



25kWp System

Vastern Road - Block BC - O453-ENV23-B0B-RF-TS-W-676-0003

Technical Submission Document



Contents

Section 1

System Layout Drawing

Section 2

System Design

Section 3

System PV Wiring Schematic Diagram

Section 4

System Weight & Wind Load Calculations

Section 5

System Mounting Solution Data Sheet

System Mounting Solution Warranty Document

Section 6

System Solar Panel Data Sheet

System Solar Panel Warranty Document

Section 7

System Inverter Data Sheet

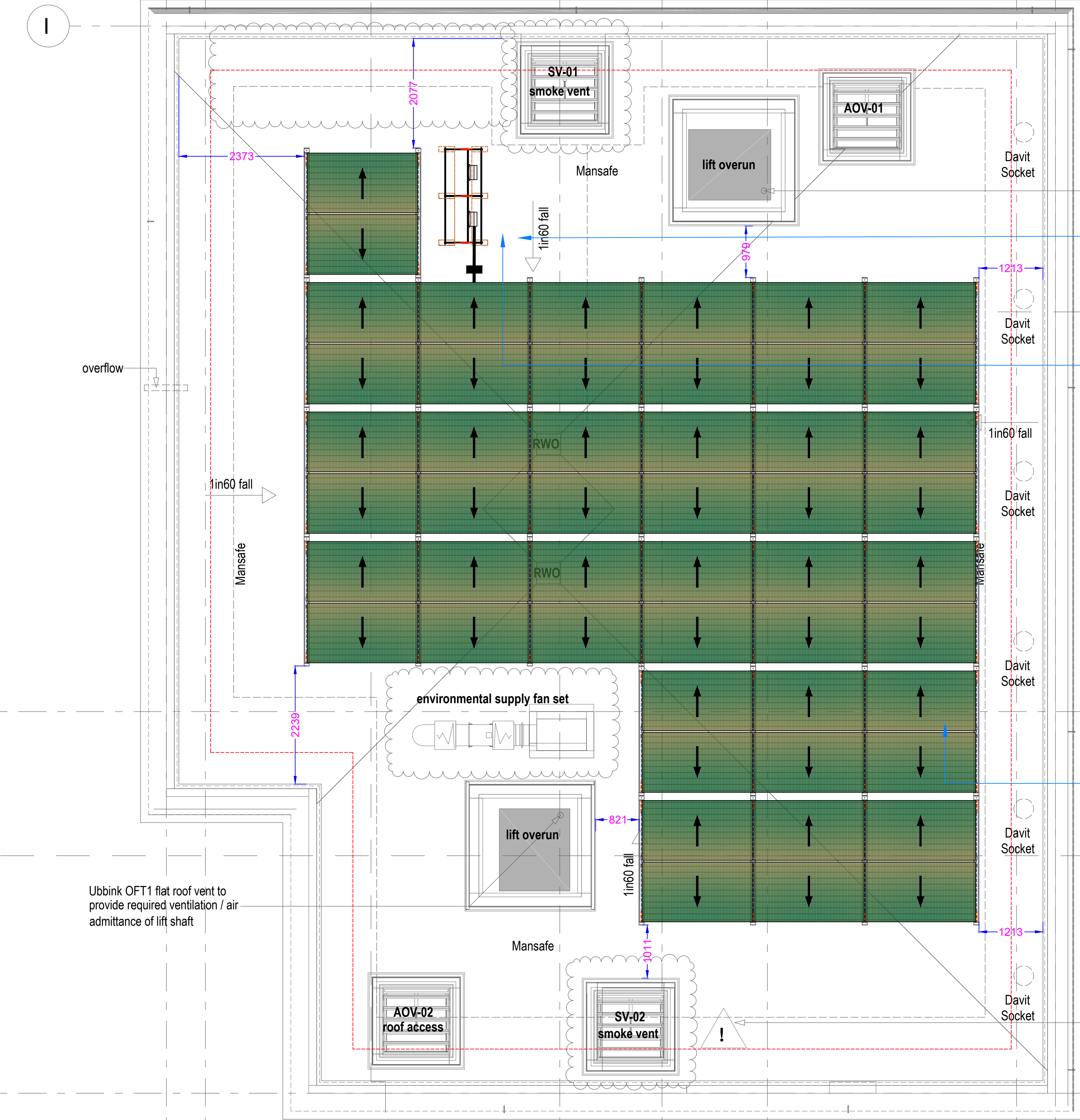
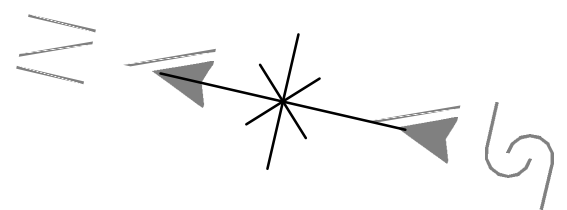
System Inverter Warranty Document

Maintenance Arrangement

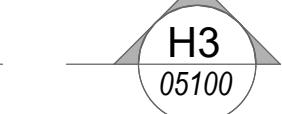
PV panels and associated equipment are low maintenance and it is recommended to perform a visual inspection annually. This entails a visual inspection of all accessible system components, testing the strings, checking the DC and AC connections, documenting the system generation and gathering inverter data and checking for any error messages; this is detailed within a report and sent back with supporting images with any further recommendations noted for your consideration. If additional works are required this will be outlined in the report i.e. items are broken then a cost can be issued to replace under warranty, or if the system is dirty and requires cleaning then a cost can be provided

Section 1

System Layout Drawing

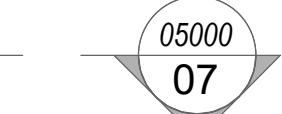


DC Cables contained in 50mm galvanized tray on big feet



2X Solis 3P-10K inverter frame mounted at roof level (Electrician to run AC cable and terminate in to IP rated AC isolator adjacent inverter)

50 x 500W PV panels self ballasted at 10° inclination



safety eye bolts to be provided to high level smoke shafts or lift overruns to facilitate ladder access to equipment above main roof level - ensure mansafe system provides suitable protection at high level

C3	17/01/25	RK	CONSTRUCTION ISSUE
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
-------	----------------------

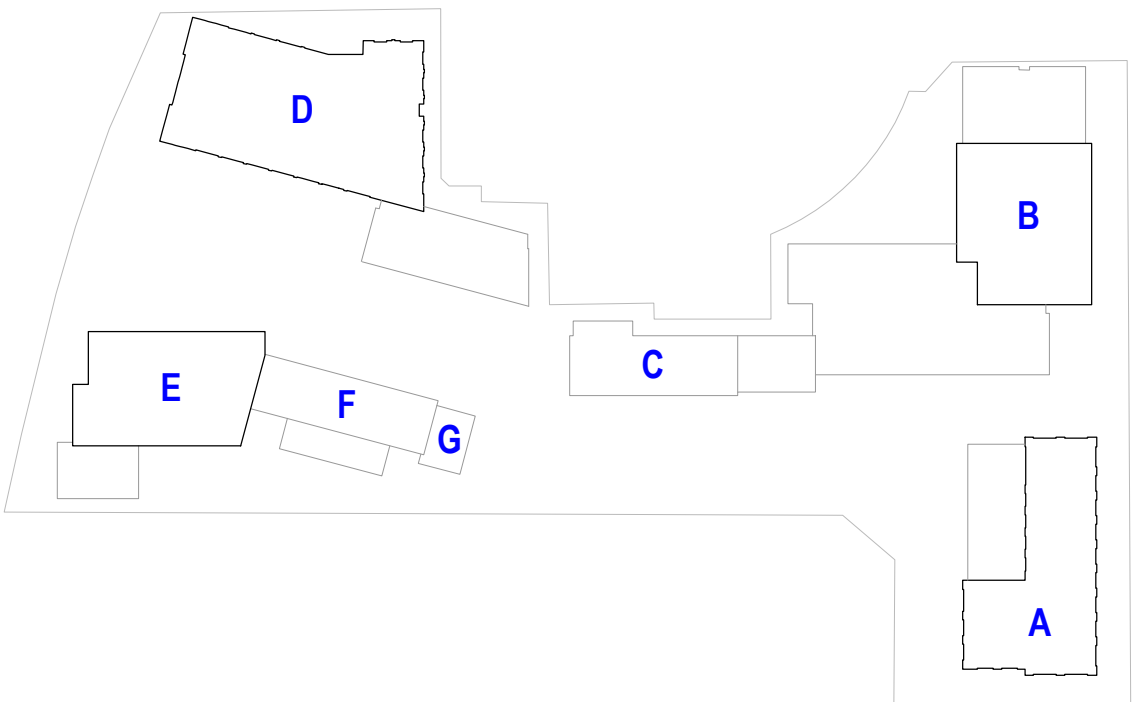
Scale	A1 - 1:50	Designed By	R.K	Checked By	JS	DATE	30/08/24
-------	-----------	-------------	-----	------------	----	------	----------

Envirolec Smart Energy Solutions
Unit 6,
Murray Business Centre,
Murray Road, Orpington
BR5 3RE
@envirolec-ses.co.uk

VR	PV	004	C3
----	----	-----	----

THIS DRAWING IS THE COPYRIGHT OF ENVIROLEC SES LTD. AND SHALL NOT BE USED WITHOUT PERMISSION

SITE PLAN NTS?



ROOF TYPE & HEIGHT

HEIGHT FFL: 32.7M
ROOF TYPE: FLAT ROOF
BUILD UP, CONCRETE SLAB
WITH TAPERED INSULATION
ON SINGLE PLY
WATERPROOFING
MEMBRANE ON TOP

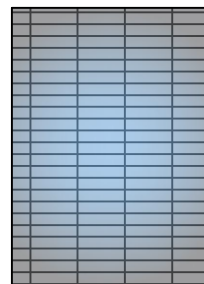
THREE PHASE INVERTERS

2X SOLIS - S5-GR3P10K
1 STRING OF 13 + 1 STRING OF 12

Inverter Installed : on Roof,
Metal Framing

MODULES & ROOF AREA

50 PANELS



JA SOLAR
(2093 X 1134 X 30)
26.3KG
500W

XX ARCBOXES

MOUNTING SYSTEM
RENUSOL 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

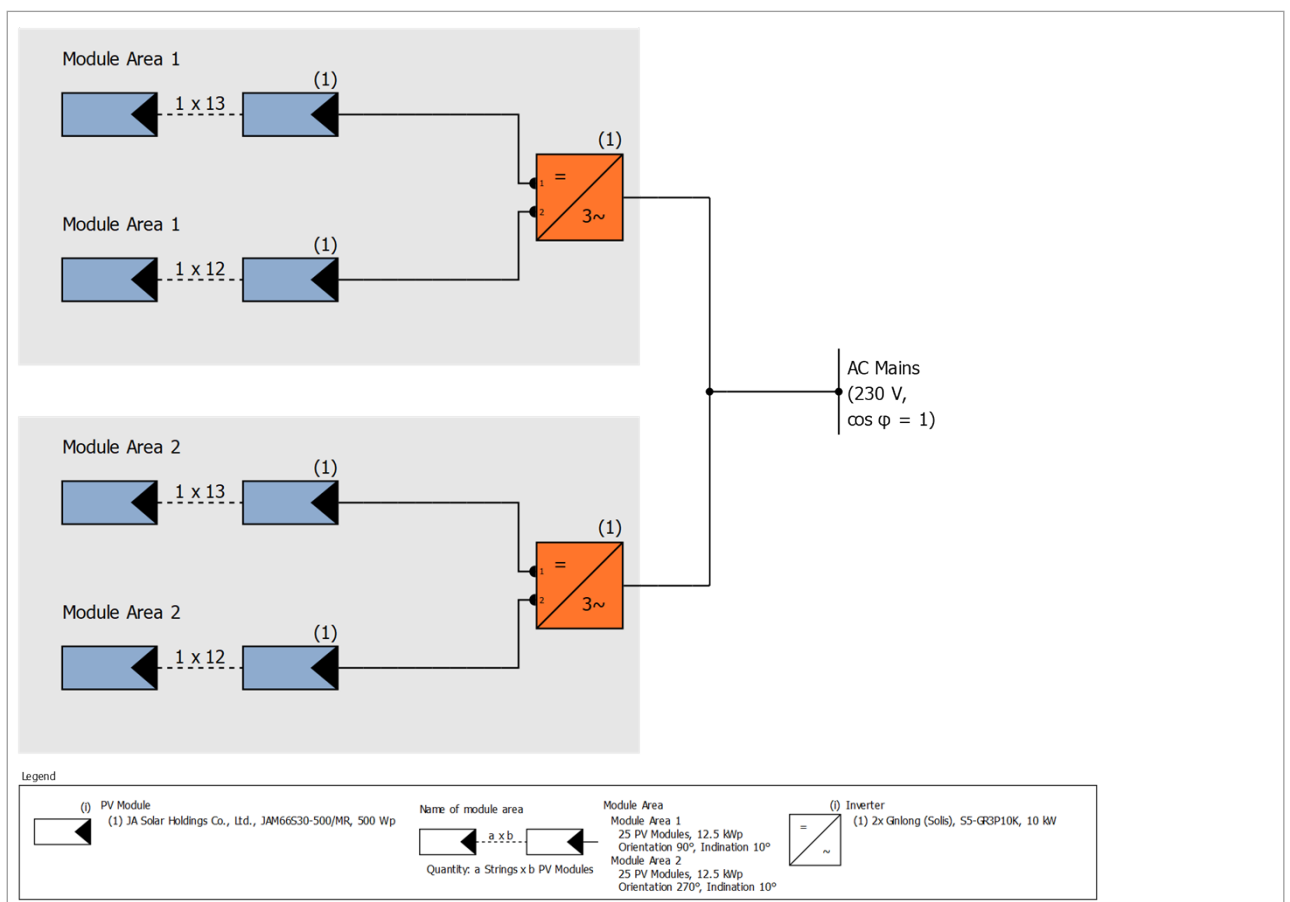


Figure: Schematic diagram

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

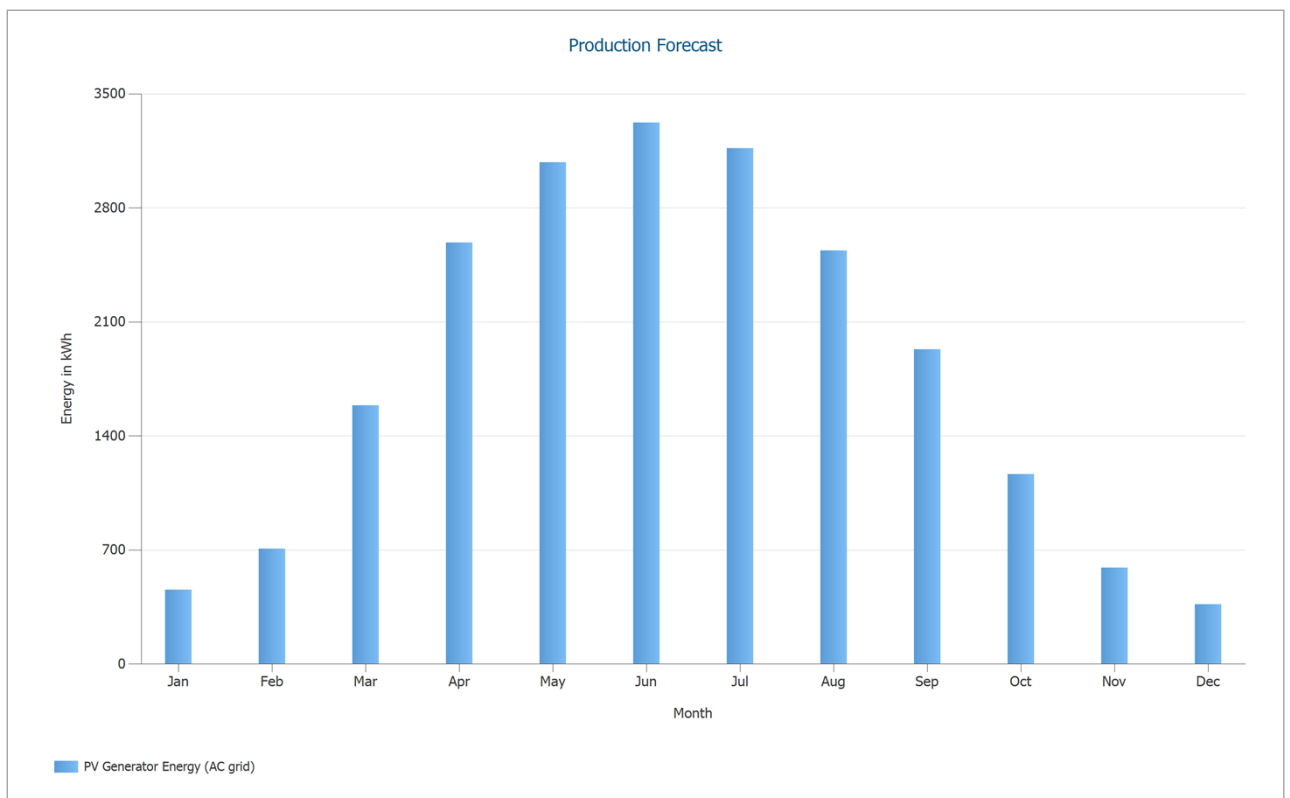
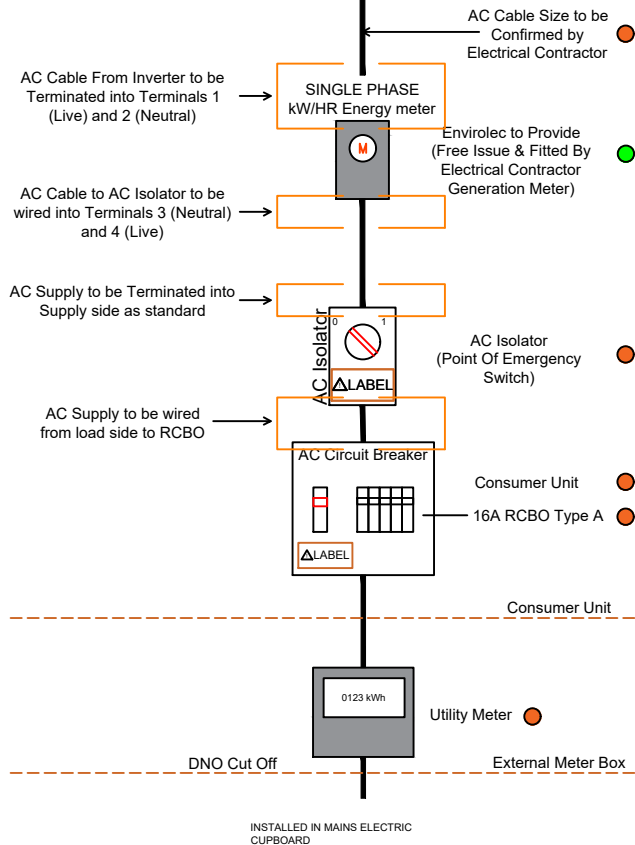
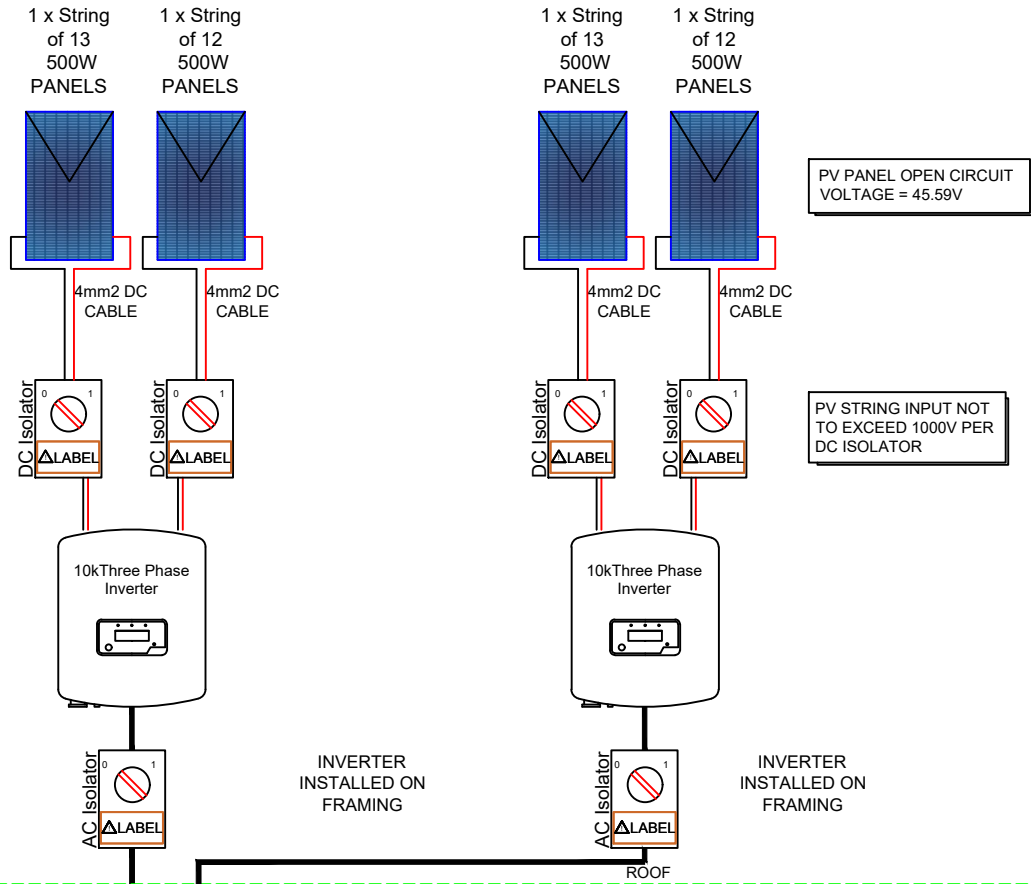


Figure: Production Forecast

Section 3

System PV Wiring Schematic Diagram



- ITEMS TO BE FREE ISSUED BY ENVIROLEC AND FITTED BY ELECTRICAL CONTRACTOR
- ITEMS TO BE SUPPLIED & INSTALLED BY OTHERS

C2	11/01/23	R.K.	CONSTRUCTION ISSUE
C1	30/08/24	R.K.	CONSTRUCTION ISSUE
REV	DATE	DRAWN BY	DESCRIPTION
Issue Status			
CONSTRUCTION			
Project			
VASTERN ROAD BLOCK BC			
Title			
SOLAR PV WIRING SCHEMATIC			
Scale	Designed By	Checked By	DATE
A1 - 1:50	R.K.	JS	30/08/24
Envirolec Smart Energy Solutions			
Unit 6, Murrey Business Centre, Murrey Road, Orpington BR5 3RE			
@envirolec-965.co.uk			
VR	PV	502	C2

Section 4

System Weight & Wind Load Calculations

Technical project overview

Vastern Road

Building project	Vastern Road
Date	21.03.2025
In-house project no.	PA_240910_620968
Comment	The wind speed in the report is based on BS EN 1991-1-4, which is part of the Eurocode series of standards for structural design. By using BS EN 1991-1-4, the report adopts this 50-year return period as a conservative benchmark for structural safety, ensuring that designs can withstand extreme and reasonably rare wind conditions.
Editor	Renusol Europe GmbH
Link to configurator	Open link
Number of modules	100
Rated output	50 kWp

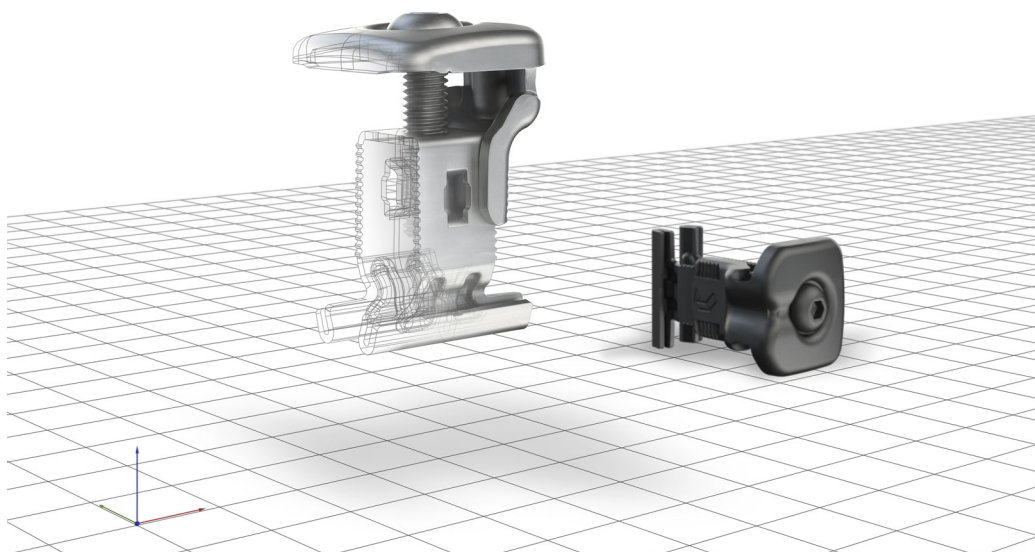


TABLE OF CONTENTS

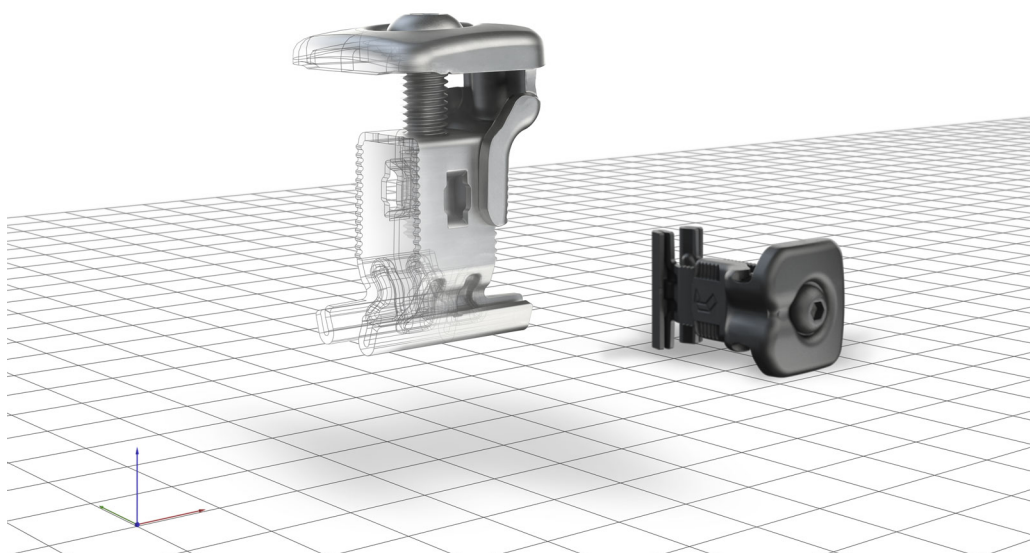
Planned construction Block A Revised 17.01.25	4
Specifications	5
Location	5
Surroundings	5
Load calculation result	5
Topography	5
Roof properties	6
Module parameters	6
System	7
Fastener details	7
Clamps	7
Static validation	8
Project documentation	9
Drawings	9
Ballast profile position	10
Assignment of modules with type of ballasting	11
Types of ballasting for your project	12
Module fields	13
Module overview with ballast values	14
Module field 1	15
Modules with positions counter for statics tables	16
Bill of material	17
Roof statics	18
Module field statics	19
Statics analysis (S1-S6)	20
Planned construction Block B C Revised 17.01.25	23
Specifications	24
Location	24
Surroundings	24
Load calculation result	24
Topography	24
Roof properties	25
Module parameters	25
System	26
Fastener details	26
Clamps	26
Static validation	27
Project documentation	28

Drawings	28
Ballast profile position	29
Assignment of modules with type of ballasting	30
Types of ballasting for your project	31
Module fields	32
Module overview with ballast values	33
Module field 1	34
Modules with positions counter for statics tables	35
Bill of material	36
Roof statics	37
Module field statics	38
Statics analysis (S1-S6)	39
Total bill of material	42
Important notes	43

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	FSPro10EW
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	50 years
Failure consequence class	2

LOAD CALCULATION RESULT

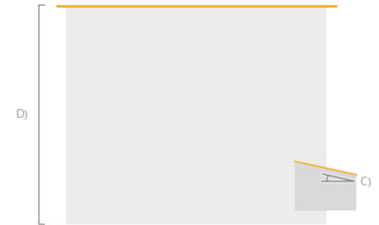
Peak velocity pressure	1,05 kN/m ²
Snow load	0,40 kN/m ²
Snow load on roof	0,32 kN/m ²
Base wind speed ($V_{b,0}$)	21,50 m/s

TOPOGRAPHY

Topography	Not exposed
------------	-------------

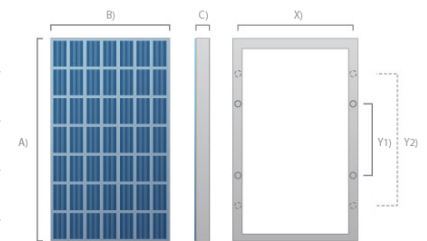
ROOF PROPERTIES

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	30 mm
Weight	25.2 kg
Rated output	500 W _{peak}
Color	black
Datasheet	Open datasheet

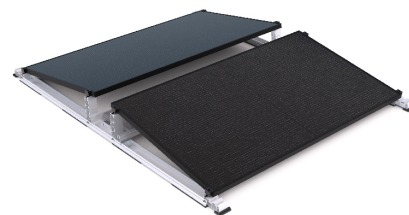


Please check the compatibility of clamping positions with module manufacturer advice.

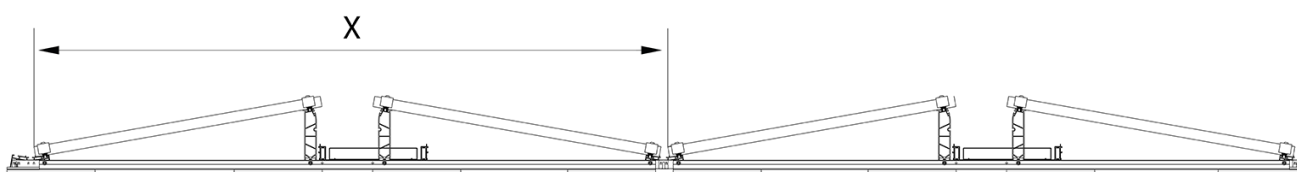
The module data was taken from a database. Please check whether this data corresponds to your actual module order. If necessary, please correct the data using the editing function.

SYSTEM

System type	Ballasted
System	FSPro10EW



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



FASTENER DETAILS

Mounting direction of modules	Landscape
Module clamping side	Short side
X) Row distance	2360mm
Sideplates	Never
Add third rail under the module	Always
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: 56 kg

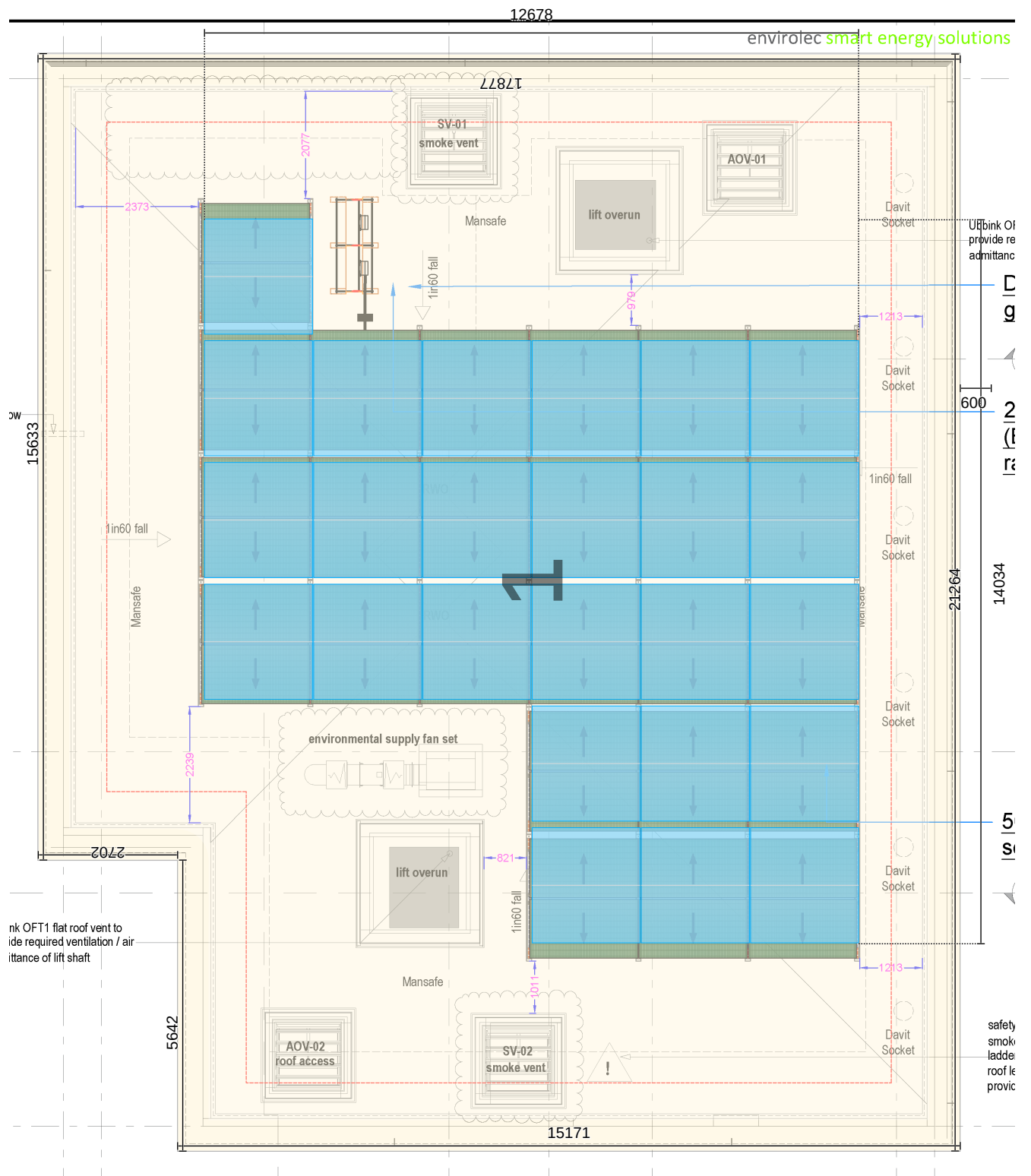
Ballast: 1531 kg

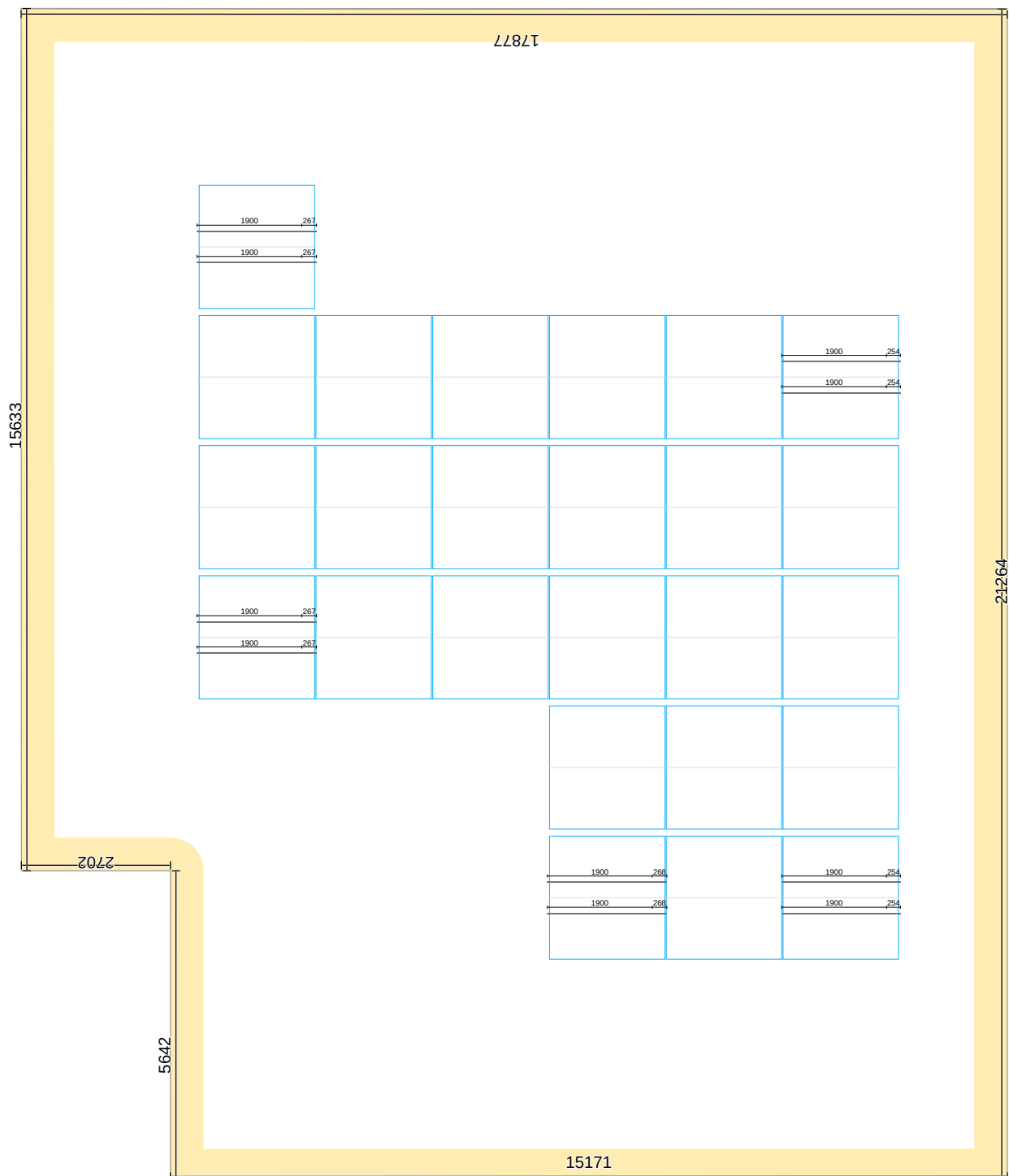
Modules: 1315 kg

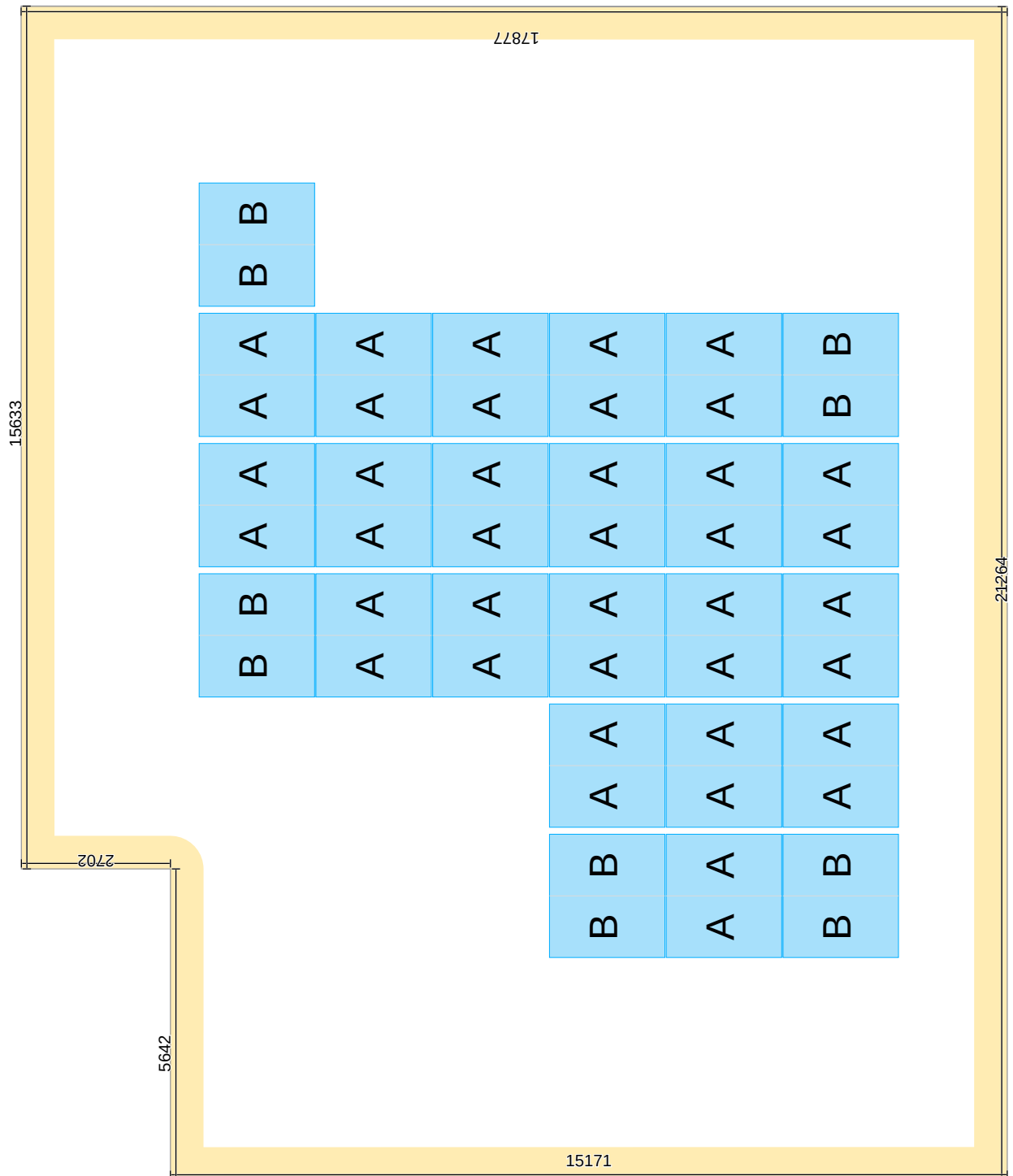
Partlist: 198 kg

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:

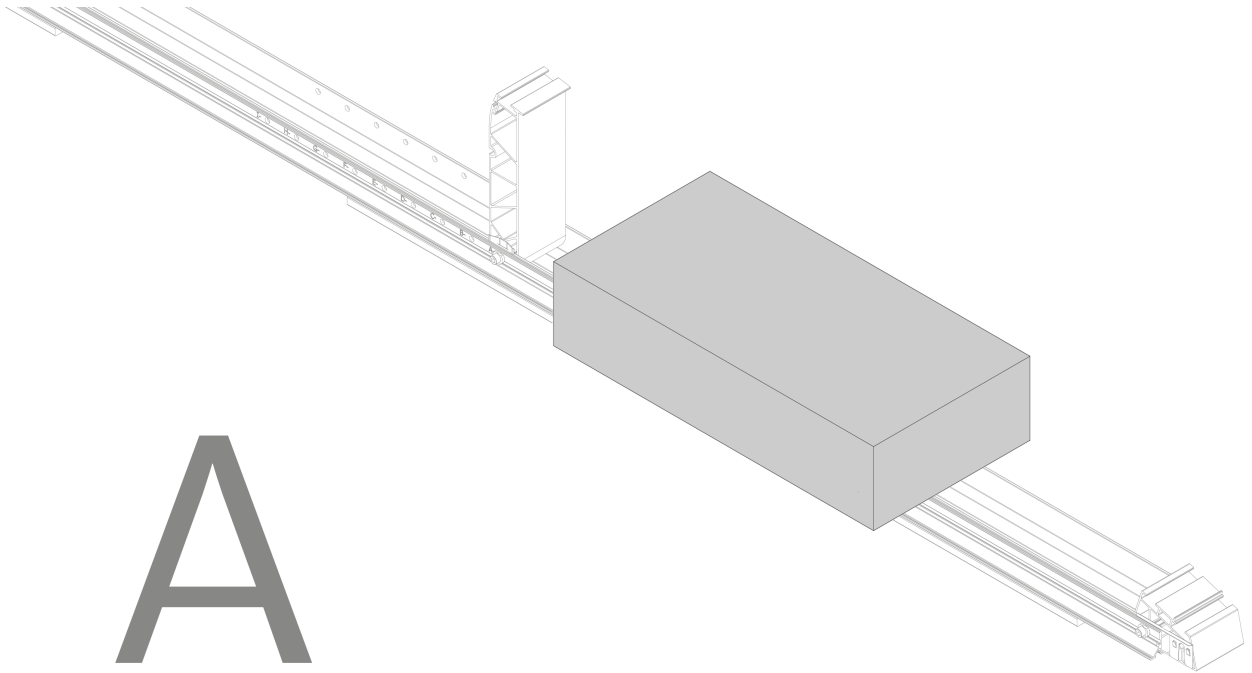
- Failure consequence class: 2
- Partial safety factor dead load (ballast): 1



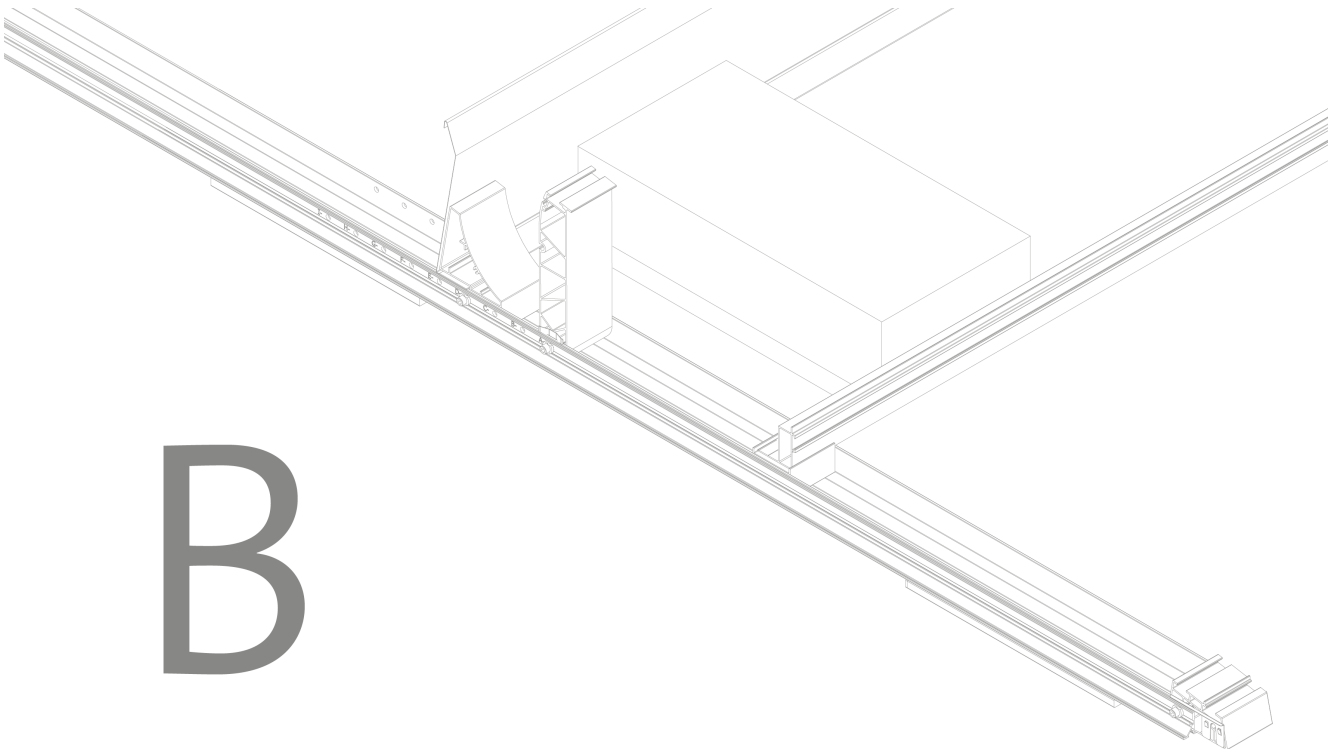


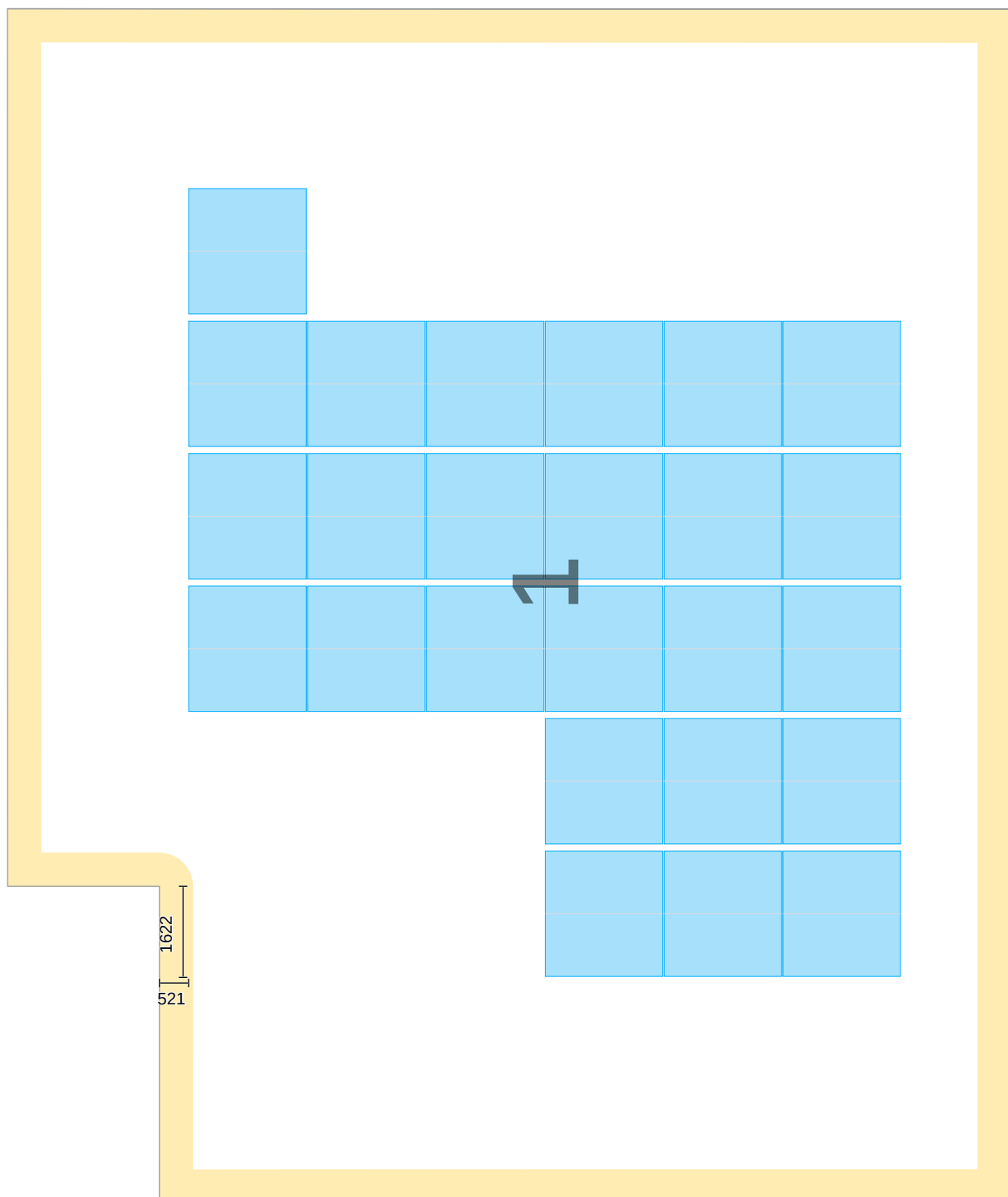


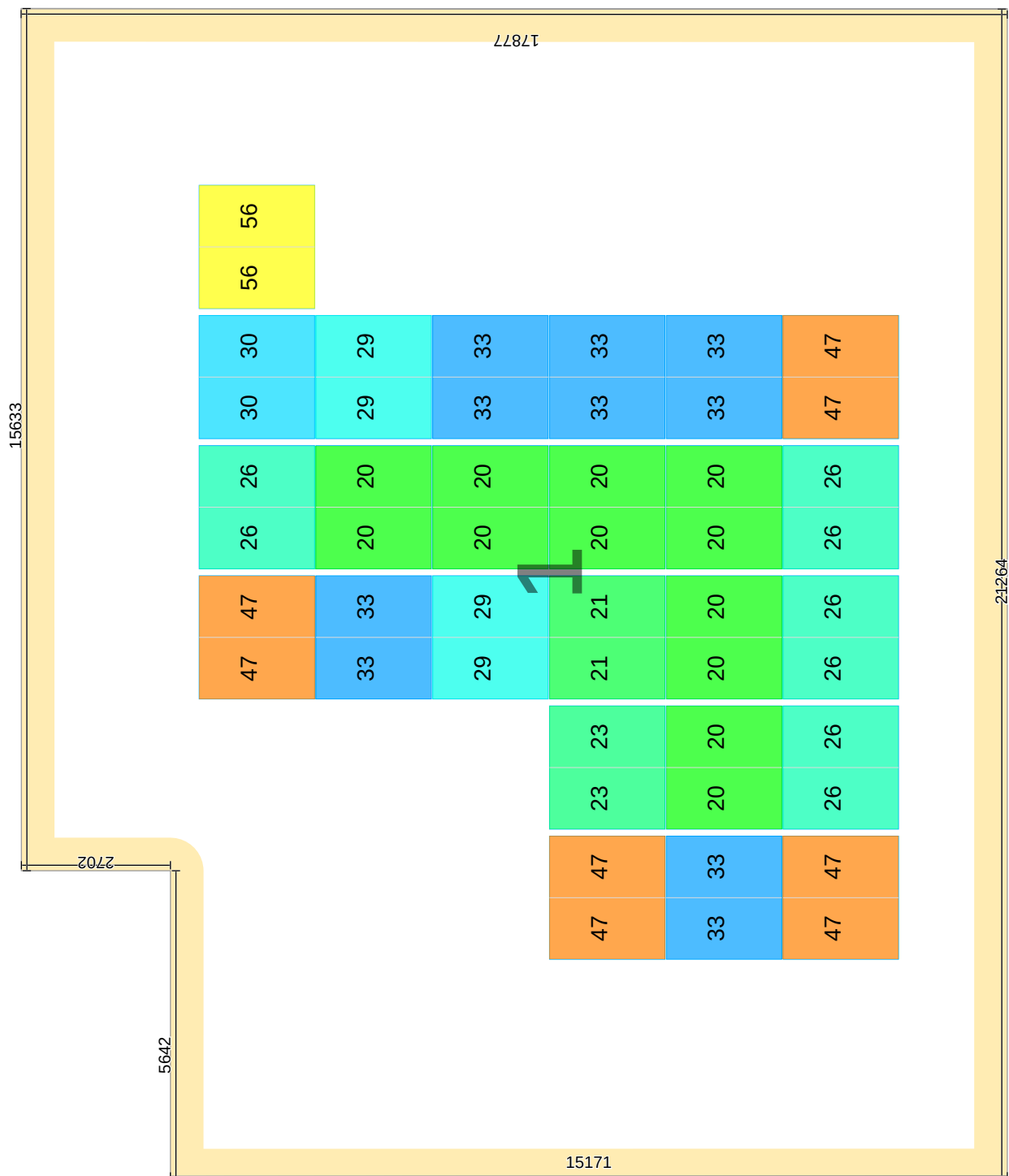
A



B



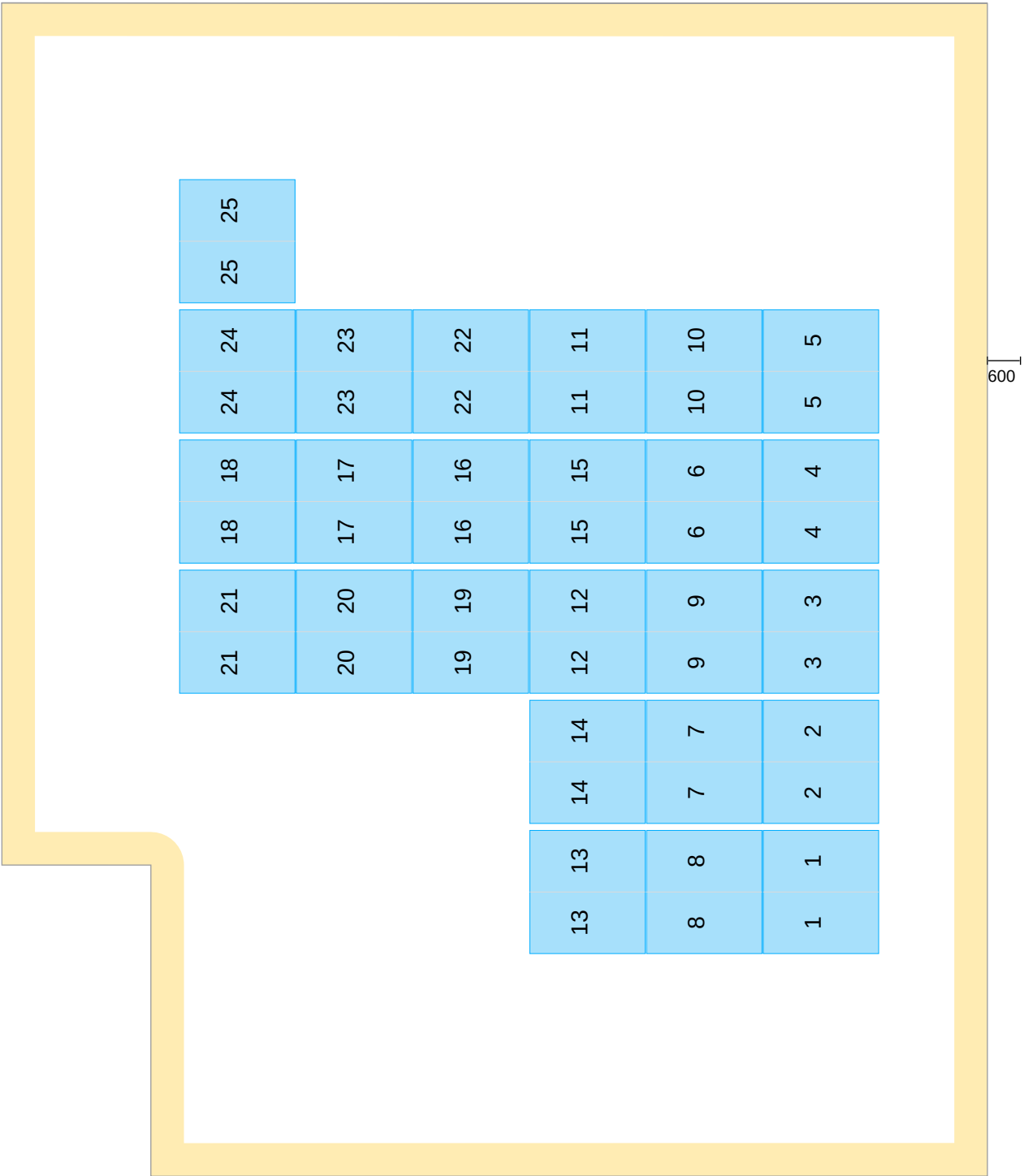




Ballast value[kg] (Blocks with 10 kg) / Sum of ballast stones: 170

20 (2)	21 (3)	23 (3)	26 (3)	29 (3)	30 (3)	33 (4)	47 (5)	56 (6)
(12 x 2)	(2 x 3)	(2 x 3)	(8 x 3)	(4 x 3)	(2 x 3)	(10 x 4)	(8 x 5)	(2 x 6)





BILL OF MATERIAL

Article No.	Article	Quantity	Ordering Unit	Weight/Piece	Weight
R420081	End clamp+	110	1	0,064 kg	7,040 kg
R420082	Middle clamp+	76	1	0,063 kg	4,788 kg
R500227	FS Pro Securing bolt	56	1	0,008 kg	0,448 kg
R500231	FS Pro 10-S Eave support	12	1	0,128 kg	1,536 kg
R500232	FS Pro 10-EW Eave support	1	1	0,196 kg	0,196 kg
R500235	FS Pro adapter LS	50	1	0,124 kg	6,200 kg
R500250	FS Pro Ballast profile 1900	12	1	1,385 kg	16,620 kg
R500251	FS Pro Ballast profile connector	10	1	0,152 kg	1,520 kg
R500252	FS Pro Ballast profile support	30	1	0,055 kg	1,650 kg
R500253	FS Pro Securing clip ballast support	30	1	0,007 kg	0,210 kg
R500261	FS Pro Potential equalisation clip EW	43	1	0,015 kg	0,645 kg
R500270	FS Pro Roof protection pad 300	7	1	0,016 kg	0,112 kg
R520223	FS Pro 10-EW Base rail 2300 (Set)	56	1	2,775 kg	155,400 kg
R520282	FS Pro Middle clamp+ EW	19	1	0,066 kg	1,254 kg
R900229	Self Drilling Screw 4,8x19 SW8 E14 A2	1	100	0,005 kg	0,500 kg
				Total Weight: 198,119 kg	

ROOF STATICS**ROOF STATICS**

Total weight	2989 kg
Module weight	1260 kg
Ballast	1531 kg
Max ballast	56 kg
Roof size	364,94 m ²
Weight per total roof area	8,19 kg/m ²
Mounting system weight	198,12 kg

MODULE FIELD STATICS**FIELD1**

Total weight	2989 kg
Module weight	1260 kg
Ballast	1531 kg
Max ballast	56 kg
Field area	124,41 m ²
Weight per field area	24,03 kg/m ²
Mounting system weight	198,12 kg

LOAD ASSUMPTIONS

Dead load

Solar modules type JAM66S30-500/MR (1500V) are used.

Dimensions: 2093 mm x 1134 mm

Weight: $G = 25.2 \text{ kg}$

Snow load

The determination of the snow load is carried out according to BS EN 1991-1-3:2003/NA:2010-06.

Snow-trap formation or snow-load accumulations are not considered in the calculation. Please contact Renusol if necessary.

Height above sea level: 38 m

Snow load zone: 2

Roof pitch: $\alpha = 2^\circ$

Module elevation: $\beta = 10^\circ$

total pitch: 2.0°

Period of use: 50 Year

Snow load: $s_k = 0.40 \text{ kN/m}^2$

$$\mu_{11} = 0.800$$

$$s_1 = \mu_{11} * s_k = 0.8 * 0.40 \text{ kN/m}^2 = 0.320 \text{ kN/m}^2$$

$$s_{1,2^\circ} = 0.320 \text{ kN/m}^2 * \cos(2.0^\circ) = 0.320 \text{ kN/m}^2$$

Wind load

The determination of the wind load is carried out according to BS EN 1991-1-4:2005/NA:2011-01.

Building height roof ridge: 33 m

Terrain category: Sea

Basic wind velocity: 21.50 m/s

Period of use: 50 Year

Pressure of the gusts velocity: $q(z) = 1.047 \text{ kN/m}^2$

MODULSTATIK

Systemkonstanten

$$\gamma_G = 1$$

$$\gamma_Q = 1.5$$

$$A_M = 2.37 \text{ m}^2$$

$$\beta_M = 10.0^\circ$$

$$m = 54.4 \text{ kg}$$

$$\alpha = 2^\circ$$

$$\mu = 0.5$$

$$q_p = 1.047 \text{ kN/m}^2$$

$$g = 9.81 \text{ m/s}^2$$

Teilsicherheitsbeiwert Eigengewicht

Teilsicherheitsbeiwert Wind

Modulfläche

Module elevation

Masse eines Modultisches (2 Module incl. Unterkonstruktion)

Roof pitch

Reibbeiwert

Pressure of the gusts velocity

Erdbeschleunigung

Koeffizienten und Beiwerte

$$n$$

$$80 \text{ m}^2 \leq A_{\text{eff}} = 2 * n * A_M \leq 930 \text{ m}^2$$

$$k_A = 1 - 0.49 * \lg(A_{\text{eff}}/80 \text{ m}^2) / \lg(930/80)$$

$$k_R = 1.6$$

$$k_p$$

$$k_\alpha = \mu / (\mu * \cos(\alpha) - \sin(\alpha)) = 1.08$$

$$cp_1^A, cp_2^A, cp_1^B, cp_2^B$$

Effektive Anzahl Modultische

Effektive Modulfläche

Koeffizient für effektive Modulfläche

Koeffizient nur für Module mit geringem Abstand zum Dachrand

Koeffizient für Attikahöhe

Koeffizient für Dachneigung im Lastfall Verschieben

Druckberwerte auf Module für Referenzsysteme A bzw. B

Gesamtdruckbeiwerte

$$c_1^A = cp_1^A * k_p * k_A * k_R$$

$$c_2^A = cp_2^A * k_p * k_A * k_R$$

$$c_1^B = cp_1^B * k_p * k_A * k_R$$

$$c_2^B = cp_2^B * k_p * k_A * k_R$$

Einwirkende Kräfte

$$F_z^A = -q_p * A_M * \cos(\beta_M) * (c_1^A + c_2^A)$$

$$F_x^A = q_p * A_M * \sin(\beta_M) * |c_1^A - c_2^A|$$

$$F_z^B = -q_p * A_M * \cos(\beta_M) * (c_1^B + c_2^B)$$

$$F_x^B = q_p * A_M * \sin(\beta_M) * |c_1^B - c_2^B|$$

Vertikale Last - Referenzsystem A

Horizontale Last - Referenzsystem A

Vertikale Last - Referenzsystem B

Horizontale Last - Referenzsystem B

Ballastermittlung (pro Modultisch)

$$G_W^A = k_\alpha * \gamma_Q * (F_x^A / \mu + F_z^A) / \gamma_G$$

$$G_W^B = k_\alpha * \gamma_Q * (F_x^B / \mu + F_z^B) / \gamma_G$$

$$G_W = 0.40 * G_W^A + 0.60 * G_W^B$$

$$G_A^A = \cos^{-1}(\alpha) * \gamma_Q * F_z^A / \gamma_G$$

$$G_A^B = \cos^{-1}(\alpha) * \gamma_Q * F_z^B / \gamma_G$$

$$G_A = 0.40 * G_A^A + 0.60 * G_A^B$$

$$B = \text{MAX}(G_W, G_A) / g - m$$

Erforderliches Gesamtgewicht im Lastfall Verschieben - Referenzsystem A

Erforderliches Gesamtgewicht im Lastfall Verschieben - Referenzsystem B

Erforderliches Gesamtgewicht im Lastfall Verschieben

Erforderliches Gesamtgewicht im Lastfall Abheben - Referenzsystem A

Erforderliches Gesamtgewicht im Lastfall Abheben - Referenzsystem B

Erforderliches Gesamtgewicht im Lastfall Abheben

Erforderlicher Ballast

MODULSTATIK

Modul	Ballast [kg]	Lastfall	k_R	n	k_p	cp_1^A	cp_2^A	cp_1^B	cp_2^B
1	93.2	Lifting	1.0	4	1.019	-0.145	-0.064	-0.515	0.009
2	52.3	Lifting	1.0	6	1.019	-0.110	-0.054	-0.347	-0.010
3	52.3	Lifting	1.0	6	1.019	-0.110	-0.054	-0.347	-0.010
4	52.3	Lifting	1.0	6	1.019	-0.110	-0.054	-0.347	-0.010
5	93.2	Lifting	1.0	4	1.019	-0.145	-0.064	-0.515	0.009
6	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
7	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
8	66.4	Lifting	1.0	6	1.019	-0.111	-0.058	-0.381	-0.033
9	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
10	66.4	Lifting	1.0	6	1.019	-0.111	-0.058	-0.381	-0.033
11	66.4	Lifting	1.0	6	1.019	-0.111	-0.058	-0.381	-0.033
12	41.6	Lifting	1.0	8	1.019	-0.097	-0.047	-0.324	0.001
13	93.2	Lifting	1.0	4	1.019	-0.145	-0.064	-0.515	0.009
14	46.6	Lifting	1.0	7	1.019	-0.103	-0.050	-0.335	-0.004
15	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
16	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
17	40.1	Verschieben	1.0	25	0.987	-0.205	0.089	-0.235	0.051
18	52.3	Lifting	1.0	6	1.019	-0.110	-0.054	-0.347	-0.010
19	58.1	Lifting	1.0	7	1.019	-0.104	-0.053	-0.361	-0.026
20	66.4	Lifting	1.0	6	1.019	-0.111	-0.058	-0.381	-0.033
21	93.2	Lifting	1.0	4	1.019	-0.145	-0.064	-0.515	0.009
22	66.4	Lifting	1.0	6	1.019	-0.111	-0.058	-0.381	-0.033
23	58.1	Lifting	1.0	7	1.019	-0.104	-0.053	-0.361	-0.026
24	59.1	Lifting	1.0	5	1.019	-0.118	-0.058	-0.361	-0.017
25	112.9	Lifting	1.0	3	1.019	-0.164	-0.071	-0.578	0.004

TOTAL BILL OF MATERIAL

Article No.	Article	Quantity	Ordering Unit	Weight/Piece	Weight
R420081	End clamp+	262	1	0,064 kg	16,768 kg
R420082	Middle clamp+	132	1	0,063 kg	8,316 kg
R500227	FS Pro Securing bolt	117	1	0,008 kg	0,936 kg
R500231	FS Pro 10-S Eave support	26	1	0,128 kg	3,328 kg
R500232	FS Pro 10-EW Eave support	2	1	0,196 kg	0,392 kg
R500235	FS Pro adapter LS	100	1	0,124 kg	12,400 kg
R500250	FS Pro Ballast profile 1900	40	1	1,385 kg	55,400 kg
R500251	FS Pro Ballast profile connector	34	1	0,152 kg	5,168 kg
R500252	FS Pro Ballast profile support	94	1	0,055 kg	5,170 kg
R500253	FS Pro Securing clip ballast support	94	1	0,007 kg	0,658 kg
R500261	FS Pro Potential equalisation clip EW	89	1	0,015 kg	1,335 kg
R500270	FS Pro Roof protection pad 300	15	1	0,016 kg	0,240 kg
R520223	FS Pro 10-EW Base rail 2300 (Set)	117	1	2,775 kg	324,675 kg
R520282	FS Pro Middle clamp+ EW	37	1	0,066 kg	2,442 kg
R900229	Self Drilling Screw 4,8x19 SW8 E14 A2	2	100	0,005 kg	1,000 kg
				Total Weight: 438,228 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.

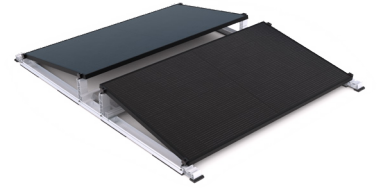


Renusol Europe GmbH
Piccoloministraße 2, 51063 Köln, Germany
T +49 221 788707-0
F +49 221 788707-99
info@renusol.com
www.renusol.com

Section 5

System Mounting Solution Data Sheet

System Mounting Solution Warranty Document



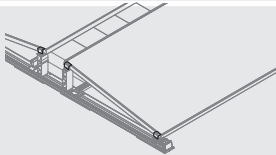
System Datasheet

Renusol *FS Pro* 10-EW

General

System	Ballasted PV-mounting system
Content	Base rail with pre-assembled building protection, eaves support and ridge support, eaves support, module clamps
System warranty	10 years, 20 years with PV configurator design
Application area	Flat roof on industrial, agricultural (except hydrogen sulfide exposition) and residential buildings
Roof covering	Bitumen, concrete, foil, gravel, trapezoidal sheet metal
Roof slope	max. 5° without additional measures

Montagevariante

FS Pro 10-EW	
	You can find further mounting options at www.renusol.com. The Renusol FS Pro 10-EW is available as a system with three rails, as portrait mounting, with a clamp on the long side, as well as a fixed version on trapezoidal sheet metal and roof-penetrating with third-party products.

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 approx	$\mu = 0,5$ is to be determined and ensured upon installation surface.
Material	Aluminium, stainless steel, galvanised sheet steel, PC, PE
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 $s_k = 2,5 \text{ kN/m}^2$)
Maximum snow load	$s_d = 2,0 \text{ kN/m}^2$ for 2 floor rails
Maximum snow load	$s_d = 3,0 \text{ kN/m}^2$ for 3 floor rails

Modules

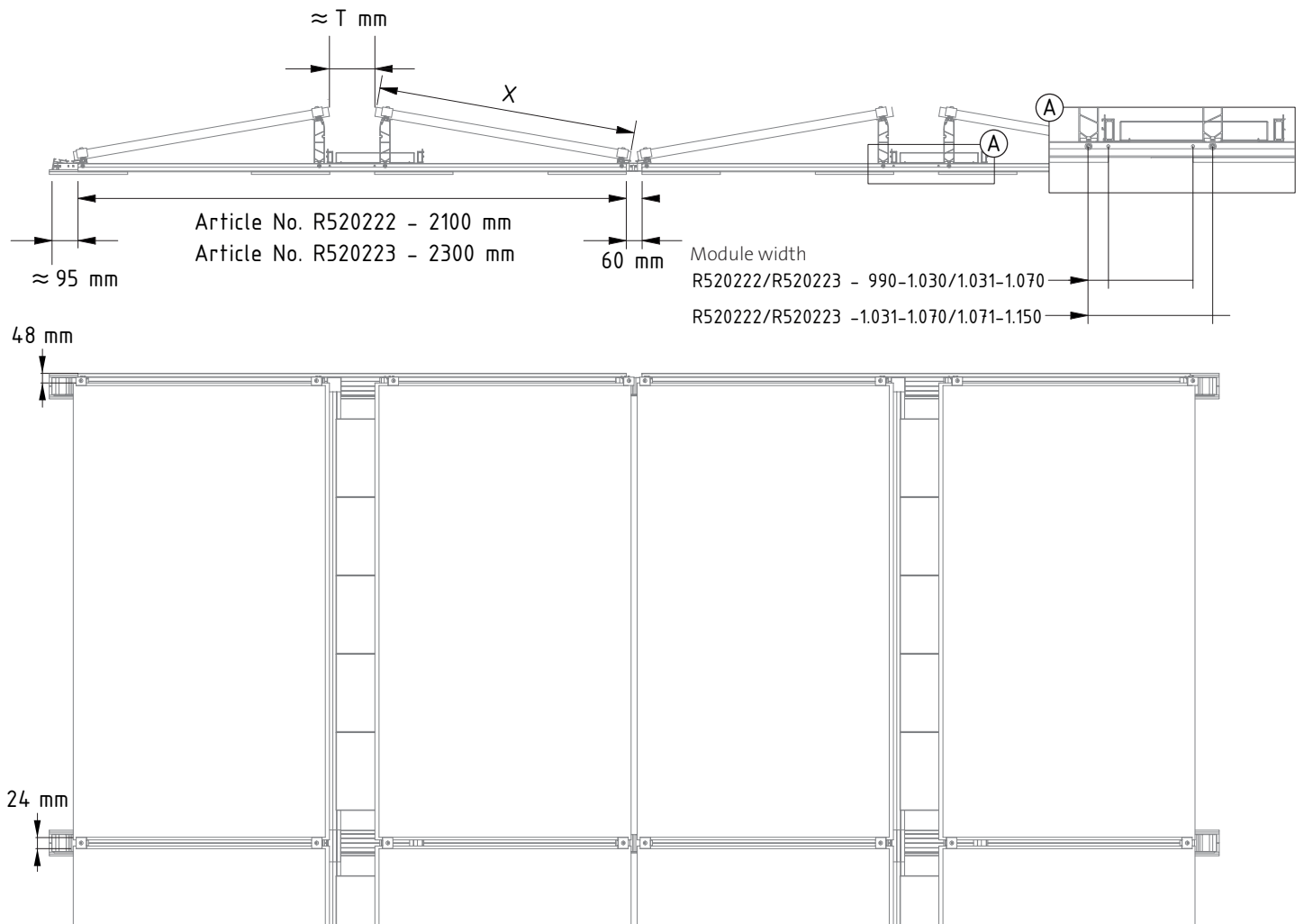
Type	Framed modules. Approval for clamping in the corner area to be provided by the customer.
Module width	R520222: 990-1.070 mm, R520223: 1.071-1.150 mm, R520229: 1.180-1.310 mm
Module guidance	Horizontal

Certifications& Services

Wind loads	Determined in wind tunnel tests by I.F.I Institut für Industrieaerodynamik GmbH
Fire behaviour	Classification: E (DIN EN 13 501-1) / Identification no. 0672
PV layout & Ballast plan	Provided by Renusol PV Configurator (www.pv-configurator.com)

System Datasheet

Renusol *FS Pro 10 EW*



Rail length	R520222 - 2100 mm	
Row spacing		2160 mm
Module width	X:	Min: 990 mm
		Max: 1070 mm
Passageway	T:	Min: 17 mm
		Max: 187 mm
System width		Module length + 65 mm
Shading angle	S(X):	≈ Min: 8,7°

Rail length	R520223 - 2300 mm	
Row spacing		2360 mm
Module width	X:	Min: 1071 mm
		Max: 1.150 mm
Passageway	T:	Min: 17 mm
		Max: 187 mm
System width		Module length + 65 mm
Shading angle	S:	≈ Min: 8,7°

Warranty Conditions of Renusol Europe GmbH

(Date of issue: 10/09/2024)

The Renusol Europe GmbH, Piccoloministraße 2, 51063 Köln, Germany („**Renusol**“) sells its products („**Goods**“) as listed in **Annex A**. *Renusol* provides a warranty („**Warranty**“) to the purchaser („**Customer**“) in accordance with the provisions of these warranty conditions.

1. Scope of warranty

- 1.1 These terms of *Warranty* shall exclusively apply to the *Goods* that the *Customer* has bought directly from Renusol. If the *Customer* has purchased the *Goods* from a third party, any claims shall be asserted only against such third party.
- 1.2 The *Warranty* only applies if *Renusol* has declared to the customer in text format (esp. letter, e-mail, fax) that this warranty is applicable. A verbal agreement is not enough.
- 1.3 The *Customer's* claims for defects in accordance with clauses 7 and 8 of Renusol's General Terms and Conditions of Business („**T&Cs**“) in the version applicable to the *Customer* and the respective purchase shall apply in addition to the *Customer's* rights under this *Warranty* and shall not be affected by the rights granted to the *Customer* under this *Warranty*.

2. Warranty period

- 2.1 The *Warranty* shall commence at the time at which the risk passes to the *Customer* pursuant to clause 6 of the *T&Cs*.
- 2.2 The warranty period applying to the *Goods* is set out in **Annex A**. Furthermore, *Renusol* ensures an extended warranty period longer than guaranteed in **Annex A**, if the following condition are met: (a) The *Customer* has registered itself in the PV-Configurator of *Renusol* via the Internet, and (b) The *Customer* has created the design for the *Goods* by means of the PV-Configurator and proved this by the number of the project report by registration. *Renusol* issues a certificate on the extended warranty period for the *Customer*.
- 2.3 If *Renusol* provides services to the customer under this *warranty* (repair or replacement of goods pursuant to clause 4.3), the *Warranty* period will not be prolonged through these services.

3. Making claims under the warranty

- 3.1 If the *Goods* are damaged, the *Customer* shall immediately, however within two weeks after the detection of the damage at the latest, notify *Renusol* about the damage in text format (esp. by letter, fax, e-mail) and enclose a copy of the warranty certificate. For keeping of term, it is enough to post the damage report on time. If the *Customer* fails to give notice of the damage in due time, the claims against *Renusol* under the *Warranty* will be excluded.
- 3.2 The damage report must include a description of all the circumstances of which the *Customer* is aware, and which are relevant in order to determine the cause of defect by *Renusol* and must be written in a way that is understandable for a *Renusol* technician. This especially includes type and location of the installation of the *Goods* as well as the modifications made by the *Customer* or third parties, repairs or other alterations and works done to the *Goods* as well as a description of the cause of damage and the consequential damages. If the above details are not included, claims against *Renusol* under the *Warranty* are excluded. This does not apply if the *Customer* cannot be reasonably expected or is unable to provide these details as part of the damage report. In this case the *Customer* must provide the details without delay as soon as this is possible or can be reasonably be expected.
- 3.3 At *Renusol's* request, the customer shall send the goods at the *Customer's* cost and risk to an address in Germany specified by *Renusol*, if this is reasonable for the *Customer*. *Renusol* will reimburse the *Customer* for the costs incurred in this regard if the defect is covered by the *Warranty* or if the *Customer* guiltlessly did not realise that the defect is not covered by the *Warranty*. The costs for returning goods that have been repaired or replaced under the *Warranty* are borne by *Renusol* „ex works“.
- 3.4 In derogation from clause 3.3, the assertion of claims for defects within the statutory warranty period does not entail any costs for the *Customer*; any costs incurred by the *Customer* are borne by *Renusol* (clause 439, subclause

2, German Civil Code.) As a consequence, within the warranty period the *Customer* has to bear return and/or shipment costs under the warranty only if, following a check of the notice of damage, it emerges that *Renusol* is not responsible for the defect asserted by the *Customer* and the *Customer* is responsible for the unjustified notice of defect, and, in particular, the *Customer* could have realised that *Renusol* was not responsible for the defect claimed.

- 3.5 *Renusol* shall acquire ownership in the *Goods* returned by the *Customer* provided they are not repaired and returned to the *Customer*.
- 3.6 For any items that the *Customer* additionally sends to *Renusol* and that are not part of the *Goods*, *Renusol* shall be liable in accordance with clauses 7 and 8 of the *T&Cs* and the statutory provisions.
- 3.7 If, at the *customer's* site, the goods have been permanently connected with a facility, especially a building, so that the goods are an essential part of the facility according to §§ 93, 94 of the German Civil Code, the *Goods* shall be checked by inspection on site on the *Customer's* request; due to the costs incurring, item 3.3. and 3.4 shall apply accordingly.

4. Scope of the warranty

- 4.1 A damage within the meaning of this *Warranty* shall only include material defects of *Goods*, which limit their suitability for normal or intended use in accordance with the contract concluded with the *Customer*.
- 4.2 If the defect reported by the *Customer* is covered by the warranty, *Renusol* will repair the *Goods* affected by the defect or replace them by supplying new *Goods*. *Renusol* shall bear the costs thereof, except for the costs for installing or removing the *Goods* at the *Customer's* premises; They shall be borne by the *Customer* itself. *Renusol* decide at its reasonable discretion whether the *Goods* will be repaired or replaced (section 315 German Civil Code). *Renusol* is also free to replace the affected *Goods*, also by completely overhauled *Goods*, if necessary.
- 4.3 *Renusol* is entitled to get the warranty services done by third parties authorized by *Renusol*. The *Customer* is not legally entitled to receive these services directly from *Renusol*.
- 4.4 If it turns out that the damage reported by the *Customer* is not covered by the terms of this *Warranty*, *Renusol* reserves the right to charge the expenses incurred from the test and, if applicable, the transport of the *Goods* to the customer's account. This does not apply if the *Customer* guiltlessly did not recognise the warranty case. *Renusol* is entitled to consolidate the costs for the warranty services, which have not been caused by their own fault, into a lump sum of 20 % of the selling price of the *Goods* reported by the *Customer* to be damaged. The *Customer* shall be entitled to prove that *Renusol* has, in fact, did not have to bear any costs or significantly paid for lower costs.
- 4.5 Claims other than those according to item 4.2, especially claims on reduction, withdraw or compensation of damage are not justified through the *Warranty*.

5. Exclusion of the warranty

- 5.1 Excluded from this *Warranty* are:
 - All damages that cannot be attributed to a material defect of the *Goods* (item 4.1).
 - All damages on the *Goods* where a manufacturing or serial number, possibly attached by *Renusol*, was removed, or was obliterated,
 - All damages which were caused because the customer or a third party did not use the *Goods* as intended, i.e., the customer or the third party did not use the *Goods* for the contractually intended or the ordinary purpose.
 - All damages which resulted from non-observance or breach of the applying assembly instructions, operating instructions, maintenance instructions or other instructions for use provided by *Renusol* for the *Goods*.
 - All damages resulting from assembly or maintenance of the *Goods*, in case the assembly or maintenance was not performed by an appropriate and specialized company,
 - all damages caused by external influences on the *Goods* at the *customer's* site after they have been delivered, especially due to changes, modifications, extensions, repairs, service works done by the *Customer* or third parties, the use of the *Goods* with foreign parts provided by the *Customer* or third parties, improper transport or packaging of the goods, vandalism, damages caused by animal, rebellion, turmoil (e.g. civil war, demonstrations), war, earthquakes, floods, overvoltage, fire, explosion, or lightning strike, and
 - All defects caused to *Goods* delivered by *Renusol* that are not included in any of the class of goods listed in **Annex A**.

- 5.2 Excluded from the warranty are, in addition to item 5.1, for the respective *Goods*, those damages that have been caused by not observing the standard terms of use for the *Goods* stated in **Annex B**.

6. Final Provisions

- 6.1 The *Warranty* and all claims related hereto shall be subject to the substantive German law only, to the exclusion of the UN Convention on Contracts for the International Sale of Goods and the International Private Law; this shall not affect article 3 (3) and (4) Rome I Convention.
- 6.2 Insofar as translations of these warranty conditions into languages other than German are produced, only the German version shall be legally binding.
- 6.3 If the *Customer* is a merchant, a legal person under public law, or a special fund under public law, the exclusive place of jurisdiction for all disputes arising directly or indirectly under this contractual relationship anywhere in the world shall be Cologne. The same applies even if the *Customer* does not have any general place of jurisdiction in Germany or if its place of residence or habitual abode is not known at the time of this commencement of proceedings. *Renusol* is entitled to enforce a claim against the *Customer* at its general place of jurisdiction.
- 6.4 Any amendments or supplements to the *Warranty* as well as all declarations and notifications related to the *Warranty* must be made in text format (esp. by letter, fax, e-mail). This shall also apply to the repeal of this formal requirement.
- 6.5 If any provision of this *Warranty* is or becomes invalid or unenforceable, in whole or in part, this shall not affect the remainder of the provisions. Statutory requirements shall apply in place of the invalid provision. This shall apply accordingly in relation to any loopholes in these provisions that the parties could not foresee.

Annex A

These warranty conditions apply to the following *Goods* with the corresponding warranty period according to item 2.2.

- FS10-S – Warranty period: ten years
- FS 18 S – Warranty period: ten years
- FS10-EW – Warranty period: ten years
- FS Pro 10 – Warranty period: ten years
- FS Pro 18 – Warranty period: ten years
- ConSole/CS – Warranty period: ten years
- InterSole – Warranty period: ten years
- VarioSole – Warranty period: ten years
- MetaSole/MS+/MS+P – Warranty period: ten years
- IntraSole – Warranty period: ten years
- TS – Warranty period: ten years

Extended warranty period for all above mentioned *Goods*: twenty years

Annex B

In accordance with clause 5.2, for the *Goods* in the ConSole and CS+ product group the following standard terms and conditions of use shall apply:

- The *Goods* are only to be used on structures with sufficient structural stability, especially if they are installed on a bearing structure that must be strong enough to carry the weight of the *Goods* as well as the possible additional weather-dependent loads, e.g., water, wind, leaves, or snow,
- Surface friction coefficient no less than 0.6
- Wind speeds of maximum 130 km/h, and
- Ambient temperatures not below -30°C and not higher than 50°C.

In accordance with clause 5.2, for the *Goods* of the product groups InterSole, VarioSole, Metasole and IntraSole the following standard terms of use shall apply:

- The *Goods* are only to be used on structures with sufficient structural stability, especially if they are installed on a bearing structure that must be strong enough to carry the weight of the *Goods* as well as the possible additional weather-dependent loads, e.g. water, wind, leaves, or snow,
- Wind speeds of maximum 115 km/h, and
- Ambient temperatures not below -30°C and not higher than 50°C.

In accordance with clause 5.2, for the *Goods* of the product group FS Pro 10, FS10-S and FS10-EW, the following standard terms of use shall apply:

- The *Goods* are only to be used on structures with sufficient structural stability, especially if they are installed on a bearing structure that must be strong enough to carry the weight of the *Goods* as well as the possible additional weather-dependent loads, e.g. water, wind, leaves, or snow,
- Surface friction coefficient no less than 0.5
- Wind surge pressure of maximum $q_p=1.5 \text{ kN/m}^2$ (for snow load $s_k \leq 1.5 \text{ kN/m}^2$) or $q_p=1.0 \text{ kN/m}^2$ (for snow load $s_k \leq 2.5 \text{ kN/m}^2$), and
- Ambient temperatures not below -30°C and not higher than 50°C.

In accordance with clause 5.2, for the *Goods* of the product group FS Pro 18 and FS18-S, the following standard terms of use shall apply:

- The *Goods* are only to be used on structures with sufficient structural stability, especially if they are installed on a bearing structure that must be strong enough to carry the weight of the *Goods* as well as the possible additional weather-dependent loads, e.g. water, wind, leaves, or snow,
- Surface friction coefficient no less than 0.5
- Wind surge pressure of maximum $q_p=1.0 \text{ kN/m}^2$ (for snow load $s_k \leq 2.37 \text{ kN/m}^2$), and
- Ambient temperatures not below -30°C and not higher than 50°C.

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

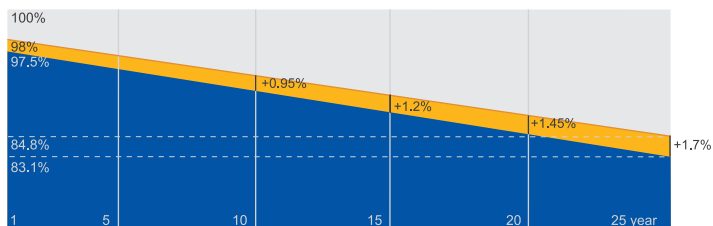


Better mechanical loading tolerance

Superior Warranty

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

0.55% Annual Degradation
Over 25 years



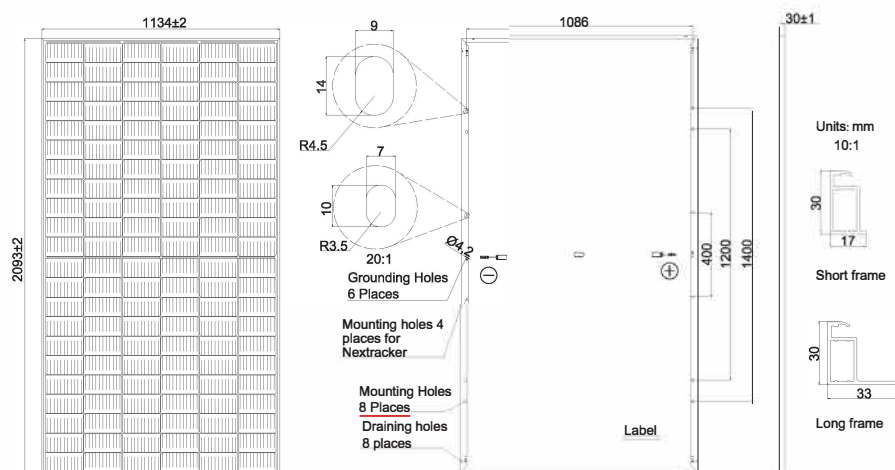
■ New linear power warranty ■ Standard module linear power warranty

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					

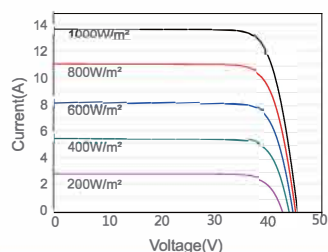
Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer. They only serve for comparison among different module types.

ELECTRICAL PARAMETERS AT NOCT

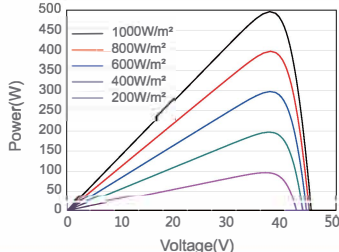
TYPE	JAM66S30 -480/MR	JAM66S30 -485/MR	JAM66S30 -490/MR	JAM66S30 -495/MR	JAM66S30 -500/MR	JAM66S30 -505/MR	OPERATING CONDITIONS	
Rated Max Power(Pmax) [W]	363	367	370	374	378	382	Maximum System Voltage	1000V/1500V DC
Open Circuit Voltage(Voc) [V]	42.15	42.30	42.43	42.58	42.72	42.86	Operating Temperature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

CHARACTERISTICS

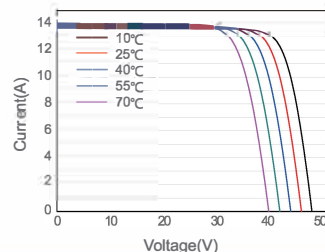
Current-Voltage Curve JAM66S30-495/MR



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's 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
------------	-----------	-----------	-----------	-----------	-----------	-----------	------------	------------	------------	------------	------------	------------	------------

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.

Version : Solis-20240501-GL