



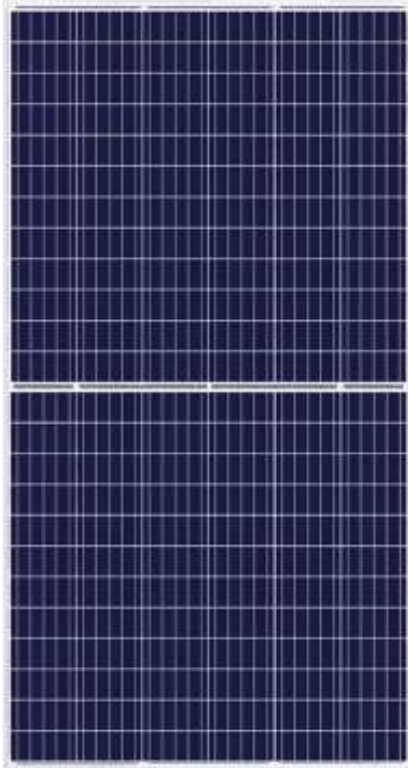
PRODUCTS CATALOGUE



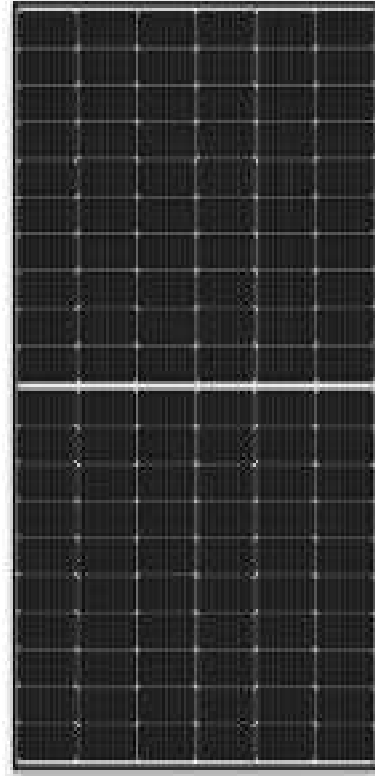
01- SOLAR PANELS

OUR PRODUCTS


CanadianSolar




TrinaSolar



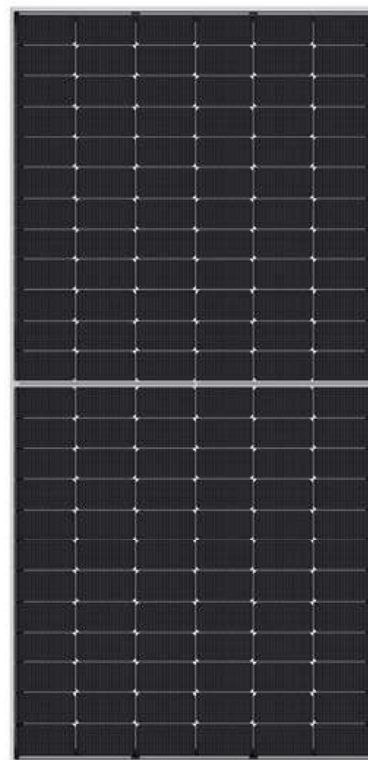

JA SOLAR



LONGI



JinKO





HiKu6 Mono PERC

535 W ~ 560 W

CS6W-535 | 540 | 545 | 550 | 555 | 560MS

MORE POWER

- 560 W** Module power up to 560 W
Module efficiency up to 21.7 %
- \$** Up to 4.5 % lower LCOE
Up to 5.6 % lower system cost
- 📈** Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- 🏠** Compatible with mainstream trackers, cost effective product for utility power plant
- ☁️** Better shading tolerance

MORE RELIABLE

- 🛡️** Minimizes micro-crack impacts
- ❄️** Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

12 Years Enhanced Product Warranty on Materials and Workmanship*

25 Years Linear Power Performance Warranty*

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / INMETRO / MCS / UKCA
CEC listed (US California) / FSEC (US Florida)
UL 61730 / IEC 61701 / IEC 62716 / IEC 63126 Level1 / IEC 60068-2-68
UNI 9177 Reaction to Fire: Class 1 / Take-e-way



* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

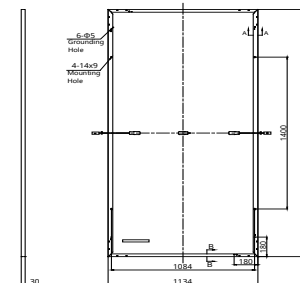
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 22 years, it has successfully delivered around 100 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

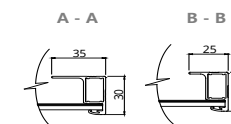
CSI Solar Co., Ltd.
199 Lushan Road, SND, Suzhou, Jiangsu, China, 215129, www.csisolar.com, support@csisolar.com

ENGINEERING DRAWING (mm)

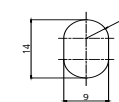
Rear View



Frame Cross Section



Mounting Hole



ELECTRICAL DATA | STC*

| CS6W | 535MS | 540MS | 545MS | 550MS | 555MS | 560MS |
|------------------------------|---|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax) | 535 W | 540 W | 545 W | 550 W | 555 W | 560 W |
| Opt. Operating Voltage (Vmp) | 41.1 V | 41.3 V | 41.5 V | 41.7 V | 41.9 V | 42.1 V |
| Opt. Operating Current (Imp) | 13.02 A | 13.08 A | 13.14 A | 13.20 A | 13.25 A | 13.31 A |
| Open Circuit Voltage (Voc) | 49.0 V | 49.2 V | 49.4 V | 49.6 V | 49.8 V | 50.0 V |
| Short Circuit Current (Isc) | 13.85 A | 13.90 A | 13.95 A | 14.00 A | 14.05 A | 14.10 A |
| Module Efficiency | 20.7% | 20.9% | 21.1% | 21.3% | 21.5% | 21.7% |
| Operating Temperature | -40°C ~ +85°C | | | | | |
| Max. System Voltage | 1500V (IEC/UL) or 1000V (IEC/UL) | | | | | |
| Module Fire Performance | TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730) | | | | | |
| Max. Series Fuse Rating | 25 A | | | | | |
| Application Classification | Class A | | | | | |
| Power Tolerance | 0 ~ + 10 W | | | | | |

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

ELECTRICAL DATA | NMOT*

| CS6W | 535MS | 540MS | 545MS | 550MS | 555MS | 560MS |
|------------------------------|---------|---------|---------|---------|---------|---------|
| Nominal Max. Power (Pmax) | 401 W | 405 W | 409 W | 412 W | 416 W | 420 W |
| Opt. Operating Voltage (Vmp) | 38.5 V | 38.7 V | 38.9 V | 39.1 V | 39.3 V | 39.5 V |
| Opt. Operating Current (Imp) | 10.42 A | 10.47 A | 10.52 A | 10.55 A | 10.59 A | 10.64 A |
| Open Circuit Voltage (Voc) | 46.3 V | 46.5 V | 46.7 V | 46.9 V | 47.1 V | 47.3 V |
| Short Circuit Current (Isc) | 11.17 A | 11.21 A | 11.25 A | 11.29 A | 11.33 A | 11.37 A |

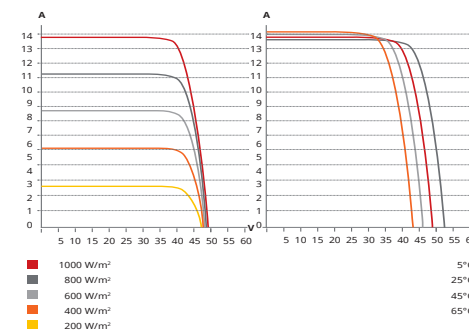
* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice.

Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

CSI Solar Co., Ltd.
199 Lushan Road, SND, Suzhou, Jiangsu, China, 215129, www.csisolar.com, support@csisolar.com

CS6W-535MS / I-V CURVES



MECHANICAL DATA

| Specification | Data |
|------------------------------------|--|
| Cell Type | Mono-crystalline |
| Cell Arrangement | 144 [2 x (12 x 6)] |
| Dimensions | 2278 x 1134 x 30 mm (89.7 x 44.6 x 1.18 in) |
| Weight | 27.6 kg (60.8 lbs) |
| Front Cover | 3.2 mm tempered glass with anti-ref-lective coating |
| Frame | Anodized aluminium alloy |
| J-Box | IP68, 3 bypass diodes |
| Cable | 4 mm ² (IEC), 12 AWG (UL) |
| Cable Length (Including Connector) | 350 mm (13.8 in) (+) / 250 mm (9.8 in) (-) or customized length* |
| Connector | T6 or MC4-EVO2 or MC4-EVO2A |
| Per Pallet | 35 pieces |
| Per Container (40' HQ) | 700 pieces or 630 pieces (only for US & Canada) |

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

TEMPERATURE CHARACTERISTICS

| Specification | Data |
|--------------------------------------|--------------|
| Temperature Coefficient (Pmax) | -0.34 % / °C |
| Temperature Coefficient (Voc) | -0.26 % / °C |
| Temperature Coefficient (Isc) | 0.05 % / °C |
| Nominal Module Operating Temperature | 41 ± 3°C |

PARTNER SECTION

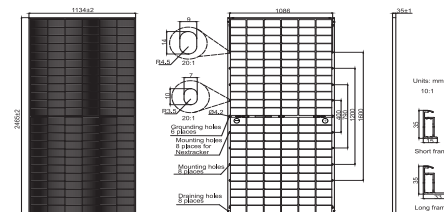




630W LB Series

630W

605-630 LB Series
JAM72D42



Remark: customized frame color and cable length available upon request

| | |
|------------------------------------|---|
| Cell | Mono-16BB |
| Weight | 34.6kg |
| Dimensions | 2465±2mm×1134±2mm×35±1mm |
| Cable Cross Section Size | 4mm ² (IEC), 12 AWG(UL) |
| No. of cells | 144(6×24) |
| Junction Box | IP68, 3 diodes |
| Connector | QC 4.10-35I/ MC4-EVO2A |
| Cable Length (Including Connector) | Portrait: 300mm(+)/400mm(-); 800mm(+)/800mm(-)(Leapfrog) Landscape: 1500mm(+)/1500mm(-) |
| Front Glass/Back Glass | 2.0mm/2.0mm |
| Packaging Configuration | 31pcs/Pallet, 496pcs/40HQ Container |

ELECTRICAL PARAMETERS AT STC

| TYPE | JAM72D42 -605/LB | JAM72D42 -610/LB | JAM72D42 -615/LB | JAM72D42 -620/LB | JAM72D42 -625/LB | JAM72D42 -630/LB |
|---|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| Rated Maximum Power(P _{max}) [W] | 605 | 610 | 615 | 620 | 625 | 630 |
| Open Circuit Voltage(V _{oc}) [V] | 51.27 | 51.47 | 51.67 | 51.86 | 52.05 | 52.24 |
| Maximum Power Voltage(V _{mp}) [V] | 42.91 | 43.11 | 43.31 | 43.51 | 43.71 | 43.90 |
| Short Circuit Current(I _{sc}) [A] | 14.83 | 14.88 | 14.93 | 14.98 | 15.03 | 15.08 |
| Maximum Power Current(I _{mp}) [A] | 14.10 | 14.15 | 14.20 | 14.25 | 14.30 | 14.35 |
| Module Efficiency (%) | 21.6 | 21.8 | 22.0 | 22.2 | 22.4 | 22.5 |
| Power Tolerance | 0~+5W | | | | | |
| Temperature Coefficient of I _{sc} (α _{Isc}) | +0.046%/ °C | | | | | |
| Temperature Coefficient of V _{oc} (β _{Voc}) | -0.260%/ °C | | | | | |
| Temperature Coefficient of P _{max} (γ _{Pmp}) | -0.300%/ °C | | | | | |
| STC | Irradiance 1000W/m ² , cell temperature 25 °C, AM1.5G | | | | | |

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

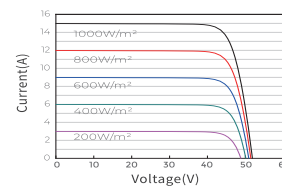
ELECTRICAL CHARACTERISTICS WITH 10% SOLAR IRRADIATION RATIO

| TYPE | JAM72D42 -605/LB | JAM72D42 -610/LB | JAM72D42 -615/LB | JAM72D42 -620/LB | JAM72D42 -625/LB | JAM72D42 -630/LB |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Rated Max Power(P _{max}) [W] | 653 | 659 | 664 | 670 | 675 | 680 |
| Open Circuit Voltage(V _{oc}) [V] | 51.27 | 51.47 | 51.67 | 51.86 | 52.05 | 52.24 |
| Max Power Voltage(V _{mp}) [V] | 42.91 | 43.11 | 43.31 | 43.51 | 43.71 | 43.90 |
| Short Circuit Current(I _{sc}) [A] | 16.01 | 16.07 | 16.12 | 16.18 | 16.23 | 16.29 |
| Max Power Current(I _{mp}) [A] | 15.23 | 15.28 | 15.34 | 15.39 | 15.44 | 15.50 |
| Irradiation Ratio (rear/front) | 10% | | | | | |

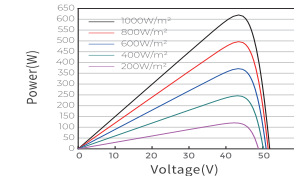
*For NextTracker installations, maximum static load please take compatibility approve letter between JA Solar and NextTracker for reference.
**Bifaciality=P_{max, rear}/Rated P_{max, front}

CHARACTERISTICS

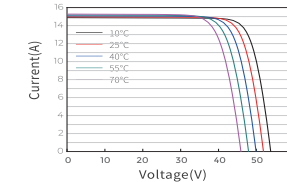
Current-Voltage Curve JAM72D42-620/LB



Power-Voltage Curve JAM72D42-620/LB



Current-Voltage Curve JAM72D42-620/LB



- Higher power generation better LCOE
- n-type with very Lower LID
- Better Temperature Coefficient
- Better low irradiance response

- 12-year product warranty
- 30-year linear power output warranty

n-type Bifacial Double Glass High Efficiency Mono Module JAM72D42 LB

605-630

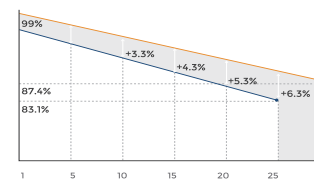
Comprehensive Certificates

- IEC 61215, IEC 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- ISO 45001: 2018 Occupational health and safety management systems
- IEC 62941: 2019 Terrestrial photovoltaic (PV) modules- Quality system for PV module manufacturing



Superior Warranty

1% 1st-year Degradation
0.4% Annual Degradation Over 30 years



- n-type Bifacial Double Glass Module Linear Performance Warranty
- Standard Module Linear Performance Warranty

OPERATING CONDITIONS

| | |
|-----------------------------|-----------------------------------|
| Maximum System Voltage | 1500V DC |
| Operating Temperature | -40 °C ~ +85 °C |
| Maximum Series Fuse Rating | 30A |
| Maximum Static Load, Front* | 5400Pa (112 lb /ft ²) |
| Maximum Static Load, Back* | 2400Pa (50 lb /ft ²) |
| NOCT | 45±2 °C |
| Bifaciality** | 80%±10% |
| Fire Performance | UL Type 29 |

Hi-MO 5_m

LR5-72HPH 535~555M

- Based on M10 wafer, best choice for ultra-large power plants
- Advanced module technology delivers superior module efficiency
 - M10 Gallium-doped Wafer
 - Smart Soldering
 - 9-busbar Half-cut Cell
- Excellent outdoor power generation performance
- High module quality ensures long-term reliability

12 12-year Warranty for Materials and Processing

25 25-year Warranty for Extra Linear Power Output



Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730
 ISO9001:2015: ISO Quality Management System
 ISO14001: 2015: ISO Environment Management System
 ISO45001: 2018: Occupational Health and Safety
 IEC62941: Guideline for module design qualification and type approval

LONGI

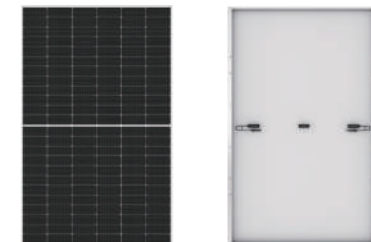
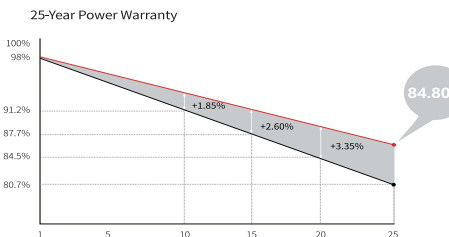


Hi-MO 5_m

LR5-72HPH 535~555M

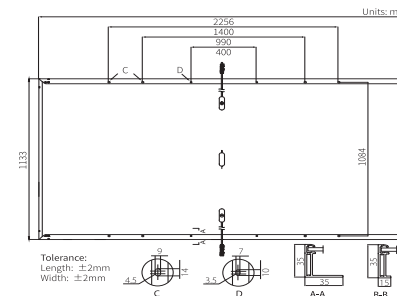
21.7% MAX MODULE EFFICIENCY
0~3% POWER TOLERANCE
<2% FIRST YEAR POWER DEGRADATION
0.55% YEAR 2-25 POWER DEGRADATION
HALF-CELL
 Lower operating temperature

Additional Value



Mechanical Parameters

| | |
|------------------|--|
| Cell Orientation | 144 (6×24) |
| Junction Box | IP68, three diodes |
| Output Cable | 4mm ² , +400, -200mm/±1400mm length can be customized |
| Glass | Single glass, 3.2mm coated tempered glass |
| Frame | Anodized aluminum alloy frame |
| Weight | 27.2kg |
| Dimension | 2256×1133×35mm |
| Packaging | 31pcs per pallet / 155pcs per 20' GP / 620pcs per 40' HC |



Electrical Characteristics

| Module Type | STC: AM1.5 1000W/m ² 25°C | | NOCT: AM1.5 800W/m ² 20°C | | 1m/s | | Test uncertainty for P _{max} : ±3% | | | |
|---|--------------------------------------|----------------|--------------------------------------|----------------|----------------|-------|---|-------|-------|-------|
| | LR5-72HPH-535M | LR5-72HPH-540M | LR5-72HPH-545M | LR5-72HPH-550M | LR5-72HPH-555M | STC | NOCT | STC | NOCT | |
| Testing Condition | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT |
| Maximum Power (P _{max} /W) | 535 | 399.9 | 540 | 403.6 | 545 | 407.4 | 550 | 411.1 | 555 | 414.8 |
| Open Circuit Voltage (V _{oc} /V) | 49.35 | 46.40 | 49.50 | 46.54 | 49.65 | 46.68 | 49.80 | 46.82 | 49.95 | 46.97 |
| Short Circuit Current (I _{sc} /A) | 13.78 | 11.14 | 13.85 | 11.20 | 13.92 | 11.25 | 13.98 | 11.31 | 14.04 | 11.35 |
| Voltage at Maximum Power (V _{mp} /V) | 41.50 | 38.55 | 41.65 | 38.69 | 41.80 | 38.83 | 41.95 | 38.97 | 42.10 | 39.11 |
| Current at Maximum Power (I _{mp} /A) | 12.90 | 10.38 | 12.97 | 10.43 | 13.04 | 10.49 | 13.12 | 10.56 | 13.19 | 10.61 |
| Module Efficiency(%) | 20.9 | | 21.1 | | 21.3 | | 21.5 | | 21.7 | |

Operating Parameters

| | |
|------------------------------------|-------------------------------|
| Operational Temperature | -40°C ~ +85°C |
| Power Output Tolerance | 0 ~ 3% |
| Voc and Isc Tolerance | ±3% |
| Maximum System Voltage | DC1500V (IEC/UL) |
| Maximum Series Fuse Rating | 25A |
| Nominal Operating Cell Temperature | 45±2°C |
| Protection Class | Class II |
| Fire Rating | UL type 1 or 2 IEC Class C |

Mechanical Loading

| | |
|-----------------------------------|--------------------------------------|
| Front Side Maximum Static Loading | 5400Pa |
| Rear Side Maximum Static Loading | 2400Pa |
| Hailstone Test | 25mm Hailstone at the speed of 23m/s |

Temperature Ratings (STC)

| | |
|---|------------|
| Temperature Coefficient of I _{sc} | +0.050%/°C |
| Temperature Coefficient of V _{oc} | -0.265%/°C |
| Temperature Coefficient of P _{max} | -0.340%/°C |

LONGI

No.8369 Shangyuan Road, Xi'an Economic And Technological Development Zone, Xi'an, Shaanxi, China.
 Web: www.longi.com

Specifications included in this datasheet are subject to change without notice. LONGi reserves the right of final interpretation. (20230115V1.7)



BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

665W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.4%

MAXIMUM EFFICIENCY

PRODUCT: TSM-DEG21C.20

POWER RANGE: 645-665W



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- Lowest guaranteed first year and annual degradation;
- Designed for compatibility with existing mainstream system components



High power up to 665W

- Up to 21.4% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

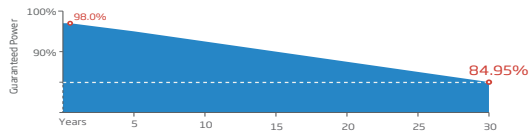
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.34%) and operating temperature
- Up to 25% additional power gain from back side depending on albedo

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



Comprehensive Products and System Certificates

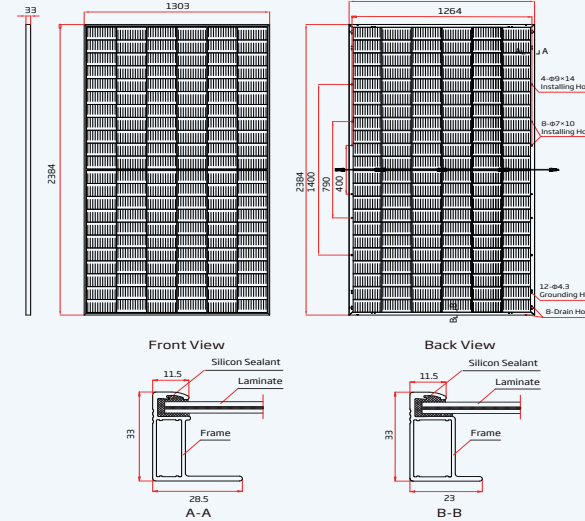


IEC61215/IEC61730/IEC61701/IEC62716/UL61730
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System

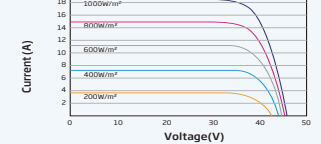


BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

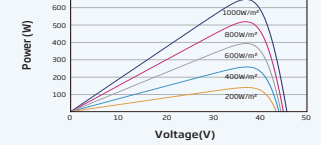
DIMENSIONS OF PV MODULE(mm)



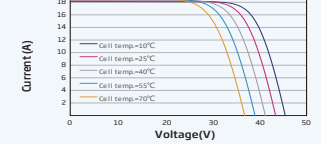
I-V CURVES OF PV MODULE(650 W)



P-V CURVES OF PV MODULE(650W)



I-V CURVES OF PV MODULE(650 W)



ELECTRICAL DATA (STC)

| Peak Power Watts- P_{max} (Wp)* | 645 | 650 | 655 | 660 | 665 |
|--------------------------------------|-------|-------|--------|-------|-------|
| Power Tolerance- P_{max} (W) | | | 0 ~ +5 | | |
| Maximum Power Voltage- V_{MPP} (V) | 37.5 | 37.7 | 37.9 | 38.1 | 38.3 |
| Maximum Power Current- I_{MPP} (A) | 17.23 | 17.27 | 17.31 | 17.35 | 17.39 |
| Open Circuit Voltage- V_{oc} (V) | 45.3 | 45.5 | 45.7 | 45.9 | 46.1 |
| Short Circuit Current- I_{sc} (A) | 18.31 | 18.35 | 18.40 | 18.45 | 18.50 |
| Module Efficiency η_m (%) | 20.8 | 20.9 | 21.1 | 21.2 | 21.4 |

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

| Total Equivalent power- P_{max} (Wp) | 690 | 696 | 701 | 706 | 712 |
|--|-------|-------|-------|-------|-------|
| Maximum Power Voltage- V_{MPP} (V) | 37.5 | 37.7 | 37.9 | 38.1 | 38.3 |
| Maximum Power Current- I_{MPP} (A) | 18.44 | 18.48 | 18.52 | 18.56 | 18.60 |
| Open Circuit Voltage- V_{oc} (V) | 45.3 | 45.5 | 45.7 | 45.9 | 46.1 |
| Short Circuit Current- I_{sc} (A) | 19.59 | 19.63 | 19.69 | 19.74 | 19.79 |
| Irradiance ratio (rear/front) | | | 10% | | |

Power Bifaciality:70±5%.

ELECTRICAL DATA (NOCT)

| | | | | | |
|--------------------------------------|-------|-------|-------|-------|-------|
| Maximum Power- P_{max} (Wp) | 488 | 492 | 495 | 499 | 504 |
| Maximum Power Voltage- V_{MPP} (V) | 34.9 | 35.1 | 35.2 | 35.4 | 35.6 |
| Maximum Power Current- I_{MPP} (A) | 13.98 | 14.01 | 14.05 | 14.10 | 14.16 |
| Open Circuit Voltage- V_{oc} (V) | 42.7 | 42.9 | 43.0 | 43.2 | 43.4 |
| Short Circuit Current- I_{sc} (A) | 14.75 | 14.79 | 14.83 | 14.87 | 14.91 |

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

| | |
|----------------------|--|
| Solar Cells | Monocrystalline |
| No. of cells | 132 cells |
| Module Dimensions | 2384*1303*33 mm (93.86*51.30*1.30 inches) |
| Weight | 38.3 kg (84.4 lb) |
| Front Glass | 2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass |
| Encapsulant material | POE/EVA |
| Back Glass | 2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass) |
| Frame | 33mm(1.30 inches) Anodized Aluminium Alloy |
| J-Box | IP 68 rated |
| Cables | Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²), Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized |
| Connector | MC4 EVO2 / TS4* |

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

| | | | |
|---|-------------|-------------------------|----------------|
| NOCT (Nominal Operating Cell Temperature) | 43°C (±2°C) | MAXIMUM RATINGS | |
| Temperature Coefficient of P_{max} | -0.34%/°C | Operational Temperature | -40~+85°C |
| Temperature Coefficient of Voc | -0.25%/°C | Maximum System Voltage | 1500V DC (IEC) |
| Temperature Coefficient of Isc | 0.04%/°C | Maximum System Voltage | 1500V DC (UL) |
| | | Max Series Fuse Rating | 35A |

WARRANTY

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 2% first year degradation
- 0.45% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 33 pieces
- Modules per 40' container: 594 pieces

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

© 2022 Trina Solar Co., Ltd. All rights reserved. Specifications included in this datasheet are subject to change without notice.

Version number: TSM_EN_2022_A

www.trinasolar.com



www.jinkosolar.com



Tiger Neo N-type 72HL4-(V) 565-585 Watt MONO-FACIAL MODULE

N-Type

Positive power tolerance of 0~+3%

IEC 61215(2016), IEC 61730(2016)

ISO 9001:2015: Quality Management System

ISO 14001:2015: Environment Management System

ISO 45001:2018

Occupational health and safety management systems



Key Features



SMBB Technology

Better light trapping and current collection to improve module power output and reliability.



PID Resistance

Excellent Anti-PID performance guarantee via optimized mass-production process and materials control.



Durability Against Extreme Environmental Conditions

High salt mist and ammonia resistance.



Hot 2.0 Technology

The N-type module with Hot 2.0 technology has better reliability and lower LID/LETID.

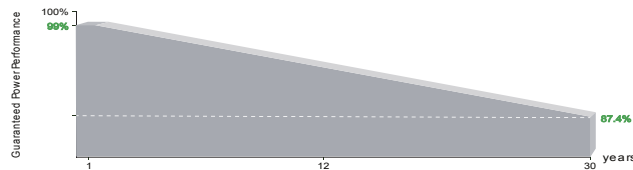


Enhanced Mechanical Load

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).



LINEAR PERFORMANCE WARRANTY

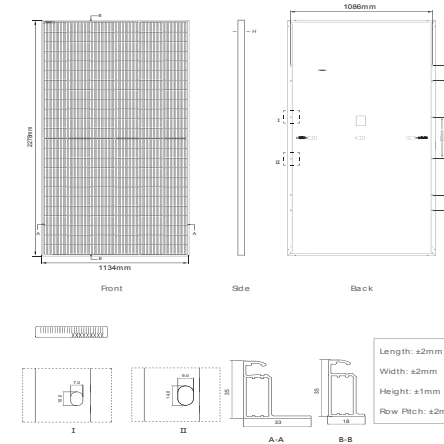


12 Year Product Warranty

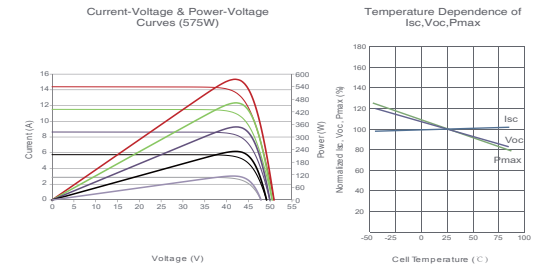
30 Year Linear Power Warranty

0.40% Annual Degradation Over 30 years

Engineering Drawings



Electrical Performance & Temperature Dependence



Mechanical Characteristics

| | |
|---------------|---|
| Cell Type | N type Mono-crystalline |
| No. of cells | 144 (6×24) |
| Dimensions | 2278×1134×35mm (89.69×44.65×1.38 inch) |
| Weight | 28 kg (61.73 lbs) |
| Front Glass | 3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass |
| Frame | Anodized Aluminium Alloy |
| Junction Box | IP68 Rated |
| Output Cables | TUV 1×4.0mm ² (+): 400mm, (-): 200mm or Customized Length |

Packaging Configuration

(Two pallets = One stack)

31pcs/pallets, 62pcs/stack, 620pcs/ 40'HQ Container

SPECIFICATIONS

| Module Type | JKM565N-72HL4 | | JKM570N-72HL4 | | JKM575N-72HL4 | | JKM580N-72HL4 | | JKM585N-72HL4 | |
|---|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | JKM565N-72HL4-V | JKM570N-72HL4-V | JKM575N-72HL4-V | JKM580N-72HL4-V | JKM585N-72HL4-V | JKM565N-72HL4-V | JKM570N-72HL4-V | JKM575N-72HL4-V | JKM580N-72HL4-V | JKM585N-72HL4-V |
| | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT |
| Maximum Power (Pmax) | 565Wp | 425Wp | 570Wp | 429Wp | 575Wp | 432Wp | 580Wp | 436Wp | 585Wp | 440Wp |
| Maximum Power Voltage (Vmp) | 41.92V | 39.38V | 42.07V | 39.51V | 42.22V | 39.60V | 42.37V | 39.69V | 42.52V | 39.81V |
| Maximum Power Current (Imp) | 13.48A | 10.79A | 13.55A | 10.85A | 13.62A | 10.92A | 13.69A | 10.99A | 13.76A | 11.05A |
| Open-circuit Voltage (Voc) | 50.60V | 48.06V | 50.74V | 48.20V | 50.88V | 48.33V | 51.02V | 48.46V | 51.16V | 48.60V |
| Short-circuit Current (Isc) | 14.23A | 11.49A | 14.31A | 11.55A | 14.39A | 11.62A | 14.47A | 11.68A | 14.55A | 11.75A |
| Module Efficiency STC (%) | 21.87% | | 22.07% | | 22.26% | | 22.45% | | 22.65% | |
| Operating Temperature(°C) | -40°C~+85°C | | | | | | | | | |
| Maximum system voltage | 1000/1500VDC (IEC) | | | | | | | | | |
| Maximum series fuse rating | 25A | | | | | | | | | |
| Power tolerance | 0~+3% | | | | | | | | | |
| Temperature coefficients of Pmax | -0.29%/°C | | | | | | | | | |
| Temperature coefficients of Voc | -0.25%/°C | | | | | | | | | |
| Temperature coefficients of Isc | 0.045%/°C | | | | | | | | | |
| Nominal operating cell temperature (NOCT) | 45±2°C | | | | | | | | | |

*STC: ☀ Irradiance 1000W/m² 📏 Cell Temperature 25°C ☁ AM=1.5

NOCT: ☀ Irradiance 800W/m² 📏 Ambient Temperature 20°C ☁ AM=1.5 🌀 Wind Speed 1m/s

©2022 Jinko Solar Co., Ltd. All rights reserved.
Specifications included in this datasheet are subject to change without notice.

JKM565-585N-72HL4-(V)-F3-EN



02- SOLAR BATTERIES

OUR PRODUCTS



- ! The DEKA Solar series of valve-regulated, gelled-electrolyte
- ! batteries is designed to offer reliable, maintenance-free power
- ! for renewable energy applications where frequent deep cycles
- ! are required and minimum maintenance is desirable.



Deka SOLAR

PHOTOVOLTAIC BATTERIES



**GEL MONOBLOC/
6V & 12V**

The **Deka Solar Valve-Regulated Gel Monobloc series** offers reliable, versatile, maintenance-free power. The thixotropic gel enables these batteries to be completely spillproof providing many available options for installation. The gelled electrolyte gives more protection to the battery plates, and is better suited for deep cycle discharge. With longer discharge and less charging time, these batteries are ideal for many renewable energy applications.

The solar battery excels in cycling applications.
*Dependent upon proper charging and ambient temperatures.

FEATURES & BENEFITS

| | |
|--|---|
| Valve-Regulated | Sealed construction eliminates periodic watering, corrosive acid fumes, and spills |
| Gelled Electrolyte | Electrolyte will not stratify |
| Positive and Negative Plate | Lead calcium |
| Self-Discharge | Less than 2% per month stand loss means little deterioration during transport and storage |
| Exclusive IPF® Technology | Optimizes power capacity, cell consistency, and long-term reliability |
| Rated Non-Spillable by ICAO, IATA, and DOT | Transports easily and safely by air, no special containers needed |

APPLICATIONS

- Renewable Energy • Water pumping • Residential • Communications
- Cathodic protection • Remote monitoring • Refrigeration
- Lighting • Aids to navigation • Wind generation



QUALITY SYSTEM CERTIFIED
ISO 9001
ISO TS 16949
ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFIED
ISO 14001



Deka SOLAR

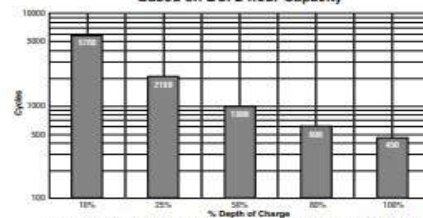
PHOTOVOLTAIC BATTERIES

The Deka Solar series of valve-regulated, gelled-electrolyte batteries is designed to offer reliable, maintenance-free power for renewable energy applications where frequent deep cycles are required and minimum maintenance is desirable.

Specifications

- Voltage 12 volts nominal (8GGC2 is 6 volts)
- Plate alloy Lead calcium
- Container/cover..... Polypropylene
- Electrolyte Sulfuric acid thixotropic gel
- Valve Self sealing

**Gel Cycle Life vs Depth of Discharge at +25°C (77°F)
Based on BCI 2-hour Capacity**



Cycle Chart applies to types with similar design characteristics, ex., U1, 226F, 24, 27, 31.

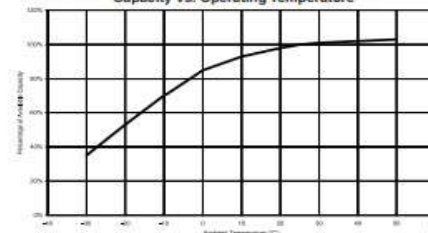
The solar battery excels in cycling applications.
*Dependent upon proper charging and ambient temperatures.

Photovoltaic Charging Parameters

| | | |
|--------------------------------|-------------------|-------------------|
| Bulk Charge | Max Current (amp) | 30% of 20 Hr Rate |
| Absorption (Regulation) Charge | Constant Voltage | 2.35 - 2.45 vpc |
| Float Charge | Constant Voltage | 2.25 vpc ± .01 |
| Equalize Charge | Constant Voltage | 2.30 - 2.43 vpc |
| Temperature Coefficient | | -0.003 v/°C |

Cut-off parameters per charge & equalize intervals are application specific and will vary dependent upon site specific characteristics such as temperature, days of autonomy, array to load ratio, ect.

Capacity vs. Operating Temperature



Capacity vs. Operating Temperatures: Above are the changes in capacity for wider ambient temperature range, giving the available capacity, as a percentage of the rated capacity, at different ambient temperatures. The curves show the behavior of the battery after a number of cycles.

Terminal Information



| BATTERY TYPE | FOOT NOTE | VOLTS | AMPERE HOUR CAPACITY 77°F (25°C) | | | | WEIGHT lb (kg) | DIMENSIONS - in (mm) | | |
|--------------|------------|-------|----------------------------------|-------|-------|--------|-------------------|----------------------|-------------|-------------|
| | | | 10 HR | 20 HR | 24 HR | 100 HR | | L | W | H |
| 8G01 | 38.39 Y | 12 | 30.5 | 31.6 | 31.9 | 36.0 | 23 (10.5) | 7.71 (196) | 5.18 (132) | 7.22 (183) |
| 8G01SH | 17.38 38 Y | 12 | 30.5 | 31.6 | 31.9 | 36.0 | 23 (10.5) | 8.31 (211) | 5.18 (132) | 7.22 (183) |
| 8G40C | 38.39 C | 12 | 37.0 | 40.0 | 40.8 | 48.0 | 32 (14.5) | 7.70 (197) | 6.62 (168) | 6.87 (174) |
| 8G22HF | 38.39 G | 12 | 47.5 | 51.0 | 51.6 | 58.0 | 37 (16.8) | 8.89 (226) | 5.47 (139) | 9.24 (235) |
| 8G34K | 38.39 K | 12 | 35.0 | 60.0 | 61.7 | 70.0 | 42 (19.1) | 10.20 (259) | 6.85 (174) | 7.85 (199) |
| 8G24 | 17.38 39 G | 12 | 88.0 | 73.6 | 74.9 | 84.5 | 52 (23.6) | 10.20 (259) | 8.80 (173) | 9.24 (235) |
| 8G27 | 17.38 39 G | 12 | 80.3 | 88.0 | 88.1 | 99.0 | 65 (29.6) | 12.83 (326) | 6.56 (167) | 9.24 (235) |
| 8G30H | 17.38 39 B | 12 | 80.0 | 97.6 | 88.4 | 108 | 70 (31.8) | 12.93 (329) | 6.75 (171) | 9.76 (248) |
| 8G37 | 17.38 39 K | 12 | 80.0 | 97.6 | 88.4 | 108 | 70 (31.8) | 12.93 (329) | 6.75 (171) | 9.24 (235) |
| 8GG2 | 38.39 U | 6 | 168 | 180 | 182 | 198 | 68 (30.8) | 10.26 (261) | 7.89 (200) | 11.06 (281) |
| 8G40 | 17.38 39 L | 12 | 168 | 183 | 187 | 210 | 127 (57.6) | 20.73 (527) | 6.44 (164) | 10.82 (275) |
| 8G80 | 17.38 39 T | 12 | 210 | 225 | 229 | 265 | 157 (71.2) | 21.85 (554) | 11.00 (279) | 10.82 (275) |
| 8G25HP | 17.38 39 B | 12 | 107 | 115 | 118 | 123 | 86 (38.5) | 15.58 (395) | 6.77 (172) | 11.42 (290) |

ALL RATINGS ARE AFTER 15 CYCLES AND CONFORM TO B.C.I. SPECIFICATIONS.

IMPORTANT CHARGING INSTRUCTIONS: WARRANTY VOID IF OPENED OR IMPROPERLY CHARGED. Do not install in a sealed container. Constant under or overcharging will damage any battery and shorten its life! Use a good constant potential, voltage-regulated charger. The open circuit voltage of a fully charged 12-volt battery is 12.8V at 68°F (20°C).

Batteries manufactured in polypropylene cases and covers. Batteries manufactured with gray case / gray cover unless noted.

Footnotes:

- 17 - Includes handle
- 38 - "Non-Spillable" defined by DOT (Department of Transportation) definitions
- 39 - "Non-Spillable" defined by ICAO (International Commercial Airline Organization) and IATA (International Airline Transport Association) definitions.

- B - Flag Terminal w/ 3/8" diameter hole
- C - 1/4-20 Threaded Inset Threaded Post
- G - Flag Terminal w/ 5/16" diameter hole
- T - "L" Terminal w/ 3/8" diameter hole
- U - 5/16" Threaded Post / SAE
- X - 3/8-16 stainless steel threaded post
- Y - Small "L" terminal w/ 5/16" diameter hole

POWERED BY EAST PENN manufacturing co., inc.

Lyon Station, PA 19536-0147 • Fax: 610-682-4781
Domestic & International Inquiries Call: 610-682-3263
www.eastpennunigy.com • e-mail: sales@eastpennunigy.com
E.P.M. Form No. 0919 Rev. 1/12 © 2012 by EPM Printed in U.S.A.



Domestic Inquiries Call: 1-800-372-9253
www.mkbattery.com • e-mail: sales@mkbattery.com

All data subject to change without notice. No part of this document may be copied or reproduced electronically or mechanically without written permission from the company.



03- Charge Controllers

OUR PRODUCTS



PWM Controllers



Pulse-Width Modulation (PWM) technology controllers are ideal for use in solar energy situations where 35 or 72 cell PV modules are available and the site is unshaded with no physical space limitations. All models incorporate advanced thermal design requiring no cooling fans, which ensures long-term reliability with no moving parts to fail-- a unique feature among higher- powered controllers.

TriStar™ Controller

45A or 60A at 12-48V



"It is a Morningstar, what do you expect! It is great"

| | |
|-------------------------------|---|
| Ambient Operating Temperature | -40 °C to +45 °C -40 °F to +113 °F |
| Terminal | 35 mm ² / 2 AWG |
| Product Weight | TS-45 1.6 kg / 3.5 lbs TS-60 1.6 kg / 3.5 lbs TS-60M 1.8 kg / 4 lbs |
| Unit Shipping Weight | TS-45 2.0 kg / 4.4 lbs TS-60 2.0 kg / 4.4 lbs TS-60M 2.2 kg / 4.8 lbs |
| Dimensions | 26.0 x 12.7 x 7.1 cm 10.3 x 5.0 x 2.8 in. |
| Warranty | 5 years |

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- EMC Compliance
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- Manufactured in a Certified ISO 9001 Facility

PWM Controllers

Three-function PWM controller for larger systems, providing reliable PWM solar battery charging or load control or diversion regulation.

- **Built for reliability and performance**, with an oversized heatsink and over-spec'd components. Fully-rated for operation at temperatures up to 45C.
- **More information with LED indicators**. Optional meter displays extensive system and controller information in five languages; automatic self-test and reset.
- **Communications capability** with RS-232 port, connects to a PC for custom settings, data logging, remote monitoring and control.
- **Fully adjustable** with DIP switches for seven digital presets. Additional custom setting via RS-232.
- **Extensive electronic protection** against reverse polarity, short circuits, overcurrent and excessive temperature.
- **Fanless design** for long-term reliability.



TriStar

| | TS-45 | TS-60 | TS-60M |
|--|------------------|-------|--------|
| Rated Solar, Load or Diversion Current | 45A | 60A | 60A |
| Nominal System Voltage | 12, 24 or 48 Vdc | | |

Options

| | TS-45 | TS-60 | TS-60M |
|---|-------|-------|---------------|
| TriStar Meter-2 (TS-M-2) | Yes | Yes | Pre-installed |
| TriStar Remote Meter-2 (TS-RM-2) | Yes | Yes | Yes |
| MeterHub (HUB-1) | Yes | Yes | Yes |
| EIA-485 Adapter (RSC-1) | Yes | Yes | Yes |
| Remote Temperature Sensor (RTS)* | Yes | Yes | Yes |
| Ground Fault Protection Device (GF-PD-150V and GFFD-600V) | Yes | Yes | Yes |

* Required for temperature compensated charging. Not included.



Portable LED lighting towers providing 24/7 illumination for safer, more efficient mining operations throughout Brazil and Latin America.

"I like to use Morningstar because it's really robust and reliable"

Ricardo Righi Reis

ProStar™ Controller

15A or 30A at 12/24V



"...you get what you pay for, and this one is worth every penny...count on Morningstar"

| | |
|-------------------------------|---|
| Ambient Operating Temperature | -40 °C to +60 °C -40 °F to +140 °F |
| Terminal | 16 mm ² / 6 AWG |
| Product Weight | |
| PS-15 | 0.3 kg / 0.86 lbs |
| PS-15M | 0.4 kg / 0.9 lbs |
| PS-30 | 0.3 kg / 0.86 lbs |
| PS-30M | 0.4 kg / 0.9 lbs |
| Unit Shipping Weight | |
| PS-15 | 0.6 kg / 1.4 lbs |
| PS-15M | 0.7 kg / 1.6 lbs |
| PS-30 | 0.6 kg / 1.4 lbs |
| PS-30M | 0.7 kg / 1.6 lbs |
| Dimensions | 15.3 x 10.5 x 5.5 cm 6.01 x 4.14 x 2.17 in |
| Warranty | 5 years |

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- Manufactured in a Certified ISO 9001 Facility
- FCC Part-15 Class B Compliant

PWM Controllers

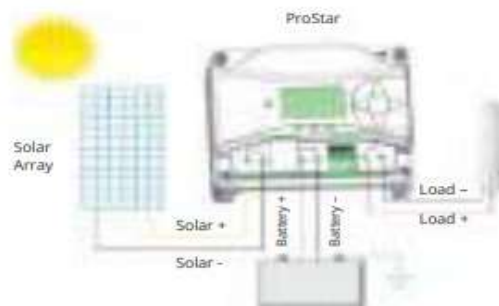
Mid-range PWM solar charge controller for both professional and consumer applications, incorporating legendary ProStar design and performance.

- **Longer battery life** through 4-stage charging and temperature compensation. Constant voltage PWM series regulation. Choice of three battery types. Voltage-sense terminals for more accurate battery monitoring.
- **More information** with three battery-level LED indicators. Optional meter includes safety disconnect and displays amps, volts, temperature and self-test.
- **Extensive electronic protection** against reverse polarity, reverse current at night, short circuits, overcurrent and excessive temperature. No mechanical fuses.
- **Fanless design** for long-term reliability.

| ProStar | PS-15 | PS-15M | PS-30 | PS-30M |
|------------------------|-----------|--------|-------|--------|
| Rated Solar Current | 15A | 15A | 30A | 30A |
| Rated Load Current * | 15A | 15A | 30A | 30A |
| Nominal System Voltage | 12/24 Vdc | | | |

| Options | PS-15 | PS-15M | PS-30 | PS-30M |
|--|-------|----------|-------|----------|
| Digital Meter | No | Included | No | Included |
| Remote Meter (RM-1) | Yes | Yes | Yes | Yes |
| Ethernet Meter/Bus Converter (EMC-1) | Yes | Yes | Yes | Yes |
| Remote Temperature Sensor (RTS) | Yes | Yes | Yes | Yes |
| Ground Fault Protection Device (GF-PD-150V and GFPPD-600V) | Yes | Yes | Yes | Yes |

* Low voltage disconnect included on all ProStar controllers.



SunSaver™ Controller

6A, 10A or 20A at 12V or 24V



"This is the only one I'd use...it's the one I wish I bought first"

| | |
|-------------------------------|---|
| Ambient Operating Temperature | -40 °C to +60 °C -40 °F to +140 °F |
| Terminal | 5 mm ² / 10 AWG |
| Product Weight | 0.23 kg / 0.5 lbs |
| Unit Shipping Weight | 0.4 kg / 0.9 lbs |
| Dimensions | 15.2 x 5.5 x 3.4 cm 6.0 x 2.2 x 1.3 in |
| Warranty | 5 years |

Certifications

- Hazardous Locations - Class 1, Div. 2 Groups A-D
- CE, RoHS and REACH Compliant
- UL 1604/ANSI/ISA 12.12.01-2000 (USA) and CSA C22.2 No. 213-M1987 (Reaffirmed 2004) (CANADA) Listed
- ETL Listed: UL 1741 (with terminal cover)*
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- Manufactured in a Certified ISO 9001 Facility

* Wire terminal cover included with every SunSaver



PWM Controllers

The world's leading small solar controller for industrial and consumer markets. Proven in demanding locations, including mines and oilfields.

- **Ideal for oil/gas applications.** Approved for use in hazardous locations: Class 1, Division 2, Groups A-D.
- **Longer battery life** through PWM 4-stage charging and temperature compensation. Sealed or flooded battery select.
- **Tropicalization** - hardened for field use with anodized aluminum enclosure, epoxy encapsulation, marine-rated terminals.
- **Additional features** include full electronic protections, 3-state battery LED indicators, terminal cover, dead battery recovery, high voltage load protection for sensitive loads.
- **L-versions** include low-voltage load disconnect.

| SunSaver | SS-6-12V | SS-6L-12V | SS-10-12V |
|------------------------|----------|-----------|-----------|
| Rated Solar Current | 6A | 6A | 10A |
| Rated Load Current | 6A | 6A | 10A |
| Nominal System Voltage | 12 Vdc | | |
| Low Voltage Disconnect | No | Yes | No |

| SunSaver | SS-10L-12V | SS-10L-24V | SS-20L-12V | SS-20L-24V |
|------------------------|------------|------------|------------|------------|
| Rated Solar Current | 10A | 10A | 20A | 20A |
| Rated Load Current | 10A | 10A | 20A | 20A |
| Nominal System Voltage | 12Vdc | 24Vdc | 12Vdc | 24Vdc |
| Low Voltage Disconnect | Yes | Yes | Yes | Yes |

| Options | All Versions |
|--|--------------|
| DIN Rail Clips (DIN-1) | Yes |
| Ground Fault Protection Device (GFPPD-150V and GFPPD-600V) | Yes |



SunLight™ Controller

10A or 20A at 12V or 24V



"Bulletproof and dependable...I will use them again and again"

PWM Controllers

World's leading solar lighting controller for street and pathway lighting, parking areas, bus stations, signage, and much more.

- **Provides 10 lighting options** with accurate on-board timer. User adjustable for 2 to 10 hours ON or for ON all night. Unique ON/OFF/ON settings conserve energy and turn lights on again for 1 or 2 hours before sunrise. Timer accuracy is within 2 seconds.
- **Easy to set-up**, with test-button feature and LED indicator. To confirm correct installation, test button turns light on during the day and LED indicates selected lighting option.
- **Rugged design** with anodized aluminum enclosure, epoxy encapsulation, corrosion-resistant terminals.



| | |
|-------------------------------|--|
| Ambient Operating Temperature | -40 °C to +60 °C -40 °F to +140 °F |
| Terminal | 5.2mm ² / 10 AWG |
| Product Weight | 0.27 kg / 0.6 lbs |
| Unit Shipping Weight | 0.3 kg / 0.7 lbs |
| Dimensions | 16.8 x 5.5 x 3.4 cm 6.6 x 2.2 x 1.3 in. |
| Warranty | 5 years |

Certifications

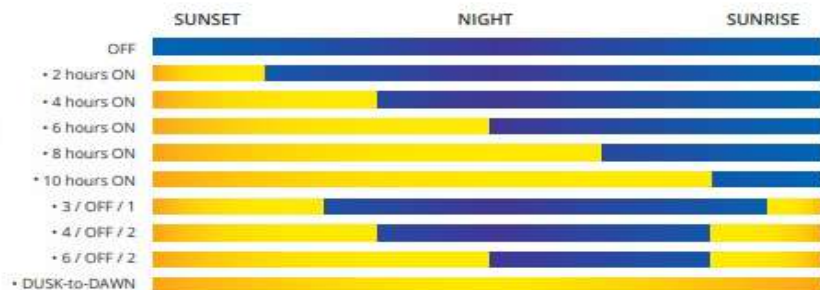
- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

| SunLight | SL-10L-12 | SL-10L-24 | SL-20L-12 | SL-20L-24 |
|------------------------|-----------|-----------|-----------|-----------|
| Rated Solar Current | 10A | 10A | 20A | 20A |
| Rated Load Current* | 10A | 10A | 20A | 20A |
| Nominal System Voltage | 12Vdc | 24Vdc | 12Vdc | 24Vdc |

| Options | All Versions | | | |
|--|--------------|-----|-----|-----|
| DIN Rail Clips (DIN-1) | Yes | Yes | Yes | Yes |
| Ground Fault Protection Device (GFPD-150V and GFPD-600V) | Yes | Yes | Yes | Yes |

* Low Voltage Disconnect is included in all SunLight Controllers.

Lighting Control Options



SunGuard™ Controller

4.5A at 12V



"Rock solid, potted so waterproof, long track-record...great charge controller for a small system"

PWM Controllers

Single module, compact solar charge controller for small systems, ideal for both professional and consumer use.

- **Rugged design** - 100% solid state, epoxy encapsulated; rated for 25% overloads (no need to de-rate)
- **Longer battery life** - series design PWM charging (instead of shunt) with temperature compensation, low self-consumption.
- **Easy to install** - outdoor rated connecting wires make a waterproof connection to the solar module and battery.

| | |
|-------------------------------|---|
| Ambient Operating Temperature | -40 °C to +60 °C -40 °F to +140 °F |
| Product Weight | 0.1 kg / 0.2 lbs |
| Unit Shipping Weight | 0.1 kg / 0.3 lbs |
| Dimensions | 6.4 x 5.1 x 3.8 cm 2.5 x 2.0 x 1.5 in. |
| Warranty | 5 years |

Certifications

- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

| SunGuard | SG-4 |
|------------------------|-------|
| Rated Solar Current | 4.5A |
| Rated Load Current* | None |
| Nominal System Voltage | 12Vdc |

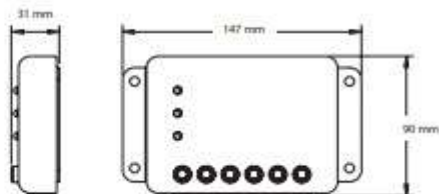
* There is no load connection on the SunGuard.



Morningstar SunKeeper and SunSaver controllers are standard operating equipment for solar-powered applications on remote oil and gas extraction sites.



Technical Drawing



Technical Data

| Type | ECO-N-MPPT-85/15 |
|---------------------------|---|
| System Voltage | 12 / 24 V auto recognition |
| Max. Charge/Load Current | 15 A |
| Float Charge | 13.8 / 27.6 V (25 °C) |
| Main Charge | 14.4 / 28.8 V (25 °C), 0.5 h daily |
| Boost Charge | 14.4 / 28.8 V (25 °C), 2 h activation; battery voltage < 12.3 / 24.6 V |
| Equalization Charge | 14.8 / 29.6 V (25 °C), 2 h activation; battery voltage < 12.1 / 24.2 V (at least every 30 days) |
| Deep-Discharge Protection | 11.00-12.00 / 22.00-24.04 V (by SOC) 11.0-11.9 / 22.0-23.8 V (by voltage) |
| Reconnect Level | 12.8 / 25.6 V |
| Overvoltage Protection | 15.5 / 31.0 V |
| Undervoltage Protection | 10.5 / 21.0 V |
| Max. PV Panel Voltage | 50 / 85 V |
| Max. Usable PV Power | 225 W / 450 W |
| Max. PV Array Power | 250 Wp / 500 Wp |
| Temperature Compensation | -25 mV/K (1.2V); -50 mV/K (24V) |
| Idle Self-Consumption | 10 mA / 8 mA |
| Grounding | Common Negative |
| Ambient Temperature | -40 to +60 °C |
| Max. Altitude | 4,000 m above sea level |
| Battery Type | Lead acid (gel, AGM, flooded), LiFePO4 (selectable) |
| Datalogger | 2 years |
| Max. Wire Cross Section | 16 mm ² (AWG 6) |
| Dimensions (WxHxD) | 147 x 90 x 31 mm / 5.8 x 3.5 x 1.2 in |
| Weight | 1.10 kg / 2.43 lbs |
| Ingress Protection | IP68 casing / IP21 terminals |
| Certificates | CE compliant, RoHS compliant |
| Warranty | 5 years |

Product Introduction

ECO-N-MPPT is the intelligent, cost-effective choice for low-power applications that require maximum charging efficiency. Phocos' high-performance maximum power point tracking (MPPT) algorithm ensures optimal charging current from your panel/array in all conditions. This results in up to 30% higher power yield than conventional PWM charge controllers. This added efficiency paired with Phocos' precision 4-stage, temperature-compensated charge regime significantly extends battery lifespan, reducing number of battery replacements over the useable life of the system.

The encapsulated housing and corrosion-resistant wire terminals protect the ECO-N-MPPT from the harshest environments. An intuitive, 3-LED interface display basic system status data including: charge on/off, low battery warning, high/low-voltage disconnect, and load over current/short circuit.

Product Features

- Works in 12 or 24 V battery systems (auto recognition)
- Up to 98% power-conversion efficiency
- Compact footprint fits in tight spaces
- Rugged, potted design withstands vibration, dust, insects and water ingress
- Install requires only a flathead screwdriver
- Built-in low-voltage disconnect feature
- Four-stage charging ensures maximum battery lifespan
- User-selectable battery type
- LiFePO4 battery compatible
- Programmable night light, battery type, charging voltages and discharge voltage limit

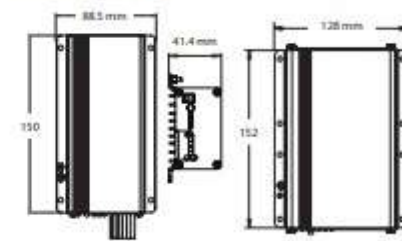
Optional Accessories

MXI and MXI-232

- Interface for CWUp controller communication with computer via USB or RS232 interface



Technical Drawing



CIS-N-MPPT 85/15

CIS-N-MPPT 100/30

Product Introduction

Off-Grid PV systems exposed to extreme weather/environmental conditions impose increased risk of damage to the power electronics. In order to ensure reliable battery protection under such conditions, Phocos developed the CIS-N-MPPT charge controller family to prevent corrosion.

The CIS-N-MPPT series include convenient and advanced lighting control, which allows the user to decide whether they want the automatic lighting control with LED dimming to be either time or low-voltage activated.

Product Features

- Infrared-programmable load timing feature with dimming ideal for lighting systems
- 2 years of system performance data accessible via MXI-IR interface, PC software (CISCOM)
- Up to 98% power conversion efficiency
- Up to 4-stage charging increases battery lifespan
- I/V or I/U curve sweep algorithm increases performance when panels are shaded
- Fully encapsulated anodized aluminum housing design prevents damage from corrosion, insects and dust
- 20 cm connection wire
- Compatible with 60-cell solar modules
- Compatible with Lithium batteries (no BMS communication)
- IP68 Ingress Protection

Optional Accessories

CIS-CU

- Infrared remote control

MXI-IR

- Infrared to USB programming accessory and interface to CISCOM software

Technical Data

| Type | CIS-N-MPPT 85/15 | CIS-N-MPPT 100/30 |
|---------------------------|---|------------------------------------|
| System Voltage | 12 / 24 V auto recognition | |
| Max. Charge/Load Current | 15 A | 30 A |
| Float Charge | 13.8 / 27.6 V (25 °C) | |
| Main Charge | 14.4 / 28.8 V (25 °C), 0.5 h daily | |
| Boost Charge | 14.4 / 28.8 V (25 °C), for 2 h activation; battery voltage < 12.3 / 24.6 V | |
| Equalization Charge | 14.8 / 29.6 V (25 °C), for 2 h activation; battery voltage < 12.1 / 24.2 V (at least every 30 days) | |
| Deep-Discharge Protection | 11-11.9 V / 22-23.8 V (by SOC) 11-12.02 V / 22-24.04 V (by voltage) | |
| Reconnect Level | 12.8 V / 25.6 V | |
| Overvoltage Protection | 15.5 V / 31.0 V | |
| Undervoltage Protection | 10.5 V / 21.0 V | |
| Max. PV Panel Voltage | 50 / 85 V | 95 V |
| Max. Usable PV Power | 225 W / 450 W | 450 W / 900 W |
| Max. PV Array Power | 250 Wp / 500 Wp | 600 Wp / 1,200 Wp |
| Temperature Compensation | -25 mV/K (1.2 V); -50 mV/K (24 V) | |
| Idle Self-Consumption | 15 mA / 8 mA | |
| Dimming Value | 0-100% (0-10 V output) | |
| Grounding | Common Negative | |
| Ambient Temperature | -40 to +60 °C | |
| Battery Type | Lead acid (gel, AGM, flooded), adjustable | |
| Datalogger | 2 years | |
| Wire Cross Section | 2.5 mm ² (AWG 13) | 3.3 mm ² (AWG 12) |
| Dimensions (WxHxD) | 88.5 x 150 x 41.4 mm / 3.5 x 6 x 1.6 in | 128 x 152 x 43 mm / 5.1 x 6 x 2 in |
| Weight | 0.78 kg / 1.72 lbs | 1.45 kg / 2.54 lbs |
| Ingress Protection | IP68 (1.5 m, 72h) | |
| Certificates | CE compliant, RoHS compliant | |
| Warranty | 5 years | |

phocos CML-USB (5-20 A)

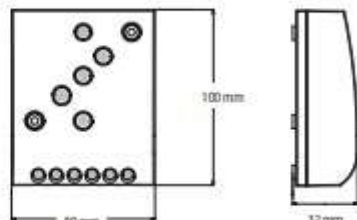
Solar Charge Controllers w/ USB Charging Output



phocos



Technical Drawing



Product Introduction

The CML-USB series is designed for low cost applications and is ideal for small solar systems in need of a low battery disconnect feature. The electronic circuit is equipped with a microcontroller that provides high-efficiency charging technology together with a number of outstanding features like status display, warning and safety functions.

Leisure and rural electrification systems are the typical applications for the CML-USB controllers. They provide a perfect solution for cost-sensitive systems that require state-of-the-art system management.

A built-in USB charging output is ideal for charging mobile devices off a solar home system. Low-voltage disconnect prevents battery damage from deep discharging.

Product Features

- Battery state-of-charge LEDs
- 4-stage PWM regulation
- Load disconnect prewarning by acoustic signal
- Boost, equalization, and float charging
- USB charging output for mobile devices

Optional Accessories

CX-DR2

- DIN rail mounting plate that enables mounting the CML-USB controller on standard 35 mm DIN rail

Technical Data

| Type | CML-USB-05 | CML-USB-10 | CML-USB-20 |
|---------------------------|---|------------|------------|
| System Voltage | 12 / 24 V auto recognition | | |
| Max. Charge/Load Current | 5 A | 10 A | 20 A |
| Float Charge | 13.8 / 27.6 V (25 °C) | | |
| Main Charge | 14.4 / 28.8 V (25 °C), 0.5 h daily | | |
| Boost Charge | 14.4 / 28.8 V (25 °C), 0.5 h daily activation: battery voltage < 12.3 / 24.6 V | | |
| Equalization Charge | 14.8 / 29.6 V (25 °C), 0.5 h daily activation: battery voltage < 12.1 / 24.2 V (at least every 30 days) | | |
| Deep-Discharge Protection | 11.4-11.9 V / 22.8-23.8 V (by SOC) 11.0 / 22.0 V (by voltage) | | |
| Reconnect Level | 12.8 / 25.6 V | | |
| Overvoltage Protection | 15.5 / 31.0 V | | |
| Undervoltage Protection | 10.5 / 21.0 V | | |
| Max. PV Panel Voltage | 30 V / 50 V | | |
| Temperature Compensation | -24 mV/K (12 V); -48 mV/K (24 V) | | |
| Idle Self-Consumption | < 4 mA | | |
| Grounding | Common Positive | | |
| Ambient Temperature | -40 to +45 °C | | |
| Max. Altitude | 4,000 m above sea level | | |
| Battery Type | Lead acid (gel, AGM, flooded) | | |
| USB Charging Port | 5 V, 700 mA | | |
| Max. Wire Cross Section | 16 mm ² (AWG 6) | | |
| Dimensions (WxHxD) | 80 x 100 x 32 mm / 3.1 x 4 x 1.3 in | | |
| Weight | 0.16 kg / 0.35 lb | | |
| Ingress Protection | IP20 | | |
| Certificates | CE compliant, RoHS compliant | | |
| Warranty | 5 years | | |

phocos CXNup Series (10-40 A)

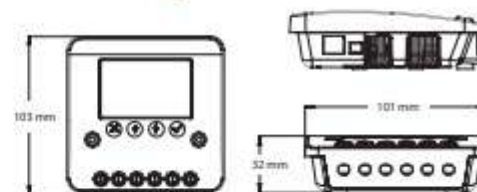
Solar Charge Controller w/ Datalogging/LCD



phocos



Technical Drawing



Product Introduction

The CXNup series is a highly intelligent charge controller family for a wide range of applications. It features an intuitive user interface and stores up to two (2) years of valuable system performance data, which is accessible via the LCD and PhocosLink software.

Real-time battery voltage, battery state-of-charge (SOC) in percent, charge and load current, and system status are clearly displayed on the large, backlit LCD. The CXNup28 offers the possibility to charge two independent batteries with up to 20 A. All other variants offer a USB port to charge mobile phones, tablets and other USB devices. Optional acoustic battery alarms and programmable street light settings are also standard.

Product Features

- USB charging port
- Datalogger information can be exported
- Load status indication**
- Touch keys ensure long lasting operation and eliminates mechanical button failures
- Prepared for 12 or 24 V battery charging
- Suitable for charging systems with up to 1.4 kW
- User friendly LCD shows extensive system information
- 2 year datalogging
- Four-stage PWM charging algorithm with integrated temperature compensation
- Full electronic protection
- Programmable load function suitable for street lights**
- Corrosion-resistant screw terminals
- Programmable battery type
- Compatible with LiFePO4 batteries (no communication to battery)

Optional Accessories



MXI and MXI-232

- Interface for CXNup controller communication with computer via USB or RS232 interface

Technical Data

| Type | CXNup10 | CXNup20 | CXNup28* | CXNup40 |
|---------------------------|--|---------|-------------|---------------|
| System Voltage | 12 / 24 V auto recognition | | | |
| Max. Charge Current | 10 A | 20 A | 20 A / 20 A | 40 A |
| Load Current | 10 A | 20 A | N/A | 40 A |
| Float Charge | 13.8 / 27.6 V (25 °C) | | | |
| Main Charge | 14.4 / 28.8 V (25 °C), 0.5 h daily | | | |
| Boost Charge | 14.4 / 28.8 V (25 °C), 2 h activation: battery voltage < 12.3 / 24.6 V | | | |
| Equalization Charge | 14.8 / 29.6 V (25 °C), 2 h activation: battery voltage < 12.1 / 24.2 V (at least every 30 days) | | | |
| Deep-Discharge Protection | 11.5-12.0 / 23.0-24.0 V (by SOC) 11.0-11.5 / 22.0-23.0 V (by voltage) | | | |
| Reconnect Level | 12.8 / 25.6 V | | N/A | 12.8 / 25.6 V |
| Overvoltage Protection | 15.5 / 31.0 V | | | |
| Undervoltage Protection | 10.5 / 21.0 V | | N/A | 10.5 / 21.0 V |
| Max. PV Panel Voltage | 30 V / 50 V | | | |
| Temperature Compensation | -25 mV/K (12 V); -50 mV/K (24 V) | | | |
| Idle Self-Consumption | < 4 mA (backlight off); < 12 mA (backlight on) | | | |
| Grounding | Common Negative | | | |
| Ambient Temperature | -40 to +60 °C | | | |
| Max. Altitude | 4,000 m above sea level | | | |
| Battery Type | Lead acid (gel, AGM, flooded), LiFePO4 (selectable) | | | |
| Datalogger | 2 years | | | |
| USB Charging Port | 5.0 V, 1.5 A | | N/A | 5.0 V, 1.5 A |
| Max. Wire Cross Section | 16 mm ² (AWG 6) | | | |
| Dimensions (WxHxD) | 101 x 103 x 32 mm / 4 x 4.1 x 1.3 in | | | |
| Weight | 0.18 kg / 0.39 lbs | | | |
| Ingress Protection | IP22 | | | |
| Certificates | CE compliant, RoHS compliant | | | |
| Warranty | 5 years | | | |



Product Introduction

The Phocos PSW (Pure Sine-Wave) inverter series converts DC (Direct Current) energy from solar and other renewable sources, into AC (Alternating Current) power to operate most standard appliances. These units are highly efficient and have a long lifespan to maximize their value in everyday applications. Pure sine wave power is a sophisticated technology that protects even the most sensitive electronics, making it ideal for many modern appliances like TVs, computers, digital clocks, various battery chargers, audio equipment, lamps, and inductive loads like brushless motors, to name a few.

An investment in the Phocos PSW Inverter series will make equipment run more efficiently and can help to maximize the life of products being powered. The THD (Total Harmonic Distortion) of Phocos' pure sine wave inverters is below 3%, which translates to a high performance benefit of premium efficiency and a cleaner AC sine wave than many public grids. Overload, short-circuit, DC over/under voltage and overheating protection are standard on all models. PSW series inverters are ideal for standard, mobile and outdoor applications (e.g. cabins/homes, RVs, boats, cars, and various industrial loads).

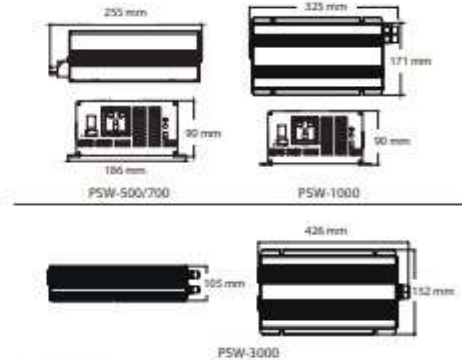
Product Features

- Low battery warning before shutdown
- Fully isolated input & output
- Load controlled cooling fan
- Output frequency 50/60 Hz switch selectable and universal AC socket allows usage in most parts of the world
- Input undervoltage/overvoltage protections
- Output short-circuit/overload/over temperature protections
- Tri-color indicators display output load level & failure status
- Automatic re-start in case of overload: every 60 s approx.
- Low self-consumption and extremely low-consumption green mode
- High-power USB charging port to recharge smartphones, tablets, etc.

Model-Specific Data

| Model | Rated Power | Surge Power | DC Voltage | No Load Power Consumption (110 V Model) | No Load Power Consumption (230 V Model) | Green Mode Consumption (110 V Model) | Green Mode Consumption (230 V Model) |
|----------|-------------|------------------------|---------------------|---|---|--------------------------------------|--------------------------------------|
| PSW-500 | 500 W | 1000 W (for 2 seconds) | 12 / 24 V versions | <12 / <19.2 W | <12 / <19.2 W | <2.4 / <3.6 W | <2.4 / <3.6 W |
| PSW-700 | 700 W | 1400 W (for 2 seconds) | 12 / 24 V versions | <12 / <19.2 W | <12 / <19.2 W | <2.4 / <3.6 W | <2.4 / <3.6 W |
| PSW-1000 | 1000 W | 2000 W (for 2 seconds) | 12/24/48 V versions | <12 / <19.2 / <38.4 W | <12 / <19.2 / <38.4 W | <2.4 / <3.6 / <4.8 W | <2.4 / <3.6 / <4.8 W |
| PSW-2000 | 2000 W | 4000 W (for 2 seconds) | 12/24/48 V versions | <14.4 / <24 / <38.4 W | <14.4 / <24 / <38.4 W | <2.4 / <4.8 / <4.8 W | <2.4 / <4.8 / <4.8 W |
| PSW-3000 | 3000 W | 6000 W (for 2 seconds) | 12/24/48 V versions | <12 / <19.2 / <38.4 W | <18 / <28.8 / <57.6 W | N/A | <3 / <4.8 / <4.8 W |

Technical Drawings



Technical Data

Common specifications for all inverters

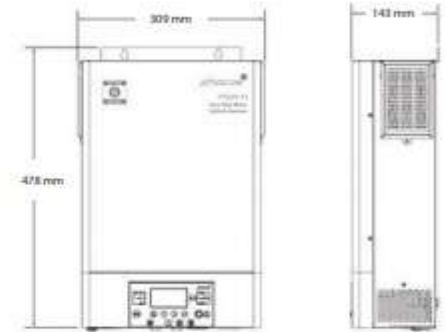
| | |
|--------------------------------|---|
| Output Waveform | Pure Sine Wave (THD <3%) |
| AC Frequency | 50 / 60 Hz \pm 0.5, Hz selectable by DIP switch |
| AC Voltage | 110 / 230 V (\pm 5 % variations) |
| Overvoltage Protection | 15.5 \pm 0.5 (12V) / 31.0 \pm 1.0 (24V) / 62.0 \pm 2.0 (48V) |
| Undervoltage Protection | 10.5 \pm 0.25 (12V) / 21.0 \pm 0.5 (24V) / 42.0 \pm 1.0 (48V) |
| Efficiency | >85 % worst case, >90 % typical |
| Storage Temperature & Humidity | -15 to +60 °C, 5-95 % (non-condensing) |
| Ambient Temperature | -10 to +50 °C |
| USB Charging Port | 5 V, 2.1 A (Not available on 48 V models) |
| Ingress Protection | IP20 |
| Certificates | CE compliant, RoHS compliant |
| Warranty | 2 years |

| Type | Weight | Dimensions (mm/in) |
|----------|-------------------|-----------------------------------|
| PSW-500 | 2.5 kg / 5.5 lbs | 255 x 186 x 90 / 10 x 7.3 x 3.5 |
| PSW-700 | 2.5 kg / 5.5 lbs | 255 x 186 x 90 / 10 x 7.3 x 3.5 |
| PSW-1000 | 3.2 kg / 7.1 lbs | 325 x 171 x 90 / 12.8 x 6.7 x 3.5 |
| PSW-2000 | 5.2 kg / 11.5 lbs | 320 x 152 x 105 / 12.6 x 6 x 4.1 |
| PSW-3000 | 6.0 kg / 13.2 lbs | 426 x 152 x 105 / 16.8 x 6 x 4.1 |

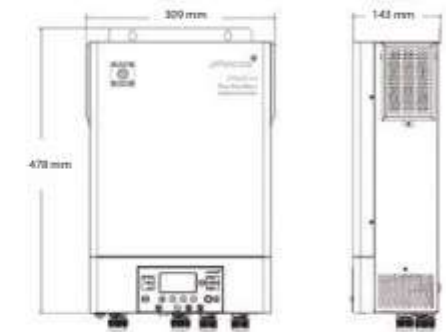
NEW



Technical Drawing



230 Vac models



120 Vac model

Product Introduction

The Phocos Any-Grid™ PSW-H Inverter Charger Series (Pure Sine Wave Hybrid) represents Phocos' most versatile line of inverters/chargers. Flexibility and reliability are key characteristics of this product line, with a strong potential for cost saving opportunities in real world conditions. The PSW-H converts DC (Direct Current) energy into AC (Alternating Current), with multiple advantages beyond standard inverters. This product includes an integrated MPPT charge controller and can function as an AC to DC battery charger, which provides flexible energy access solutions in a broad range of applications.

The battery can be charged from solar and/or an AC source (public grid or generator), with easily programmable priorities. The PSW-H can function without an AC source or alternatively even without solar, as a pure uninterruptible power supply (UPS). When the utility grid or AC generator fails, the PSW-H immediately switches to 'Off-Grid' mode within 10 ms (typical, in LPS mode) to securely power the loads at all times. Solar can be set as the priority energy source to save electricity costs.

The Any-Grid PSW-H can function in a battery-free mode. In this mode, for installations with stable public grids, grid energy consumption can be reduced without the need to invest in a costly battery bank. Additionally, power can be supplied directly to loads from the grid and solar simultaneously.

This unit comes with a quality, integrated MPPT charge controller. The controller accepts particularly high PV voltages, allowing many PV modules to be connected in series, decreasing installation cost and avoiding combiner boxes. Up to 9 inverters can be connected in parallel or 3-phase for up to 45 kW of synchronized AC power.





04- Off-Grid Inverter

OUR PRODUCTS

MUST

SOFAR
SOLAR

phocos



SUN & ENERGY SOLAR



HYD

5K~20KTL-3PH

5000 / 6000 / 8000 / 10000 / 15000 / 20000 W

THREE-PHASE ENERGY STORAGE INTEGRATED INVERTER

Various operational modes for optimal performance

Up to 2 MPPTs, allowing a flexible configuration

Maximum two battery inputs

Off-grid output can be connected to unbalanced load, three-phase separate output is supported

Multiple parallel systems, more flexible system solutions

Fully digital operation, enabling higher control accuracy

| Datasheet | HYD 5KTL-3PH | HYD 6KTL-3PH | HYD 8KTL-3PH | HYD 10KTL-3PH | HYD 15KTL-3PH | HYD 20KTL-3PH |
|--|--|-----------------------|------------------------|------------------------|--------------------------|--------------------------|
| Battery Input Data | | | | | | |
| Battery type | Lithium-ion, Lead-acid | | | | | |
| No. of battery input | 1 | | | 2 | | |
| Battery voltage range (V) | 180-800 | | | | | |
| Battery voltage range for full load (V) | 200-800 | 240-800 | 320-800 | 200-800 | 300-800 | 400-800 |
| Nominal charging / discharging power (W) | 5000 | 6000 | 8000 | 10000(5000/5000) | 15000(7500/7500) | 20000(10000/10000) |
| Max. charging / discharging current (A) | 25 | | | 50 (25 / 25) | | |
| Peak charging / discharging current, duration (A, s) | 40, 60 | | | 70 (35 / 35), 60 | | |
| Charging strategy for battery | Self-adaptation to BMS | | | | | |
| Communication interfaces | CAN (RS485) | | | | | |
| PV String Input Data | | | | | | |
| Recommended max. PV input power (Wp) | 7500 (6000 / 6000) | 9000 (6600 / 6600) | 12000 (6600 / 6600) | 15000 (7500 / 7500) | 22500 (11250 / 11250) | 30000 (15000 / 15000) |
| Max. DC voltage (V) | 1000 | | | | | |
| Start-up operating voltage (V) | 200 | | | | | |
| MPPT voltage range (V) | 180-960 | | | | | |
| Nominal DC voltage (V) | 600 | | | | | |
| Full power MPPT voltage range (V) | 250-850 | 320-850 | 360-850 | 220-850 | 350-850 | 450-850 |
| Max. input current (A) | 12.5 / 12.5 | | | 25 / 25 | | |
| Max. short current (A) | 15 / 15 | | | 30 / 30 | | |
| No. of MPP trackers | 2 | | | 2 | | |
| No. of strings per MPP tracker | 1 | | | 2 | | |
| AC Output Data (On-grid) | | | | | | |
| Nominal AC power (W) | 5000 | 6000 | 8000 | 10000 | 15000 | 20000 |
| Max. AC power output to utility grid (VA) | 5500 | 6600 | 8800 | 11000 | 16500 | 22000 |
| Max. AC power from utility grid (VA) | 10000 | 12000 | 16000 | 20000 | 30000 | 40000 |
| Max. AC current output to utility grid (A) | 8 | 10 | 13 | 16 | 24 | 32 |
| Max. AC current from utility grid (A) | 15 | 17 | 24 | 29 | 44 | 58 |
| Nominal grid voltage | 3 / N / PE, 220 / 380 Vac, 230 / 400 Vac | | | | | |
| Grid voltage range | 184 Vac~276 Vac | | | | | |
| Nominal grid frequency | 50 / 60 Hz | | | | | |
| Grid frequency range | 45 Hz~55 Hz / 55 Hz~65 Hz | | | | | |
| Output power factor | 1 default (+/-0.8 adjustable) | | | | | |
| Output THDI (@Nominal output) | < 3% | | | | | |
| AC Output Data (Back-up) | | | | | | |
| Nominal output power (W) | 5000 | 6000 | 8000 | 10000 | 15000 | 20000 |
| Max. output power (VA) | 5500 | 6600 | 8800 | 11000 | 16500 | 22000 |
| Peak output power, duration (VA, s) | 10000, 60 | 12000, 60 | 16000, 60 | 20000, 60 | 22000, 60 | |
| Rated output current (A) | 7.2 | 8.7 | 11.6 | 14.5 | 21.7 | 29 |
| Max. output current (A) | 8 | 10 | 13 | 16 | 24 | 32 |
| Peak output current, duration (A, s) | 15, 60 | 18, 60 | 24, 60 | 30, 60 | 32, 60 | |
| Nominal output voltage | 3 / N / PE, 220 / 380 Vac, 230 / 400 Vac | | | | | |
| Nominal output frequency | 50 / 60 Hz | | | | | |
| Output THDv (@symmetrical load) | < 3% | | | | | |
| Switch time | < 10 ms | | | | | |
| Efficiency | | | | | | |
| MPPT efficiency | 99.9% | | | | | |
| Euro efficiency | 97.5% | | | 97.7% | | |
| Max. efficiency | 98.0% | | | 98.2% | | |
| Max. battery charge / discharge efficiency | 97.6% | | | 97.8% | | |
| Protection | | | | | | |
| DC switch | Yes | | | | | |
| PV reverse polarity protection | Yes | | | | | |
| Output overcurrent protection | Yes | | | | | |
| Output overvoltage protection | Yes | | | | | |
| Anti-islanding protection | Yes | | | | | |
| Residual current detection | Yes | | | | | |
| Insulation resistor detection | Yes | | | | | |
| Surge protection level | PV: type II standard, AC: type II standard | | | | | |
| Battery reverse protection | Yes | | | | | |
| General Data | | | | | | |
| Dimension(mm) | 571.4*515*264.1 | | | | | |
| Weight (kg) | 33 | | | 37 | | |
| Inverter topology | Transformerless | | | | | |
| Standby self-consumption (W) | < 15 | | | | | |
| Operating temperature range | -30°C~+60°C | | | | | |
| Relative humidity | 0~100% | | | | | |
| Noise | < 45 dB | | | | | |
| Operating altitude | < 4000 m | | | | | |
| Cooling | Natural | | | Forced airflow | | |
| Protection degree | IP65 | | | | | |
| Feature | | | | | | |
| DC terminal | MC4 | | | | | |
| Grid AC terminal | 5P Connector | | | | | |
| Back-up AC terminal | 5P Connector | | | | | |
| Display | LCD Display | | | | | |
| Monitoring interfaces | RS485/Bluetooth/CAN2.0/Ethernet, Optional: WIFI/4G | | | | | |
| Parallel operation | Yes | | | | | |
| Standard warranty | 5 Years | | | | | |
| Certifications & Standards | | | | | | |
| EMC | EN 61000-6-1, EN61000-6-3 | | | | | |
| Safety | IEC 62109-1, IEC 62109-2, NB-T32004 / IEC 62040-1 | | | | | |
| Grid | AS / NZS 4777, VDE V 0124-100, V0126-1-1, VDE-AR-N 4105, CEI 0-16 / CEI 0-21, EN 50549, G98 / G99, UTE C15-712-1 | | | | | |

SOFAR 110K~125KTLX-G4

110 / 125 kW

THREE-PHASE TEN-MPPTS



Product advantages

- Max. efficiency up to 98.75%
- IP66 design for outdoor
- Maximum 10 MPP trackers with 150%+ DC overload
- Type II SPD for both DC and AC side
- AC / DC dual power supply redundant design, 24-hour status monitoring
- I-V curve scanning function
- Supports Modbus Communication, external WiFi



| Datasheet | SOFAR 110KTLX-G4 | SOFAR 125KTLX-G4 |
|-----------------------------------|--|-------------------------------------|
| Input (DC) | | |
| Max. input voltage | 1100V | |
| Rated input voltage | 625V | |
| Start-up voltage | 200V | |
| MPPT operating voltage range | 180-1000V | |
| Number of MPP trackers | 10 | |
| Number for DC inputs | 20 | |
| Max. input current per MPPT | 10*40A | |
| Max. input short circuit current | 10*50A | |
| Output (AC) | | |
| Rated output power | 100kW | 110kW |
| Max. apparent power | 110kVA@45°C / 100kVA@50°C | 125kVA@45°C / 110kVA@50°C |
| Max. Output current | 167.2A@380V / 159.5A@400V / 153.1A@415V | 190A@380V / 181.2A@400V / 174A@415V |
| Rated grid voltage | 3/N/PE, 380V / 400V / 415V | |
| Grid voltage range | 310~480V | |
| Rated frequency | 50 / 60 Hz | |
| Grid frequency range | 45~55Hz / 55~65Hz | |
| Active power adjustable range | 0~100% | |
| THDI | <1%(@100%P) | |
| Power factor | 1 (adjustable +/-0.8) | |
| Efficiency | | |
| Max. efficiency | 98.60% | |
| European efficiency | 98.30% | |
| Protection | | |
| DC reverse polarity protection | Yes | |
| Anti-islanding protection | Yes | |
| Leakage current protection | Yes | |
| Ground fault monitoring | Yes | |
| PV-array string fault monitoring | Yes | |
| DC switch | Yes | |
| AFCI | Yes | |
| SPD | PV: type II standard, AC: type II standard | |
| General Data | | |
| Ambient temperature range | -30°C ~ +60°C | |
| Self-consumption at night | <1W | |
| Topology | Transformerless | |
| Degree of protection | IP66 | |
| Allowable relative humidity range | 0~100% | |
| Max. operating altitude | 4000m(>3000m derating) | |
| Weight | 75kg | |
| Cooling | Smart forced air cooling | |
| Dimension (W*H*D) | 970*695*325 mm | |
| Display | LCD & Bluetooth +APP | |
| Communication | RS485/WiFi | |

* All specifications are subject to change without notice.

MUST

PV1800 VHM SERIES (2KW-5.5KW)
High Frequency Off Grid Solar Inverter



(2KW-3KW)



(3KW-5.5KW)

INTRODUCTION

PV1800 VHM is a multi-functional inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support in portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

FEATURES

- Pure sine wave solar inverter
- Output power factor 1
- High PV input voltage range
- Built-in 80A MPPT solar charger
- Battery equalization function to optimize battery performance and extend lifecycle
- Built-in anti-dusk kit for harsh environment



Rated power
2kw-5.5kw



Battery Voltage
24VDC/48VDC



Auto Frequency Sensing
50Hz/60Hz



Multi Protection



Battery smart
charge design



Lead-acid/Lithium Battery
Optional

MUST

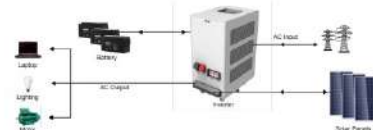
Low Frequency On/Off Grid Hybrid Solar Inverter



PH3000 Series (9-12KW)

Features

- 1-phase or Single-phase
- Smart LCD setting (Working mode, Charge Current, Charge Voltage, etc.)
- Built-in MPPT 180A solar charge controller
- MPPT Efficiency max 98%
- Combining solar system, AC utility, and battery power source to supply continuous power
- Multiple operation: Basic Grid-tie, Off-Grid, Grid-Interactive
- Support CAN, RS485 monitoring function with free CD
- WIFI remote monitoring (optional)
- Compatible to generator



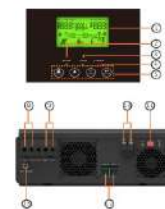
Selection Guide

| MODEL | PH3000-9000-T | PH3000-12000-T |
|--|--|--|
| GENERAL | | |
| Nominal Battery System Voltage | 48VDC | 48VDC |
| Rated output power | 9000W | 12000W |
| Output wave | Pure Sine Wave | Pure Sine Wave |
| Nominal output voltage | 230VAC (P/N) 400VAC (P/P) | 230VAC (P/N) 400VAC (P/P) |
| Nominal output current | 13.6A per phase | 13.6A per phase |
| Nominal output frequency | 50 Hz / 60 Hz | 50 Hz / 60 Hz |
| Rate of voltage detection (100% inverter rating) | 0% (90%)/5% | 0% (90%)/5% |
| Inverter efficiency | 98% | 98% |
| Power factor | 0.9 lead - 0.9 lag | 0.9 lead - 0.9 lag |
| Overload capacity | 100% (10min) / 110% (30min) / 120% (1hour) / 150% (1.5hours) | 100% (10min) / 110% (30min) / 120% (1hour) / 150% (1.5hours) |
| AC INPUT | | |
| AC Input maximum current | 200A per phase | 240A per phase |
| Nominal frequency | 50Hz / 60Hz | 50Hz / 60Hz |
| Acceptable input voltage range | Default: 180Vac ~ 250Vac per phase / Normal: 170Vac ~ 270Vac per phase / Wide Range: 160Vac ~ 270Vac per phase | Default: 180Vac ~ 250Vac per phase / Normal: 170Vac ~ 270Vac per phase / Wide Range: 160Vac ~ 270Vac per phase |
| Maximum Voltage | 480VDC | 480VDC |
| Low Voltage Protection Point | Charge: 84 VDC, Inverter: 48 VDC | Charge: 84 VDC, Inverter: 48 VDC |
| Reconnection Voltage | 60VDC | 60VDC |
| Reverse Voltage | 64 VDC | 64 VDC |
| Phase Voltage | 47 VDC | 47 VDC |
| AC Output Current Voltage | 48VDC | 48VDC |
| Max. Solar Charging Current | 80A per phase | 80A per phase |
| Max AC Charging Current | 60A per phase | 60A per phase |
| Max Charging Current | 100A per phase | 100A per phase |
| Max. AC Output Power | 9000W | 12000W |
| Max. AC Output Voltage | 230VAC | 230VAC |
| Max. AC Output Frequency | 50Hz / 60Hz | 50Hz / 60Hz |
| Package Dimensions (W*H*Depth) | 412*390*510 | 412*390*510 |
| Net Weight (kg) | 130 | 140 |
| Gross Weight (kg) | 130 | 140 |
| Dimensions (mm) | 284*240*115 | 284*240*115 |
| Operation Temperature Range | 0°C ~ 50°C | 0°C ~ 50°C |
| Storage Temperature Range | -30°C ~ 60°C | -30°C ~ 60°C |
| Relative Humidity | 0 ~ 95% | 0 ~ 95% |
| Protection | IP20 | IP20 |
| Warranty | 3 Years | 3 Years |

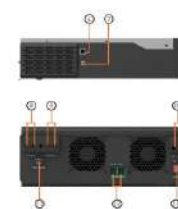
MUST

MUST

PV1800 VHM SERIES (2KW-5.5KW)
High Frequency Off Grid Solar Inverter



(2KW-3KW)



(3KW-5.5KW)

1. LCD Display
2. Status Indicator
3. Charging Indicator
4. Fault Indicator
5. Function Buttons
6. RS-485 Communication port
7. USB
8. AC Input
9. AC Output
10. PV Input
11. Power On/Off Switch
12. Battery Input
13. Circuit breaker

| MODEL | PV1800-2000-VHM | PV1800-3000-VHM | PV1800-4000-VHM | PV1800-5000-VHM | PV1800-5500-VHM |
|---------------------------------------|--|-----------------|-----------------|-----------------|-----------------|
| GENERAL | | | | | |
| Nominal Battery System Voltage | 24VDC | 24VDC | 48VDC | 48VDC | 48VDC |
| Rated Power | 2000W | 3000W | 4000W | 5000W | 5500W |
| Charge Power | 4000W | 6000W | 8000W | 10000W | 12000W |
| Waveform | Pure Sine Wave | | | | |
| AC Voltage Regulation (Grid-Tie) | 0.2% (230VAC) / 0.5% (400VAC) | | | | |
| Inverter Efficiency | 98% | | | | |
| Transfer Time | 30ms (for Remote Computer/Smart Home Appliances) | | | | |
| Voltage | 110V (for Remote Computer/Smart Home Appliances) / 230VAC | | | | |
| AC INPUT | | | | | |
| Acceptable Voltage Range | 110V (for Remote Computer/Smart Home Appliances) / 180V (for Solar Panels) | | | | |
| Frequency Range | 50Hz/60Hz (Auto Sensing) | | | | |
| Normal Voltage | 230VAC | 230VAC | 400VAC | 400VAC | 400VAC |
| Fluctuation Voltage | 27VDC | 27VDC | 48VDC | 48VDC | 48VDC |
| Overvoltage Protection | 27VDC | 27VDC | 48VDC | 48VDC | 48VDC |
| BATTERY | | | | | |
| Maximum PV Array Open Circuit Voltage | 30-120VDC | 30-120VDC | 64-120VDC | 64-120VDC | 64-120VDC |
| PV Array MPPT Voltage | 20-120VDC | 20-120VDC | 40-120VDC | 40-120VDC | 40-120VDC |
| Standby Power | 2W | | | | |
| PV Input Power | 1610W/1930W | 1610W/1930W | 2640W/3100W | 2640W/3100W | 2640W/3100W |
| SOLAR CHARGER & AC CHARGER | | | | | |
| Maximum Solar Charge Current | 80A/90A | | | | |
| Maximum AC Charge Current | 98% | | | | |
| Maximum AC Charge Voltage | 20A/20A | 20A/20A | 40A | 40A | 40A |
| Maximum Charge Current | 40A | 40A | 120A/120A | 120A/120A | 120A/120A |
| Maximum Charge Voltage | 27V/27V/100V | 27V/27V/100V | 48V/48V/140V | 48V/48V/140V | 48V/48V/140V |
| Package Dimension (W*H*Depth) | 140*100*140 | 140*100*140 | 140*100*140 | 140*100*140 | 140*100*140 |
| Net Weight (kg) | 10 | 11 | 12 | 13 | 13 |
| Gross Weight (kg) | 11.7 | 12 | 13 | 14 | 14 |
| Mechanical Specifications | | | | | |
| Humidity | 0% to 95% (Relative Humidity) (Non-condensing) | | | | |
| Operating Temperature | 0°C ~ 50°C | | | | |
| Storage Temperature | -30°C ~ 60°C | | | | |

Smart String Inverter



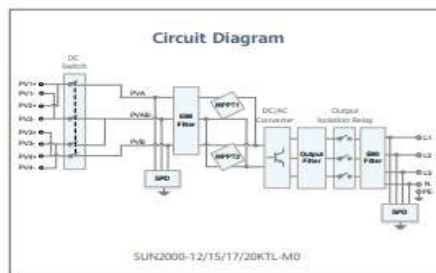
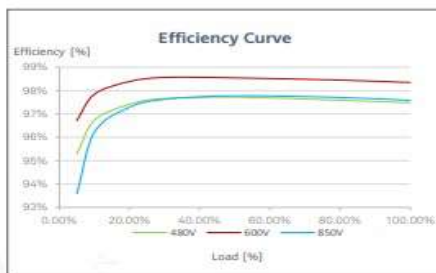
Higher Revenue
 Max. efficiency 98.65%



Simple & Easy
 25 kg



Safe & Reliable
 Arc fault protection



| Technical Specification | SUN2000-12KTL-M0 | SUN2000-15KTL-M0 | SUN2000-17KTL-M0 | SUN2000-20KTL-M0 |
|--|--|---|------------------|------------------|
| Efficiency | | | | |
| Max. efficiency | 98.50% | 98.65% | 98.65% | 98.65% |
| European weighted efficiency | 98.00% | 98.30% | 98.30% | 98.30% |
| Input | | | | |
| Recommended max. PV power | 24,000 Wp | 26,880 Wp | 26,880 Wp | 26,880 Wp |
| Max. input voltage | | 1,080 V | | |
| Start voltage | | 200 V | | |
| Operating voltage range | | 160 V ~ 950 V | | |
| Rated input voltage | | 800 V | | |
| Max. input current per MPPT | | 22 A | | |
| Max. short-circuit current | | 30 A | | |
| Number of MPP trackers | | 2 | | |
| Max. number of inputs | | 4 | | |
| Output | | | | |
| Grid connection | | Three phase | | |
| Rated output power | 12,000 W | 15,000 W | 17,000 W | 20,000 W |
| Max. apparent power | 13,200 VA | 16,500 VA | 18,700 VA | 22,000 VA |
| Rated output voltage | | 220 Vac / 380 Vac, 230 Vac / 400 Vac, 3W + N + PE | | |
| Rated AC grid frequency | | 50 Hz / 60 Hz | | |
| Max. output current | 20 A | 25.2 A | 28.5 A | 33.5 A |
| Adjustable power factor | | 0.8 leading ... 0.8 lagging | | |
| Max. total harmonic distortion | | ≤ 3% | | |
| Features & Protections | | | | |
| Input-side disconnection device | | Yes | | |
| Anti-islanding protection | | Yes | | |
| AC over-current protection | | Yes | | |
| AC short-circuit protection | | Yes | | |
| AC over-voltage protection | | Yes | | |
| DC reverse-polarity protection | | Yes | | |
| DC lightning protection | | Yes | | |
| AC lightning protection | | Yes | | |
| Residual current monitoring unit | | Yes | | |
| Arc fault protection | | Yes | | |
| Ripple receiver control | | Yes | | |
| General Data | | | | |
| Operation temperature range | -25 ~ +60 °C (-13 °F ~ 140 °F) (Derating above 45 °C @ Rated output power) | | | |
| Relative humidity | 0 % RH ~ 100% RH | | | |
| Max. operating altitude | 0 - 4,000 m (13,123 ft.) (Derating above 2000 m) | | | |
| Cooling | Natural Convection | | | |
| Display | LED Indicators | | | |
| Communication | RS485; WLAN via Smart Dongle-WLAN; 4G / 3G / 2G via Smart Dongle-4G | | | |
| Weight (with mounting plate) | 25 kg | | | |
| Dimensions (W x H x D) (incl. mounting plate) | 525 x 470 x 262 mm (20.7 x 18.5 x 10.3 inch) | | | |
| Degree of protection | IP65 | | | |
| Standard Compliance (more available upon request) | | | | |
| Safety | EN/IEC 62109-1, EN/IEC 62109-2 | | | |
| Grid connection standards | G98, G99, EN 50438, CEI 0-21, VDE-AR-N-4105, VDE-AR-N-4110, AS 4777, C10/11, ABNT, UTE C15-712, RD 1699, TOR D4, NRS 097-2-1, IEC61727, IEC62116, DEWA 2.0 | | | |

FRENIC-Multi series inverters, developed by Fuji Electric FA Components & Systems, are loaded with advanced technologies. The Multi series features class-highest control performance, abundant model variation, limited use of hazardous substances, reduced noise effect on peripheral equipment, and optimal functions for conveyance machines. The other features include easy operation and wiring, various protection functions, improved maintenance methods. The Multi series inverters can be used for a wide range of applications such as conveyance machines, fans, pumps, centrifugal separators, and food processing machines.

Gentler on the environment

Expanded capacity range and abundant model variation

The highest standards of control and performance in its class

Optimum for the operations specific to vertical and horizontal conveyance

Simple and thorough maintenance

Simple operation, simple connection

Consideration of peripheral equipment, and a full range of protective functions

You can use an inverter equipped with functions like these



Variation

| Standard type | | | | | | | |
|------------------------------|------------------|------------------|-------------------|------------------------------|------------------|------------------|-------------------|
| Applicable motor rating [HP] | Three-phase 230V | Three-phase 460V | Single-phase 230V | Applicable motor rating [HP] | Three-phase 230V | Three-phase 460V | Single-phase 230V |
| 1/8 | FRNF12E1S-2U | | FRNF12E1S-7U | 5 | FRN005E1S-2U | FRN005E1S-4U | |
| 1/4 | FRNF25E1S-2U | | FRNF25E1S-7U | 7.5 | FRN007E1S-2U | FRN007E1S-4U | |
| 1/2 | FRNF50E1S-2U | FRNF08E1S-4U | FRNF50E1S-7U | 10 | FRN010E1S-2U | FRN010E1S-4U | |
| 1 | FRN001E1S-2U | FRN001E1S-4U | FRN001E1S-7U | 15 | FRN015E1S-2U | FRN015E1S-4U | |
| 2 | FRN002E1S-2U | FRN002E1S-4U | FRN002E1S-7U | 20 | FRN020E1S-2U | FRN020E1S-4U | |
| 3 | FRN003E1S-2U | FRN003E1S-4U | FRN003E1S-7U | | | | |

FRENIC-Multi Series

Standard specifications

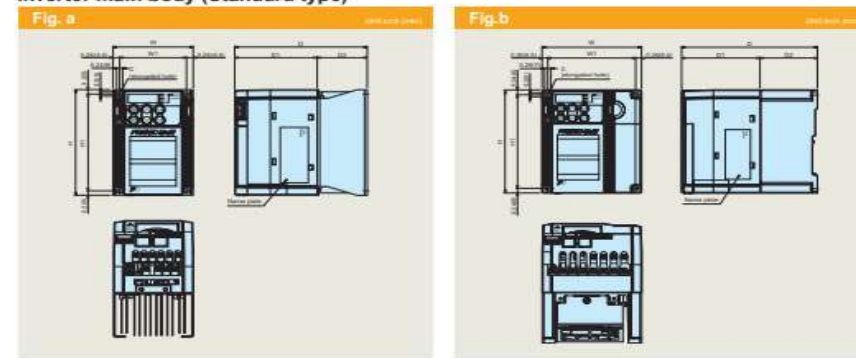
Three-phase 230V

| Item | Specifications | | | | | | | | | | | |
|------------------------------------|-----------------|--|----------|----------|----------|----------|----------|----------|----------|----------|-----------|---------|
| | F12 | F25 | F50 | 001 | 002 | 003 | 005 | 007 | 010 | 015 | 020 | |
| Type (FRN E1S-2U) | HP | 1/8 | 1/4 | 1/2 | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 |
| Applicable motor rating *1) | kVA | 0.30 | 0.57 | 1.1 | 1.9 | 3.0 | 4.1 | 6.4 | 8.9 | 12 | 17 | 22 |
| Rated capacity *2) | V | Three-phase 200V to 230V (with AVR function) | | | | | | | | | | |
| Rated voltage *3) | A | 0.8 | 1.5 | 3.0 | 5.0 | 8.0 | 11 | 17 | 25 | 33 | 47 | 60 |
| Rated current *4) | | (0.7) | (1.4) | (2.8) | (4.7) | (7.0) | (10) | (16.5) | (23.5) | (31) | (44) | (57) |
| Overload capability | Hz | 150% of rated current for 1min, 200% - 0.5s | | | | | | | | | | |
| Rated frequency | | 50, 60Hz | | | | | | | | | | |
| Phases, voltage, frequency | | Three-phase, 200 to 240V, 50/60Hz | | | | | | | | | | |
| Voltage/frequency variations | | Voltage: +10 to -15% (Voltage unbalance *5): 2% or less) Frequency: +5 to -5% | | | | | | | | | | |
| Rated current *9) | A [with DCR] | 0.57 | 0.93 | 1.6 | 3.0 | 5.7 | 8.3 | 14.0 | 21.1 | 28.8 | 42.2 | 57.8 |
| | A [without DCR] | 1.1 | 1.8 | 3.1 | 5.3 | 9.5 | 13.2 | 22.2 | 31.5 | 42.7 | 60.7 | 80 |
| Required power supply capacity *9) | kVA | 0.2 | 0.3 | 0.6 | 1.3 | 2.0 | 2.9 | 4.9 | 7.4 | 10 | 15 | 20 |
| Torque *6) | % | 150 | | | | | | | | | | |
| Torque *7) | % | — | | | | | | | | | | |
| Braking | | DC injection braking | | | | | | | | | | |
| Braking transistor | | Starting frequency: 0.1 to 60.0Hz, Braking time: 0.0 to 30.0s, Braking level: 0 to 100% of rated current | | | | | | | | | | |
| Applicable safety standards | | UL508C, C22 No.14, EN50178-1997 | | | | | | | | | | |
| Enclosure (IEC60529) | | IP20, UL open type | | | | | | | | | | |
| Cooling method | | Natural cooling | | | | | | | | | | |
| Cooling method | | Fan cooling | | | | | | | | | | |
| Weight | kg (kg) | 1.3(0.6) | 1.3(0.6) | 1.5(0.7) | 1.8(0.8) | 3.7(1.7) | 3.7(1.7) | 5.1(2.3) | 7.5(3.4) | 7.9(3.6) | 13.6(6.1) | 16(7.5) |

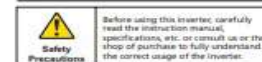
*1) Fig.4-4 size standard motor.
 *2) Rated capacity is calculated by assuming the output rated voltage as 230V for three-phase 230V series and 460V for three-phase 460V series.
 *3) Output voltage control across the power supply voltage.
 *4) When setting the carrier frequency (Fz) to 3 kHz or less, use the current () or below when the carrier frequency setting is higher than 6kHz and continuously operating at 100%.
 *5) Obtained when a DC REACTOR is used.
 *6) Average locking torque obtained when reducing the speed from 50% with AVR control OFF (fans with the efficiency of the motor).
 *7) Average braking torque obtained by use of external braking resistor (standard type available as option).
 *8) Voltage unbalance (%) = (Max voltage [V] - Min voltage [V]) / (1/3 (SEC E1850-3))
 *9) If this value is 2 or 3%, use AC REACTOR (ACR) option.
 *10) This value is calculated on assumption that the inverter is connected with a power supply capacity of 300kVA (or 10 times the inverter capacity if the inverter capacity exceeds 30kVA) and NLA is 0%.

External Dimensions

Inverter main body (Standard type)



| Power supply voltage | Inverter type | Fig. | Dimensions [Unit: inch (mm)] | | | | | | | |
|----------------------|---------------|------|------------------------------|----------|-----------|-----------|-----------|----------|----------|--------------------------------------|
| | | | W | W1 | H | H1 | D | D1 | D2 | C |
| Three-phase 230V | FRNF12E1S-2U | a | 3.15(80) | 2.64(67) | 4.72(120) | 4.33(110) | 3.62(92) | 3.23(82) | 0.39(10) | 4-0.20x0.24 (4-6x8) (elongated hole) |
| | FRNF25E1S-2U | | | | | | 4.21(107) | | 0.99(25) | |
| | FRNF50E1S-2U | | | | | | 5.20(132) | | 1.97(50) | |
| | FRN001E1S-2U | | | | | | | | | |
| | FRN002E1S-2U | | | | | | | | | |
| | FRN003E1S-2U | | | | | | | | | |
| | | b | 4.33(110) | 3.82(97) | 5.12(130) | 4.65(118) | 5.91(150) | 3.39(86) | 2.52(64) | 4-0.20x0.28 (4-6x7) (elongated hole) |



Before using this inverter, carefully read the instruction manual, specifications, etc. or consult us or the shop of purchase to fully understand the correct usage of the inverter.

Fuji Electric FA Components & Systems Co., Ltd.
 Fuji Electric Corp. of America
http://www.fujielectric.com/products/ac_drives/
 47520 Westinghouse Drive Fremont, CA 94538, U.S.A. Tel. +1-510-440-1060 Fax. +1-510-440-1063



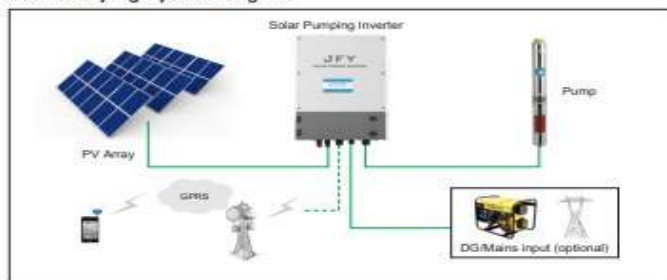
JFY SPRING Series Solar Pumping Inverter

- Solar Pumping System uses the solar power which is one of green energy and it drives the pump directly after the conversion of the inverter. The system requires no external battery, stores waters instead of electricity and then drives the AC pump. The system is economical, saving-energy and clean. It can be applied to many occasions such as people and animals drinking water in remote areas, farmland irrigation, desertification control and city landscape water use etc.
- SPRING series Solar Pumping Inverter from JFY company is dedicated to Solar Pumping System and it can be used for various application scenario. The Solar Pumping Inverter controls and regulates the system operation, converts the DC power from PV array to AC power and then drives AC pumps. It can adjust the output frequency real-time according to the irradiation change and fulfill maximum power point tracking(MPPT).

Product Features

- Designed dedicated for solar pump, and compatible with various motor types; have excellent performance;
- IP 55 protection level, inverter integrates the combiner box which contains the PV dedicated DC switch, SPD, fuse and other optional accessories;
- Plenty of communication interfaces, such as RS485/CAN/GPRS (optional); the running and status can be checked remotely;
- Inverter allows using grid or diesel generator as backup power supply, 24-hour running;
- Natural cooling design, IP65 high protection level guarantees inverter to be applied under all kinds of outdoor strict environment;
- Using advanced dynamic VI MPPT technique; fast respond and good operating stability;
- Main circuit adopts intelligent power module, high reliability, conversion efficiency reach to 98%;
- Advanced IGBT module, the high and low water position detection control circuit optional;
- Full automatic running, no need manual duty, the pump speed range can be set freely according to the system conditions so that guarantee the running time as long as possible;
- The inverter outer casing is solid and durable, compact size, nice appearance; friendly UI, user can check the real time info and historical info via the LCD display located in the front board; can store the running data up to 8 years;
- Inverter has perfect running protection mechanism, such as output short-circuit protection, IGBT over-current protection, input overvoltage protection, overload protection, module over-temp protection, grounding protection and so on;

Solar Pumping System Diagram



Application Scenario

Farmland irrigation



Desertification control



Animal drinking water



Tourism water supply



JFY Solar Pumping Inverter Series & Technical Parameter

| 380V Triphase output series: 3000W-32kW | | | | | | | | | | | | |
|---|-------------------------|---------------------|----------------------------|---------------------------------|------------------------|------------------------|-----------------------|------------------|-------------|----------------|-------|--------|
| Inverter Model | MAX Input String Number | Start Voltage (Vdc) | MAX DC Input Voltage (Vdc) | Recomm MPPT Voltage Range (Vdc) | Rated Output Power (W) | MAX Output Current (A) | Output Frequency (Hz) | Protection Level | Weight (kg) | Pack Size (mm) | | |
| | | | | | | | | | | Length | Width | Height |
| SPRING 3000 | 2 | 250 | 900 | 500-680 | 3000 | 8 | 0-50/60 | IP65 | 11.5 | 478 | 325 | 155 |
| SPRING 3000-A | 2 | 250 | 900 | 500-680 | 3000 | 8 | 0-50/60 | IP65 | 12 | 478 | 325 | 155 |
| SPRING 4000 | 2 | 250 | 900 | 500-680 | 4000 | 10 | 0-50/60 | IP65 | 11.5 | 478 | 325 | 155 |
| SPRING 4000-A | 2 | 250 | 900 | 500-680 | 4000 | 10 | 0-50/60 | IP65 | 12 | 478 | 325 | 155 |
| SPRING 5500 | 2 | 250 | 900 | 500-680 | 5500 | 13 | 0-50/60 | IP65 | 11.5 | 478 | 325 | 155 |
| SPRING 5500-A | 2 | 250 | 900 | 500-680 | 5500 | 13 | 0-50/60 | IP65 | 12 | 478 | 325 | 155 |
| SPRING 7500 | 3 | 250 | 900 | 500-680 | 7500 | 18 | 0-50/60 | IP65 | 13.5 | 528 | 346 | 166 |
| SPRING 7500-A | 3 | 250 | 900 | 500-680 | 7500 | 18 | 0-50/60 | IP65 | 14 | 528 | 346 | 166 |
| SPRING 9200 | 3 | 250 | 900 | 500-680 | 9200 | 21 | 0-50/60 | IP65 | 13.5 | 528 | 346 | 166 |
| SPRING 9200-A | 3 | 250 | 900 | 500-680 | 9200 | 21 | 0-50/60 | IP65 | 14 | 528 | 346 | 166 |
| SPRING 11K | 3 | 250 | 900 | 500-680 | 11000 | 24 | 0-50/60 | IP65 | 13.5 | 528 | 346 | 166 |
| SPRING 11K-A | 3 | 250 | 900 | 500-680 | 11000 | 24 | 0-50/60 | IP65 | 14 | 528 | 346 | 166 |
| SPRING 13K | 6 | 250 | 900 | 500-680 | 13000 | 28 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 13K-A | 6 | 250 | 900 | 500-680 | 13000 | 28 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 15K | 6 | 250 | 900 | 500-680 | 15000 | 30 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 15K-A | 6 | 250 | 900 | 500-680 | 15000 | 30 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 18K5 | 6 | 250 | 900 | 500-680 | 18500 | 39 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 18K5-A | 6 | 250 | 900 | 500-680 | 18500 | 39 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 22K | 6 | 250 | 900 | 500-680 | 22000 | 45 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |
| SPRING 22K-A | 6 | 250 | 900 | 500-680 | 22000 | 45 | 0-50/60 | IP65 | 22.5 | 583 | 405 | 190 |

| 380V Triphase output series: 26kW-75kW | | | | | | | | | | | | | |
|--|-------------------------|---------------------|----------------------------|---------------------------------|------------------------|------------------------|-----------------------|-------------------------------------|-------------|----------------|-------|--------|-----|
| Inverter Model | MAX Input String Number | Start Voltage (Vdc) | MAX DC Input Voltage (Vdc) | Recomm MPPT Voltage Range (Vdc) | Rated Output Power (W) | MAX Output Current (A) | Output Frequency (Hz) | Protection Level | Weight (kg) | Pack Size (mm) | | | |
| | | | | | | | | | | Length | Width | Height | |
| SPRING 26K | 1 (via combiner box) | 250 | 900 | 500-680 | 26000 | 54 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 26K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 26000 | 54 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 30K | 1 (via combiner box) | 250 | 900 | 500-680 | 30000 | 60 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 30K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 30000 | 60 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 37K | 1 (via combiner box) | 250 | 900 | 500-680 | 37000 | 75 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 37K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 37000 | 75 | 0-50/60 | IP20 | 18.5 | 467 | 260 | 220 | |
| SPRING 45K | 1 (via combiner box) | 250 | 900 | 500-680 | 45000 | 91 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| SPRING 45K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 45000 | 91 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| SPRING 55K | 1 (via combiner box) | 250 | 900 | 500-680 | 55000 | 112 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| SPRING 55K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 55000 | 112 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| SPRING 75K | 1 (via combiner box) | 250 | 900 | 500-680 | 75000 | 162 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| SPRING 75K-A | 1 (via combiner box) | 250 | 900 | 500-680 | 75000 | 162 | 0-50/60 | IP20 | 28 | 546 | 347 | 242 | |
| JFY W1 | | | | | | | | Outdoor Cabinet, For Spring 26K-37K | IP54 | 33 | 550 | 320 | 790 |
| JFY W1-A | | | | | | | | Outdoor Cabinet, For Spring 26K-37K | IP54 | 49 | 650 | 320 | 790 |
| JFY W2 | | | | | | | | Outdoor Cabinet, For Spring 45K-75K | IP54 | 36 | 650 | 320 | 940 |
| JFY W2-A | | | | | | | | Outdoor Cabinet, For Spring 45K-75K | IP54 | 53 | 790 | 320 | 940 |

*AC grid voltage range and frequency range depend on local standards.



- Product Series
- Rated Output Power
- S-Output 220V/Single phase; Null-tripphase
- L-Output 220V/tripphase; Null-Output 380V/tripphase
- A-AC Input available; Null-AC Input Unavailable



Ducab دوكاب



H1Z2Z2-K Cables for Photovoltaic Systems 1.5 kVDC

APPLICATIONS:

Solar cable is the interconnection cable used in photovoltaic power plants, they connect solar panels and other electrical components of a photovoltaic system. The cables are suitable to be used with class II equipment as per BS50618.

CONSTRUCTION:

| | | | | | | | |
|------------------|---|-----------------------|---|-----------------------|--|----------------------|---------------------------------|
| CONDUCTOR | Flexible Class 5 - Tinned annealed copper to IEC 60228. | INSULATION | Cross Linked (XLPO) to BS EN 50618:2014 1.5KVDC | SHEATH | Cross Linked (XLPO) to BS EN 50618:2014. | SHEATH COLOUR | BLACK (Other Colour on request) |
| STANDARDS | BS EN 50618 & TUV 2 PFG 1189/08. | VOLTAGE RATING | 1.5 KVDC. | OPERATING TEMP | -40° C to +120° C. | | |

| No. of Cores | Conductor Area | Thickness of Insulation Specified Value | Thickness of Sheath Specified Value | Mean overall diameter (Approx) | Minimum insulation resistance at 20°C | Minimum insulation resistance at 90°C | Approx. Weight of Completed Cable |
|--------------|--------------------|---|-------------------------------------|--------------------------------|---------------------------------------|---------------------------------------|-----------------------------------|
| | (mm ²) | (mm) | (mm) | (mm) | MΩ.km | MΩ.km | (Kg/Km) |
| 1C | 1.5 | 0.7 | 0.8 | 5.4 | 860 | 0.86 | 35 |
| 1C | 2.5 | 0.7 | 0.8 | 5.9 | 690 | 0.69 | 46 |
| 1C | 4 | 0.7 | 0.8 | 6.6 | 580 | 0.58 | 59 |
| 1C | 6 | 0.7 | 0.8 | 7.4 | 500 | 0.50 | 80 |
| 1C | 10 | 0.7 | 0.8 | 8.8 | 420 | 0.42 | 120 |
| 1C | 16 | 0.7 | 0.9 | 10.1 | 340 | 0.34 | 182 |
| 1C | 25 | 0.9 | 1.0 | 12.5 | 340 | 0.34 | 282 |
| 1C | 35 | 0.9 | 1.1 | 14.0 | 290 | 0.29 | 375 |
| 1C | 50 | 1.0 | 1.2 | 16.3 | 270 | 0.27 | 520 |
| 1C | 70 | 1.1 | 1.2 | 18.7 | 250 | 0.25 | 733 |
| 1C | 95 | 1.1 | 1.3 | 20.8 | 220 | 0.22 | 963 |
| 1C | 120 | 1.2 | 1.3 | 22.8 | 210 | 0.21 | 1196 |
| 1C | 150 | 1.4 | 1.4 | 25.5 | 210 | 0.21 | 1504 |
| 1C | 185 | 1.6 | 1.6 | 28.5 | 200 | 0.20 | 1851 |
| 1C | 240 | 1.7 | 1.7 | 32.1 | 200 | 0.20 | 2425 |

ELECTRICAL DATA:

| Conductor Size | DC Resistance at 20°C | Short circuit rating for 1Sec |
|--------------------|-----------------------|-------------------------------|
| (mm ²) | (ohm/km) | (kA) |
| 1.5 | 13.7 | 0.19 |
| 2.5 | 8.21 | 0.32 |
| 4 | 5.09 | 0.50 |
| 6 | 3.39 | 0.75 |
| 10 | 1.95 | 1.26 |
| 16 | 1.24 | 2.02 |
| 25 | 0.795 | 3.15 |
| 35 | 0.565 | 4.42 |
| 50 | 0.393 | 6.31 |
| 70 | 0.277 | 8.84 |
| 95 | 0.210 | 11.9 |
| 120 | 0.164 | 15.2 |
| 150 | 0.132 | 18.9 |
| 185 | 0.108 | 23.3 |
| 240 | 0.0817 | 30.3 |

*The short circuit rating is calculated based on the condition of normal maximum operating conductor temperature of 120°C prior to short circuit and maximum conductor temperature of 250°C after the short circuit.

GENERAL INFORMATION

The following designations are used for insulation materials in this catalogue. All materials are halogen free.

The designation XLPO stands for cross-linked polyethylene compound. It has excellent mechanical and electrical characteristics.

Halogen free - Halogen free refers to the absence of halogens, such as chlorine and fluorine, and is determined on the basis of halogen content and the acidity of gases of cable.

Smoke emission - Smoke emission refers to visibility in a fire. The greater the light transmittance, the better the visibility. When tested in accordance with IEC 61034-2 the minimum light transmittance shall be greater than 60%.

BSEN 50267-2-1 - Determine the halogen content of the material. To meet the requirement as halogen free the halogen content of the material may not exceed 0.5 % or 5mg/g.

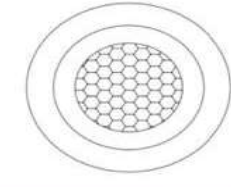
BSEN 50267-2-2 - Determine the degree of acidity of gases evolved during combustion. The limit values are 4.3 for pH and 10 microS for conductivity.

IEC 60332-1 is the test for single insulated wire and cable. Test procedure and requirements according to the picture, below. Min 50 mm of the cable, measured from the upper support, must remain unburned after the specified time.



| LEADER 技术规格书 | | Approval Sheets | |
|--|-----------------------------|--------------------------|---|
| Customer/客户 | | Sheet NO/编号 | S0905001 |
| Standard/标准 | EN50618 | Construction Figure/截面图: |  |
| Construction/规格 | H1Z2Z2-K 1X4mm ² | | |
| Construction Item | Units | 4.0mm ² | |
| Construction/构造 | mm | 56/0.295±0.008 | |
| Material/材质 | --- | Tinned copper wire | |
| O.D./绞合外径 | mm | 2.50 | |
| Insulation (绝缘) | | | |
| Material/材质 | --- | XLPE | |
| Avg.Thick/平均厚度 | mm | 0.70 | |
| Min.Thick/最小厚度 | mm | 0.50 | |
| O.D./线径 | mm | 3.95±0.15 | |
| Color/颜色 | --- | 黑色 | |
| Twisted Pair (对绞) | | | |
| Ins.Color/芯线颜色 | --- | / | |
| Lay of Strand/绞距 | mm | / | |
| O.D./绞合外径 | mm | / | |
| Assemble (成缆) | | | |
| Filling/填充 | --- | / | |
| Lapping/包带 | --- | / | |
| Drain.wire/地线 | --- | / | |
| Covering (内护) | | | |
| Material/材质 | --- | / | |
| Avg.Thick/标准厚度 | mm | / | |
| Min.Thick/最小厚度 | mm | / | |
| O.D./线径 | mm | / | |
| Color/颜色 | --- | / | |
| Armour (铠装) | | | |
| Construction/结构 | --- | / | |
| Coverage/覆盖率 | % | / | |
| Shield (屏蔽) | | | |
| Material/材质 | --- | / | |
| Construction/结构 | --- | / | |
| Coverage/覆盖率 | % | / | |
| Jacket (护套) | | | |
| Material/材质 | --- | XLPE | |
| Avg.Thick/平均厚度 | mm | 0.80 | |
| Min.Thick/最小厚度 | mm | 0.60 | |
| O.D./线径 | mm | 5.6±0.2 | |
| Color/颜色 | --- | Black | |
| Surface/外观 | --- | / | |
| Marking (印字) | | | |
| TÜV DC1500V H1Z2Z2-K 1X4.0mm ² Solar PV Cable | | | |
| | | APPROVED批准 | CHECKED审查 |
| | | DESIGNED编制 | |
| | | 张学武 | 赵亮亮 |
| | | 王坤斌 | |
| APPROVED BY THE CLIENT 客户认可 | | | |
| Revision Date:2016-09-05 | | | |

备注:

| LEADER 技术规格书 | | Approval Sheets | |
|--|-----------------------------|--------------------------|---|
| Customer/客户 | | Sheet NO/编号 | S0918006 |
| Standard/标准 | EN 50618-2014 | Construction Figure/截面图: |  |
| Construction/规格 | H1Z2Z2-K 1*6mm ² | | |
| Conductor (导体) | | | |
| Construction Item | Units | 6mm ² | |
| Construction/构造 | mm | 84/0.2950±0.008 | |
| Material/材质 | --- | Tinned copper wire | |
| O.D./绞合外径 | mm | 2.59 | |
| Insulation (绝缘) | | | |
| Material/材质 | --- | XLPE | |
| Avg.Thick/标准厚度 | mm | 0.72 | |
| Min.Thick/最小厚度 | mm | 0.65 | |
| O.D./线径 | mm | 4.55±0.2 | |
| Color/颜色 | --- | Black | |
| Twisted Pair (对绞) | | | |
| Ins.Color/芯线颜色 | --- | / | |
| Lay of Strand/绞距 | mm | / | |
| O.D./绞合外径 | mm | / | |
| Assemble (成缆) | | | |
| Filling/填充 | --- | / | |
| Lapping/包带 | --- | / | |
| Drain.wire/地线 | --- | / | |
| Covering (内护) | | | |
| Material/材质 | --- | / | |
| Avg.Thick/标准厚度 | mm | / | |
| Min.Thick/最小厚度 | mm | / | |
| O.D./线径 | mm | / | |
| Color/颜色 | --- | / | |
| Armour (铠装) | | | |
| Construction/结构 | --- | / | |
| Coverage/覆盖率 | % | / | |
| Shield (屏蔽) | | | |
| Material/材质 | --- | / | |
| Construction/结构 | --- | / | |
| Coverage/覆盖率 | % | / | |
| Jacket (护套) | | | |
| Material/材质 | --- | XLPE | |
| Avg.Thick/标准厚度 | mm | 0.80 | |
| Min.Thick/最小厚度 | mm | 0.65 | |
| O.D./线径 | mm | 6.4±0.2 | |
| Color/颜色 | --- | Black | |
| Surface/外观 | --- | / | |
| Marking (印字) | | | |
| TÜV DC1500V H1Z2Z2-K 1X6.0mm ² Solar PV Cable | | | |
| | | APPROVED批准 | CHECKED审查 |
| | | DESIGNED编制 | |
| | | 王红梅 | 许胜才 |
| | | 周灯 | |
| APPROVED BY THE CLIENT 客户认可 | | | |
| Revision Date:2016-04-19 | | | |

Version:1.0



For More Information

Tel: +971 4 332 9118

Web: www.sunergysolar.ae

Email: sales@sunergysolar.ae

Social Media: [Solar.Sunergy](#)