

ANEXOS

A1 – PVSYST

Sistema Conectado a la Red: Parámetros de la simulación

Proyecto :SON REUS FV

Lugar geográfico

Palma De Mallorca

País

Espana

Ubicación

Latitud

39.55° N

Longitud

2.73° E

Hora definido como

Hora Legal

Huso hor. UT+1

Altitud

8 m

Albedo

0.20

Datos climatológicos:

Palma De Mallorca

MeteoNorm 7.2 station - Síntesis

Variante de simulación :SON REUS 1

Fecha de simulación

07/02/19 9h09

Parámetros de la simulación

Tipo de sistema

Sheds, single array

Orientación Plano Receptor

Inclinación

30°

Acimut

0°

Sheds configuration

N° de ramas

10

Single array

Sheds spacing

8.63 m

Ancho receptor

5.93 m

Banda inactiva

Arriba

0.02 m

Abajo

0.02 m

Ángulo límite de sombreado

Limit profile angle

40.5°

Factor de ocupación (GCR)

68.7 %

Modelos empleados

Transposición

Meteonorm

Difuso

Meteonorm

Perfil obstáculos

Sin perfil de obstáculos

Sombras cercanas

Detailed electrical calculation

(acc. to module layout)

Características generador FV

Módulo FV

Si-poly

Modelo

JINKO - 370P 1500V

Custom parameters definition

Fabricante

JINKO SOLAR

Número de módulos FV

En serie

30 módulos

En paralelo

120 cadenas

N° total de módulos FV

N° módulos

3150

Pnom unitaria

370 Wp

Potencia global generador

Nominal (STC)

1165,5 kWp

En cond. funciona.

1067 kWp (50°C)

Caract. funcionamiento del generador (50°C)

V mpp

1078 V

I mpp

1040 A

Superficie total

Superficie módulos

6112 m²

Superf. célula

5570 m²

Inversor

Modelo

SUNWAY TG900 1500V TE 640 OD

Custom parameters definition

Fabricante

Santerno

Características

Tensión Funciona.

910-1500 V

Pnom unitaria

998 kWac

Banco de inversores

N° de inversores

1 unidades

Potencia total

998 kWac

Relación Pnom

1.17

Factores de pérdida Generador FV

Factor de pérdidas térmicas

Uc (const)

20.0 W/m²K

Uv (viento)

0.0 W/m²K / m/s

Pérdida Óhmica en el Cableado

Res. global generador

17 mOhm

Fracción de Pérdidas

1.5 % en STC

Pérdida Calidad Módulo

Fracción de Pérdidas

-0.4 %

Pérdidas Mismatch Módulos

Fracción de Pérdidas

1.0 % en MPP

Strings Mismatch loss

Fracción de Pérdidas

0.10 %

Efecto de incidencia, perfil definido por el usuario (IAM): User defined IAM profile

10°	20°	30°	40°	50°	60°	70°	80°	90°
0.998	0.998	0.995	0.992	0.986	0.970	0.917	0.763	0.000

Necesidades de los usuarios :Carga ilimitada (red)

Sistema Conectado a la Red: Definición del sombreado cercano

Proyecto : SON REUS FV

Variante de simulación : SONREUS1

Parámetros principales del sistema	Tipo de sistema	Sheds, single array		
Sombras cercanas	Detailed electrical calculation	(acc. to module layout)		
Orientación Campos FV	inclinación	30°	acimut	0°
Módulos FV	Modelo	JINKO - 370P 1500V	Pnom	370 Wp
Generador FV	N° de módulos	3150	Pnom total	1165 kWp
Inversor	SUNWAY TG900 1500V TE 640	OD	Pnom	998 kW ac
Necesidades de los usuarios	Carga ilimitada (red)			

Perspectiva del campo FV y situación del sombreado cercano

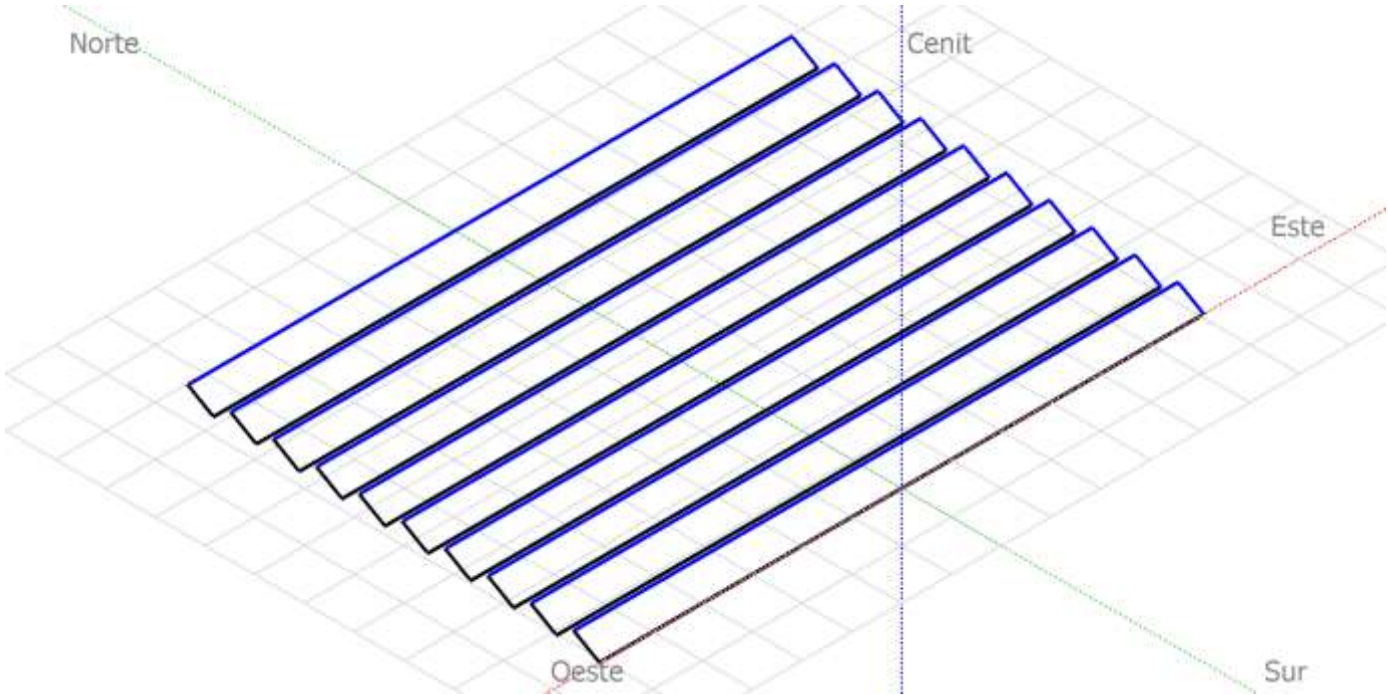
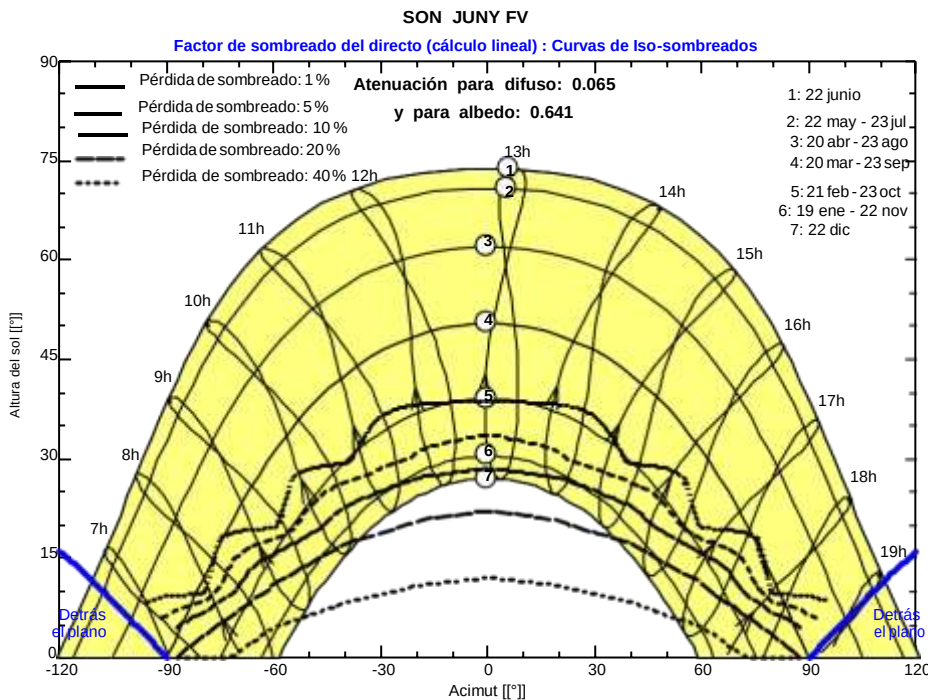


Diagrama de Iso-sombrados



Sistema Conectado a la Red: Resultados principales

Proyecto : SON REUS FV

Variante de simulación : SONREUS1

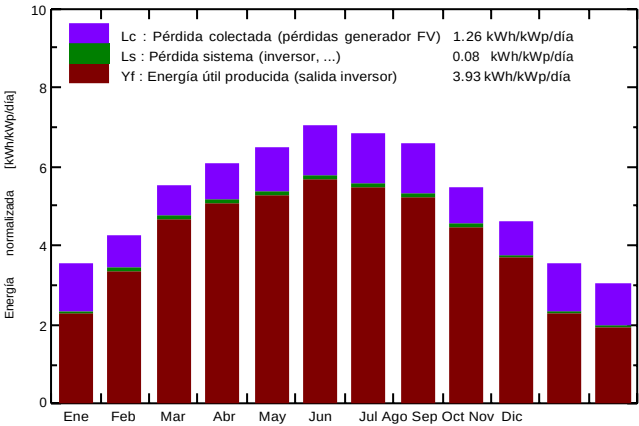
Parámetros principales del sistema	Tipo de sistema	Sheds, single array		
Sombras cercanas	Detailed electrical calculation	(acc. to module layout)		
Orientación Campos FV	inclinación	30°	acimut	0°
Módulos FV	Modelo	JINKO - 370P 1500V	Pnom	370 Wp
Generador FV	N° de módulos	3150	Pnom total	1165 kWp
Inversor	SUNWAY TG900 1500V TE 640 OD		Pnom	998 kW ac
Necesidades de los usuarios	Carga ilimitada (red)			

Resultados principales de la simulación

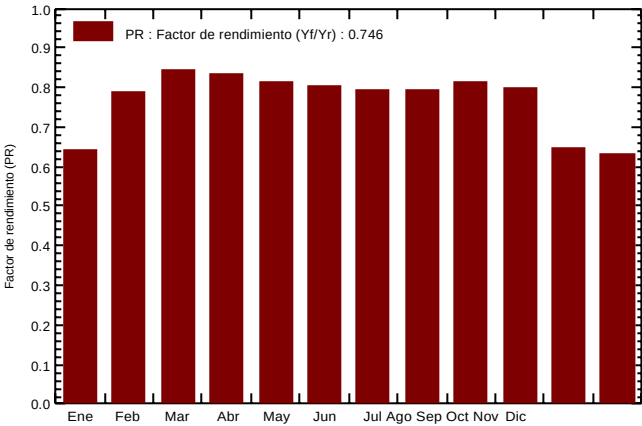
Producción del Sistema **Energía producida 1755 MWh/año** Produc. específico 1434 kWh/kWp/año

Factor de rendimiento (PR) 74.57%

Producciones normalizadas (por kWp instalado): Potencia nominal 1165,5 kWp



Factor de rendimiento (PR)



SONREUS1

Balances y resultados principales

	GlobHor	DiffHor	T Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	MWh	MWh	
Enero	70.1	29.80	10.30	111.0	97.4	89.4	87.6	0.645
Febrero	85.1	38.20	10.10	119.5	111.9	118.0	115.8	0.792
Marzo	137.1	51.50	12.50	171.5	163.4	180.7	177.3	0.845
Abril	166.8	67.70	14.90	182.2	172.2	189.5	186.0	0.834
Mayo	202.8	77.80	18.80	200.4	189.4	204.5	200.6	0.818
Junio	223.1	74.50	22.80	211.4	200.1	212.5	208.6	0.806
Julio	219.4	77.20	25.60	212.6	201.1	211.2	207.3	0.797
Agosto	193.4	74.90	25.60	204.1	193.1	202.8	199.0	0.796
Septiembre	139.6	58.60	21.70	164.8	156.2	168.0	164.9	0.817
Octubre	107.1	47.80	19.00	142.6	134.6	142.7	140.0	0.802
Noviembre	68.3	30.50	13.90	107.0	94.4	86.6	85.0	0.649
Diciembre	56.8	25.40	10.60	95.1	80.5	75.3	73.8	0.634
Año	1669.6	653.90	17.19	1922.3	1735.1	1788.4	1754.6	0.746

Leyendas:

GlobHor

Irradiación global horizontal

DiffHor

Irradiación difusa horizontal

T Amb

Temperatura Ambiente

GlobInc

Global incidente plano receptor

GlobEff

Global efectivo, corr. para IAM y sombreados

EArray

Energía efectiva en la salida del generador

E_Grid

Energía reinyectada en la red

PR

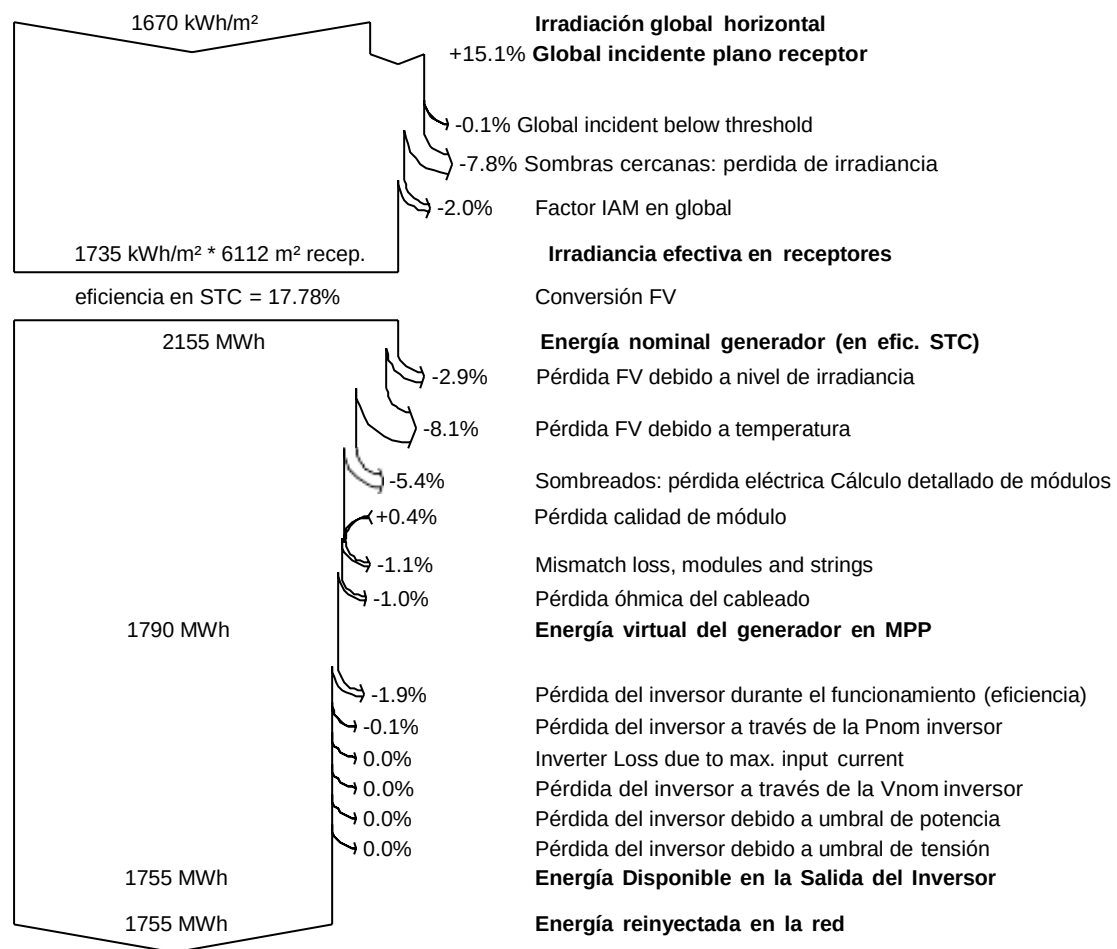
Factor de rendimiento

Sistema Conectado a la Red: Diagrama de pérdidas

Proyecto : SON REUS FV
Variante de simulación : SONREUS1

Parámetros principales del sistema	Tipo de sistema	Sheds, single array
Sombras cercanas	Detailed electrical calculation	(acc. to module layout)
Orientación Campos FV	inclinación	30°
Módulos FV	Modelo	JINKO - 370P 1500V
Generador FV	N° de módulos	3150
Inversor	SUNWAY TG900 1500V TE 640	OD Pnom 998 kW ac
Necesidades de los usuarios	Carga ilimitada (red)	

Diagrama de pérdida durante todo el año



A2 – MATERIALES

U8 Driven System

Structure driven into the ground for solar plants



Monopole structure

Bipole structure

- System developed to achieve **fast and effective construction** of large solar plants.
- Profitable implementation due to the level of **preassembly**.
- **Perfect access** for maintenance and clear the ground.
- High resistance to avoid corrosion due to galvanic treatment according to UNE-EN ISO 1461.
- It is not necessary foundations or civil works.
- Structure with 10-year warranty.

SPECIFICATIONS AND FEATURES:

- _ Installation site:
Ground according to geotechnical analysis
- _ System pitch:
5 to 35°
- _ Solar modules:
All types
- _ Position modules:
Landscape / Portrait
- _ Snow load resistance:
According to calculation
- _ Wind resistance:
According to calculation
- _ Design standards applied:
Eurocode



SYSTEM MATERIALS:

- _ Base support:
STEEL S235/275/355JR
OR ALUMINIUM
- _ Fixing system:
STEEL S235/275/355JR
- _ Solar module fixing screws:
STAINLESS STEEL OR
DACROMET PROTECTION
- _ Treatment:
Galvanic treatment according
to UNE-EN ISO 1461

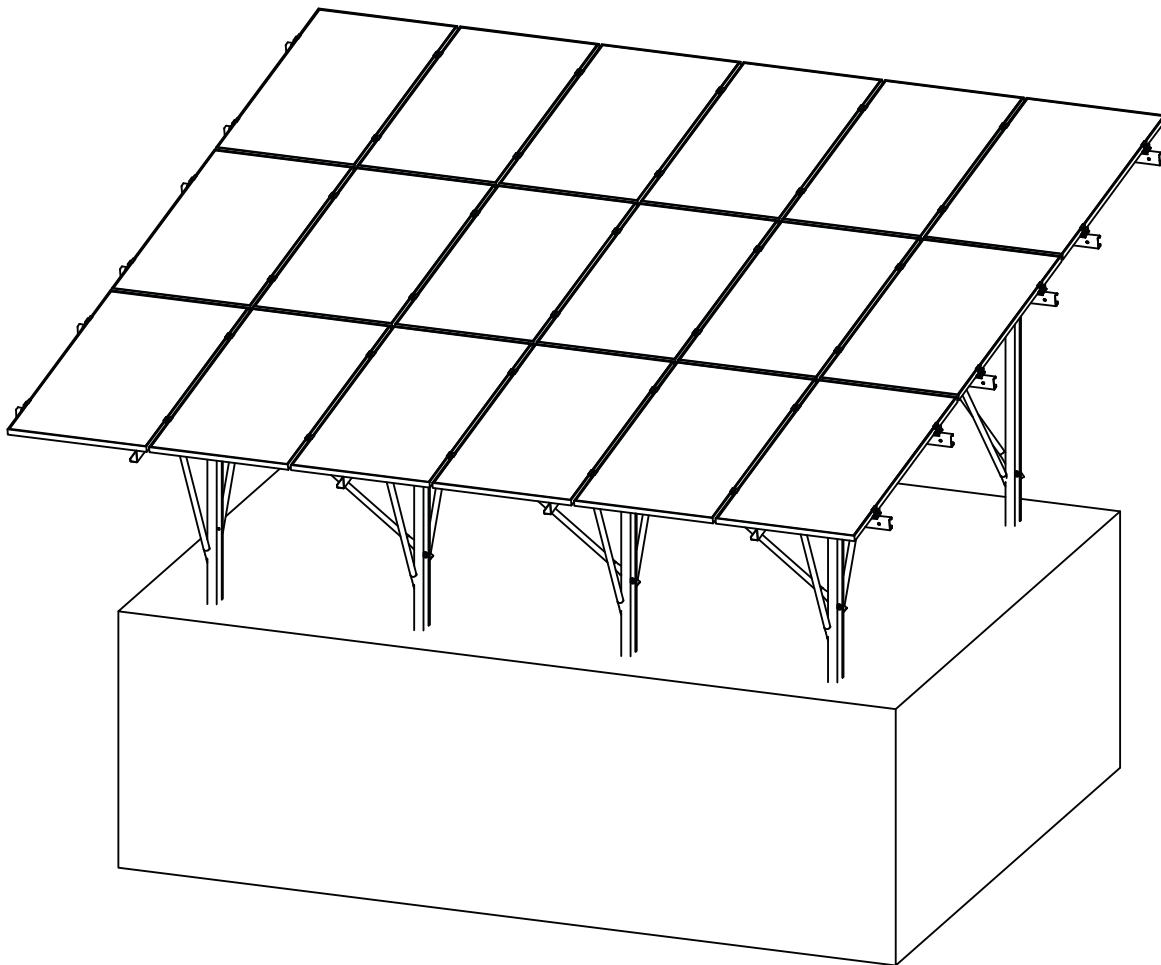
- System designed to satisfy the
current standard E DIN 1055
load hypothesis DIN 1055
part 4 (03/2005)
part 5 (06/2005)
part 100 (03/2001)
Eurocode 1 (06/2002)
DIN 4113, DIN 18800
Eurocode 9 and others, or
standards for specific countries.



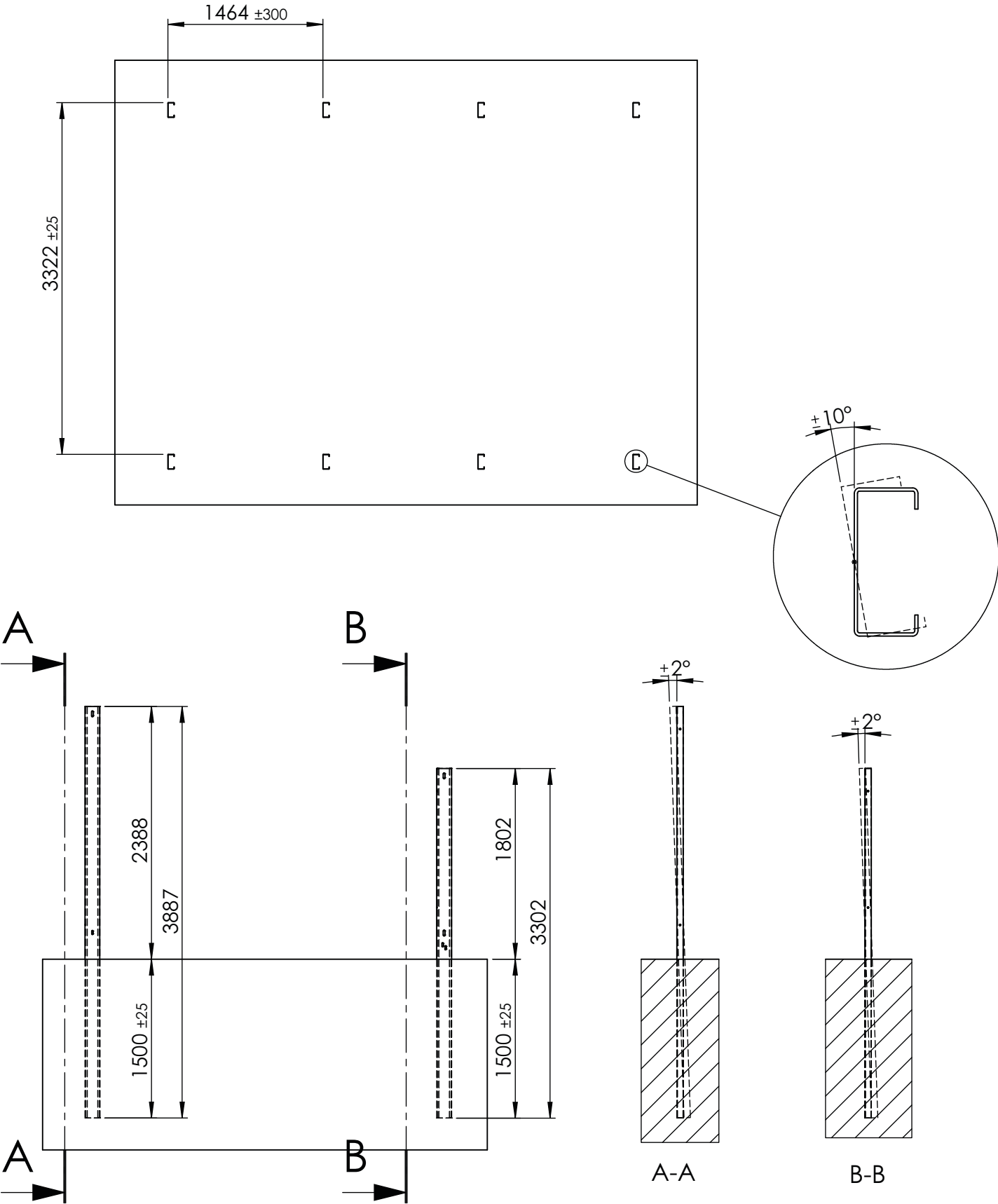
MOUNTING SYSTEM

ASSEMBLY INSTRUCTIONS

3Vx6

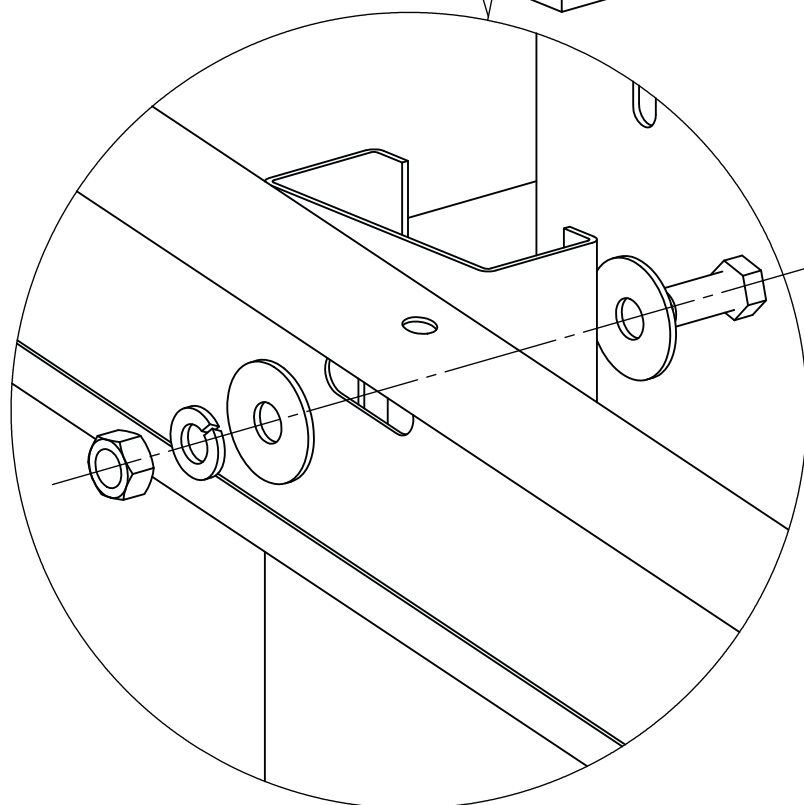
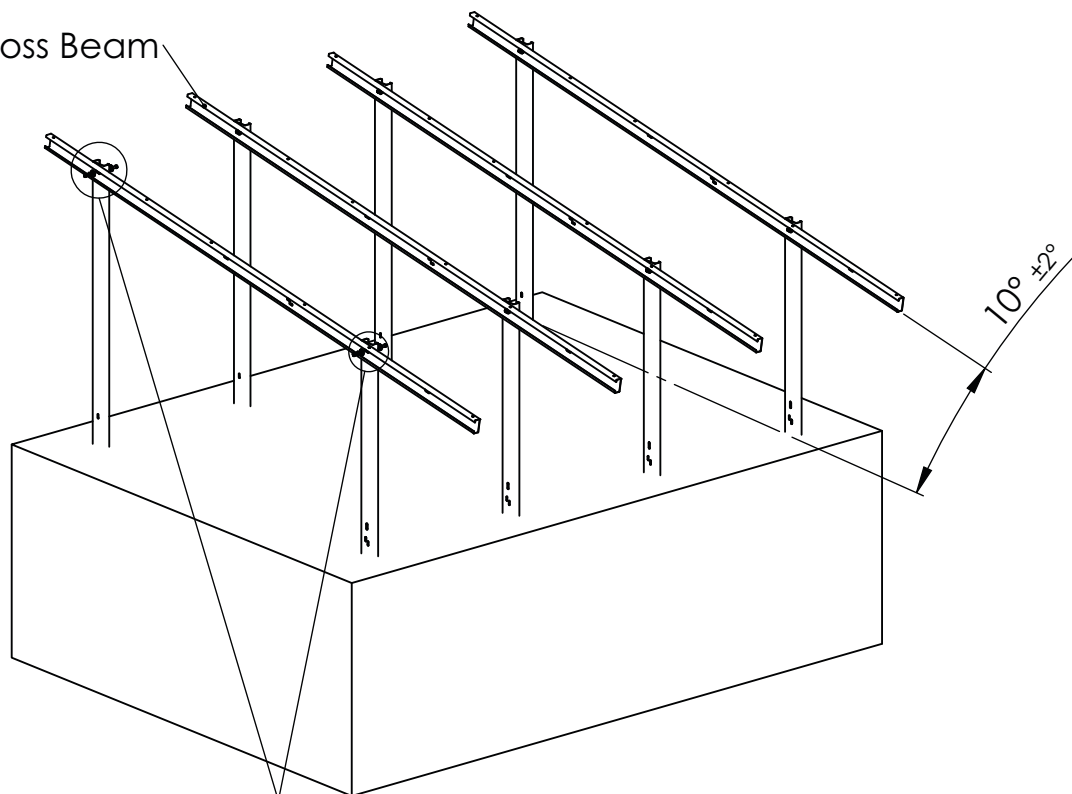


1.- Posts ramming



2.- Cross Beams Assembly

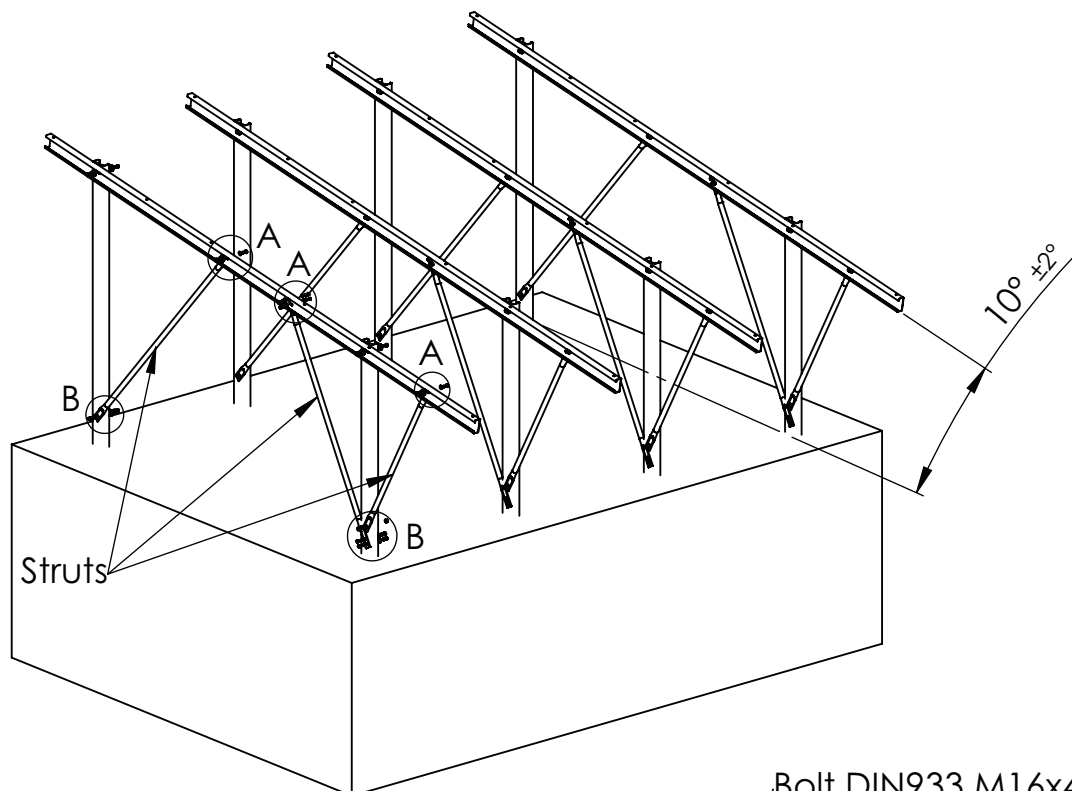
Piece 2 - Cross Beam



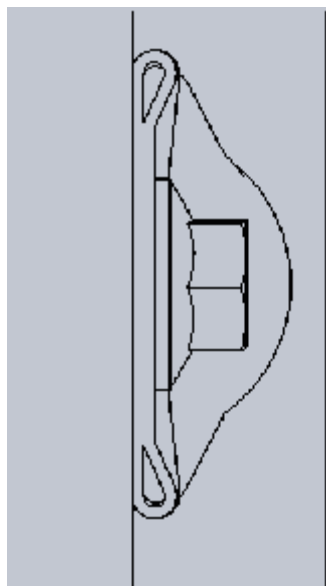
Bolt DIN933 M16x40
Washers DIN9021 M16(x2)
Washers DIN127 M16
Nut DIN934 M16

Tightening torque for M16 8.8 bolts and nuts: $230 \pm 5 \text{ N} \cdot \text{m}$

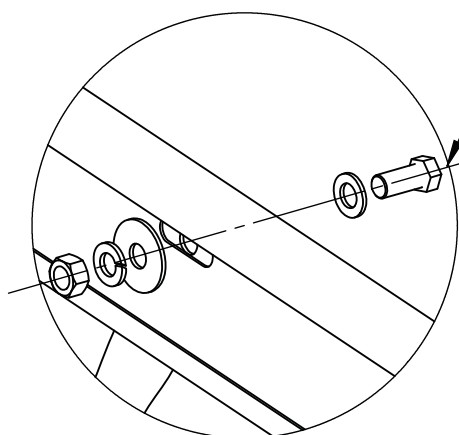
3.- Struts Assembly



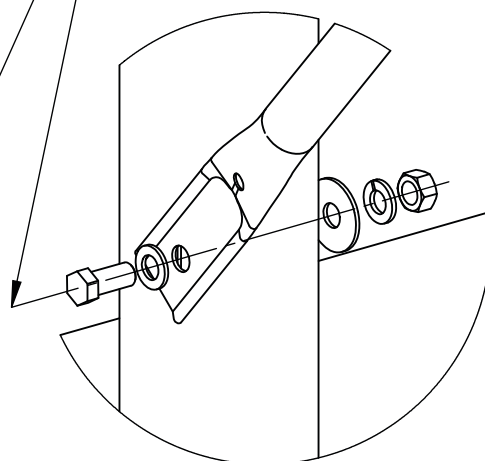
Strut position



Bolt DIN933 M16x40
Washers DIN125 M16
Washers DIN9021 M16
Washers DIN127 M16
Nut DIN934 M16



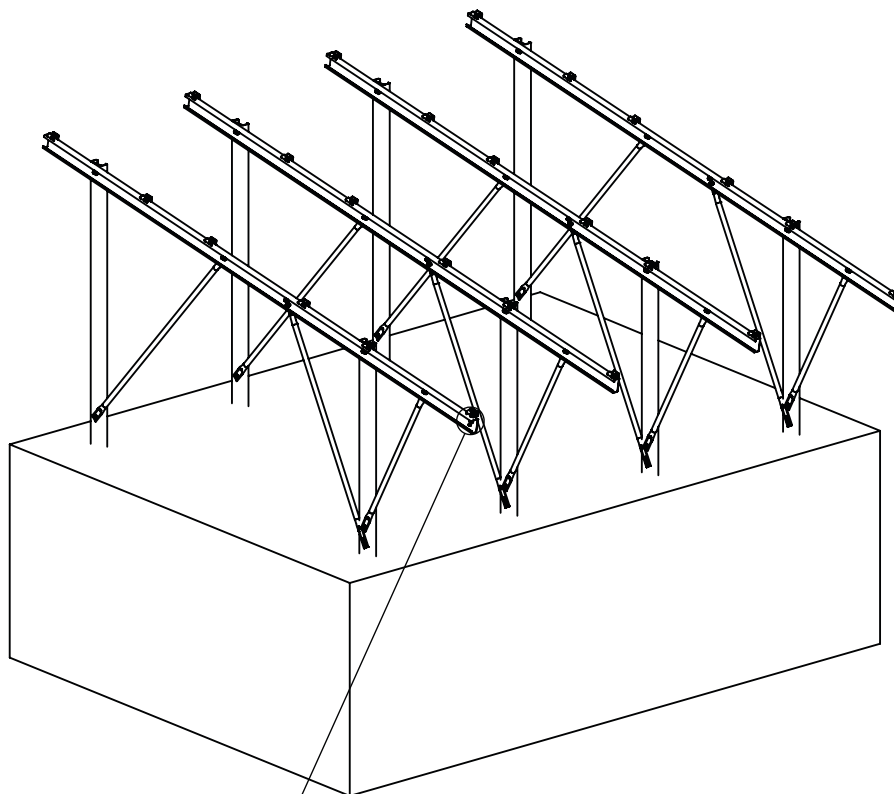
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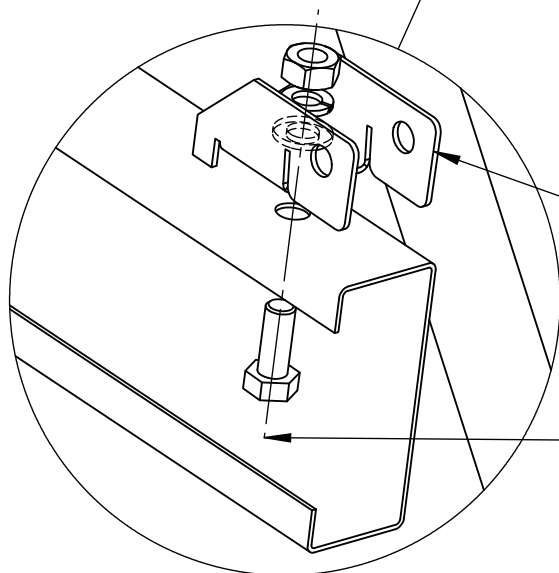
B

Tightening torque for M16 8.8 bolts and nuts: $230 \pm 5 \text{ N} \cdot \text{m}$

4.- Purlin Clamps Assembly



Do not tight the nut in this setp,
just secure the position of the
clamp with the bolt

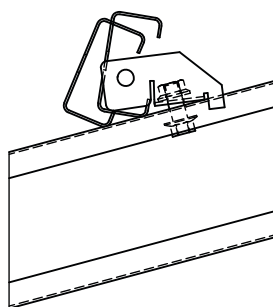
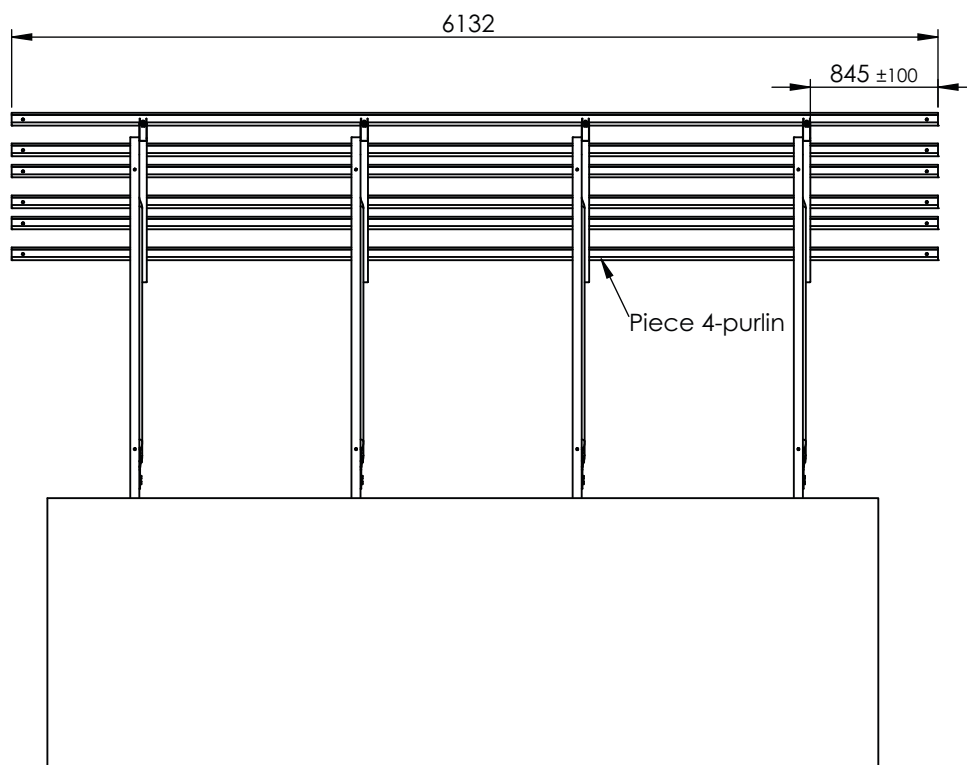


Piece 9 - Purlin clamp

Bolt DIN933 M12x30
Washers DIN125 M12
Washers DIN127 M12
Nut DIN934 M12

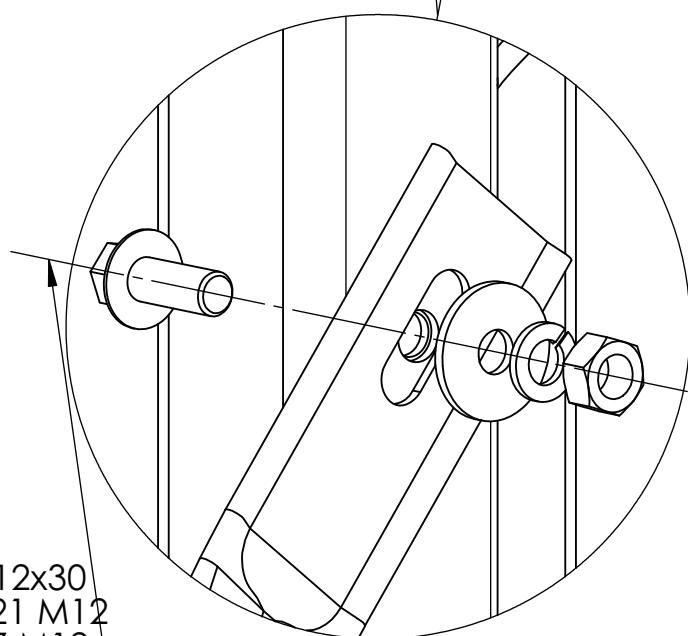
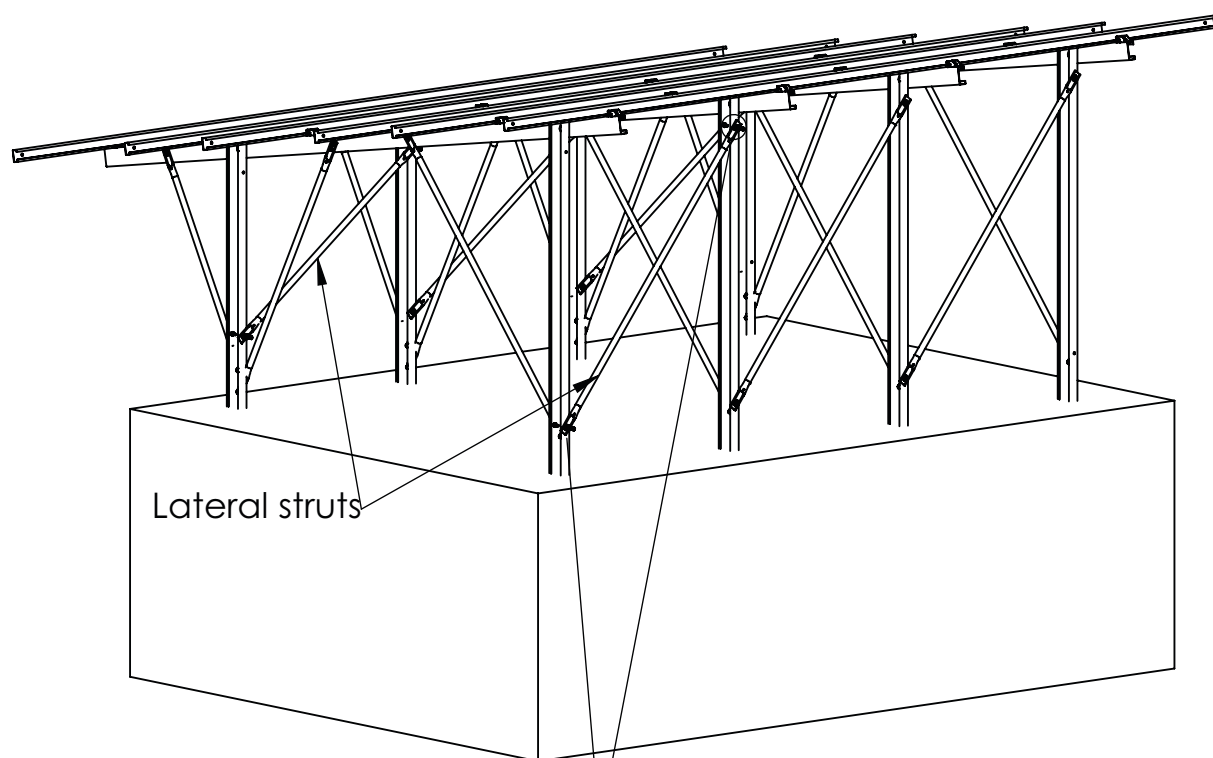
Tightening torque for M12 8.8 bolts and nuts: $92 \pm 5 \text{ N} \cdot \text{m}$

5.- Purlin Assembly



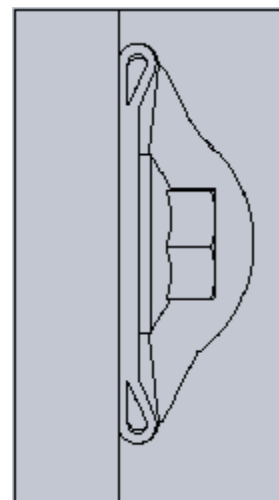
Lift and turn the purlin clamp in order to place the purlin below.

6.- Lateral Strut

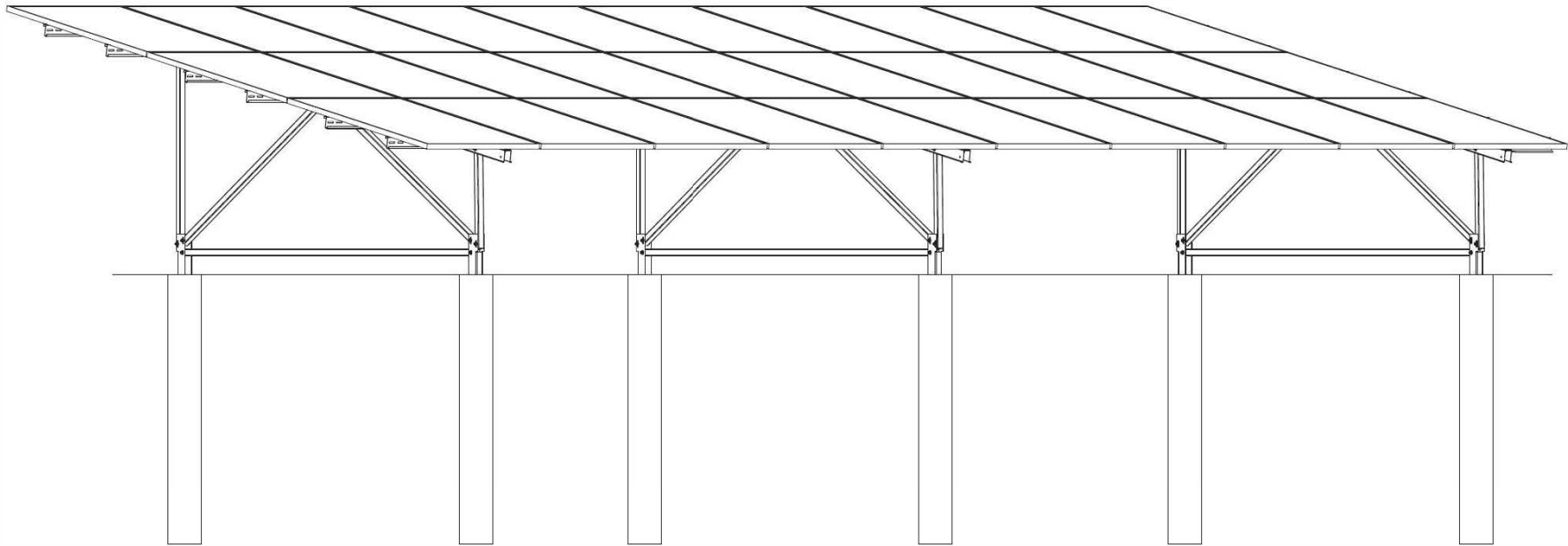
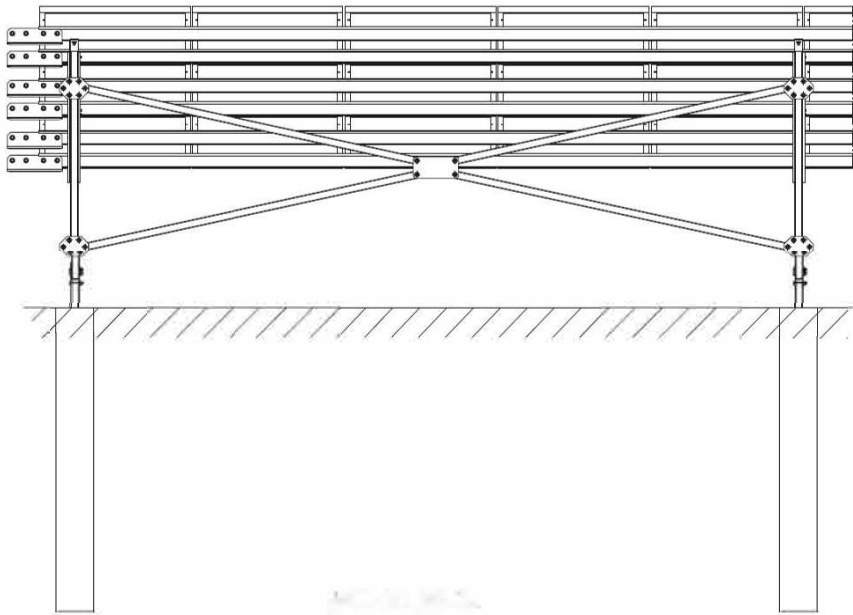
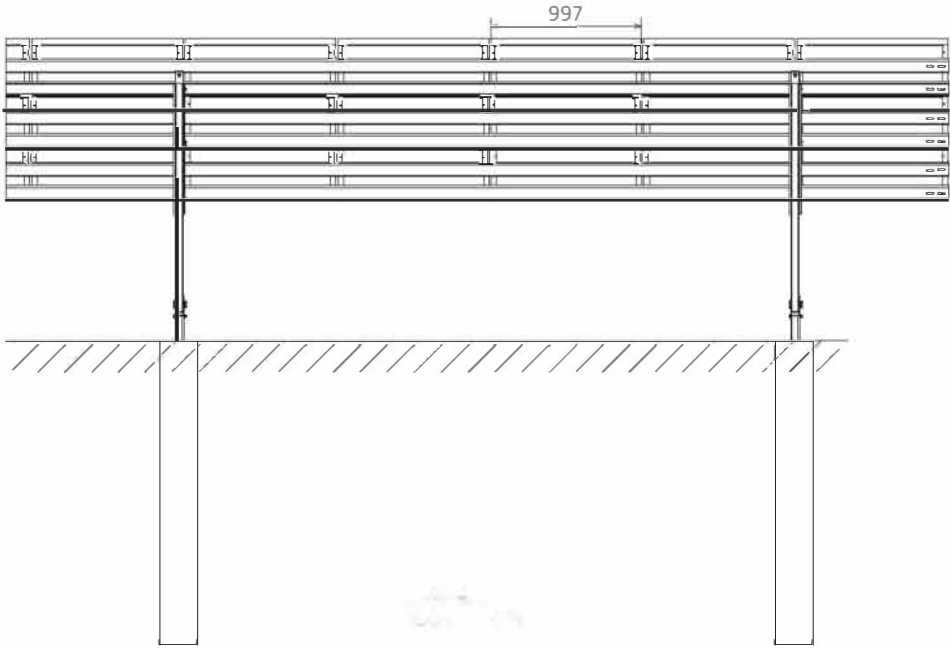
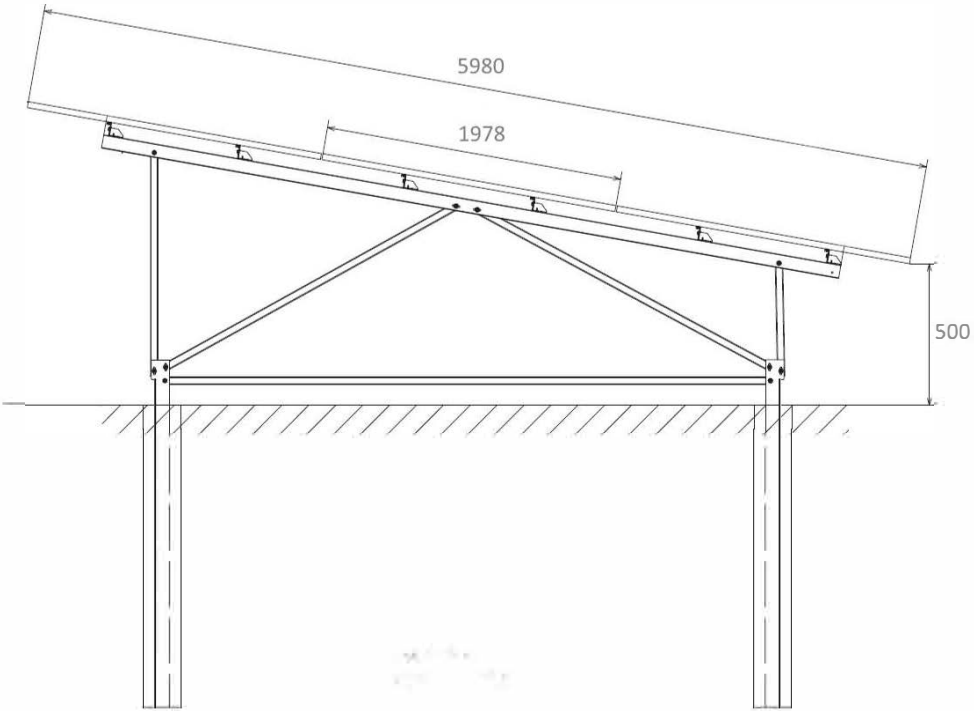


Bolt DIN6921 M12x30
Washers DIN9021 M12
Washers DIN127 M12
Nut DIN6923 M12

Strut position



Tightening torque for M12 8.8 bolts and nuts: $[92 \pm 5] \text{ N} \cdot \text{m}$



PROJECT OWNER: Enel Green Power S.p.A

PROJECT:

PROJECT LOCATION:

DOCUMENT TITLE: DETAILS OF PV MOUNTING STRUCTURE

PROJECT CODE: PROJECT PHASE: SCALE: 1:1000

DOCUMENT CODE: REVISION: 00 NUMBER / SHEET: 1/1

DOCUMENT APPROVALS	REVISION 00	COMMENTS
	REVISION 01	
	REVISION 02	
	REVISION 03	

DESIGNER / ENGINEERING

DOCUMENT VALIDATION

Eagle PERC 72

350-370 Watt

MONO CRYSTALLINE MODULE

Positive power tolerance of 0~+3%

ISO9001:2008、ISO14001:2004、OHSAS18001
certified factory.
IEC61215、IEC61730 certified products.



(5BB)

PERC



KEY FEATURES



System Voltage:

The maximum voltage is promoted to 1500V and the module strings are extended by 50% which reduces the overall system BOS.



5 Busbar Solar Cell:

5 busbar solar cell adopts new technology to improve the efficiency of modules, offers a better aesthetic appearance, making it perfect for rooftop installation.



High Efficiency:

Higher module conversion efficiency (up to 19.08%) benefit from Passivated Emmitter Rear Contact (PERC) technology.



PID RESISTANT:

Eagle modules pass PID test, limited power degradation by PID test is guaranteed for mass production.



Low-light Performance:

Advanced glass and solar cell surface texturing allow for excellent performance in low-light environments.



Severe Weather Resilience:

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

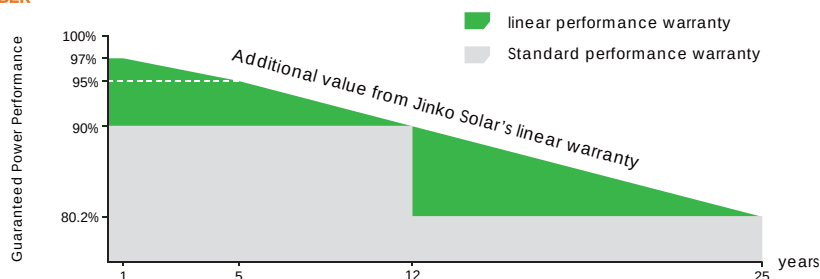


Durability against extreme environmental conditions:

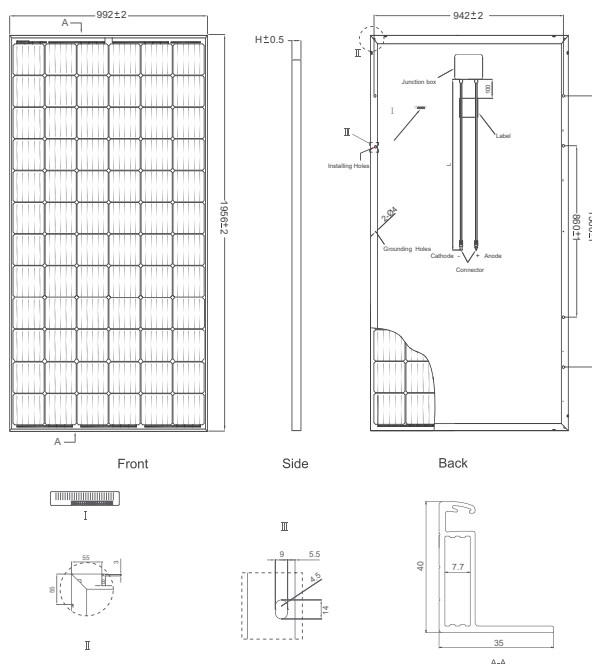
High salt mist and ammonia resistance certified by TUV NORD.

LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 25 Year Linear Power Warranty



Engineering Drawings

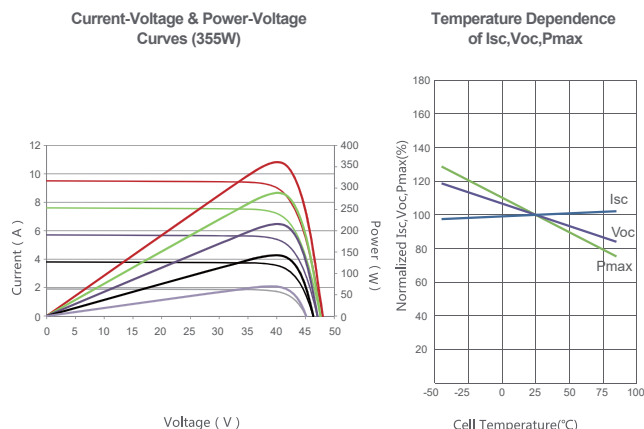


Packaging Configuration

(Two pallets =One stack)

26pcs/pallet , 52pcs/stack, 624 pcs/40'HQ Container

Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	Mono-crystalline PERC	156×156mm (6 inch)
No.of cells	72 (6×12)	
Dimensions	1956×992×40mm (77.01×39.05×1.57 inch)	
Weight	26.5 kg (58.4 lbs)	
Front Glass	4.0mm, High Transmission, Low Iron, Tempered Glass	
Frame	Anodized Aluminium Alloy	
Junction Box	IP67 Rated	
Output Cables	TÜV 1×4.0mm ² Length:900mm or Customized Length	

SPECIFICATIONS

Module Type	JKM350M-72-V		JKM355M-72-V		JKM360M-72-V		JKM365M-72-V		JKM370M-72-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	350Wp	262Wp	355Wp	266Wp	360Wp	270Wp	365Wp	274Wp	370Wp	278Wp
Maximum Power Voltage (Vmp)	39.1V	37.2V	39.3V	37.5V	39.5V	37.7V	39.7V	37.9V	39.9V	38.1V
Maximum Power Current (Imp)	8.94A	7.05A	9.04A	7.09A	9.12A	7.17A	9.20A	7.24A	9.28A	7.30A
Open-circuit Voltage (Voc)	47.5V	46.0V	47.8V	46.2V	48.0V	46.5V	48.2V	46.8V	48.5V	47.0V
Short-circuit Current (Isc)	9.38A	7.46A	9.45A	7.54A	9.51A	7.61A	9.57A	7.68A	9.61A	7.75A
Module Efficiency STC (%)	18.01%		18.31%		18.57%		18.82%		19.08%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1500VDC (IEC)									
Maximum series fuse rating	20A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.40%/°C									
Temperature coefficients of Voc	-0.29%/°C									
Temperature coefficients of Isc	0.048%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

STC: Irradiance 1000W/m²

Cell Temperature 25°C

AM=1.5

NOCT: Irradiance 800W/m²

Ambient Temperature 20°C

AM=1.5

Wind Speed 1m/s

* Power measurement tolerance: ± 3%

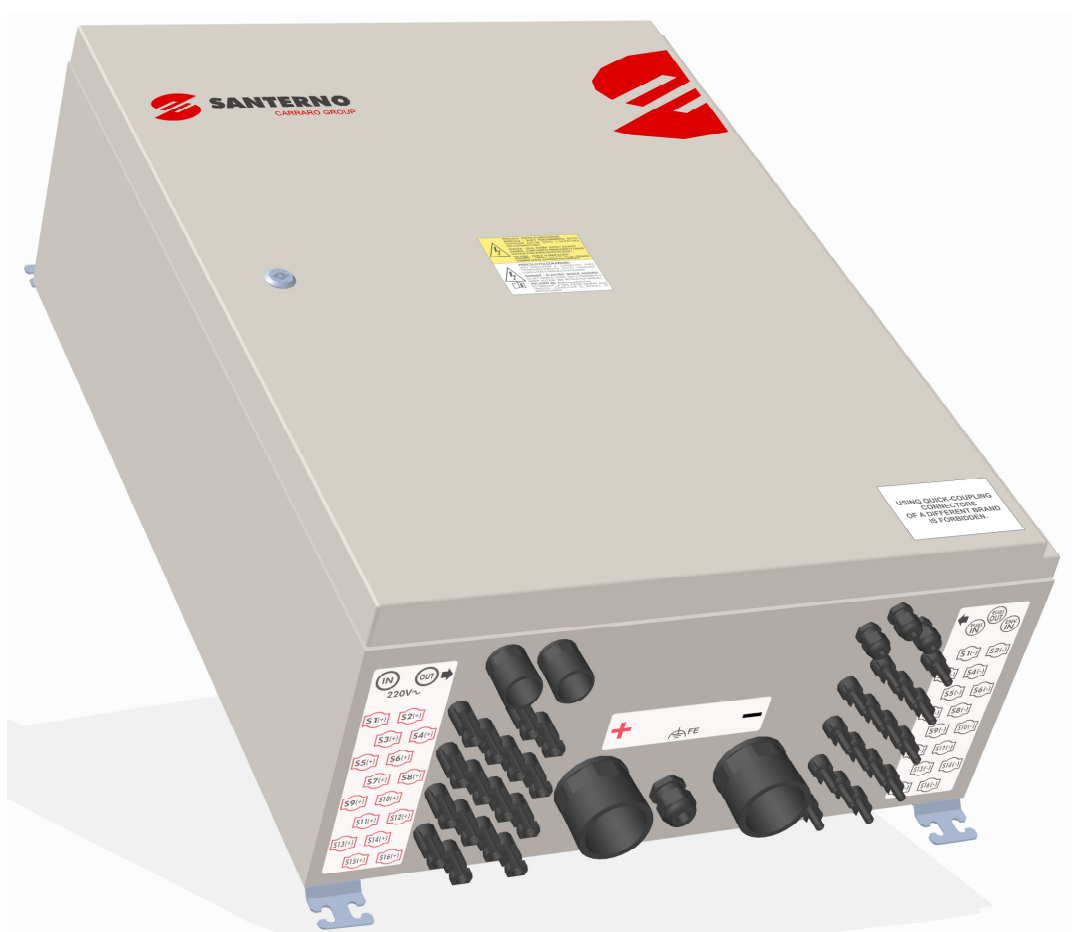
Electronica Santerno S.p.A.
Via Della Concia, 7
40023 Castel Guelfo (Bo) Italia
t +39 0542 489711
f +39 0542 489722
info@santerno.com
santerno.com



SUNWAY STRING BOX LT - 1500 V

16 inputs

Combiner Boxes



Sede Legale
Via Olmo, 37
35011 Campodarsego
(Pd) Italia
t +39 049 9219111
f +39 049 9289111

Cap. Soc. € 2.500.000 i.v.
Codice Fiscale e Partita Iva
03686440284
R.E.A. PD 328951
Cod. Mecc. PD 054138
Cod. Ident. IVA Intracom.
IT03686440284

Electronica Santerno S.p.A.
Società soggetta all'attività
di direzione e coordinamento
di Carraro S.p.A.

The **SUNWAY STRING BOX LT** series are combiner boxes for PV strings designed in Italy by the technicians of Elettronica Santerno S.p.A. They feature the highest reliability, ease of installation and maintainability.

KEY FEATURES

The main integrated standard functions of STRING BOX SB-16-LT03-1500V are:

- Possibility to connect up to 16 strings
- String fuses protection on each pole
- Load break switch
- Signaling contact for load break switch status
- Signaling contact for SPD status
- Polyester flameproof and UV ray-resistant box
- Lockable enclosure
- Degree of protection IP65
- Suitable both for floating and earthed PV configuration
- Thorough manufacturing with first class materials

Technical Data

Sunway String Box LT SB-16-LT03-1500V	
Input Ratings	
Max. number of strings	16
Max. DC voltage (max. Udc)	1500 V
String DC fuses size ⁽¹⁾	8 A up to 30 A
Max. input current per channel (Isc) @45°C	20 A
String cable cross-section	4 ÷ 6 mm ²
String connector type ⁽²⁾	Quick-coupling PV connectors, Amphenol or similar
Output Ratings	
Max. output current (max. OPV) @45°C	160 A
Max. output cable cross-section	1 x 300 mm ²
Max. grounding cable cross-section	35 mm ²
Dimensions and weight	
Dimensions (WxHxD)	915x635x310 mm
Weight	31 kg
Additional features	
Fuse protection	On both poles
Load break switch	Yes
Load break switch status	Clean Contact
Protection against DC overvoltage (SPD)	Yes
SPD status	Clean Contact
Degree of protection	IP65
Lockable enclosure	Yes

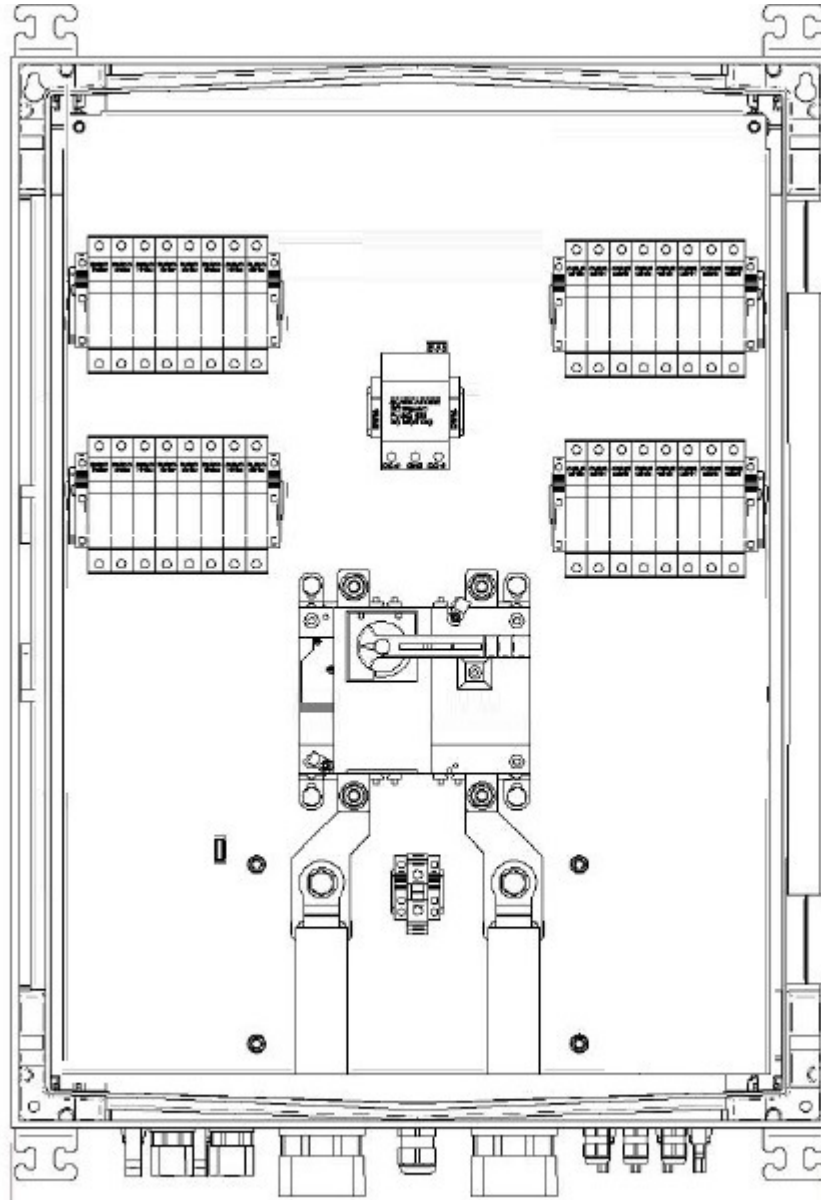
Elettronica Santerno reserves the right to make any technical changes to this document without prior notice.

NOTE

⁽¹⁾ Fuses are not included. Fuse rating to be defined by customer in agreement with PV module manufacturer.

⁽²⁾ Mating connectors (string side) are not included. Always use mating connectors of the same brand as the connectors installed on the string box. The use of other connectors may damage the product.

Layout



SUNWAY TG OUTDOOR series

SUNWAY TG1800 1500V TE - 640 OD SKID

Outdoor Application



Designed for utility scale applications, the **SUNWAY TG** inverters feature best-in-class technology and deliver the highest power density and reliability.

Thanks to its intrinsic flexibility, the **SUNWAY TG** product range allows optimal configuration of medium and large PV plants, at the lowest system costs and with maximum yield.

The **SUNWAY TG** inverters are designed and manufactured in Italy by the technicians and engineers of Elettronica Santerno S.p.A.

BENEFITS

- Very high conversion efficiency with a single power conversion stage, optimized for minimum losses
- Modular construction and cabinet industrialization for maximum reliability and easy access to all components for maintainability and ease of on-site servicing
- Grid Code integrated features (LVRT, Reactive Power Control, Frequency and Voltage control) in compliance with the most advanced European and worldwide standards
- Remote monitoring via Sunway Portal website and REMOTE SUNWAY™ software, both for single- and multi-inverter installations
- Integrated DC-side protection provided by disconnect switch with release coil
- Integrated miswiring protection on DC side
- Integrated AC-side protection with automatic-disconnection on load breaker
- Integrated active monitoring of DC isolation
- Integrated Modbus on RS485 and TCP-IP on Ethernet data connection
- Integrated inputs for environmental sensors
- Compatible with photovoltaic modules requiring one earthed pole (positive or negative pole)
- Made in Italy with first class materials

Main features	
Model	SUNWAY TG1800 1500V TE - 640 OD SKID
MPPT voltage range ⁽¹⁾	940 - 1200 V
Extended MPPT voltage range ⁽¹⁾⁽²⁾	910 - 1500 V
Number of independent MPPTs	2
Static / Dynamic MPPT efficiency	99.8 % / 99.7 %
Maximum open-circuit voltage	1500 V
Rated AC voltage	640 V $\pm$ 20 %
Rated output frequency	50 Hz (up to -3 / +2 Hz)
Power Factor range ⁽³⁾	Circular Capability
Operating temperature range	-10 $\div$ 62 °C
Application / Degree of protection	Outdoor / IP54
Maximum operating altitude ⁽⁴⁾	4000 m

Input ratings (DC)			
Maximum short circuit PV input current	2x1500 A		
PV voltage Ripple	< 1%		
Output ratings (AC)			
	25 °C	45 °C	50 °C
Rated output power	1995 kVA	1774 kVA	1663 kVA
Rated output current	1800 A	1600 A	1500 A
Power threshold	1% of Rated output power		
Total AC current distortion	≤ 3%		
Inverter efficiency			
Maximum / EU / CEC efficiency ^{(1) (5)}	98.7 % / 98.4 % / - %		
Inverter dimensions and weight			
Dimensions (W x H x D)	3220 x 2376 x 1032 mm		
Weight	2930 kg		
Auxiliary consumptions			
Stop mode losses / Night losses	90 W / 90 W		
Auxiliary consumptions	1800 W		

NOTES

⁽¹⁾ @ rated V_{AC} and $\cos \varphi = 1$.

⁽²⁾ With power derating

⁽³⁾ Default range: 1 - 0.95 lead/lag. Settings may be modified upon request.

⁽⁴⁾ Up to 1000 m without derating.

⁽⁵⁾ Auxiliary loads externally supplied

Additional information	
Protection against overvoltage (SPD)	DC Side: Yes - AC Side: No
Maximum value for relative humidity	95% non-condensing
Cooling system / Fresh air consumption	Forced air / 5650 m ³ /h
Thermal protection	Integrated, 5 sensors, both on cabinet and power stack
Environmental sensors	4 embedded inputs
Digital communications channels	2 x RS485 with Modbus + Ethernet with TCP/IP
Noise emission @ 1m / 10m ⁽¹⁾	78 / 58 dBA
Connection phases	3Ø3W
Max DC inputs per pole/ fuse protected ⁽²⁾	16 / 16
DC inputs current monitoring	Yes
DC side disconnection device	DC disconnect switch
AC side disconnection device	AC circuit breaker
Ground fault monitoring, DC side	Yes
Ground fault monitoring, AC side	No
Grid fault monitoring	Yes
Display	Alphanumeric display/keypad
Power modulation	Digital, via RS485 or Ethernet
RAL	RAL 7035
PV plant monitoring	Yes

NOTES

(1) Noise level measured in central and front position.

(2) Fuses to be ordered separately.

Description of Operation

The **SUNWAY TG** are grid connected solar inverters, suitable for connection to LV or MV distribution lines, as well as HV grids.

Advanced grid interface, certified in compliance with the most advanced requirements, ensures reliability and maximum uptime, providing grid support features such as FRT, active power modulation, voltage control. Utility Interactive Features are embedded, software-controlled, completely configurable based on the applicable grid code.

Moreover, the Sunway TG inverters can be integrated in smart grid plants, installed together with off-grid inverters.

Best reliability is ensured by design. All electronics PCBs are coated for best protection against harsh environments. Redundant protection systems and auto-diagnostic functions are also implemented.

Auxiliary power and LVRT are self-supplied. Neither external power nor UPS is needed; however, an external source may be connected, if desired.

Standard Supply

All inverters are supplied with user manuals, technical documents complying with the regulations in force, keys and lifting hooks, special pallets for easy and safe transport.

Main Normative References

The **SUNWAY TG** inverters have been developed, designed and manufactured in accordance with up-to-date requirements of the Low Voltage directives, Electromagnetic Compatibility directives and Grid Connection standards (as per applicable parts).

Standards ⁽¹⁾	
Certification	CE, BDEW , CQC
Immunity	IEC 61000-6-4, IEC 61000-6-2
Harmonics	IEC 61000-3-12
Emissions	IEC 61000-6-3, IEC 61000-6-1
Safety	IEC 62109-1, IEC 62109-2
Grid connection	CEI 0-16, A.70, BDEW, Arrêté du 23 Avril 2008, RD 1699/2011, RD 661/2007, CQC, IEEE 1547

NOTES

(1) Some standards apply to specific models only.

SUNWAY TG OUTDOOR series

SUNWAY TG900 1500V TE - 640 OD SKID M

Outdoor Application



Designed for utility scale applications, the **SUNWAY TG** inverters feature best-in-class technology and deliver the highest power density and reliability.

Thanks to its intrinsic flexibility, the **SUNWAY TG** product range allows optimal configuration of medium and large PV plants, at the lowest system costs and with maximum yield.

The **SUNWAY TG** inverters are designed and manufactured in Italy by the technicians and engineers of Elettronica Santerno S.p.A.

BENEFITS

- Very high conversion efficiency with a single power conversion stage, optimized for minimum losses
- Modular construction and cabinet industrialization for maximum reliability and easy access to all components for maintainability and ease of on-site servicing
- Grid Code integrated features (LVRT, Reactive Power Control, Frequency and Voltage control) in compliance with the most advanced European and worldwide standards
- Remote monitoring via Sunway Portal website and REMOTE SUNWAY™ software, both for single- and multi-inverter installations
- Integrated DC-side protection provided by disconnect switch with release coil
- Integrated miswiring protection on DC side
- Integrated AC-side protection with automatic-disconnection on load breaker
- Integrated active monitoring of DC isolation
- Integrated Modbus on RS485 and TCP-IP on Ethernet data connection
- Integrated inputs for environmental sensors
- Compatible with photovoltaic modules requiring one earthed pole (positive or negative pole)
- Made in Italy with first class materials

Main features	
Model	SUNWAY TG900 1500V TE - 640 OD SKID M
MPPT voltage range ⁽¹⁾	940 - 1200 V
Extended MPPT voltage range ⁽¹⁾⁽²⁾	910 - 1500 V
Number of independent MPPTs	1
Static / Dynamic MPPT efficiency	99.8 % / 99.7 %
Maximum open-circuit voltage	1500 V
Rated AC voltage	640 V $\pm$ 20 %
Rated output frequency	50 Hz (up to -3 / +2 Hz)
Power Factor range ⁽³⁾	Circular Capability
Operating temperature range	-10 $\div$ 62 °C
Application / Degree of protection	Outdoor / IP54
Maximum operating altitude ⁽⁴⁾	4000 m

Input ratings (DC)			
Maximum short circuit PV input current	1500 A		
PV voltage Ripple	< 1%		
Output ratings (AC)			
	25 °C	45 °C	50 °C
Rated output power	998 kVA	887 kVA	831 kVA
Rated output current	900 A	800 A	750 A
Power threshold	1% of Rated output power		
Total AC current distortion	≤ 3%		
Inverter efficiency			
Maximum / EU / CEC efficiency ^{(1) (5)}	98.7 % / 98.4 % / - %		
Inverter dimensions and weight			
Dimensions (W x H x D)	2020 x 2376 x 1032 mm		
Weight	1780 kg		
Auxiliary consumptions			
Stop mode losses / Night losses	45 W / 45 W		
Auxiliary consumptions	1250 W		

NOTES

⁽¹⁾ @ rated V_{AC} and $\cos \varphi = 1$.

⁽²⁾ With power derating

⁽³⁾ Default range: 1 - 0.95 lead/lag. Settings may be modified upon request.

⁽⁴⁾ Up to 1000 m without derating.

⁽⁵⁾ Auxiliary loads externally supplied

Additional information	
Protection against overvoltage (SPD)	DC Side: Yes - AC Side: Yes
Maximum value for relative humidity	95% non-condensing
Cooling system / Fresh air consumption	Forced air / 3100 m ³ /h
Thermal protection	Integrated, 5 sensors, both on cabinet and power stack
Environmental sensors	4 embedded inputs
Digital communications channels	2 x RS485 with Modbus + Ethernet with TCP/IP
Noise emission @ 1m / 10m ⁽¹⁾	78 / 58 dBA
Connection phases	3Ø3W
Max DC inputs per pole/ fuse protected ⁽²⁾	8 / 8
DC inputs current monitoring	Yes
DC side disconnection device	DC disconnect switch
AC side disconnection device	AC circuit breaker
Ground fault monitoring, DC side	Yes
Ground fault monitoring, AC side	Yes
Grid fault monitoring	Yes
Display	Alphanumeric display/keypad
Power modulation	Digital, via RS485 or Ethernet
RAL	RAL 7035
PV plant monitoring	Yes

NOTES

(1) Noise level measured in central and front position.

(2) Fuses to be ordered separately.

Description of Operation

The **SUNWAY TG** are grid connected solar inverters, suitable for connection to LV or MV distribution lines, as well as HV grids.

Advanced grid interface, certified in compliance with the most advanced requirements, ensures reliability and maximum uptime, providing grid support features such as FRT, active power modulation, voltage control. Utility Interactive Features are embedded, software-controlled, completely configurable based on the applicable grid code.

Moreover, the Sunway TG inverters can be integrated in smart grid plants, installed together with off-grid inverters.

Best reliability is ensured by design. All electronics PCBs are coated for best protection against harsh environments. Redundant protection systems and auto-diagnostic functions are also implemented.

Auxiliary power and LVRT are self-supplied. Neither external power nor UPS is needed; however, an external source may be connected, if desired.

Standard Supply

All inverters are supplied with user manuals, technical documents complying with the regulations in force, keys and lifting hooks, special pallets for easy and safe transport.

Main Normative References

The **SUNWAY TG** inverters have been developed, designed and manufactured in accordance with up-to-date requirements of the Low Voltage directives, Electromagnetic Compatibility directives and Grid Connection standards (as per applicable parts).

Standards ⁽¹⁾	
Certification	CE, BDEW , CQC
Immunity	IEC 61000-6-4, IEC 61000-6-2
Harmonics	IEC 61000-3-12
Emissions	IEC 61000-6-3, IEC 61000-6-1
Safety	IEC 62109-1, IEC 62109-2
Grid connection	CEI 0-16, A.70, BDEW, Arrêté du 23 Avril 2008, RD 1699/2011, RD 661/2007, CQC, IEEE 1547

NOTES

(1) Some standards apply to specific models only.

PLANOS

RELACION DE PLANOS

- 01.- Situación y emplazamiento.
- 02.- Topográfico. Situación actual.
- 03.- Propuesta implantación.
- 04.- Esquema distribución interior a 15 kV.
- 05.1.- Esquema unifilar. Generador 1.165,5 kWp – 998 kW.
- 05.2.- Esquema unifilar. Generador 2.331 kWp – 1.995 kW.
- 06.- Esquema cajas conexión y protección nivel 1.
- 07.- Propuesta interconexión de 7 CTs a CMM.
- 08.- Instalación interior.
- 09.- Cerramientos.
- 10.- Propuesta interconexión red privada a 15 kV de CMM a SE Veles.
- 11.- Detalles CMM.
- 12.- Detalle caseta control.
- 13.- Detalles estructura.
- 14.- Detalle Skids.
- 15.- Detalle cabinas 15 kV.
- 16.- Perfiles.