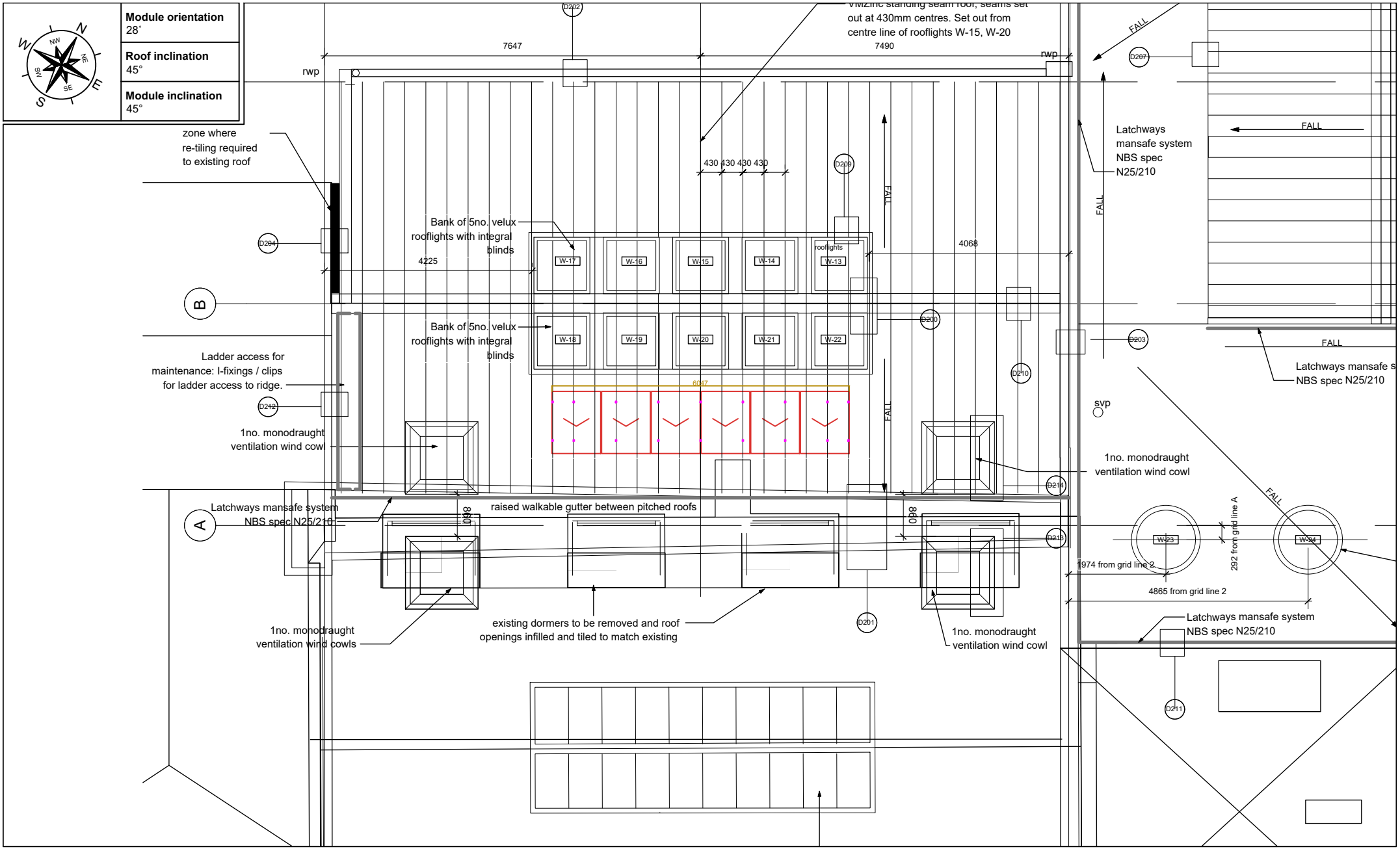


Notes
Standing seam Mounting System
Drawing scaled from PDF, dimentions to be confirmed

Module length 1650mm	**Module type** 6 x JA Solar 275W Poly	**Site address** Kingsgate Primary School, Camden, London, NW6 2JG	**Drawing type** Layout	**Project reference** KING3940
Module width 991 mm	**PV peak output** 1.65kWp		**Revision number** 01	**Drawn by** JC
Module depth 35mm	**Inverter type & qty** 1x Solis 1.5kW Mini 4G Single Tracker Inverter		**Scale** 1:100@A4	**Date** 01/11/17

Solstice energy
020 8789 4717
www.solsticeenergy.co.uk

S-5!™

The Right Way!

S-5-E Clamp

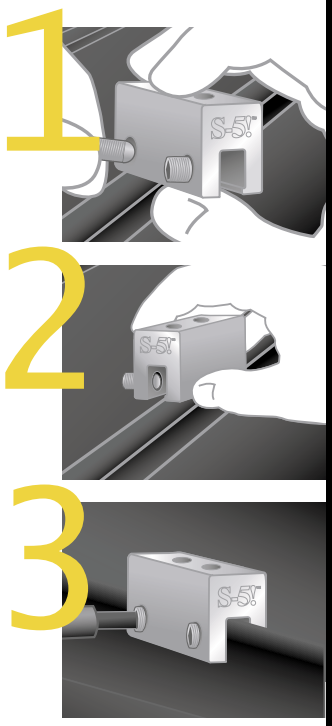
The S-5-E Clamp

The S-5-E clamp is designed specially for double-folded standing seam roof profiles having the appropriate dimensioning. This clamp is also the one recommended for Butler's MR24™.

Although a bit smaller and less expensive than the S-5-U, for these profiles, the S-5-E is just as strong.

The S-5-E is perfect for S-5!™ snow retention products and other heavy-duty applications.

Thanks to our patented round-point setscrews, S-5!™ clamps do not pierce metal roof paneling, thereby protecting roof coatings and weather-tightness warranties.



Installation is as simple as placing the clamp on the seam and tightening the patented round-point setscrews to the specified tension. Then, affix ancillary items using the bolt provided. Go to **www.S-5.com/tools** for information and tools available for properly attaching and tensioning S-5!™ clamps.

The S-5-E Mini

The S-5-E Mini is a medium-duty, non-penetrating seam clamp. (A bit shorter than the S-5-E and having one setscrew rather than two.) The Mini is the choice for attaching all kinds of rooftop accessories: signs, walkways, satellite dishes, antennas, rooftop lighting, lightning protection systems, solar arrays, exhaust stack bracing, conduit, condensate lines, mechanical equipment—just about anything!*

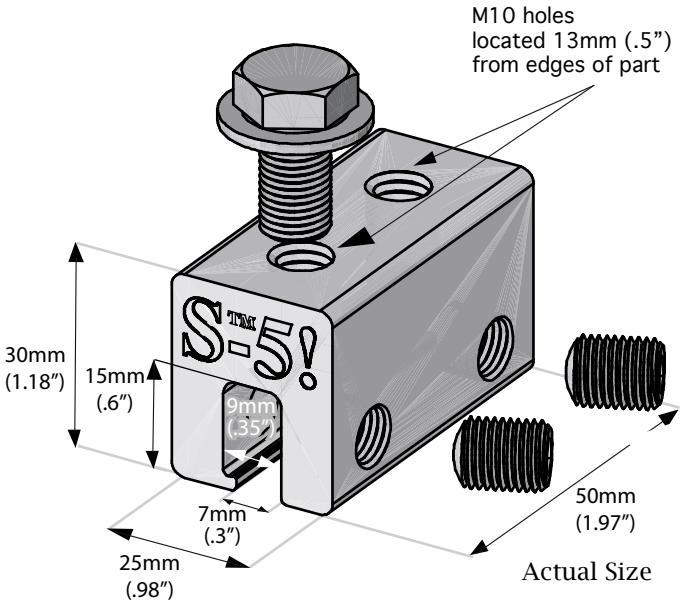
*S-5!™ Mini clamps can be used with RamGard™ unitized snow guards but are not compatible and should not be used with our SnoRail™/SnoFence™ or ColorGard® snow retention systems.

Attach almost anything to standing seam metal roofs without piercing the panel!

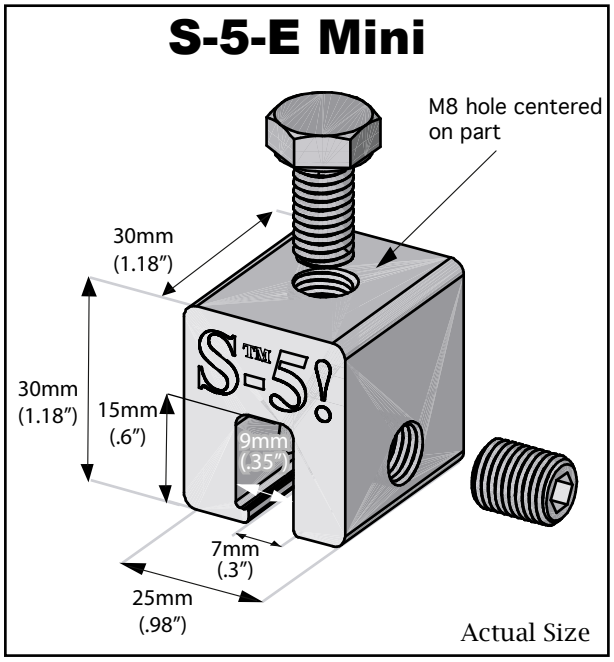
888-825-3432 www.S-5.com

S-5!™
The Right Way!

S-5-E Clamp

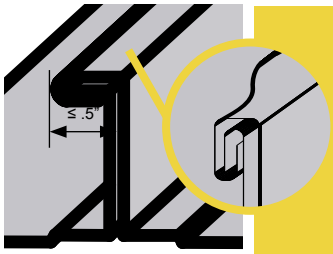


S-5-E Mini



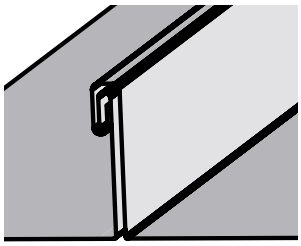
The S-5-E and S-5-E Mini clamps are each furnished with the hardware shown above. Each box also includes a bit tip for tightening setscrews using an electric screw gun. A structural aluminum attachment clamp, the S-5-E is compatible with most common metal roofing materials excluding copper. All included hardware is stainless steel. Please visit **www.S-5.com** for more information including CAD details, metallurgical compatibilities and specifications.

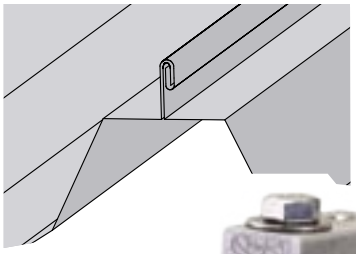
Example Profiles



For horizontal seams under .5" crimp the seam to 180 degrees at desired clamp location.

This illustration demonstrates crimping technique, NOT actual location of clamp.





The S-5-E clamp has been tested for load-to-failure results on a variety of double-folded standing seam roofs, from leading manufacturers of panels and panel-forming machines. The independent lab test reports found on our website at **www.S-5.com** prove that S-5!™ holding strength is unmatched in the industry.

The strength of the S-5-E clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but will not puncture it.

S-5!™ Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5!™ website at www.S-5.com for published data regarding holding strength.

version 081509

Distributed by

JA SOLAR

JAP6(K)

-60/255-275/4BB
F 35-35

MULTIKRISTALLINES SILIZIUMMODUL

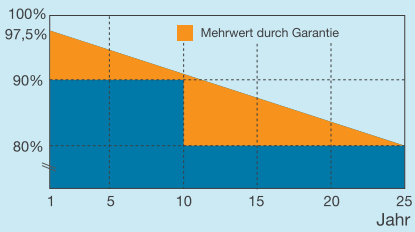
JA Solar Holdings Co., Ltd.

JA Solar ist ein weltweit führender Hersteller von Photovoltaikprodukten, die Sonnenlicht in elektrische Energie umwandeln. Systeme mit Modulen von JA Solar können somit umweltschonenden Strom für Privathaushalte, Gewerbebetriebe und Energieversorgungsunternehmen aus Erneuerbaren Energien erzeugen. Das Unternehmen wurde am 18. Mai 2005 gegründet und ist seit Februar 2007 an der NASDAQ notiert. JA Solar ist einer der weltweit größten Hersteller von Solarzellen und -Modulen. Sein Angebot an Standard- und hocheffizienten Produkten gehört zu den leistungsfähigsten und kostengünstigsten in der Branche.

Adr.: Building No.8, Nuode Center, Automobile Museum East Road, Fengtai District, Beijing
Tel.: +86 (10) 63611888
Fax: +86 (10) 63611999
E-Mail: sales@jasolar.com market@jasolar.com

Bessere Garantie

- 12-jährige Produktgarantie
- 25-jährige lineare Ausgangsleistungsgarantie



Hauptmerkmale

- Höherer Wirkungsgrad und verbesserte elektrische Eigenschaften durch Zellen von JA Solar mit 4-Busbar Design
- Hohe Ausgangsleistung, 16,51 % höchster Umwandlungswirkungsgrad
- Für DC IEC 1000V Anwendungen konzipiert
- Eine entspiegelte, schmutzabweisende Oberfläche verringert den Leistungsverlust durch Schmutz und Staub
- Ausgezeichnete Leistung in Umgebung mit wenig Lichteinstrahlung
- Ausgezeichnete mechanische Belastbarkeit: Zertifiziert für hohe Wind- (2400Pa) und Schneelasten (5400Pa)
- Hohe Salz- und Ammoniakbeständigkeit, durch TÜV NORD bescheinigt

Zuverlässige Qualität

- Positive Leistungstoleranz: 0~+5W
- Eine 100%ige doppelte EL-Kontrolle stellt sicher, dass die Module frei von Fehlern sind
- Nach Strom klassifizierte Module zur Erhöhung der Anlagenleistung
- Resistent gegen potenzialinduzierte Degradation (PID)

Umfassende Zertifizierungen

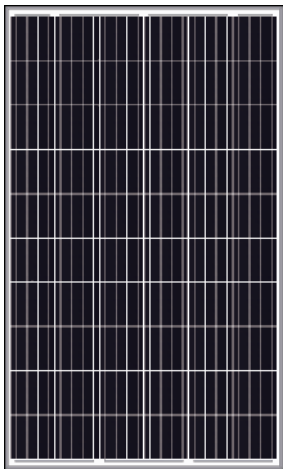
- IEC 61215, IEC 61730, UL1703, CEC registriert, MCS und CE
- ISO 9001: 2008: Qualitätsmanagementsysteme
- ISO 14001: 2004: Umweltmanagementsysteme
- BS OHSAS 18001: 2007: Arbeitsschutzmanagementsysteme
- Wir sind das erste Solarunternehmen Chinas, dass die CO2-Evaluierung von Intertek erfolgreich absolviert hat und dessen Produkte mit dem Umweltprüfzeichen ausgezeichnet wurden.

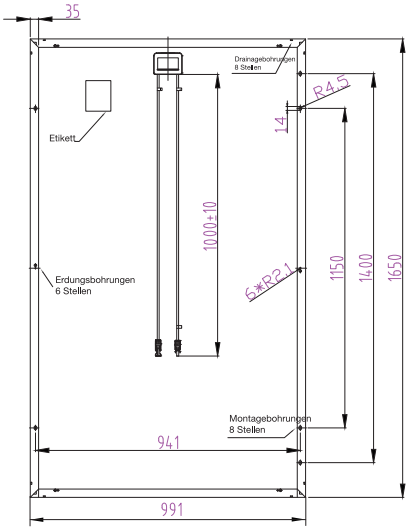
Spezifikationen vorbehaltlich technischer Änderungen und Tests.
JA Solar behält sich das Recht der endgültigen Auslegung vor.

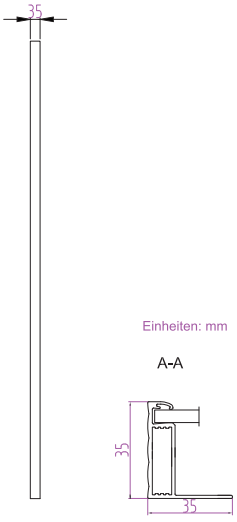
JAP6(K)-60/255-275/4BB
F 35-35

JA SOLAR

Technische Zeichnungen







MECHANISCHE PARAMETER

Zelle (mm)	Poly 156,75x156,75
Gewicht (kg)	18 (ca.)
Abmessungen (LxBxH) (mm)	1650×991×35
Kabelquerschnitt Größe (mm2)	4
Anzahl der Zellen und Anschlüsse	60 (6×10)
Anschlussdose	IP67, 3 Dioden
Steckverbinder	MC4-kompatibel
Verpackungsangaben	30 pro Palette

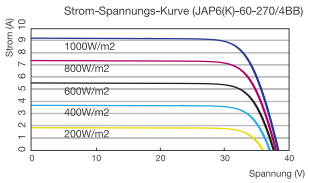
BETRIEBSBEDINGUNGEN

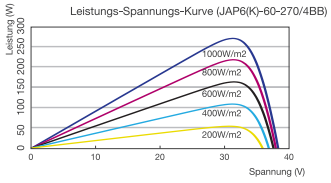
Max. Systemspannung	DC 1000V (IEC)
Betriebstemperatur	-40℃~+85℃
Rückstrombelastbarkeit	15A
Max. statische Belastung, Vorderseite (z. B. durch Schnee und Wind) Max. statische Belastung, Rückseite (z. B. durch Schnee)	5400Pa (4,7 kg/m^2) 2400Pa (2,1 kg/m^2)
NOCT	45±2℃
Anwendungsklasse	Klasse A

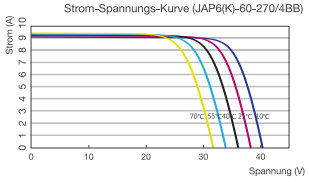
ELEKTRISCHE PARAMETER

TYP	JAP6(K)-60-255/4BB	JAP6(K)-60-260/4BB	JAP6(K)-60-265/4BB	JAP6(K)-60-270/4BB	JAP6(K)-60-275/4BB
Max. Nennleistung bei STC (W)	255	260	265	270	275
Leerlaufspannung (Uoc/V)	37,51	37,74	37,95	38,17	38,38
Spannung bei Nennleistung (Umpp/V)	30,49	30,71	30,92	31,13	31,34
Kurzschlussstrom (Isc/A)	8,93	9,04	9,11	9,18	9,29
Strom bei Maximalleistung (Imp/A)	8,36	8,47	8,57	8,67	8,77
Modulwirkungsgrad [%]	15,59	15,90	16,21	16,51	16,82
Leistungstoleranz (W)	-0~+5W				
Temperaturkoeffizient Isc (αIsc)	+0,058%/℃				
Temperaturkoeffizient Uoc (βUoc)	-0,330%/℃				
Temperaturkoeffizient Pmax (γPmpp)	-0,410%/℃				
STC	Einstrahlung 1000W/m^2, Zelltemperatur 25℃, Luftmasse 1,5				

I-V-KURVE







NOCT

TYP	JAP6(K)-60-255/4BB	JAP6(K)-60-260/4BB	JAP6(K)-60-265/4BB	JAP6(K)-60-270/4BB	JAP6(K)-60-275/4BB
Max. Nennleistung (Pmax) [W]	185,13	188,76	192,39	196,02	199,65
Leerlaufspannung (Uoc) [V]	34,44	34,60	34,84	35,15	35,46
Spannung bei Nennleistung (Umpp) [V]	27,85	28,07	28,29	28,49	28,68
Kurzschlussstrom (Isc) [A]	7,06	7,10	7,13	7,17	7,23
Strom bei Maximalleistung (Imp) [A]	6,65	6,72	6,80	6,88	6,96
Bedingungen	Bei normaler Betriebszelltemperatur, Einstrahlung von 800 W/m^2, Spektrum AM 1,5, Umgebungstemperatur 20℃, Windgeschwindigkeit 1 m/s				

Die tatsächlichen elektrischen Werte können innerhalb der Messtoleranz von den o.a. Angaben abweichen.

Limited Warranty

for PV Modules

JA SOLAR

www.jasolar.com

JA SOLAR HOLDINGS CO. , LTD.
Add: No.36,Jiang Chang San Road, Zhabei, Shanghai 200436, China
Tel: +86-21-6095 5888/6095 5999
Email: service@jasolar.com

JA Solar 08.2013

JA SOLAR

JA Solar Holdings Co., Ltd., and on behalf of ALL its DIRECTLY AND indirectly owned and controlled subsidiary, INCLUDING BUT NOT LIMITED TO Shanghai JA Solar Technology Co., Ltd.-(hereinafter jointly referred to as "JA Solar") warrants its Photovoltaic Solar modules' (MODULES) performance starting from the date of sale to the first customer installing (for their own use) the modules ("Customer") or starting at the latest 6 months after modules dispatch from the JA Solar factory, whichever occurs earlier (the "Warranty Commencement Date").

1. Limited Product Warranty – Ten Year Repair or Replacement

JA Solar warrants that the MODULES together with the factory-assembled DC connectors and cables are free from any defects in materials and workmanship under normal application, usage, installation and service conditions for a period of one hundred and twenty (120) months from the Warranty Commencement Date. If MODULES become malfunctioning or non-operative due to defects in material or workmanship during the one hundred and twenty (120)-month period from the Warranty Commencement Date, as verified by an independent testing agency that will be selected and confirmed mutually by JA Solar and Customer in advance, JA Solar will, at its sole option, either repair or replace the malfunctioning or inoperative MODULES. MODULES' repair or replacement remedy shall be the sole and exclusive remedy p ovided under this Limited Product Warranty and shal not extend beyond the period set forth herein. This Limited Product Warranty does not warranty a specific power output at or during any time frame, which shall be exclusively covered under Section 2 of this Warranty hereinafter ("Limited Peak Power Warranty")

2. Limited Peak Power Warranty– Limited Remedy

JA Solar warrants that for a period of twenty-five years starting from the Warranty Commencement Date, loss of power output against the minimum "Peak Power at STC" as specified on the label of the modules (hereinafter "Nominal Power") when measured at Standard Test Conditions (STC) for the Product(s) shall not exceed:

(1) For Mono and Maple Products: 3 % for the first year from the Warranty Commencement Date, and 0.708% per year thereafter from the 2nd to the 25th year of the warranty period: with a power output standing at 80.008% of the Nominal Power at the end of the 25-year warranty period;

(2) For Poly Products: 2.5 % for the first year from the Warranty Commencement Date, and, 0.7% per year thereafter from the 2nd to the 25th year of the warranty period: with a power output standing at 80.7% of the Nominal Power at the end of the 25-year warranty period.

Within the period of twenty-five (25)-year warranty period from the Warranty Commencement Date, should any qualified Module sold by JA Solar exhibit a loss of power output exceed the aforementioned warranted values, provided that any such declared loss in power has been verified by JA Solar, at its sole discretion is due to MODULES' defects in materials or workmanship attributable to JA Solar's own causes and further confirmed by an independent testing agency (if so requested by a customer) (which is to be selected and confirmed mutually by JA Solar and Customer in advance), JA Solar will, at its sole option and discretion, either (1) make up such loss in power by providing to customer(s) additional MODULES; or (2) repair or replace the defective MODULES including free shipping to the location as set out in the original sales contract entered between JA Solar and the customer.

The remedies set forth herein are the sole and exclusive remedies JA Solar is bound to provide under the Limited Peak Power Warranty.

CAVEAT:

The shipping charges for any allegedly defected MODULES shall be borne by the customers making such claims in advance. Should the independent testing agency confirm that such filed defected are to be covered under this Warranty by JA Solar, the shipping charges advanced by the customers may be reimbursed by JA Solar against the original proof of expenditure.

3. Exclusions and Limitations

(a) Warranty claims from any customers, in any event, shall be filed in writing to JA Solar or its authorized distributors within the applicable warranty period and not beyond the last day of the applicable period of time as stated above.

(b) The Limited Product Warranty and Limited Peak Power Warranty shall not apply to MODULES which have been subject to:

- Misuse, abuse, neglect, vandalism or accident;
- Alteration, improper installation or application;
- Repair or modifications that do not strictly follow the manufacturer's instructions;

Non-observance of JA Solar's maintenance instructions;

- Power failure, electrical spikes or surges, lightning, flood, fire, accidental breakage or other events outside JA Solar's control.

(c) The Limited Product Warranty and Limited Peak Power Warranty do not cover any costs associated with installation, removal or re-installation of the MODULES and (except as explicitly set forth in the last paragraph of the Section 5) customs clearance or any other costs for return of the MODULES.

(d) Warranty claims will not be honored if the type or serial number of JA Solar MODULES have been altered, removed or made illegible without written authorization from JA Solar.

4. Limitation of Warranty Scope

This Warranty as set forth herein is expressly in lieu of ad excludes all other express or implied warranties, including but not limited to warranties of merchantability and of fitness for particular purpose, use, or application, and all other obligations or liabilities on the part of JA Solar, unless such other obligations or liabilities are expressly agreed to in writing signed and approved by JA Solar. JA Solar shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to the MODULES, including, without limitation, any defects in the MODULES or from use or installation.

Under no circumstances shall JA Solar be liable for incidental, consequential or special damages, howsoever caused. Loss of use, loss of profits, loss of production, and loss of revenues. The aforementioned alleged losses by customers are specifically and without limitation excluded from responsibilities of JA Solar. JA Solar's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice value as paid by the Customer, for the single unit of MODULES.

5. Obtaining Warranty Performance

If the Customer has a justified claim covered by this Warranty, an immediate written notification shall be directly made to JA Solar by means of registered letter to the address of JA Solar listed hereunder, or, sending a notification via e-mail to the e-mail account of JA Solar listed hereunder. Together with the notification, the Customer should enclose the evidence of the claim with the corresponding serial number of the MODULES and the date on which the MODULES have been purchased. An invoice with clear indication of the purchase date, purchase price, module type, stamp or signature of JA Solar or its distributors should also be submitted as part of the preliminary evidence.

If the MODULES will be returned to JA Solar for inspection, repair or replacement by JA Solar, JA Solar shall provide the Customer with a Return Merchandise Authorization (RMA). However, JA Solar will not accept a return of any MODULES without such RMA. In connection with both the Limited Product Warranty and Limited Peak Power Warranty, JA Solar may reimburse customer for reasonable, customary and documented transportation charges by sea freight for both the return of the MODULES and reshipment of any repair or replacement MODULES, only if such cost reimbursement is authorized by JA Solar's Customer Service Department in advance.

6. Transferability

This warranty is extended to the original end-user purchaser, and is also transferable to any subsequent owner of the location or holder of the product when MODULES remain at their original installed location upon satisfactory proof of succession or assignment.

7. Severability

If a section, provision or clause of this Warranty, or the application thereof to any person or circumstance, is held invalid, void or unenforceable, such shall not affect and thus shall leave all other sections, provisions, clauses or applications under this Warranty severable, and therefore validly binding.

8. Dispute Resolution

In case of any dispute in terms of warranty-claims, a first-class international testing institute, such as PI Berlin, TÜV SUD or Intertek, UL, shall be entrusted by both parties upon mutual consents in order to provide third party verification and comments. All fees and expenses shall be borne by the party that demanded such verification procedure, unless otherwise agreed.

Further dispute over the claim shall be submitted to dispute resolution as stipulated in the main sales contract to which this Warranty is a part of and subject to the applicable jurisdiction agreed by the parties in the sales contract.

9. Various

The repair or replacement of the MODULES or the supply of additional MODULES does not lead to a new commencement of warranty terms, nor shall the original terms of this Warranty be extended. Any replaced MODULES shall become the property of JA Solar.

JA Solar shall at its own options to deliver another type of MODULES (different in size, color, shape, or power), either a new brand or the original one, in case that JA Solar has discontinued producing the module in question at the time of the claim.

10. Force Majeure

JA Solar shall not be responsible or liable to the Customer whatsoever or any third-party arising out of any non-performance or delay in performance of any terms and conditions of the sales, including this Warranty, due to causes of natural disasters such as fire, flood, blizzard, hurricane, thunder, acts of God, changes of public policies, terrorism, war, riots, strikes, unavailability of suitable and sufficient labor or materials and other events which are out of control of JA Solar.

REMARK:

"Peak Power" is the power in watt peak that MODULES generates in its maximum power point under STC condition. 'STC' are as follows:

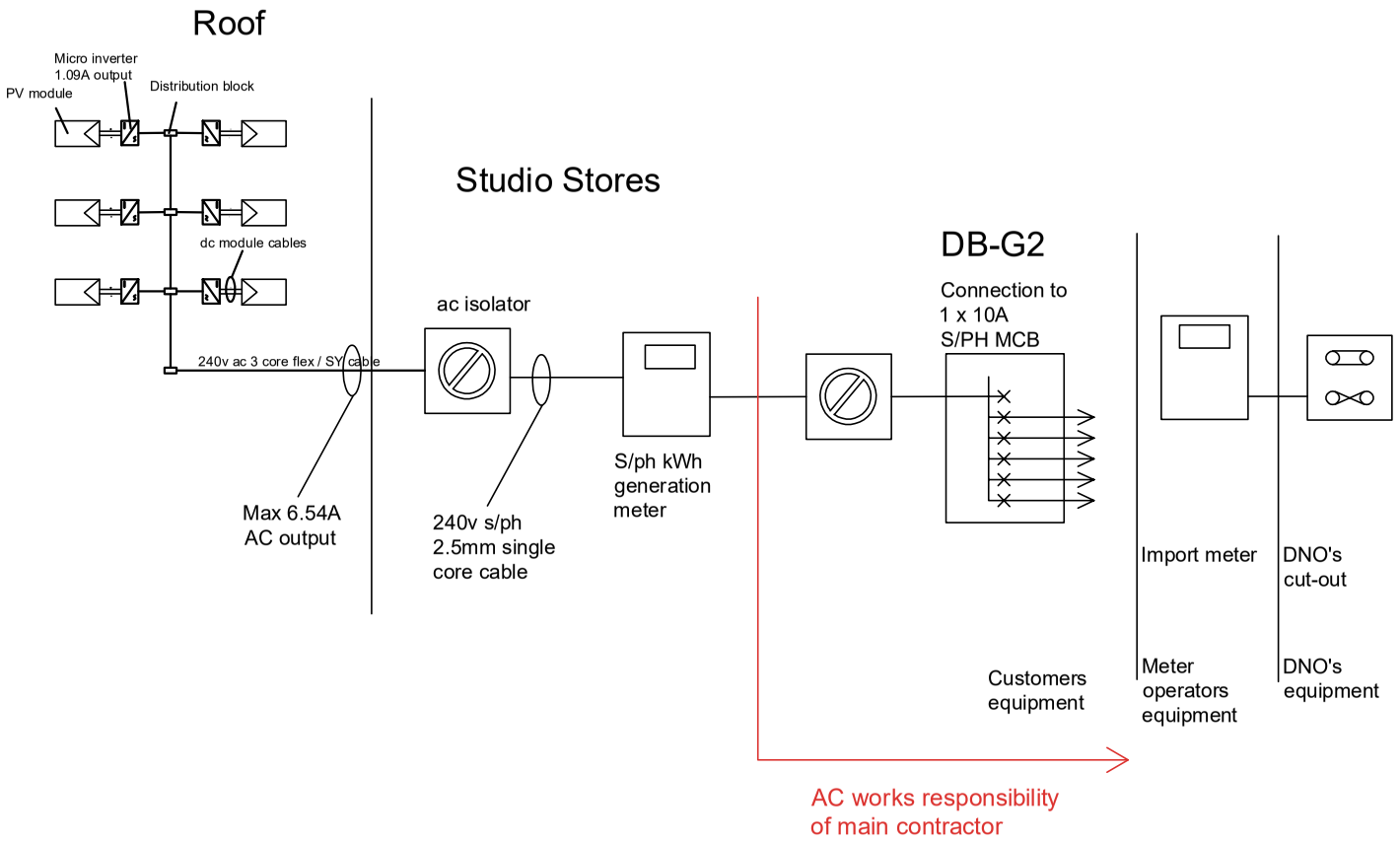
(a) Light spectrum of AM 1.5

(b) Irradiance at 1,000W/m2

(c) Cell temperature of 25 degree Centigrade at right angle irradiation

The measurements are carried out in accordance with IEC61215 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 be in compliance with the standards applied by international institutions accredited for this purpose.

PV System Electrical Schematic
6 x JA Solar 275Wp modules with Enecsys micro inverters
1.65kWp Total



MANUAL START / STOP PROCEDURE
This solar photovoltaic generator can be isolated at any time using any of the switches provided.

For general isolation it is recommended to switch the system off at the primary AC isolator. This is a red and yellow rotary switch labelled: **PV SYSTEM - POINT OF EMERGENCY ISOLATION**. This switch can be secured with a padlock in the off position. The system will automatically restart (after a three minute delay) when switched back on.

AUTOMATIC ISOLATION

OVERVOLTAGE	264V
UNDERVOLTAGE	207V
OVERFREQUENCY	50.5Hz
UNDERFREQUENCY	47Hz
LOSS OF MAINS (ROCOF)	

Module type & qty
6nr x 275Wp JA Poly

System Size
1.65kWp

Inverters
6 x Enphase 250Wp

Site address
Kingsgate Primary School,
96 Kingsgate Road
Camden
London
NW6 2JG

Drawing type
Schematic

Project reference
KING3940

Revision number
01

Drawn by
RB

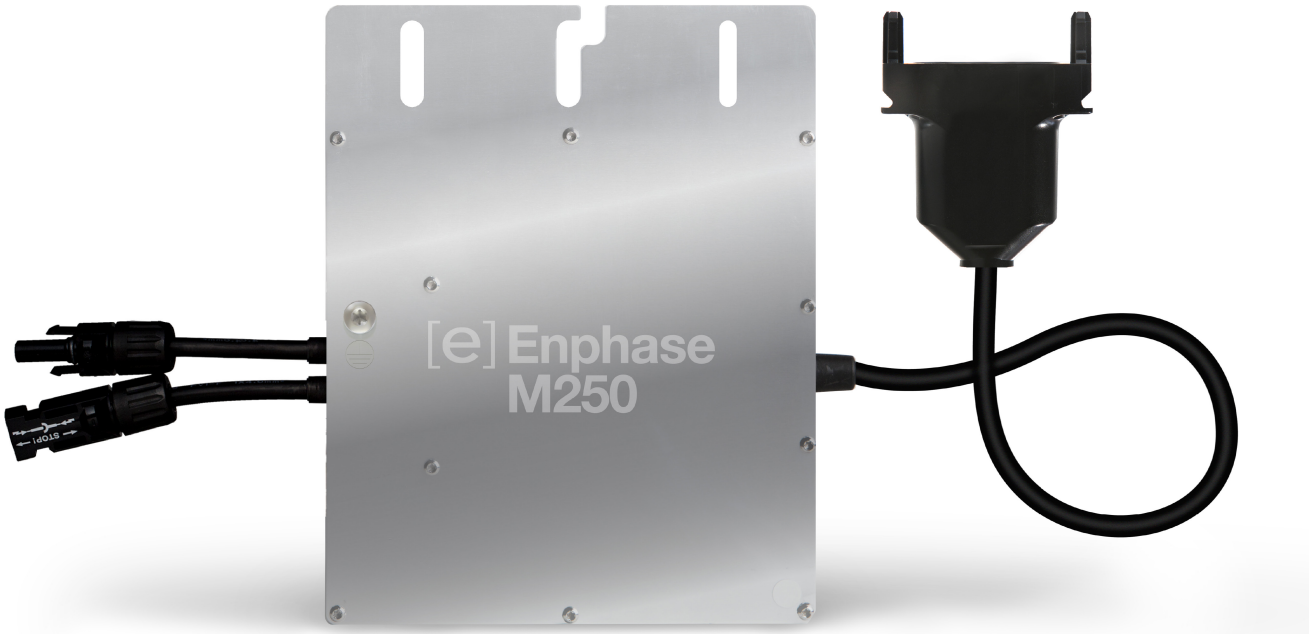
Scale
Not to scale

Date
21/11/2017

Solstice energy
020 8789 4717
www.solsticeenergy.co.uk

Enphase **Microinverters**

Enphase® **M250**



The **Enphase Energy Microinverter System** improves energy harvest, increases reliability, and dramatically simplifies design, installation, and management of solar power systems.

The Enphase System includes the microinverter, the Enphase® Envoy, and Enlighten,® Enphase's monitoring and analysis software.

PRODUCTIVE
- Optimised for higher-power modules
- Maximises energy production
- Minimises impact of shading, dust, and debris

SMART
- Quick and simple design, installation, and management
- 24/7 monitoring and analysis

RELIABLE
- 4th-generation product
- More than one million hours of testing
- System availability greater than 99.8%

SAFE
- Low-voltage DC reduces fire risk
- No single point of system failure
- Easy installation with Engage Cable

[e] enphase® ENERGY

CE

INPUT DATA (DC)	**Model:** M250-60-230-S22, M250-60-230-S25	**Model:** M250-72-2LN-S2, M250-72-2LN-S5
Recommended input power (STC)	210 - 310 W	210 - 310 W
Maximum input DC voltage	48 V	60 V
Peak power tracking voltage	27 V - 39 V	27 V - 48 V
Operating range	16 V - 48 V	16 V - 60V
Min/Max start voltage	22 V / 48 V	22 V / 48 V
Max DC short circuit current	15 A	15 A
OUTPUT DATA (AC)		
Peak output power	258 W	258 W
Rated output power	250 W	250 W
Rated output current	1.09 A	1.09 A
Nominal voltage	230 V	230 V
Nominal frequency	50.0 Hz	50.0 Hz
Power factor	>0.95	>0.95
Maximum units per 20 A branch circuit	14 (Ph + N), 42 (3Ph + N)	14 (Ph + N), 42 (3Ph + N)
Maximum units per cable section	14 (Ph + N), 24 (3Ph + N)	14 (Ph + N), 24 (3Ph + N)
AC backfeed current to module	0 mA	0 mA
EFFICIENCY		
EN 50530 (EU) efficiency	95.7%	95.7%
Static MPPT efficiency (weighted, reference EN50530)	99.6%	99.5%
Night time power consumption	0.055 W	0.065 W
MECHANICAL DATA		
External operating temperature range (ambient)	-40°C to +65°C	
Internal operating temperature range	-40°C to +85°C	
Enclosure environmental rating	Outdoor - IP67	
Connector type, MC4	M250-60-230-S22 and M250-72-2LN-S2	
Connector type, Amphenol H4	M250-60-230-S25 and M250-72-2LN-S5	
Dimensions (WxHxD)	179 mm x 217 mm x 28 mm (with bracket)	
Weight	1.66 kg	
Cooling	Natural convection - No fans	
FEATURES		
Compatibility	60-cell PV modules	60-cell and 72-cell PV modules
Communication	Power line communication	
Monitoring	Enlighten Manager and MyEnlighten monitoring options	
Transformer design	High frequency transformers, galvanically isolated	
Compliance	AS4777, C10/11, CEI_0-21, EN50438, EN62109-1, EN62109-2, ERDF-NOI-RES_13E_V5, G59/2, G83/2, VDE-0126-1-1 + A1, VDE AR-N 4105	
Automatic disconnect	Automatic disconnect according to OVE / ÖNORM E 8001-4-712 (Installations in Austria limited to 3.68 KVa.)	

To learn more about Enphase microinverter technology, visit **enphase.com/eu**.

Enphase Energy M250 Microinverter
20-Year Limited Warranty - United Kingdom

Enphase Energy Inc. ("Enphase") has developed a highly reliable microinverter, designated as the M250 Series ("Microinverter"), that is designed to withstand normal operating conditions when used for its originally intended purpose in compliance with the Enphase User Manual made available with the originally shipped system. The Enphase limited warranty ("Limited Warranty") covers defects in workmanship and materials of the Enphase Microinverter ("Defective Product") for a period of twenty (20) years from the date of original purchase of such Microinverter at point of sale to the system owner (the "Warranty Holder") at the originally-installed end user location (the "Warranty Period") in the United Kingdom in locations where we have approved our Microinverters for installation as listed on our website at http://www.enphase.com/warranty.

During the Warranty Period, the Limited Warranty is transferable to a different owner ("Transferee") as long as the Microinverter remains installed at the originally-installed end user location ("Original Location") and the Transferee submits to Enphase a "Change of PV Ownership Form" and applicable Transfer Fee within 30 days from the date of transfer to the Transferee. This submission is a requirement for continued Limited Warranty coverage. The Transfer Fee is set forth in the Change of PV Ownership Form, and is subject to reasonable adjustment from time to time (as determined at Enphase's discretion). The Change of PV Ownership Form and payment instructions are available at http://www.enphase.com/warranty. Enphase reserves the right to provide separate warranties that shall govern with respect to Microinverters installed in specific regions as set forth on our website at http://www.enphase.com/warranty.

During the Warranty Period, if Enphase establishes, through inspection, the existence of a defect that is covered by the Limited Warranty, Enphase will at its option, either (1) repair or replace the Defective Product free of charge, or (2) issue a credit or refund for the Defective Product to the Warranty Holder in an amount up to its actual value at the time the Warranty Holder notifies Enphase of the defect, as determined by Enphase.

If Enphase elects to repair or replace the Defective Product, Enphase will, at its option, use new and/or reconditioned parts in repairing or replacing the Defective Product. Enphase reserves the right to use parts or products of original or improved design in the repair or replacement of Defective Product. If Enphase repairs or replaces a Defective Product, the Limited Warranty continues on the repaired or replacement product for the remainder of the original Warranty Period or ninety (90) days from the date of Enphase's return shipment of the repaired or replacement product, whichever is later. The Limited Warranty covers a replacement unit to replace the Defective Product, but does not include labour costs related to (1) un-installing the Defective Product or (2) if applicable, re-installing a repaired or replacement product. To the extent applicable, the Limited Warranty also covers the costs of shipping a repaired or replacement product from Enphase, via a non-expedited freight carrier selected by Enphase, to locations within the United Kingdom where we have approved our Microinverters for installation as listed on our website at http://www.enphase.com/warranty. The Limited Warranty does not cover, and Enphase will not be responsible for, shipping damage or damage caused by mishandling by the freight carrier and any such damage is the responsibility of the freight carrier.

Enphase Microinverters are designed to withstand normal operating conditions and typical wear and tear when used for their original intent and in compliance with the installation and operating instructions supplied with the original equipment. The Limited Warranty does not apply to, and Enphase will not be responsible for, any defect in or damage to any Enphase Microinverter: (1) that has been misused,

neglected, tampered with, altered, or otherwise damaged, either internally or externally; (2) that has been improperly installed, operated, handled or used, including use under conditions for which the product was not designed, use in an unsuitable environment, or use in a manner contrary to the Enphase User Manual or applicable laws or regulations; (3) that has been subjected to fire, water, generalised corrosion, biological infestations, acts of God, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Enphase Microinverter specifications, including high input voltage from generators or lightning strikes; (4) that has been subjected to incidental or consequential damage caused by defects of other components of the solar system; or (5) if the original identification markings (including trademark or serial number) of such Microinverter have been defaced, altered, or removed. This Limited Warranty does not cover cosmetic, technical or design defects, or shortcomings which do not materially influence or affect the energy production or degrade form, fit, or function of the Enphase Microinverter. The Limited Warranty does not cover costs related to the removal, installation or troubleshooting of the Warranty Holder's electrical systems. The Limited Warranty does not extend beyond the original cost of the Enphase Microinverter.

To obtain repair or replacement service, credit or refund (as applicable) under this Limited Warranty, the Warranty Holder must comply with the Return Merchandise Authorization Number (RMA) policy and procedure http://www.enphase.com/uk/rma.

Enphase expressly reserves the right to novate or assign its rights and obligations under this warranty agreement to a third party with the demonstrated expertise and requisite resources needed to effectively discharge the obligations hereunder.

THE LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY ENPHASE AND, WHERE PERMITTED BY LAW, IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OR WARRANTIES AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN MANUALS OR OTHER DOCUMENTATION. IN NO EVENT WILL ENPHASE BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING, WHETHER IN CONTRACT OR TORT, INCLUDING WITHOUT LIMITATION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, OR ANY PERSONAL INJURY.

To the extent any implied warranties are required under applicable law to apply to the Enphase Microinverter, such implied warranties shall be limited in duration to the Warranty Period, to the extent permitted by applicable law. Some regions do not allow limitations or exclusions on implied warranties or on the duration of an implied warranty or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply. This Limited Warranty gives the Warranty Holder specific legal rights, and the Warranty Holder may have other rights that may vary from region to region. The grant of this Limited Warranty by Enphase is conditioned upon agreement by the Warranty Holder and any permitted Transferee to the terms, conditions and requirements herein.

Performance estimate

Methodology taken from "Guide to the Installation of Photovoltaic Systems (2012)" which can be downloaded here:http://www.microgenerationcertification.org/mcs-standards/installer-standards

Installation data	Array 1	
Installed capacity of system	1.65	kWp
Orientation of PV system	28°	deg
Inclination of system	45°	deg
Postcode region	1	

Calculations:		
kWh / kWp (Kk) from table	960	kWh/kWp
Shade factor (SF)**	0.70	(ASSUMED)
Estimated Output (kWp x Kk x SF)	1109	kWh / year

**(to be decided on site visit)

Disclaimer pre-site visit:
This system performance calculation has been undertaken using estimated values for array orientation, inclination or shading. Actual performance may be significantly higher or lower if the characteristics of the installed system vary from the estimated values.

Disclaimer where site visit has taken place and shading factor is <1
This shade assessment has been undertaken using the standard MCS procedure – it is estimated that this method will yield results within 10% of the actual energy yield for most systems.

Horizon view from base and centre of array, looking due South (irrespective of array orientation)

No of shaded segments = ... (x)
Shading factor: 1 - (x * 0.01) =

Any objects on the horizon view that are <10m to any part of the array shall have a shade circle added to the diagram. The shaded cirle(s) should have a radius equal to the height of the object, and should be located so that the apex of the circle sits on the highest point of the shade object. All segments touched by or within the shade circle(s) should be counted as part of the overall shade analysis.