Buncombe County Public Sector Solar Initiative

Equipment Cutsheets

Contacts for Manufacturers

Modules

1. REC Solar – Marty Krapf – marty.krapf@recgroup.com
2. Trina Solar – Adam Jordan – adam.jordan@trinasolar.com
3. Q-Cell – Dawson Rauch – dawson.rauch@us.q-cells.com

Inverters

1. SolarEdge – Sumner Komro – sumner.komro@solaredge.com
2. SMA – www.sma-america.com/contact
3. Fronius – www.fronius.com/en-us/usa/contact

Canopies

1. Quest Renewables – James Keane – james@questrenewables.com
   Finn Findley – finn@questrenewables.com

Racking

1. PanelClaw – Joe Gondron – jgondron@panelclaw.com
2. Iron-Ridge – Jeff Ryan – jryan@ironridge.com
3. Aero-Compact – Elizabeth Davis – Elizabeth.davis@aerocompact.com
4. RBI Solar – Pat Hudepohl – phudepohl@rbisolar.com
5. SolarFlexRack – Derek Gault – dgault@solarflexrack.com

Solar Panels

SOLAR'S MOST TRUSTED

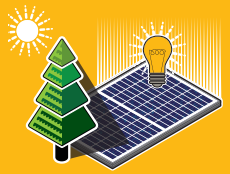
REC TWINPEAK 2S MONO 72 SERIES

PREMIUM SOLAR PANELS 100% MADE IN SINGAPORE

REC TwinPeak 2S Mono 72 Series solar panels feature an innovative design with high efficiency and an industry-leading lightweight, yet robust construction, enabling customers to get the most out of the installation area .

Combined with the product quality and reliability of a strong and established European brand, REC TwinPeak 2S Mono 72 Series panels are ideal for all types of commercial rooftop and utility installations worldwide.

REDUCES BALANCE OF SYSTEM COSTS

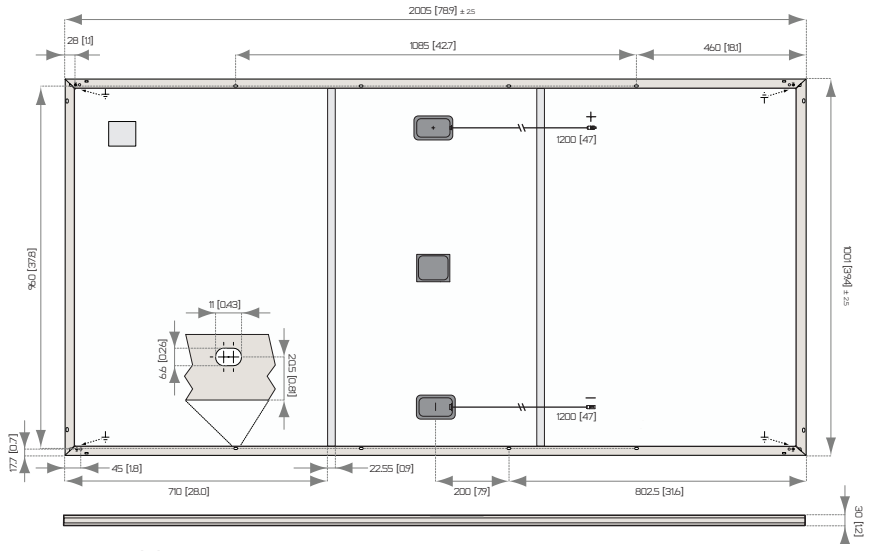


IMPROVED PERFORMANCE IN SHADED CONDITIONS

INDUSTRY-LEADING LIGHTWEIGHT 72-CELL PANEL

100% PID FREE

REC TWINPEAK 2S MONO 72 SERIES



All measurements in mm [in]

ELECTRICAL DATA @ STC	Product code*: RECxxxTP2SM 72						
Nominal Power - P_{MPP} (Wp)	370	375	380	385	390	395	400
Watt Class Sorting - (W)	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5
Nominal Power Voltage - V_{MPP} (V)	39.8	40.1	40.3	40.5	40.7	40.9	41.1
Nominal Power Current - I_{MPP} (A)	9.30	9.36	9.43	9.51	9.58	9.66	9.73
Open Circuit Voltage - V_{OC} (V)	47.0	47.4	48.0	48.6	49.2	49.8	50.4
Short Circuit Current - I_{SC} (A)	10.02	10.04	10.05	10.07	10.08	10.09	10.10
Panel Efficiency (%)	18.4	18.7	18.9	19.2	19.4	19.7	20.0

Values at standard test conditions STC (airmass AM 1.5, irradiance 1000 W/m², cell temperature 77°F (25°C).
At low irradiance of 200 W/m² (AM 1.5 and cell temperature 77°F (25°C)) at least 95% of the STC module efficiency will be achieved.
* xxx indicates the nominal power class (P_{MPP}) at STC, and can be followed by the suffix XV for modules with a 1500 V maximum system rating.

ELECTRICAL DATA @ NMOT	Product code*: RECxxxTP2SM 72						
Nominal Power - P_{MPP} (Wp)	276	280	283	287	290	295	298
Nominal Power Voltage - V_{MPP} (V)	37.1	37.3	37.5	37.7	37.9	38.1	38.3
Nominal Power Current - I_{MPP} (A)	7.44	7.49	7.54	7.60	7.66	7.73	7.78
Open Circuit Voltage - V_{OC} (V)	43.7	44.1	44.7	45.3	45.8	46.4	46.9
Short Circuit Current - I_{SC} (A)	8.02	8.03	8.04	8.06	8.06	8.07	8.08

Nominal cell operating temperature NOCT (800 W/m², AM 1.5, windspeed 1 m/s, ambient temperature 68°F(20°C).
* xxx indicates the nominal power class (P_{MPP}) at STC, and can be followed by the suffix XV for modules with a 1500 V maximum system rating.

CERTIFICATION

C US

UL 1703, Fire classification: Type 1 (1500 V XV): Type 2 (1000 V);
IEC 61215, IEC 61730, IEC 62804 (PID), IEC 62716 (Ammonia),
IEC 61701 (Salt Mist level 6),
ISO 9001: 2015, ISO 14001: 2004, OHSAS 18001: 2007

WARRANTY

20 year product warranty
25 year linear power output warranty
Max. performance degression of 0.5% p.a. from 97.5% in year 1
See warranty conditions for further details.

20.0% EFFICIENCY

20 YEAR PRODUCT WARRANTY

25 YEAR LINEAR POWER OUTPUT WARRANTY

GENERAL DATA

Cell type:	144 half-cut monocrystalline PERC cells 6 strings of 24 cells in series
Glass:	0.13" (3.2 mm) solar glass with anti-reflection surface treatment
Backsheet:	Highly resistant polymeric construction
Frame:	Anodized aluminum
Support bars:	Anodized aluminum
Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790
Cable:	4 mm² solar cable, 1.2 m + 1.2 m in accordance with EN 50618
Connectors:	Stäubli MC4-Evo2 PV-KBT4-EVO-2/PV-KST4-EVO-2 (4mm²) in accordance with IEC 62852, IP68 only when connected
Origin:	Made in Singapore

MAXIMUM RATINGS

Operational temperature:	-40 ... +185°F (-40 ... +85°C)
Maximum system voltage:	1000 V / 1500 V
Design load (+): snow Maximum test load (+):	75.2 lbs/ft² (3600 Pa)* 112.8 lbs/ft² (5400 Pa)*
Design load (-): wind Maximum test load (-):	33.4 lbs/ft² (1600 Pa)* 50.1 lbs/ft² (2400 Pa)*
Max series fuse rating:	25 A
Max reverse current:	25 A

+ Calculated using a safety factor of 1.5
* See installation manual for mounting instructions

TEMPERATURE RATINGS

Nominal Module Operating Temperature:	44.6°C (±2°C)
Temperature coefficient of P_{MPP}:	-0.37 %/°C
Temperature coefficient of V_{OC}:	-0.28 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

MECHANICAL DATA

Dimensions:	78.9" x 39.4" x 1.2" (2005 x 1001 x 30 mm)
Area:	21.6 ft² (2.01 m²)
Weight:	48.5 lbs (22 kg)

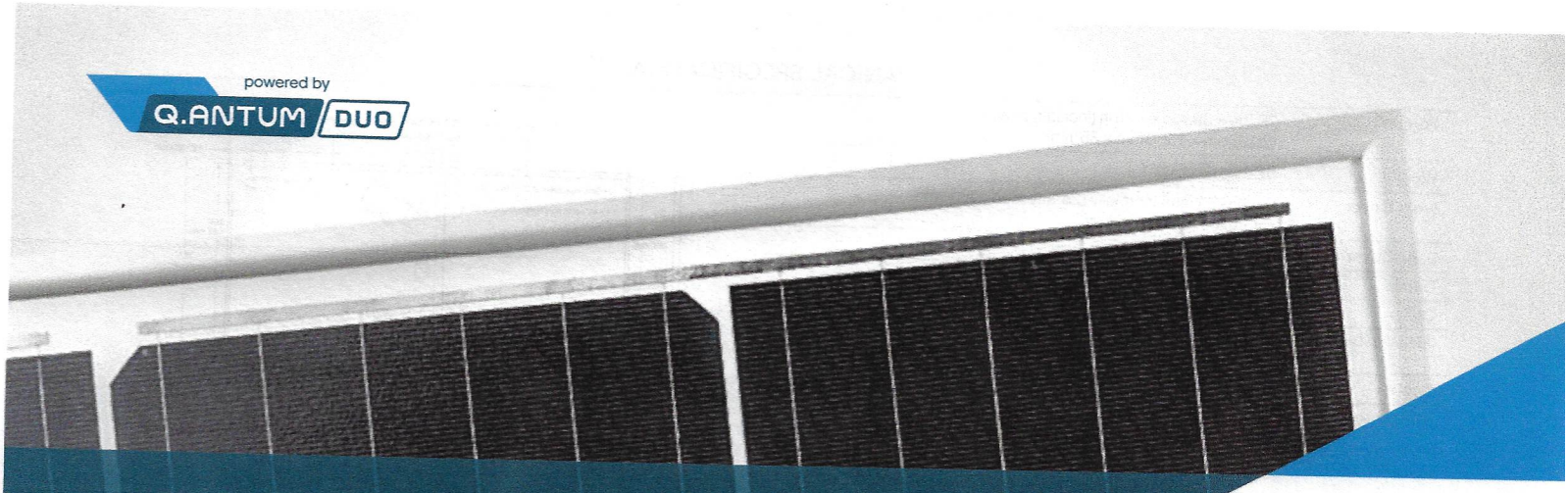
Specifications subject to change without notice.

Ref: PM-DS-07-23 Rev-B 07.19

Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.

REC
www.recgroup.com

powered by Q.ANTUM DUO

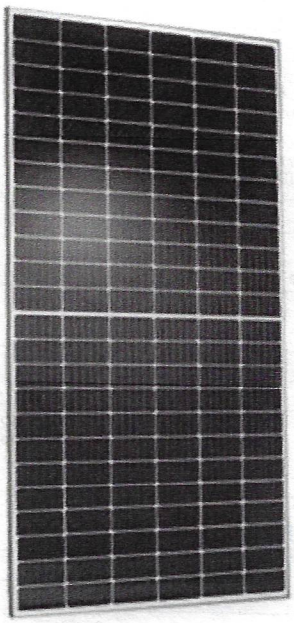


Q.PEAK DUO L-G5.2
380-405
ENDURING HIGH PERFORMANCE

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2019

Photon Q.PRO-G2 235 Best polycrystalline solar module 2014 Q CELLS 174 modules tested

Q CELLS YIELD SECURITY – ANTI PID TECHNOLOGY (APT) – HOT-SPOT PROTECT (HSP) – TRACEABLE QUALITY (TRA.Q™) – ANTI LID TECHNOLOGY (ALT)



Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.3%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

Rooftop arrays on commercial/industrial buildings

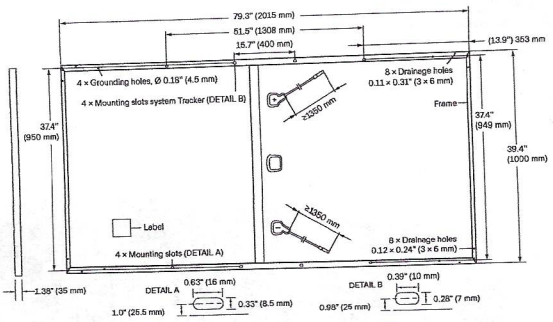
Ground-mounted solar power plants

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	79.3 in × 39.4 in × 1.38 in (including frame) (2015 mm × 1000 mm × 35 mm)
Weight	51.8 lbs (23.5 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodized aluminum
Cell	6 × 24 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 × 1.26-2.36 × 0.59-0.71 in (53-101 × 32-60 × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥53.1 in (1350 mm), (−) ≥53.1 in (1350 mm)
Connector	Stäubli MC4, Stäubli MC4-Evo2, Amphenol UTX, Renhe 05-8, Tonglin TL-Cable01S-F; IP68 or Friends PV2e; IP67

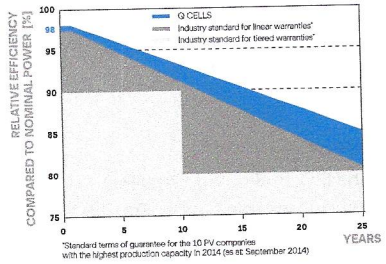


ELECTRICAL CHARACTERISTICS

POWER CLASS				380	385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)									
Minimum	Power at MPP[1]	P_{MPP}	[W]	380	385	390	395	400	405
	Short Circuit Current[1]	I_{SC}	[A]	10.05	10.10	10.14	10.19	10.24	10.28
	Open Circuit Voltage[1]	V_{OC}	[V]	47.95	48.21	48.48	48.74	49.00	49.26
	Current at MPP	I_{MPP}	[A]	9.57	9.61	9.66	9.70	9.75	9.79
	Voltage at MPP	V_{MPP}	[V]	39.71	40.05	40.38	40.71	41.04	41.36
	Efficiency[1]	η	[%]	≥18.9	≥19.1	≥19.4	≥19.6	≥19.9	≥20.1
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]									
Minimum	Power at MPP	P_{MPP}	[W]	284.4	288.2	291.9	295.6	299.4	303.1
	Short Circuit Current	I_{SC}	[A]	8.10	8.14	8.17	8.21	8.25	8.28
	Open Circuit Voltage	V_{OC}	[V]	45.21	45.46	45.71	45.96	46.21	46.45
	Current at MPP	I_{MPP}	[A]	7.53	7.57	7.60	7.64	7.67	7.71
	Voltage at MPP	V_{MPP}	[V]	37.77	38.08	38.40	38.71	39.02	39.33

[1] Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2°C, AM 1.5 G according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5 G

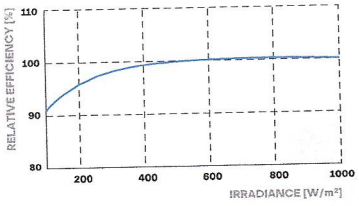
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.36	Normal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500 (IEC) / 1500 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C / TYPE 1
Max. Design Load, Push / Pull[3]	[lbs / ft²]	75 (3600 Pa) / 33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	−40°F up to +185°F (−40°C up to +85°C)
Max. Test Load, Push / Pull[3]	[lbs / ft²]	113 (5400 Pa) / 50 (2400 Pa)		

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent No. 9,893,215 (solar cells)

PACKAGING INFORMATION

Number of Modules per Pallet	29
Number of Pallets per 53' Trailer	27
Number of Pallets per 40' HC-Container	22
Pallet Dimensions (L × W × H)	81.9 × 45.3 × 46.9 in (2080 × 1150 × 1190 mm)
Pallet Weight	1635 lbs (742 kg)

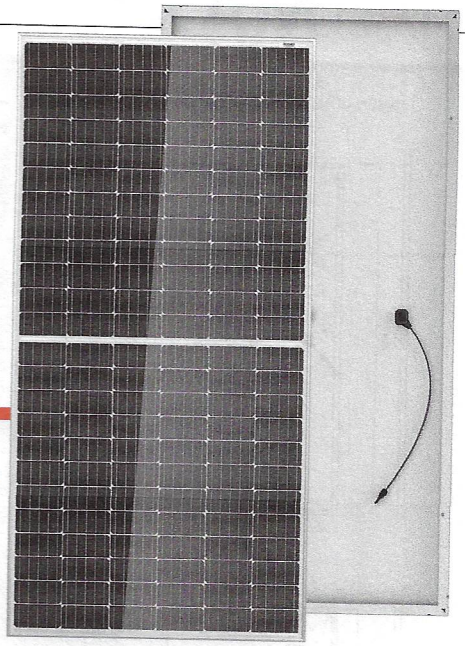
Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748-5996 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.com/na

THE

TALLMAX M

FRAMED 144 HALF-CELL MODULE



PRODUCTS	COLOR OF FRAME	POWER RANGE
TSM-DE15H(II)	Silver	385-410W

144-Cell
MONOCRYSTALLINE MODULE

380-410W
POWER OUTPUT RANGE

20.2%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneÿcial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Veriÿcation
OHSAS 18001: Occupation Health and Safety Management System

Trinasolar

High power output

- Reduce BOS cost with high power bin and 1500V system voltage
- New cell string layout and split J-box location reduces the energy loss caused by inter-row shading
- Lower resistance of half-cut cells ensures higher power

High energy generation, low LCOE

- Excellent 3rd party validated IAM and low light performance with cell process and module material optimization
- Integrated LRF(Light Redirecting Film) to enhance power
- Low P_{max} temp coefficient (-0.36%) increases energy production
- Better anti-shading performance and lower operating temperature

Certified to perform in highly challenging environments

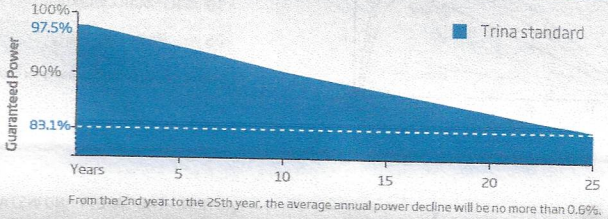
- High PID resistance through cell process and module material control
- Resistant to salt, acid, sand, and ammonia
- Certified to 5400 Pa positive load and 2400 Pa negative load

Easy to install, wide application

- Frame design enables compatibility with standard installation methods
- Deployable for ground mounted and rooftop projects
- Safe and easy to transport, handle, and install

PERFORMANCE WARRANTY

10 Year Product Warranty · 25 Year Power Warranty

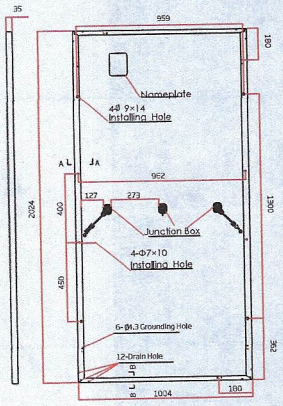


From the 2nd year to the 25th year, the average annual power decline will be no more than 0.6%.

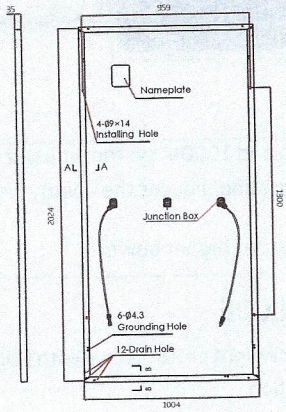
TALLMAX™

FRAMED 144 HALF-CELL MODULE

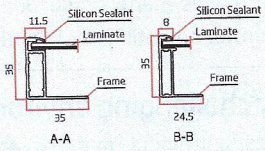
DIMENSIONS OF PV MODULE(mm)



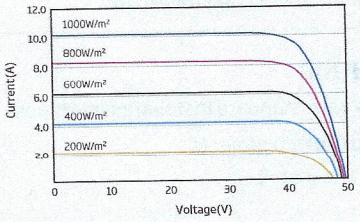
Back View(Portrait)



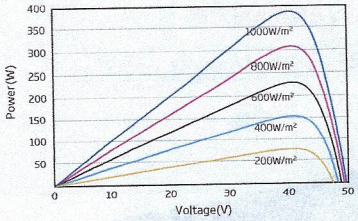
Back View(Landscape)



I-V CURVES OF PV MODULE(390W)



P-V CURVES OF PV MODULE(390W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	380	385	390	395	400	405	410
Power Output Tolerance-P_{MAX} (W)	0 ~ +5						
Maximum Power Voltage-V_{MPP} (V)	39.6	40.1	40.5	40.8	41.1	41.4	41.7
Maximum Power Current-I_{MPP} (A)	9.59	9.61	9.64	9.69	9.74	9.79	9.84
Open Circuit Voltage-V_{OC} (V)	48.1	48.5	49.7	50.1	50.4	50.8	51.2
Short Circuit Current-I_{SC} (A)	9.99	10.03	10.08	10.13	10.18	10.23	10.29
Module E°ciency η_m (%)	18.7	18.9	19.2	19.4	19.7	19.9	20.2

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

ELECTRICAL DATA (NMOT)

Maximum Power-P_{MAX} (Wp)	287	291	296	299	303	307	311
Maximum Power Voltage-V_{MPP} (V)	37.6	37.9	38.6	38.9	39.1	39.4	39.7
Maximum Power Current-I_{MPP} (A)	7.64	7.68	7.66	7.70	7.74	7.78	7.82
Open Circuit Voltage-V_{OC} (V)	45.4	45.8	46.9	47.3	47.6	47.9	48.3
Short Circuit Current-I_{SC} (A)	8.05	8.08	8.12	8.16	8.20	8.24	8.29

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

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	144 cells (6 × 24)
Module Dimensions	2024 × 1004 × 35 mm (79.69 × 39.53 × 1.38 inches)
Weight	22.8kg (50.3lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Portrait: N 140mm/P 285mm (5.51/11.22 inches) Landscape: N 1400 mm /P 1400 mm (55.12/55.12 inches)
Connector	Trina TS4

TEMPERATURE RATINGS

NMOT(Nominal Module Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P_{MAX}	- 0.36%/°C
Temperature Coefficient of V_{OC}	- 0.26%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty

25 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 30 pieces

Modules per 40' container: 660 pieces

Trinasolar

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

Version number: TSM_DE15H(II)_EN_2019_D

www.trinasolar.com

Mono Multi Solutions

THE

DUOMAX twin

BIFACIAL DUAL GLASS 144 HALF-CELL MODULE

144-Cell
MONOCRYSTALLINE MODULE

380-405W
POWER OUTPUT RANGE

19.7%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

PRODUCT	POWER RANGE
TSM-DEG15HC.20(II)	380-405W

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneÿcial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Veriÿcation
OHSAS 18001: Occupation Health and Safety Management System

Trinasolar

High power output

- Up to 405W front power and 19.7% module effiiency with half-cut technology enabling higher BOS savings
- Lower resistance of half-cut cells ensures higher power

Certified to perform in highly challenging environments

- High PID resistance through cell process and module material control
- Resistant to salt, acid, sand, and ammonia
- Proven to be reliable in high temperature and humidity areas
- Certified to the best fire class A
- Minimizes micro-crack and snail trails
- Certified to 5400 Pa positive load and 2400 Pa negative load

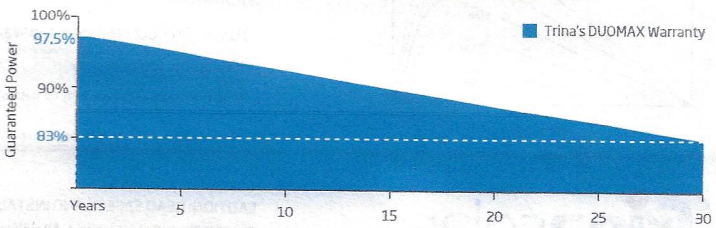
High energy generation, low LCOE

- Up to 25% additional power gain from back side, depending on the albedo
- Excellent 3rd party validated IAM and low light performance with cell process and module material optimization
- Low temp coefficient (-0.35%) and NMOT increases energy production
- Better anti-shading performance and lower operating temperature
- Higher power from same installation footprint as standard modules

Easy to install, wide application

- Frame design enables compatibility with standard installation methods
- Deployable for ground mounted utility, carports, and agricultural projects
- Safe and easy to transport, handle, and install like normal framed modules

Trina Solar's DUOMAX Performance Warranty

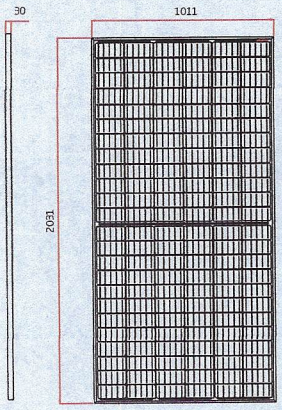


From the 2nd year to the 30th year, the average annual power decline will be no more than 0.5%.

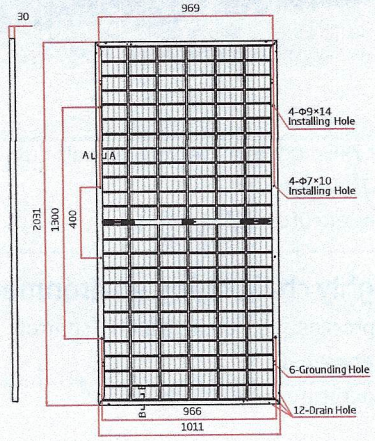
DUOMAX twin

BIFACIAL DUAL GLASS 144 HALF-CELL MODULE

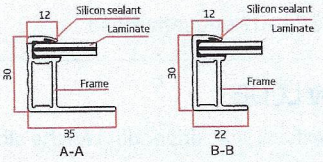
DIMENSIONS OF PV MODULE(mm)



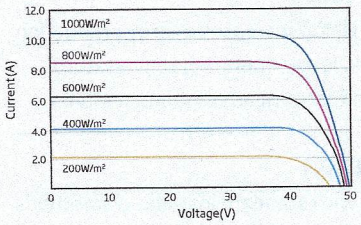
Front View



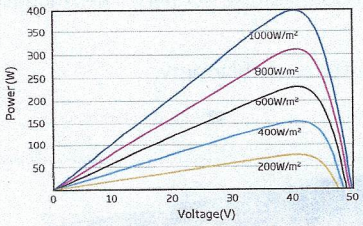
Back View



I-V CURVES OF PV MODULE(400W)



P-V CURVES OF PV MODULE(400W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	380	385	390	395	400	405
Power Output Tolerance-P_{MAX} (W)	0 ~ +5					
Maximum Power Voltage-V_{MPP} (V)	40.3	40.4	40.5	40.6	40.7	40.8
Maximum Power Current-I_{MPP} (A)	9.43	9.53	9.63	9.73	9.83	9.93
Open Circuit Voltage-V_{OC} (V)	49.2	49.4	49.6	49.7	49.9	50.1
Short Circuit Current-I_{SC} (A)	9.99	10.09	10.19	10.29	10.39	10.49
Module Efficiency η_m (%)	18.5	18.7	19.0	19.2	19.5	19.7

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

ELECTRICAL DATA (NMOT)

Maximum Power-P_{MAX} (Wp)	289	292	296	300	304	308
Maximum Power Voltage-V_{MPP} (V)	38.1	38.2	38.3	38.4	38.6	38.7
Maximum Power Current-I_{MPP} (A)	7.58	7.65	7.73	7.81	7.88	7.95
Open Circuit Voltage-V_{OC} (V)	46.6	46.8	47.0	47.1	47.2	47.4
Short Circuit Current-I_{SC} (A)	8.05	8.13	8.21	8.29	8.37	8.45

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

Electrical characteristics with different rear side power gains (referenced specific to 400 Wp front)**

Maximum Power-P_{MAX} (Wp)	420	440	460	480	500
Maximum Power Voltage-V_{MPP} (V)	40.7	40.7	40.7	40.7	40.7
Maximum Power Current-I_{MPP} (A)	10.32	10.81	11.30	11.80	12.29
Open Circuit Voltage-V_{OC} (V)	49.9	50.0	50.0	50.0	50.1
Short Circuit Current-I_{SC} (A)	10.91	11.43	11.95	12.47	12.99
Pmax gain	5%	10%	15%	20%	25%

Bifaciality Factor: 70±5%.

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	144 cells (6 × 24)
Module Dimensions	2031 × 1011× 30 mm (79.96×39.80 × 1.18 inches)
Weight	26.8 kg (59.1 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	30 mm (1.18 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mm² (0.006 inches²) Portrait: 280/280 mm (11.02/11.02 inches) Landscape: 1900/1900 mm (74.80/74.80 inches)
Connector	TS4

TEMPERATURE RATINGS

NMOT (Nominal Module Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P_{MAX}	- 0.35%/°C
Temperature Coefficient of V_{OC}	- 0.25%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty

30 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 32 pieces

Modules per 40' container: 704 pieces

** Back-side power gain varies depending upon the specific project albedo

Trinasolar

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

Version number: TSM_DEG15HC20_EN_2019_E_2.0mm

www.trinasolar.com

Inverters & Optimizers

INVERTERS

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

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Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, adjustable -0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

[1] For other regional settings please contact SolarEdge support
[2] A higher current source may be used; the inverter will limit its input current to the values stated

Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

Model Number	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi Access Point for local connection							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1'' Maximum / 14-6 AWG					1'' Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1'' Maximum / 1-2 strings / 14-6 AWG					1'' Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4		26.2 / 11.9	38.8 / 17.6		lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

[3] Revenue grade inverter P/N: SExxxxH-US000BNC4
[4] Full power up to at least 50°C / 122°F; for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

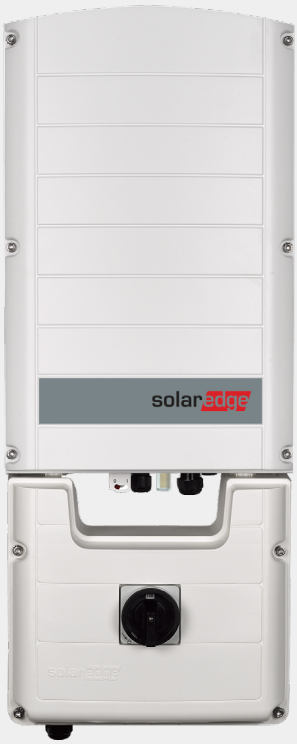
RoHS

Three Phase Inverters for the 120/208V Grid

for North America

SE9KUS / SE14.4KUS

INVERTERS



12-20 YEAR WARRANTY

The best choice for SolarEdge enabled systems

- Specifically designed to work with power optimizers
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Internet connection through Ethernet or Wireless
- Fixed voltage inverter for longer strings
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Built-in module-level monitoring
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- Integrated Safety Switch
- Supplied with RS485 Surge Protection, to better withstand lightning events
- Small, lightweight, and easy to install outdoors or indoors on provided bracket

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/ Three Phase Inverters for the 120/208V Grid[1] for North America

SE9KUS / SE14.4KUS

MODEL NUMBER	SE9KUS	SE14.4KUS	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXK-XXXXXBXX4		
OUTPUT			
Rated AC Power Output	9000	14400	VA
Maximum AC Power Output	9000	14400	VA
Output Line Connections	3 phase, 3-wire / PE (L1-L2-L3), TN, TT 3 phase, 4-wire / PE (L1-L2-L3-N), TN, TT		
AC Output Voltage Minimum-Nominal-Maximum[2] (L-N)	105-120-132.5		Vac
AC Output Voltage Minimum-Nominal-Maximum[2] (L-L)	183-208-229		Vac
AC Frequency Min-Nom-Max[2]	59.3 - 60 - 60.5		Hz
Maximum Continuous Output Current (per Phase)	25	40	A
GFDI Threshold	1		A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes		
THD	≤ 3		%
INPUT			
Maximum DC Power (Module STC)	12150	19400	W
Transformer-less, Ungrounded	Yes		
Maximum Input Voltage DC to Gnd	250	300	Vdc
Maximum Input Voltage DC+ to DC-	500	600	Vdc
Nominal Input Voltage DC to Gnd	200		Vdc
Nominal Input Voltage DC+ to DC-	400		Vdc
Maximum Input Current	26.5	38	Adc
Maximum Input Short Circuit Current	45		Adc
Reverse-Polarity Protection	Yes		
Ground-Fault Isolation Detection	1MΩ Sensitivity	350kΩ Sensitivity[3]	
CEC Weighted Efficiency	96.5	97.5	%
Night-time Power Consumption	< 3	< 4	W
ADDITIONAL FEATURES			
Supported Communication Interfaces	RS485, Ethernet, Built-in Cellular (optional)		
Inverter Commissioning	With the SetApp mobile application using built-in access point for local connection		
Rapid Shutdown – NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect		
RS485 Surge Protection Plug-in	Supplied with the inverter		
Smart Energy Management	Export Limitation		
STANDARD COMPLIANCE			
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07		
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)		
Emissions	FCC part15 class B		
INSTALLATION SPECIFICATIONS			
AC output conduit size / AWG range	3/4" minimum / 8-4 AWG		
DC input conduit size / AWG range	3/4" minimum / 12-6 AWG		
Number of DC inputs	2 pairs	3 pairs[4]	
Dimensions (H x W x D)	21 x 12.5 x 10.5 / 540 x 315 x 260		in / mm
Dimensions with Safety Switch (H x W x D)	30.5 x 12.5 x 10.5 / 775 x 315 x 260		in / mm
Weight	93.6 / 42.5		lb / kg
Weight with Safety Switch	100.3 / 45.5		lb / kg
Cooling	Fans (user replaceable)		
Noise	< 55		dBA
Operating Temperature Range	-40 to +140 / -40 to +60[5]		˚F / ˚C
Protection Rating	NEMA 3R		

(1) For 277/480V inverters refer to:https://www.solaredge.com/sites/default/files/se-three-phase-us-inverter-277-480V-setapp-datasheet.pdf
(2) For other regional settings please contact SolarEdge support
(3) Where permitted by local regulations
(4) Field replacement kit for 1 pair of inputs P/N: DCD-3PH-1TBK; Field replacement kit for 3 pairs of fuses and holders P/N: DCD-3PH-6FHK-S1
(5) For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

CE

INVERTERS

Three Phase Inverter with Synergy Technology

for the 208V Grid for North America

SE43.2KUS

Specifically designed to work with power optimizers

- Easy two-person installation – each unit mounted separately, equipped with cables for simple connection between units
- Balance of System and labor reduction compared to using multiple smaller string inverters
- Independent operation of each unit enables higher uptime and easy serviceability
- No wasted ground area: wall/rail mounted, or horizontally mounted under the modules (10˚inclination)
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- Fixed voltage inverter for superior efficiency (97%) and longer strings
- Integrated DC Safety Switch
- Built-in RS485 Surge Protection, to better withstand lightning events
- Built-in module-level monitoring with Ethernet or cellular GSM

solaredge

/ Three Phase Inverter with Synergy Technology for the 208V Grid for North America

SE43.2KUS

	SE43.2KUS	
OUTPUT		
Rated AC Power Output	43200	VA
Maximum AC Power Output	43200	VA
AC Output Line Connections	4-wire WYE (L1-L2-L3-N) plus PE or 3 wire Delta	
AC Output Voltage Minimum-Nominal-Maximum[1] (L-N)	105-120-132.5	Vac
AC Output Voltage Minimum-Nominal-Maximum[1] (L-L)	183-208-229	Vac
AC Frequency Min-Nom-Max[1]	59.3 - 60 - 60.5	Hz
Maximum Continuous Output Current (per Phase) @208V	120	A
GFDI Threshold	1	A
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes	
INPUT		
Maximum DC Power (Module STC), Inverter / Unit	58200 / 19400	W
Transformer-less, Ungrounded	Yes	
Maximum Input Voltage DC to Gnd	300	Vdc
Maximum Input Voltage DC+ to DC-	600	Vdc
Nominal Input Voltage DC to Gnd	200	Vdc
Nominal Input Voltage DC+ to DC-	400	Vdc
Maximum Input Current	38 x 3	Adc
Maximum Input Short Circuit Current	135	Adc
Reverse-Polarity Protection	Yes	
Ground-Fault Isolation Detection	350kΩ Sensitivity per Unit	
CEC Weighted Efficiency	97	%
Nighttime Power Consumption	< 12	W
ADDITIONAL FEATURES		
Supported Communication Interfaces	RS485, Ethernet, Cellular GSM (optional)	
Rapid Shutdown	NEC2014 and NEC2017 compliant/certified, upon AC Grid Disconnect	
RS485 Surge Protection	Built-in	
Cable Covers	Ordered separately with part number: DCD-SGY-COVER-HP; Dimensions (H x W x D) – 314.3 x 343.7 x 134.5 mm	
DC SAFETY SWITCH		
DC Disconnect	1000V / 3 x 40A	
STANDARD COMPLIANCE		
Safety	UL1741, UL1741 SA, UL1699B, UL1998, CSA 2.22	
Grid Connection Standards	IEEE 1547, Rule 21, Rule 14 (HI)	
Emissions	FCC part15 class A	
INSTALLATION SPECIFICATIONS		
Number of units	3	
AC Output Conduit Size / Max AWG / Max PE AWG	2" / 4/0 / 4	
DC Output Conduit Size / Terminal Block AWG Range / Number of Strings[2]	2 x 1.25" / 6-14 / 9 strings	
Dimensions (H x W x D)	Primary Unit: 37 x 12.5 x 10.5 / 940 x 315 x 260; Secondary Unit: 21 x 12.5 x 10.5 / 540 x 315 x 260	in / mm
Weight	Primary Unit: 105.8 / 48; Secondary Unit 99.2 / 45	lb / kg
Operating Temperature Range	-40 to +140 / -40 to +60[3]	°F / °C
Cooling	Fan (user replaceable)	
Noise	< 60	dBA
Protection Rating	NEMA 3R	
Mounting	Bracket provided	

[1] For other regional settings please contact SolarEdge support
[2] Single input option per unit (up to 3AWG) available
[3] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

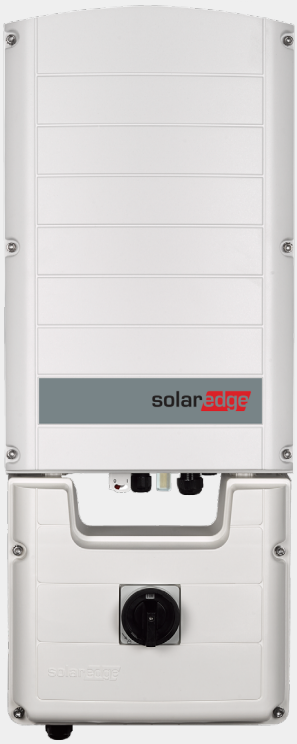
CE RoHS

Three Phase Inverters for the 277/480V Grid

for North America

SE20KUS / SE30KUS / SE33.3KUS

INVERTERS



12-20 YEAR WARRANTY

The best choice for SolarEdge enabled systems

- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Specifically designed to work with power optimizers
- Superior efficiency (98%)
- Fixed voltage inverter for longer strings
- Integrated Safety Switch
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Small, lightweight, and easy to install outdoors or indoors on provided bracket
- Supplied with RS485 Surge Protection Device, to better withstand lightning events

solaredge

/ Three Phase Inverters for the 277/480V Grid[1] for North America

SE20KUS / SE30KUS / SE33.3KUS

MODEL NUMBER	SE20KUS	SE30KUS	SE33.3KUS	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXK-XXXXXBXX4			
OUTPUT				
Rated AC Power Output	20000	30000	33300	VA
Maximum AC Power Output	20000	30000	33300	VA
Output Line Connections	3 phase, 4-wire / PE (L1-L2-L3-N), TN, TT			
AC Output Voltage Minimum-Nominal-Maximum[2] (L-N)	244-277-305			Vac
AC Output Voltage Minimum-Nominal-Maximum[2] (L-L)	422.5-480-529			Vac
AC Frequency Min-Nom-Max[2]	59.3 - 60 - 60.5			Hz
Maximum Continuous Output Current (per Phase)	24	36.5	40	A
GFDI Threshold	1			A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes			
THD	≤ 3			%
INPUT				
Maximum DC Power (Module STC)	27000	40500	45000	W
Transformer-less, Ungrounded	Yes			
Maximum Input Voltage DC to Gnd	490			Vdc
Maximum Input Voltage DC+ to DC-	1000			Vdc
Nominal Input Voltage DC to Gnd	420			Vdc
Nominal Input Voltage DC+ to DC-	840			Vdc
Maximum Input Current	26.5	39	40	Adc
Maximum Input Short Circuit Current	45			Adc
Reverse-Polarity Protection	Yes			
Ground-Fault Isolation Detection	1MΩ Sensitivity	350kΩ Sensitivity[3]		
CEC Weighted Efficiency	98	98.5		%
Night-time Power Consumption	< 3	< 4		W
ADDITIONAL FEATURES				
Supported Communication Interfaces	RS485, Ethernet, Built-in Cellular (optional)			
Inverter Commissioning	With the SetApp mobile application using built-in access point for local connection			
Rapid Shutdown – NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect			
RS485 Surge Protection Plug-in	Supplied with the inverter			
Smart Energy Management	Export Limitation			
STANDARD COMPLIANCE				
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07			
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)			
Emissions	FCC part15 class B			
INSTALLATION SPECIFICATIONS				
AC output conduit size / AWG range	3/4" minimum / 12-6 AWG	3/4" minimum / 8-4 AWG		
DC input conduit size / AWG range	3/4" minimum / 12-6 AWG			
Number of DC inputs	2 pairs	3 pairs[4]		
Dimensions (H x W x D)	21 x 12.5 x 10.5 / 540 x 315 x 260			in / mm
Dimensions with Safety Switch (H x W x D)	30.5 x 12.5 x 10.5 / 775 x 315 x 260			in / mm
Weight	67.6 / 30.7	99.5 / 45		lb / kg
Weight with Safety Switch	74.2 / 33.7	106 / 48		lb / kg
Cooling	Fans (user replaceable)			
Noise	< 50	< 55		dBA
Operating Temperature Range	-40 to +140 / -40 to +60[5]			˚F / ˚C
Protection Rating	NEMA 3R			

[1] For 120/208V inverters refer to: https://www.solaredge.com/sites/default/files/se-three-phase-us-inverter-208V-setapp-datasheet.pdf
[2] For other regional settings please contact SolarEdge support
[3] Where permitted by local regulations
[4] Field replacement kit for 1 pair of inputs P/N: DCD-3PH-1TBK; Field replacement kit for 3 pairs of fuses and holders P/N: DCD-3PH-6FHK-S1
[5] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

CE

Power Optimizer Zep Compatible™

Module Add-On For North America

P320-ZEP, P400-ZEP

POWEROPTIMIZER

Compatible with Zep Groove framed modules

- Specifically designed to work with SolarEdge inverters
- Certified Zep CompatibleTM bracket
- Attaches to module frame without screws - reduces on-roof labor and mounting costs
- Power optimizer equipment grounded through the bracket
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Next generation maintenance with module-level monitoring
- Compliant with arc fault protection and rapid shutdown NEC requirements (when installed as part of the SolarEdge system)
- Module-level voltage shutdown for installer and firefighter safety

solaredge

/ Power Optimizer - Zep Compatible™

Module Add-On For North America

P320-ZEP, P400-ZEP

Optimizer model (typical module compatibility)	P320-ZEP (for 60-cell modules)	P400-ZEP (for 72 & 96-cell modules)	
INPUT			
Rated Input DC power[1]	320	400	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48	80	Vdc
MPPT Operating Range	8 - 48	8 - 80	Vdc
Maximum Short Circuit Current (Isc)	11	10.1	Adc
Maximum DC Input Current	13.75	12.63	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.8		%
Overvoltage Category	II		
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING INVERTER)			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1 ± 0.1		Vdc
STANDARD COMPLIANCE			
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3		
Safety	IEC62109-1 (class II safety), UL1741		
RoHS	Yes		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		Vdc
Input Connector	MC4[2]		
Output Connector	Double Insulated; MC4		
Output Wire Length	0.95 / 3.0	1.2 / 3.9	m / ft
Operating Temperature Range	-40 - +85 / -40 - +185		°C / °F
Protection Rating	IP68 / NEMA 6P		
Relative Humidity	0 - 100		%

* These specifications apply to power optimizers with part number Pxxx-5NM4MTx
[1] Rated STC power of the module. Module of up to +5% power tolerance allowed.
[2] Other input connector types available upon request; contact SolarEdge for details.

PV System Design Using a Solaredge Inverter[3]	Single Phase HD-Wave	Single phase	Three phase 208v	Three phase 480v	
Minimum String Length (Power Optimizers)	8		10	18	
Maximum String Length (Power Optimizers)	25		25	50[4]	
Maximum Power per String	5700 (6000 with SE7600H-US)	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes				

[3] For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf.
[4] A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement

CE RoHS

Power Optimizer
For North America
P860

POWEROPTIMIZER

PV power optimization at the module-level
The most cost effective solution for commercial and large field installations

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Balance of System cost reduction; 50% less cables, fuses and combiner boxes, over 2x longer string lengths possible
- Fast installation with a single bolt
- Advanced maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Use with two PV modules connected in parallel

solaredge

/ Power Optimizer
For North America
P860

Optimizer Model (Typical Module Compatibility)	P860 (for 2 x 72 cell modules)		
INPUT			
Rated Input DC Power[1]	860		W
Connection Method	Dual input for independently connected modules[2]		
Absolute Maximum Input Voltage (Voc at lowest temperature)	60		Vdc
MPPT Operating Range	12.5 - 60		Vdc
Maximum Short Circuit Current (Isc)	22		Adc
Maximum Short Circuit Current per input (Isc)	11		Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)			
Maximum Output Current	18		Adc
Maximum Output Voltage	85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1 ± 0.1		Vdc
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	Compliant with NEC 2014, 2017[3]		
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
INSTALLATION SPECIFICATIONS			
Compatible SolarEdge Inverters	Three phase inverters		
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 168 x 59 / 5.1 x 6.61 x 2.32		mm / in
Weight	1064 / 2.34		gr / lb
Input Connector	MC4[4]		
Input Wire Length[5]	Lengths options	Input #1	Input #2	m / ft
	(1)	(-) 0.16 / 0.52, (+) 0.16 / 0.52	(-) 0.16 / 0.52, (+) 0.16 / 0.52	
	(2)	(-) 1.6 / 5.24 , (+) 0.16 / 0.52	(-) 0.16 / 0.52 , (+) 1.6 / 5.24	
	(3)	(-) 1.6 / 5.24, (+) 1.6 / 5.24	(-) 1.6 / 5.24, (+) 1.6 / 5.24	
Output Wire Type / Connector	Double Insulated; MC4			
Output Wire Length	2.1 / 6.8 [6]			m / ft
Operating Temperature Range[7]	-40 - +85 / -40 - +185			˚C / ˚F
Protection Rating	IP68 / NEMA6P			
Relative Humidity	0 - 100			%

[1] Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed.
[2] In a case of odd number of PV modules in one string, it is allowed to install one P860 power optimizer connected to one PV module. When connecting a single module to P860, seal the unused input connectors with the supplied pair of seals.
[3] NEC 2017 requires max combined input voltage be not more than 80V.
[4] For other connector types please refer to: https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf
[5] Longer inputs wire length are available for use with split junction box modules. (For option 2 order P860-xxxYxxY. For option 3 order P860-xxxZxxY).
[6] When using longer input wire length (options 2 and 3), the output wire length is 2.2m /7.2ft
[7] For ambient temperature above +70˚C / +158˚F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Application Note for more details.

PV System Design Using a SolarEdge Inverter[8]		Three Phase for 208V Grid[9]	Three Phase for 277/480V Grid	
Minimum String Length	Power Optimizers	8	14	
	PV Modules	16	27	
Maximum String Length	Power Optimizers	30		
	PV Modules	60		
Maximum Power per String		7200[10]	15300[11]	W
Parallel Strings of Different Lengths or Orientations		Yes		

[8] It is not allowed to mix P860 with P730/P800p/P850 in one string or to mix with P320/P340/P370/P400/P405/P505 in one string.
[9] P860 design with three phase 208V inverters is limited. Use the SolarEdge Designer for verification.
[10] For 208V grid: It is allowed to install up to 7,700W per string when the maximum power difference between each string is 1,000W
[11] For 277/480V grid: it is allowed to install up to 17,550W per string when the maximum power difference between each string is 2,000W

Intertek RoHS

SUNNY TRIPOWER CORE1 33-US / 50-US / 62-US

Fully integrated

- Innovative design requires no additional racking for rooftop installation
- Integrated DC and AC disconnects and overvoltage protection
- 12 direct string inputs for reduced labor and material costs

Increased power, flexibility

- Multiple power ratings for small to large scale commercial PV installions
- Six MPP trackers for flexible stringing and maximum power production
- ShadeFix, SMA's proprietary shade management solution, optimizes at the string level

Enhanced safety, reliability

- Integrated SunSpec PLC signal for module-level rapid shutdown compliance to 2017 NEC
- Next-gen DC AFCI arc-fault protection certified to new Standard UL 1699B Ed. 1

Smart monitoring, control, service

- Advanced smart inverter grid support capabilities
- Increased ROI with SMA ennexOS cross sector energy management platform
- SMA Smart Connected proactive O&M solution reduces time spent diagnosing and servicing in the field

SUNNY TRIPOWER CORE1 33-US / 50-US / 62-US

It stands on its own

The Sunny Tripower CORE1 is the world's first free-standing PV inverter for commercial rooftops, carports, ground mount and repowering legacy solar projects. From distribution to construction to operation, the Sunny Tripower CORE1 enables logistical, material, labor and service cost reductions, and is the most versatile, cost-effective commercial solution available. Integrated SunSpec PLC for rapid shutdown and enhanced DC AFCI arc-fault protection ensure compliance to the latest safety codes and standards. With Sunny Tripower CORE1 and SMA's ennexOS cross sector energy management platform, system integrators can deliver comprehensive commercial energy solutions for increased ROI.

Technical data	Sunny Tripower CORE1 33-US	Sunny Tripower CORE1 50-US	Sunny Tripower CORE1 62-US
Input (DC)			
Maximum array power	50000 Wp STC	75000 Wp STC	93750 Wp STC
Maximum system voltage		1000 V	
Rated MPP voltage range	330 V … 800 V	500 V … 800 V	550 V … 800 V
MPPT operating voltage range		150 V … 1000 V	
Minimum DC voltage / start voltage		150 V / 188 V	
MPP trackers / strings per MPP input		6 / 2	
Maximum operating input current / per MPP tracker		120 A / 20 A	
Maximum short circuit current per MPPT / per string input		30 A / 30 A	
Output (AC)			
AC nominal power	33300 W	50000 W	62500 W
Maximum apparent power	33300 VA	53000 VA	66000 VA
Output phases / line connections		3 / 3-(N)-PE	
Nominal AC voltage		480 V / 277 V WYE	
AC voltage range		244 V … 305 V	
Maximum output current	40 A	64 A	80 A
Rated grid frequency		60 Hz	
Grid frequency / range		50 Hz, 60 Hz / -6 Hz … +6Hz	
Power factor at rated power / adjustable displacement		1 / 0.0 leading … 0.0 lagging	
Harmonics THD		<3 %	
Efficiency			
CEC efficiency	97.5%	97.5%	97.5%
Protection and safety features			
Load rated DC disconnect		●	
Load rated AC disconnect		●	
Ground fault monitoring: Riso / Differential current		● / ●	
DC AFCI arc-fault protection		●	
SunSpec PLC signal for rapid shutdown		●	
DC reverse polarity protection		●	
AC short circuit protection		●	
DC surge protection: Type 2 / Type 1+2		O / O	
AC surge protection: Type 2 / Type 1+2		O / O	
Protection class / overvoltage category (as per UL 840)		I / IV	
General data			
Device dimensions (W / H / D)		621 mm / 733 mm / 569 mm (24.4 in x 28.8 in x 22.4 in)	
Device weight		84 kg (185 lbs)	
Operating temperature range		-25 °C … +60 °C (-13 °F … +140 °F)	
Storage temperature range		-40 °C … +70 °C (-40 °F … +158 °F)	
Audible noise emissions (full power @ 1m and 25 °C)		65 dB(A)	
Internal consumption at night		5 W	
Topology		Transformerless	
Cooling concept		OptiCool (forced convection, variable speed fans)	
Enclosure protection rating		Type 4X, 3SX (as per UL 50E)	
Maximum permissible relative humidity (non-condensing)		100 %	
Additional information			
Mounting		Free-standing with included mounting feet	
DC connection		Amphenol UTX PV connectors	
AC connection		Screw terminals - 4 AWG to 4/0 AWG CU/AL	
LED indicators (Status / Fault / Communication)		●	
Network interfaces: Ethernet / WLAN / RS485		● (2 ports) / ● / O	
Data protocols: SMA Modbus / SunSpec Modbus / Webconnect		● / ● / ●	
Multifunction relay		●	
ShadeFix technology for string level optimization		●	
Integrated Plant Control / Q on Demand 24/7		● / ●	
Off-Grid capable / SMA Fuel Save Controller compatible		● / ●	
SMA Smart Connected (proactive monitoring and service support)		●	
Certifications			
Certifications and approvals		UL 1741, UL 1699B Ed. 1, UL 1998, CSA 22.2 107-1, PV Rapid Shutdown System Equipment	
FCC compliance		FCC Part 15 Class A	
Grid interconnection standards		IEEE 1547, UL 1741 SA - CA Rule 21, HECO Rule 14H	
Advanced grid support capabilities		L/HFRT, L/HVRT, Volt-VAr, Volt-Watt, Frequency-Watt, Ramp Rate Control, Fixed Power Factor	
Warranty			
Standard		10 years	
Optional extensions		15 / 20 years	
O Optional features ● Standard features – Not available			
Type designation	STP 33-US-41	STP 50-US-41	STP 62-US-41

Accessories

SMA Data Manager M
EDMM-US-10

SMA Sensor Module
MD.SEN-US-40

Universal Mounting System
UMS_KIT-10

AC Surge Protection Module Kit
AC_SPD_KIT1-10, AC_SPD_KIT2_T1T2
DC Surge Protection Module Kit
DC_SPD_KIT4-10, DC_SPD_KIT5_T1T2

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SMA America, LLC

/ Perfect Welding / Solar Energy / Perfect Charging

FRONIUS SYMO

/ Powering commercial projects that last. The Fronius Symo.

/ PC Board Replacement

/ SnapINverter Mounting System

/ Integrated Data Communication

/ Design Flexibility

/ Smart Grid Ready

/ AFCI & NEC 2014 Compliant

/ Featuring ten models ranging from 10 kW to 24 kW, the transformerless Fronius Symo is the ideal compact three-phase inverter for all commercial applications. The high system voltage and wide input range ensure maximum flexibility in system design. With low roof loading, NEMA 4X and 1000 V DC rating, the Fronius Symo can be mounted in many different ways, including flat on a roof or on a pole. The modern design is equipped with the SnapINverter mounting system, allowing for lightweight, secure and convenient installation. Several industry-leading features are available with the Fronius Symo including Wi-Fi®* and SunSpec Modbus interfaces for seamless monitoring and data-logging, field proven Arc Fault Circuit Interruption (AFCI), NEC 2014 compliant, and Fronius' superb online and mobile monitoring platform Fronius Solar.web.

INPUT DATA		SYMO 10.0-3 208-240	SYMO 12.0-3 208-240	SYMO 10.0-3 480	SYMO 12.5-3 480	SYMO 15.0-3 208
Recommended PV power (kWp)		8.0 - 13.0	9.5 - 15.5	8.0 - 13.0	10.0 - 16.0	12.0 - 19.5
Max. usable input current (MPPT1/MPPT 2)		25.0 A / 16.5 A				50.0 A
Max. usable input current total (MPPT 1 + MPPT 2)		41.5 A				50.0 A
Max. array short circuit current		37.5 A / 24.8 A				75.0 A
Nominal input voltage	208 V	350 V	350 V	N/A	N/A	325 V
	240 V	370 V	370 V	N/A	N/A	N/A
	480 V	N/A	N/A	675 V	685 V	N/A
Operating voltage range		200-600 V		200-1000 V		325-1000 V
DC startup voltage		200 V				360 V
MPP Voltage range		300-500 V		300-800 V		325-850 V
Max. input voltage		600 V		1000 V		
Admissable conductor size DC		AWG 14-AWG 6 copper direct, AWG 6 aluminum direct, AWG 4-AWG 2 copper or aluminum with input combiner				
Integrated DC string fuse holders		NA				6- and 6+
Max (Isc) input terminal rating		33A				12A
Number of MPPT		2				1

OUTPUT DATA		SYMO 10.0-3 208-240	SYMO 12.0-3 208-240	SYMO 10.0-3 480	SYMO 12.5-3 480	SYMO 15.0-3 208
Max. output power	208 V	9995 VA	11995 VA	NA	NA	15000 VA
	240 V	9995 VA	11995 VA	NA	NA	NA
	480 V	NA	NA	9995 VA	12495 VA	NA
Output configuration		208/240 V		480 V Delta +N**		208 V
Frequency range (adjustable)		45-65 Hz				
Nominal operating frequency		60 Hz				
Admissable conductor size AC		AWG 14-AWG 6				
Total harmonic distortion		<1.5 %	<1.75 %		<1.5 %	<3.5 %
Power factor range		0-1 ind./cap.				
Max. continuous output current	208 V	27.7 A	33.3 A	NA	NA	41.6 A
	240 V	24.0 A	28.9 A	NA	NA	NA
	480 V	NA	NA	12.0 A	15.0 A	NA
OCPD/AC breaker size	208 V	35 A	45 A	NA	NA	60 A
	240 V	30 A	40 A	NA	NA	NA
	480 V	NA	NA	15 A	20 A	NA
Max. Efficiency		97.0 %	97.0 %	98.1 %	98.1 %	97.3%
CEC Efficiency	208 V	96.5 %	96.5 %	NA	NA	96.5%
	240 V	96.5 %	96.5 %	NA	NA	NA
	480 V	NA	NA	96.5 %	97.0 %	NA

TECHNICAL DATA (10.0-3 208/240, 12.0-3 208/240, 10.0-3 480, 12.5-3 480, 15.0-3 208)

GENERAL DATA	STANDARD WITH ALL FRONIUS SYMO MODELS
Dimensions (width x height x depth)	20.1 x 28.5 x 8.9 inches
Protection Class	NEMA 4X
Night time consumption	< 1 W
Inverter topology	Transformerless
Cooling	Variable speed fan
Installation	Indoor and outdoor installation
Ambient operating temperature range	-40°F - + 140 °F (-40 - +60 °C)
Permitted humidity	0 - 100 % (non-condensing)
Elevation	2000 m (6562 ft) with a max. input voltage of 1000 V / 3400 m (11155 ft) with a max. input voltage of 850 V
DC connection terminals	6x DC+ and 6x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid / stranded)
AC connection terminals	Screw terminals 14-6 AWG
Certificates and compliance with standards	UL 1741-2010 Second Edition (incl. UL1741 Supplement SA 2016-09 for California Rule 21 and Hawaiian Electric Code Rule 14H), UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547a-2014, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC 2017 Article 690, C22. 2 No. 107.1-16, UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013

GENERAL DATA	SYMO 10.0-3 208-240	SYMO 12.0-3 208-240	SYMO 10.0-3 480	SYMO 12.5-3 480	SYMO 15.0-3 208
Weight	91.9 lbs.		76.7 lbs.		78.3 lbs.

PROTECTIVE DEVICES	STANDARD WITH ALL FRONIUS SYMO MODELS
DC reverse polarity protection	Yes
Anti islanding	Internal; in accordance with UL 1741-2010, IEEE 1547-2003 and NEC
Over temperature protection	Output power derating /Active cooling
AFCI	Yes
Rapid shutdown compliant	Yes (according to NEC 2014)
Ground Fault Protection with Isolation Monitor Interrupter	Yes
DC disconnect	Yes

INTERFACES	AVAILABLE WITH ALL FRONIUS SYMO MODELS
USB (A socket)	Datalogging and inverter update possible via USB
2x RS422 (RJ45 socket)	Fronius Solar Net, interface protocol
AVAILABLE WITH THE FRONIUS DATAMANAGER 2.0 CARD (ONLY ONE CARD REQUIRED FOR UP TO 100 INVERTERS)	
Wi-Fi/Ethernet/Serial/ Datalogger and webserver	Wireless standard 802.11 b/g/n / Fronius Solar.web, SunSpec Modbus TCP, JSON / SunSpec Modbus RTU
6 inputs and 4 digital I/Os	Load management; signaling, multipurpose I/O

TECHNICAL DATA (15.0-3 480, 17.5-3 480, 20.0-3 480, 22.7-3 480, 24.0-3 480)

INPUT DATA	SYMO 15.0-3 480	SYMO 17.5-3 480	SYMO 20.0-3 480	SYMO 22.7-3 480	SYMO 24.0-3 480
Recommended PV power (kWp)	12.0 – 19.5	14.0 - 23.0	16.0 - 26.0	18.0 - 29.5	19.0 - 31.0
Max. usable input current (MPPT1/MPPT 2)	33.0 A / 25.0 A				
Max. usable input current total (MPPT 1 + MPPT 2)	51 A				
Max. array short circuit current (MPPT 1/MPPT 2)	49.5 A / 37.5 A				
Nominal input voltage 480 V	685 V	695 V	710 V	720 V	
Operating voltage range	200-1000 V				
DC startup voltage	200 V				
MPP-voltage range	350-800 V	400-800 V	450-800 V	500-800 V	
Max. input voltage	1000 V				
Admissable conductor size DC	AWG 14 - AWG 6 copper direct, AWG 6 aluminum direct, AWG 4 - AWG 2 copper or aluminum with input combiner				
Integrated DC string fuse holders	NA	NA	6- and 6+		
Max (Isc) input terminal rating	33A	33A	12A		
Number of MPPT	2				

TECHNICAL DATA (15.0-3 480, 17.5-3 480, 20.0-3 480, 22.7-3 480, 24.0-3 480)

OUTPUT DATA		SYMO 15.0-3 480	SYMO 17.5-3 480	SYMO 20.0-3 480	SYMO 22.7-3 480	SYMO 24.0-3 480
Max. ouput power	480 V	14995 VA	17495 VA	19995 VA	22727 VA	23995 VA
Ouput configuration		480 V Delta +N**				
Frequency range (adjustable)		45-65 Hz				
Nominal operating frequency		60 Hz				
Admissable conductor size (AC)		AWG 14-AWG 6				
Total harmonic distortion		<1.5 %	<1.25 %	<1.0 %	<1.25 %	<1.0 %
Power factor range		0 - 1 ind./cap.				
Max. continuous output current	480 V	18.0 A	21.0 A	24.0 A	27.3 A	28.9 A
OCPD/AC breaker size	480 V	25 A	30 A	30 A	35 A	40 A
Max. Efficiency		98.0 %				
CEC Efficiency	480 V	97.0 %	97.5 %	97.5 %	97.5 %	97.5 %

TECHNICAL DATA (15.0-3 480, 17.5-3 480, 20.0-3 480, 22.7-3 480, 24.0-3 480)

GENERAL DATA	STANDARD WITH ALL FRONIUS SYMO MODELS
Dimensions (width x height x depth)	20.1 x 28.5 x 8.9 inches
Protection Class	NEMA 4X
Night time consumption	< 1 W
Inverter topology	Transformerless
Cooling	Variable speed fan
Installation	Indoor and outdoor installation
Ambient operating temperature range	-40°F - + 140 °F (-40 - +60 °C)
Permitted humidity	0 - 100 % (non-condensing)
Elevation	2000 m (6562 ft) with a max. input voltage of 1000 V / 3400 m (11155 ft) with a max. input voltage of 850 V
DC connection terminals	6x DC+ and 6x DC- screw terminals for copper (solid / stranded / fine stranded) or aluminum (solid / stranded)
AC connection terminals	Screw terminals 14-6 AWG
Certificates and compliance with standards	UL 1741-2010 Second Edition (incl. UL1741 Supplement SA 2016-09 for California Rule 21 and Hawaiian Electric Code Rule 14H), UL1998 (for functions: AFCI, RCMU and isolation monitoring), IEEE 1547-2003, IEEE 1547a-2014, IEEE 1547.1-2003, ANSI/IEEE C62.41, FCC Part 15 A & B, NEC 2017 Article 690, C22. 2 No. 107.1-16, UL1699B Issue 2 -2013, CSA TIL M-07 Issue 1 -2013

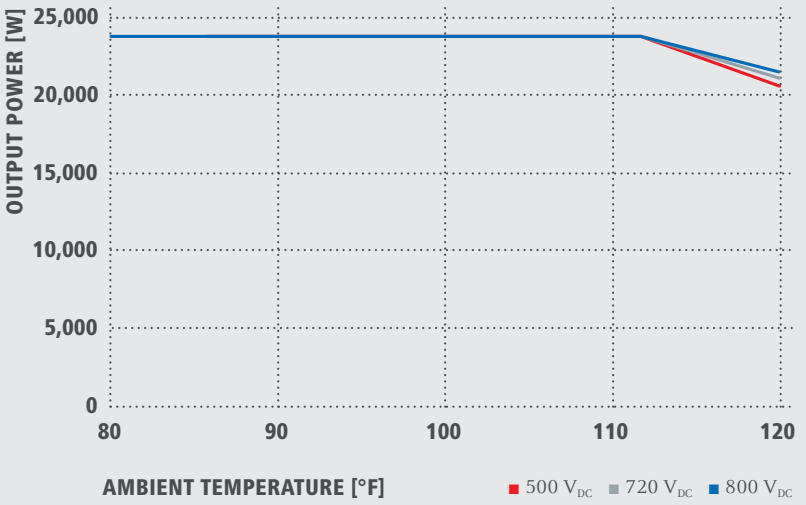
GENERAL DATA	SYMO 15.0-3 480	SYMO 17.5-3 480	SYMO 20.0-3 480	SYMO 22.7-3 480	SYMO 24.0-3 480
Weight	95.7 lbs.				

PROTECTIVE DEVICES	STANDARD WITH ALL FRONIUS SYMO MODELS
DC reverse polarity protection	Yes
Anti islanding	internal; in accordance with UL 1741-2010, IEEE 1547-2003 and NEC
Over temperature protection	Ouput power derating/Active cooling
AFCI	Yes
Rapid shutdown compliant	Yes (according to NEC 2014)
Ground Fault Protection with Isolation Monitor Interrupter	Yes
DC disconnect	Yes

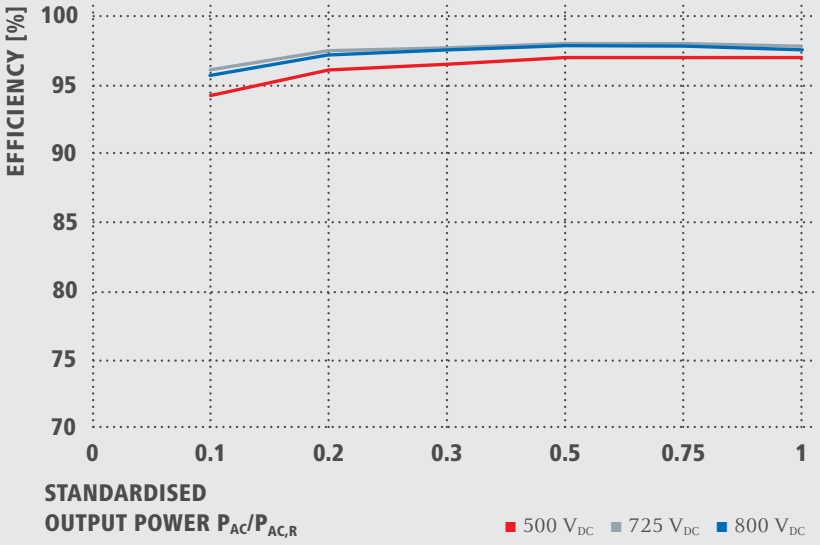
INTERFACES	AVAILABLE WITH ALL FRONIUS SYMO MODELS
USB (A socket)	Datalogging and inverter update possible via USB
2x RS422 (RJ45 socket)	Fronius Solar Net, interface protocol
AVAILABLE WITH THE FRONIUS DATAMANAGER 2.0 CARD (ONLY ONE CARD REQUIRED FOR UP TO 100 INVERTERS)	
Wi-Fi/Ethernet/Serial/ Datalogger and webserver	Wireless standard 802.11 b/g/n / Fronius Solar.web, SunSpec Modbus TCP, JSON / SunSpec Modbus RTU
6 inputs and 4 digital I/Os	Load management; signaling, multipurpose I/O

**+N FOR SENSING PURPOSES - NO CURRENT CARRYING CONDUCTOR.

FRONIUS SYMO 24.0-3 480 TEMPERATURE DERATING CURVE



FRONIUS SYMO 24.0-3 480 CEC EFFICIENCY CURVE



/ Perfect Welding / Solar Energy / Perfect Charging

WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS OF POSSIBILITY.

/ Whether welding technology, photovoltaics or battery charging technology – our goal is clearly defined: to be the innovation leader. With around 3,700 employees worldwide, we shift the limits of what's possible - our record of over 800 granted patents is testimony to this. While others progress step by step, we innovate in leaps and bounds. Just as we've always done. The responsible use of our resources forms the basis of our corporate policy.

Further information about all Fronius products and our global sales partners and representatives can be found at **www.fronius.com**

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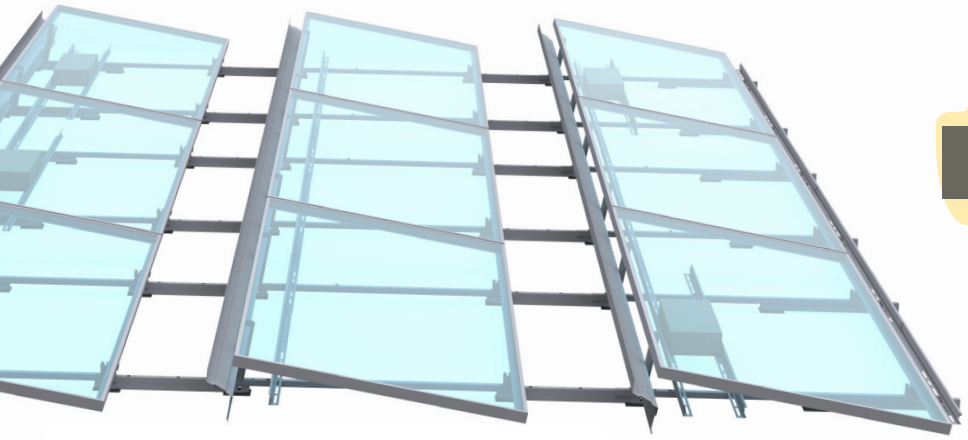
M,06,0235,EN-US USA REV. 10/04/2017

Racking Systems & Canopies

clawFR® 10°

Flat Roof Racking Specialists

PanelClaw® is the only major racking provider in North America focused exclusively on flat roof racking. Our 11+ years of focus on flat roof result in a competitive advantage for our partners. No one knows more about flat roof racking than PanelClaw; no one delivers a more thoroughly tested and reliable platform; and no one matches our level of service. Our mission is to accelerate the deployment of flat roof PV and the best way to do this is to continue to lower its life-cycle cost while maintaining the highest levels of reliability. The clawFR platform is the result of this experience and commitment to flat roof.



PANELCLAW®

Engineered for Speed

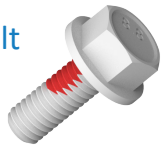
- Single M6 bold hardware kit
- No tool module attachment method
- 90 degree single-module tilt-up feature
- Flexible order of operations installation process allows for optimized coordination of building trades on the roof
- Integrated roof protection pads
- 10” plus access ways between modules
- Only 1 ground lug required per array

SYSTEM COMPONENTS

Base

Rail

M6 Bolt



Module Connector

Wind Deflector

Cam Bracket w/ Cam Claw

Applications
< 5° slope flat roofs (up to 7° possible w/engineering review)

Roof Type Compatibility
Membrane, tar and gravel, ballasted, BUR, concrete, asphalt (not compatible with metal roofs)

3 Shade Ratio Options
1.7:1 | 2.0:1 | 2.5:1

Platform Load
~ 2.0 - ~ 12.0 psf

Module Orientation
Landscape

Module Attachment
Airy point flange mounted

Basic Wind Speed
Up to 190 mph
(>190 mph by approval)

Wind Exposure Category
B and C (D required engineering review)

USGS Seismic Categories
A, B, C, D (others require engineering review)

Building Height
No building height limitations

Corrosion Resistance
ZAM coating provides 5x better resistance than G90

Warranty and Certifications
25 year warranty

ANSI/UL 2703-2015 Listed

System Fire Rating
Class A with Type 1 and Type 2 modules

Intelligent Componet Design

- A single Ballast Rail part number covers all compatible 60 and 72 cell modules
- The Base does not change with module changes
- The wind deflector has 2 part numbers that cover all 72 cell module lengths
- The Module Connector and Deflector each have 2 part numbers have cover all compatible 72 cell modules

Safety and Reliability

clawFR has been tested well beyond code requirements in the US. In addition to wind tunnel testing and ANSI/UL 2703-2015 listing, we have completed a battery of reliability and performance tests which can all be found at panelclaw.com.

PANELCLAW®

(978) 688.4900 | sales@panelclaw.com

panelclaw.com

Made in USA

O&M Features

Construction designed specifically for O&M, and to assist providers

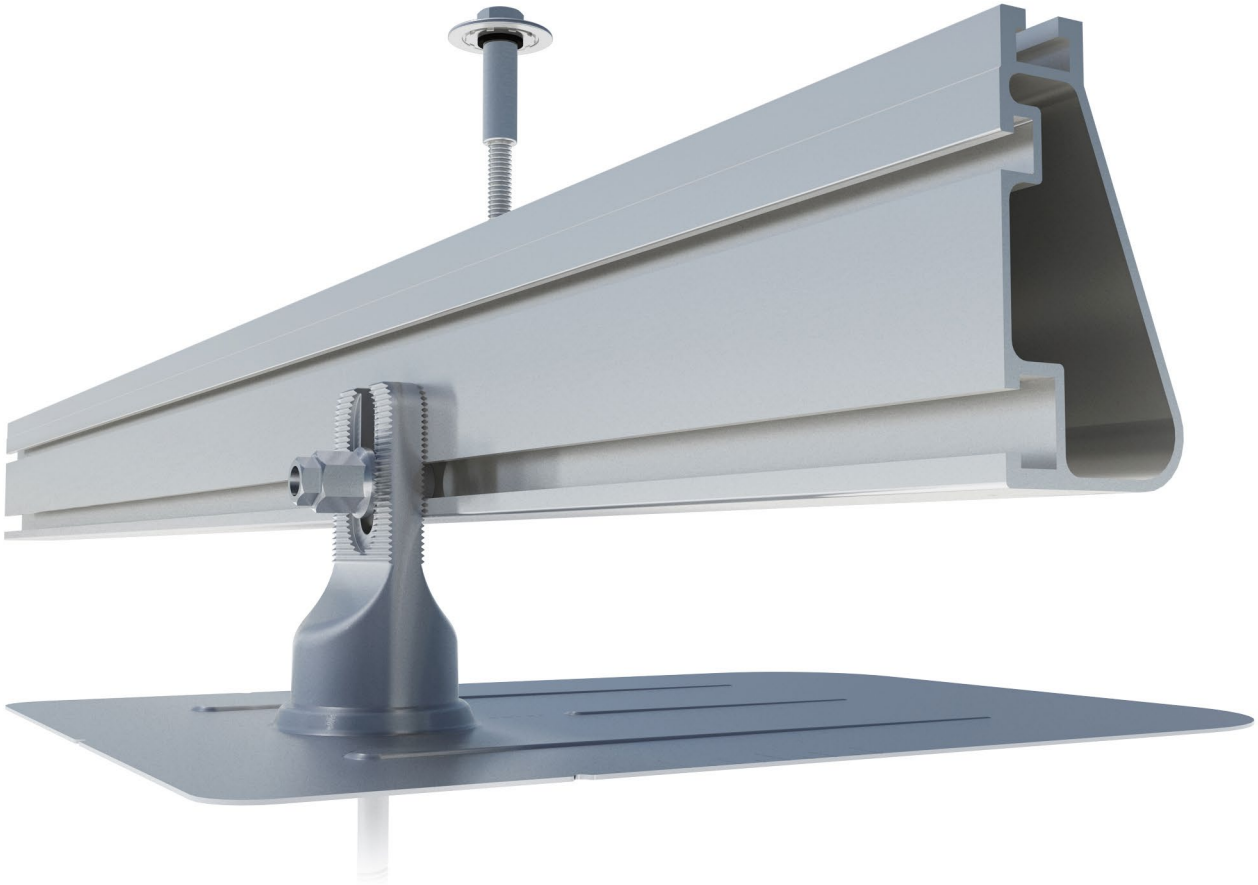
- Recessed Deflector allows for easy access to module connections and optimizer equipment
- ZAM coating with 5x better corrosion resistance than G90
- If mechanical roof attachments are needed, they are always placed in the North/South module gaps for easy O&M inspection

clawFR® 10°

Datasheet

IRONRIDGE

Flush Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest mounting system for pitched roofs in solar. Our components have been tested to the limit and proven in extreme environments, including Florida's high-velocity hurricane zones.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 25-year warranty.

Strength Tested

All components evaluated for superior structural performance.

PE Certified

Pre-stamped engineering letters available in most states.

Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.

Design Assistant

Online software makes it simple to create, share, and price projects.

UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.

25-Year Warranty

Products guaranteed to be free of impairing defects.

XR Rails

XR10 Rail

A low-profile mounting rail for regions with light snow.

- 6’ spanning capability
- Moderate load capability
- Clear and black finish

XR100 Rail

The ultimate residential solar mounting rail.

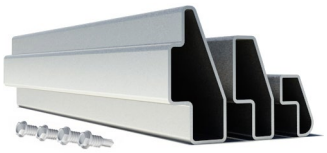
- 8’ spanning capability
- Heavy load capability
- Clear and black finish

XR1000 Rail

A heavyweight mounting rail for commercial projects.

- 12’ spanning capability
- Extreme load capability
- Clear anodized finish

Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

Clamps & Grounding

UFOs

Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

Stopper Sleeves

Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

CAMO

Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Bonding Hardware

Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16” socket
- Assembled and lubricated

Attachments

FlashFoot2

Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

Conduit Mount

Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures ¾” or 1” conduit

Knockout Tile

Replace tiles and ensure superior waterproofing.

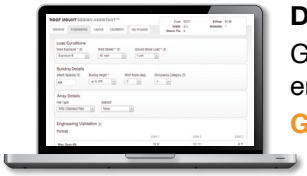
- Flat, S, & W tile profiles
- Form-fit compression seal
- Single-lag universal base

All Tile Hook

Mount on tile roofs with a simple, adjustable hook.

- Works on flat, S, & W tiles
- Single-socket installation
- Optional deck flashing

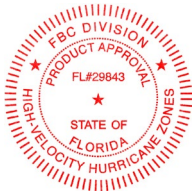
Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

Go to IronRidge.com/design



Endorsed by FL Building Commission

Flush Mount is the first mounting system to receive Florida Product approval for 2017 Florida Building Code compliance.

Learn More at bit.ly/floridacert

RBI SOLAR

Fixed-Tilt Ground Mount Solution | GM-2

When EPCs and project developers across the USA need dependable, low-maintenance ground mount racking, they turn to RBI Solar. As a single-source provider, we take responsibility for the Design, Engineering, Manufacturing, and Installation of PV mounting solutions. When you choose RBI Solar for your next ground mount, you're choosing peace of mind that your project is in the hands of the most trusted solar racking team in the industry.

Why choose RBI Solar?

- Professional Engineers licensed in all 50 states
- Quick response & efficient communication
- National installation capabilities
- Our in-house team members are an extension of your staff
- 85+ years manufacturing experience
- Complete turn-key process, reduction in your vendor coordination
- Company owned post driving equipment
- National project management capabilites with roaming site service personnel
- More time to focus on your business

www.rbisolar.com

GM-2 Solution Features

Foundation and racking design	Site wind speeds 170+ mph and ground snow loads 90+ psf
Signed and sealed drawings	Available in all 50 states
Proprietary on-site testing	Pull testing & corrosion testing - no geotechnical report required
Pre-assembled parts	Reduction in installation time
Variable slope	Accommodates slopes up to 30% (with topographic site map)
20-yr standard warranty	Proven rack reliability and bankability
G115 minimum galvanized coating	Exceeds ASTM and UL standards for 30% extended life
Driven posts	Cost-effective cee channel or I-beam post options available
Up to 24’ long post driving	Ability to address challenging soils or elevate array structure
Module configurations	Portrait, landscape (all module types)
Raised purlins	Integrated bonding and grounding to UL 2703
Corrosion class	System available for all corrosion classes
Wire management and electrical	Integrated wire management solution and inverter mounting

Contact us at info@rbisolar.com or (513) 242-2051

DESIGN • ENGINEERING • MANUFACTURING • INSTALLATION

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RBI SOLAR

QUEST RENEWABLES

PRODUCT SHEET

QUADPOD™ PARKING GARAGE CANOPY

FEWEST STRUCTURAL CONNECTIONS

The QuadPod Canopy is the most efficient product for the parking garage solar market, as it delivers the most kW per structural connection to the deck. The canopy is an engineered PV structure that directly connects to parking garages in a manner that dramatically reduces structural loads and moment forces when compared to traditional canopies. The benefits of the QuadPod parking garage canopy include increased structural reliability, streamlined engineering reviews and less frequent garage retrofits.

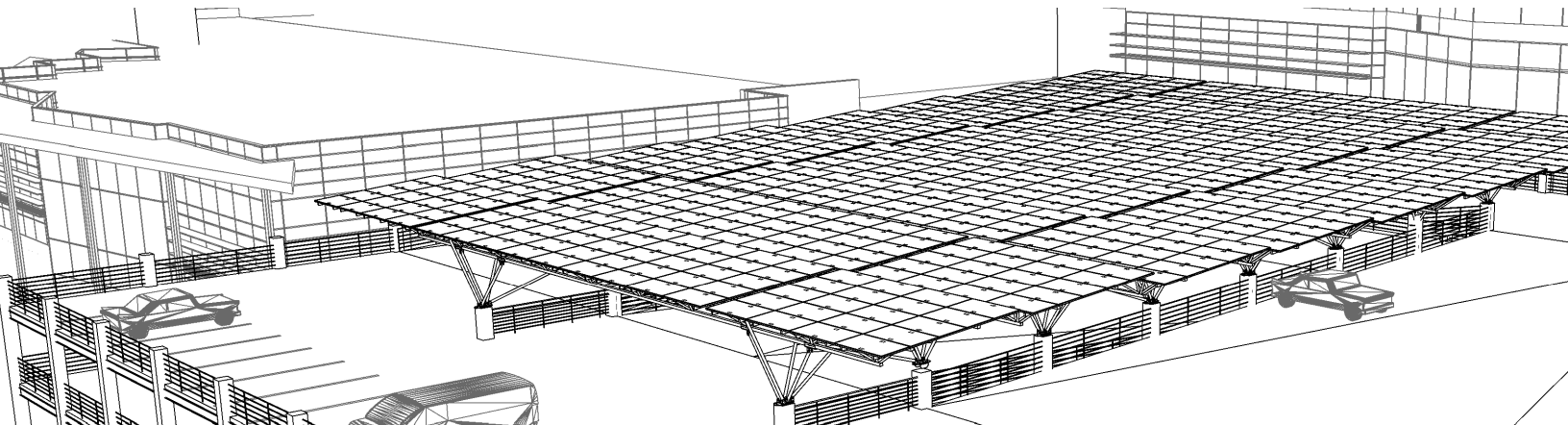
EFFICIENT STRUCTURAL INTEGRATION BETWEEN SOLAR CANOPY AND PARKING GARAGE

Unlike traditional solar canopies, 90% of QuadPod's construction takes place on the ground, inclusive of module and inverter wiring. After ground assembly, electrical and lighting, the canopies are lifted by crane for final installation, minimizing overhead work and optimizing worksite safety. The mechanical and electrical workers get a safer construction environment, and the incremental cost of the crane is more than made up by the efficiency gained. On-site time is half that of other canopies, typically 40 construction days per MW, reducing construction management costs, increasing throughput, and limiting disruption to parking lot operations.

UP TO 50% LABOR SAVINGS+ ONSITE EFFICIENCIES

The QuadPod parking garage canopy's simple span trusses cover the parking spaces and drive aisles to maximize power generation.

DRIVE AISLE COVERAGE



TECHNICAL SPECIFICATIONS

Length	90'–126'
Width	18'–22.5'
Max Height	25' to top of modules
Span between foundations	50'–65'
Cantilever	10'–30'
DC Capacity	Up to 40kW / Truss
Wind Load Capacity	designed and tested for 150 mph winds
Snow Load Capacity	designed and tested for 50 psf snow
Standard steel coating	G90

TESTING/CERTIFICATIONS

Wind tunnel testing	CPP
Installation time and motion testing	Yes
UL 2703 Bonding and Grounding	ETL Intertek

OPTIONAL PACKAGES

Rain water collection
Lighting
Battery storage
Inverter Mounting
Marine environment coating
Snow guards

INSTALLATION SERVICES

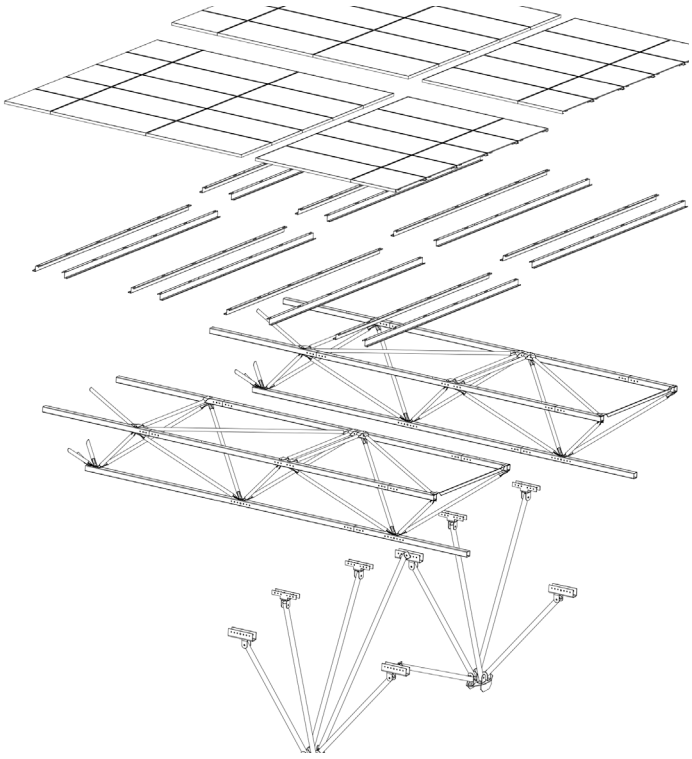
Structural plansets
Staging and pick plans
Stamping services in 50 states
Construction training and management
Turnkey delivery

FEATURES AND BENEFITS

Material efficiency	less than 50% steel weight per MW
Maximum capacity	enables high density canopies over parking with fewest garage connections
Speed	three times faster installation than industry average
Safety	90% on the ground assembly
Labor efficiency	50% less labor hours

MISC

Material lead time	8 weeks
Standard Warranty	10-year
kW/Acre	430



Quest Renewables creates high-value solar racking solutions that enable our customers to eliminate waste, increase value, and enter new markets.

Our commitment to optimizing the total installation process results in more satisfied developers, contractors, and site owners.

For more information, please visit **www.questrenewables.com.**

Made in the USA

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Atlanta, GA 30308
404.536.5787

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