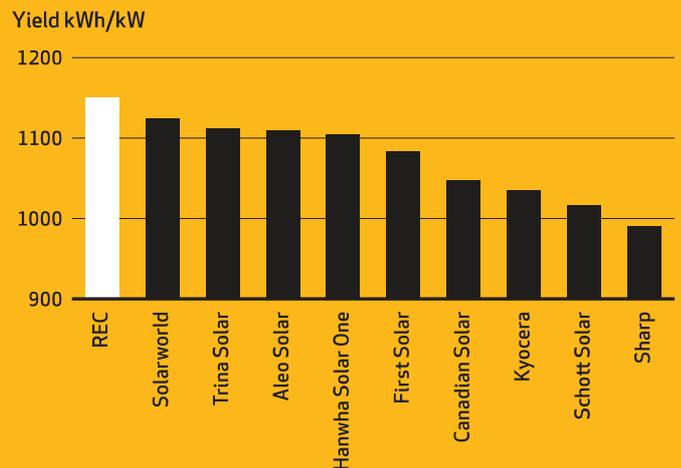
## TEST RESULTS

On average, REC modules generated more electricity than 45 other module brands, producing 6 percent more energy. REC multicrystalline modules outperformed 45 different types of modules, including thin film and monocrystalline products. The highest performance ratio of 90.8 percent and also the highest yield of 1150.4 kWh/kW were measured for the REC module. Over the last 24 months, REC modules have maintained a leading position in the Photon Test, ranking second overall in 2010.

## Monthly comparison of module performance Photon test 2011



## Yearly comparison Photon Test 2011 leading brands



REC is a leading vertically integrated player in the solar energy industry. Ranked among the world's largest producers of polysilicon and wafers for solar applications and a rapidly growing manufacturer of solar cells and modules, REC also engages in project development activities in selected PV segments. Founded in Norway in 1996, REC is an international solar company, employing about 3,700 people worldwide with revenues of about EUR 1.7 billion in 2011. Please visit [www.recgroup.com](http://www.recgroup.com) to learn more about REC.



Please visit [www.recgroup.com](http://www.recgroup.com)



## Enecsys Micro Inverters

SMI-D480W-60



**Maximized Energy Harvest**

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**Improved Safety**

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**Increased Lifetime & Reliability**

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**Enhanced Monitoring Capability**

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**Simplified PV Array Design & Installation**

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Enecsys develops, manufactures and markets world leading, highly reliable grid-connected solar micro inverters and monitoring systems that offer an outstanding value proposition for solar PV systems.

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#### Technical Specification

#### SMI-D480W-60-(see "ordering information" for region code)

Input Data (DC)	
Nominal Input Power	480W
Recommended Input Power (STC)	500W
Maximum DC Voltage	44V
Minimum DC Voltage	20V
MPPT Voltage Range	24V - 35V
Maximum Input Current	22A

Output Data (AC)	
Maximum AC Output Power	450W
Nominal AC Output Current	1.96A
Nominal Output Voltage	230V
Nominal Frequency	50Hz
Power Factor	> 0.95
Total Harmonic Distortion	< 5%

Efficiency	
Euro Efficiency	93.5%*1
Peak Efficiency	95%
Maximum Night Power Consumption	< 30mW

Mechanical Data	
Operating Temperature Range	-40°C to 85°C
Enclosure Rating	IP66
Dimensions (LxHxW)	262mm x 160mm x 40mm*2
Weight	2.1kg
Cooling	Natural Convection

Features & Compliance	
Safety Class Compliance	CE, pr EN 62109-1, AS/NZS 3100
EMC (Emission & Immunity) Compliance	EN61000-6-3, EN61000-6-1
Grid Connection Compliance	G83/ 1-1, VDE 0126-1, VDE 4105, IEC 61727, IEC 62116, AS 4777, RD 1699*3
Communication	Zigbee IEEE 802.15.4
Connector	MC4 compatible
PV Compatibility	Compatible with most 60 cell modules
Warranty	20 Years (at full ambient temperature range)
Technology	Thin film capacitors
Isolation	Galvanic

#### Ordering Information

Region code	Region
-AU	Australia
-ES	Spain
-DE	Germany
-FR	France
-IT	Italy
-UK	United Kingdom

\*1 - Efficiency maintained over full ambient temperature range from -40°C to 85°C and at nominal output power  
 \*2 - Without the mounting bracket  
 \*3 - In accordance with the Enecsys installation guidelines (please refer to the Enecsys Installation Manual)  
 All technical specifications contained within this document are subject to change without prior notice

# Enecsys Micro-Inverter 10 Year Standard Limited Warranty

Enecsys Ltd. provides a standard limited warranty for Enecsys micro-inverters of 10 years subject to the terms and conditions herein. This warranty covers defects in workmanship and materials.

Note that this Limited Warranty is for Enecsys micro-inverters only. Other Enecsys components such as the Gateway have separate limited warranties not defined herein.

Enecsys micro-inverters are designed to be highly reliable, have a very long life for their originally intended purpose, able to withstand normal operating conditions and ordinary wear and tear in compliance with all Enecsys user and installation manuals and instructions.

This warranty is provided to the purchaser of the Enecsys micro-inverters and the warranty period begins with the date of this sale. The warranty is valid for owners of installed systems using Enecsys micro-inverters.

During the Warranty Period, Enecsys Ltd. will, at its option, repair or replace defective Enecsys micro-inverters free of charge, subject to Enecsys' verification of defect(s) covered by this Limited Warranty. Enecsys will, at its option, use new and/or reconditioned parts in repairing or replacing defective micro-inverters.

Enecsys may at its discretion use parts or components of its choosing to repair or replace the defective micro-inverter as original components may no longer be practically available and/or new components and/or designs have superseded the defective micro-inverter.

The Enecsys Monitoring capability is provided as a part of this Limited Warranty and Enecsys authorization by the installation owner to view the performance data of the Enecsys micro-inverters at the installation site is a required condition of this Limited Warranty. If the Enecsys monitoring is not installed and available to Enecsys for troubleshooting then this warranty is limited to 5 years.

Repaired or replaced micro-inverters continue to be warranted for the remaining term of the original warranty.

This Limited Warranty does include the cost of shipping defective micro-inverters to Enecsys and the return of repaired or replacement micro-inverters under Enecsys' instructions and using a freight carrier of Enecsys' choosing.

This Limited Warranty does not extend beyond the original cost of the Enecsys micro-inverter.

### **Requirements To Obtain Repair Or Replacement Under The Terms And Conditions Of This Limited Warranty Are:**

To obtain repair or replacement service under this Limited Warranty, the customer must comply with the following policy and procedure:

1. A Return Merchandise Authorization Number (RMA) must be obtained from Enecsys Ltd. before returning any micro-inverters for repair or replacement.
2. To issue the RMA, Enecsys requires:
  - Proof-of-purchase of the Defective Product from Enecsys
  - Model and Serial number of the Defective Product.
  - Detailed description of the defect.
  - Shipping address for return of the repaired or replacement product
3. All defective micro-inverters authorized for return must be returned in packaging that is suitably protective of the product.

### **Exclusions Under This Limited Warranty Are:**

1. The costs to analyse and diagnose a micro-inverter failure at the installation are not covered.
2. Labor costs to un-install defective Enecsys micro-inverters or re-installing repaired or replaced Enecsys micro-inverters are not covered.
3. Enecsys is not responsible for returned micro-inverters lost, damaged or mishandled in transit.
4. Micro-inverters that have been misused, neglected, tampered with, altered, disassembled, modified or otherwise damaged, either internally or externally are not covered.
5. Micro-inverters that have been improperly installed, operated, handled or used, including use under conditions for which the product was not designed, operated in any manner that exceeds its specification, use in an unsuitable environment, or use in a manner contrary to the Enecsys user and installation manuals or in violation of applicable laws or regulations are excluded.
6. Micro-inverters that have been subjected to fire, submersion in water, generalized corrosion, biological infestations, acts of God, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Enecsys micro-inverter

specifications or certification requirements documents, including high input voltage from generators or lightning strikes are not covered.

7. Micro-inverters that have been subjected to incidental or consequential damage caused by defects of other components of the solar system are not covered.
8. Micro-inverters where the original identification markings (including trademark or serial number) have been defaced, altered, or removed.
9. This Limited Warranty does not cover costs related to the removal, installation or troubleshooting of the customer's electrical systems.

THE LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY ENECYSYS LIMITED AND, WHERE PERMITTED BY LAW, IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OR WARRANTIES AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN MANUALS OR OTHER DOCUMENTATION. IN NO EVENT WILL ENECYSYS LIMITED BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING, WHETHER IN CONTRACT OR TORT, INCLUDING WITHOUT LIMITATION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, OR ANY PERSONAL INJURY.

To the extent any implied warranties are required under applicable law to apply to the Enecsys Micro-inverter such implied warranties shall be limited in duration to the Warranty Period, to the extent permitted by applicable law. Some countries, states and provinces do not allow limitations or exclusions on implied warranties or on the duration of an implied warranty or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply. This Limited Warranty gives the customer specific legal rights, and the customer may have other rights that may vary by country, state or province.

**Enecsys Limited**

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2  
1  
0  
2



**PV ALUMINIUM  
UNIVERSAL MOUNTING SYSTEM**  
ΣΤΗΡΙΞΗ Φ/Β ΣΕ ΣΤΕΓΕΣ, ΔΩΜΑ, ΥΠΑΙΘΡΙΑ ΠΑΡΚΑ

- ΑΜΕΣΗ ΠΑΡΑΔΟΣΗ
- 10ΕΤΗΣ ΕΓΓΥΗΣΗ
- ΠΙΣΤΟΠΟΙΗΣΗ TÜV
- ΕΥΕΛΙΞΙΑ ΤΟΠΟΘΕΤΗΣΗΣ
- ΜΕΙΩΣΗ ΧΡΟΝΟΥ ΕΓΚΑΤΑΣΤΑΣΗΣ

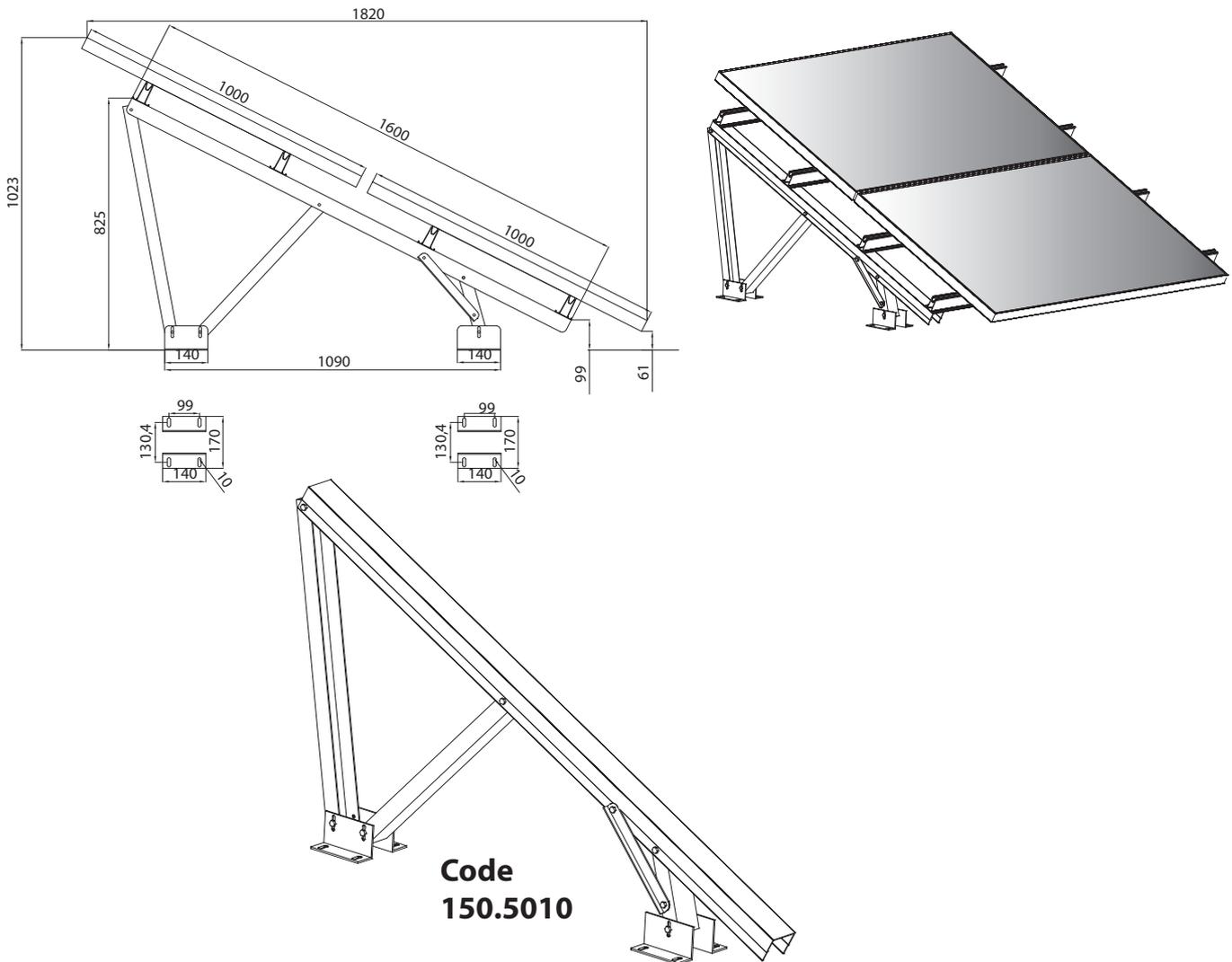


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## Flat (Roof and Ground) Mounting Frame 2 ΚΑΒΑΛΕΤΟ ΤΥΠΟΣ II



### FLAT (ROOF AND GROUND) MOUNTING FRAME 2

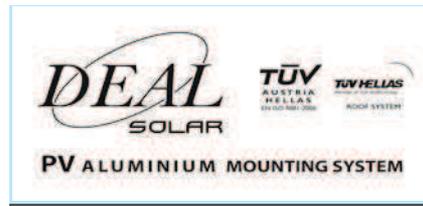
All profiles are aluminium and TUV certified. Stainless steel M8 screws with lock nuts are provided. Support feet can be easily adjusted and aligned independently within 25mm. Mounting frames are congruous to ensure consistent angles to form one plane surface. Distances between support frames spaced up to 2,8m and projected profiles up to 0,5m.

### ΚΑΒΑΛΕΤΟ ΤΥΠΟΣ II - ΣΤΗΡΙΞΗ ΠΑΝΕΛ 2 LANDSCAPE

Το καβαλέτο είναι κατασκευασμένο εξ' ολοκλήρου από προφίλ αλουμινίου. Οι συνδέσεις των επιμέρους τμημάτων γίνονται με βίδες INOX M8 και με παξιμάδια ασφαλείας. Τα πέλματα στήριξης αυτορυθμίζονται ανεξάρτητα το ένα με το άλλο και έχουν επιπλέον ρύθμιση καθ' ύψος 0,025m, για να ευθυγραμμίζονται με μεγαλύτερη ευκολία. Μπορούν να συνεργαστούν με τα υπόλοιπα καβαλέτα, διότι είναι κατασκευασμένα με την ίδια γωνία για να αποτελέσουν όλα μια επιφάνεια. Οι αποστάσεις μεταξύ των καβαλέτων δεν πρέπει να υπερβαίνουν τα 2,8 μέτρα και οι πρόβολοι των προφίλ να μην ξεπερνούν 0,50m.

**ΠΡΟΣΟΧΗ:** Κατά την τοποθέτηση και εγκατάσταση των καβαλέτων θα πρέπει να ληφθεί υπόψη ο πίνακας αντίστασης των καβαλέτων σε ανεμοπιέσεις, κατά περιοχές. Ο πίνακας βρίσκεται στη σελίδα 14 και καταδεικνύει τα αντίβαρα που πρέπει να χρησιμοποιηθούν. Για να εξασφαλίσουμε τα αποδεκτά επίπεδα αντοχής, επιβάλλεται η χρησιμοποίηση των χημικών παρεμβυσμάτων σε δώμα ή αντίστοιχα αντίβαρα τιμέντου, σε αγρό.

# CUSTOMER WARRANTY DOCUMENT



Η εταιρεία DEAL, ΔΕΛΑΒΕΡΙΔΗΣ & ΣΙΑ Ο.Ε, ΠΡΟΙΟΝΤΑ ΑΛΟΥΜΙΝΙΟΥ, ΜΕΣΗ ΒΕΡΟΙΑΣ, ΤΚ 59100 θέτει υψηλές απαιτήσεις για την ποιότητα των προϊόντων της, τα οποία κατασκευάζονται και πιστοποιούνται σύμφωνα με τα ποιοτικά πρότυπα, που προβλέπονται στους Ευρωκώδικες 1 & 9. Στο πλαίσιο αυτό η εταιρεία είναι σε θέση να εγγυηθεί τα εξής :

## § 1. Απόδοση των συστημάτων στήριξης στο πλαίσιο της εγγύησης

(1) Οι Βάσεις Στήριξης και τα Συστήματα Στήριξης Φωτοβολταικών Πλαισίων που απαριθμούνται κατωτέρω είναι άριστης ποιότητας, ελεύθερα από από οποιαδήποτε ατέλεια κατασκευής και παρέχονται τουλάχιστον για 20ετή χρήση, χωρίς να παρουσιάσουν πρόβλημα διάβρωσης, αλλοίωσης, θραύσης ή και οξειδωσης. Τα προϊόντα αυτά είναι:

α. Η ΒΑΣΗ ΣΤΗΡΙΞΗΣ ΤΥΠΟΣ I, ΤΥΠΟΣ II, ΤΥΠΟΣ III, ΤΥΠΟΣ IV ΚΑΙ ΒΑΣΗ ΛΑΜΑΡΙΝΟΣΚΕΠΗΣ.

β. ΤΑ ΣΥΣΤΗΜΑΤΑ ΣΤΗΡΙΞΗΣ ΤΥΠΟΣ I, ΤΥΠΟΣ II ΤΥΠΟΣ III και ΤΥΠΟΣ IV.

(2) Η παραπάνω εγγύηση δεν καλύπτει περιπτώσεις στις οποίες εντοπίζονται ατέλειες και προβλήματα στο προϊόν, τα οποία προέκυψαν επειδή

- Δεν συναρμολογήθηκε σύμφωνα με τις οδηγίες συναρμολόγησης και τους εφαρμόσιμους τεχνικούς κανόνες και τους κανονισμούς.
- Δεν έχει συναρμολογηθεί από καταρτισμένο προσωπικό.
- Μεταφέρθηκε, εγκαταστάθηκε, συναρμολογήθηκε, ελέγχθηκε ή χρησιμοποιήθηκε, χωρίς την τήρηση των ενδεδειγμένων μέτρων.
- Δεν χρησιμοποιήθηκε σύμφωνα με τις τεχνικές προδιαγραφές και χρησιμοποιήθηκε αντίθετα από τον προοριζόμενο σκοπό της χρήσης.
- Δεν αποθηκεύτηκε κατάλληλα πριν από ή κατά τη διάρκεια της φάσης συναρμολόγησης.

- Οι παρεμβάσεις ή οι αλλαγές στο προϊόν ή τα εξαρτήματά του έγιναν χωρίς τη σαφή συγκατάθεση της εταιρείας DEAL.
- Χρησιμοποιήθηκε με άλλα εξαρτήματα, τα οποία δεν προέρχονται από την DEAL και είχαν σαν επακόλουθο τη δημιουργία προβλήματος.
- Εκτέθηκε σε εξαιρετικές περιβαλλοντικές επιδράσεις, (υπερβολική ηλεκτρική τάση, μαγνητικά πεδία, ή παρόμοιες περιστάσεις)
- Τέθηκε σε καταστάσεις ανωτέρας βίας (π.χ., αστραπές, χαλάζι, πυρκαγιά, βανδαλισμός και φυσικές καταστροφές).
- Έγινε συνδυασμός μετάλλων (π.χ. χαλκός) που προκάλεσαν οξειδωση και διάβρωση στο Β/Φ πάνελ.
- Το μέγεθος φορτίων της κατασκευής στεγών ή/και του εδάφους δεν έχουν βεβαιωθεί, σύμφωνα με την αποδεκτή τεχνολογία κατάστασης και τους εφαρμόσιμους τεχνικούς κανόνες και τους κανονισμούς.
- Όταν η εγκατάσταση του Φωτοβολταϊκού είναι σε απόσταση από τη θάλασσα μικρότερη των 500μ.

(3) Η εγγύηση δεν καλύπτει οποιεσδήποτε άμεσες ή έμμεσες ζημιές και επακόλουθες συνέπειες, συμπεριλαμβανομένου του τραυματισμού προσωπικού ή της ζημίας ιδιοκτησίας, το χαμένο κέρδος, ζημιά στη φήμη, απώλεια στοιχείων, κόστους διαφήμισης ή παραγωγής, γενικών εξόδων και απώλειας πελατών, καθώς επίσης και δαπανών που προκύπτουν από τις διακοπές λειτουργίας, τις αφαιρέσεις ή/και την επανεγκατάσταση ή την εκ νέου προμήθεια προϊόντων.

(4) Περίπτωση λήψης μέτρων εγγύησης δεν θα προκύψει, από ατέλειες ή αποκλίσεις στην κατάσταση του προϊόντος που δεν είναι υλικές και από ατέλειες ή αποκλίσεις που είναι ασήμαντες σε σχέση με την αξία ή την αναμενόμενη χρήση του προϊόντος.

(5) Σε περίπτωση που μία κατάσταση εγγύησης προκύψει, η εταιρεία DEAL θα πραγματοποιήσει επισκευή του εν λόγω υλικού, ή θα αντικαταστήσει το προϊόν με ένα νέο, χωρίς να είναι υποχρεωμένη να το εγκαταστήσει η ίδια ή να επιβαρυνθεί τα έξοδα εγκατάστασης. Η εταιρεία θα αποκτήσει τον τίτλο κτήσης σε κάθε αντικατεστημένο προϊόν. Εάν το εν λόγω προϊόν δεν κατασκευάζεται πλέον, η εταιρεία DEAL έχει δικαίωμα να παρέχει ένα διαφορετικό ανάλογο προϊόν (διαφορετικό μέγεθος, διαφορετικό χρώμα, διαφορετική μορφή ή/και διαφορετική απόδοση κ.λπ.).

(6) Το συνολικό πεδίο της ευθύνης υπό το πλαίσιο της παρούσας εγγύησης για το προϊόν ή τις ατέλειες κατασκευής που ορίζεται στην υποενοότητα (1), περιορίζεται στη τιμή αγοράς από τον πελάτη του συγκεκριμένου προϊόντος.

(7) Οι διορθώσεις στο πλαίσιο της εγγύησης δεν επιφέρουν την έναρξη νέων εγγυητικών περιόδων, ούτε θα επεκτείνουν την εγγυητική περίοδο.

## **§ 2. Γεωγραφικό πεδίο εφαρμογής /εγγυητική περίοδος**

(1) Η εγγύηση ισχύει γεωγραφικά για όλες τις χώρες της Ευρωπαϊκής Ένωσης.

(2) Η εγγυητική περίοδος για όλα τα μεταλλικά συστατικά είναι 20 έτη.

(3) Η εγγυητική περίοδος για υπεριώδη αντίσταση όλων των EP-DM ή των πλαστικών συστατικών είναι 20 έτη.

(4) Η εγγυητική περίοδος που ορίζεται στην § 1 υποενοότητα 1 αρχίζει κατά την ημερομηνία της παράδοσης του προϊόντος στον πελάτη.

## **§ 3. Προϋποθέσεις εγγύησης**

(1) Ο πελάτης θα πρέπει να δηλώσει εγγράφως στην εταιρεία DEAL οποιοσδήποτε προφανείς ατέλειες, το συντομότερο δυνατόν από την εμφάνιση του προβλήματος. Ο πελάτης θα θεωρηθεί ότι έχει αποσυρθεί από τις αξιώσεις εγγύησής του, εάν τέτοια ειδοποίηση δεν θα παρασχεθεί.

## **§ 4. Διαδικασίες σε περίπτωση υποβολής παραπόνων**

(1) Εάν το προϊόν παρουσιάζει ατέλειες που εμπίπτουν σε αυτήν την εγγύηση, ο πελάτης θα πρέπει αμέσως να έλθει σε επαφή με την εταιρεία DEAL στο τηλ : +30 23310 77000, έχοντας διαθέσιμες τις ακόλουθες πληροφορίες :

- Το όνομα, τη διεύθυνση, τον ταχυδρομικό κώδικα και ένα αριθμό τηλεφώνου, όπου θα μπορεί το προσωπικό της εταιρείας να επικοινωνήσει με τον ενδιαφερόμενο.

- Την περιγραφή προϊόντος, την παραλαβή αγορών που περιέχει την ημερομηνία και τη διεύθυνση του προμηθευτή.

- Την ημερομηνία της εγκατάστασης, τη θέση και τη διεύθυνση της εγκατάστασης.

- Μια πλήρης λίστα των ατελειών και των πρόσθετων πληροφοριών που θα μπορούσαν να βοηθήσουν στην ανάλυση της ατέλειας.

(2) Το προσωπικό της εταιρείας DEAL θα ενημερώσει για οποιαδήποτε πρόσθετα βήματα και θα εφοδιάσει τον ενδιαφερόμενο με το μεμονωμένο αριθμό παραπόνων. Παρακαλώ παρέχετε αυτόν τον αριθμό κατά τη διάρκεια οποιασδήποτε συζήτησης σχετικής με την επεξεργασία του θέματος.

(3) Εάν τα μέλη προσωπικού ζητήσουν να σταλεί η τεκμηρίωση αγορών (πχ αποδείξεις, δελτία αποστολής) αυτές θα πρέπει να σταλούν, είτε ταχυδρομικώς, είτε με fax στην ακόλουθη διεύθυνση:

*Εταιρεία DEAL, ΔΕΛΑΒΕΡΙΔΗΣ & ΣΙΑ Ο.Ε, ΠΡΟΙΟΝΤΑ ΑΛΟΥΜΙΝΙΟΥ, ΜΕΣΗ ΒΕΡΟΙΑΣ, ΤΚ 59100, ΤΘ 50, Fax: +30 23310 41693.*

4) Παρακαλώ σημειώστε ότι, η εταιρεία DEAL δεν μπορεί να δεχτεί την παράδοση οποιονδήποτε υλικών, χωρίς την προγενέστερη ειδοποίησή της τουλάχιστον τηλεφωνικώς.

## **§ 5 Τελικές διατάξεις**

(1) Η αξίωση του πελάτη κάτω από αυτήν την εγγύηση περιορίζεται στην απόδοση εγγύησης που απαριθμείται στην § 1.

(2) Η εταιρεία μας δεν θα είναι υπεύθυνη για οποιοσδήποτε καθυστερήσεις ή αποτυχία να παρασχεθεί η απόδοση εγγύησης που απαριθμείται στην § 1, εάν εκείνη η καθυστέρηση ή αποτυχία προκαλείται από ανωτέρα βία, τον πόλεμο, συνθήκες πολέμου, την κοινωνική αναταραχή, τις απεργίες, τις επιδημίες, την πυρκαγιά, την πλημμύρα ή άλλες παρόμοιες περιστάσεις, οι οποίες είναι έξω από την περιοχή ευθύνης της εταιρείας.

**Σημείωση:** Αυτοί οι όροι της εγγύησης ισχύουν ανεξάρτητα από τα νομικά και συμβατικά δικαιώματα εγγύησης, τα οποία προβλέπονται από το νόμο περί προστασίας των καταναλωτών, αποτελούν δε συμπλήρωμα αυτών.

DEAL  
ΔΕΛΑΒΕΡΙΔΗΣ & ΣΙΑ Ο.Ε.  
ΠΡΟΙΟΝΤΑ ΑΛΟΥΜΙΝΙΟΥ  
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[www.dealsolar.gr](http://www.dealsolar.gr)



**XLPE INSULATED  
MAINS AND  
CONTROL CABLE  
(1.5MM<sup>2</sup> TO 16MM<sup>2</sup>)**

## FIXED WIRING AND MAINS CABLES

Stranded plain annealed copper conductors, XLPE insulated, PVC bedding, galvanised steel wire armour, PVC outer sheath. Black. 600/1000 volts grade to BS5467. Flame propagation to IEC 332 PT1 and BS4066 PT1.

CCC CODE	CONDUCTOR SIZE (MM <sup>2</sup> )	STRANDING (MM)	NO. OF CORES	WEIGHT KG/KM	OVERALL DIAMETER (MM)	GLAND SIZE (MM)	SINGLE CLEAT
XLPE2X1/5	1.5	7/0.53	2	305	12.4	20/16	0.5
XLPE3X1/5	1.5	7/0.53	3	338	12.9	20/16	0.6
XLPE4X1/5	1.5	7/0.53	4	381	13.7	20S	0.6
XLPE5X1/5	1.5	7/0.53	5	426	14.2	20S	0.6
XLPE7X1/5	1.5	7/0.53	7	488	15.6	20S	0.7
XLPE8X1/5	1.5	7/0.53	8	501	16.7	20	0.7
XLPE10X1/5	1.5	7/0.53	10	777	18.7	20	0.8
XLPE12X1/5	1.5	7/0.53	12	817	20.1	20	0.8
XLPE19X1/5	1.5	7/0.53	19	1225	24.0	25	1.0
XLPE27X1/5	1.5	7/0.53	27	1553	27.7	32	1.1
XLPE37X1/5	1.5	7/0.53	37	1859	30.3	32	1.2
XLPE48X1/5	1.5	7/0.53	48	2236	32.3	32	1.4
XLPE2X2/5	2.5	7/0.67	2	352	13.2	20S	0.6
XLPE3X2/5	2.5	7/0.67	3	397	13.8	20S	0.6
XLPE4X2/5	2.5	7/0.67	4	452	14.7	20S	0.6
XLPE5X2/5	2.5	7/0.67	5	549	16.3	20S	0.6
XLPE7X2/5	2.5	7/0.67	7	685	17.6	20	0.7
XLPE10X2/5	2.5	7/0.67	10	1000	21.4	25	0.9
XLPE12X2/5	2.5	7/0.67	12	910	21.8	25	0.9
XLPE19X2/5	2.5	7/0.67	19	1500	26.1	25	1.1
XLPE27X2/5	2.5	7/0.67	27	1928	30.3	32	1.2
XLPE37X2/5	2.5	7/0.67	37	2360	33.4	32	1.4
XLPE48X2/5	2.5	7/0.67	48	3888	38.8	40	1.6
XLPE2X4	4.0	7/0.85	2	419	14.3	20S	0.6
XLPE3X4	4.0	7/0.85	3	481	14.9	20S	0.6
XLPE4X4	4.0	7/0.85	4	563	16.2	20	0.7
XLPE5X4	4.0	7/0.85	5	810	18.9	20	0.8
XLPE7X4	4.0	7/0.85	7	912	19.7	20	0.8
XLPE12X4	4.0	7/0.85	12	1400	25.0	25	1.0
XLPE19X4	4.0	7/0.85	19	1852	28.1	32	1.2
XLPE27X4	4.0	7/0.85	27	2630	35.2	40	1.4
XLPE2X6	6.0	7/1.04	2	498	15.4	20S	0.7
XLPE3X6	6.0	7/1.04	3	639	17.4	20	0.7
XLPE4X6	6.0	7/1.04	4	795	18.3	20	0.8
XLPE5X6	6.0	7/1.04	5	970	20.5	25	0.8
XLPE7X6	6.0	7/1.04	7	1180	21.9	25	0.9
XLPE2X10	10.0	7/1.35	2	764	17.9	20	0.8
XLPE3X10	10.0	7/1.35	3	908	18.9	25	0.8
XLPE4X10	10.0	7/1.35	4	1064	20.3	25	0.8
XLPE5X10	10.0	7/1.35	5	1150	22.0	25	0.9
XLPE7X10	10.0	7/1.35	7	1560	25.0	25	1.0
XLPE2X16	16.0	7/1.70	2	900	21.9	25	0.9
XLPE3X16	16.0	7/1.70	3	1220	24.4	25	1.0
XLPE4X16	16.0	7/1.70	4	1410	26.3	25	1.1
XLPE5X16	16.0	7/1.70	5	1800	26.0	25	1.1
XLPE7X16	16.0	7/1.70	7	2237	28.1	32	1.2

### Temperature limits:

-15 to +90°C.

### Bending radius:

6 x overall diameter.

### Core identification:

2 core - Brown, Blue.

3 core - Brown, Black, Grey.

4 core - Brown, Black, Grey, Blue.

5 core and above - up to 6mm<sup>2</sup> -

White with Black numbers.

5 core and above - 10mm<sup>2</sup> and 16mm<sup>2</sup> - Brown, Black, Grey, Blue, Green/Yellow

1.5 & 2.5 - 2,3,4 core also available in white numbered cores to ESI 09-6

Should not be installed at temperatures below 0°C.

Current ratings, see page 112.

## FIXED WIRING AND MAINS CABLES

Stranded plain annealed copper conductors, XLPE insulated, PVC bedding, galvanised steel wire armour, PVC outer sheath. Black. 600/1000 volts grade to BS5467. Flame propagation to IEC 332 PT1 and BS4066 PT1.



**XLPE INSULATED  
MAINS CABLE  
(25MM<sup>2</sup> TO 400MM<sup>2</sup>)**

CCC CODE	CONDUCTOR SIZE (MM <sup>2</sup> )	STRANDING (MM)	NO. OF CORES	WEIGHT KG/KM	OVERALL DIAMETER (MM)	GLAND SIZE (MM)	SINGLE CLEAT
6942X25	25	7/2.14	2	1000	20.4	25	0.9
6943X25	25	7/2.14	3	1500	23.6	32	1.0
6944X25	25	7/2.14	4	1950	26.1	32	1.2
6945X25	25	7/2.14	5	2370	31.0	32	1.2
6942X35	35	7/2.52	2	1490	27.9	32	1.2
6943X35	35	7/2.52	3	1940	29.6	32	1.2
6944X35	35	7/2.52	4	2350	32.1	32	1.4
6945X35	35	7/2.52	5	3150	35.0	40	1.4
6942X50	50	19/1.78	2	1750	25.8	32	1.2
6943X50	50	19/1.78	3	2225	28.5	32	1.2
6944X50	50	19/1.78	4	2875	32.0	32	1.4
6945X50	50	19/1.78	5	4260	40.0	50S	1.6
6942X70	70	19/2.14	2	2300	29.0	32	1.2
6943X70	70	19/2.14	3	3025	32.2	32	1.4
6944X70	70	19/2.14	4	4250	37.7	40	1.6
6945X70	70	19/2.14	5	5685	43.0	50S	1.8
6942X95	95	19/2.52	2	3100	33.1	40	1.6
6943X95	95	19/2.52	3	4275	37.0	40	1.6
6944X95	95	19/2.52	4	5475	41.7	50S	1.8
6945X95	95	19/2.52	5	7700	52.0	50	R9
6942X120	120	37/2.03	2	3700	36.1	40	1.6
6943X120	120	37/2.03	3	5250	40.4	50S	1.8
6944X120	120	37/2.03	4	7175	47.1	50	2.0
6942X150	150	37/2.25	2	4400	39.3	40	1.8
6943X150	150	37/2.25	3	6650	45.5	50S	2.0
6944X150	150	37/2.25	4	8475	51.4	50	R9
6942X185	185	37/2.52	2	5700	44.7	50S	2.0
6943X185	185	37/2.52	3	8000	49.8	50	2.0
6944X185	185	37/2.52	4	10350	56.6	63S	R10
6942X240	240	61/2.25	2	7100	49.0	50	2.0
6943X240	240	61/2.25	3	10150	55.1	63S	R9
6944X240	240	61/2.25	4	13000	63.0	63	R10
6942X300	300	61/2.52	2	8500	53.5	63S	R9
6943X300	300	61/2.52	3	12400	60.2	63	R10
6944X300	300	61/2.52	4	15750	68.8	75S	R11
6942X400	400	61/2.85	2	10650	58.0	63S	R10
6943X400	400	61/2.85	3	14770	65.8	75S	R11
6944X400	400	61/2.85	4	19950	75.4	90	R12

### Temperature limits:

-15 to +90°C.

Should not be installed at temperatures below 0°C.

### Bending radius:

8 x overall diameter.

Current ratings, see page 112.

### Core identification:

2 core - Brown, Blue.

3 core - Brown, Black, Grey.

4 core - Brown, Black, Grey, Blue.

5 core - Brown, Black, Grey, Blue, Green/Yellow.

# EXZHELLENT SOLAR ZZ-F (PVF-1 TÜV)

VOLTAGE: 0,6/1 kV c.a. - 1,8 kV c.c.

 **General Cable**



## STANDARDS

Specification TÜV Pfg 1169

IEC 60332-1 - Flame propagation (single wire)

IEC 60754 – Low corrosivity and acidity of evolved gases

IEC 61034 – Low opacity of evolved fumes

## CONSTRUCTION

### CONDUCTOR:

Tinned copper, flexible class 5

### INSULATION:

Halogen-free thermoset compound

### SHEATH:

Halogen-free thermoset compound

## APPLICATIONS AND MAIN CHARACTERISTICS

For the connection between PV modules and between PV modules and inverters (i.e. DC Application).

Low fire hazard cable: flame retardant, halogen free and low opacity of evolved fumes.

Weather resistant.

Work at extreme ambient temperatures, from -40 °C to +90 °C.

Maximum conductor temperature of 120 °C during 20.000 hours.

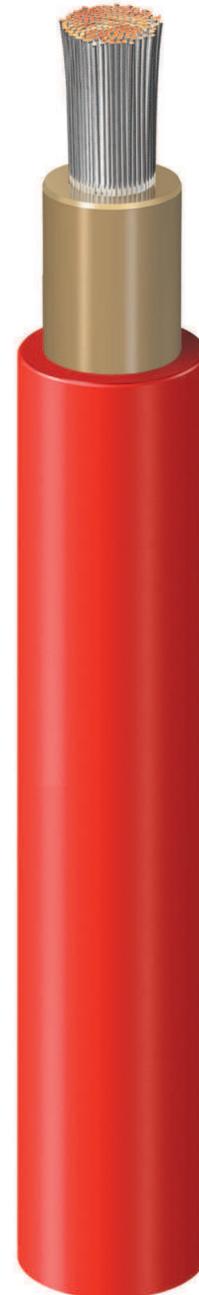
Excellent mechanical performance.

Mobile service.

Minimum service life of 25 years.

Current ratings at 60 °C ambient temperature and 120 °C conductor temperature.

Product certified by TÜV - Cert. No. R.60034574.



# EXZHELLENT SOLAR ZZ-F (PVF-1 TÜV)

VOLTAGE: 0,6/1 kV c.a. - 1,8 kV c.c.



						
	mm <sup>2</sup>	mm	kg/km	mm	A	V/A.km
1614107	1x2,5	4.8	45	20	41	22.87
1614108	1x4	5.4	65	22	55	14.18
1614109	1x6	6.1	85	25	70	9.445
1614110	1x10	7.8	140	31	96	5.433
1614111	1x16	8.6	195	35	132	3.455
1614112	1x25	10.3	290	41	176	2.215
1614113	1x35	11.6	390	47	218	1.574



Low Voltage Products

Solar energy

Protecting and isolating PV systems

# Miniature circuit-breakers S800 PV-S



S800 PV-S miniature circuit-breakers can be used in networks up to 1200 V d.c. (four-pole version). These products and their vast range of accessories (auxiliary contacts, release coils) can be used to create countless system configurations. The main features of S800 PV-S circuit-breakers are:

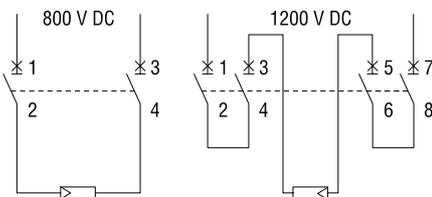
- interchangeable terminals
- fault signalling lever in the central position
- contact status displayed for each individual pole
- no restrictions as to polarity or power direction in the wiring
- use of the rotary door operating handle

Main technical specifications		S800 PV-S	
Reference Standards		IEC EN 60947-2	
Rated current $I_n$	[A]	10...80	100, 125
Number of poles		2, 4	
Rated voltage $U_e$			
(d.c.) 2 poles*	[V]	800	1200
(d.c.) 4 poles*	[V]	600	1200
Ultimate rated short-circuit breaking capacity $I_{cu}$			
(d.c.) 600/800 V (2 poles) *	[kA]	5	5
(d.c.) 1200 V (4 poles) *	[kA]	5	5
Thermomagnetic release characteristic		4 $I_n \leq I_m \leq 7 I_n$	
Class of use		A	
Operating temperature	[°C]	-25...+60	
Mounting		on EN 60715 channel (35 mm) with a quick coupling device	

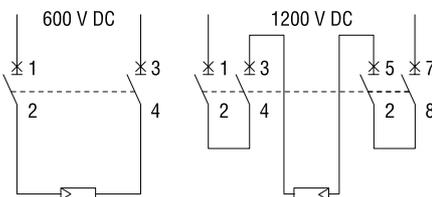
Please refer to wiring diagrams\*

Poles	Rated current $I_n$ [A]	Description Type	Order code
2	10	S802PV-S10	2CCP842001R1109
2	13	S802PV-S13	2CCP842001R1139
2	16	S802PV-S16	2CCP842001R1169
2	20	S802PV-S20	2CCP842001R1209
2	25	S802PV-S25	2CCP842001R1259
2	32	S802PV-S32	2CCP842001R1329
2	40	S802PV-S40	2CCP842001R1409
2	50	S802PV-S50	2CCP842001R1509
2	63	S802PV-S63	2CCP842001R1639
2	80	S802PV-S80	2CCP842001R1809
2	100	S802PV-S100	2CCP842001R1829
2	125	S802PV-S125	2CCP842001R1849
4	10	S804PV-S10	2CCP844001R1109
4	13	S804PV-S13	2CCP844001R1139
4	16	S804PV-S16	2CCP844001R1169
4	20	S804PV-S20	2CCP844001R1209
4	25	S804PV-S25	2CCP844001R1259
4	32	S804PV-S32	2CCP844001R1329
4	40	S804PV-S40	2CCP844001R1409
4	50	S804PV-S50	2CCP844001R1509
4	63	S804PV-S63	2CCP844001R1639
4	80	S804PV-S80	2CCP844001R1809
4	100	S804PV-S100	2CCP844001R1829
4	125	S804PV-S125	2CCP844001R1849

≥ 80A



≥ 100, 125A



## Connection

Photovoltaic panel network  
in earth-insulated systems

# Surge arresters for DC OVR PV

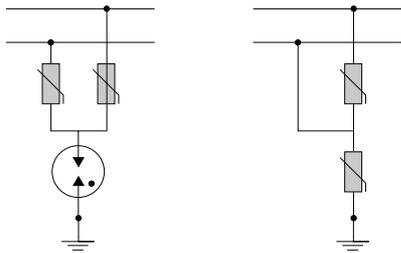


ABB provides a wide range of surge protection devices that have been specifically designed for photovoltaic systems.

The main features of the OVR PV surge arresters are:

- built-in thermal protection with 25 A d.c. breaking capacity\*
- removable cartridges for easy maintenance with no need to isolate the line
- remote signalling contact for monitoring the operating status (TS versions)
- no subsequent short-circuit current
- no risk if the polarity is reversed

Main technical specifications		OVR PV
Electrical specifications		
Type of network		photovoltaic systems
Type		2
Response time	[ns]	25
Residual current	[mA]	< 1
Protection class		IP20
Built-in thermal protection		self-protected for up to 100 A d.c. short-circuit current
Back-up protection		
current $I_{cc} < 100A$		not required
current $I_{cc} > 100A$		10 A gR fuse
Mechanical specifications		
L/PE terminals		
rigid	[mm <sup>2</sup> ]	2,5...25
flexible	[mm <sup>2</sup> ]	2,5...16
Tightening torque L [	Nm]	2,80
Status indicator		yes
Remote signal contact		
Type		1 NA/NC
Minimum rating		12 V d.c. - 10 mA
Maximum rating		250 V a.c. - 1 A
Cable section	[mm <sup>2</sup> ]	1,5
TS versions		
Operating temperature	[°C]	-40...+80
Storage temperature	[°C]	- 40...+80
Maximum altitude	[m]	2000
Housing material		PC RAL 7035
UL94 fire resistance		V0
Reference standards		IEC 61643-1 / EN 61643-11

**\*Note:**

For surge protection device installed at points of the network where short circuit current exceeds 25A DC suitable protection must be provided

I Max	Protection Level (L-L/L-PE) kV	Description Type	Order code
40A	2.8/1.4	OVR PV 40 600 P	2CTB803953R5300
	2.8/1.4	OVR PV 40 600 P TS	2CTB803953R5400
	3.8	OVR PV 40 1000 P	2CTB803953R6400
	3.8	OVR PV 40 1000 P TS	2CTB803953R6500

# Surge Arresters for AC OVR T2



The OVR T2 protects inverters and installations from over voltages and impulse currents, such as switching and lighting surges. The device ensures the limitation of over voltage to an acceptable level for the equipment to be protected.

The device has a remote signal control and removable cartridge for easy maintenance without needing to isolate the line.

These devices are available with a remote signal control and removable cartridge (...P TS) for easy maintenance without needing to isolate the line.

Main technical specifications	OVR T2
Rated operating voltage	230V and 400V AC
Poles	1, 2, 3, 4
Maximum discharge current	15, 40, 70kA
Residual current	< 1
Voltage protection level	1.2 .... 3.8kV
Standards	IEC 61643-1 IEC 61643-11

Network TT	I Max	Type	Order code
TT (3 + N)	25	OVR T1 3N 25 255 TS	2CTB815101R0700
TT (1 + N)	40	OVR T2 1N 40 275 SP TS	2CTB803952R0200
TT (3 + N)	70	OVR T2 3N 70 275 SP TS	2CTB803953R0100
TT (1 + N)	15	OVR T2 1N 15 275 P	2CTB803952R1200

# Miniature circuit breaker for AC S 200M



The S200 M protect installations against overload and short circuit, ensuring reliability and safety for operations. They are selectively switchable, even under load, in the event of a fault or for maintenance purposes. The standstill times are minimised thanks to the devices' reclosing capability. These devices offer users confidence thanks to their 100% factory testing. The devices, with their wide range of accessories, are suitable for international use.

The S200 M are known for their ease of maintenance – thanks to a special type of fastening for easy removal of the device from its present installation. Supply is possible from above or below, also for busbars. Without busbars, two terminal sections can be used. The tripping behaviour caters to customer requirements (B, C, D, K, Z characteristics)

Main technical specifications		S 200M
Reference Standards		IEC 60898, IEC 60947-2 UL 489, UL 1077
Rated operating current	[Vd.c.]	0,5 ... 63 A
Ultimate short-circuit breaking capacity		6, 10, 25 kA
Rated operating voltage	1-pole	12 ... 230 VAC
	2-4 pole	12 ... 400 VAC

Rated current In [A]	Rated breaking capacity [kA]	Poles	Description Type	Order code
10	10kA	2	S202MC10	2CDS272001R0104
16			S202MC16	2CDS272001R0164
20			S202MC20	2CDS272001R0204
25			S202MC25	2CDS272001R0254
32			S202MC32	2CDS272001R0324
10			3	S203MC10
16		S203MC16		2CDS273001R0164
20		S203MC20		2CDS273001R0204
25		S203MC25		2CDS273001R0254
32		S203MC32		2CDS273001R0324
10		4		S204MC10
16			S204MC16	2CDS274001R0164
20	S204MC20		2CDS274001R0204	
25	S204MC25		2CDS274001R0254	
32	S204MC32		2CDS274001R0324	

# RCDs for AC F200 PV-B



Residual current devices ensure protection of people and installations against fault current to earth and fire risks. An RCD B type is required on the AC side in case of lack of electrical separation between the AC and the DC side.

The devices save money and improve global efficiency by using PV connectors without an internal insulation transformer. The devices, with their wide range of accessories are suitable for international use.

The RCCBs F202 PV B and F204 B are intended for installation of single and three phase PV converters. they protect against fire risks and leakage currents.

Main technical specifications	F202 PV B, F204 B
Rated operating current	25, 40, 63, 125A
Rated sensitivity current	30, 300, 500mA
Rated operating voltage	230 ... 400 VAC
Poles	2 ... 4
Type	B, B S (selective version)
Reference Standards	IEC/EN61008 IEC52423

Poles	A / mA	Description Type	Order code
2	40 / 300	F202-A-40/300mA	2CSF202121R3400
2	63 / 300	F202-A-63/300mA	2CSF202121R3630
4	40 / 300	F204-A-40/300mA	2CSF204121R3400
4	63 / 300	F204-A-63/300mA	2CSF204121R3630
4	63 /300	F204-B-63/300mA	2CSF204501R3630

# Enclosures Europa Series



The Europa series wall-mounted consumer units feature IP65 protection which makes them ideal for installation outdoors. This means that they can be used for making string boxes on the load side of photovoltaic strings.

The main features of the Europa series wall-mounted consumer units:

- class II insulation
- manufactured in self-extinguishing thermoplastic material able to withstand abnormal heat and fire up to 650 °C (glow wire test) in compliance with IEC 60695-2-11 standards
- installation temperature: -25 °C to +60 °C
- rated insulation voltage: 1000 V a.c.; 1500 V d.c.
- shock resistance: 6 joules (IK 08 degrees)
- pull-out DIN channel holder frame for more convenient bench wiring. Can be disassembled (and re-assembled by means of a snap-fit mechanism) to make the individual wires easier to route
- 53, 68 and 75 mm depth switchgear can be installed
- models with 8 or more modules equipped with bi-metal and rigid flanges for easier insertion of pipes and cables
- consumer units in compliance with IEC 23-48, IEC 23-49 and IEC 60670 standards- IMQ Mark



Description	Dimensions	Order code
IP65 consumer unit P/smoke grey 4M	140 x 220 x 140	12744
IP65 consumer unit P/smoke grey 8M	205 x 220 x 140	12748
IP65 consumer unit P/smoke grey 12M	275 x 220 x 140	12752
IP65 consumer unit P/smoke grey 8M 1 row	380 x 220 x 140	12753
IP65 consumer unit P/smoke grey 24M 2 rows	275 x 370 x 140	12754
IP65 consumer unit P/smoke grey 36M 2 rows	380 x 370 x 140	12755

Cable gland		Nut		Dimensions mm		
Description	Order code	Description	Order code	Gauge	Min	Max
M12 cable gland with metric pitch	00 951	Nut for M12 cable gland	00 96	12 x 1.5	3.5	7
M16 cable gland with metric pitch	00 952	Nut for M16 cable gland	00 962	16 x 1.5	5.5	10

## Junction boxes

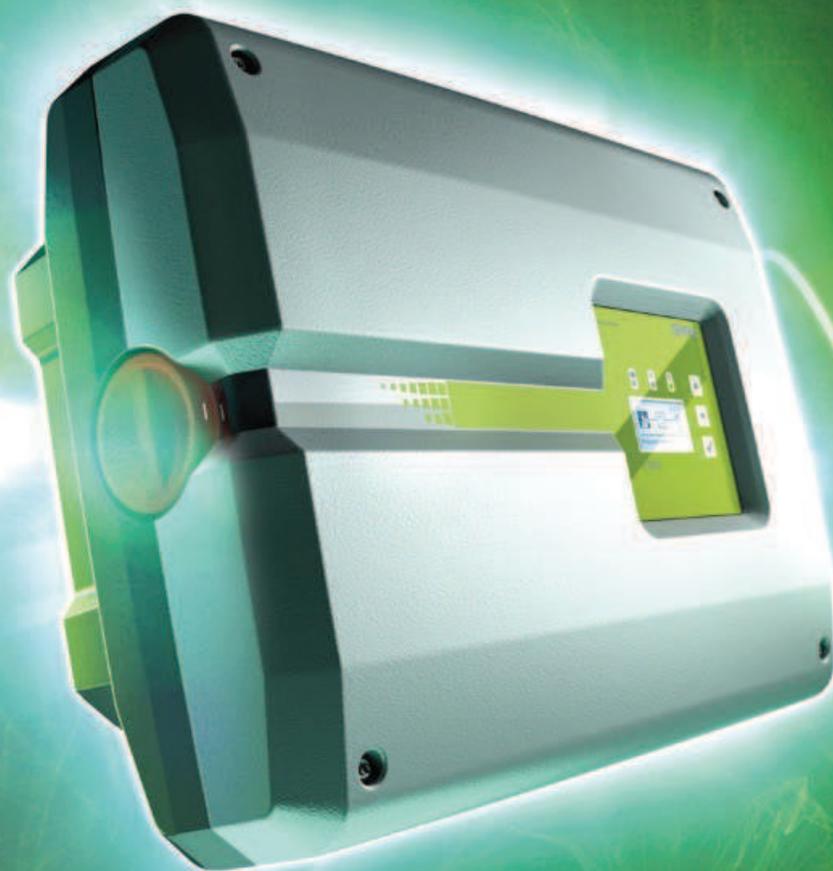


ABB also provides IP65 polycarbonate junction boxes that are perfect for use in outdoor installations.

The main features of the junction boxes are:

- class II insulation
- manufactured in self-extinguishing thermoplastic material able to withstand abnormal heat and fire up to 960 °C (glow wire test) in compliance with IEC 60695-2-11 standards
- installation temperature: -25 °C to +60 °C
- rated insulation voltage: 1000 V a.c.; 1500 V d.c.
- shock resistance: 20 joules (IK 10 degrees)
- junction boxes in compliance with IEC 23-48 and IEC 60670 standards
- IMQ Mark

Description	Dimensions	Order code
Box IP65 PC	140 x 220 x 140	12804
	205 x 220 x 140	12808
	275 x 220 x 140	12812



02/2013

EN

Smart  
connections.

Data sheet

PIKO 3.0

3.0

# Technical data PIKO 3.0



- Single-phase feed-in
- Transformerless converting
- An ergonomically designed casing for easy handling
- Broad input voltage range
- Integrated switch contact for internal consumption control
- Integrated robust electronic DC switch
- Integrated data logger and web server for system monitoring
- Various communication interfaces integrated as a standard: 2 x Ethernet (integrated switch), RS485, S0, 4 x analogue inputs (e.g. for ripple control receivers)
- Graphic display with 3-button operating concept

## Input side (DC)

		PIKO 3.0
Inverter type		PIKO 3.0
Max. PV power	kW	4.3
Rated input voltage ( $U_{DC,r}$ )	V	400
Max. input voltage ( $U_{DC,max}$ )	V	900
Min. input voltage ( $U_{DC,min}$ )	V	160
Start input voltage ( $U_{DC,start}$ )	V	180
Max. MPP voltage ( $U_{MPP,max}$ )	V	730
Min. MPP voltage with DC rated output in single-tracker operation ( $U_{MPP,min}$ )	V	270
Min. MPP voltage with DC rated output in dual-tracker or parallel operation ( $U_{MPP,min}$ )		-
Max. input current ( $I_{DC,max}$ )	A	12.5
Max. input current with parallel connection	A	-
Number of DC inputs		1
Number of independent MPP trackers		1

## Output side (AC)

Rated output, $\cos \varphi = 1$ ( $P_{AC,r}$ )	kW	3
Max. output apparent power $\cos \varphi_{adj}$	kVA	3
Max. output voltage ( $U_{AC,max}$ )	V	264.5
Min. output voltage ( $U_{AC,min}$ )	V	184
Rated output current	A	13
Max. output current ( $I_{AC,max}$ )	A	13.7
Short-circuit current (peak)	A	26.4
Grid connection		1/N/PE, AC, 230 V
Rated frequency (fr)	Hz	50
Setting range of the power factor $\cos \varphi_{AC,r}$		0,9...1...0,9
Max. total harmonic distortion	%	$\leq 3$

## Device properties

Max. night-time consumption of inverters	W	0.1
Max. night-time consumption of communication board	W	1.6

## Degree of efficiency

Max. efficiency	%	96.2
European efficiency rate	%	95.5

## Warranty

Warranty (years)		5
Warranty extension optional (years)		10/20

This manual is subject to technical changes and printing errors.  
 You can find current information at [www.kostal-solar-electric.com](http://www.kostal-solar-electric.com).  
 Manufacturer: KOSTAL Industrie Elektrik GmbH, Hagen, Germany

## Contact

KOSTAL Solar Electric GmbH  
 Hanferstr. 6  
 79108 Freiburg  
 Germany  
 Tel. +49 761 477 44 - 100  
 Fax +49 761 477 44 - 111  
[www.kostal-solar-electric.com](http://www.kostal-solar-electric.com)

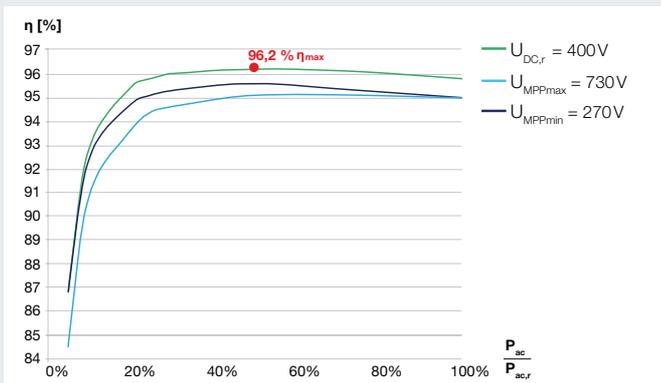
## System data

Topology: Without galvanic separation - transformerless		✓
Internal protection according to IEC 60529		IP 55
Protection class according to IEC 62103		I
Surge category according to IEC 60664-1 Input side (PV generator)		II
Surge category according to IEC 60664-1 Output side (grid connection)		III
Degree of contamination		3
Environmental category (outdoor installation)		✓
Environmental category (interior installation)		✓
UV resistance		✓
Minimum cable cross-section of AC connecting line	mm <sup>2</sup>	1.5
Minimum cable cross-section of DC connecting line	mm <sup>2</sup>	4
Min. fusing on output side		B16, C16
Operator protection		RCCM type B 30mA
Electronic disconnection device integrated		✓
Height	mm	385
Width	mm	500
Depth	mm	222
Weight	kg	22
Cooling principle - convection		✓
Cooling principle - regulated fans		-
Max. air throughput	m <sup>3</sup> /h	-
Max. noise emission	dB(A)	< 33
Ambient temperature	°C	-20...60
Max. installation altitude above sea level	m	2000
Relative humidity (non-condensing)	%	0...95
Connection technology at input side - MC 4		✓
Connection technology at output side - spring-loaded terminal strip		✓

## Various interfaces

Ethernet RJ45		2
RS485		1
S0		1
Analogue inputs		4

## Efficiency rate characteristic curves PIKO 3.0



Smart connections.



10-year product guarantee



12-year guarantee for 90% rated power



25-year guarantee for 80% rated power



## ECO LINE

# 72/185 – 200 W

### Monocrystalline module family



Longlife tested



Power proofed



Safety provided



Selection of components



Cross-linking degree test



Performance surplus of 1.5 to 6.49 Wp



Imp sorting



Special packing to avoid micro cracks in the cells



German warrantor

Wherever flexibility is especially sought after, this module is in top form. With its dimension in a 1:2 ratio, it can always be optimally arranged in every roof covering and open-field installation. Our 72-cell module portrays a positive image with plus tolerances of 1.5 to 6.49 Wp, through exemplary energy output. This is achieved through high-quality solar cell with an efficiency up to 18.6% at the best possible low light behaviour. A durable plug-in connection guarantees

reliable power contact for every weather. Compatible with current assembly systems through the torsionally stiff and corrosion-free hollow-section frame made of anodised aluminium. Manufactured according to German standards and under the strict eyes of our engineers, each Luxor photovoltaic module is marked by a special level of durability and reliability.

# ECO LINE ECO LINE 72/185 – 200 W

Monocrystalline module family

Electrical data	LX-185M	LX-190M	LX-195M	LX-200M
Rated power P <sub>mpp</sub> [Wp]	185.00	190.00	195.00	200.00
P <sub>mpp</sub> range	186.50 – 191.49	191.50 – 196.49	196.50 – 201.49	201.50 – 206.49
Rated current I <sub>mpp</sub> [A]	5.16	5.28	5.33	5.39
Rated voltage V <sub>mpp</sub> [V]	36.15	36.27	36.87	37.39
Short-circuit current I <sub>sc</sub> [A]	5.62	5.71	5.79	5.87
Open-circuit voltage U <sub>oc</sub> [V]	43.58	43.81	44.04	44.27
Efficiency at STC	14.61%	15.00%	15.39%	15.79%
Efficiency at 200 W/m <sup>2</sup>	14.21%	14.61%	15.00%	15.39%
NOCT [°C]	47 ± 2°C	47 ± 2°C	47 ± 2°C	47 ± 2°C

Specification as per STC (Standard test conditions): irradiance 1000 W/m<sup>2</sup> | module temperature 25°C | AM = 1,5  
 NOCT (nominal operating cell temperature): irradiance 800 W/m<sup>2</sup> | wind speed 1 m/sec | temperature 20°C | AM = 1,5

Limiting values	LX-185M / LX-190M / LX-195M / LX-200M
Max. system voltage [V]	1000 V
Max. return current [I]	12 A
Temperature range	-40 to 85°C
Snow-load zone <sup>1</sup>	approval up to SLZ 3 (according to DIN 1055)
Max. pressure load (static)	5400 Pa

Temperature coefficient	LX-185M / LX-190M / LX-195M / LX-200M
Temperature coefficient [V]   [I]   [P]	-0.35% / °C   0.04% / °C   -0.45% / °C

Specifications	LX-185M / LX-190M / LX-195M / LX-200M
Number of cells (matrix)	6 x 12, three strings in a row
Cell size	125 mm x 125 mm (diagonal: 165 mm)
Module dimensions (L x W x H) <sup>2</sup>   Weight	1,580 mm x 808 mm x 35 mm   15.0 kg
Front-side glass	3.2 mm hardened solar glass with low iron content
Frame	stable, anodised aluminium frame in a hollow-section design
Socket	plastic (PPO), IP65, ventilated and strain-relieved
Cable	4 mm <sup>2</sup> solar cable, cable length 1.0 m
Plug-in connection	high-quality plug-in system, (IP65) MC4 or equivalent
Hail test (max. hailstorm)	∅ 45 mm   impact velocity 23 m/s
General technical approval	classified according to DIN EN 13501-5 as B <sub>ROOF</sub> (ti)

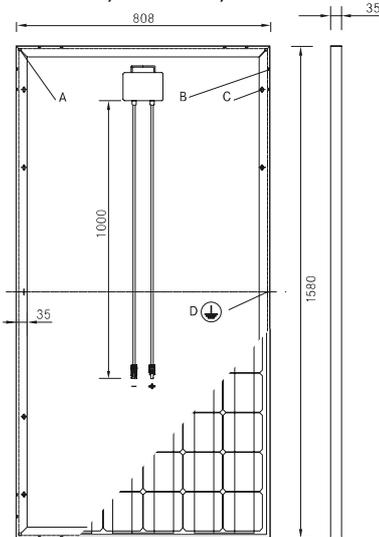
Packing	LX-185M / LX-190M / LX-195M / LX-200M
Packing unit	28 modules, 2 Imp classes   28 PU/40' container
Dimensions (L x W x H)   Weight	168 cm x 110 cm x 105 cm   496 kg gross

The specifications and average values can vary slightly. Decisive is the corresponding data of the individual measurement. Specifications are subject to change without notice. Measurement tolerance: rated power +/- 3%, other values +/- 10%, all information in this data sheet corresponds to DIN 50380, other information to be found in the installation guidelines.

- 1 For standing installation
- 2 Tolerance L/W = +/- 3 mm, H = the dimensions given in the order confirmation will be decisive
- 3 Location on request

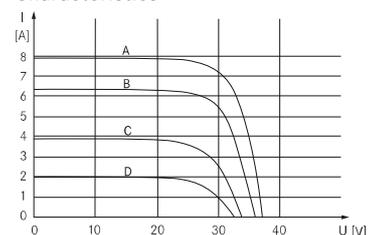
Luxor, your specialised company

Back view/ Front view/ Side view<sup>2</sup>

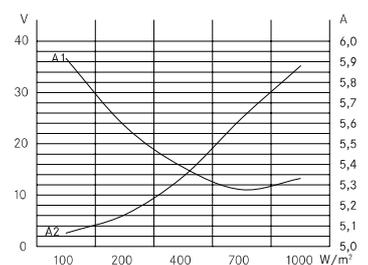


- A: 4 x drainage 10\*10 mm
- B: 16 x ventilation aperture 3\*7 mm
- C: 8 x mounting hole<sup>3</sup> d = 7 mm
- D: 2 x earthing d = 2 mm

### Characteristics



A: 1000 W/m<sup>2</sup> | B: 800 W/m<sup>2</sup> | C: 600 W/m<sup>2</sup>



A1: Imp | A2: Vmpp

Guidelines: 2006/95/EG - 2006/95/EC, 89/336/EWG - 89/336/EEC, 93/68/EWG - 93/68/EEC



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## GUARANTEE DECLARATION FOR PHOTOVOLTAIC MODULES

Dear Luxor Solar customer

Luxor Solar GmbH photovoltaic modules are carefully produced and their operational capability is subjected to a thorough final inspection in order to meet the highest expectations. Should a photovoltaic module, nevertheless exhibit a material and/or manufacturing defect or a loss of power you have recourse, in addition to any statutory guarantee claims to which you are entitled against the seller, to Luxor Solar GmbH under this product and performance guarantee under the following conditions. The guarantee applies to all modules which were sold on from us to a direct buyer (first buyer) from May 2007 onwards.

### 1. PRODUCT GUARANTEE

Luxor Solar GmbH guarantees that the photovoltaic modules manufactured in its name (from here on referred to as „product/s“), are, under normal and correct conditions of use, installation, operation and maintenance, free from material and manufacturing defects for a period of ten (10) years from the delivery of the product by Luxor Solar GmbH to the first buyer. The product guarantee relates to the components: frame, glass, cells, cable, connectors, junction box and film, however only in terms of function. For example, discolorations do not represent faults or defects in the terms of this product guarantee.

Should a product, due to defects affecting one or more components, not meet this impeccable quality, which guarantees the flawless, technical functionality of the product, Luxor Solar GmbH will, for a period of time of ten (10) years from delivery of the product by Luxor Solar GmbH to the first buyer, meet its guarantee obligation in a manner of its own choosing by repairing the product free of charge on site within Europe, exchanging the deficient product (place of fulfilment is the place where Luxor Solar GmbH has its head office) for a similar fault-free product or by refunding the purchasing price. This maximum amount which shall be refunded is the sum which Luxor Solar GmbH itself has collected from its first buyer taking an annual write-off of 1/10 (one tenth) of the original purchase price into account.

### 2. GUARANTEE AGAINST DEGRADATION OF THE OUTPUT POWER

If (a) within a period of twelve (12) years from the delivery of the product to the first buyer the power is less than 90% of the specified minimum power at the time of delivery (nominal value in accordance with our product label) or (b) within a period of twenty-five (25) years from the purchase date by the first buyer the power is less than 80% of the specified minimum power at the time of delivery (nominal value in accordance with our product label) of the module, Luxor Solar GmbH shall, provided that Luxor Solar GmbH recognises such a loss of power as being due to a degradation / power loss of the cells, replace the lost performance at its own discretion through:

- + additional modules or a replacement (place of fulfilment is the place where Luxor Solar GmbH has its head office), or
- + repairing on-site within Europe, or
- + refunding the corresponding fraction of the original purchase price which Luxor Solar GmbH itself has collected from its first buyer taking into account an annual write-off of 1/12 (one twelfth) of the original purchase price in the case of a degradation of over 10% within 12 years and 1/25 (one twenty-fifth) in the case of a degradation of over 20% within 25 years.

### 3. LIMITS / EXCLUSION OF GUARANTEE OBLIGATIONS

The agreed guarantee does not apply to losses of power or defects which have arisen through improper treatment, operating errors or external forces, or through other effects as cited below:

This guarantee does not apply in the following cases, if a defect / loss of power in a module has occurred

- + as a result of construction parts, devices and system components such as diodes, connection cables, inverters etc., that were connected to the module by persons other than employees or subcontractors of Luxor Solar GmbH or as a result of other devices or the assembly method of such devices;
- + as a result of unprofessional or defective cabling work, or installation work or handling during such work;
- + on account of a defective design, configuration and/or installation of the system and/or its individual components;
- + as a result of operation under improper environmental conditions or improper methods which diverge from the product specification, operating instructions or rating-plate details;
- + as a result of improper maintenance and testing, broken glass due to extraneous causes, flying objects or external stress;
- + as a result of influences such as dirt on the front glass, pollution or damage through unusual environmental or weathering effects, such as smoke, salt (incl. salt contained in the air in coastal regions) or other external influences of this kind;
- + on account of damaging influences through paints or unsuitable cleaning agents applied to the module;
- + on account of use on mobile units such as vehicles, boats etc. unless specifically allowed for this use; or
- + as a result of the forces of nature, force majeure and other unforeseeable circumstances outside of the influence of Luxor Solar GmbH, for example, earthquakes, storms, volcanic, eruptions, flooding, lightning, snow damage, nuclear events etc.

Luxor Solar GmbH or its authorized representatives reserve the right to verify the relevant circumstances. Any arising expenses or costs for dismantling, reinstallation, inspection on the part of the customer as well as other indirect costs will not be born by Luxor Solar GmbH.

Through this guarantee commitment there shall be no further claims or other claims against Luxor Solar GmbH, especially compensation claims related to any loss of profit, loss of use, indirect damages as well as claims to compensation for damages which have arisen outside of the product.

#### 4. CLAIMS ON THE GUARANTEE COMMITMENT

The performance of guarantee benefits does not extend the period of the guarantee which begins with the delivery of the goods to the first buyer.

The guarantee benefits are only honoured if notice of the defect / degradation is given in writing immediately after detection by the buyer to the respective seller / trader or to Luxor Solar GmbH, with the production of the original bill and/or the cash receipt, the delivery date, module type, and serial number shown, and is then proven via appropriate channels (by an acknowledged test institute / test procedure / expert report). The guarantee will not be valid if the model or serial number of the module is altered, removed or made illegible. Luxor Solar GmbH accepts no return of modules unless this is requested by Luxor Solar GmbH themselves.

For the fulfilment of the guarantee commitments and for the purpose of product exchange, Luxor Solar GmbH may deliver another model of its own choice (different size, design, colour and/or performance parameters); furthermore no claim shall exist to the use of new or as good as new products when supplied as replacement products. The exchanged modules shall become the property of Luxor Solar GmbH. If Luxor Solar GmbH offers guarantee benefits for defective or degraded modules in the form of a replacement or complementary goods, then this shall not encompass the costs for dismantling/exchanging the products which form the basis of the complaint, nor transport from our warehouse to the end customer.

Date 15 July 2010



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Data sheet

Powador

3200 | 4200 | 4400

5300 | 5500 | 6600

## Less is More: No Transformer, lots of Power.

The Powador 3200 – 6600 transformerless string inverters.

Our Powador 3200 to 6600 transformerless single-phase inverters are now equipped with digital controllers so that they can be used internationally. The appropriate country settings can easily be selected on-site; the country-specific settings are stored in the software, so the inverters can be quickly installed in any country. Users can also choose a menu language regardless of the selected country setting. We have changed the product names. The maximum PV generator power for which the particular unit is optimised can now be read from the designation. All units operate with a full bridge without a step-up converter. Four IGBT power switches reproduce the sine-

shaped voltage curve of the public power grid employing pulse width modulation. These are true single-stage, self-commutated units. However, the input voltage must be greater than the peak line voltage for them to be used.

The units are equipped with a wide MPP range of 350 V to 600 V. The open circuit voltage is 800 V, which simplifies the work of installers when laying out systems. The same is true for the integrated DC disconnect. Screw terminals make connecting to the grid easy. The units contain a single- or three-phase monitoring system conforming to VDE0126-1-1, including an AC/DC-sensitive residual

current protector. The units can thus be connected to the grid without any additional measures, even in installations with several inverters.

In addition, the units operate using purely passive noiseless convection cooling. The heat that is lost is, to a great degree, dissipated via the heat sink on the rear of the unit. The rest of the heat is radiated from the surface of the aluminium housing. No fans, no problems, just long service life.

# Technical data

Powador 3200 | 4200 | 4400 | 5300 | 5500 | 6600

Electrical data	3200	4200	4400
<b>Input variables</b>			
Max. recommended PV generator power	3200 W	4200 W	4400 W
MPP range	350 V ... 600 V	350 V ... 600 V	350 V ... 600 V
No-load voltage	800 V	800 V	800 V
Max. input current	8.6 A	11.5 A	12.0 A
Number of strings	3	3	3
Number of MPP trackers	1	1	1
Inverse polarity protection	short-circuit diode	short-circuit diode	short-circuit diode
<b>Output variables</b>			
Rated output	2600 VA	3450 VA	3600 VA
Max. output	2850 VA	3800 VA	4000 VA
Supply voltage	acc. to local requirements	acc. to local requirements	acc. to local requirements
Rated current	11.3 A	15.0 A	15.6 A
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
cos phi	0.80 inductive ... 0.80 capacitive	0.80 inductive ... 0.80 capacitive	0.80 inductive ... 0.80 capacitive
Number of grid phases	1	1	1
<b>General electrical data</b>			
Max. efficiency	96.6 %	96.6 %	96.5 %
European efficiency	95.8 %	95.8 %	95.9 %
Night consumption	0 W	0 W	0 W
Switching plan	self-commutated, transformerless	self-commutated, transformerless	self-commutated, transformerless
Grid monitoring	acc. to local requirements	acc. to local requirements	acc. to local requirements
<b>Mechanical data</b>			
Display	LCD 2 x 16 characters	LCD 2 x 16 characters	LCD 2 x 16 characters
Control units	2 buttons for display control	2 buttons for display control	2 buttons for display control
Interfaces	RS232/RS485, 50	RS232/RS485, 50	RS232/RS485, 50
Fault signalling relay	potential-free NOC max. 250 V / 1 A	potential-free NOC max. 250 V / 1 A	potential-free NOC max. 250 V / 1 A
Connections	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)
Ambient temperature	-20 °C ... +60 °C*	-20 °C ... +60 °C*	-20 °C ... +60 °C*
Temperature monitoring	> 75 °C temperature-dependent power limitation / > 85 °C cut-out	> 75 °C temperature-dependent power limitation / > 85 °C cut-out	> 75 °C temperature-dependent power limitation / > 85 °C cut-out
heat sink	free convection / no fan	free convection / no fan	free convection / no fan
Cooling	IP54	IP54	IP54
Protection class	< 35 dB (A) (noiseless)	< 35 dB (A) (noiseless)	< 35 dB (A) (noiseless)
Noise emission	integrated	integrated	integrated
DC switch	aluminium	aluminium	aluminium
Casing	500 x 340 x 200 mm	550 x 340 x 200 mm	550 x 340 x 220 mm
H x W x D	19 kg	21 kg	21 kg
Weight			

\*Power derating at high ambient temperatures

Electrical data	5300	5500	6600
<b>Input variables</b>			
Max. recommended PV generator power	5300 W	5500 W	6600 W
MPP range	350 V ... 600 V	350 V ... 600 V	350 V ... 600 V
No-load voltage	800 V	800 V	800 V
Max. input current	14.5 A	15.2 A	18.0 A
Number of strings	3	3	3
Number of MPP trackers	1	1	1
Inverse polarity protection	short-circuit diode	short-circuit diode	short-circuit diode
<b>Output variables</b>			
Rated output	4400 VA	4600 VA	5500 VA
Max. output	4800 VA	5060 VA	6000 VA
Supply voltage	acc. to local requirements	acc. to local requirements	acc. to local requirements
Rated current	19.1 A	20.0 A	23.9 A
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
cos phi	0.80 inductive ... 0.80 capacitive	0.80 inductive ... 0.80 capacitive	0.80 inductive ... 0.80 capacitive
Number of grid phases	1	1	1
<b>General electrical data</b>			
Max. efficiency	96.4 %	96.3 %	96.3 %
European efficiency	95.8 %	95.7 %	95.8 %
Night consumption	0 W	0 W	0 W
Switching plan	self-commutated, transformerless	self-commutated, transformerless	self-commutated, transformerless
Grid monitoring	acc. to local requirements	acc. to local requirements	acc. to local requirements
<b>Mechanical data</b>			
Display	LCD 2 x 16 characters	LCD 2 x 16 characters	LCD 2 x 16 characters
Control units	2 buttons for display control	2 buttons for display control	2 buttons for display control
Interfaces	RS232/RS485, 50	RS232/RS485, 50	RS232/RS485, 50
Fault signalling relay	potential-free NOC max. 250 V / 1 A	potential-free NOC max. 250 V / 1 A	potential-free NOC max. 250 V / 1 A
Connections	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)	PCB terminals within the device (max. cross section: 10mm <sup>2</sup> ) cable supply via cable connections (DC connection M16, AC-connection M32)
Ambient temperature	-20 °C ... +60 °C*	-20 °C ... +60 °C*	-20 °C ... +60 °C*
Temperature monitoring	> 75 °C temperature-dependent power limitation / > 85 °C cut-out	> 75 °C temperature-dependent power limitation / > 85 °C cut-out	> 75 °C temperature-dependent power limitation / > 85 °C cut-out
heat sink	free convection / no fan	free convection / no fan	free convection / no fan
Cooling	IP54	IP54	IP54
Protection class	< 35 dB (A) (noiseless)	< 35 dB (A) (noiseless)	< 35 dB (A) (noiseless)
Noise emission	integrated	integrated	integrated
DC switch	aluminium	aluminium	aluminium
Casing	550 x 340 x 220 mm	600 x 340 x 220 mm	600 x 340 x 220 mm
H x W x D	26 kg	28 kg	30 kg
Weight			

\*Power derating at high ambient temperatures



Powador  
3200 | 4200 | 4400  
5500 | 5300 | 6600

Capable of reactive power

Integrated potential-free  
fault signal

Silent, maintenance-free  
convection cooling

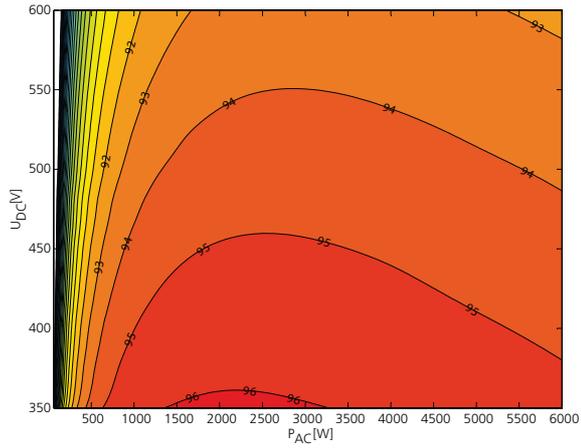
Preconfigured international  
country settings

Menu language can be chosen  
as required

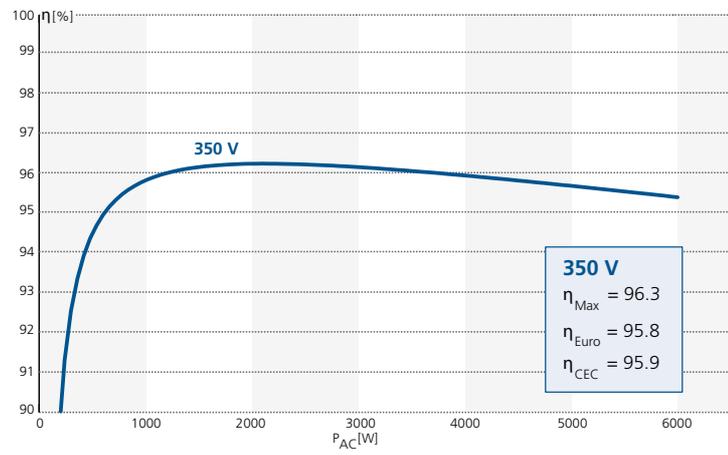
Asymmetry monitoring via special  
KACO Sym-Bus

## Graphical Display of efficiency

3D efficiency diagram for Powador 6600



Efficiency characteristic curve for Powador 6600



Your retailer