



25kWp System

Vastern Road - Block BC

O453-ENV23-B0B-RF-TS-W-675-0003

Technical Submission Document



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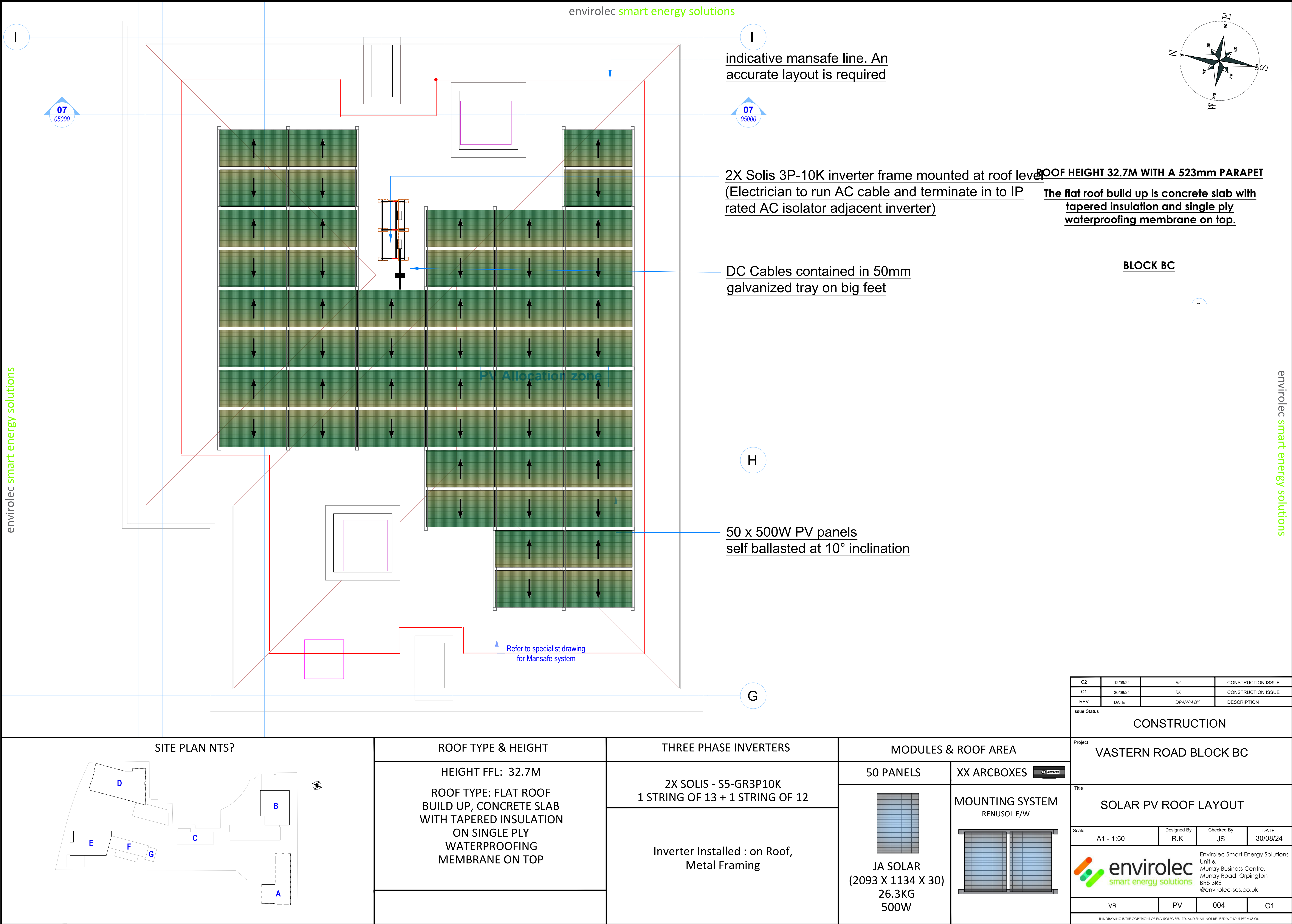
Section 7

System Inverter Data Sheet

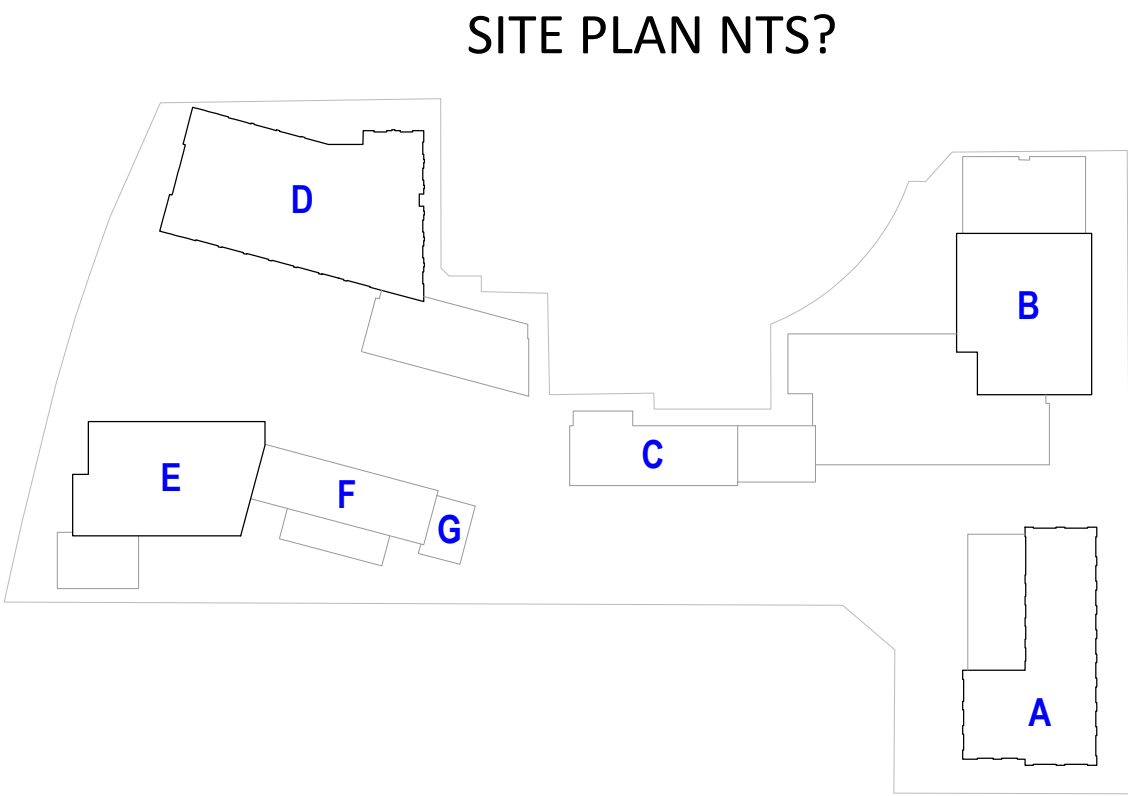
System Inverter Warranty Document

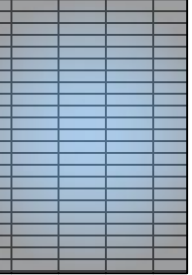
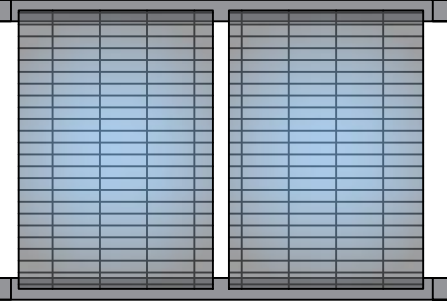
Section 1

System Layout Drawing



C2	12/09/24	RK	CONSTRUCTION ISSUE
C1	30/08/24	RK	CONSTRUCTION ISSUE
REV	DATE	DRAWN BY	DESCRIPTION
Issue Status			
CONSTRUCTION			
Project			
VASTERN ROAD BLOCK BC			
Title			
SOLAR PV ROOF LAYOUT			
Scale	A1 - 1:50	Designed By	DATE
		R.K	30/08/24
Checked By			
JS			
Envirolec Smart Energy Solutions			
Unit 6, Murray Business Centre, Murray Road, Orpington BR5 3RE @envirolec-ses.co.uk			
VR	PV	004	C1
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ROOF TYPE & HEIGHT	THREE PHASE INVERTERS	MODULES & ROOF AREA	
HEIGHT FFL: 32.7M ROOF TYPE: FLAT ROOF BUILD UP, CONCRETE SLAB WITH TAPERED INSULATION ON SINGLE PLY WATERPROOFING MEMBRANE ON TOP	2X SOLIS - S5-GR3P10K 1 STRING OF 13 + 1 STRING OF 12	50 PANELS	XX ARCBOXES 
	Inverter Installed : on Roof, Metal Framing	 JA SOLAR (2093 X 1134 X 30) 26.3KG 500W	MOUNTING SYSTEM RENU SOL E/W 

Section 2

System Design

Project Overview

PV System

Grid-connected PV System

Climate Data	Silsoe, GBR (1991 - 2010)
Values source	Meteonorm 7.3
PV Generator Output	25 kWp
PV Generator Surface	118.7 m ²
Number of PV Modules	50
Number of Inverters	2

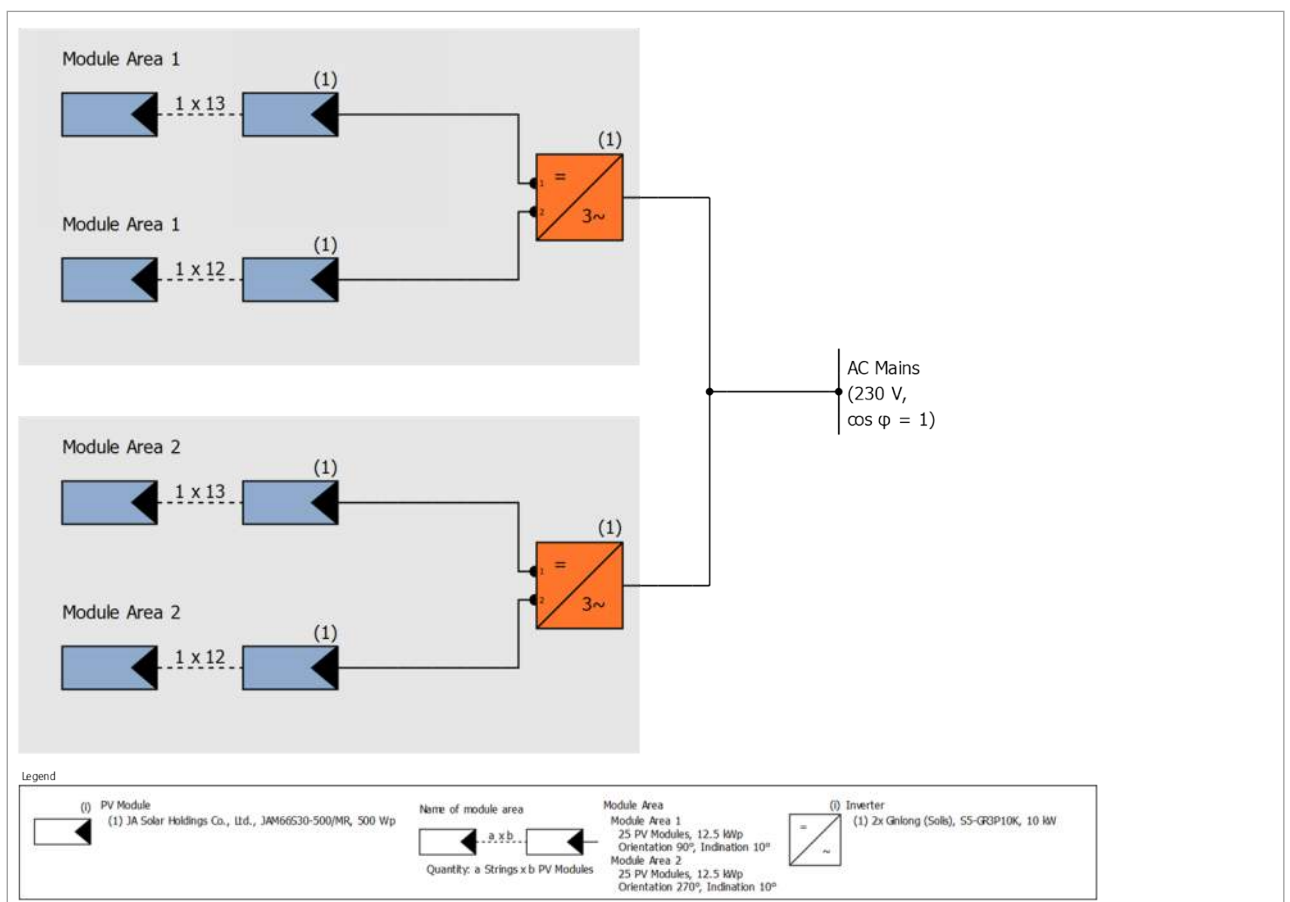


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	25.00 kWp
Spec. Annual Yield	858.88 kWh/kWp
Performance Ratio (PR)	90.64 %
Grid Export	21,498 kWh/Year
Grid Export in the first year (incl. module degradation)	20,790 kWh/Year
Standby Consumption (Inverter)	26 kWh/Year
CO ₂ Emissions avoided	10,092 kg / year

The results have been calculated with a mathematical model calculation from Valentin Software GmbH (PV*SOL algorithms). The actual yields from the solar power system may differ as a result of weather variations, the efficiency of the modules and inverter, and other factors.

Set-up of the System

Overview

System Data

Type of System	Grid-connected PV System
----------------	--------------------------

Climate Data

Location	Silsoe, GBR (1991 - 2010)
Values source	Meteonorm 7.3
Resolution of the data	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

Module Areas

1. Module Area - Module Area 1

PV Generator, 1. Module Area - Module Area 1

Name	Module Area 1
PV Modules	25 x JAM66S30-500/MR (v3)
Manufacturer	JA Solar Holdings Co., Ltd.
Inclination	10 °
Orientation	East 90 °
Installation Type	Roof parallel
PV Generator Surface	59.4 m ²

2. Module Area - Module Area 2

PV Generator, 2. Module Area - Module Area 2

Name	Module Area 2
PV Modules	25 x JAM66S30-500/MR (v3)
Manufacturer	JA Solar Holdings Co., Ltd.
Inclination	10 °
Orientation	West 270 °
Installation Type	Roof parallel
PV Generator Surface	59.4 m ²

Inverter configuration

Configuration 1

Module Area	Module Area 1
Inverter 1	
Model	S5-GR3P10K (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	125 %
Configuration	MPP 1: 1 x 13 MPP 2: 1 x 12

Vastern Road

Configuration 2

Module Area	Module Area 2
Inverter 1	
Model	S5-GR3P10K (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	125 %
Configuration	MPP 1: 1 x 13
	MPP 2: 1 x 12

AC Mains

AC Mains

Number of Phases	3
Mains voltage between phase and neutral	230 V
Displacement Power Factor (cos phi)	+/- 1

Simulation Results

Results Total System

PV System

PV Generator Output	25.00 kWp
Spec. Annual Yield	858.88 kWh/kWp
Performance Ratio (PR)	90.64 %
Grid Export	21,498 kWh/Year
Grid Export in the first year (incl. module degradation)	20,790 kWh/Year
Standby Consumption (Inverter)	26 kWh/Year
CO ₂ Emissions avoided	10,092 kg / year

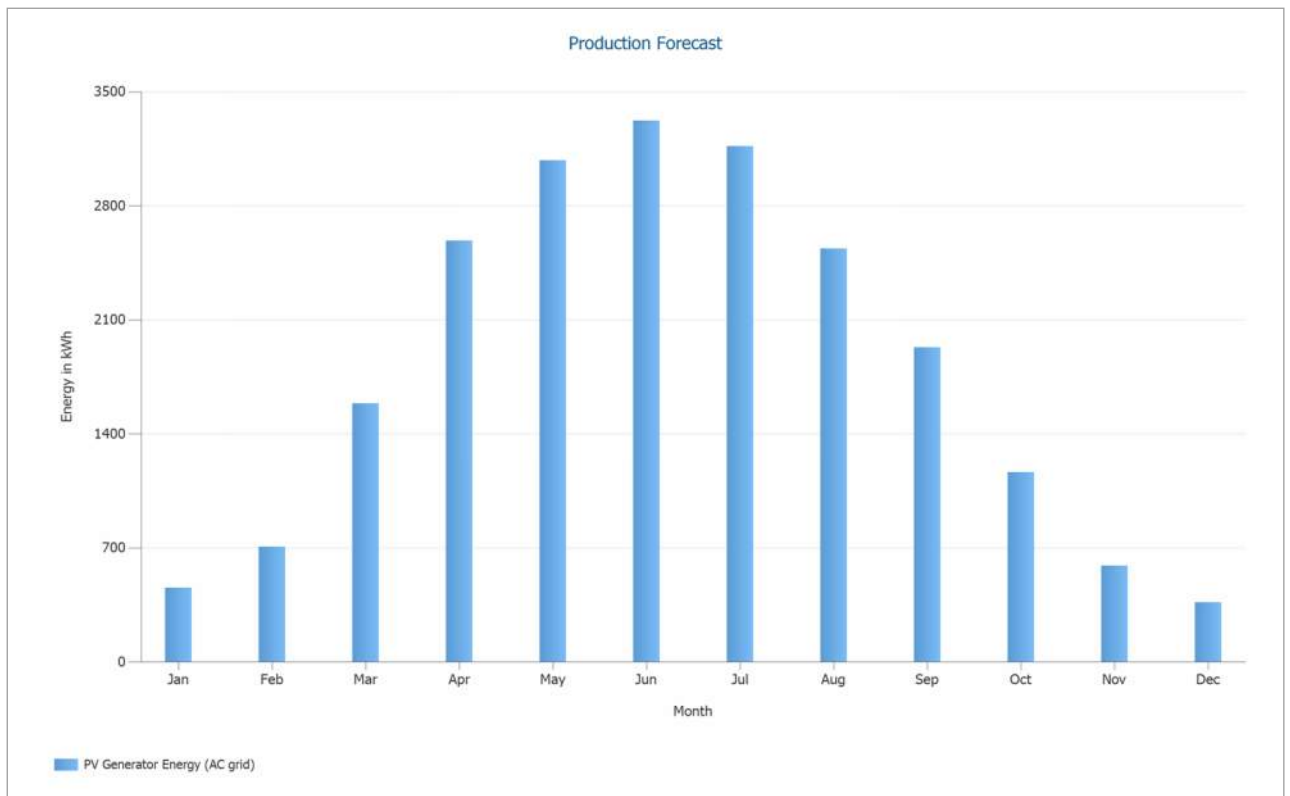


Figure: Production Forecast

Section 3

System PV Wiring Schematic Diagram

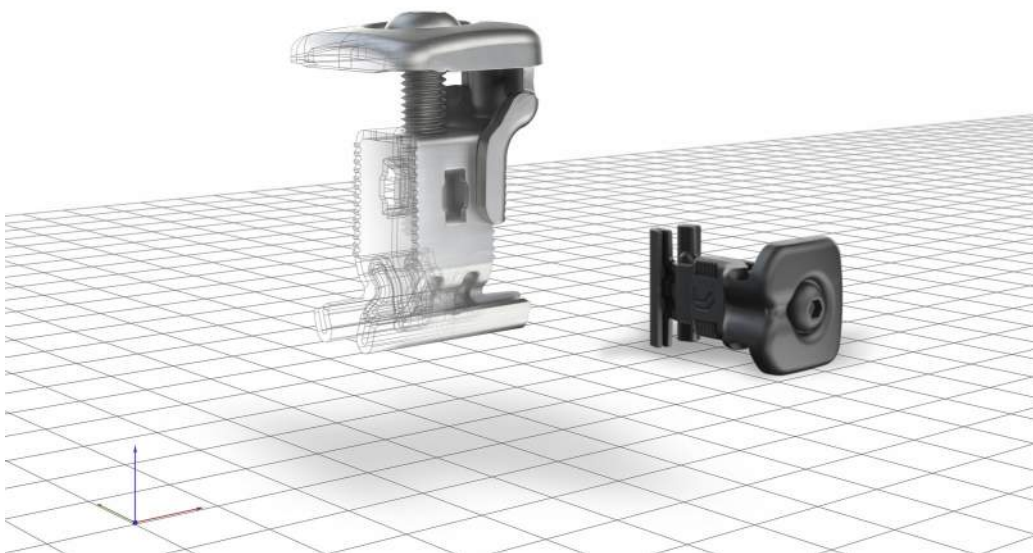
Section 4

System Weight & Wind Load Calculations

Technical project overview

Vastern Road

Building project	Vastern Road
Address	Vastern Road , RG1
Country	United Kingdom
Module Type	Shanghai JA Solar Technology Co. Ltd. - JAM66S30-500/MR (1500V)
Number of modules	50
Rated output	25 kWp
Mounting system	FS10EW
Editor	Renusol Europe GmbH



LOCATION

Street	Vastern Road
City	RG1
Country	United Kingdom

SURROUNDINGS

Code	Eurocode NA GB
Terrain height above sealevel	38,00 m
Snow load zone	Zone 2
Terrain category	Sea
Surroundings	normal
Service life of PV system	25 years
Failure consequence class	2

LOAD CALCULATION RESULT

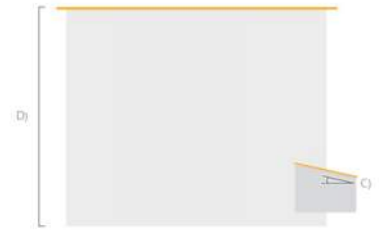
Peak velocity pressure	0,96 kN/m ²
Snow load	0,37 kN/m ²
Snow load on roof	0,30 kN/m ²
Base wind speed ($V_{b,0}$)	21,50 m/s

TOPOGRAPHY

Topography	Not exposed
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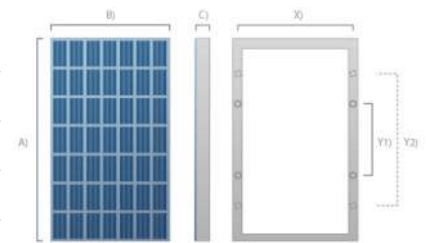
ROOF PROPERTIES

Roof type	Free-form Flat roof
Coverage type	Foil
C) Roof pitch	2,00 °
D) Building height	32,70 m
Parapet height	523,00 mm
Parapet width	0,00 mm



MODULE PARAMETERS

Manufacturer	Shanghai JA Solar Technology Co. Ltd.
Name	JAM66S30-500/MR (1500V)
Length	2093 mm
Width	1134 mm
Height	35 mm
Weight	26.3 kg
Rated output	500 W _{peak}



Please check the compatibility of clamping positions with module manufacturer advice.

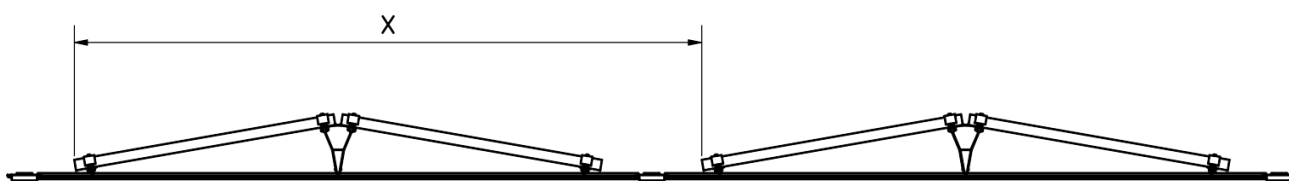
The module data was taken from a database. Please check whether this data corresponds to your actual module order. If necessary, please correct the data using the editing function.

SYSTEM

System type	Ballasted
System	FS10EW



Please check the entered row distance for an ideal yield calculation with a correct calculation including consideration of the shading.



FASTENER DETAILS

X) Row distance	2462mm
Add third rail under the module	Automatic
Ballast block mass (optional)	10,00 kg
Friction coefficient	0,50
Partial safety factor dead load (ballast)	1

CLAMPS

Clamp type	Mid clamps+ / End clamps+
Clamp colour	silver

STATIC VALIDATION

Your project was validated by our statics check successfully.

Maximum ballast value: 111 kg

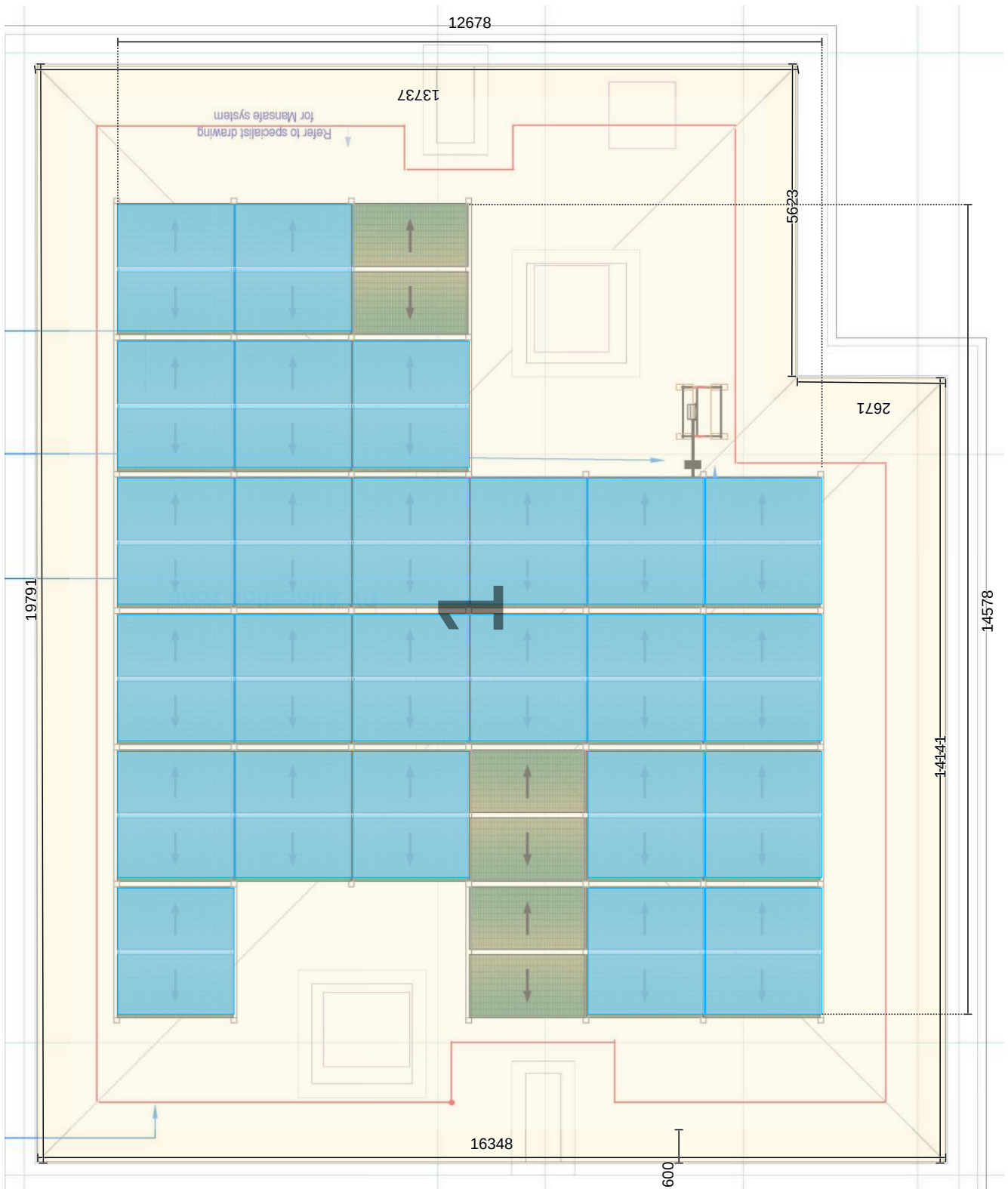
Ballast: 4425 kg

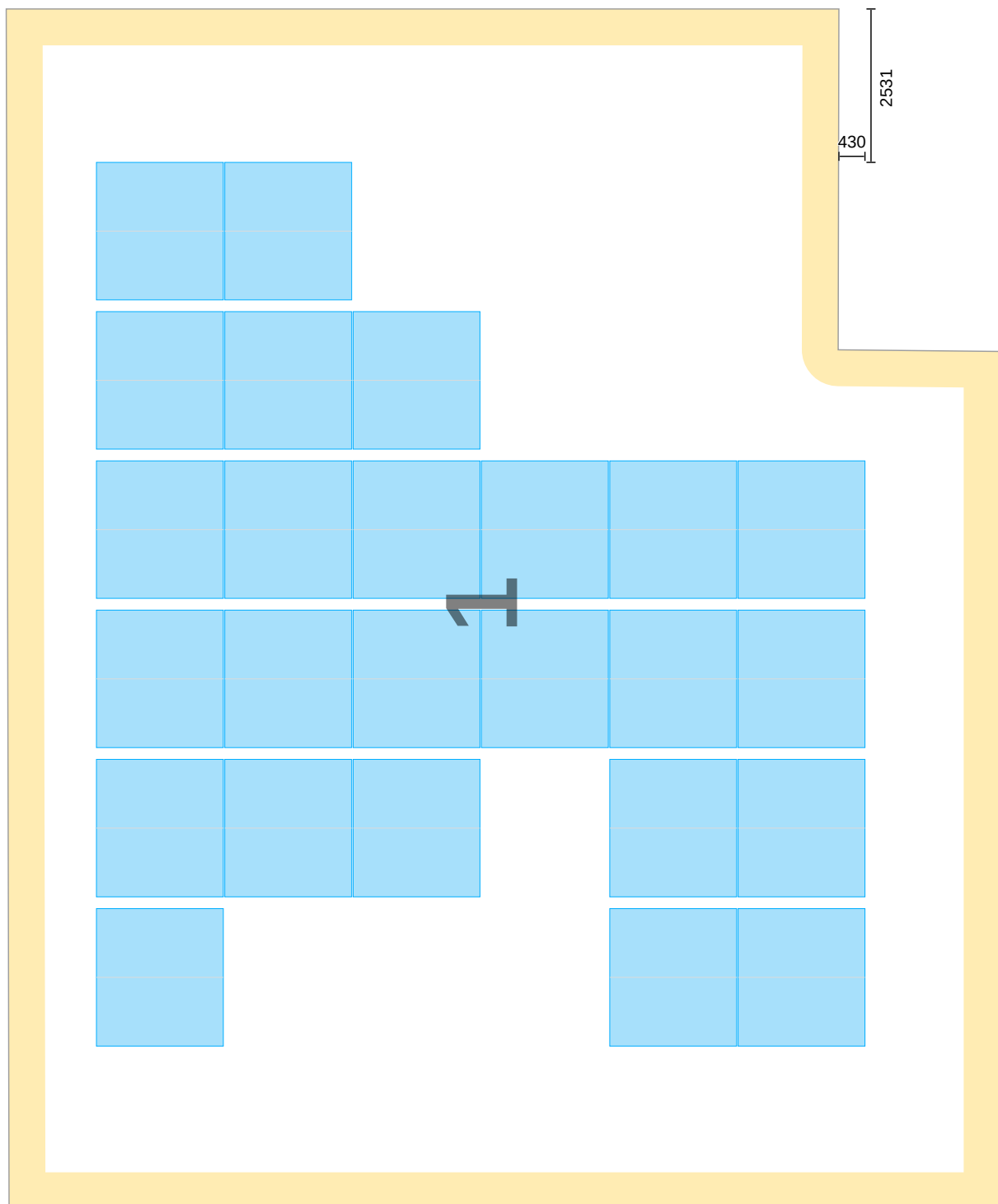
Modules: 1315 kg

Partlist: 174 kg

The predefined default values for input fields have to be compared with the conditions of the project. Necessary changes to adapt to local conditions must be carried out. The following relevant input fields contain their default value:

- Service life of PV system: 25 years
- Failure consequence class: 2
- Partial safety factor dead load (ballast): 1



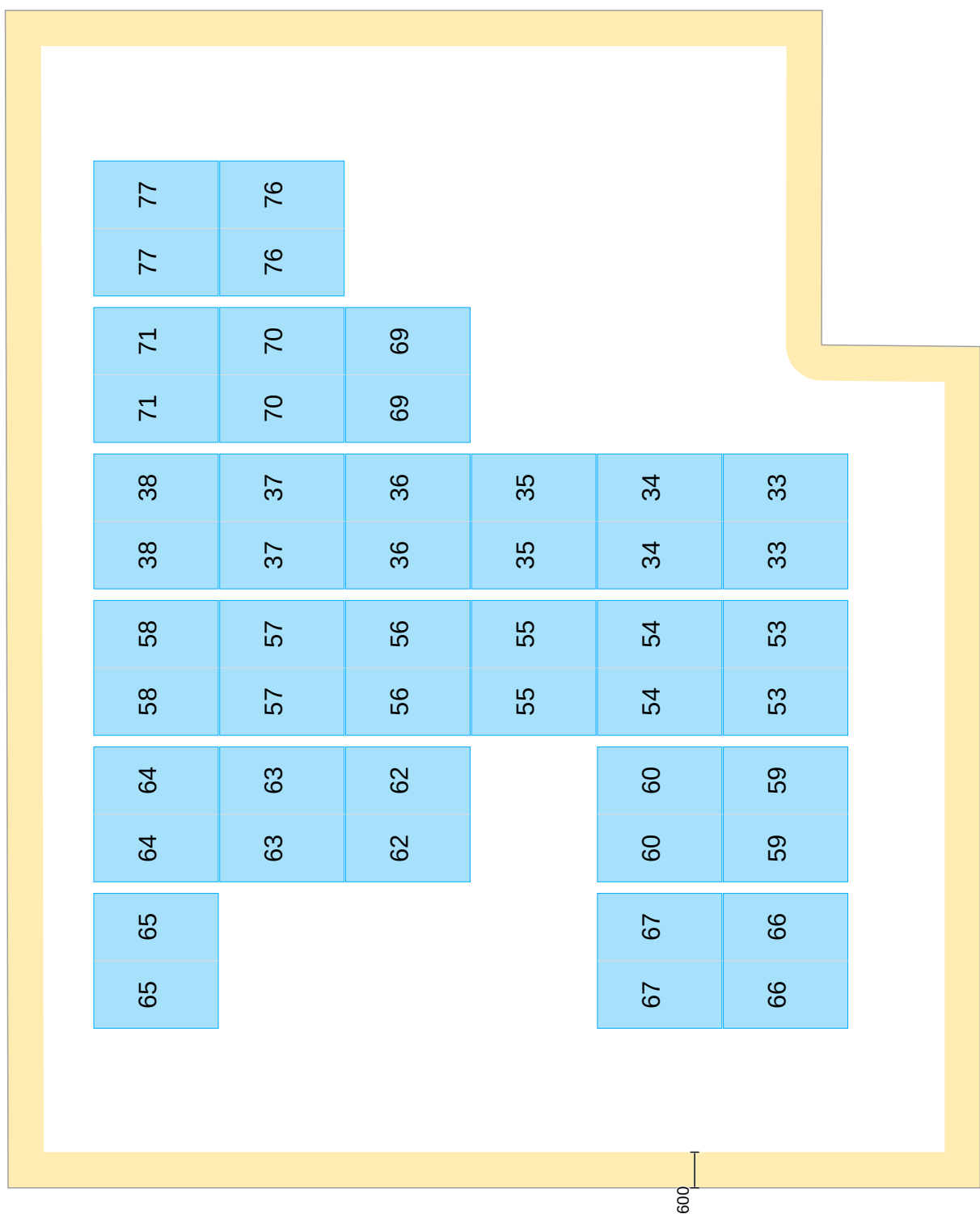




Ballast value[kg] (Blocks with 10 kg) / Sum of ballast stones: 470

57 (6)	87 (9)	94 (10)	111 (12)
(12 x 6)	(14 x 9)	(8 x 10)	(16 x 12)





BILL OF MATERIAL

Article No.	Article	Quantity	Ordering Unit	Weight/Piece	Weight
R420081	End clamp+	64	1	0,064 kg	4,096 kg
R420082	Middle clamp+	68	1	0,063 kg	4,284 kg
R500404	Base rail connector	40	1	0,079 kg	3,160 kg
R500411	Roof protection pad 110x95x20 mm alu coated	40	1	0,133 kg	5,320 kg
R500419	Eave support XL	66	1	0,049 kg	3,234 kg
R500423	Ridge support 10° XL	33	1	0,443 kg	14,619 kg
R500499	Base rail FS10-EW XL 2362 mm	33	1	1,660 kg	54,780 kg
R520502	ECO Ballast set FS 2100 mm	33	1	2,500 kg	82,500 kg
R900229	Self Drilling Screw 4,8x19 A2	1	100	0,005 kg	0,500 kg
R900314	Socket bolt 6 x 110 mm	165	1	0,009 kg	1,485 kg
				Total Weight: 173,978 kg	

ROOF STATICS

ROOF STATICS

Total weight	5914 kg
Module weight	1315 kg
Ballast	4425 kg
Max ballast	111 kg
Roof size	308,99 m ²
Weight per total roof area	19,14 kg/m ²
Mounting system weight	173,98 kg

MODULE FIELD STATICS

FIELD1

Total weight	5914 kg
Module weight	1315 kg
Ballast	4425 kg
Max ballast	111 kg
Field area	129,13 m ²
Weight per field area	45,80 kg/m ²
Mounting system weight	173,98 kg

MODULE STATICS

MODULE STATICS

Sliding B_W	$B_W = [q_p * A * \gamma_Q * (C_W - \mu * C_{AW})] / [\gamma_G * (\mu \cos \alpha - \sin \alpha)] - G$
Uplift B_A	$B_A = [-q_p * A * \gamma_Q * C_{AA}] / [\gamma_G * \cos \alpha] - G$
C_{AA} & C_{AW}	Cp value for uplift
C_W	Cp value for sliding
γ_G	Partial safety factor self-weight
γ_Q	Partial safety factor wind
$G = 0,60 \text{ kN}$	Self weight
Loads F_z	$F_z = q_p * A * \gamma_Q * C_A$
Loads F_x	$F_x = q_p * A * \gamma_Q * C_W$
$A = 4,75 \text{ m}^2$	Module area
$\mu = 0,50$	Friction coefficient
$q_p = 0,96$	Peak velocity pressure
$\alpha = 2,00^\circ$	Roof pitch

Modul	B _W [kN]	B _A [kN]	C _W	C _{AA}	C _{AW}	Y _G	Y _Q
33	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
34	1,81	1,27	0,030	-0,302	-0,302	1,00	1,35
35	1,81	1,27	0,030	-0,302	-0,302	1,00	1,35
36	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
37	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
38	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
53	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
54	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
55	1,81	1,27	0,030	-0,302	-0,302	1,00	1,35
56	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
57	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
58	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
59	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
60	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
62	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
63	1,81	1,27	0,030	-0,302	-0,302	1,00	1,35
64	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
65	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
66	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
67	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
69	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
70	1,07	0,58	0,030	-0,190	-0,190	1,00	1,35
71	1,66	1,13	0,030	-0,280	-0,280	1,00	1,35
76	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35
77	1,81	2,14	0,030	-0,442	-0,302	1,00	1,35

TOTAL BILL OF MATERIAL

Article No.	Article	Quantity	Ordering Unit	Weight/Piece	Weight
R420081	End clamp+	184	1	0,064 kg	11,776 kg
R420082	Middle clamp+	160	1	0,063 kg	10,080 kg
R500404	Base rail connector	114	1	0,079 kg	9,006 kg
R500411	Roof protection pad 110x95x20 mm alu coated	114	1	0,133 kg	15,162 kg
R500419	Eave support XL	172	1	0,049 kg	8,428 kg
R500423	Ridge support 10° XL	86	1	0,443 kg	38,098 kg
R500499	Base rail FS10-EW XL 2362 mm	86	1	1,660 kg	142,760 kg
R520502	ECO Ballast set FS 2100 mm	91	1	2,500 kg	227,500 kg
R900229	Self Drilling Screw 4,8x19 A2	2	100	0,005 kg	1,000 kg
R900314	Socket bolt 6 x 110 mm	430	1	0,009 kg	3,870 kg
				Total Weight: 467,680 kg	

IMPORTANT NOTES

The Project Report is a result of information provided by the Customer ("Customer" means customer of Renusol ordering this Project Report from the technical service of Renusol or user of the PV Configurator creating this Project Report himself). Renusol has neither verified the accurateness nor the completeness of the information and data provided by the Customer, which form the basis of this Project Report. It is the responsibility of the Customer to check and verify all input variables (including but not limited to those input variables which had been pre-set with proposed values) and assumptions used in the Project for their accuracy and correctness.

These verifications shall include but not be limited to the following aspects: (a) Wind and snow loads are proposed by the PV Configurator using respective wind and snow load maps. It should be verified that the local conditions do not deviate from the values used in the Configuration (e.g. location on mountain with higher snow load). (b) The Customer shall check and verify the Failure Consequence Class ("CC"). Typical residential and commercial buildings require CC 2. The Customer shall use higher CC in sensitive local environment (e.g. public building, high frequency of visitors, vicinity with potential for severe damages). (c) The service lifetime of the PV installation shall be verified by the Customer depending on the expectation of the ultimate user of the PV installation as well as the lifetime of the other components used in the installation. If the lifetime is expected beyond the service lifetime used for this Project Report, all relevant structural properties as well as input variables and assumptions shall be re-checked using the then expected service lifetime. (d) For flat roof systems: The Customer shall in any case measure and document the friction coefficient of the PV system on the location-specific roof cover it is placed on. The measurement shall be performed in various, at least three roof areas. (e) For flat roof systems: The PV Configurator proposes a ballast calculation. The ballast forms, together with the weight of the PV mounting system itself and the weight of the module, the total weight of the system. The actual ballast applied may in no case be lower than the values proposed by the PV Configurator. The ballast applied shall furthermore be documented. If the ballast applied cannot be precisely determined, a safety factor increasing the ballast is to be applied.

To the extent values of input variables measured or observed by the Customer differ from values used in this Project Report, the configuration of the PV installation shall be re-iterated using the respective correct values.

To the extent this Project Report includes a data concerning structural properties, it is the responsibility of the Customer to professionally verify (have verified) the structural data with regards to its compliance with the applicable local laws and properties of the location for which the Project Report has been prepared.

Furthermore the Terms of Use of the Renusol PV Configurator (<https://www.pv-configurator.com/pages/terms>) and the General Terms and Conditions (https://www.renusol.com/files/content/Downloads/Rechtliche%20Dokumente/Renusol_AGB_EN_110406.pdf) apply. The General Installation Guidelines of Renusol as well as the Installation Manuals and Data Sheets of the respective Renusol products, have likewise to be complied to.

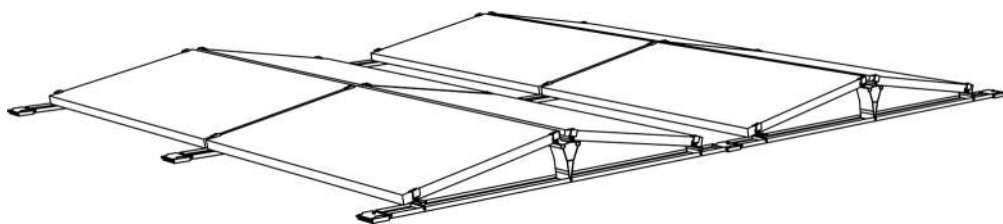


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www.renusol.com

Section 5

System Mounting Solution Data Sheet

System Mounting Solution Warranty Document



System Datasheet

FS10-EW / FS10-EW XL

General

System	Ballasted PV-mounting system
Content	Ground rails, rail connector, building protection mat, low post, high post, clamps
System warranty	10 years
Application area	Flat roof on industrial, agricultural (except hydrogen sulfide exposition) and residential buildings
Roof covering	Bitumen, concrete, foil, gravel
Roof slope	max. 5° without additional measures

System properties

System orientation	East-West
Module tilt	10°
System weight approx.	1,15 kg/m²plus ballast (project specific)
Weight PV-module included approx.:	11,8 kg/m²plus ballast (project specific)
Friction coefficient	$\mu = 0,5$ is to be determined and ensured upon installation surface.
Material	Aluminum, stainless steel, rubber granulate
Minimum edge distance	0,6 m
Max. Wind Dynamic Pressure	$q_p = 1,5 \text{ kN/m}^2$ (with simultaneously acting snow load of $s_k = 1,5 \text{ kN/m}^2$)
Max. Wind Dynamic Pressure	$q_p = 1,0 \text{ kN/m}^2$ (with simultaneously acting snow load of $s_k = 2,5 \text{ kN/m}^2$)

Modules

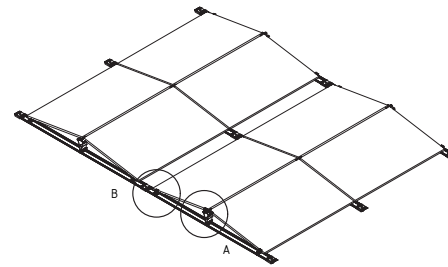
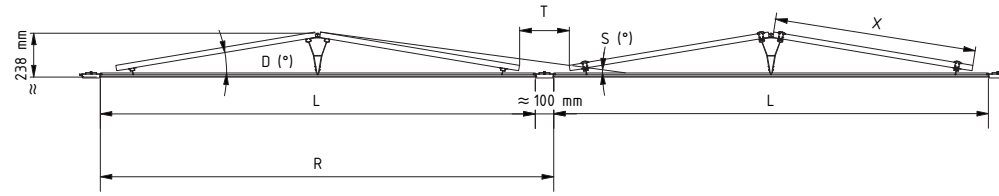
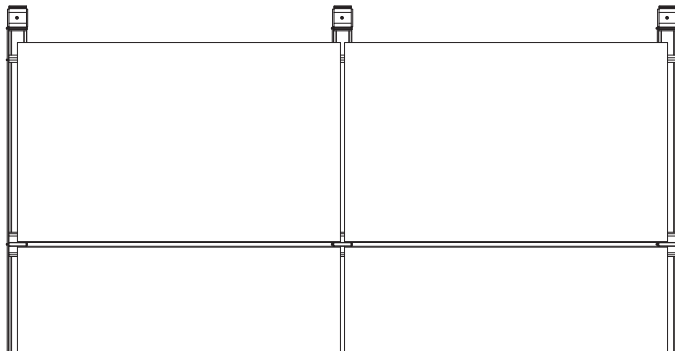
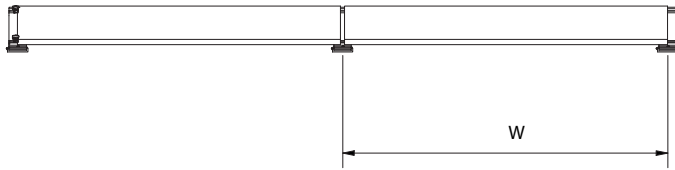
Type	Suitable for standard 60/72 cell panels. Approval for panel corner clamping is to be obtained.
Module width:	FS10-EW: 950-1.052 mm / FS10-EW XL: 1053-1.168 mm
Module guidance	Horizontal/Landscape

Certifications

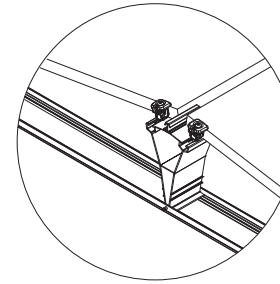
Wind loads	Determined in wind tunnel tests by Ruscheweyh Consult GmbH
PV layout	Provided by Renusol (www.pv-configurator.com)
Ballast plan	Provided by Renusol (www.pv-configurator.com)

Services

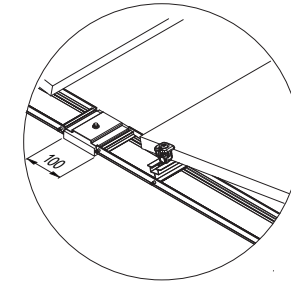
PV layout	Provided by Renusol (www.pv-configurator.com)
Ballast plan	Provided by Renusol (www.pv-configurator.com)



A (1 : 10)



B (1 : 10)



System	FS10-EW XL	
Ground rail	R500499	
Rail length	L:	2362 mm
Row spacing	R:	2462 mm
Module width	X ₁ :	Min: 1053 mm
	X ₂ :	Max: 1168 mm
Passageway	T(X ₁):	Min: 355 mm
	T(X ₂):	Max: 125 mm
System width	W:	Module length +24mm
Module inclination	D:	9°
Shading angle	S;	≈ 7,0° - 9,0°

System	FS10-EW	
Ground rail	R500500	
Rail length	L:	2260 mm
Row spacing	R:	2360 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1052 mm
Passageway	T(X ₁):	Min: 455 mm
	T(X ₂):	Max: 255 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 6,7° - 7,9°

System	FS10-EW	
Ground rail	R500407	
Rail length	L:	2060 mm
Row spacing	R:	2160 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1052 mm
Passageway	T(X ₁):	Min: 255 mm
	T(X ₂):	Max: 55 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 7,8° - 9,3°

System	FS10-EW	
Ground rail	R500501	
Rail length	L:	1989 mm
Row spacing	R:	2090 mm
Module width	X ₁ :	Min: 950 mm
	X ₂ :	Max: 1020 mm
Passageway	T(X ₁):	Min: 185 mm
	T(X ₂):	Max: 45 mm
System width	W:	Module length +24mm
Module inclination	D:	10°
Shading angle	S:	≈ 9,0° - 9,5°

Section 6

System Solar Panel Data Sheet

System Solar Panel Warranty Document

DEEP BLUE 3.0

Mono

505W MBB Half-cell Module JAM66S30 480-505/MR Series

Introduction

Assembled with 11BB PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.



Higher output power



Lower LCOE



Less shading and lower resistive loss

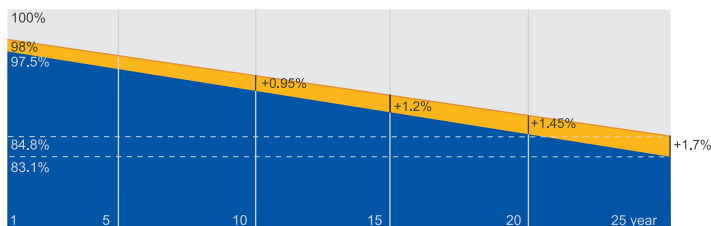


Better mechanical loading tolerance

Superior Warranty

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

0.55% Annual Degradation
Over 25 years



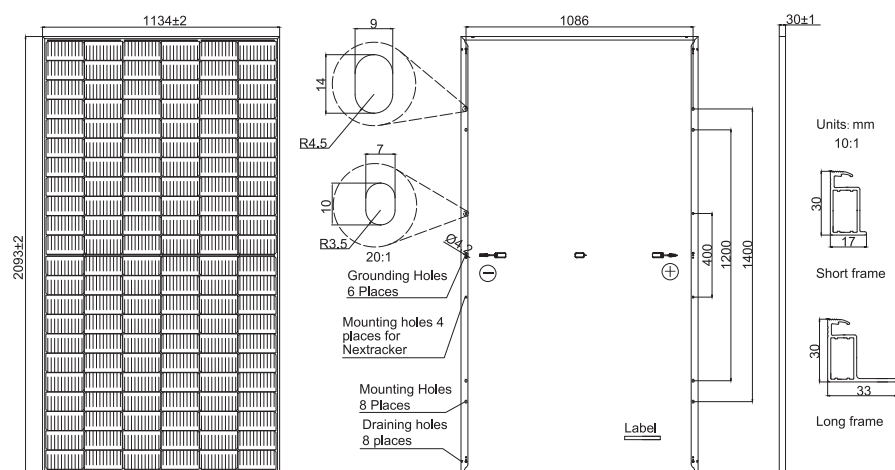
■ New linear power warranty ■ Standard module linear power warranty

Comprehensive Certificates

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



MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	26.3kg
Dimensions	2093±2mm×1134±2mm×30±1mm
Cable Cross Section Size	4mm ² (IEC) , 12 AWG(UL)
No. of cells	132(6×22)
Junction Box	IP68, 3 diodes
Connector	MC4-EVO2/QC 4.10-35
Cable Length (Including Connector)	Portrait: 200mm(+)/300mm(-); Landscape: 1200mm(+)/1200mm(-)
Packaging Configuration	36pcs/Pallet 792pcs/40HQ Container

ELECTRICAL PARAMETERS AT STC

TYPE	JAM66S30 -480/MR	JAM66S30 -485/MR	JAM66S30 -490/MR	JAM66S30 -495/MR	JAM66S30 -500/MR	JAM66S30 -505/MR
Rated Maximum Power(P _{max}) [W]	480	485	490	495	500	505
Open Circuit Voltage(V _{oc}) [V]	45.07	45.20	45.33	45.46	45.59	45.72
Maximum Power Voltage(V _{mp}) [V]	37.62	37.81	37.99	38.17	38.35	38.53
Short Circuit Current(I _{sc}) [A]	13.65	13.72	13.79	13.86	13.93	14.00
Maximum Power Current(I _{mp}) [A]	12.76	12.83	12.90	12.97	13.04	13.11
Module Efficiency [%]	20.2	20.4	20.6	20.9	21.1	21.3
Power Tolerance	0~+5W					
Temperature Coefficient of I _{sc} (α _{Isc})	+0.045%/°C					
Temperature Coefficient of V _{oc} (β _{Voc})	-0.275%/°C					
Temperature Coefficient of P _{max} (γ _{Pmp})	-0.350%/°C					
STC	Irradiance 1000W/m ² , cell temperature 25°C, AM1.5G					

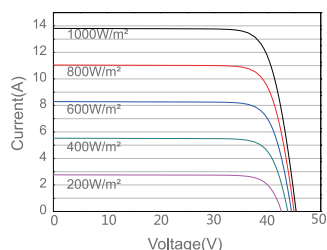
Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

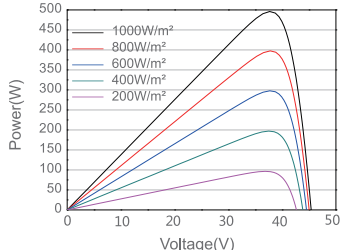
TYPE	JAM66S30 -480/MR	JAM66S30 -485/MR	JAM66S30 -490/MR	JAM66S30 -495/MR	JAM66S30 -500/MR	JAM66S30 -505/MR	Maximum System Voltage	1000V/1500V DC
Rated Max Power(Pmax) [W]	363	367	370	374	378	382	Operating Temperature	-40℃~+85℃
Open Circuit Voltage(Voc) [V]	42.15	42.30	42.43	42.58	42.72	42.86	Maximum Series Fuse Rating	25A
Max Power Voltage(Vmp) [V]	35.54	35.67	35.76	35.84	35.93	36.02	Maximum Static Load,Front* Maximum Static Load,Back*	5400Pa(112lb/ft²) 2400Pa(50lb/ft²)
Short Circuit Current(Isc) [A]	10.99	11.06	11.13	11.20	11.27	11.34	NOCT	45±2℃
Max Power Current(Imp) [A]	10.21	10.28	10.36	10.44	10.52	10.60	Safety Class	Class II
NOCT	Irradiance 800W/m², ambient temperature 20℃,wind speed 1m/s, AM1.5G						Fire Performance	UL Type 1

CHARACTERISTICS

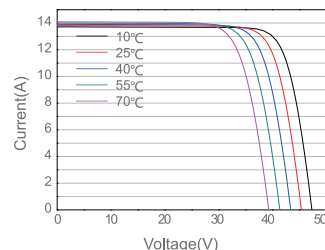
Current-Voltage Curve JAM66S30-495/MR



Power-Voltage Curve JAM66S30-495/MR



Current-Voltage Curve JAM66S30-495/MR



JA SOLAR MODULE PRODUCT

LIMITED WARRANTY



This Limited Warranty for JA Solar Brand Crystalline Solar PV Modules (hereinafter referred to as "Limited Warranty") is issued by JA Solar Co., Ltd., which is headquartered at Building No.8, Noble Center, Automobile Museum East Road, Fengtai District, Beijing, China (100160), or its legal successors or assigns (hereinafter collectively referred to as "JA Solar"), and applies exclusively to Modules (as defined in Section 1 hereof).

01. Definition of Modules:

Modules are defined in this Limited Warranty as photovoltaic solar modules manufactured by JA Solar or its authorized manufacturers, legitimately bearing "JA Solar" brand, that are of the following product types:

Mono-crystalline single glass products:

JAM60S XX -XXX / XX; JAM72S XX -XXX / XX; JAM66 SXX-XXX / XX; JAM78 SXX -XXX / XX

Mono-crystalline double glass products:

JAM60 DXX -XXX / XX; JAM72 DXX -XXX / XX; JAM66 DXX-XXX / XX; JAM78 DXX -XXX / XX

Poly-crystalline single glass products:

JAP 60 SXX -XXX / XX; JAP 72SXX -XXX / XX;

Poly-crystalline double glass products:

JAP60 DXX -XXX / XX; JAP 72DXX -XXX / XX;

Note: "X" represents different types of product under different power class.

02. Effective Date, Beneficiary and Warranty Start Date:

2.1 This Limited Warranty takes effect on [28th] [Aug], 2019 (hereinafter referred to as "Effective Date") and applies to Modules first sold after the Effective Date (the date of sale shall be the date indicated in the contracts for the supply of the relevant Modules signed by JA Solar and its affiliates that sold the Modules). Modules sold before the Effective Date is still subject to the Limited Warranty applicable at the time of sale. This version of the Limited Warranty shall remain in effect for the duration of the Limited Product Warranty Period and Limited Peak Power Warranty Period for the applicable Modules covered.

2.2 The sole and exclusive beneficiary of this Limited Warranty is the initial end customer who purchases Modules directly or indirectly from JA Solar or from any one of its authorized manufacturers or distributors or from any other legitimate source, and is the initial owner of such Modules (hereinafter referred to as "Customer"), and any of such Customer's permitted successors or assigns under Section 7. Upon JA Solar's written request, Customer shall confirm ownership of the Modules.

2.3 The term of this Limited Warranty starts from the earlier of: (i) the date of initial delivery to the Customer by JA Solar or its authorized manufacturer, or (ii) six (6) calendar months after Modules dispatch from the JA Solar factory as indicated by the serial numbers for such Modules (hereinafter referred to as "Warranty Start Date").

03. Limited Warranty:

3.1 Limited Product Warranty:

Subject to the terms and conditions of this Limited Warranty, JA Solar warrants to the Customer for a period of one hundred and forty-four (144) calendar months following the Warranty Start Date (hereinafter referred to as "Limited Product Warranty Period") that the Modules (together with the

factory-assembled DC connectors and cables), when installed, used, and serviced under normal operating conditions and in accordance with the JA Solar module installation manual, product technical specifications and maintenance manual (which, if not provided in the supply contract, can be downloaded from JA Solar' official website at www.jasolar.com) will:

- 1) be free from any defects in design, materials, workmanship or manufacturing that have a negative effect on the functioning of the Modules; and,
- 2) Comply with the design and technical specifications in the product technical specifications related to the Modules.

(hereinafter referred to as "Limited Product Warranty").

The Limited Product Warranty does not cover any changes in appearance (including but not limited to color changes) and normal wear and tear (including but not limited to scratches, contamination, mechanical wear, rust, mildew and other forms of natural wear and tear) that occur after the delivery or installation of the Modules. The Limited Product Warranty does not warrant a specific power output or performance of any Modules, which shall be exclusively covered under Section 3.2 below.

3.2 Limited Peak Power Warranty

Subject to the terms and conditions of this Limited Warranty, JA Solar provides to the Customer a Limited Peak Power Warranty with a term of 25 years for single glass Modules or 30 years for double glass Modules from the Warranty Start Date ("Limited Peak Power Warranty Period"):

1) for mono-crystalline single glass Modules (whose product types are: JAM60S XX -XXX/XX; JAM72S XX -XXX/XX; JAM66 SXX-XXX / XX; JAM78 SXX -XXX / XX): the Degradation Rate shall not exceed 2.5% in the first year beginning from the Warranty Start Date, and an additional 0.6% each year thereafter from the beginning of the second year until that date which is twenty-five (25) years following the Warranty Start Date, at which time the Peak Power Output shall be not less than 83.1% of the Nominal Power Output;

2) for poly-crystalline single glass Modules (whose product types are: JAP60SXX-XXX/XX; JAP72SXX-XXX/XX): the Degradation Rate shall not exceed 2.5% in the first year beginning from the Warranty Start Date, and an additional 0.7% each year thereafter from the beginning of the second year until that date which is twenty-five (25) years following the Warranty Start Date, at which time the Peak Power Output shall be not less than 80.7% of the Nominal Power Output;

3) for mono-crystalline double glass Modules (whose product types are: JAM60DXX-XXX/XX; JAM72DXX-XXX/XX; JAM66 DXX-XXX / XX; JAM78 DXX-XXX / XX): the Degradation Rate shall not exceed 2.5% in the first year beginning from the Warranty Start Date, and an additional 0.5% each year thereafter from the beginning of the second year until that date which is thirty (30) years following the Warranty Start Date, at which time the Peak Power Output shall be not less than 83% of the Nominal Power Output; and,

4) for poly-crystalline double glass Modules (whose product types are: JAP60DXX-XXX/XX; JAP72DXX-XXX/XX): the Degradation Rate shall not exceed 2.5% in the first year beginning from the Warranty Start Date, and an additional 0.5% each year thereafter from the beginning of the second year until that date which is thirty (30) years following the Warranty Start Date, at which time the Peak Power Output shall be not less than 83% of the Nominal Power Output.

(hereinafter referred to as "Limited Peak Power Warranty")

Note: "X" represents different types of product under different power class.

For the avoidance of doubt, unless otherwise specified in this Limited Warranty, the terms used in the Limited Peak Power Warranty shall have the following meanings:

"Nominal Power Output" means the power output measured for the Modules under the Standard Test Conditions, as indicated on its original nameplate, excluding any positive tolerance that may exist in the Modules.

"Standard Test Conditions" or "STC": (a) light spectrum of AM 1.5; (b) an irradiation of 1000W per square meter; and (c) a cell temperature of 25 degrees centigrade at right angle irradiation. The measurements are carried out in accordance with IEC61215 (equivalent to GB/T 9535) as tested at the junction box terminals per the calibration and testing standards of JA Solar valid at the date of manufacture of the Modules. JA Solar's calibration standards shall comply with the standards applied by international institutions accredited for this purpose.

"Peak Power Output" means the power output that the Modules generates in the relevant warranty period

after the Warranty Start Date under STC as measured in accordance with IEC61215, considering and corrected for any measurement uncertainty.

"Degradation Rate" means any positive amount calculated in accordance with the following formula, expressed as a percentage:

Degradation Rate = $100\% \times (\text{Nominal Power Output} - \text{Peak Power Output}) / \text{Nominal Power Output}$

For the avoidance of doubt, notwithstanding anything to the contrary herein, the Limited Peak Power Warranty for bifacial double glass series Modules shall apply only to the front-side power output of such Modules.

3.3 Exclusions:

The Limited Product Warranty provided in Section 3.1 and the Limited Peak Power Warranty provided in Section 3.2 shall not apply to the following events:

- 1) The Modules have been subject to misuse, abuse, neglect, or accident except as may be caused by JA Solar or its affiliates that sold the Modules in the course of storage, transportation or handling;
- 2) The Modules have been installed, used and serviced in a manner that fails to strictly comply with the relevant provisions of the JA Solar module installation manual, product technical specifications and maintenance manual;
- 3) The Modules have been installed or serviced by installation personnel or other personnel who do not have the relevant qualifications in violation of the relevant laws and regulations;
- 4) The Modules have been altered, repaired or modified, or used in processes or in combination with other products not supplied by JA Solar in a manner not consistent with the written instructions of or without the prior written consent of JA Solar or its affiliates;
- 5) The Modules (or the repaired or replaced or supplemented new Modules provided by JA Solar under the Limited Warranty) have been removed and re-installed at any location other than the physical location in which it was originally installed;
- 6) The product type, nameplate or serial number of the Modules have been removed, altered, erased or rendered illegible;
- 7) The design or layout of the photovoltaic power plant system in which the Modules are installed does not conform to the designated module application (certification) or does not meet applicable requirements (e.g. IEC 62548:2016, IEC TS 62738:2018) and generally accepted codes of practice for a safe and harmless operation;
- 8) The Modules are installed on mobile units (except photovoltaic tracking systems), such as vehicles, ships, etc., or on offshore facilities;
- 9) Exposure of the Modules to an extreme environment or damage caused by drastic changes in such environments, including but not limited to extreme heat, acidic rainfall (including snow), blowing sand, corrosiveness, salty air (e.g. marine environment), contaminated air, soil or groundwater, abnormal levels of oxidation, mold, or any nearby fire, explosion, smoke, or charring.
- 10) Damage caused by force majeure such as natural disasters, including but not limited to lightning, hail, frost, snow, storms, tidal waves, floods, extreme temperatures, earthquakes, typhoons, tornadoes, volcanic eruptions, meteorites, ground motions, earth fissures, landslides, or animal damage;
- 11) Direct or indirect damage caused by third party vandalism or acts beyond the control of JA Solar and its affiliates that sold the Modules, including but not limited to accidents, riots, war, insurrection and communal violence; and
- 12) Damage caused by an accident at the photovoltaic power plant in which the Modules are installed due to any external factor. External factors include but are not limited to voltage fluctuations, power peaks, excess current, power failure, poor electrical or mechanical engineering work, untrained personnel, or other faults occurring in the power supply system (whether or not such failures are caused by any act or omission of the Customer).

In addition, the Limited Product Warranty provided in Section 3.1 and the Limited Peak Power Warranty provided in Section 3.2 shall not apply to Modules for which JA Solar and its affiliates that sold the Modules have not received all or part of the receivable derived from the sale of the Modules (whether or not the Customer is the debtor for the receivable). Where JA Solar exercises the right to reject a warranty claim under this provision, the Customer may pay the outstanding payment to JA Solar to get the claim accepted.

If Customer was not the debtor, then after the Customer pays the outstanding payment, it can assert a claim against the actual debtor. To this end, JA Solar can assist the Customer by issuing a debt transfer certificate.

04. Warranty Claims:

4.1 Time Limit for Warranty Claims

All claims under the Limited Product Warranty must be submitted in writing to JA Solar within the Limited Product Warranty Period, while all claims under the Limited Peak Power Warranty must be submitted in writing to JA Solar within the Limited Peak Power Warranty Period. JA Solar shall have the right to reject any and all warranty claims submitted outside of the respective warranty period.

4.2 Burden of Proof for Warranty Claims

In any circumstance, the burden of proof for any warranty claim made by the Customer shall rest upon the Customer. The warranty claim will only be accepted if the Customer provides sufficient documentary evidence to fully demonstrate that **the only cause** of the fault or non-conformity in the Modules is a breach of the Limited Product Warranty and/or the Limited Peak Power Warranty.

4.3 Warranty Claim Procedures

Customer shall, as soon as it becomes aware of an instance of non-conformity with the Limited Product Warranty and/or the Limited Peak Power Warranty (such Modules involved in the warranty claim are referred to as the "Claim Modules"), immediately (but in any event no later than the earlier of (i) 14 calendar days after it became aware of or should have become aware of such events, and (ii) the respective expiry date of the Limited Product Warranty Period and/or the Limited Peak Power Warranty Period for the Claim Modules) notify JA Solar's Global Customer Service department by giving it written notice sent to: Building No.8, Noble Center, Automobile Museum East Road, Fengtai District, Beijing, China (100160), Tel: 400-4230-186, or via email sent to: Services@jasolar.com.

Customer shall provide the following information along with the notice: a) cause of the claim and related supporting documents; b) proof of purchase of the Claim Modules (including but not limited to the supply contract, commercial invoice, delivery and acceptance certificate, payment voucher, etc. If Customer did not purchase the Claim Modules directly from JA Solar or one of its affiliates, it shall provide proof of purchase from the supplier that can be traced back to the supply contract, commercial invoice, etc., signed by JA Solar and its affiliates); c) product type and serial number of the Claim Modules; d) Warranty Start Date of the Claim Modules; e) place of installation of the Claim Modules; f) other additional information requested by JA Solar.

JA Solar will review and evaluate the claim. JA Solar may require the Customer to ship the Claim Modules back to JA Solar's factory for testing if it deems necessary, in which case, JA Solar will issue a return merchandise authorization (hereinafter referred to as "RMA") to Customer. **Customers shall only return the Claim Modules in accordance with the requirements of the RMA after receiving of the same issued by JA Solar. Otherwise, JA Solar shall have the right to reject the warranty claim and refuse to accept the Claim Modules returned by Customer without authorization, and the related risk of loss and expenses shall be borne by Customer.** If the Claim Modules returned are confirmed to be not in conformity with the Limited Product Warranty and/or the Limited Peak Power Warranty, JA Solar will reimburse Customer for the actual shipping and insurance costs associated with the returning of the Claim Modules based on the invoices related to such costs provided by Customer.

JA Solar has the right to decide at its sole discretion whether to conduct an on-site investigation and verification at the installation site of the Claim Modules by a representative. If JA Solar decides to conduct on-site investigation and verification, it shall notify Customer in writing at least 10 working days in advance of its plan for such on-site investigation and verification. Customer shall reply and confirm as soon as possible after receiving written notice from JA Solar. The parties shall communicate timely and cooperatively to plan and enable a constructive and efficient on-site investigation and verification. For this purpose, Customer or plant operation staff is requested to fully cooperate (technical and logistical) with JA Solar's representative during the on-site investigation. If Customer refuses JA Solar's on-site investigation and verification request without any proper reason, JA Solar shall have the right to postpone the claim.

processing until additional and evaluable data are provided, or if not delivered within a reasonable period of time, to reject the related warranty claim.

4.4 Technical Disputes

Any dispute on technical facts relating to claims brought under this Limited Warranty shall be finally determined by an independent third-party testing organization. JA Solar and Customer shall jointly appoint a reputable international or Chinese testing organization such as TÜV Rheinland, TÜV SÜD, Intertek, UL, CQC or CGC, or any other mutually acceptable neutral third-party testing organization (hereinafter referred to as "Third-party Testing Organization") to determine the dispute. Neither Customer nor JA Solar shall unreasonably refuse to participate in the evaluation or delay the relevant testing and evaluation procedures, and shall provide convenience for the relevant testing and evaluation (including but not limited to providing convenience at the installation site and/or providing convenience for JA Solar to ship the Claim Modules involved to the Third-party Testing Organization for testing). Before carrying out such testing and evaluation, the Third-party Testing Organization shall inform JA Solar and Customer of the test equipment's power tolerance, which should be reflected in the final conclusions. The Third-party Testing Organization shall act as an expert, adjudicate on the disputed technical facts, allow the parties a reasonable opportunity to make representations and counter-representations and take those representations and counter-representations into account in making final conclusions. The final conclusions arrived at by the Third-party Testing Organization shall be final, conclusive and binding on both parties, and shall be a mandatory prerequisite for the judicial assertion of a warranty claim. Reasonable expenses incurred by the Third-party Testing Organization in carrying out the evaluation shall be paid in advance by Customer, including the cost of shipping the Claim Modules to the designated testing location of the Third-party Testing Organization, insurance costs, storage costs, etc., as well as the service charges for testing and evaluation. If the Third-party Testing Organization concludes that the Claim Modules do not conform to the Limited Product Warranty and/or the Limited Peak Power Warranty, JA Solar shall reimburse for actual testing and transportation expenses prepaid by Customer upon receipt of the relevant written notice and copies of the relevant invoices. The risk of damage to and loss of the Claim Modules in the process of testing and evaluation by the Third-party Testing Organization shall be transferred at the same time as their ownership.

4.5 Ownership of the Claim Modules

The ownership of the Claim Modules is transferred to JA Solar only after JA Solar confirms Customer's warranty claim and provides replacements or refunds in accordance with the remedies provided under this Limited Warranty. Until such time, ownership of the Claim Modules shall remain with Customer.

05. Remedy for Warranty Claims:

5.1 Remedy under the Limited Product Warranty:

Should JA Solar confirm that the Claim Modules are indeed not in conformity with the Limited Product Warranty, it shall, at its sole discretion, within a reasonable time period, either: a) repair the Claim Modules at no charge to Customer; b) provide Customer with replacement Modules in place of the Claim Modules; or c) provide Customer a refund of the purchase price as evidenced by the original supply invoice provided by Customer, subject to an annual 4% for single glass module or 3.33% for double glass module depreciation rate on the purchase price (if Customer is unable to provide the original supply invoice, monetary compensation will be made based on the then market price of an identical or similar module type). Unless the parties agree otherwise, JA Solar shall ship the repaired Modules or replacement Modules in the same manner and to the same destination as specified in the original supply contract signed by JA Solar or one of its affiliates. The cost of shipping shall be paid in the same manner as specified in the original supply contract.

5.2 Remedy under the Limited Peak Power Warranty:

Should JA Solar confirm that the Claim Modules are indeed not in conformity with the Limited Peak Power Warranty, it shall, at its sole discretion, within a reasonable time period, either: a) repair the Claim Modules at no charge to Customer; b) provide Customer with replacement Modules in place of the Claim Modules; c) provide Customer a refund of the purchase price as evidenced by the original supply

invoice provided by Customer subject to an annual 4% for single glass module or 3.33% for double glass module depreciation rate on the purchase price (if the Customer is unable to provide the original supply invoice, monetary compensation will be made based on the then market price of an identical or similar module type).

5.3 Exclusive Remedy:

The Remedy under the Limited Product Warranty and the Remedy under the Limited Peak Power Warranty as set forth above are the sole and exclusive responsibility and obligation of JA Solar to Customer under this Limited Warranty, and are also the sole and exclusive remedy of Customer for the Claim Modules under this Limited Warranty. JA Solar will only reimburse for expenses expressly stipulated in this Limited Warranty. Costs and expenses associated with removal of the Claim Modules and the reinstallation of the repaired or replacement Modules as well as customs clearance costs incurred by the return of the Claim Modules (if any) shall be borne by Customer. JA Solar's performance of its warranty obligation under this Limited Warranty shall not extend the Limited Product Warranty Period or the Limited Peak Power Output Warranty Period. The original warranty periods shall still apply to the repaired or replacement Modules. If the production of the same type of the Claim Modules has been discontinued, withdrawn from the market, or is otherwise unavailable, JA Solar shall have the right to replace the Claim Modules with a similar type, the performance of which should not be lower than the original type.

06. Limitation of Liability:

1) Notwithstanding anything to the contrary herein, the warranties set forth in this Limited Warranty are in lieu of all other warranties, whether express, implied, or statutory, including but not limited to any implied warranties of merchantability, fitness for a particular purpose or non-infringement. However, if Customer is identified as a "consumer" and the Modules as a "consumer product" in accordance with the laws governing the protection of consumer rights in the country where the Modules were first installed, to the extent required by applicable law, any implied warranties of merchantability, fitness for a particular purpose or non-infringement are limited to the Limited Product Warranty Period or the Limited Peak Power Output Warranty Period set forth above, or such shorter period as required by applicable law. This Limited Warranty gives Customer specific legal rights, and Customer may also have other rights that vary by state, province or jurisdiction, and such other rights shall remain unaffected.

2) Unless otherwise provided by applicable mandatory law in the country where the Modules were first installed, JA Solar shall not be liable for any of the following losses: a) personal injury or property damage; b) any other loss or injury whatsoever arising out of or in connection with the Modules (including but not limited to any defects in the Modules or arising from the use or installation thereof); c) any incidental, consequential or special damages resulting from any cause; and d) lost power, lost profits, lost production, lost revenue or lost interest caused by the non-usability of the Modules, even if JA Solar was aware of the possibility of such damages. JA Solar's liability for fraudulent or willful intent, gross negligence or personal injury, in each case, under applicable mandatory liability law shall remain unaffected. Notwithstanding any other provision of this Limited Warranty, and including if JA Solar is liable to compensate Customer hereunder, the total compensation paid or payable by JA Solar, and the total liability of JA Solar hereunder, shall not exceed the amount actually received by JA Solar as indicated in the original invoice for the Claim Modules. The limitations of liability under this Limited Warranty will not apply to the extent restricted or prohibited by applicable mandatory law.

3) Customer acknowledges that the foregoing limitations on liability are an essential element of the relevant supply contract between the parties and that in the absence of such limitations the purchase price of the relevant Modules would be substantially higher.

4) JA Solar has adopted reasonable methods such as bolding, blackening and highlighting to draw the Customer's attention to clauses which exclude or limit its liability under this Limited Warranty, and have fully explained the relevant clauses as required by Customer. There is no disagreement between the parties over the understanding of any clause of this Limited Warranty.

07. Assignment:

Upon written notice to JA Solar, Customer may assign this Limited Warranty to a new owner of the entire power plant project in which such Modules were originally installed, provided that: (i) the Modules remain in their original place of installation, (ii) there is no outstanding payment due under the supply contract; and (iii) the assignee agrees to be bound by these Limited Warranty terms. If requested by JA Solar, Customer shall provide reasonable evidence of such succession or transfer of ownership. This Limited Warranty may not otherwise be assigned or transferred, and any attempt to assign or transfer in violation of this Section 7 shall be null and void.

08. Miscellaneous:

8.1 Severability

If any portion or provision of this Limited Warranty is held to be invalid, illegal or unenforceable under applicable law, or the application of such portion or provision to certain persons or in certain circumstances is held to be invalid, illegal or unenforceable, then the portion or provision shall be deemed to be changed and interpreted to accomplish the objectives of such portion or provision to the greatest extent possible under applicable law and the remaining portions or provisions of this Limited Warranty or the applicability of this Limited Warranty will remain unaffected, independent and valid.

8.2 Force Majeure:

JA Solar shall not be responsible or liable in any way to Customer for any non-performance or delay in JA Solar's performance of its obligations under this Limited Warranty due to occurrences of force majeure events such as natural disasters, war, riots, strikes, unavailability of suitable or sufficient labor, material, or capacity or technical or yield failures and any unforeseen event beyond its control, including, without limitation, any technological or physical event or condition which is not reasonably known or understood by JA Solar at the time of the sale of the Claim Modules or the notification by Customer of the relevant warranty claim.

8.3 Governing Law and Dispute Resolution

Any dispute related to or arising out of this Limited Warranty, including without limitation any question regarding its existence, validity, breach, or termination, shall be referred to and finally resolved pursuant to the governing law clauses and dispute resolution procedures under the supply contract between the original purchaser and JA Solar. As a condition to any obligation of JA Solar hereunder, JA Solar may require any Customer seeking to enforce this Limited Warranty to execute such additional agreements as may reasonably be required to enforce the terms of this Section. The laws governing this Limited Warranty shall exclude any conflicts-of-law rule as well as the United Nations Convention on Contracts for the International Sale of Goods (CISG) concluded on April 11, 1980 and any other uniform code.

Harvest the Sunshine

Premium Cells, Premium Modules

Section 7

System Inverter Data Sheet

System Inverter Warranty Document

S5-GR3P(3-25)K

Solis Three Phase Inverters



360 degree

Model:

S5-GR3P3K S5-GR3P4K S5-GR3P5K S5-GR3P6K S5-GR3P8K S5-GR3P9K S5-GR3P10K
S5-GR3P12K S5-GR3P13K S5-GR3P15K S5-GR3P17K S5-GR3P20K S5-GR3P25K



Efficient

- ▶ Max. efficiency 98.7%
- ▶ String current up to **16A**
- ▶ Wide voltage range and low startup voltage



Safe

- ▶ IP66
- ▶ AFCI protection, proactively reduces fire risk
- ▶ Automatic voltage stabilization technology in weak grid conditions



Smart

- ▶ Supports export power control
- ▶ Supports RS485, WiFi, GPRS
- ▶ Scan to register on SolisCloud, supports remote upgrade and control



Economic

- ▶ Compact design, simple installation and maintenance
- ▶ > 150% DC/AC ratio
- ▶ Supports high power modules for lower installation costs

Datasheet

Model Name	S5-GR3P3K	S5-GR3P4K	S5-GR3P5K	S5-GR3P6K	S5-GR3P8K	S5-GR3P9K	S5-GR3P10K	S5-GR3P12K	S5-GR3P13K	S5-GR3P15K	S5-GR3P17K	S5-GR3P20K	S5-GR3P25K
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Input DC

Recommended max. PV power	4.5 kW	6 kW	7.5 kW	9 kW	12 kW	13.5 kW	15 kW	18 kW	19.5 kW	22.5 kW	25.5 kW	30 kW	37.5 kW
Max. input voltage	1100 V												
Rated voltage	600 V												
Start-up voltage	180 V												
MPPT voltage range	160-1000 V												
Max. input current	16 A / 16 A						32 A / 32 A						
Max. short circuit current	25 A / 25 A						50 A / 50 A						
MPPT number/Max. input strings number	2/2						2/4						

Output AC

Rated output power	3 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	13 kW	15 kW	17 kW	20 kW	25 kW
Max. apparent output power	3.3 kVA	4.4 kVA	5.5 kVA	6.6 kVA	8.8 kVA	9.9 kVA	11 kVA	13.2 kVA	14.3 kVA	16.5 kVA	18.7 kVA	22 kVA	27.5 kVA
Max. output power	3.3 kW	4.4 kW	5.5 kW	6.6 kW	8.8 kW	9.9 kW	11 kW	13.2 kW	14.3 kW	16.5 kW	18.7 kW	22 kW	27.5 kW
Rated grid voltage	3/N/PE, 220 V / 380 V, 230 V / 400 V												
Rated grid frequency	50 Hz / 60 Hz												
Rated grid output current	4.6 A / 4.3 A	6.1 A / 5.8 A	7.6 A / 7.2 A	9.1 A / 8.7 A	12.2 A / 11.5 A	13.7 A / 13.0 A	15.2 A / 14.4 A	18.2 A / 17.3 A	19.8 A / 18.8 A	22.8 A / 21.7 A	25.8 A / 24.6 A	30.4 A / 28.9 A	38.0 A / 36.1 A
Max. output current	4.7 A	6.4 A	7.9 A	9.5 A	12.7 A	14.3 A	15.9 A	19.1 A	20.7 A	23.8 A	27 A	31.8 A	39.7 A
Power Factor	>0.99 (0.8 leading - 0.8 lagging)												
THDi	<2%												

Efficiency

Max. efficiency	98.3%				98.5%				98.6%				98.7%
EU efficiency	97.9%				98.1%				98.2%				98.2%

Protection

DC reverse-polarity protection	Yes												
Short circuit protection	Yes												
Output over current protection	Yes												
Surge protection	Yes												
Grid monitoring	Yes												
Anti-islanding protection	Yes												
Temperature protection	Yes												
Integrated AFCI (DC arc-fault circuit protection)	Yes ⁽¹⁾												
Integrated DC switch	Optional												

General Data

Dimensions (W*H*D)	310*563*219 mm						
Weight	17.3 kg		18 kg		18.9 kg	20.3 kg	20.5 kg
Topology	Transformerless						
Self consumption (night)	<1 W						
Operating ambient temperature range	-25 ~ +60°C						
Relative humidity	0-100%						
Ingress protection	IP66						
Cooling concept	Natural convection			Intelligent redundant fan-cooling			
Max. operation altitude	4000 m						
Grid connection standard	G98 or G99, VDE-AR-N 4105 / VDE V 0124, EN 50549-1, VDE 0126 / UTE C 15 / VFR:2019, RD 1699 / RD 244 / UNE 206006 / UNE 206007-1, CEI 0-21, C10/11, NRS 097-2-1, TOR, EIFS 2018.2, IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530						
Safety/EMC standard			IEC/EN 62109-1/-2, IEC/EN 61000-6-1/-2/-3/-4				

Features

DC connection	MC4 connector												
AC connection	Quick connection plug												
Display	LCD												
Communication	RS485, Optional: Wi-Fi, GPRS												

(1) Activation required.

LIMITED PRODUCT WARRANTY

The Ginlong Technologies Co., Ltd. ("Ginlong") Limited Product Warranty (the "Limited Warranty") in this document covers the products listed in Table 1, below (the "Products"), when a claim for service under this Limited Warranty (a "Claim") is made by a Claimant (as defined in Section B, below), provided all of the applicable terms and conditions herein have been satisfied.

A. The Limited Warranty

Ginlong warrants that the Products will be free from defects and workmanship within the Warranty Period set forth in Section C, below. This Limited Warranty is subject to the terms and conditions in this document. This Limited Warranty may extend a Customer's statutory rights and cannot be construed so as to diminish such statutory rights.

The Limited Warranty under this document is available on and from May 1, 2024 ("Warranty Validation Date"). Unless otherwise agreed in writing, the Limited Warranty under this document is not applicable to any Products sold prior to the Warranty Validation Date. For the avoidance of doubt, the original terms and conditions supplied with that Product will continue to apply for any Product sold prior to the Warranty Validation Date.

B. Limited Warranty Eligibility

Who may submit a Claim?

A "Customer" is anyone who purchased the Products:

1. directly from Ginlong, or
2. from an authorised reseller who acquired the Products from Ginlong legitimately and made no modifications to the Products.

A "Warranty Holder" may be:

1. a Customer; or
2. a transferee who receives a Product from a Customer and who has followed the proper process set forth in Section F, below, to transfer the Limited Warranty.

A "Claimant" may be:

1. a Warranty Holder; or
2. a third party designated by the Warranty Holder for the purpose of submitting a Claim on the Warranty Holder's behalf.

Only a Claimant may submit a Claim.

When must a Claim be submitted?

Any Claim must be received by Ginlong within the Limited Warranty Period set forth in Table 1, below.

C. Limited Warranty Period and Products Covered

The Limited Warranty Period commences on the date the Product is sold to the Customer, if the Customer is an individual person. Otherwise, the Limited Warranty Period commences at the earlier of:

1. the date the Products are commissioned at installation; or
2. six (6) months after the Products are dispatched from the Ginlong factory.

(as applicable, the Limited Warranty Commencement).

The Limited Warranty Period is the timeframe from Limited Warranty Commencement until the expiration of the applicable Limited Warranty Period set forth in Table 1, below. The Limited Warranty Period may be extended in accordance with Ginlong's policy, or a written agreement between Ginlong and the Warranty Holder. If the Claimant applies for extended Limited Warranty Period, the Products need to be delivered to the place designated by Ginlong. The service scope of extended Limited Warranty is limited to the replacement or repair of the Products' hardware. For other conditions and details of extended Limited Warranty, please refer to Ginlong's policy or the written agreement between Ginlong and the Warranty Holder.

The Limited Warranty Period for any Products that has been replaced or repaired under this Limited Warranty shall be the greater of:

1. the remaining Warranty Period of the defective Product; or
2. three (3) months from repair/replacement.

Table 1

Product	Limited Warranty Period
Solis Grid-tied Inverter on sale	5 Years
Solis Storage Inverter on sale	5 Years
Accessories	2 Years

D. Limited Warranty Claim Procedure

To make a Claim, the Claimant shall promptly notify Ginlong upon detection that the Products are non-conforming or defective. To determine if the Product is covered by this Limited Warranty, the Claimant shall notify Ginlong's service department in writing of the issue. Such notice shall include:

1. Detailed information about the defect;
2. Completed Warranty Claim Form, which can be obtained from a Solis Service Agent via the Solis website ;
3. Product Model (i.e. S6-GR1P(2.5-6)K) and Product Serial Number (i.e.160D72198270017);
4. Copy of the Product invoice; and
5. Copy of the installation report/certificate.

After receiving notice from the Claimant, Ginlong will determine whether or not the reported defect is eligible for coverage under the Limited Warranty. If Ginlong determines, in its sole discretion, that the reported defect is not eligible, Ginlong will notify the Claimant accordingly and will explain the reason why such coverage is not available. See Warranty Exclusions in Section E, below, for details.

Note that the Product label must be completely undamaged and legible and properly attached to the Product. If the aforementioned requirements are not fully met, Ginlong has no obligations under this Limited Warranty.

If all of the requirements herein are met and the Product is eligible for coverage under the Limited Warranty, Ginlong shall, in its sole discretion:

1. Provide replacement Product(s); or
2. Instruct an accredited service provider to visit the Warranty Holder's location to repair the defects or provide replacement Product(s); or
3. Direct the Warranty Holder to return the Product(s) to Ginlong for repair or replacement.

Ginlong will provide instructions for proper return or disposal of the defective Product. Any replacement provided by Ginlong may be, at Ginlong's sole discretion, new or factory refurbished. Any replacement provided by Ginlong will be at least functionally equivalent in feature, function, and compatibility to the Product. A replacement may have cosmetic defects that have no influence on energy production or safety compliance.

Ginlong may repair or replace faulty parts at its discretion. If the Products or any parts are replaced by Ginlong under this Limited Warranty, all of the rights, title and interests in the returned Products/parts shall vest in Ginlong upon replacement.

The Warranty Holder must return the Products/parts in the original packaging or equivalent. If the replaced Products/parts are not received by Ginlong within thirty (30) days from the date the Warranty Holder receives the replacement, the Warranty Holder will be charged for the Products/parts at the current price for new Products/parts.

Ginlong may, in its sole discretion, elect to ship replacement Products/parts either prior to or after receipt of the Product, or after prepayment of the value of the replacement Product and delivery costs.



No claim for compensation may be made for any loss of profit or use (including energy that has not been fed into the grid, energy that has not been used for self-consumption, etc.). In no event, whether in contract, tort, or otherwise, shall the maximum compensation for the Warranty Holder's losses caused by a Product exceed the amount paid by the Customer for the purchase of the Products.

Ginlong's shall have no obligation to render on-site replacement services in locations where Ginlong, in its sole discretion, deems the location or circumstances too risky to render such services.

If any Claim made pursuant to this Limited Warranty is determined to be unfounded (i.e. the returned Product is not faulty), Ginlong will charge the Warranty Holder for all costs incurred, including but not limited to labour, travel, and delivery to and from the Warranty Holder.

Ginlong will notify the Claimant of any costs to be borne by the Warranty Holder prior to repair/replacement of the Product(s). Such the costs must be paid in advance. If the Warranty Holder declines to pay such costs, Ginlong reserves the right to withhold repair/replacement services.

Provided the Warranty Holder has been trained by Ginlong to perform an assembly replacement, Ginlong reserves the right to send an assembly in place of a replacement.

E. Limited Warranty Exclusions

Ginlong shall not be responsible or have any liability for failure to fulfil service commitments within the committed period of time when such issues are beyond Ginlong's reasonable control.

This Limited Warranty does not apply to damage (to hardware or data), costs or fees, or performance limitations/failures related to:

- Access, labour or transport costs;
- Loss or damage occurring whilst in transit
- Items ancillary to installation not supplied by Ginlong;
- Duties, import/export fees or costs and other general administrative costs;
- Consequential damages including but not limited to loss of revenue
- Fault caused by any other circumstance, event or matter, including another component in the Claimant's photovoltaic system, or any other event, device or appliance at the installation site;
- Defect unable to be identified upon examination of Products at the time of purchase or installation;
- Force majeure, including but not limited to extreme weather, lightning strikes, natural disasters, power surges, fires, pests, wars, etc.;
- Non-conformity with local certification requirements because of their changes during the Limited Warranty Period;
- Actions of third parties, event or accident outside Ginlong' s reasonable control and not arising under normal and standard operating conditions;
- Normal wear and tear;
- Improper handling, transportation, storage, or repackaging by anyone other than Ginlong;
- Failure to initially purchase the Products from Ginlong or the authorised reseller of Ginlong;
- Failure to return the replaced Products to Ginlong or the authorised reseller in time;
- Failure of the Customer to pay in full all amounts owing to Ginlong by the Customer;
- Expiry of the Limited Warranty Period;
- Failure to comply with Product manuals or other applicable documentation;
- Failure to meet system requirements, including but not limited to ambient environment or external electricity parameter settings, as stated in any applicable written documents;
- Improper system design, including insufficient protection from lightning or other environmental conditions;
- Accident, negligence, misuse, abuse, neglect, or intentional damage;
- Failure to observe safety regulations;
- Improper site preparation, installation, commissioning, or maintenance;
- Failure to have the Products installed correctly by a local grid company qualified installer and as per the installation instructions supplied with the Products or installed by Ginlong or the authorised reseller;
- Movement of the Products for any reason after they have been installed (regardless of whether the Products are subsequently reinstalled or moved back to the same location) unless the Products are reinstalled at the same location by a qualified installer and they are stored during any interim period in accordance with the Product manual;

- Repairs or attempted repairs by anyone other than Ginlong or its authorized representative;
- Products opened, modified, or disassembled without Ginlong's prior written consent;
- Adjustment, change, or removal of identification marks not in compliance with Ginlong's requirements or instructions;
- Problems in Warranty Holder's premises;
- Use in combination with software, equipment, and batteries not certified and listed on Ginlong's approved list for operation in the applicable territory with Ginlong's Energy Storage Inverter.

This Limited Warranty does not apply to cosmetic defects that do not impact energy production, or degrade form, fit, or function, or Products that were described in a quotation or delivery note as 'ex-display' or 'reconditioned' (A separate Warranty extension may have been issued to cover such Products).

F. Transferring the Limited Warranty

The Limited Warranty may be transferred from the Customer to another party after obtaining Ginlong's written approval. Ginlong will initiate the transfer of the Limited Warranty. A transferred Limited Warranty will be valid for the remainder of the Limited Warranty Period. Customer should discuss the transfer details with Ginlong to ensure the Limited Warranty is properly transferred and not void or voided.

G. Data Protection

If the Warranty Holder seeks warranty service provided by Ginlong, the Warranty Holder shall allow Ginlong to access, collect, and process information related to failure, detection, identifying, and debugging when providing the services. Such information will only be used to provide warranty services. Because the Warranty Holder is the controller of such information, Ginlong cannot confirm whether such information contains Warranty Holder confidential information or personal data.

The Warranty Holder shall have sole responsibility and ensure that they will obtain and retain all necessary consent, permission, and authorisation ("Consent"), in accordance with applicable legal requirements, for Ginlong to provide such service, so that Ginlong will not violate applicable legal requirements, Warranty Holder's privacy policies, or Warranty Holder's user-agreements in providing services.

Ginlong will take reasonable measures to ensure the security of Warranty Holder's information, but Ginlong is not responsible and shall have no direct or indirect liability related to the acquisition, processing, and/or loss of such information in the process of providing services.

If the Warranty Holder returns Products to Ginlong, it indicates that the Warranty Holder has backed up any confidential, private, personal, or other information stored in the Products and has completely deleted such information from the Products. It further indicates that the Warranty Holder authorises Ginlong to transfer the Products to the Ginlong service centre in other countries for maintenance. The Warranty Holder shall be solely responsible for deleting the above information before delivering the hardware to Ginlong. The Warranty Holder shall indemnify, defend, and hold Ginlong harmless from and against any and all claims, liabilities, obligations, costs, expenses, penalties, fines, confiscations and rulings imposed by any government agency or third party as a result of Ginlong's failure to comply with applicable laws and regulations in transferring and disposing of the above information.

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