



**REGIONE SICILIA  
PROVINCIA MESSINA  
COMUNE DI MISTRETТА**



**PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN IMPIANTO AGROVOLTAICO AD INSEGUIMENTO POTENZA IMPIANTO 43,148 MW<sub>p</sub> DENOMINATO "MISTRETТА" NEL TERRITORIO COMUNALE DI MISTRETТА(ME) SU TERRENO D.4.4 A DESTINAZIONE SPERIMENTAZIONE AGROPASTORALE, COMPRENDE LE OPERE PER LA CONNESSIONE ALLA RETE ELETTRICA IN AT NEL COMUNE DI MISTRETТА (ME)**

**PROGETTO DEFINITIVO**

**SCHEDE TECNICHE COMPONENTI IMPIANTO FV**

Titolo elaborato

Committente

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Rev.	Data	Oggetto revisione	Redatto	Verificato	Approvato

# SCHEDA TECNICA TRACKER

# TRACKER Vanguard™ -1P

## Single-Row



### About TrinaTracker

#### Excellent Bankability

Trina Solar was ranked top in the list of "Top Bankable Module Supplier" released by Bloomberg New Energy Finance (BNF) for five consecutive years

#### Multiple Product Line For All Applications

Multiple product line developed by experienced International R&D team for meeting market demands in all application scenarios

#### Superb Reliability and High Quality Total Solution

Leading quality management system and over 20 years product quality control experience in the industry

#### Efficient Engineering Design Expert

Systematic and high efficient workflow for presales service to guarantee prompt engineering design

#### Unified Product Delivery Service

Global supply chain layout for core equipments in solar farm (modules and tracker) and unified delivery channel for unique experience in customer service



### Compatible with Larger Modules

Vanguard™-1P is designed to reduce LCOE with larger modules. Compatible with modules up to **670W+**



### Highly reliable with strengthened structure

Optimized torque tube improves the torsional resistance by **29.6%** and the bending resistance by **12.4%**



### Less Installation Time & Costs

Trina Clamp is a proprietary product that is quick and easy to use with the 1P configuration, reducing the installation time and costs.



### Highly stable with Bilateral - damper system

The bilateral damper system increases stability and structural flexibility of the tracker, improving the tracking system's resistance to wind gusts from all directions by **20%**.



### Innovative SuperTrack Technology

SuperTrack can improve power generation under highly diffused irradiation weather, reduce generation losses due to row-to-row shading. Up to **8%** yield gain compared with conventional tracking algorithm.

### BILATERAL DAMPER SYSTEM

The bilateral damper system can shorten the tracker oscillation time, thus preventing oscillation. Dynamic responses are reduced and the critical wind speed increased.



### SPHERICAL BEARING

Global patented spherical bearings with up to 30% angle adjustability, alleviate the damage caused by uneven foundation settlement during operations. The spherical bearings dissipate the extra stress caused by the deformation of the tracker system, thus reduce the load and failure rate of each component.



# TECHNICAL SPECIFICATIONS

## GENERAL FEATURES

Solar tracker type	Single row Single-Axis
Tracking range	±60° (120°)
Driver	Slewing driver
Configuration	One module in portrait (1P) up to 90 modules per tracker (1500V string)
Solar module supported	Framed
Foundation options	Direct ramming / Pre-drilling + ramming / Micropile / PHC piles
Pile section	W, compatible with IPE, IPEA, HEA and HEB
Modules attachment	Bolts, Rivets and Clamps
Piles per MW (550Wp module)	~250 piles/MW <sup>(1)</sup> (87 modules per row)
(670Wp module)	~242 piles/MW <sup>(1)</sup> (64 modules per row)
Terrain adaptability	20% N-S <sup>(2)</sup>
Wind and snow loads tolerance	Tailored to site requirement

## STRUCTURE

Material	High Yield Strength Steel
Coating	HDG, Pregalvanized& ZM <sup>(3)</sup>

## CONTROLLER

Controller	Electronic board with microprocessor
Ingress protection marking	IP65
Tracking method	Astronomical algorithms + SuperTrack technology <sup>(4)</sup>
Advanced wind control	Customizable
Anemometer	Cup/Ultrasonic
Night-time stow	Configurable
Communication with the tracker	Wired option: RS485 Wireless option: LoRa/Zigbee
Operating conditions	Altitude < 4000m <sup>(5)</sup> Temperature: -30°C to 60°C <sup>(5)</sup>
Sensors	Digital inclinometer
Power (motor drive)	DC motor: 0.15kW
Power supply	Grid connection / String powered / Self-powered with battery

## WARRANTY

Structure	10 years
Driver and control components	5 years

(1) Depending on layout

(2) For scenarios beyond the scope of use, please consult TrinaTracker

(3) Standard configuration. Other coating under request, please consult TrinaTracker

(4) Includes smart tracking algorithm and smart backtracking algorithm

(5) Standard configuration. Different conditions under request, please consult TrinaTracker

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

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Doc.number: DT-T-0004 Rev: B

## SCHEDA TECNICA PANNELLO FV

Trina Solar

# INTRODUCTION OF **670W** VERTEX MODULE

## Vertex

High Power

**670W**

High Efficiency

**21.6%**

Mechanical data

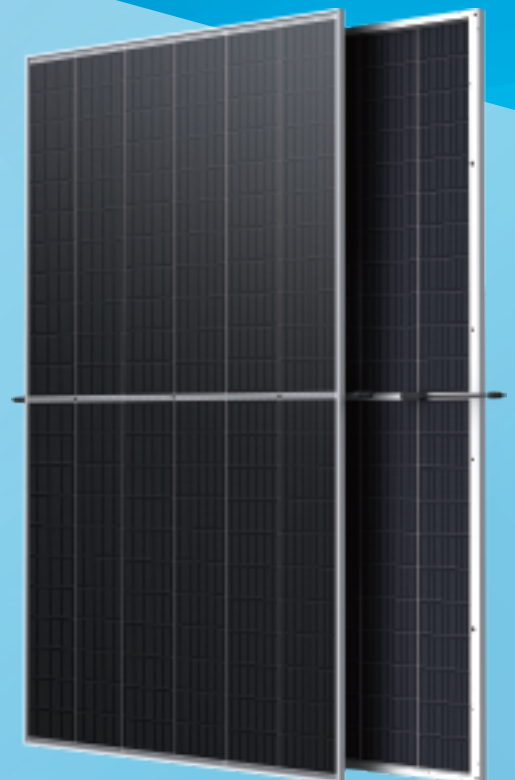
Size: 2384\*1303mm

Weight: 33.9kg

Electrical Data

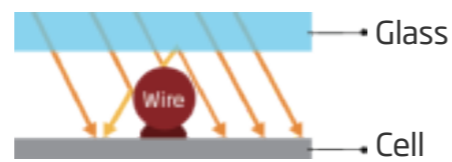
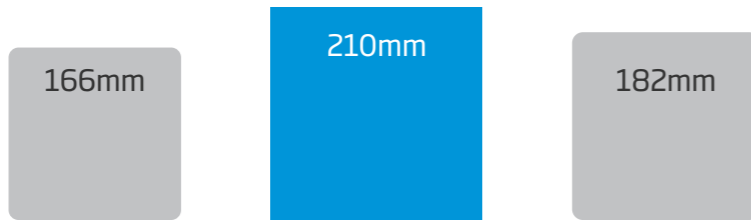
Low voltage concept design

Voc: 45.7V Isc: 18.5A

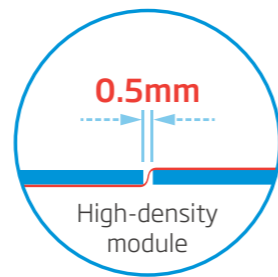
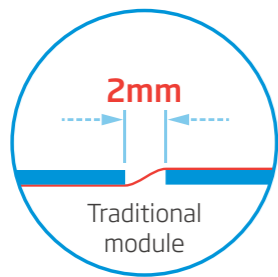


# 210, The Future from Now On!

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

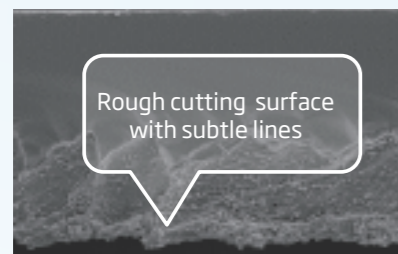


Multi-busbar technology, improving optical utilization rate with higher electricity performance, Module power increase **2~3%**, efficiency increase **0.4~0.6%**

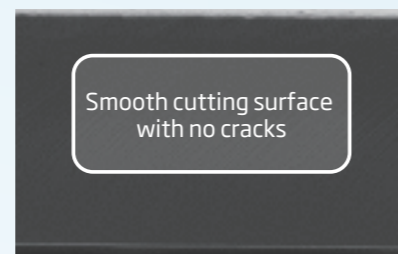


High density encapsulation technology, optimizing power output with good balance between reliability and efficiency, module efficiency increase **0.2~0.3%**

## 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

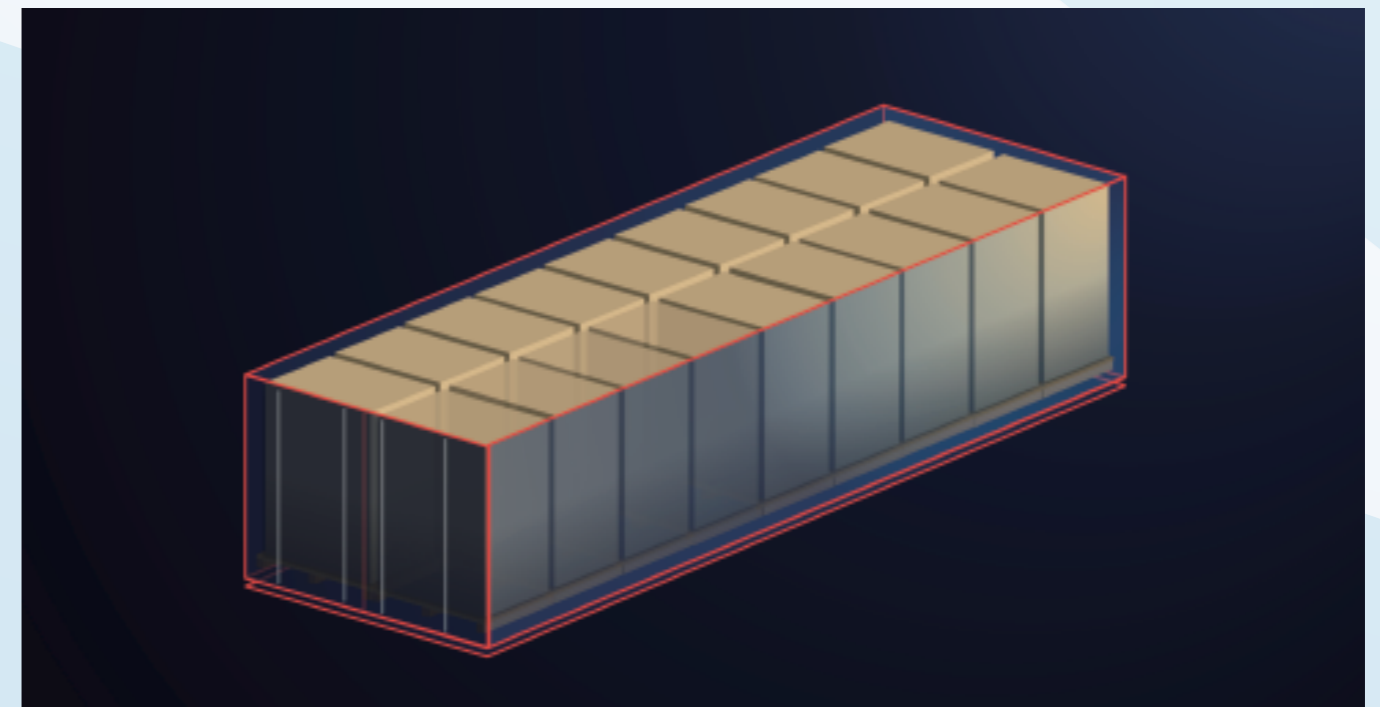
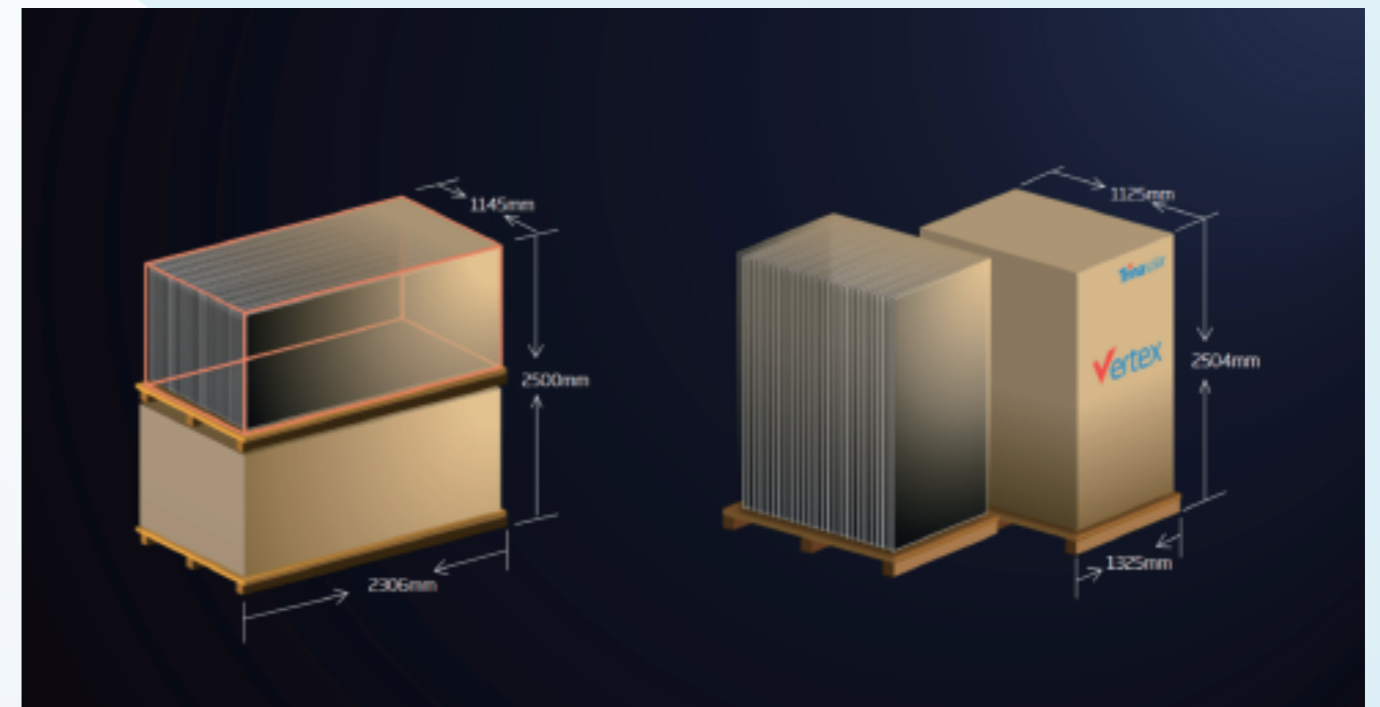


**-7%**  
installation

	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

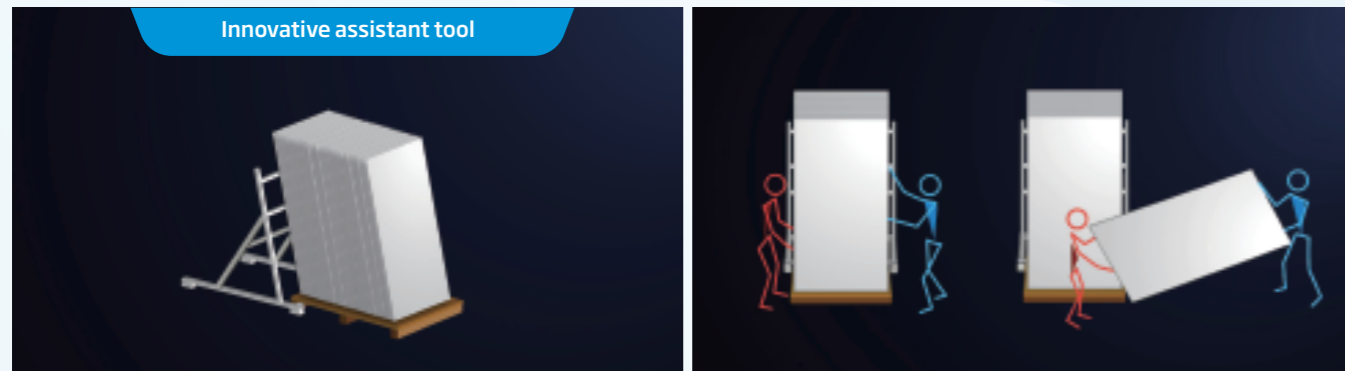


Category	Module Power	Piece per Pallet	Pallet NO. per Container	Power per Container
Other Module	540W	31	20	334,800W
Vertex Module	670W	31	18	373,860W

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

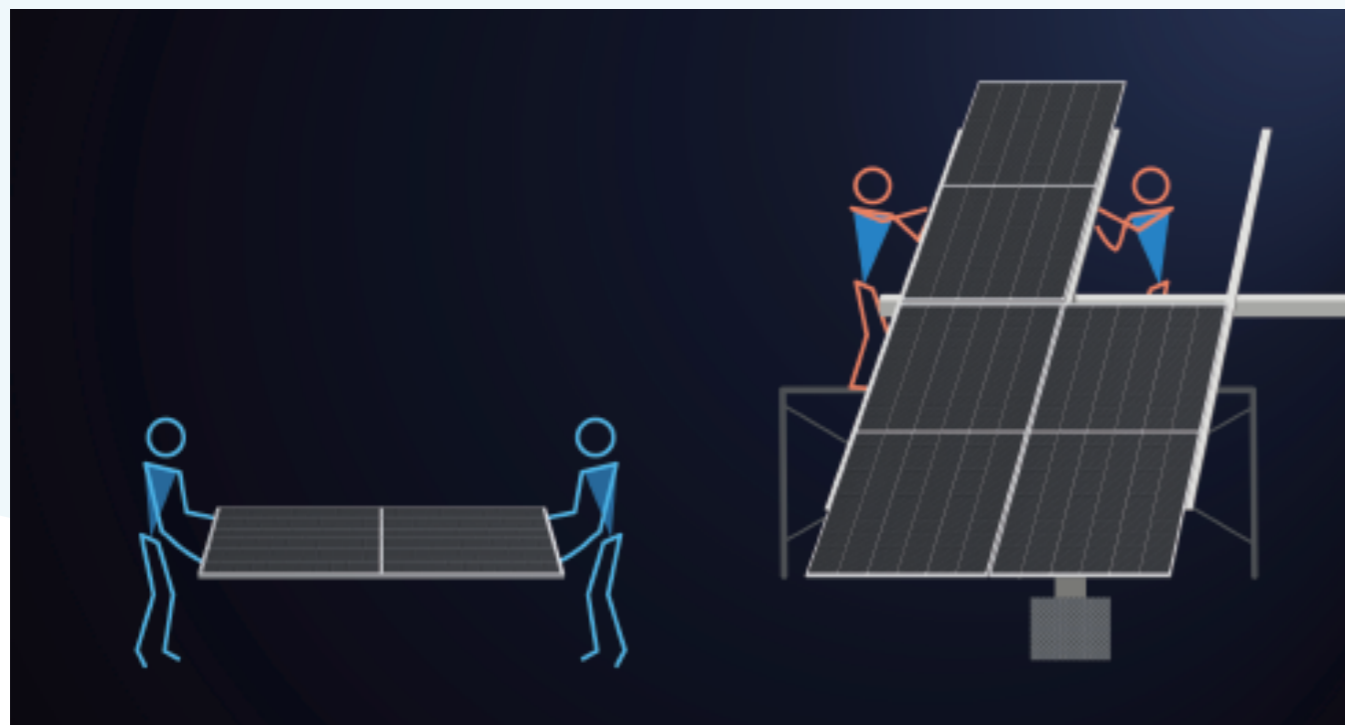


## Easy for unpacking and prevent module from falling down



## Manual handling

4 crews/group, same staffing as traditional installation



**-24%**

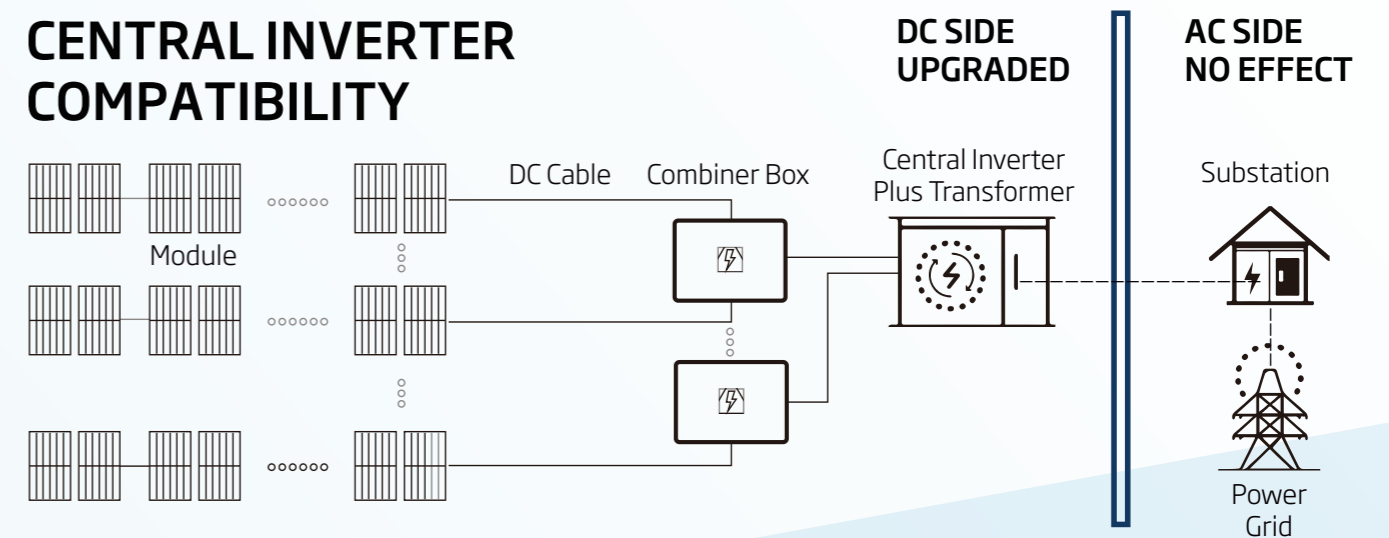
Module installation Quantity

**Installation cost reduction 5-7%**

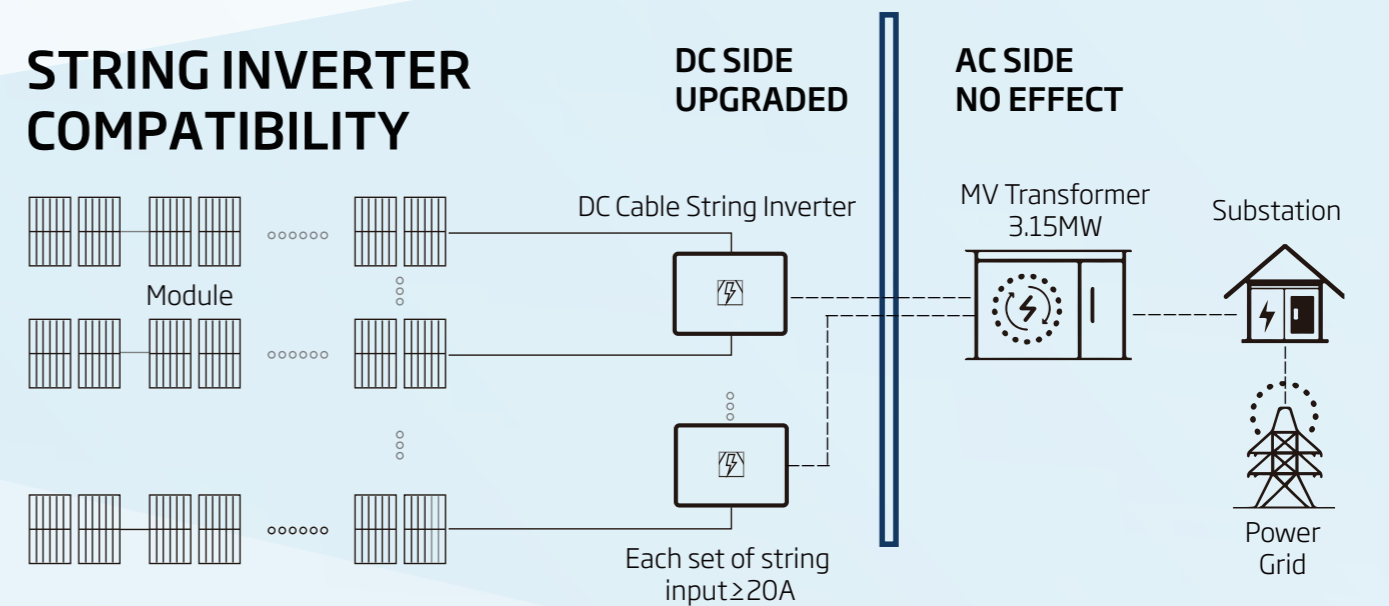
## ECOSYSTEM IS COMPLETELY IN PLACE

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**      **Tracker**

*Static loading +5400Pa/-2400Pa*      *Static loading +3600Pa/-2400Pa*      *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.

## SCHEMA TECNICA INVERTER 200 KW

# SUN2000-215KTL-H3

## Smart String Inverter



100A  
Per MPPT



99.0%  
Max. Efficiency



String-Smart  
Switch



Smart I-V Curve  
Diagnosis Supported



MBUS  
Supported



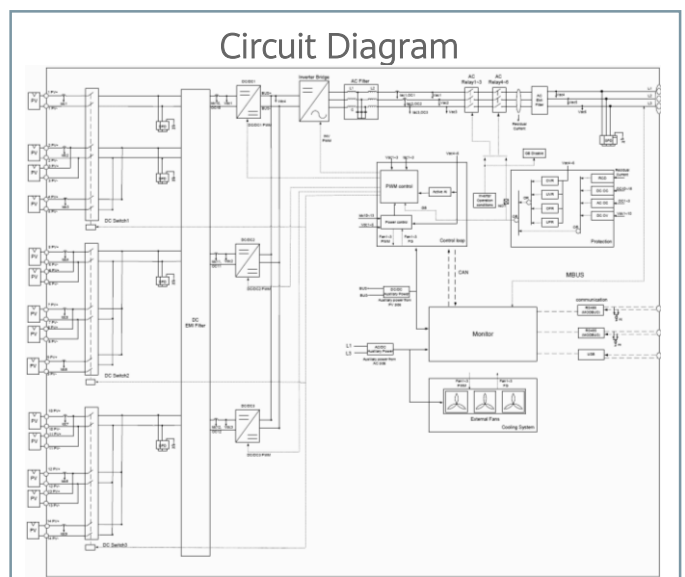
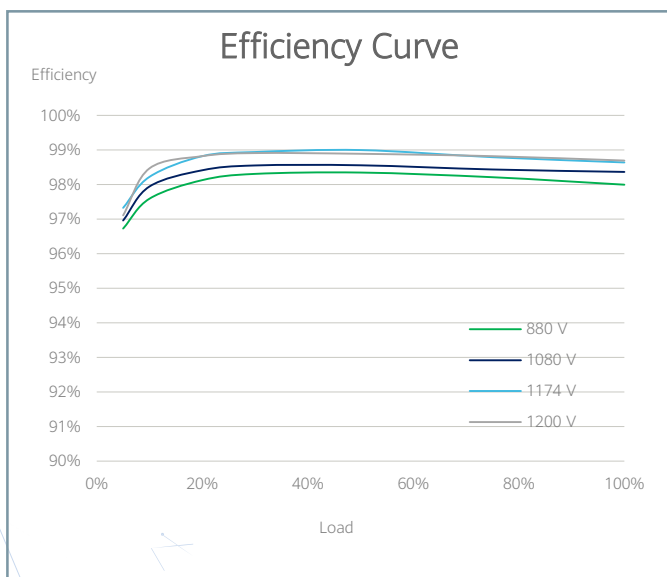
Fuse Free  
Design



Surge Arresters for  
DC & AC



IP66  
Protection



# Technical Specifications

Efficiency	
Max. Efficiency	≥99.0%
European Efficiency	≥98.6%
Input	
Max. Input Voltage	1,500 V
Number of MPP Trackers	3
Max. Current per MPPT	100A/100A/100A
Max. PV Inputs per MPPT	4/5/5
Start Voltage	550 V
MPPT Operating Voltage Range	500 V ~ 1,500 V
Nominal Input Voltage	1,080 V
Output	
Nominal AC Active Power	200,000 W
Nominal Output Voltage	800 V, 3W + PE
Rated AC Grid Frequency	50 Hz / 60 Hz
Nominal Output Current	144.4 A
Adjustable Power Factor Range	0.8 LG ... 0.8 LD
Max. Total Harmonic Distortion	< 1%
Protection	
Input-side Disconnection Device	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
PV-array String Fault Monitoring	Yes
DC Surge Arrester	Type II
AC Surge Arrester	Type II
DC Insulation Resistance Detection	Yes
Residual Current Monitoring Unit	Yes
Communication	
Display	LED Indicators, WLAN + APP
USB	Yes
MBUS	Yes
RS485	Yes
General	
Dimensions (W x H x D)	1,035 x 700 x 365 mm (40.7 x 27.6 x 14.4 inch)
Weight (with mounting plate)	≤86 kg (191.8 lb.)
Operating Temperature Range	-25°C ~ 60°C (-13°F ~ 140°F)
Cooling Method	Smart Air Cooling
Max. Operating Altitude without Derating	4,000 m (13,123 ft.)
Relative Humidity	0 ~ 100%
DC Connector	Staubli MC4 EVO2
AC Connector	Waterproof Connector + OT/DT Terminal
Protection Degree	IP66
Topology	Transformerless

## SCHEDA TECNICA CAVI MT

# ARE4H5EX COMPACT



Elica visibile 12/20 kV e 18/30 kV  
Triplex 12/20 kV and 18/30 kV

**Norma di riferimento**  
HD 620/IEC 60502-2

### Descrizione del cavo

#### Anima

Conduttore a corda rotonda compatta di alluminio

#### Semiconduttivo interno

Mescola estrusa

#### Isolante

Mescola di polietilene reticolato (qualità DIX 8)

#### Semiconduttivo esterno

Mescola estrusa

#### Rivestimento protettivo

Nastro semiconduttore igroespandente

#### Schermatura

Nastro di alluminio avvolto a cilindro longitudinale (Rmax 3Ω/Km)

#### Guaina

Polietilene: colore rosso (qualità DMP 2)

#### Marcatura

PRYSMIAN (\*\*) ARE4H5EX <tensione> <sezione>  
<fase 1/2/3> <anno>

(\*\*) sigla sito produttivo

Marcatura in rilievo ogni metro  
Marcatura metrica ad inchiostro

### Applicazioni

Il cavo rispetta le prescrizioni della norma HD 620 per quanto riguarda l'isolante; per tutte le altre caratteristiche rispetta le prescrizioni della IEC 60502-2.

### Accessori idonei

#### Terminali

ELTI-1C (pag. 115), ELTO-1C (pag. 118), FMCS 250 (pag. 128), FMCE (pag. 130), FMCTS-400 (pag. 132), FMCTXs-630/C (pag. 136)

#### Giunti

ECOSPEED™ (pag. 140)

**Standard**  
HD 620/IEC 60502-2

### Cable design

#### Core

Compact stranded aluminium conductor

#### Inner semi-conducting layer

Extruded compound

#### Insulation

Cross-linked polyethylene compound (type DIX 8)

#### Outer semi-conducting layer

Extruded compound

#### Protective layer

Semiconductive watertight tape

#### Screen

Aluminium tape longitudinally applied (Rmax 3Ω/Km)

#### Sheath

Polyethylene: red colour (DMP 2 type)

#### Marking

PRYSMIAN (\*\*) ARE4H5EX <rated voltage> <cross-section>  
<phase 1/2/3> <year>

(\*\*) production site label

Embossed marking each meter  
Ink-jet meter marking

### Applications

According to the HD 620 standard for insulation, and the IEC 60502-2 for the other characteristics.

### Suitable accessories

#### Terminations

ELTI-1C (pag. 115), ELTO-1C (pag. 118), FMCS 250 (pag. 128), FMCE (pag. 130), FMCTS-400 (pag. 132), FMCTXs-630/C (pag. 136)

#### Joints

ECOSPEED™ (pag. 140)

TEMPERATURA FUNZIONAMENTO / OPERATING TEMPERATURE	TEMPERATURA CORTOCIRCUITO / SHORT-CIRCUIT TEMPERATURE	RIGIDO / RIGID

## Condizioni di posa / Laying conditions

TEMPERATURA MIN. DI POSA -25 °C / MINIMUM INSTALLATION TEMPERATURE -25 °C	CANALE INTERRATO / BURIED TROUGH	TUBO INTERRATO / BURIED DUCT	ARIA LIBERA / OPEN AIR	INTERRATO CON PROTEZIONE / BURIED WITH PROTECTION



## ARE4H5EX COMPACT

Elica visibile 12/20 kV e 18/30 kV  
*Triplex 12/20 kV and 18/30 kV*

### Conduttore di alluminio / *Aluminium conductor - ARE4H5EX*

sezione nominale	diametro conduttore	diametro sull'isolante	diametro esterno nominale	massa indicativa del cavo	raggio minimo di curvatura
<i>conductor cross-section</i>	<i>conductor diameter</i>	<i>diameter over insulation</i>	<i>nominal outer diameter</i>	<i>approximate weight</i>	<i>minimum bending radius</i>
(mm <sup>2</sup> )	(mm)	(mm)	(mm)	(kg/km)	(mm)

sezione nominale	portata di corrente in aria	posa interrata a trifoglio p=1 °C m/W	posa interrata a trifoglio p=2 °C m/W
<i>conductor cross-section</i>	<i>open air installation</i>	<i>underground installation trefoil</i>	
(mm <sup>2</sup> )	(A)	(A)	(A)

#### Dati costruttivi / *Construction charact. - 12/20 kV*

50	8,2	19,9	28	1730	550
70	9,7	20,8	29	1940	570
95	11,4	22,1	30	2230	590
120	12,9	23,2	32	2510	630
150	14,0	24,3	33	2800	660
185	15,8	26,1	35	3260	700
240	18,2	28,5	37	3930	740
300	20,8	31,7	42	4730	820

#### Caratt. elettriche / *Electrical charact. - 12/20 kV*

50	186	175	134
70	230	214	164
95	280	256	197
120	323	291	223
150	365	325	250
185	421	368	283
240	500	427	328
300	578	483	371

#### Dati costruttivi / *Construction charact. - 18/30 kV*

50	8,2	25,5	34	2480	680
70	9,7	25,6	34	2600	680
95	11,4	26,5	35	2860	700
120	12,9	27,4	36	3120	720
150	14,0	28,1	37	3390	740
185	15,8	29,5	38	3790	760
240	18,2	31,5	42	4440	820
300	20,8	34,7	45	5240	890

#### Caratt. elettriche / *Electrical charact. - 18/30 kV*

50	190	175	134
70	235	213	164
95	285	255	196
120	328	291	223
150	370	324	249
185	425	368	283
240	503	426	327
300	581	480	369