

REGIONE SICILIANA  
COMUNE DI CASTELLANA SICULA (PA)

PROGETTO DEFINITIVO

Progetto per la realizzazione di un impianto agrovoltaico di potenza di picco 80,280 MWp e potenza in immissione 66,456 MW denominato "H136 - C.DA BELICE" e relative opere connesse

N° Elaborato: **D.7 - VNREL0007A0**

Scala: **N.D.**

Documento: **Schede tecniche componenti (moduli, skid, cabine, etc)**

Formato: **A4**

Proponente:

**GT 1 S.r.l.**

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gt1.srl@legalmail.it

Progettazione:

**XEQSOLAR**

**XEQUESTRIS SOLAR ITALIA s.r.l.**

Corso Principe Oddone, n°18  
10122, Torino (TO)  
P.IVA 06710470821

Ufficio Progettazione Xeq Solar:

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Ordine Ingegneri Trapani, n°1666  
Direttore Tecnico Energie Rinnovabili

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Responsabile Attività Ingegneria  
Energie Rinnovabili

**Ing. Fabio Sinacori**

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Tecnico Energie Rinnovabili

**Geom. Roberto Patanè**

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**Ing. Aurora Scoma**

Tecnico Energie Rinnovabili

**Arch. Noemi Guarneri**

Tecnico Energie Rinnovabili

REV.	DATA	DESCRIZIONE	REDATTO	APPROVATO	RILASCIATO
00	15/09/2023	1° EMISSIONE	ARCH. MORGANA E.	ING. RICCI G	ING. SINACORI D

Trina Solar

# INTRODUCTION OF **670W** VERTEX MODULE

## Vertex

High Power

**670W**

High Efficiency

**21.6%**

Mechanical data

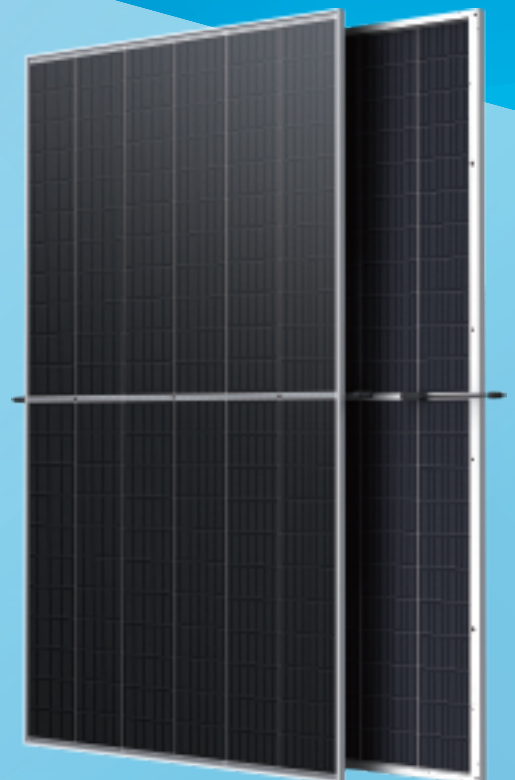
Size: 2384\*1303mm

Weight: 33.9kg

Electrical Data

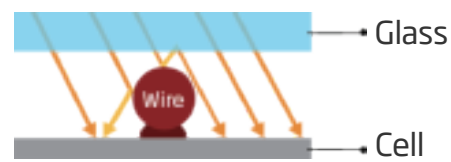
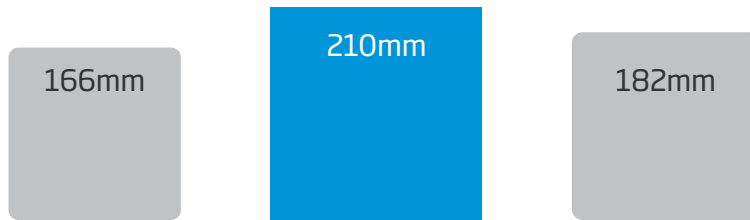
Low voltage concept design

Voc: 45.7V Isc: 18.5A

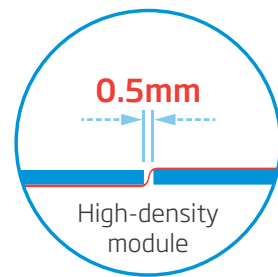
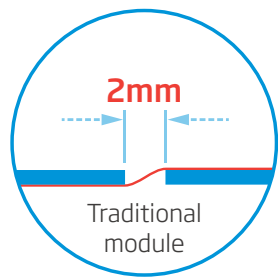


# 210, The Future from Now On!

Vertex module with 670W+ power and 21.6%+ efficiency

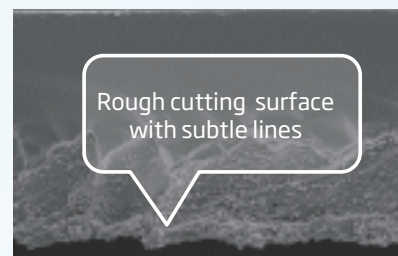


Multi-busbar technology, improving optical utilization rate with higher electricity performance, Module power increase **2~3%**, efficiency increase **0.4~0.6%**

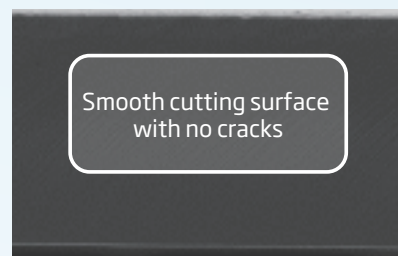


High density encapsulation technology, optimizing power output with good balance between reliability and efficiency, module efficiency increase **0.2~0.3%**

## Non-destructive Cutting(NDC) Technology



Cross-section from conventional cutting



Cross-section from NDC

Achieving better cell strength, lower micro-cracks risk for better product reliability

# LOWER VOLTAGE BRINGS HIGHER STRING POWER **34%**

Module Type	String Module Number	Module Pmax	String Power	Higher Power
210	28	670W	18,760	34%
182	26	540W	14,040	-

**670W**

String Power **18,760W**

28 pcs/string  
53.3 Strings/MW

Rack Steel **33.76 ton/MW**

**VS**

**540W**

String Power **14,040W**

26 pcs/string  
71.4 Strings/MW

Rack Steel **37.15 ton/MW**

# HIGHER STRING POWER BRINGS LOWER COST

## CUSTOMER VALUE OF 670W VERTEX MODULES



### Case study

Location: Minnesota  
 Project Capacity: 100MW  
 Inverter: String Inverter  
 Capacity ratio: 1.2  
 Fixed Tilt



**-15%**  
Racks



**-17%**  
Foundation



**-11%**  
Cable

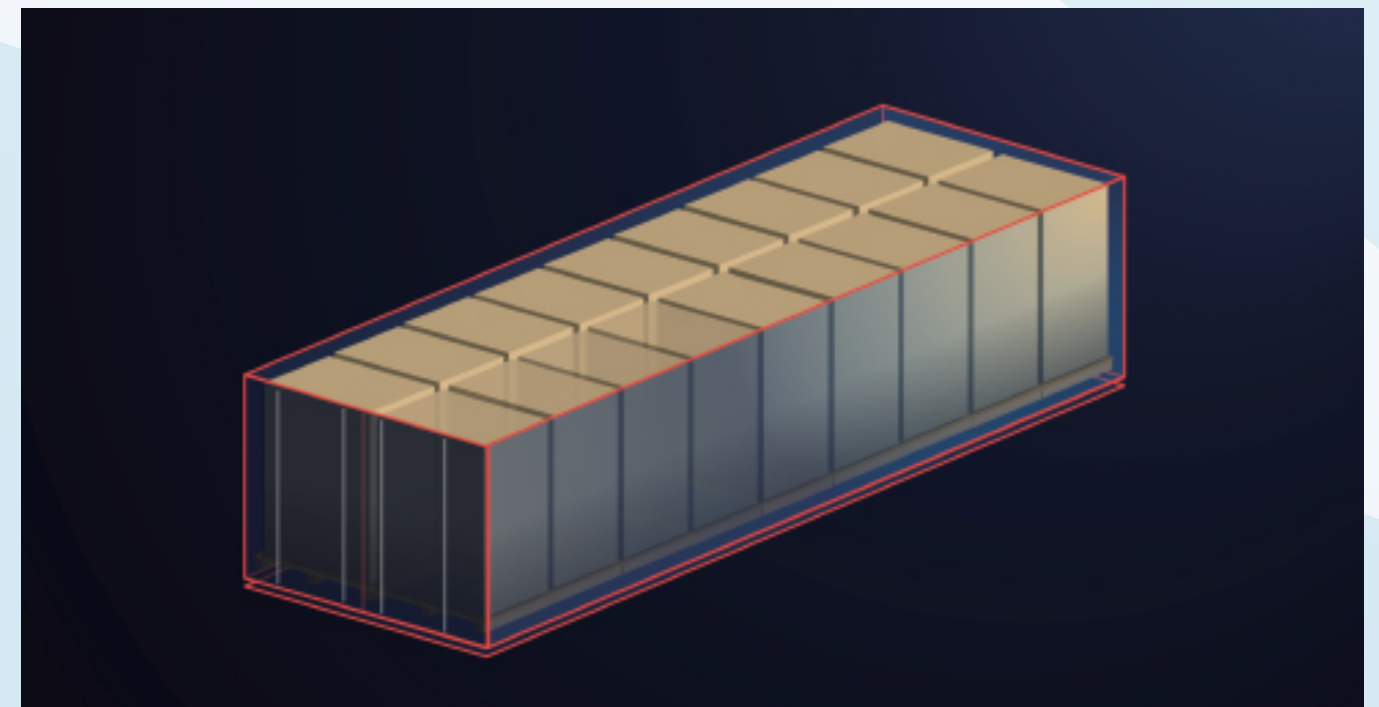
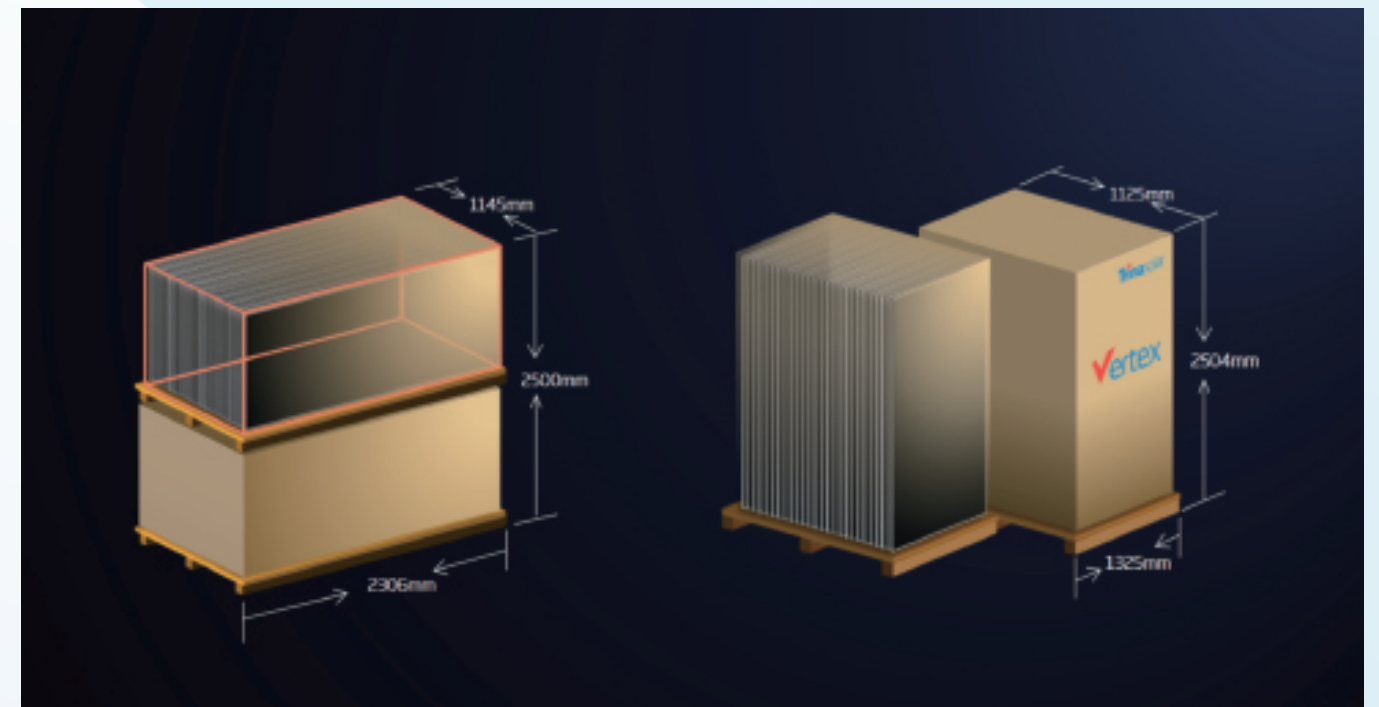


**-7%**  
installation

	Module Type Power	Reference module 540W	Vertex 670W
<b>BOS(\$/W)</b>	Racks	BL	<b>-0.0035</b>
	Foundation	BL	<b>-0.0015</b>
	Cable	BL	<b>-0.0027</b>
	installation	BL	<b>-0.0053</b>
	Sum	BL	<b>-0.013</b>
<b>LCOE</b>			<b>~ -1.2%</b>

\*Source: Authority expert.

## Logistic cost reduce **12%** per container

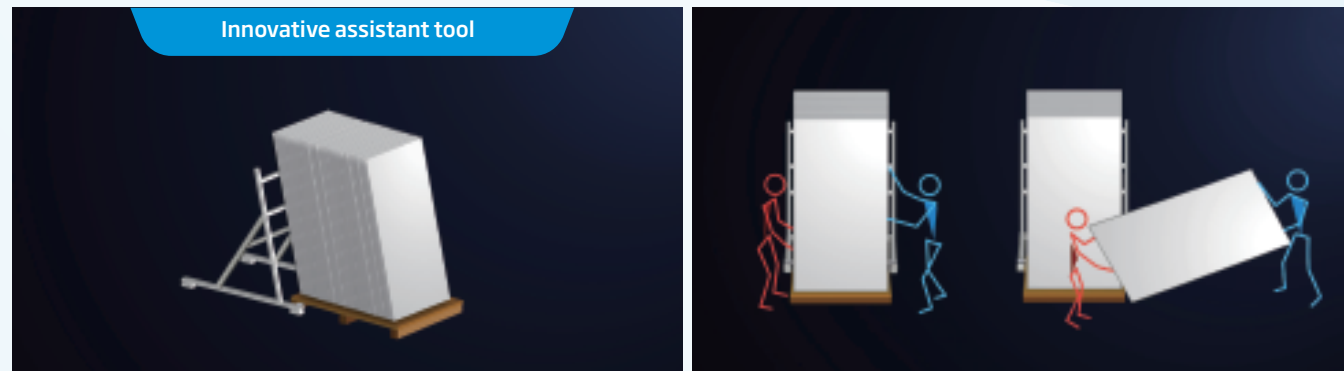


Category	Module Power	Piece per Pallet	Pallet NO. per Container	Power per Container
Other Module	540W	31	20	334,800W
Vertex Module	670W	31	18	373,860W

**+390,60W (+12%)**

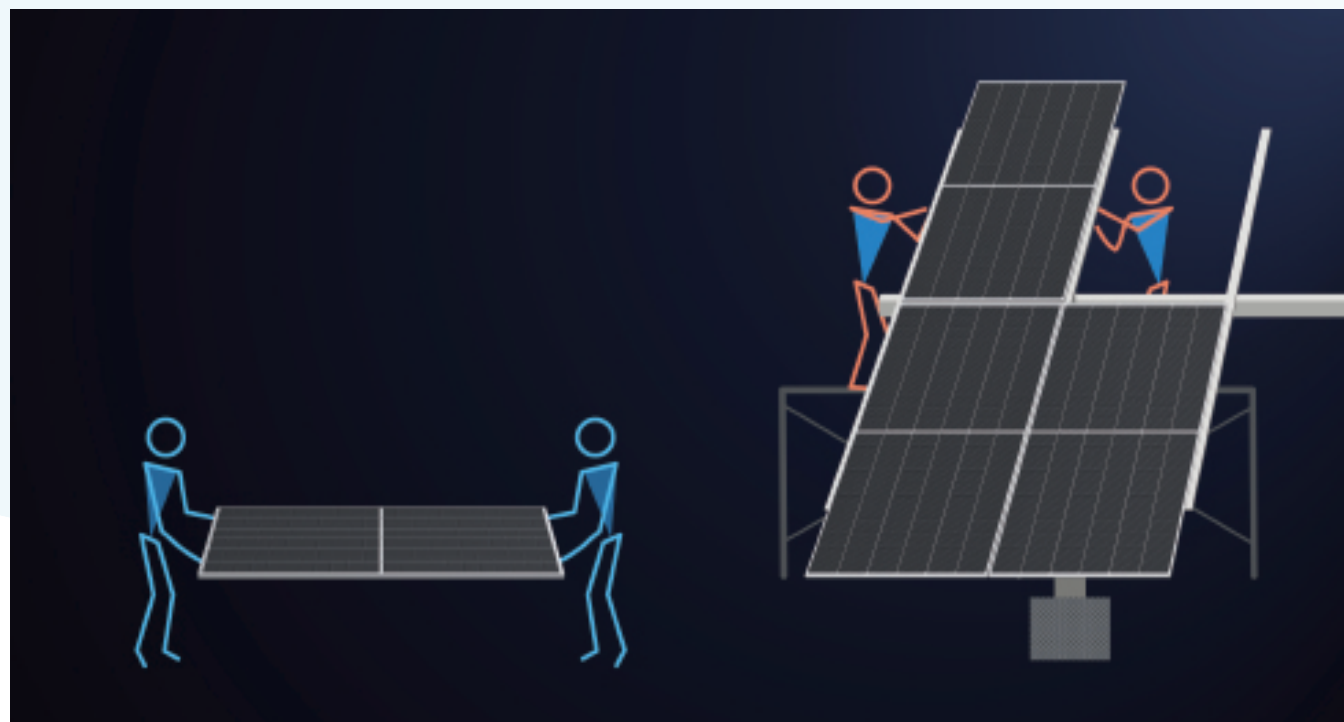


## Easy for unpacking and prevent module from falling down



## Manual handling

4 crews/group, same staffing as traditional installation



**-24%**

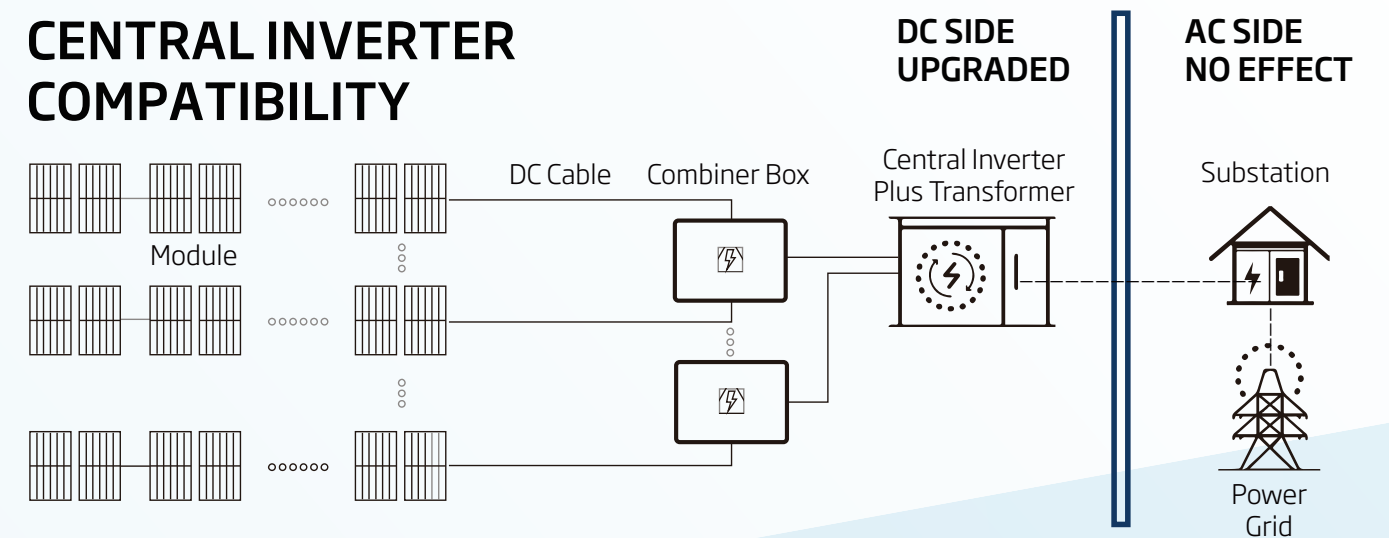
Module installation Quantity

**Installation cost reduction 5-7%**

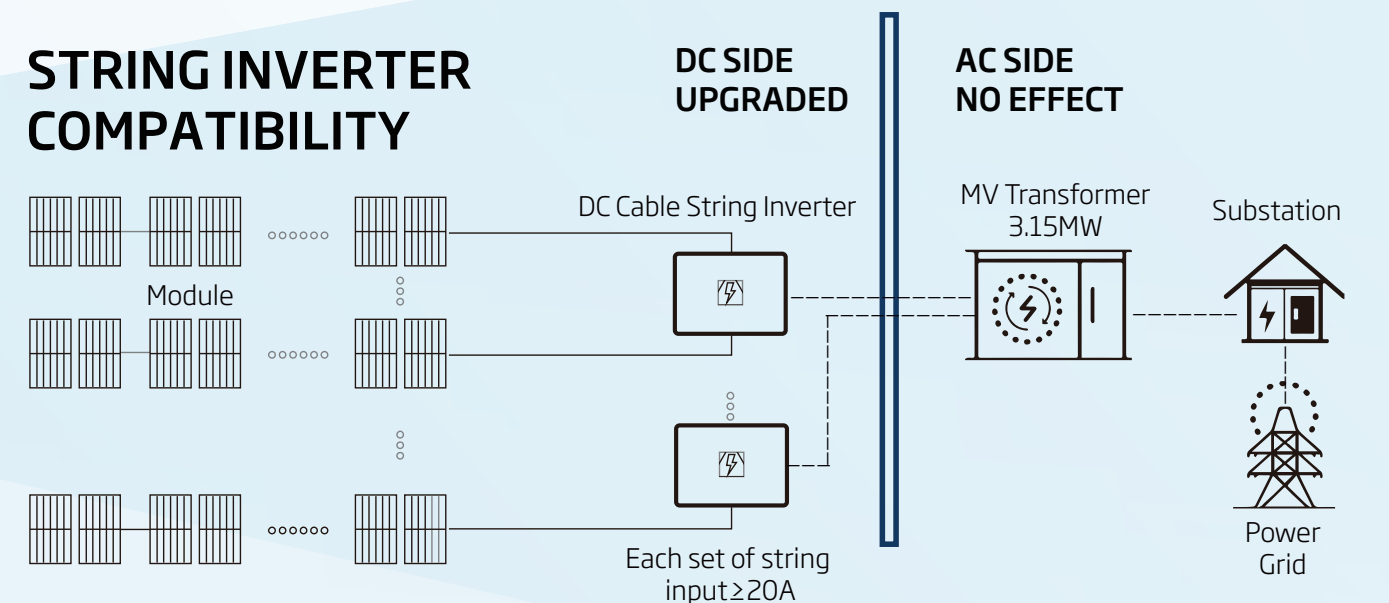
## ECOSYSTEM IS COMPLETELY IN PLACE

TYPE	BRAND	MODEL	
INVERTER	Central	SUNGROW	1600/2500/3125KW
	String	SUNGROW	SG225HX/SG250HX
		HUAWEI	SUN2000-196KTL-H0/SUN2000-196KTL-H3
		SMA	Sunny Tripower 150-20
		SINENG	SP-225-H/SP-250K-H
COMBINER BOX	LongMax, Bentek, ConnectPV Shoals, SolarBOS	1500V High Current	
CABLE	4MM <sup>2</sup> /6MM <sup>2</sup>		

### CENTRAL INVERTER COMPATIBILITY



### STRING INVERTER COMPATIBILITY



# MECHANICAL LOADING

Compatible with Fixed-tilt and Tracker

**Frame design optimization**

*Conventional Module frame*      *670W Vertex Module frame*

Optimal Design:  
 Optimized frame profile design;  
 Strengthened material;  
 Reinforced supporting bar for backsheet module;  
 Excellent loading performance suits diversified scenarios.

**TÜVRheinland®** **IEC 61215, IEC 61730**  
 Precisely Right. Received certification in Jan 2021.

**Fix-tilt**

Static loading  
+5400Pa/-2400Pa

**Tracker**

Static loading  
+2400Pa/-2400Pa

Company Name	Brand/Product Type	210 Modules
Arcotech Solar Holdings Co., Ltd.	Skyline/Skysmart II	✓
Array Technologies Inc	DuraTrack HZ v3	✓
GameChange Solar LP	GENIUS TRACKER™ 1P/ GENIUS TRACKER™ 2P	✓
IDEEMATEC Deutschland GmbH	H4PLUS™	✓
Nexttracker Inc.	Nexttracker products	✓
PV HARDWARE SOLUTIONS, S.L.U	Independent row: Monoline™ (all its versions 1V, 3H and 2V); Multi-row: Axone™, Axone Duo™	✓
SOLTEC ENERGIAS RENOVABLES S.L.	SF7 & SF8	✓
Trina Solar Co., Ltd	TrinaTracker (Vanguard™/Agile™)	✓
FTC Solar	Voyager/Voyager+	✓
Soltigua	Soltigua products	✓

**Vertex Module Capacity in 2021** **50+ GW**





# Power Beyond Solar

Uif!Xpsme!Mfbejoh!QW!boe!Joufhsbufe!Tnbsu!Fofshz!Tpmvujpo!Qspwjefs



Trina Solar  
Official Website



Vertex Product  
information

For more information regarding Vertex module,  
please follow our social media accounts or  
scan the QR codes to visit us at our website.



BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE21

PRODUCT RANGE: 635-670W

670W

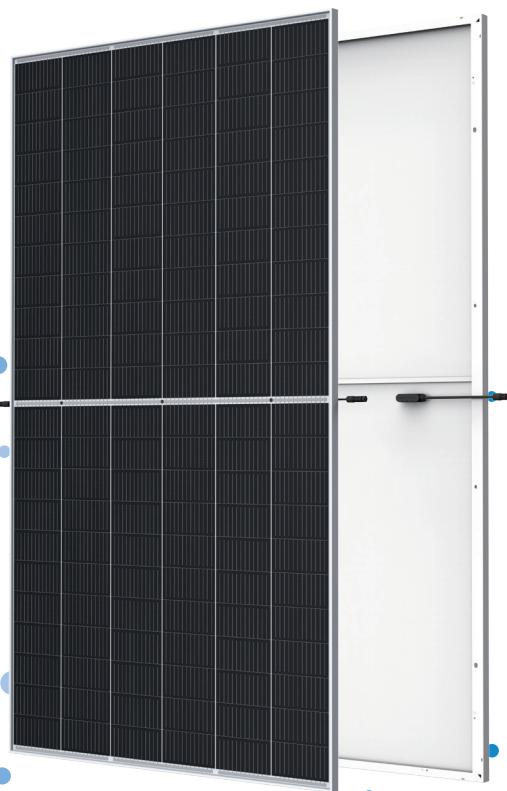
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.6%

MAXIMUM EFFICIENCY



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
- Higher return on Investment



High power up to 670W

- Up to 21.6% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

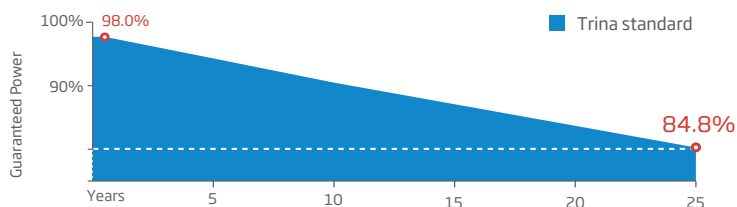
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



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

Trina Solar's Backsheet Performance Warranty

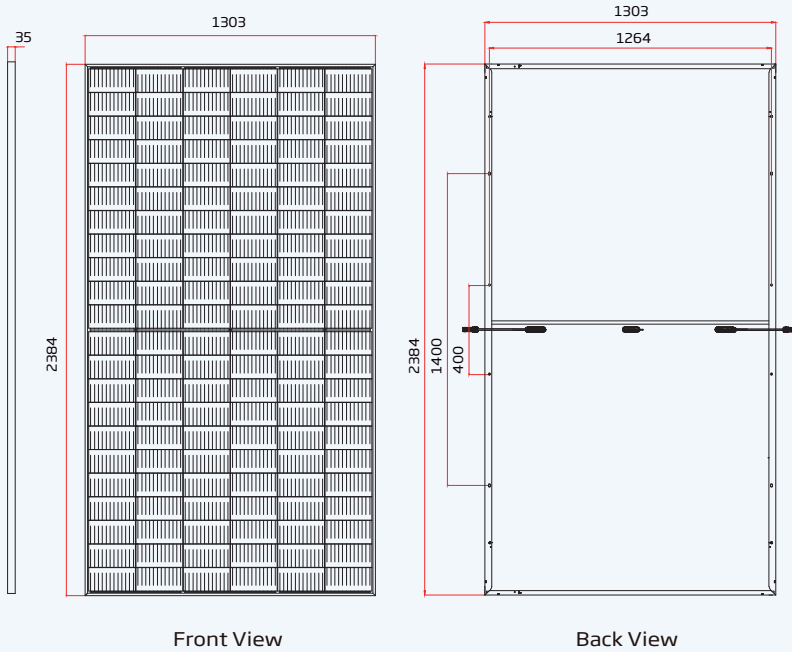
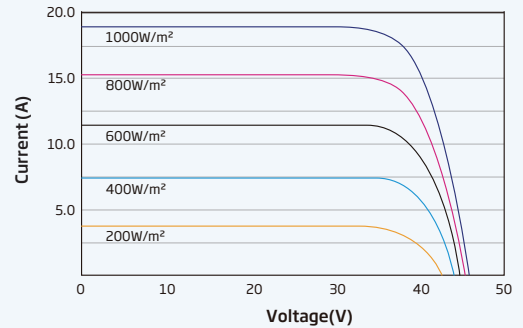
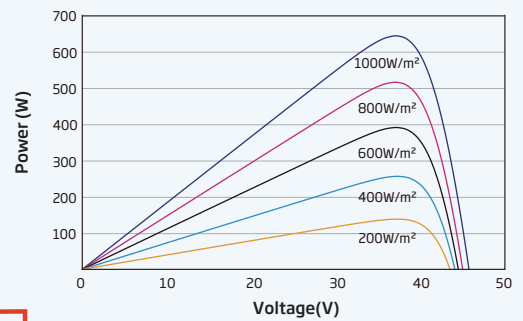


Comprehensive Products and System Certificates



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



**DIMENSIONS OF PV MODULE(mm)**

**I-V CURVES OF PV MODULE(645 W)**

**P-V CURVES OF PV MODULE(645W)**


Preliminary

**ELECTRICAL DATA (STC)**

Peak Power Watts-P <sub>MAX</sub> (Wp)*	635	640	645	650	655	660	665	670
Power Tolerance-P <sub>MAX</sub> (W)	0 ~ +5							
Maximum Power Voltage-V <sub>MPP</sub> (V)	36.8	37.0	37.2	37.4	37.6	37.8	38.0	38.2
Maximum Power Current-I <sub>MPP</sub> (A)	17.26	17.30	17.35	17.39	17.43	17.47	17.51	17.55
Open Circuit Voltage-V <sub>OC</sub> (V)	44.7	44.9	45.1	45.3	45.5	45.7	45.9	46.1
Short Circuit Current-I <sub>SC</sub> (A)	18.30	18.34	18.39	18.44	18.48	18.53	18.57	18.62
Module Efficiency η <sub>m</sub> (%)	20.4	20.6	20.8	20.9	21.1	21.2	21.4	21.6

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance: ±3%.

**ELECTRICAL DATA (NOCT)**

Maximum Power-P <sub>MAX</sub> (Wp)	481	485	488	492	496	500	504	508
Maximum Power Voltage-V <sub>MPP</sub> (V)	34.3	34.6	34.8	34.9	35.1	35.3	35.4	35.6
Maximum Power Current-I <sub>MPP</sub> (A)	13.97	14.01	14.05	14.09	14.13	14.17	14.22	14.26
Open Circuit Voltage-V <sub>OC</sub> (V)	42.1	42.3	42.5	42.7	42.9	43.0	43.2	43.4
Short Circuit Current-I <sub>SC</sub> (A)	14.75	14.78	14.82	14.86	14.89	14.93	14.96	15.01

NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

**MECHANICAL DATA**

Solar Cells	Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×35 mm (93.86×51.30×1.38 inches)
Weight	33.9 kg (74.7 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA
Backsheet	White
Frame	35mm(1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ), Portrait: 280/280 mm(11.02/11.02 inches) Length can be customized
Connector	MC4 EV02 / TS4*

\*Please refer to regional datasheet for specified connector.

**TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P <sub>MAX</sub>	-0.34%/°C
Temperature Coefficient of V <sub>OC</sub>	-0.25%/°C
Temperature Coefficient of I <sub>SC</sub>	0.04%/°C

**MAXIMUM RATINGS**

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	30A

**WARRANTY**

12 year Product Workmanship Warranty  
25 year Power Warranty  
2% first year degradation  
0.55% Annual Power Attenuation

(Please refer to product warranty for details)

**PACKAGING CONFIGURATION**

Modules per box: 31 pieces  
Modules per 40' container: 558 pieces





**SF7** | One Track  
Zero Gap

The latest generation of the horizontal single-axis tracker



# TECHNICAL DATASHEET



Single-Axis Tracker

## MAIN FEATURES

Tracking System	Horizontal Single-Axis with independent rows
Tracking Range	120° +
Drive System	Enclosed Slewing Drive, DC Motor
Power Supply	Self-Powered PV Series Optional: AC/DC Universal Input
Tracking Algorithm	Astronomical with TeamTrack Backtracking
Communication	Wireless Hybrid Radio + RS-485 Cable Optional: Wire RS-485 Full Wired
Wind Resistance	Per Local Codes
Land Use Features	Independent Rows YES Slope North-South 17% Slope East-West Unlimited Ground Coverage Ratio Configurable. Typical range: 28-50%
Foundation	Driven Pile   Ground Screw   Concrete
Temperature Range	Standard - 4°F to +131°F   -20°C to +55°C Extended -40°F to +131°F   -40°C to +55°C
Availability	>99%
Modules	Standard: 72 cells   Optional: 60 Cells; Crystalline, Thin Film (Solar Frontier, First Solar and others); Bifacial

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## MODULE CONFIGURATIONS

1000V	Length	Height	Width	1500V	Length	Height	Width
2x38	124' 12" (38.1 m)	12' 12" (3.95 m)	12' 10" (3.92 m)	2x42	138' 12" (42.1 m)	12' 12" (3.95 m)	12' 10" (3.92 m)
				2x43.5	144' 8" (44.1 m)		
2x40	131' 7" (40.1 m)	2x45	147' 12" (45.1 m)				

## SERVICES

Tracker Advisory Services	Tracker Turnkey Contracting
Technical Support	Commissioning
Pull Out Test	Maintenance

## MAINTENANCE ADVANTAGES

Self-lubricating Bearings  
Face to Face Cleaning Mode  
2x Wider Aisles

## WARRANTY

Structure 10 years (extendable)  
Motor 5 years (extendable)  
Electronics 5 years (extendable)



**DNV GL Technology Review available**  
**Bankability report**  
**WIND TUNNEL TESTED**



www.soltec.com

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# DELTA TECHNOLOGY

CABINE PREFABBRICATE E QUADRI ELETTRICI MT/BT  
MV/LV COMPACT SUBSTATIONS & SWITCHBOARDS

## CABINE ELETTRICHE SERIE "CSS PLUS"



✓ Spessore pareti 7 / 9 cm

✓ Tetto asportabile

✓ Vasca di fondazione integrata

Delta Technology Srl

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info@deltatechnology.it - www.deltatechnology.it





Comoda, funzionale, pratica  
da trasportare e facile da installare:  
**la nuova serie "CSS PLUS"**  
si adatta alle esigenze del cliente  
evitando i consueti  
imprevisti di cantiere

# SERIE "CSS PLUS"

I box della nuova serie **CSS "PLUS"** sono dei manufatti prefabbricati in c.a.v. con pareti perimetrali di spessore 7 o 9 cm e base di spessore 10 cm, chiusi in copertura con un elemento piano di spessore variabile tra 10 e 15 cm, avente un colmo centrale per lo smaltimento delle acque meteoriche.

Progettata per soddisfare le esigenze più svariate, ha nella **versatilità** il proprio punto di forza. È realizzabile, infatti, come cabina monoblocco con **vasca incorporata**, lunghezza **variabile**, profondità **standard** o "large" e tetto **asportabile**.

La nuova serie CSS "PLUS" è stata studiata per **integrare** nello stesso box non solo le apparecchiature necessarie, ma anche la vasca di base, comunemente fornita come elemento separato. La totale realizzazione in stabilimento offre al cliente la comodità di un prodotto "**chiavi in mano**" dalle caratteristiche industriali, senza imprevisti di cantiere.

I box prodotti negli stabilimenti Delta Technology sono strutturalmente realizzati con **calcestruzzo armato** di tipo Rck 40 N/mm<sup>2</sup> e barre e/o **rete elettrosaldata** in acciaio di tipo B450C o B450A. Per la realizzazione dei manufatti sono stati scelti dei carichi progettuali in conformità alle **vigenti normative** (L.5/11/1971 n. 1086, L.2/2/1974 n. 64 e DM 14.01.2008) ed in sintonia alle **specifiche Enel DG 2061**.



## CARATTERISTICHE GENERALI

<b>STRUTTURA</b> Box monoblocco	<b>DIMENSIONI ESTERNE: ALTEZZA MASSIMA</b> 3,2 m	<b>RIVESTIMENTO ESTERNO BOX/TETTO</b> Rivestimento murale plastico idrorepellente Impermeabilizzazione con guaina ardesiata
<b>TIPO DI INVOLUCRO</b> Cemento Armato Vibrato (CAV)	<b>SPESSORE</b> Pareti: 7 / 9 cm Base: 10 cm Tetto: 10 ÷ 15 cm	<b>INFISSI</b> Vetroresina / Acciaio GZ200 Verniciato
<b>TIPOLOGIA MATERIALE</b> CLS Rck 40 N/mm <sup>2</sup> (C32/40 secondo UNI 11104e DM 14/1/2008)	<b>COPERTURA</b> Asportabile	<b>GRADO DI PROTEZIONE</b> IP 33D
<b>DIMENSIONI ESTERNE: LUNGHEZZA MASSIMA</b> 10 m	<b>PESO SOLO INVOLUCRO (RANGE)</b> Da 11 a 32 (t)	<b>SISTEMI DI AREAZIONE</b> Naturale / Forzata
<b>DIMENSIONI ESTERNE: PROFONDITÀ MASSIMA</b> 3 m	<b>TEMPERATURA AMBIENTE DI ESERCIZIO (RANGE)</b> Da -20 a 50 (°C)	

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# Solar inverter

## PVS-175-TL

The PVS-175-TL is FIMER's innovative three-phase string inverter, delivering a six-in-one solution to enhance and optimize solar power generation for ground mounted utility scale applications.

**175 kW**



**High power density**

This new high-power string inverter with the highest power density within the 1500 Vdc segment, delivers up to 185 kVA at 800 Vac. This not only maximizes the ROI for ground-mounted utility-scale applications but also reduces Balance of System costs (i.e. AC side cabling) for small to large scale, free field ground mounted PV installations.

**Design flexibility**

The inverter comes equipped with 12 MPPT, the highest available in the market, assuring maximum PV plant design flexibility and increasing yields also in case of complex installations.

**Installer friendly design**

Quick and easy installation, thanks to plug and play connectors, as the existing PV module's mounting systems can be used to install the inverters, thus saving time and cost on site preparation and hire of plant.

The fuse and combiner free design eliminates the need for external components, such as separate DC combiner boxes and AC first level combiners, thanks to the integrated DC disconnect and AC wiring compartment with optional AC disconnect.

The Advanced Cooling Concept preserves the lifetime of the system and minimizes O&M costs thanks to internal heavy-duty inverter cooling fans. These can be easily removed during scheduled maintenance cycles whilst the power module can be easily replaced without removing the wiring box.

**Advanced communication for O&M**

Standard wireless access from any mobile device makes the

configuration of inverter and plant easier and faster. Improved user experience thanks to a built-in User Interface (UI) enables access to advanced inverter configuration settings. The Installer for Solar Inverters mobile APP and configuration wizard enable a quick multi-inverter installation and commissioning thus reducing the time spent on site.

**Fast system integration**

Industry standard Modbus (RTU/TCP)/SUNSPEC protocol enables fast system integration. Two Ethernet ports enable fast and future-proof communication for PV plants.

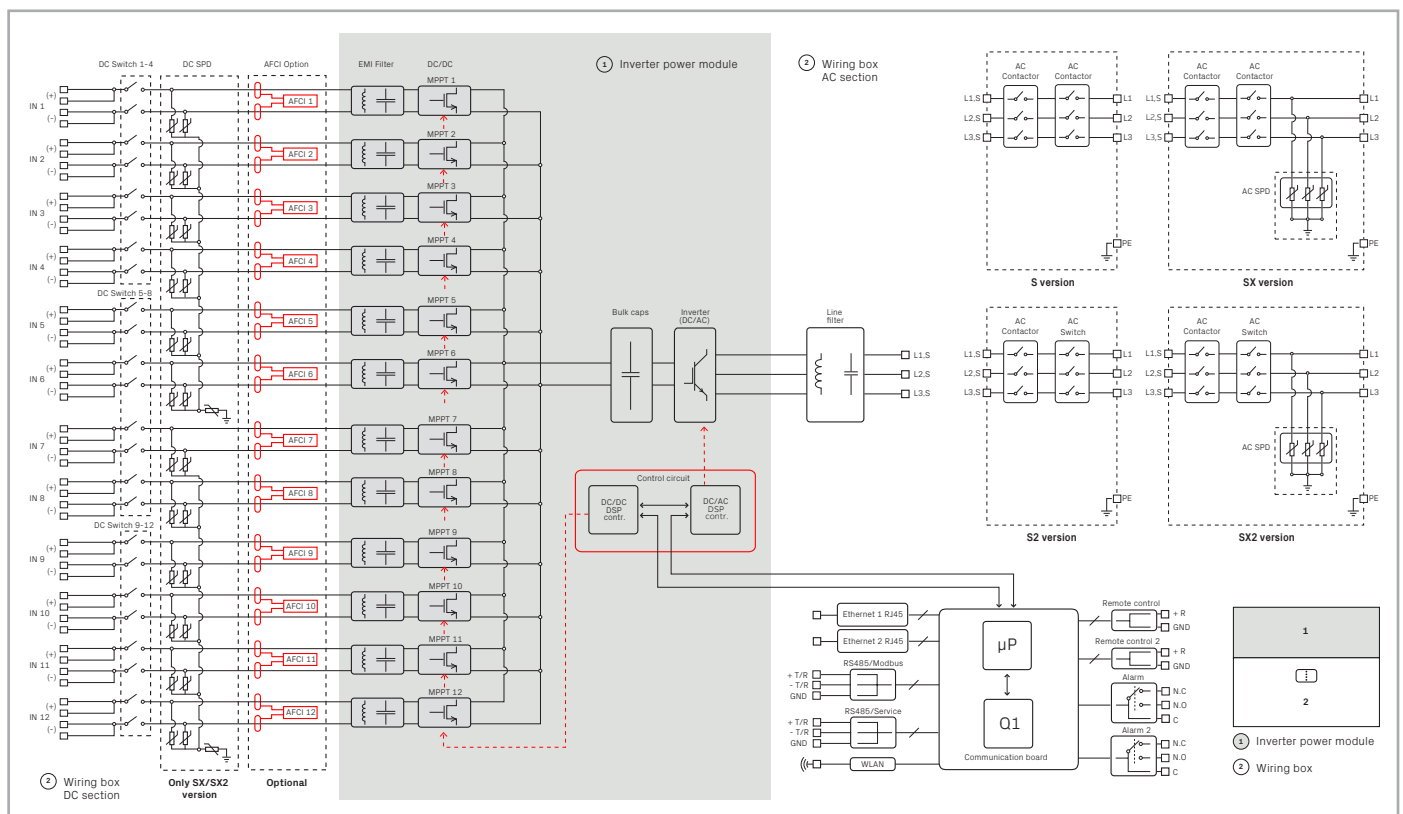
**Protect your assets**

Monitoring your assets is made easy, as every inverter is capable to connect to Aurora Vision cloud platform and thanks to the state-of-the-art cybersecurity and Arc Fault Detection option, your assets and profitability are secure in the long term.

**Highlights**

- Up to 185 kW power rating, highest in class
- All-in-one combiner and fuse free design
- Separate power module and wiring compartment for fast swap and replacement
- Easy access to consumables for fast inspection and replacement
- 12 MPPT and wide input voltage range for maximum energy yield
- WLAN interface for commissioning and configuration
- Remote monitoring and firmware upgrade via the Aurora Vision cloud platform (logger free)
- Free of charge standard access to Aurora Vision cloud

**PVS-175-TL string inverter block diagram**



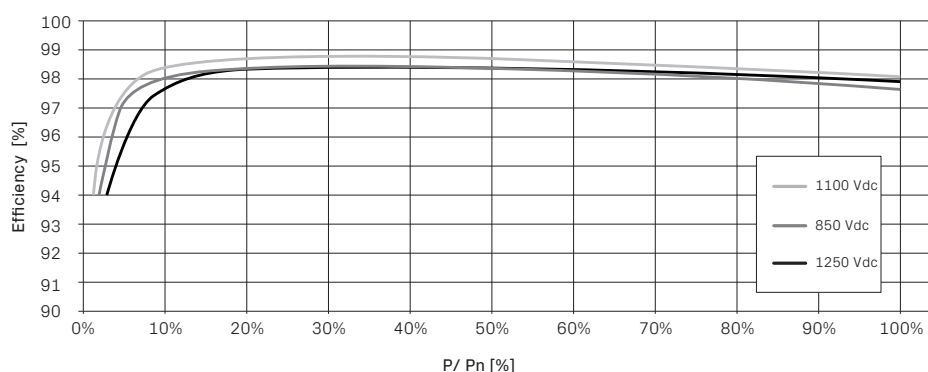
## Technical data and types

Type code	PVS-175-TL
<b>Input side</b>	
Absolute maximum DC input voltage ( $V_{max,abs}$ )	1500 V
Start-up DC input voltage ( $V_{start}$ )	750 V (650...1000 V)
Operating DC input voltage range ( $V_{d,min}...V_{d,max}$ )	0.7 x $V_{start}$ ...1500 V (min 600 V)
Rated DC input voltage ( $V_{dcr}$ )	1110 Vdc
Rated DC input power ( $P_{dcr}$ )	188000 W @ 30°C - 177000 W @ 40°C
Number of independent MPPT	12
MPPT input DC voltage range ( $V_{MPPTmin}...V_{MPPTmax}$ ) at $P_{acr}$	850...1350 V
Maximum DC input current for each MPPT ( $I_{MPPTmax}$ )	22 A
Maximum input short circuit current for each MPPT ( $I_{SCmax}$ )	30 A
Number of DC input pairs for each MPPT	2 DC inputs per MPPT
DC connection type	PV quick fit connector <sup>1)</sup>
<b>Input protection</b>	
DC Series Arc Fault Circuit Interrupter <sup>2)</sup>	Type I acc. to UL 1699B with single-MPPT sensing capability
Reverse polarity protection	Yes, from limited current source
Input over voltage protection for each MPPT - varistor	Yes, 2 (S/S2 version only)
Input over voltage protection for each MPPT - replaceable surge arrester	Type 2 with monitoring (SX/SX2 version only)
Photovoltaic array isolation control (insulation resistance)	Yes, acc. to IEC 62109-2
Residual Current Monitoring Unit (leakage current protection)	Yes, acc. to IEC 62109-2
DC Load Breaking Disconnect Switch (rating for each MPPT)	20 A/1500 V - 35 A/1250 V - 50 A/1000 V
Fuse rating	N/A, No fuses
String current monitoring	MPPT-level current sense
<b>Output side</b>	
AC Grid connection type	Three phase 3W+PE (TN system)
Rated AC power ( $P_{acr}$ @ $\cos\phi=1$ )	175 000 W @ 40°C
Maximum AC output power ( $P_{ac,max}$ @ $\cos\phi=1$ )	185 000 W @ $\leq 30^\circ\text{C}$
Maximum apparent power ( $S_{max}$ )	185 000 VA
Rated AC grid voltage ( $V_{ac,r}$ )	800 V
AC voltage range	(552...960) <sup>3)</sup>
Maximum AC output current ( $I_{ac,max}$ )	134 A
Rated output frequency ( $f_r$ )	50 Hz/60 Hz
Output frequency range ( $f_{min}...f_{max}$ )	45...55 Hz/55...65 Hz <sup>3)</sup>
Nominal power factor and adjustable range	> 0.995, 0...1 inductive/capacitive with maximum $S_{max}$
Total current harmonic distortion	< 3%
Max DC current injection (% of $I_n$ )	< 0.5%* $I_n$
Maximum AC Cable outer diameter / multi core	1 x 53 mm (1 x M63 cable gland)
Maximum AC Cable outer diameter / single core	3 x 32 mm (3 x M40 cable gland)
AC connection type <sup>4)</sup>	Copper Busbar for lug connections with M10 bolts (included)
<b>Output protection</b>	
Anti-islanding protection	According to local standard
Maximum external AC overcurrent protection	200 A
Output overvoltage protection - replaceable surge protection device	Type 2 with monitoring
<b>Operating performance</b>	
Maximum efficiency ( $\eta_{max}$ )	98.7%
Weighted efficiency (EURO/CEC)	98.4%
<b>Communication</b>	
Embedded communication interfaces	Dual port Ethernet, WLAN <sup>5)</sup> , RS-485
User interface	4 LEDs, Web User Interface, Mobile APP
Communication protocol	Modbus RTU/TCP (Sunspec)
Commissioning tool	Web User Interface, Mobile APP/APP for plant level
Monitoring	Plant Portfolio Manager, Plant Viewer
FW update	Remote inverter FW (all components) upgrade via Ethernet/WLAN interface locally/remotely
Parameter upgrade	Remote inverter parameter (all components) upgrade via Ethernet/WLAN interface locally/remotely

## Technical data and types

Type code	PVS-175-TL
<b>Environmental</b>	
Operating ambient temperature range	-25...+60°C/-13...140°F with derating above 40°C/133 °F
Relative humidity	4%...100% condensing
Sound pressure level, typical	65dB(A) @ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
<b>Physical</b>	
Environmental protection rating	IP 65 (IP54 for cooling section)
Cooling	Forced air
Dimension (H x W x D)	867x1086x419 mm / 34.2"x42.7"x16.5" for -S, -SX model 867x1086x458 mm / 34.2"x42.7"x18.0" for -S2, SX2 model
Weight	~76 kg / 167,5 lbs for power module; ~77 kg / 169.7 lbs for Wiring box Overall max ~153 kg / 337.2 lbs
Mounting system	Mounting bracket (vertical support only)
<b>Safety</b>	
Isolation level	Transformerless
Marking	CE
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12, EN 301 489-1, EN 301 489-17, EN 300 328, EN 62311,
Grid standard <sup>6)</sup>	CEI 0-16, UTE C 15 712-1, JORDAN IRR-DCC-MV and IRR-TIC, BDEW, VDE-AR-N 4110, VDE-AR-N 4120, P.O. 12.3, DRRG D.4
<b>Available product variants</b>	
Inverter power module	PVS-175-TL-POWER MODULE
24 quick fit connector pairs (2 each mppt) + DC switches + DC side varistors	WB-S-PVS-175-TL
24 quick fit connector pairs (2 each mppt) + DC switches + DC side varistors + AC disconnection switch	WB-S2-PVS-175-TL
24 quick fit connector pairs (2 each mppt) + DC switches + SPD Type 2 Pluggable Cartridges (DC & AC)	WB-SX-PVS-175-TL
24 quick fit connector pairs (2 each mppt) + DC switches + AC disconnection switch + SPD Type 2 Pluggable Cartridges (DC & AC)	WB-SX2-PVS-175-TL
<b>Optional available</b>	
DC Series Arc Fault Circuit Interrupter	Type I acc. to UL 1699B <sup>2)</sup> with single-MPPT sensing capability
AC Plate, Single Core Cables	Plate with 4 individual AC cable glands: 3 x M40: Ø 22...32mm, 1 x M32: Ø 18...25mm
AC Plate, Multi Core Cables	Plate with 2 individual AC cable glands: 1 x M63: Ø 37...53mm, 1 x M32: Ø 18...25mm
DC link recharge circuit	Night time operation with restart capability
Anti-PID <sup>7)</sup>	Based on night time polarization of the array

## Efficiency curves of PVS-175-TL



- Multicontact MC4-Evo2. Cable couplers may accept up to 10mm<sup>2</sup> (AWG8)
- Available as an option. Performance in line with the relevant requirements of the Draft IEC 63027 standard
- The AC voltage and frequency range may vary depending on specific country grid standard
- Use of aluminum cables is possible via bi-metallic cable lugs

- As per IEEE 802.11 b/g/n standard, 2.4 GHz
- Check your sales channel for availability of the applicable grid standard for your country
- Cannot operate simultaneously when installed in conjunction with the DC link recharge circuit

**Remark. Features not specifically listed in the present data sheet are not included in the product**



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# Solar inverter

## Medium voltage Compact Skid

### PVS-175-MVCS

The FIMER medium voltage compact skid is a plug&play solution designed for large-scale solar power generation using PVS-175 high-power string inverters. It includes the medium voltage transformer, the medium voltage switchgear and all low voltage protections needed to connect the inverters to the transformer.

## String inverter - PVS-175-MVCS

The PVS-175-MVCS is an integrated product specifically engineered for decentralized solar plants realized with FIMER "PVS-175" string inverters. The solution allows to connect up to 36 inverters for a maximum power of 6.7MVA

The MVCS includes an optimized MV oil-immersed transformer, MV gas-insulated switchgear, all necessary LV protections and connections to attach the solar array and a set of available auxiliary services with independent auxiliary power.

All PVS-175-MVCS components ensure the highest standards of quality, performance and durability.

This medium voltage compact skid is used to connect a PV power plant to a MV electricity grid easily and rapidly. To meet the PV power plant's demanded capacity, several FIMER compact skids can be used and connected in any possible manner thanks to the versatility of the integrated MV switchgear.

The compact skid solution has dimensions suitable for transportation inside a closed 20 feet high cube shipping container. The standardized shipping dimensions ensure cost-effective and safe transportability to the site, even overseas.

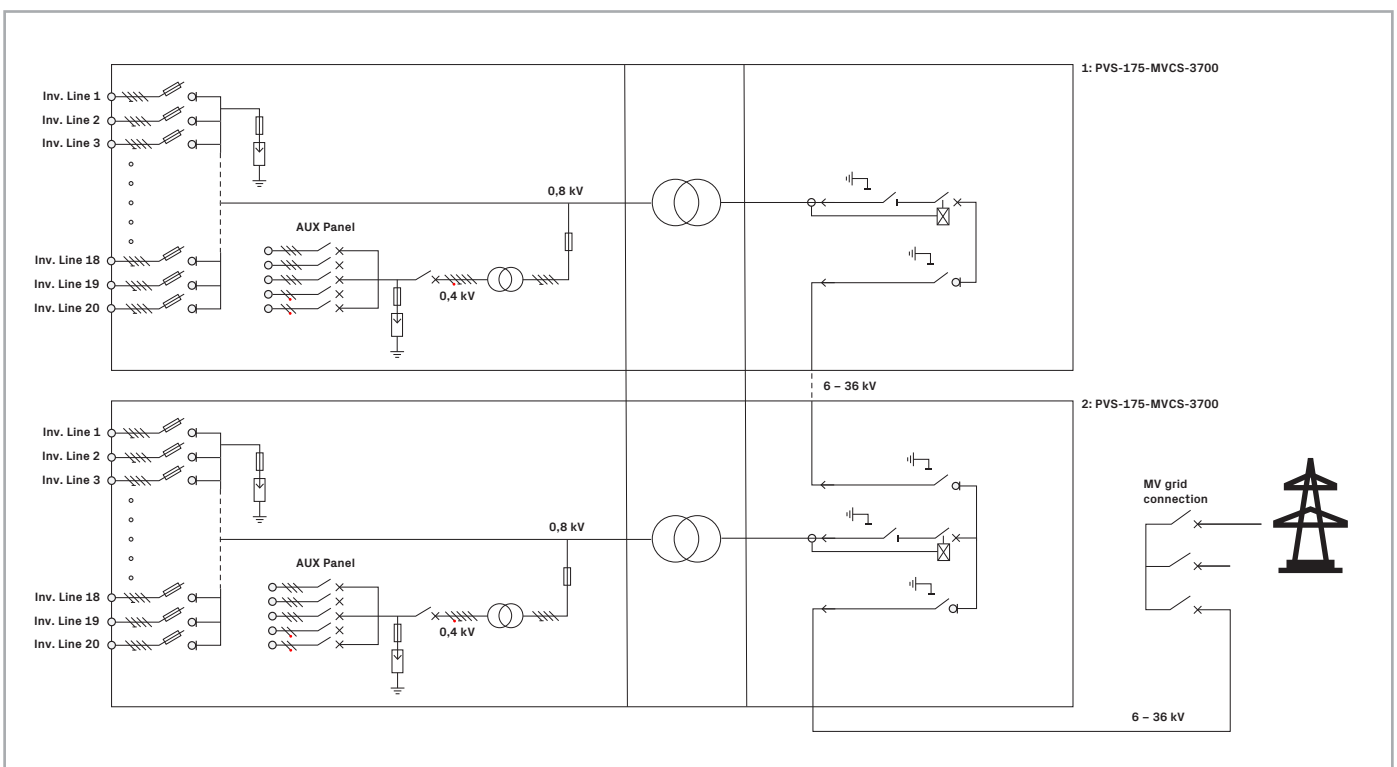
The solution's optimized cooling, filtering and high

environmental protection degree enable installations in a wide span of ambient conditions, from harsh desert temperatures to cold and humid environments. The FIMER medium voltage compact skid is designed for at least 25 years of operation.

### Highlights

- Designed for decentralized systems based on the award-winning 1500 Vdc string inverters PVS-175-TL
- Integrated low voltage distribution panel for a simplified and cost optimized Balance of System (BoS) without the need of additional recombiners
- Quick individual isolation of each feeder, even on-load, for easy and cost-effective maintenance, ensuring maximum uptime
- Individually-protected feeders, enabling separate inverters to be serviced without disrupting the rest of the units connected to the same cluster
- Optimized and very compact layout for integration of all components necessary for medium voltage connection
- Standardized shipping dimensions ensure reduced logistic costs
- Made in Europe product, compatible with most of the world-wide structural regulations and standards
- Vertically integrated product from FIMER, guaranteed by FIMER

### PVS-175-MVCS block diagram example





## Technical data and types

Type code	1850	2200	2590	2960	3330	3700	4070
Inverter	PVS-175-TL						
Number of inverters in parallel	10	12	14	16	18	20	22
Maximum rating in kVA	1850	2200	2590	2960	3300	3700	4070
<b>LV distribution panel</b>							
Number of fused protected feeders	10	12	14	16	18	20	22
Fuse rating of feeders	200 A						
Breakable on load	Yes						
Over voltage protection - replaceable surge arrester	Type 2 (Type 1+2 optional)						
<b>MV transformer</b>							
Transformer type	Oil immersed (ONAN)						
AC Power @ 30° C in kVA	1850	2200	2590	2960	3300	3700	4070
AC Power @ 40° C in kVA	1750	2100	2450	2800	3150	3500	3850
Low voltage level	800 V						
Medium voltage level range	≤ 36kV						
Rated frequency	50 Hz or 60 Hz						
Oil type	Mineral (vegetable optional)						
Tap changer	± 2 x 2.5%						
Winding material (primary / secondary)	Al / Al						
Eco efficiency optional	Yes						
<b>MV switchgear</b>							
Switchgear type	SF <sub>6</sub> -insulated						
Rated current	630 A						
Configuration	Single (CV) or double feeder (CCV)						
Protection (up to 24 kV / up to 36 kV)	Circuit breaker (16 kA or 20 kA / 20 kA or 25 kA)						
Protection relay type	REJ603 (others on request)						
Motorized optional	Yes						
<b>Auxiliary supply</b>							
Auxiliary transformer power	10 kVA (higher on request)						
Auxiliary transformer voltage	800 / 400-230 V						
Low voltage distribution panel for auxiliary functions	Yes						
<b>Mechanical characteristics</b>							
Dimensions (length x width x height) in mm	5700 x 2150 x 2500						
Weight approx. in ton	9	9	10	10	10	11	11
<b>Environmental</b>							
Operating temperature range	-25° C ... +60° C (with derating above 40° C)						
Operating altitude range	≤ 2000 m						
Relative humidity (non-condensing)	≤ 95%						
Environmental protection rating	IP 54						
Painting corrosion protection	C4 (C5M optional)						
<b>Product compliance</b>							
Conformity	IEC 60364, IEC 61936-1, IEC 60502-1						

## Technical data and types

Type code	4440	4810	5180	5550	5920	6290	6660
Inverter	PVS-175-TL						
Number of inverters in parallel	24	26	28	30	32	34	36
Maximum rating in kVA	4440	4810	5810	5550	5920	6290	6660
<b>LV distribution panel</b>							
Number of fused protected feeders	24	26	28	30	32	34	36
Fuse rating of feeders	200 A						
Breakable on load	Yes						
Over voltage protection - replaceable surge arrester	Type 2 (Type 1+2 optional)						
<b>MV transformer</b>							
Transformer type	Oil immersed (ONAN)						
AC Power @ 30° C in kVA	4440	4810	5810	5550	5920	6290	6660
AC Power @ 40° C in kVA	4200	4550	4900	5250	5600	5950	6300
Low voltage level	800 V						
Medium voltage level range	≤ 36kV						
Rated frequency	50 Hz or 60 Hz						
Oil type	Mineral (vegetable optional)						
Tap changer	± 2 x 2.5%						
Winding material (primary / secondary)	Al / Al						
Eco efficiency optional	Yes						
<b>MV switchgear</b>							
Switchgear type	SF <sub>6</sub> -insulated						
Rated current	630 A						
Configuration	Single (CV) or double feeder (CCV)						
Protection (up to 24 kV / up to 36 kV)	Circuit breaker (16 kA or 20 kA / 20 kA or 25 kA)						
Protection relay type	REJ603 (others on request)						
Motorized optional	Yes						
<b>Auxiliary supply</b>							
Auxiliary transformer power	10 kVA (higher on request)						
Auxiliary transformer voltage	800 / 400-230 V						
Low voltage distribution panel for auxiliary functions	Yes						
<b>Mechanical characteristics</b>							
Dimensions (length x width x height) in mm	5700 x 2150 x 2500						
Weight approx. in ton	12	12	13	13	14	14	15
<b>Environmental</b>							
Operating temperature range	-25° C ... +60° C (with derating above 40° C)						
Operating altitude range	≤ 2000 m						
Relative humidity (non-condensing)	≤ 95%						
Environmental protection rating	IP 54						
Painting corrosion protection	C4 (C5M optional)						
<b>Product compliance</b>							
Conformity	IEC 60364, IEC 61936-1, IEC 60502-1						



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