

Union Stockley Park

Supporting Design Statement: Roof Level PV Cells Installation

31/07/20

A11633 – USP PV 01

Revision A



31/07/20

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Supporting Design statement for Roof Level PV Cells Installation

This supporting Design Statement has been prepared by tp bennett on behalf of Tritax (the client) for the installation of Roof level Photovoltaic Cells on Union Stockley Park, previously known as Lakeside House, 1 Furzeground Stockley Park.

This existing office building is undergoing significant redevelopment, which includes the relocation of the entrance, replacement windows, fully new internal finishes and M&E equipment and significant landscaping. These works were subject to a separate Planning Application (reference number XXXXXX) and Permission was granted in XXXX of 2019.

Tritax are submitting this further application for the installation of PV Cells to the roof of the building in order to improve the sustainability credentials of the project.

The following application drawings detail the proposals and illustrate the extent and layout of the cells.

A11633D2001	P1	Site Location Plan
A11633D2104	P1	Proposed Roof plan PV Cells
A11633D2200	P1	Proposed Elevations 01
A11633D2203	P1	Proposed Elevations 02
A11633D2500	P1	Sketch Axonometric
A11633F2104	P1	Existing Roof Plan
A11633F2200	P1	Existing Elevations 01 (prior to building refurbishment)
A11633F2201	P1	Existing Elevations 02 (prior to building refurbishment)

636 Trina Solar TSM-335DE06M PV Modules are proposed in total. The details of this system are included overleaf.

The cells are to be mounted in a portrait orientation, on GSE 1710-1005 in-roof mounting frames, meaning they are to be recessed into the existing roof and re essentially flush with the existing roof finish (not surface mounted). Typical distances from the module edges to the gutter/eaves/ridges is c. 900mm, except near the stairway access, where this is reduced to 450mm.

The cells will be dark in colour, meaning they will blend with the existing roof tiles. As noted in the supporting technical details, the Cells have a 10-year product warranty. Access for maintenance will remain as currently arranged, with rooftop access from the flat area of the roof.

Details

Lakeside House, Stockley Park
IN ROOF Solar PV System



office@carbon3.co.uk

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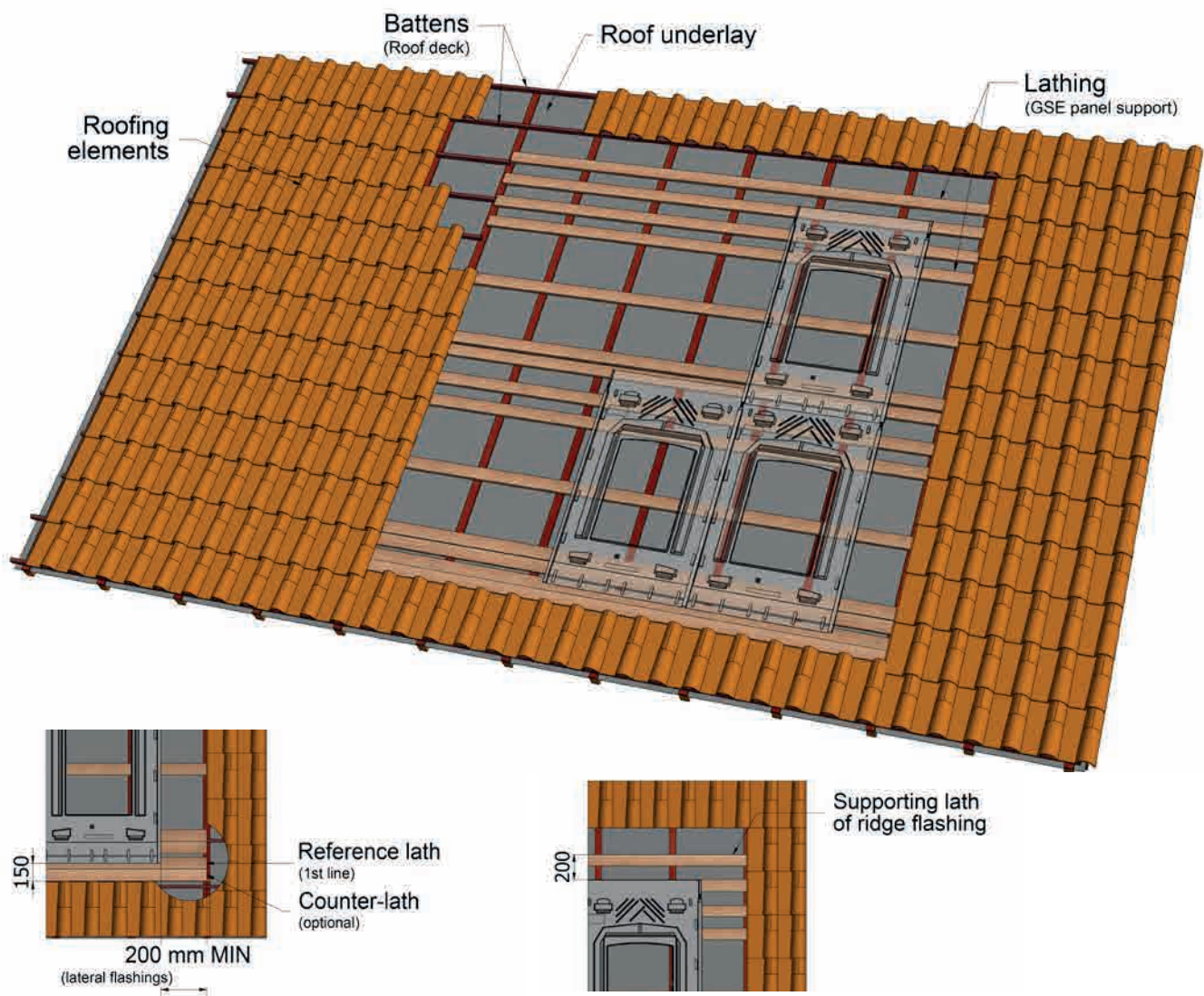
Installation

System fixing



ATTENTION: PRIOR TO STARTING ANY WORK, THE INSTALLER MUST ENSURE THAT THE FRAMEWORK IS FLAT AND **THERE MUST** BE A ROOF UNDERLAY ACCORDING TO THE BUILDING STANDARD BS 5534.

1. Determine beforehand the number of fixing clamps and the adapted batten section (see section 2).
2. Dispose the wooden battens to the following locations:
 - Fixing points of the clamps
 - Fixing points of the frames
 - Junction between the frame rows³
 - Support of the sealing strip³
 - Mounting hooks of top flashings³



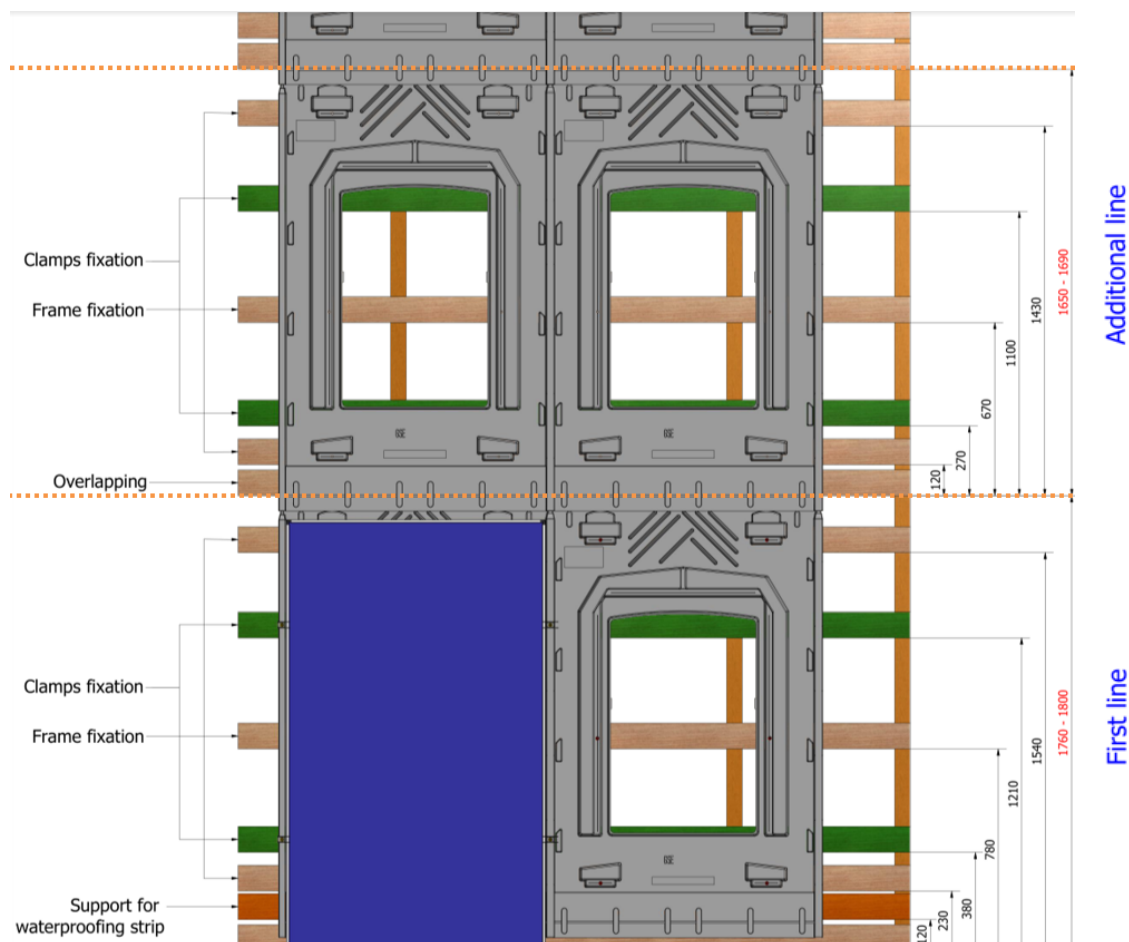
ATTENTION: THE POSITION OF THE FIXING CLAMPS AND THEIR SUPPORT BATTENS MUST COMPLY WITH MODULE MANUFACTURER REQUIREMENTS.

³ Since these elements play no role in the mechanical system strength, the width of the timber could be different from that calculated for the fixing clamps. Only the thickness should be identical.

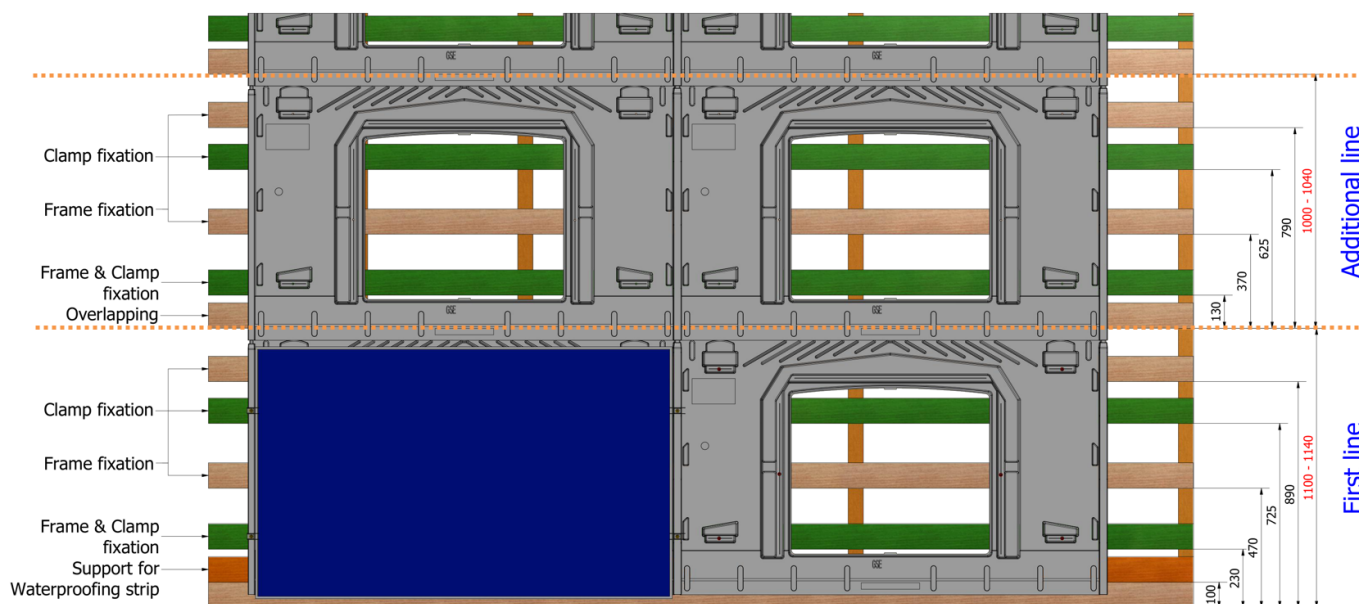
Battening Plan



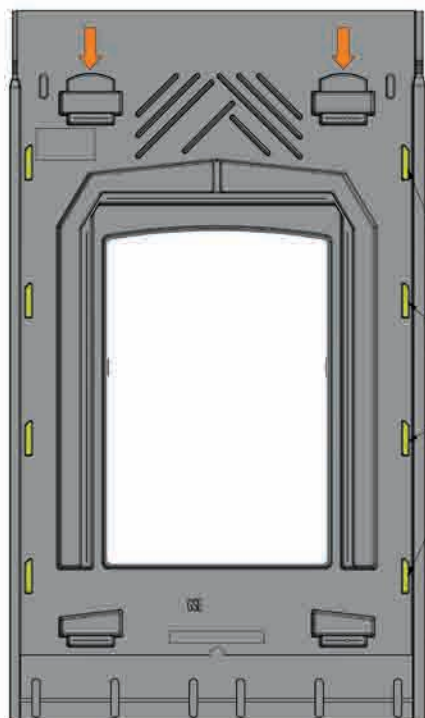
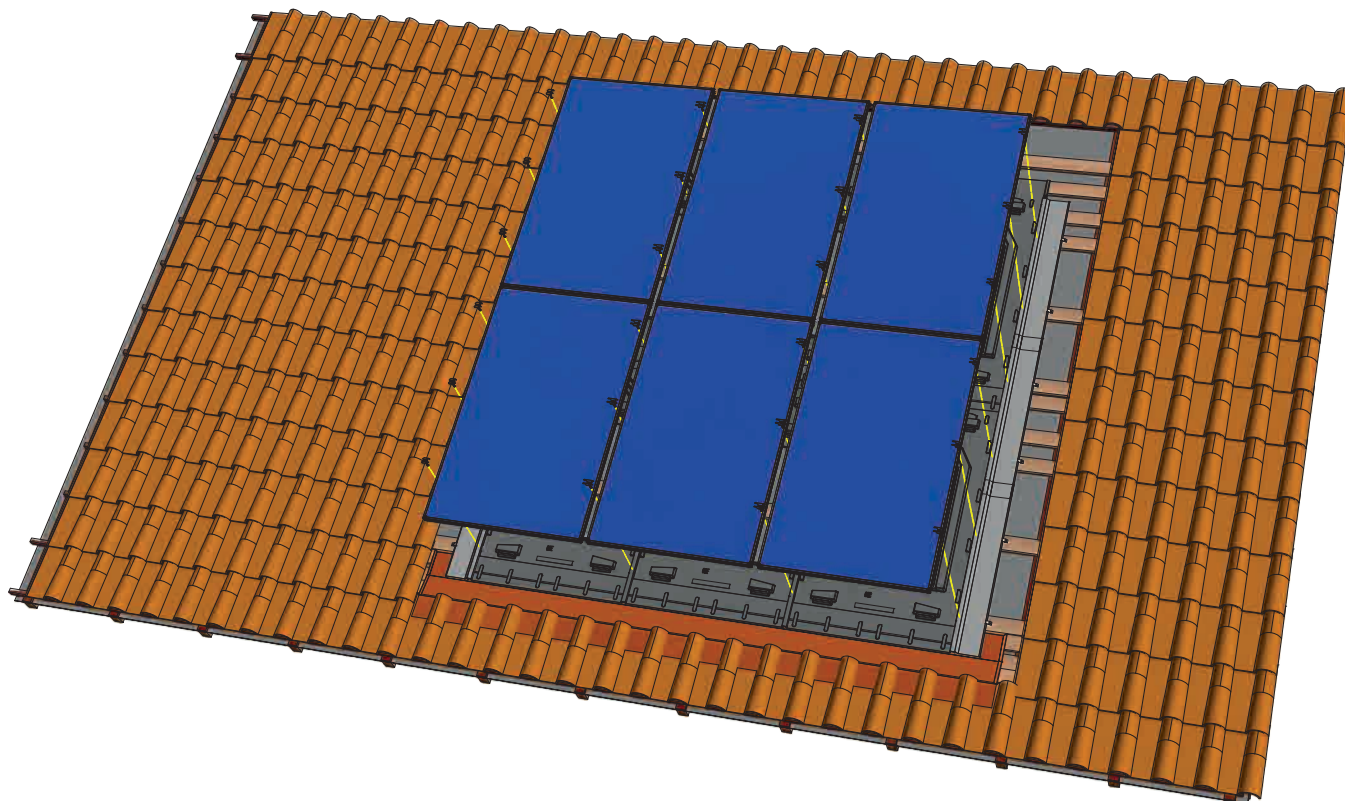
Example of battening plans for PORTRAIT frames with a reference height of 1640 mm and 4 fixing clamps :



Example of battening plans for LANDSCAPE frames with a reference height of 992 mm and 4 fixing clamps :

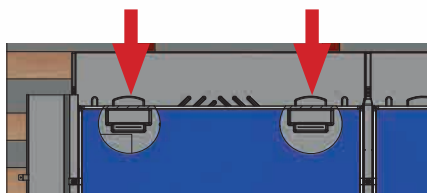
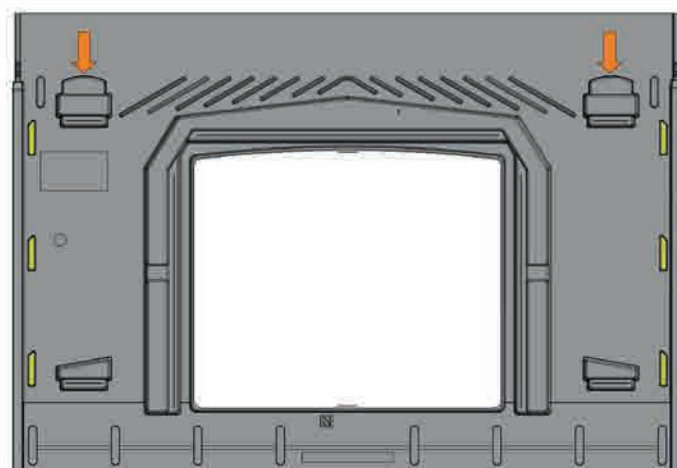


Module Fix



Position the modules in such a way that they're resting on the support pads (yellow) and abut against the upper pads (orange arrows).

Module support pads



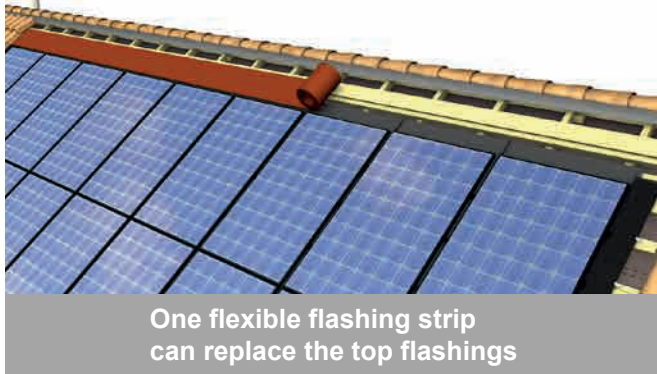
ATTENTION:
CHECK THAT THE MODULES ARE WELL CENTERED IN RELATION TO THE FRAME SO THAT THE GRIP OF THE CLAMPS IS THE SAME ON BOTH SIDES.
THE MODULE FRAME MUST ABUT AGAINST THE UPPER PADS OF THE PANEL TO PREVENT SHIFTING.

Weathering



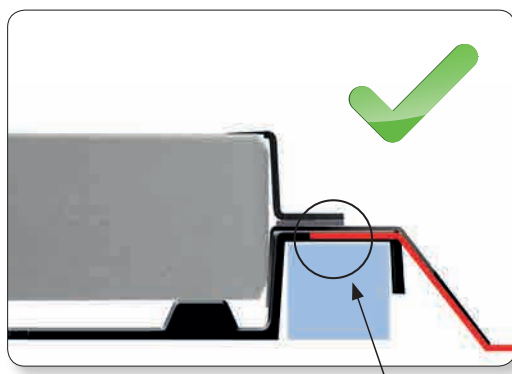
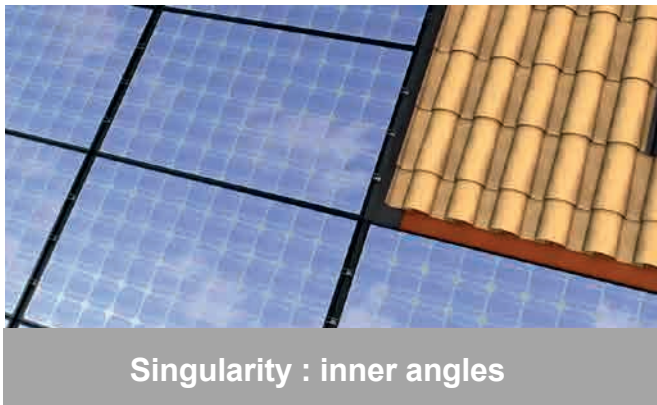
TOP FLASHINGS WITH A FLEXIBLE STRIP

It is possible to install a flexible flashing strip or equivalent to make the connection with the upper roofing elements. Shape a 2-cm fold in the upper and lateral parts of the strip to prevent any water upwelling.

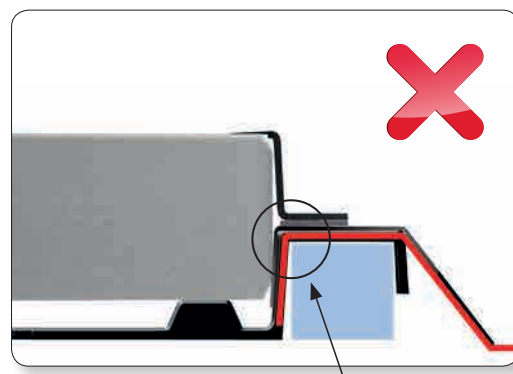


Angle Weathering

In the case of non-rectangular PV array, inner and outer angles must be connected to the roofing using a flexible flashing strip compliant with the building/roofing regulation.



End the flashing strip on top of the corrugation



Risk of tearing

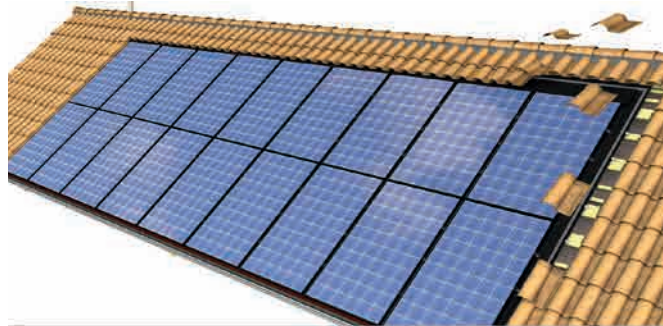
ATTENTION: IN BOTH CASES, THE FLEXIBLE STRIP CAUGHT BETWEEN THE FLASHING AND THE CORRUGATION OF THE GSE PANEL MUST BE POSITIONED ON TOP OF THE CORRUGATION TO PREVENT THE RISK OF TEARING.

Weathering



Indicative - subject to tile/ slate type

Reposition the lateral and upper sections of the roofing elements to make a continuous and watertight connection with the roof.



Installation of the cutted tiles

It may be necessary to cut the tiles to ensure a compliant overlap between the elements, according to roofing regulation. These elements must be attached mechanically, as described in the roofing regulation.



Tiles cutting for left flashing

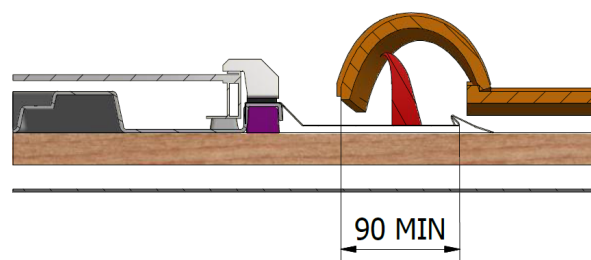
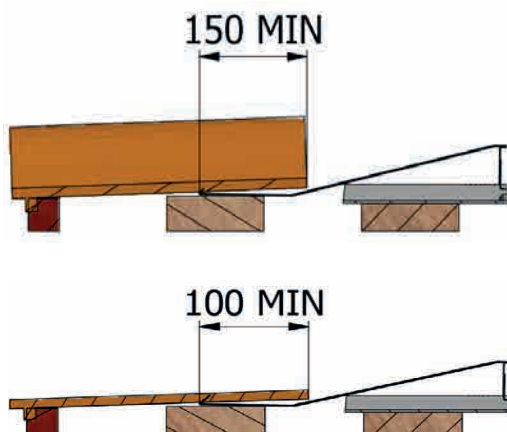


Tiles cutting for top flashing

TIP:

YOU CAN USE DOUBLE TILES OR HALF TILES FOR THE LATERAL CONNECTION.

The roof tiles must rest on the flashings with enough overlap to meet the requirements of the roofing regulation.



Solis-40K-5G

Solis 5G Three Phase Inverters



Features:

- ▶ Over 98.8% Max. efficiency
- ▶ Wide voltage range and low startup voltage
- ▶ 4 MPPT design with precise MPPT algorithm
- ▶ THDi<3%, low harmonic distortion against grid
- ▶ Anti-resonance, single transformer can connect 6M+ in parallel
- ▶ Perfect commercial site monitoring solution
- ▶ 1.3 times DC overload ratio, 13A input for each PV string
- ▶ Strings intelligent monitoring, Smart I-V Curve Diagnosis supported
- ▶ Fuse free design to avoid fire hazard
- ▶ Type II surge arrester for both DC and AC
- ▶ Natural convection, Fan-less design, longer lifespan
- ▶ Leakage current repression technology
- ▶ Volt-watt work mode integrated
- ▶ DC input reverse alarm
- ▶ Integrated Export Power Manager(EPM)



Model:

400V: Solis-40K-5G

Datasheet

Model Name	Solis-40K-5G
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Input DC

Max. input power	52kW
Max. input voltage	1100V
Rated voltage	600V
Start-up voltage	180V
MPPT voltage range	200~1000V
Max. input current	4*26A
Max. Short Circuit current	4*40A
MPPT number/Max. input strings number	4/8

Output AC

Rated output power	40kW
Max. apparent output power	44kVA
Max. output power	44kW
Rated grid voltage	3/N/PE, 220/380V, 230/400V
Rated grid frequency	50Hz/60Hz
Rated grid output current	60.8A/57.7A
Max. output current	66.9A
Power Factor	>0.99 (Adjustable from 0.8 leading to 0.8 lagging)
THDi	<3%

Efficiency

Max. efficiency	98.8%
EU efficiency	98.3%

Protection

DC reverse-polarity protection	Yes
Short circuit protection	Yes
Output over current protection	Yes
Surge protection (DC/AC)	Yes
Grid monitoring	Yes
Islanding protection	Yes
Temperature protection	Yes
Strings monitoring	Yes
I/V Curve scanning	Yes
Anti-PID function	Optional
Intergarated DC switch	Yes

General Data

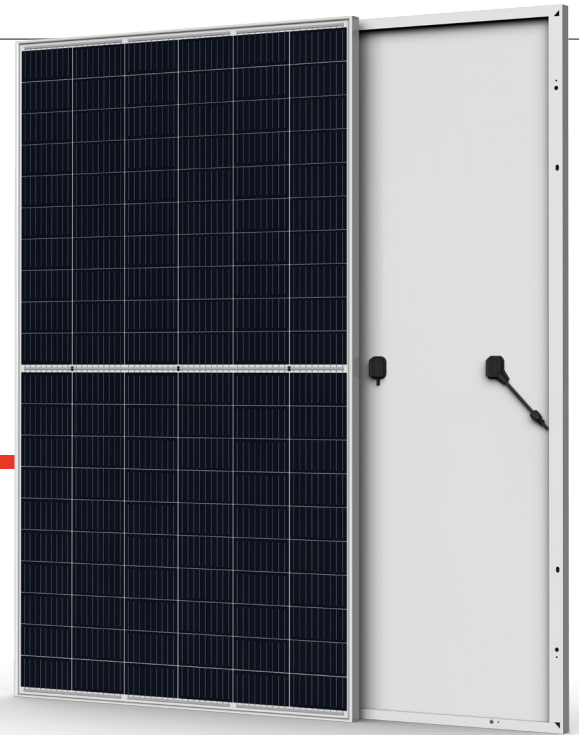
Dimensions (W*H*D)	647mm*629mm*252mm
Weight	45kg
Topology	Transformerless
Self consumption	<1W (Night)
Operating ambient temperature range	-25~60°C
Relative humidity	0~100%
Ingress protection	IP65
Cooling concept	Natural convection
Max. operation altitude	4000m
Grid connection standard	EN50549, G99, AS4777.2-2015, VDE0126-1-1, IEC62727, VDE4105-2018, NB/T 32004
Safety/EMC standard	IEC62109-1/-2, EN61000-6-2, EN61000-6-3

Features

DC connection	MC4
AC connection	Terminal board
Display	LCD, 2×20 Z.
Communication	RS485; WiFi/GPRS (optional)

THE Honey^M

FRAMED 120 LAYOUT MODULE



120 LAYOUT MONOCRYSTALLINE MODULE

325-340W POWER OUTPUT RANGE

20.2% MAXIMUM EFFICIENCY

0~+5W POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL1703
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupation Health and Safety Management System



PRODUCTS

TSM-DE06M(II)

POWER RANGE

325-340W



High power

- Up to 340W front power and 20.2% module efficiency with half-cut and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of half-cut and good reflection effect of MBB ensure high power



High reliability

- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

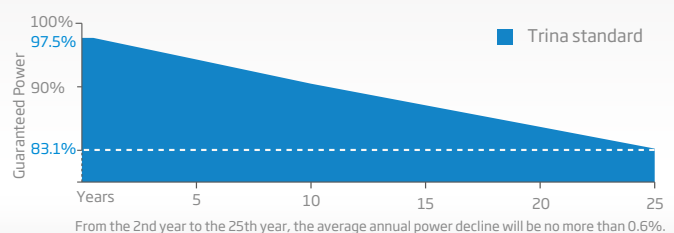


High energy generation

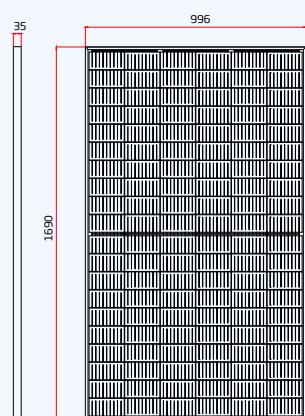
- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp coefficient (-0.36%) and NMOT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

PERFORMANCE WARRANTY

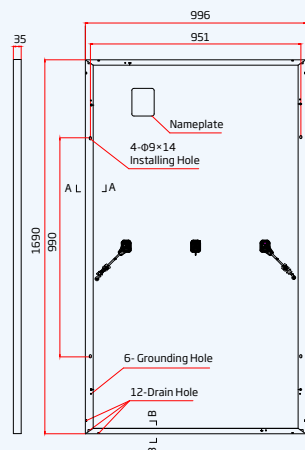
10 Year Product Warranty · 25 Year Power Warranty



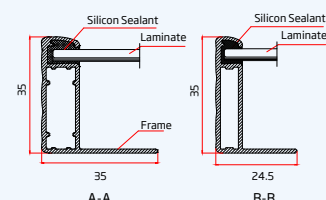
DIMENSIONS OF PV MODULE(mm)



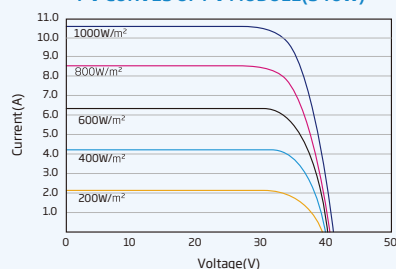
Front View



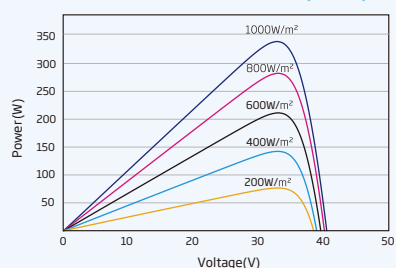
Back View



I-V CURVES OF PV MODULE(340W)



P-V CURVES OF PV MODULE(340W)



ELECTRICAL DATA (STC)

Peak Power Watts- P_{MAX} (Wp)*	325	330	335	340
Power Output Tolerance- P_{MAX} (W)	0 ~ +5			
Maximum Power Voltage- V_{MPP} (V)	33.6	33.8	34.0	34.2
Maximum Power Current- I_{MPP} (A)	9.67	9.76	9.85	9.94
Open Circuit Voltage- V_{OC} (V)	40.4	40.6	40.7	41.1
Short Circuit Current- I_{SC} (A)	10.30	10.39	10.48	10.55
Module Efficiency η_m (%)	19.3	19.6	19.9	20.2

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.*Measuring tolerance: $\pm 3\%$.

ELECTRICAL DATA (NMOT)

Maximum Power- P_{MAX} (Wp)	246	250	254	257
Maximum Power Voltage- V_{MPP} (V)	31.6	31.7	31.9	32.1
Maximum Power Current- I_{MPP} (A)	7.79	7.86	7.94	8.01
Open Circuit Voltage- V_{OC} (V)	38.1	38.3	38.4	38.7
Short Circuit Current- I_{SC} (A)	8.30	8.38	8.46	8.54

NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	120 cells (6 × 20)
Module Dimensions	1690 × 996 × 35 mm (66.54 × 39.21 × 1.38 inches)
Weight	18.0 kg (39.7 lb)
Glass	3.2mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²), Portrait: N 140mm/P 285mm(5.51/11.22inches) Landscape: N 1200 mm /P 1200 mm (47.24/47.24 inches)
Connector	MC4 /TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NMOT (Nominal Module Operating Temperature)	41°C ($\pm 3^\circ\text{C}$)
Temperature Coefficient of P_{MAX}	-0.36%/°C
Temperature Coefficient of V_{OC}	-0.26%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	20A

WARRANTY

10 year Product Workmanship Warranty
25 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 30 pieces
Modules per 40' container: 780 pieces

tp bennett

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