Installation Instructions

Solahart®

Single-Phase PV Systems

Silhouette Modules

Solahart PV Systems must be installed and serviced by a suitably qualified person.

Warning: For continued safety of this PV System, it must be installed, operated and maintained in accordance with these instructions and the installation guide supplied with the PV inverter.

Caution: Only qualified and accredited personnel should perform work on PV systems, such as design, installation, commissioning, maintenance and repairs. Be sure to follow the safety instructions for all system components. It is also important to observe relevant local codes and regulations for health and safety and accident prevention.

Only Solahart parts and Solahart approved parts may be used. No substitute parts may be used without prior approval from Solahart Industries Pty Ltd. Only parts supplied by Solahart Industries Pty Ltd are covered by the Solahart warranty.

The warranty can become void if safety devices are tampered with or if the installation is not in accordance with these instructions.

CONTENTS

SOLAHART PV SYSTEM WARRANTY – AUSTRALIA ONLY

IMPORTANT NOTE: This Limited Warranty covers a range of systems, products and components. This Warranty only applies in respect of the specific items you have purchased and which are delivered to you in conjunction with this hard copy Warranty document.

Your new PV System comprises a PV Module, an Inverter, a racking system and balance of system components (together the **PV System**). Alternatively, you may add components sourced from Solahart to your existing PV System, including a battery and associated products.

The PV System, the Battery, and any other components supplied by Solahart (collectively, the 'Products') are covered by this warranty given by Solahart Industries Pty Ltd ABN 45 064 945 848 of 1 Alan Street, Rydalmere NSW 2116 (**Solahart**). The terms of your warranty are set out below. This warranty consists of a number of parts (not all of which will apply, depending on the Products you have purchased):

A. The specific warranty terms for Modules supplied by Solahart;

B. The specific warranty terms for the LG Chem, Tesla and BYD Batteries;

C. The specific warranty terms for Inverters – FIMER/ABB;

D. The specific warranty terms for SolarEdge Inverters and associated SolarEdge products;

E. The specific warranty terms for GoodWe Inverters and associated GoodWe products;

F. The specific warranty terms for CE25 products;

G. The specific warranty terms for the racking system;

H. The specific warranty terms for the balance of the system;

I. The specific warranty terms for the labour; and

J. General terms which apply to all of the above.

This Limited Warranty is valid in Australia for all Products sold after 1 September 2020. If a subsequent version of this warranty is published, the terms of that warranty will apply to Products manufactured after the date specified in the subsequent version.

Solahart issues the following voluntary warranty to:

1. The end-user who purchased the System in Australia for their own use and put the System into use for the first time (the **'Original End-User'**); and

2. In the case of SolarEdge and GoodWe Products and the BYD Battery-Box System only, any owner of the Product subsequent to the Original End-User who provides proof of title transfer, provided that the Product has never been relocated from its original installation location without the express written consent of Solahart.

This warranty is in addition to any rights and remedies that you may have under the Australian Consumer Law.

Solahart offers national service through its Dealer network. Solahart will repair or replace parts subject to the terms of this Limited Warranty. Solahart, in addition can provide preventative maintenance and advice on the operation of the PV System. You can contact Solahart on 1800 638 011 to arrange a service call or to find out details about this warranty.

Notification of a claim under this Limited Warranty must be given without undue delay after detection of the defect and prior to the expiration of the applicable Warranty Period and in accordance with the procedure set out below.

PART A - MODULES

Warranty coverage for Solahart Modules and Hanwha Q Cells Modules

Subject to the terms of this Limited Warranty, Solahart warrants that the Solahart Modules and Hanwha Q Cells Modules will not show any material defects or processing defects for a period of:

- for Solahart315 modules, 12 years after the date of initial purchase of the Module;
- for SolahartS2 range modules, 25 years after the date of initial purchase of the Module;
- for Hanwha Q Cells modules, 5 years after the date of initial purchase of the Module,

being the invoice date, if used and serviced in accordance with the relevant Module specifications and other product documents (the '**Module Warranty Period**').

If a defect (as described above) occurs during the Module Warranty Period materially affecting the functionality of the Module, Solahart will, at its sole option:

1. Remedy the defect;
2. Supply a replacement Module free of defects; or
3. Repay the purchase price of the Module.

Module Warranty Terms, Limitations and Exclusions

This limited warranty applies to a Module if used, serviced and maintained in accordance with the Solahart Owner's Guide which accompanies the Module.

This warranty does not apply to scratches, marks, mechanical wear, rust, mould, degradation, discoloration and other changes which occur after the delivery of the Modules but which do not result in any adverse effect on the mechanical stability of the Module or a reduction of performance which exceeds the levels set out in this warranty.

Solahart will pay the costs of a technical inspection and transport of defective or non-performing Modules to its nominated location. If the Module is found by Solahart not to be defective (including for any of the exclusions outlined in this warranty document), you agree to reimburse us for those costs on demand. All dismantling and reinstallation costs are your sole responsibility.

In the event of glass breakage, Solahart will also perform a static calculation to verify the substructure before accepting liability under this warranty.

PART B – BATTERIES

Warranty coverage for capacity retention – LG Chem Battery

Subject to the terms of this Limited Warranty, Solahart warrants that the LG Chem Battery will retain the capacity levels specified in Exhibit A during the applicable periods identified in the Exhibit (each, an '**LG Chem Capacity Retention Warranty Period'**).

Remedies – LG Chem Battery

If Solahart determines that a reported defect in relation to a LG Chem Battery is eligible for coverage under this Limited Warranty, Solahart will, at its sole option:

1. Repair the defective LG Chem Battery;
2. Replace the LG Chem Battery; or
3. Provide a Refund to be calculated in accordance with the formula below.

    100% of the purchase price from the initial installation date to 24th month

    72% of the purchase price from 25th to 36th month

    58% of the purchase price from 37th to 48th month

    44% of the purchase price from 49th to 60th month

    30% of the purchase price from 61st to 72nd month

    16% of the purchase price from 73rd to 84th month

6% of the purchase price from 85th to 96th month

4% of the purchase price from 97th to 108th month

2% of the purchase price from 109th to 120th month

Warranty coverage - Tesla Powerwall Battery

Subject to the terms of this Limited Warranty, Solahart warrants that the Tesla Powerwall Battery will be free from defects for 5 years following its initial installation (**'Tesla Warranty Period'**).

Remedies – Tesla Powerwall Battery

If your Tesla Powerwall Battery fails to comply with the above warranty during the Tesla Warranty Period, Solahart will, at its sole option:

1. Repair your Tesla Powerwall Battery;
2. Replace your Tesla Powerwall Battery with an equivalent product; or
3. Refund you the market price of an equivalent product at the time of the warrant claim.

Warranty coverage for defects - BYD Battery-Box System

Subject to the terms of this Limited Warranty, Solahart warrants that the BYD Battery-Box System will be free from defects in materials or workmanship for 10 years from the sales date as mentioned in the seller's invoice (**'Warranty Start Date'**) to the Original End-User (**'BYD Warranty Period'**).

Warranty coverage for capacity retention – BYD Battery-Box System

Subject to the terms of this Limited Warranty, Solahart warrants that

> the BYD Battery-Box System HVM series will: (i) retain sixty per cent (60%) of its **Usable Energy** (as specified in Exhibit B) for ten (10) years from the Warranty Start Date; or (ii) reach the **Minimum Throughput Energy** (as specified in Exhibit B), whichever comes first, on the condition that the Product is operated under normal use in accordance with Solahart Owner's Manual. The 'Minimum Throughput Energy' is the total output energy of the Product recorded in the control module of the Product,

(each a '**BYD Warranty Period'**).

Warranty coverage for capacity retention for additional battery modules after the initial installation (Subsequent Product) – BYD Battery-Box System

Subject to the terms of this Limited Warranty, Solahart warrants that the Subsequent Product will: (i) retain sixty percent (60%) of Usable Energy (as specified in Exhibit B) for ten (10) years from the invoice date of the Subsequent Product; or (ii) reach the Minimum Throughput Energy (as specified in Exhibit B), whichever comes first, on the condition that the Product is operated under normal use in accordance with Solahart Owner's Manual ('**BYD Warranty Period'**).

BYD Battery-Box System HVM series Warranty Terms and Exclusions

This warranty for Battery-Box System HVM series does not apply:

1. If access is not granted to the performance data of the Product over the Internet upon request after reporting the warranty claim or
2. To wear and tear in the appearance of the Product (including to any scratches, stains, mechanical wear, rust or mould) which does not impair its function.

Remedies for BYD Battery-Box System HVM series

If your BYD Battery-Box System fails to comply with the above warranties during the relevant BYD Warranty Period, Solahart will repair or replace the non-conforming Product or parts at no charge (or provide a partial refund) on the following conditions:

1. Whether to repair or replace the Product will be determined by Solahart in its sole discretion.
2. If the manufacture of the BYD Battery-Box System in issue has been discontinued at the time of the warranty claim, withdrawn from the market, or are otherwise unavailable Solahart may, at its discretion, replace it with a similar Product or part (which may include previously used parts that are equivalent to new in performance and reliability).

3. If Solahart does not repair or replace the defective Product or parts, Solahart will refund an amount of money calculated as follows:

   a. If the Product cannot be operated (that is, the warranty for **defects** applies), the refund will be calculated as follows:

      Refund = (Maximum Claim Amount*/120) × (120 - number of months since Warranty Start Date);

   b. If the Product fails to comply with the Limited Performance Warranty for **capacity**, Solahart may calculate the refund using one of the two refund formulas below:

      i) Refund = Maximum Claim Amount * × (warranted Minimum Throughput Energy - output energy of the Product recorded in the control module of the Product)/ warranted Minimum Throughput Energy; or

      ii) Refund = Maximum Claim Amount * × (warranted remaining Useable Energy - remaining Useable Energy)/ warranted Usable Energy;

   Where:

   - * the Maximum Claim Amount is the market value of the Product (or an equivalent Product) determined by Solahart if it were purchased new with no defects; and
   - the Minimum Throughput Energy and the Usable Energy are specified in Exhibit B.

PART C – INVERTERS –FIMER/ABB

Warranty coverage for FIMER/ABB Inverters

Solahart warrants that a FIMER/ABB Inverter when provided by Solahart or a Solahart certified installer, when located at its original installation, will operate in accordance with its specifications in the Solahart's Owner's Guide and Installation Instructions for a period of: (a) ten (10) years from the date of purchase of the inverter for all UNO-DM Inverters; and (b) five (5) years from the date of purchase of the inverter for all other FIMER/ABB Inverters. If the Inverter fails to operate in accordance with its specifications and this materially affects the usability of the Inverter, Solahart will, at its sole option:

1. Repair the Inverter (either on site or at FIMER/ABB's factory); or
2. Provide a replacement Inverter (which might be new, reconditioned or an equivalent product).
3. Reimbursement.

Warranty Terms

If Solahart determines in its sole discretion that you do not have a valid warranty claim, Solahart may invoice you for any inspection and transportation costs of the returned Product.

Given the evolution of the technology, a replacement unit or a new device available at the time of the claim may not be compatible with the installed system. The warranty does not cover any expenses and/or costs incurred as part of the configuration, update or adjustment of the system to enable the installation of the Product. Solahart will not be liable under this warranty to pay any financial compensation, including compensation for any energy not supplied to the network by the system during any assistance activities, including preventive and corrective maintenance.

PART D – INVERTERS AND ASSOCIATED COMPONENTS – SOLAREDGE

(In this Part D, a reference to "Products" is to the SolarEdge Products as described below).

Warranty coverage for SolarEdge Inverter

Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the SolarEdge Inverter, when located at its original installation, for a period of twelve (12) years commencing on the earlier of:

1. 4 months from the date the Inverter is shipped from the manufacturer; and
2. The date of installation of the Inverter.

Warranty coverage for StorEdge Interface

Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the StorEdge Interface for a period of ten (10) years commencing on the earlier of:

1. 4 months from the date the Interface is shipped from the manufacturer; and

2. The date of installation of the Interface.

Warranty coverage for Power Optimizers
Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the Power Optimizers for a period of twelve (12) years commencing on the earlier of:

1. 4 months from the date the Power Optimizers are shipped from the manufacturer; and

2. The date of installation of the Power Optimizers.

For all Power Optimizers with a part number ending in C, this warranty does not apply to the input connector.

Warranty coverage for Power Meter
Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the Power Meter for a period of five (5) years commencing on the earlier of:

1. 4 months from the date the Power Meter is shipped from the manufacturer; and

2. The date of installation of the Power Meter.

Remedies
If Solahart determines that a reported defect in relation to a Product is eligible for coverage under this Limited Warranty (including retention capacity), Solahart will, at its sole option:

1. Repair the defective Product;

2. Issue a credit note for the defective Product in an amount up to its actual value at the time buyer notifies Solahart of the defect, as determined by Solahart, for use toward the purchase of a new Product; or

3. Provide the buyer with replacement units for the Product.

Exclusions
The Limited Warranty does not apply to components which are separate from the Products, ancillary equipment and consumables, such as, for example, cables, fuses, wires and connectors.

Beneficiary of Limited Warranty
The Limited Warranty only applies to the buyer who purchased the Products from Solahart, for use in accordance with their intended purpose ('**Original Buyer'**). The Limited Warranty may be transferred from the Original Buyer to any assignee, and will remain in effect for the time period remaining under the above Warranty Periods, provided that the Products are not moved outside their original country of installation and any reinstallation is done in accordance with the installation directions and use guidelines accompanying the Products.

PART E – INVERTERS AND ASSOCIATED PRODUCTS – GOODWE
(In this Part E, a reference to "Products" is to the GoodWe Products as described below).

Warranty coverage for GoodWe Inverter
Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the GoodWe Inverter, when located at its original installation, for a period of 5 (five) years commencing on the first installation date.

Warranty coverage for GoodWe Accessories
Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in workmanship and materials in relation to the GoodWe Accessories for a period of 5 (five) years commencing on the first installation date.

Remedies
If the Product malfunctions or becomes inoperative due to a defect in workmanship or material under normal operation as specified in the Product instructions during the relevant warranty period, Solahart will, at its sole option:

1. fix the issue by changing configurations or updating software;

2. repair the defective Product by replacing with spare parts; or

3. replace the defective Product with a Product that is new or refurbished but at least functionally equivalent to the original product, or upgraded model which has at least equivalent or upgraded functionality to the original product.

If a Product is replaced under this Limited Warranty, a warranty of 3 months or the balance of the warranty period on the replaced Product, whichever is the greater, will apply to the replacement Product.

This Limited Warranty covers the cost of labour work and materials to return the Product to working functionally and the transportation costs, including shipments, taxes, customs and duties, of replacements.

If a Product is found not to be covered by this Limited Warranty, Solahart reserves the right to charge a handling fee.

Beneficiary of Limited Warranty
The Limited Warranty only applies to:

1. the buyer who purchased the Product from Solahart and put them into operation for the first time; and

2. the first purchaser who acquires the Product from that buyer in their original installation.

PART F - CE25 PRODUCTS
(In this Part F, a reference to "Products" is to the CE25 Products as described below).

Warranty coverage for CE25 Products
Subject to the terms of this Limited Warranty, Solahart provides a warranty against defects in materials and workmanship under normal use for 5 years ('**CE25 Warranty Period**').

If a defect (as described above) occurs during the CE25 Warranty Period, Solahart will, at its sole option:

1. repair the defect; or

2. replace the Product with a refurbished or "as new" Product (which includes Products that may have been used for testing or demonstration purposes).

Warranty Terms

For Products capable of retaining user-generated data, repair of the Product may result in loss of the data.

The warranty only covers factory imperfections in materials and workmanship and does not cover normal wear and tear.

PART G – THE RACKING SYSTEM
Warranty coverage for the Racking System
Solahart warrants that the racking system supplied with the PV System shall be free from defects in material and workmanship for a period of five (5) years from the date of installation.

This Warranty shall be void if the racking system has been modified, repaired, or reworked in a manner not previously authorized by Solahart in writing. If within the specified Warranty period the racking system shall be reasonably proven to be defective, then Solahart shall repair or replace the defective component(s) at Solahart's sole discretion. Such repair or replacement shall completely satisfy and discharge all of Solahart's liability with respect to this Limited Warranty.

PART H - BALANCE OF THE SYSTEM
Warranty coverage for the balance of the system
The balance of the PV System (**BOS**) consists of PV module cabling, circuit breakers, isolators, enclosures and labels. Solahart warrants that the BOS supplied by it will operate in accordance with its specifications in the Owner's Guide and Installation Instructions for a period of five (5) years from the date of installation of the BOS. If the BOS fails to operate in accordance with its specifications and this materially affects the usability of the BOS, Solahart will, at its sole option, repair or replace the defective component.

PART I - LABOUR WARRANTY

Warranty coverage for labour – PV System and LG Chem Battery

In addition to the above coverage, Solahart provides you with five (5) years of coverage, from the date of installation, for all labour costs involved with inspection by Solahart, removal or installation of warranted parts or components by Solahart of your PV System. Other than this five (5) years coverage, this Warranty does not cover, nor will Solahart reimburse, any on-site labor or other costs incurred in connection with the inspection, de-installation or removal of defective parts or components, or the re-installation of replaced or repaired parts or components for your PV System.

Warranty coverage for labour - SolarEdge Products

If Solahart determines that a reported defect in relation to a SolarEdge Product is eligible for coverage under this Limited Warranty and Solahart decides to repair the Product or part(s), warranty coverage includes labour and material costs necessarily incurred to correct the Product defect; and where Solahart decides to replace the Product or part(s) to which the Limited Warranty applies, warranty coverage includes the cost of the replacement of the Product or part(s). All other costs will be borne by you.

PART J - GENERAL TERMS

Back-up if sole or dominant power supply

If the PV System is to be the sole or dominant power supply for your business or application, you should ensure that you have back up redundancy if the PV System were to become inoperable for any reason. We suggest that you seek advice from your electrician or qualified professional about your needs and build backup redundancy into your electricity supply system.

Application of this warranty

This warranty only applies to Products provided by Solahart.

This warranty does not apply to defects, damage, malfunction, power output or service failures which have been caused by:

1. Repair, modifications, alterations, attachments or movement to or of the Product, or (in the case of the LG Chem Battery) opening of the external casing of the LG Chem Battery, performed by someone other than a Solahart Dealer or a Solahart Accredited Service Agent or otherwise without the prior written consent of Solahart;

2. Abuse, malicious acts, misuse or abnormal use, accident, negligent acts, power failures or surges, any external or environmental causes or force majeure events, including, but not limited to, pollution, explosion, lightning, fire, smoke, charring, flood, hail, extreme temperature conditions or cold weather (including frost), high snow loads or any other natural disaster, any other force majeure event, pest damage, accidental breakage, actions of third parties, and any other events or accidents outside Solahart's control and/or not arising under normal operating conditions and/or exceed the specifications set out in the relevant product information and sound structured engineering;

3. Operating the Product in an unintended environment or under incorrect safety or protection conditions;

4. Failure to operate and/or maintain the Product in accordance with the applicable Solahart Owner's Guide and Installation Instructions;

5. Transport damage;

6. Wear and tear from adverse conditions including corrosive atmospheric conditions e.g. salt, ocean spray, dust storm or other weather damage;

7. Cosmetic defects;

8. Any improper attachment, installation or application of the Product, and in respect of the PV System, any insufficient framing if the PV System is a frameless module;

9. Any attempt to extend or reduce the life of the Product, whether by physical means, programming or otherwise, without the prior written consent of Solahart;

10. Removal and reinstallation at a location other than the original installation location, without the prior written consent of Solahart;

11. Insufficient ventilation of the Product;

12. Failure to observe the applicable safety regulations; or any factor identified in the applicable Solahart Owner's Guide and Installation Instructions; or

13. Ignoring safety warnings and instructions contained in all documents relevant to the applicable Product.

If your claim relates to a failure to operate in accordance with the Solahart Owner's Guide as a result of one of the factors listed above, Solahart may charge you at its standard rates for its time and materials related to your claim.

Where a Product covered by this Limited Warranty is added to an existing PV system, this Limited Warranty will only apply to the Product, not the rest of the PV System.

Without limiting the above exclusions:

1. In relation to the Solahart315, SolahartS2 and Hanwha Q Cells Modules, Solahart may refuse to honour this Warranty where: (a) modules have been used or handled, or modifications made to the modules, not in accordance with the relevant product information or written instructions issued by Solahart; (b) where the modules have been used for purposes or in circumstances not conforming to the product specifications; (c) the Modules have been damaged due to damage to or defects in the photovoltaic system in which the Modules are installed, due to factors such as voltage fluctuations, power peaks, excess voltage, power failure etc; (d) the Modules have been used in processes involving, or in conjunction with, other products without Solahart's prior written consent; (e) the serial number or product label has been removed, changed, deleted or made unrecognizable, or if the number or label is no longer clearly distinguishable for other reasons beyond Solahart's control and therefore it is not possible to conclusively identify the Modules; or (f) you do not report any visible defect immediately.

2. In relation to LG Chem Batteries, the Warranty does not cover damage from any of the following activities: (a) modification, alteration, disassembly, repair or replacement without authorization from Solahart; (b) external influences including unusual physical or electrical stress (power failure surges, inrush current, lightning, flood, fire, accidental breakage, etc); or (c) use of an incompatible inverter, rectifier or power conditioning system.

3. In relation to Inverters, the Warranty does not cover: (a) mechanical damage during transportation of the defective unit when the Product is conveyed under the responsibility of a third party; (b) any modification made to the Product that has not been authorized by Solahart; (c) improper installation or commissioning of the Product; (d) improper use of the Product; (e) external event (over-voltage, malfunction of other) components of the system causing the Product to break down, etc.); (f) failure to comply with the Product documentation (Product manual, installation instructions, preventive maintenance); (g)·force majeure, including lightning, overcurrents, natural disasters and fires; (h) external agents, including acid rain, salt, vandalism or other pollutants; (i) failure to (properly) implement safety rules; or (j) use in combination with equipment, products or materials not authorised by Solahart.

4. In relation to BYD Battery-Box Products, the Warranty does not apply to any defect or deterioration resulting from: (a) the Product not being maintained or operated in accordance with the Operating Manual and Quick Start Guide; (b) exposure of the Product to movement or shaking following installation, or temperatures of more than 50°C and/or below -10°C; (c) failure to notify Solahart of the defect or deterioration within 30 days of becoming aware of the defect or deterioration; (d) modification or repair of the Product without Solahart's approval; (e) a force majeure event (e.g., natural catastrophes, such as flooding, fires, earthquakes, lightning or other abnormal environmental conditions, war, etc.); (f) changes to national or regional laws, regulations or directives; or (g) the Product not being operated for any period of 6 months or more.

5. In relation to SolarEdge Products, the Warranty does not cover: (a) Products which are damaged due to failure to observe the applicable safety regulations governing the proper use of the Products; (b) Products which are operated not in strict accordance with the accompanying instruction documentation, including without limitation, not ensuring sufficient ventilation for the Product as described in the applicable installation guide; (c) Products which are opened, modified or disassembled in any way without Solahart's prior written consent; (d) Products which are used in combination with equipment, items or materials not permitted in the instruction documentation or in violation of local codes and standards; (e) cosmetic or superficial defects, dents, marks or scratches which do not influence the proper functioning of the Products; (f) Products damaged or rendered non-functional as a result of power surges, lightening, fire, flood, pest damage, accident, action of third parties, or other events beyond Solahart's reasonable control or not arising from normal operating conditions.

6. In relation to the GoodWe Products, the Warranty does not cover: (a) normal wear and tear (including, without limitation, wear and tear of batteries); (b) faults or damages due to faulty installations, operations,

maintenances against manufacturer's instructions by an which was done by anyone other than Solahart or a Solahart certified installer; (c) disassembly, repair or modification by anyone other than Solahart or a Solahart certified installer; (d) faults or damages due to inappropriate handling, misuse, neglect, unpredictability factors, man-made factors, or force majeure (including stormy weather, flooding, lightning, over voltage, pests and fire, water, or other acts of nature; (e) product modified, design change or parts replaced which were not approved by the manufacturer; (f) vandalism, engraving, labels, irreversible marking or contamination or theft; (g) failure to comply with safety regulations (VDE, IEC, etc.); (h) faults or damages caused by other reasons not related to product quality problems; (i) rust appearing on the product's enclosure cause by harsh environment; (h) fault or damages caused by exposure to sea coasts/saltwater or other aggressive atmospheres or environmental conditions; or (i) accidents and external influences.

7. In relation to Tesla Powerwall Batteries, the Warranty does not apply to any defect resulting from any of the following: (a) abuse, misuse or negligence; (b) accidents or force majeure events, including but not limited to lightning, flood, earthquake, fire or other events outside the reasonable control of Solahart; (c) storage, installation, commissioning, modification or repair of your Tesla Powerwall Battery, or opening of the external casing of your Tesla Powerwall Battery, that is performed by anyone other than Solahart or a Solahart certified installer; (d) failure to operate or maintain your Tesla Powerwall Battery in accordance with the Owner's Manual provided by Tesla; (e) any attempt to modify your Tesla Powerwall Battery, whether by physical means, programming or otherwise, without the express written consent of Solahart; or (f) removal and reinstallation of your Tesla Powerwall Battery at a location other than the original installation location, without the express written consent of Solahart. In order to provide this Warranty for the full five (5) year warranty period, Solahart requires the ability to update your Tesla Powerwall Battery through remote firmware upgrades. Installation of these remote upgrades may interrupt the operation of your Tesla Powerwall Battery for a short period. By installing your Tesla Powerwall Battery and connecting it to the internet, you consent to Solahart or its partners updating your Tesla Powerwall Battery through these remote upgrades from time to time, without further notice to you. If your Tesla Powerwall Battery is not connected to the Internet for an extended period, we may not be able to provide important remote firmware upgrades. In these circumstances, we may not be able to honour the full five (5) year Warranty. The Warranty for Tesla Powerwall Batteries will not apply to (a) normal wear and tear or deterioration, or superficial defects, dents or marks that do not impact the performance of your Tesla Powerwall Battery; or (b) noise or vibration that is not excessive or uncharacteristic and does not impact your Tesla Powerwall Battery's performance.

8. In relation to CE25 Products, the Warranty does not apply to: (a) damage or fault caused by operating the CE25 Product outside the permitted or intended uses described in the applicable installation guide or arising from failure to follow instructions on use of the CE25 Product; (b) consumable parts, unless damage has occurred due to a defect in materials or workmanship; (c) cosmetic damage, including scratches, dents and broken plastic on ports, that does not otherwise affect the CE25 Product's functionality or materially impair its use; (d) any abuse, misuse, neglect, mishandling or misapplication (including opening up, modifying or tampering with the hardware); (e) damage or fault caused by a fault with a third-party product not provided by Solahart; (f) any unusual hazards affecting the CE25 Product or failure to provide an environment within the specifications of the CE25 Product (including exposure to excessive humidity, heat, cold, dust, liquids, magnetic or electromagnetic interference, or incorrect supply voltage or current); (g) damage, malfunction or failure resulting from alterations, accident, misuse, abuse, fire, liquid spillage, use on an incorrect voltage, power surges and dips, thunderstorm activity, acts of God, voltage supply problems, tampering, unauthorised repairs or other acts by any persons (including any repairs by persons other than Solahart authorised service personnel) or entry by any insect, vermin or foreign object in the CE25 Product; or (h) cases where the factory applied UID has been altered or removed from the CE25 Product.

Location and positioning

Where the Product is installed outside the boundaries of a metropolitan area (as defined by Solahart) or further than 25 km from a regional Solahart Dealer, the cost of transport, insurance and travelling costs to the nearest Solahart Dealer shall be the owner's responsibility.

Replacements

Solahart may use new, used, remanufactured or refurbished parts or products when repairing or replacing any Product under this Limited Warranty. Any exchanged or replaced parts or Products will become the property of Solahart. Goods presented for repair may be replaced by refurbished goods of the same type rather than being repaired.

If the Product is repaired or replaced under this Warranty, the remainder of the applicable Warranty Period will apply to the repaired or replaced Product and the repaired or replaced Product or parts will not carry a new Solahart Warranty. The Warranty Periods set out above will not be extended in any way in the event of a

replacement or repair of a Product, but this does not affect any rights you may have under the Australian Consumer Law in relation to the replaced or repaired Product (see the section below entitled “The Australian Consumer Law” for further details).

Limitation of this warranty
This Limited Warranty is provided voluntarily and free of charge and does not constitute an independent guarantee promise. Therefore, if any defect materially affects the functionality of any Product, the remedies under this Warranty are limited exclusively to the remedies set out above in the warranty cases specified herein.

Subject to any statutory provisions to the contrary, Solahart assumes no warranties, express or implied, written or oral, other than the warranties made herein and specifically disclaims all other warranties, merchantability or fitness for a particular purpose and Solahart excludes all liabilities for any special, incidental, indirect, consequential or punitive damages arising from or in connection with the use or loss of use of the Product to perform as warranted, regardless of the form of action and regardless of whether a party has been informed of or otherwise might have anticipated the possibility of such damages; including but not limited to damages for loss of power, loss in income or revenue, lost profits or savings nor expenses arising from third-party claims. This does not apply to the extent Solahart is liable under applicable mandatory laws.

If you require a call out and we find that the fault is not covered by Solahart's warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Solahart that service will be at your cost.

Entitlement to claim under this warranty
To be entitled to make a claim under this warranty you need to:

1. Provide proof of purchase documentation and be the owner of the Product or have the consent of the owner to act on their behalf.

2. Contact your Solahart dealer without undue delay after detection of the defect (or in the case of BYD Battery-Box System, within 2 weeks of appearance of the defection) and, in any event, within the applicable Warranty Period.

You are not entitled to make a claim under this warranty if the relevant Product:

1. Does not have its original product labels, serial numbers and type plate or the labels or numbers are illegible; or

2. Is not installed in Australia.

Warranty claim procedure
If you wish to make a claim under this warranty, you need to:

1. Contact your Solahart dealer, provide proof of purchase (your invoice) and owner’s details, address of the Product, a contact number and date of installation of the Product.

2. Solahart will arrange for the Product to be tested and assessed. Solahart will inform you whether this will occur on-site or whether the Product must be sent elsewhere for testing and assessment.

3. If Solahart determines in its sole discretion that you have a valid warranty claim, Solahart will organise for the repair or replacement of the Product or any component in accordance with this warranty.

Any expenses incurred in the making of a claim under this Warranty will be borne by you.

The Australian Consumer Law
Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Exhibit A

LG CHEM CAPACITY RETENTION LEVELS

References in this Exhibit to the "Product" are to a LG Chem Battery.

The Product will retain at least 60% of Nominal Energy* when the Product is operated under normal use, consistent with the specification and the Installation Manual provided by LG Chem is followed until the earliest to occur of:

(a) 10 years after the date of the initial installation; or

(b) the Product has had a minimum Energy Throughput as per the table below:

Product Name	Nominal Energy	Energy Throughput
RESU10H	9.8kWh	27.4MWh

* Nominal Energy means the initially rated capacity of the Products as printed on the label of the Products.

During measurement of the Product's capacity:

- The ambient temperature will be 25~30℃
- The initial battery temperature from BMS: 25~30℃
- Charging/discharging method:
  - Charge: 0.2CC/CV (Constant voltage: RESU7H_BPI126V/ RESU10H_BPI 176.4V, Cut-off current 0.05C)
  - Discharge: 0.2CC (Cut-off voltage: RESU7H_BPI 90V/ RESU10H_BPI 126V)
  - Current at 0.2C: 12.6A
- Current and voltage measurement at battery DC side

Exhibit B

BYD BATTERY-BOX SYSTEM RETENTION LEVELS

References in this Exhibit to the "Product" are to a BYD Battery-Box.

In respect of the **HVM series**, the Usable Energy and Minimum Throughput Energy for each Product Model are set out in the table below:

Product Type	Usable Energy(kWh)1 *	Minimum Through Output Energy (MWh)
HVM 8.3	8.28	25.62
HVM 11.0	11.04	34.15
HVM 13.8	13.8	42.69
HVM 16.6	16.56	51.23
HVM 19.3	19.32	59.77
HVM 22.1	22.08	68.31

* For the purposes of this Limited Warranty, the remaining Usable Energy is as measured and calculated using the following testing method and values, while the ambient temperature is between 25~28℃:

- Discharge the battery with constant current until the battery reaches end of discharge voltage (**'EODV'**) or its self-protective voltage.
- Wait for 10 minutes
- Charge the battery with constant current and constant charge voltage to its full capacity.
- Wait for 10 minutes.
- Discharge the battery with constant current until it reaches EODV or self-protection voltage. Calculate discharged capacity. Record the current, voltage and time/
- The remaining Usable Energy is the integral of discharge time, current and voltage.

Test value list:

Product Type	End of discharge voltage(V)	Constant charge voltage(V)	Constant current(A)
HVM 8.3	120	180	10
HVM 11.0	160	240	10
HVM 13.8	200	300	10
HVM 16.6	240	360	10
HVM 19.3	280	420	10
HVM 22.1	320	480	10

Website: www.solahart.com.au

OVERVIEW

The following installation instructions detail installation procedures for photovoltaic modules, power optimizers, inverter, module racking systems and balance of system (BOS) components.

Prior to the installation of any grid connected PV system, a Site Visit shall be performed in accordance with the Clean Energy Council's "Grid-Connected Solar PV Systems - Design Guidelines for Accredited Installers".

SAFETY REQUIREMENTS

The voltages and currents produced by a single module or modules connected in series (voltages added together) or in parallel (currents added together) can be dangerous.

Although module DC plug connectors are insulated to provide touch safe protection, the following points must be observed when handling modules in order to avoid the risk of sparking, fire hazard, burn risk, and lethal electric shocks:

- Exercise extreme caution when wiring modules and look out for damaged or split cable ends.
- Do not perform wiring work in rainy or damp conditions.
- Never insert metallic or otherwise conductive objects into plugs or sockets.
- Ensure that all electrical connections are completely dry and free from contaminants before they are assembled.
- Ensure that connections are tight and correctly made.
- Keep all materials, tools and work areas clean and dry.
- Do not connect any exposed cable ends. Do not touch poles at the same time.
- Always use appropriate safety equipment such as insulated tools and wear personal protective equipment such as insulated gloves.
- Solar modules produce current when exposed to sunlight. It is recommended that the system is shielded with an opaque cover during installation, maintenance or repair work.

The installation shall not be carried out alone.

INSTALLER RESPONSIBILITIES

The installer is solely responsible for:

- Observing and conforming to all relevant Australian Standards, all relevant Clean Energy Council Accreditation guidelines and all applicable laws, ordinances, regulations, codes of practice and local or national building codes, including any that may have superseded these Installation Instructions.
- Ensuring that the installation complies with AS/NZS 3000, AS/NZS 5033, AS/NZS 1170.2, AS/NZS 1562.1, AS 4777.1, AS/NZS 1768, AS/NZS 3008, AS 2050 and any relevant electrical service and installation rules for the state or territory where the system is installed.
- Ensuring that the PV System and associated components are appropriate for the particular installation and the installation environment.
- Ensure the system is integrated into any existing lightning protection system in accordance with the applicable local regulations.
- Ensuring that the roof, roof rafters, battens, purlins, connections, and other structural support members can support the total assembly under building live load conditions. The roof on which the PV system is to be installed must have the capacity to resist the combined Design Dead Load and Live Load at each mounting point.
- Ensuring only parts supplied by Solahart Industries and installer supplied parts as specified by Solahart Industries are utilised (substitution of parts may void the warranty and invalidate certification).
- Ensuring that lag screws have adequate pull-out strength and shear capacities to suit the installation.
- Maintaining the waterproof integrity of the roof, including selection of appropriate flashing.
- Ensuring safe installation of all electrical aspects of the PV system.

DISCLAIMER OF LIABILITY AND WARRANTY

Solahart assumes no responsibility for loss, damage or expense resulting from improper installation, handling or misuse of PV modules. Refer to “Solahart PV System Warranty – Australia Only” on page 4 for full warranty terms and conditions.

IEC 61730 INFORMATION

Modules supplied by Solahart are designed to fulfil the criteria of application Class A requirements according to IEC 61730. Modules are qualified for application Class A: Hazardous voltage (Higher than 50 V DC) and hazardous power (higher than 240 W) applications where general contact access is anticipated. For the purposes of AS/NZS 3000, modules are classified as Class I equipment.

FIRE GUIDELINES

Utilise the following fire safety guidelines when installing modules supplied by Solahart:

- Modules supplied by Solahart have a Class C Fire Rating.
- Check with local authorities for guidelines and requirements concerning fire safety for any building or structure on to which the modules will be installed.
- The system design should ensure that firefighting personnel can access the system in the event of a building fire. Check with local authorities for any applicable regulations concerning setbacks or other placement restrictions that may apply for roof-mounted PV arrays.
- Any electrical equipment can pose a fire risk. Modules must therefore be mounted over a fire retardant roof covering rated for the application and a sufficient distance between the module and the mounting surface must be maintained to allow free circulation of air beneath the module.

ENVIRONMENTAL FACTORS

Solahart’s limited warranty is based upon modules being installed in accordance with the following conditions:

- Modules are not suitable for installation in potentially hazardous locations.
- Modules shall not be installed in locations:
  - near sources of flammable gases, vapours or open flames.
  - in proximity to air conditioning systems.
  - in enclosed spaces (i.e. indoor), or on moving objects.
  - in direct contact with salt water/spray. Avoid installing in areas subject to high salt mist content.
  - which experience extreme hail and/or snow.
  - where they may be exposed to sulphur e.g. near sulphur springs or volcanoes
  - where they may be exposed to harmful chemicals.

WARNINGS

Warning: This document provides sufficient information for system installation heights up to 20 m. If the installation site is more than 20 m in height contact Solahart Industries for further advice.

Warning: This system has not been certified for, and should not be installed in, wind region D.

Warning: During installation and when working on the roof, be sure to observe the appropriate OH&S safety regulations and relevant regulations of your local region.

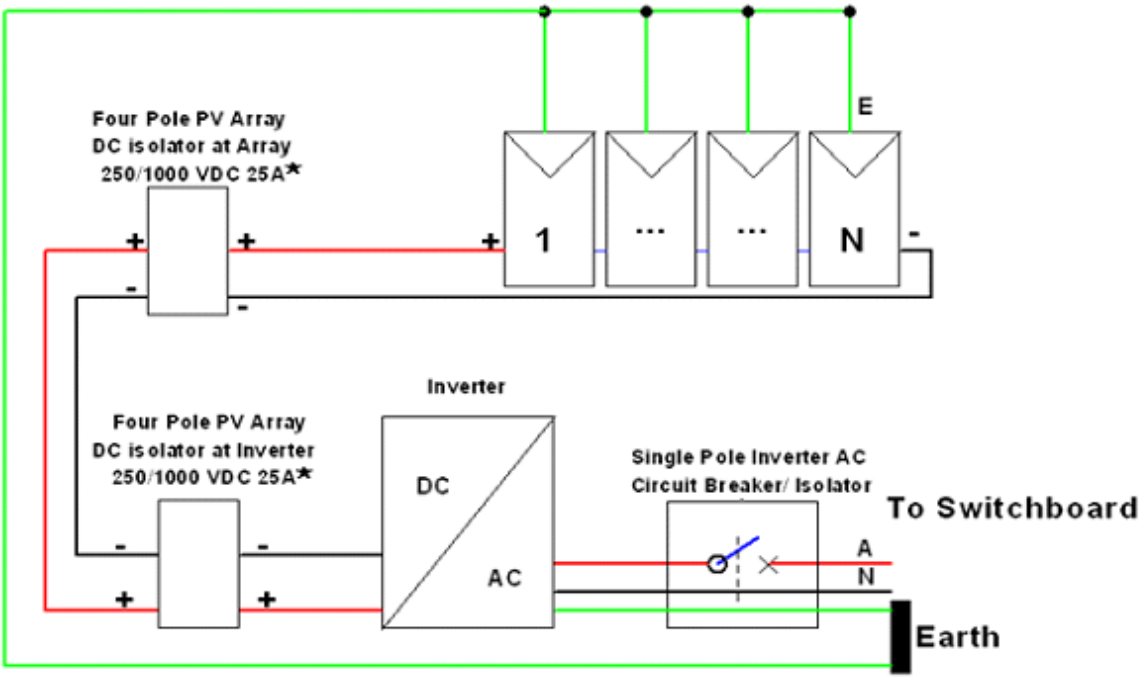
Warning: Ensure electrical connection/ disconnection is performed only when the relevant circuit is isolated. Do not connect / disconnect wiring under load conditions.

Warning: Do not expose the PV modules to artificially concentrated light.

Warning: Do not drill holes in the modules as this will void product warranty.

WIRING DIAGRAMS

SINGLE INPUT INVERTER SYSTEMS WITH SINGLE STRING – EXTERNAL DC ISOLATOR



*For DC Isolator Wiring refer to "DC Isolator Wiring" on page 46.

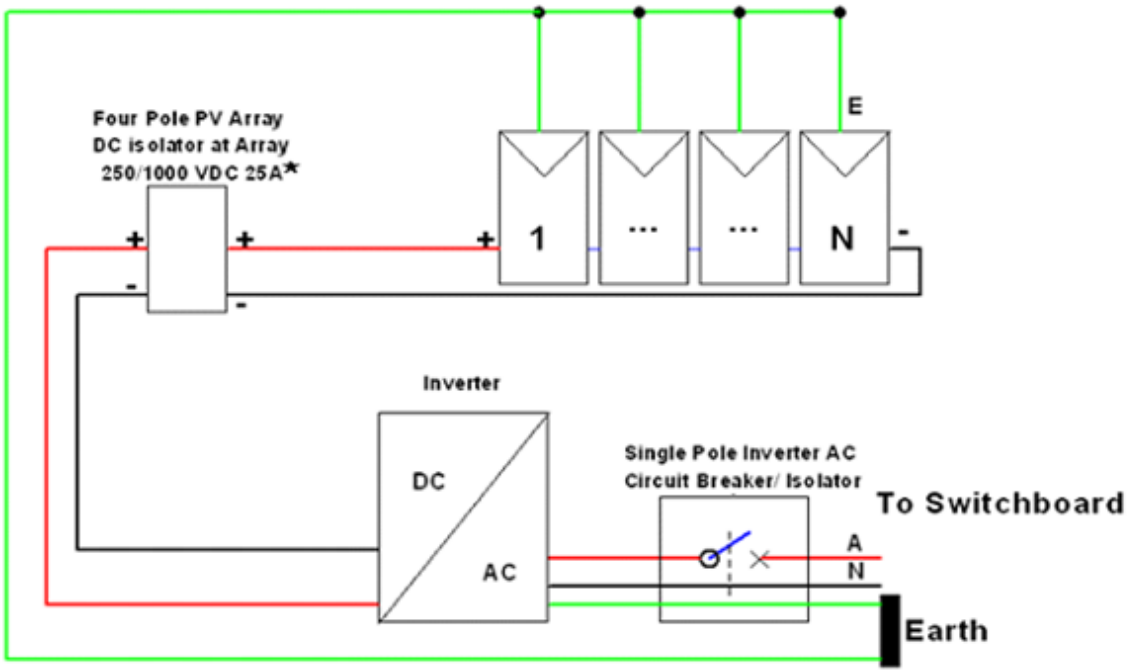
Note: The recommended circuit breaker rating for each inverter model is provided in the table below.

Solahart370S2 Modules								
Inverter	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W)*	AC Circuit Breaker Rating	I_{sc} (A)* per String	V_{oc} (V)*
UNO-DM-2.0-TL-BQ	3	7	1	7	2590	16	10.44	Refer to Voltage Tables on page 24
GW3048-EM	4	10	1	10	3700	32		

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

For earthing arrangement and wiring diagram refer to "Earthing Arrangements – All Systems" on page 27.

SINGLE INPUT INVERTER SYSTEMS WITH SINGLE STRING – INTERNAL DC ISOLATOR



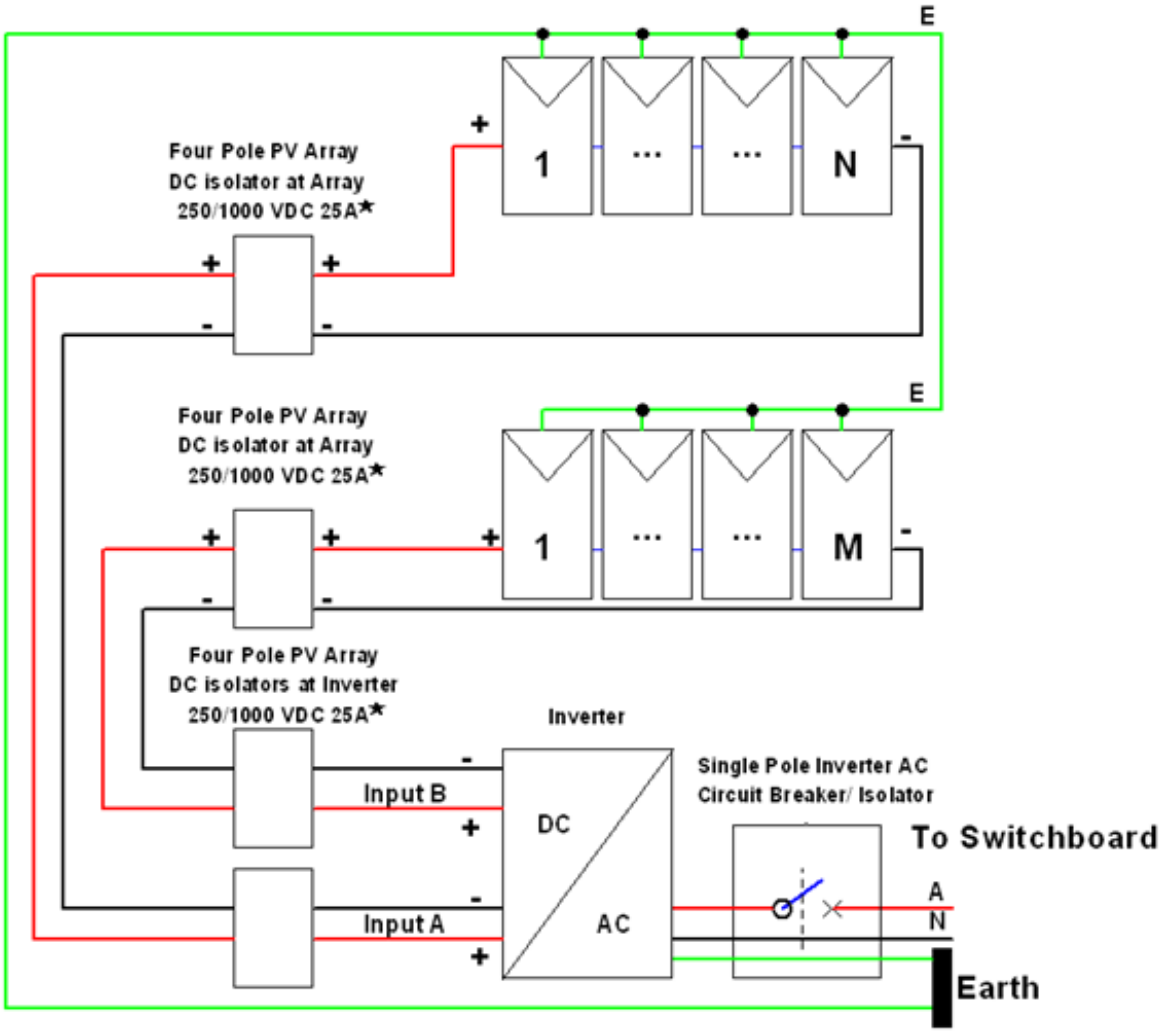
★For DC Isolator Wiring refer to "DC Isolator Wiring" on page 46.
Note: The recommended circuit breaker rating for each inverter model is provided in the table below.
Note: Do not install additional external PV array DC Isolators adjacent to the inverter.

Solahart370S2 Modules								
Inverter	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W)*	AC Circuit Breaker Rating	I_{sc} (A)* per String	V_{oc} (V)*
GW2500-XS	2	9	1	9	3330	16	10.44	Refer to Voltage Tables on page 24
GW3000D-NS	4	10	1	10	3700	16		

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

For earthing arrangement and wiring diagram refer to "Earthing Arrangements – All Systems" on page 27.

MULTIPLE INPUT INVERTER SYSTEMS – EXTERNAL DC ISOLATOR(S)



*For DC Isolator Wiring refer to "DC Isolator Wiring" on page 46.

Note: The recommended circuit breaker rating for each inverter model is provided in the table below.

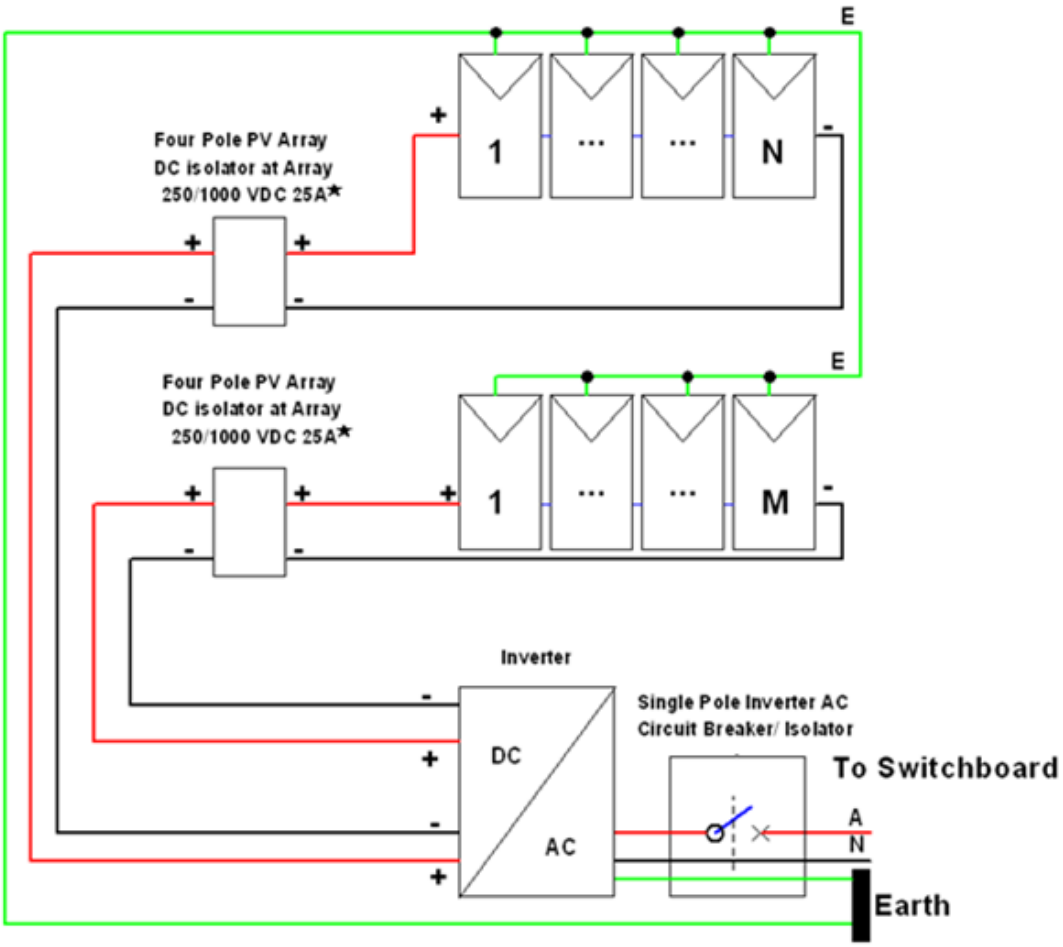
Solahart370S2 Modules								
Inverter	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W) *	AC Circuit Breaker Rating (A)	I_{sc} (A)* per String	V_{oc} (V)*
UNO-DM-3.3-TL-BQ	4	11	2	11	4070	25	10.44	Refer to Voltage Tables on page 24
UNO-DM-4.0-TL-BQ	4	12**	2	14	5180	25		
UNO-DM-5.0-TL-BQ	4	12**	2	18	6660	32		
UNO-DM-6.0-TL-BQ	4	12**	2	21	7770	32		
GW5048D-ES	4	12**	2	18	6660	50		

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

****** -16°C is used to calculate maximum V. If minimum temperatures lower than -16°C are experienced at the installation site, maximum number of modules must be re-evaluated.

For earthing arrangement and wiring diagram refer to "Earthing Arrangements – All Systems" on page 27.

MULTIPLE INPUT INVERTER SYSTEMS – INTERNAL DC ISOLATOR



*For DC Isolator Wiring refer to "DC Isolator Wiring" on page 46.
Note: The recommended circuit breaker rating for each inverter model is provided in the table below.
Note: Do not install additional external PV array DC Isolators adjacent to the inverter.

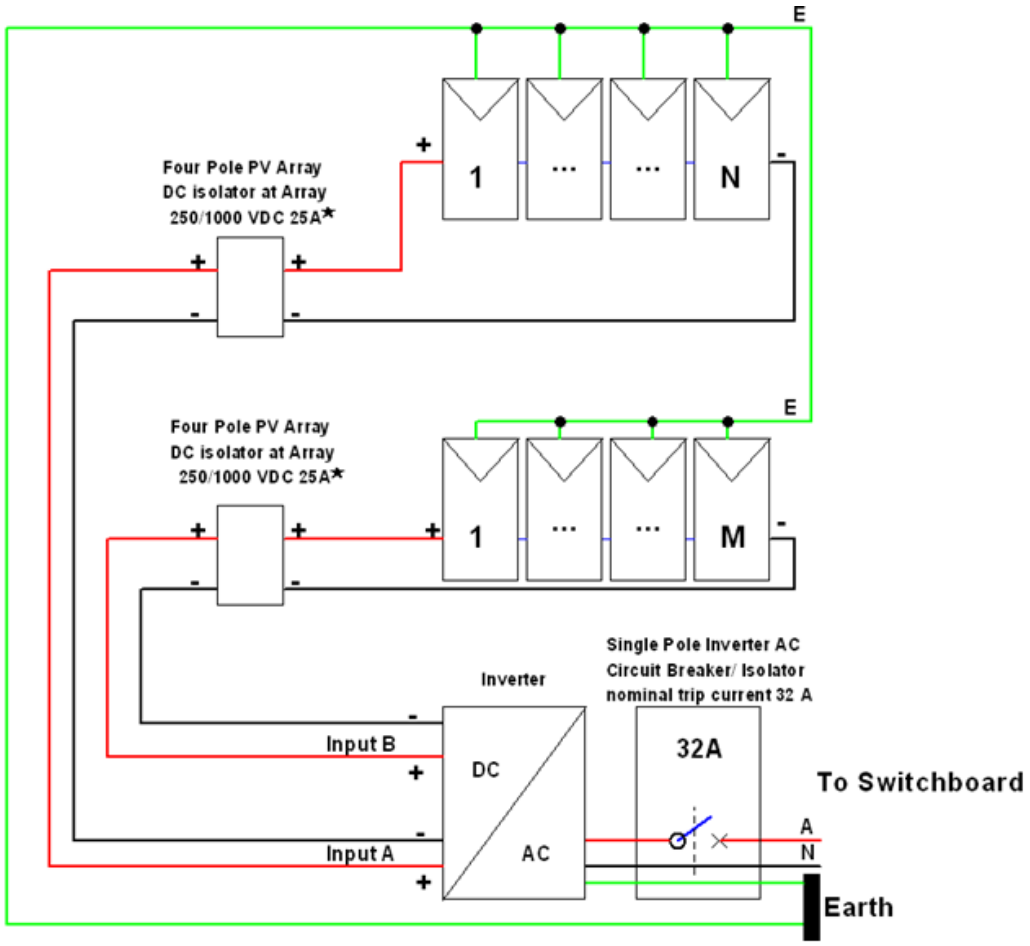
Solahart370S2 Modules								
Inverter	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W) *	AC Circuit Breaker Rating (A)	I_{sc} (A)* per String	V_{oc} (V)*
GW3000D-NS	4	10	2	10	3700	16	10.44	Refer to Voltage Tables on page 24
GW5000D-NS	4	12**	2	18	6660	32		
UNO-DM-3.3-TL-SBQ	4	12**	2	11	4070	25		
UNO-DM-4.0-TL-SBQ	4	12**	2	14	5180	25		
UNO-DM-5.0-TL-SBQ	4	12**	2	18	6660	32		
UNO-DM-6.0-TL-SBQ	4	12**	2	21	7770	32		

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

****** -16°C is used to calculate maximum V. If minimum temperatures lower than -16°C are experienced at the installation site, maximum number of modules must be re-evaluated.

For earthing arrangement and wiring diagram refer to "Earthing Arrangements – All Systems" on page 27.

SE5000 AND SE6000 INVERTER SYSTEMS



★ For DC Isolator Wiring refer to "DC Isolator Wiring" on page 46.

Note: Do not install additional external PV array DC Isolators adjacent to the inverter.

Solahart370S2 Modules							
Inverter	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W) *	Max Inverter Input Current (A)*	Max Inverter Voltage (V)*
SE5000-xxxxxxxxx**	8	14	2	18	6660	19.5	500
SE6000-xxxxxxxxx**	8	14	2	21	7770	23	500
SE5000H-xxxxxxxxx**	8	15	2	18	6660	13.5	480
SE6000H-xxxxxxxxx**	8	15	2	21	7770	16.5	480

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

** This model may have suffixes indicating different options and functionality.

For earthing arrangement and wiring diagram refer to "Earthing Arrangements – All Systems" on page 27.

SE8000H AND SE10000H INVERTER SYSTEMS

Note: Ensure the single phase inverter limit, as set by your local electricity distributor, is larger than or equal to the inverter's rated AC power output as shown in the following table below.

Solahart370S2 Modules										
Inverter	Rated AC Power Output (W)	Max Number of DC Inputs	Number of Modules per String		Number of Strings		Max Number of Modules per Inverter	Max System Power Rating (W)*	Max Inverter Input Current (A)*	AC Circuit Breaker Size (A)
			Min	Max	Min	Max				
SE8000H-xxxxxxxxx**	8000	2	8	16	1	3	28	10360	20.5	50***
SE10000H-xxxxxxxxx**	10000	2	8	16	1	4	36	13320	25.5	50***

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

** This model may have suffixes indicating different options and functionality.

*** The current rating of the circuit breaker must be no greater than the current carrying capacity of the AC cable, refer to AS/NZS 3000.

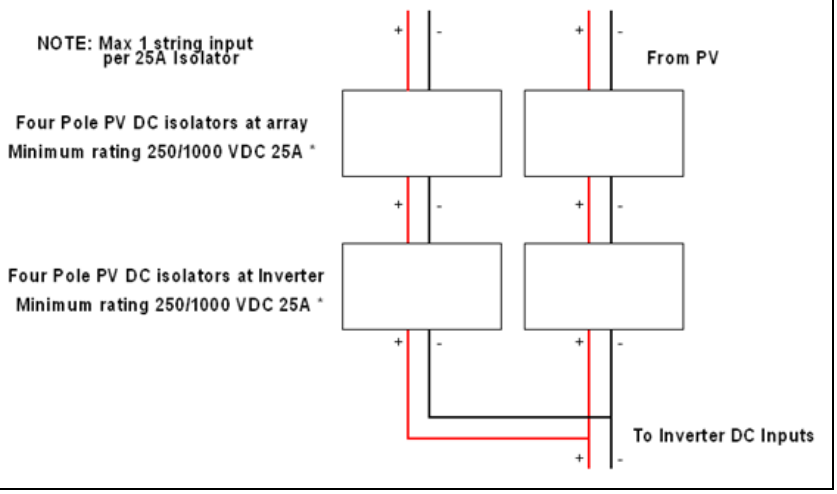
STRING COMBINATION RULES FOR SE8000H and SE10000H

The following design rules must be followed:

1. The number of modules per string must satisfy the minimum and maximum requirements as indicated in the table above.
2. The number of strings per inverter must satisfy the maximum as indicated in the table above.
3. The maximum DC input limitations of the inverter are met.
4. Strings may be combined on the roof or at the ground.

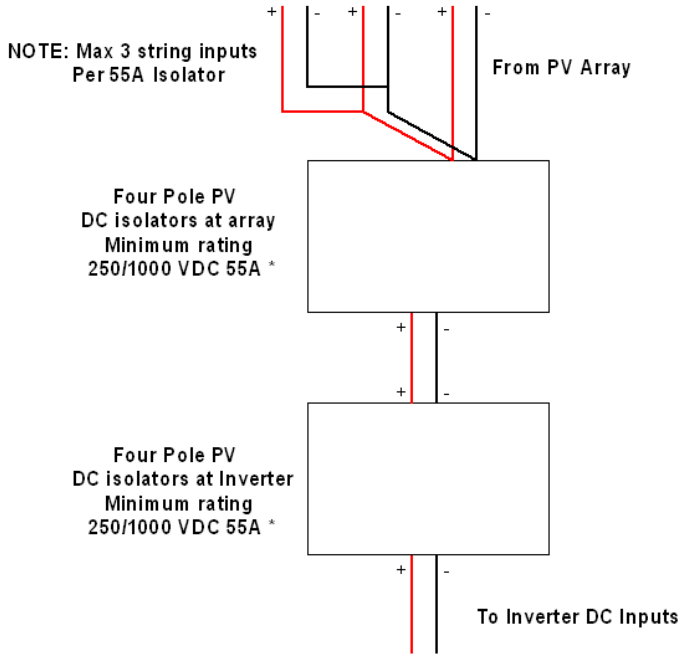
For combining strings at the ground:

- 25 A DC Isolators can be used
- A maximum of 2 strings can be combined per 25 A DC Isolator
- Use the supplied branch connectors to join strings at the inverter



For combining strings at the roof:

- 55 A DC isolator must be used.
- A maximum of 3 strings can be combined per 55 A DC isolator.
- Use the supplied branch connectors



For earthing arrangement and wiring diagram refer to “Earthing Arrangements – All Systems” on page 27.

VOLTAGE TABLES FOR FIMER/ABB AND GOODWE SYSTEMS

Solahart370S2 (V_{oc} = 44.97 V)			
No of Modules per String	V_{oc} * of the String (V)	No of Modules per String	V_{oc}* of the String (V)
2	89.9	8	359.8
3	134.9	9	404.7
4	179.9	10	449.7
5	224.9	11	494.7
6	269.8	12	539.6
7	314.8		

* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual V_{oc} and should be allowed for.

VOLTAGE TABLES FOR SOLAREDGE SYSTEMS

Note: SolarEdge Inverters operate on a fixed string voltage. The V_{oc} of the string is fixed to the nominal DC voltage of the inverter regardless of the panel V_{oc}.

Inverter Model	Nominal DC Voltage	V_{oc} of string
SE5000-xxxxxxxxx*	400 Vdc	400 Vdc
SE6000-xxxxxxxxx*	400 Vdc	400 Vdc
SE5000H-xxxxxxxxx*	380 Vdc	380 Vdc
SE6000H-xxxxxxxxx*	380 Vdc	380 Vdc
SE8000H-xxxxxxxxx*	400 Vdc	400 Vdc
SE10000H-xxxxxxxxx*	400 Vdc	400 Vdc

* This model may have suffixes indicating different options and functionality.

DC ISOLATOR SIZING FOR SOLAREDGE SYSTEMS

As SolarEdge Systems have a constant V_{oc} for each string, and a variable I_{sc}, which is dependent on the number of modules per string, there are multiple DC isolator options which will work on its systems. It is vital to correctly size these DC Isolators to safely install and operate the PV system.

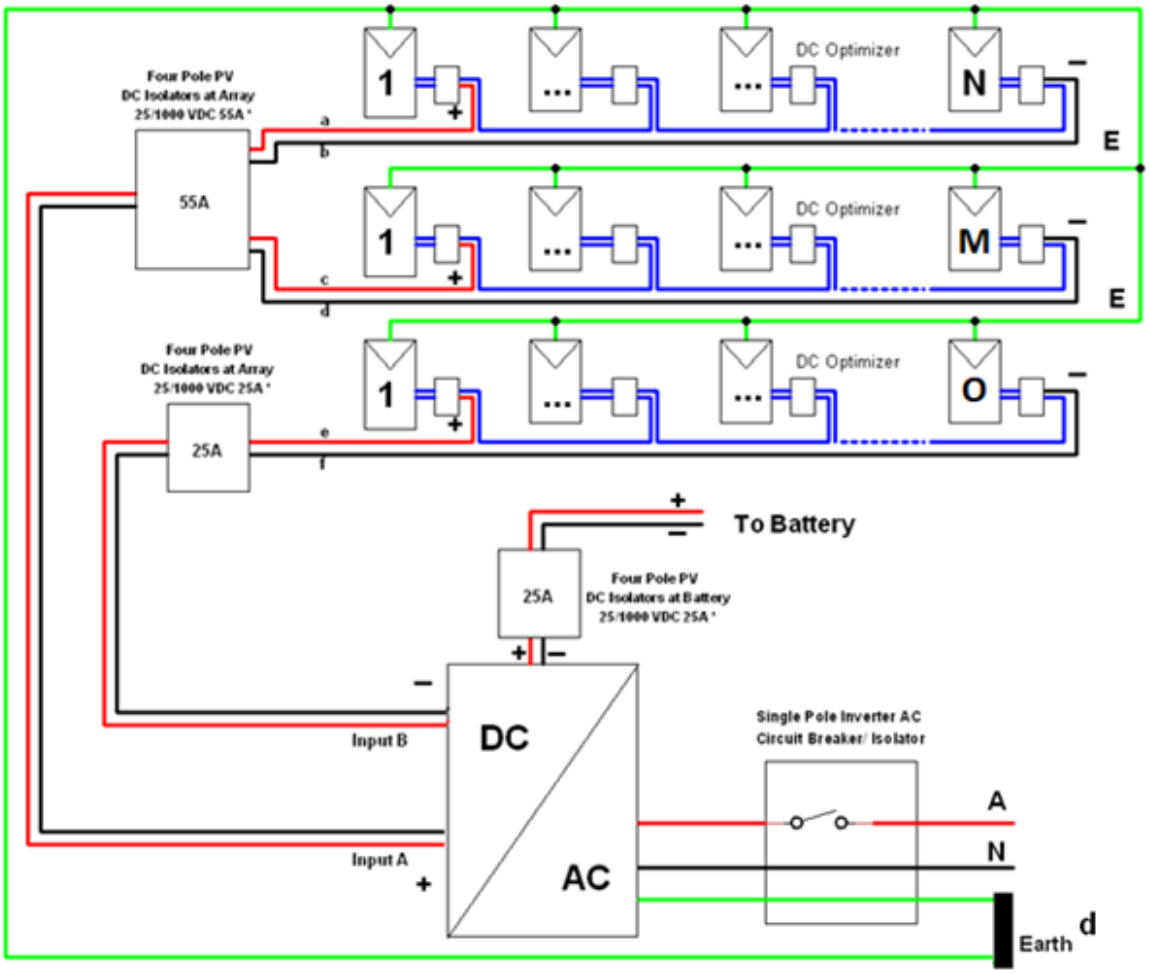
For each of the available DC Isolators follow this guide to correctly select the DC isolator required for the system.

Warning: Ensure string configuration is correct and compliant with the table below.

DC Isolator	Maximum allowable current	Maximum current per string	No of allowable Strings on each isolator
1000 V 25 A	17.6 A	15 A	1
1000 V 32 A	19.2 A	15 A	1
1000 V 55 A	40 A	15 A	3

OVERSIZING DC COUPLED SOLAREDGE BATTERY SYSTEMS

DC Coupled SolarEdge Battery Systems are capable of oversizing the existing max inverter power rating by 5 kW. The additional DC power must be installed at the same time as the battery system.



Solahart370S2 Modules									
Inverter	StorEdge Interface	Min No of Modules	Max No of Modules per String	Max No of Strings	Max No of Modules per Inverter	Max System Power Rating (W) *	Max Inverter Input Current (A)*	Max Inverter Voltage (V)*	AC Circuit Breaker Size ***
SE5000-xxxxxxxx**	-	8	14	3	31	11470	19.5	500	32
SE6000-xxxxxxxx**	-	8	14	4	35	12950	23	500	32
SE5000H-xxxxxxxx**	SESTI-S4	8	15	4	34	12580	13.5	480	32
SE6000H-xxxxxxxx**	SESTI-S4	8	15	4	38	14060	16.5	480	32
SE8000H-xxxxxxxx**	SESTI-S4	8	16	5	47	17390	20.5	480	50
SE10000H-xxxxxxxx**	SESTI-S4	8	16	6	55	20350	25.5	480	50

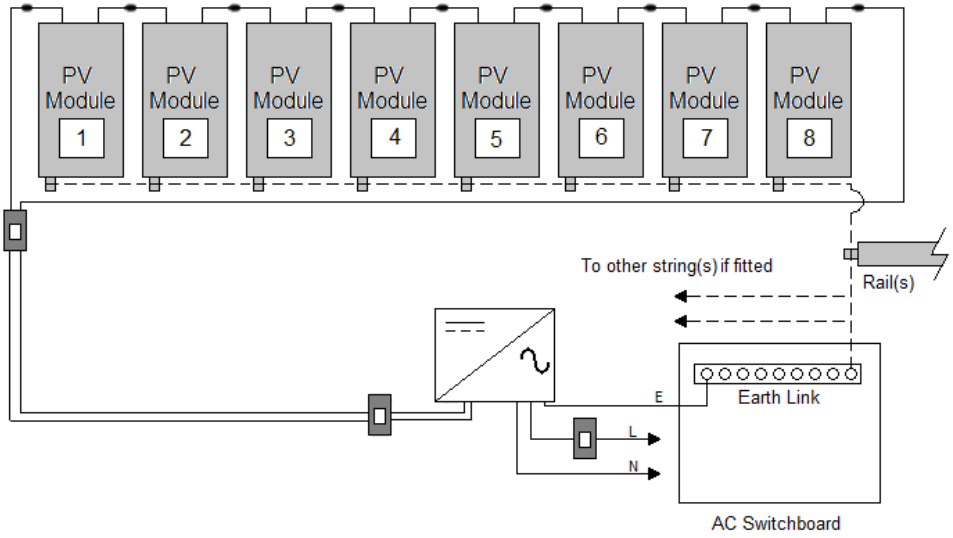
* Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5 and cell temperature 25°C. Variations from STC values will affect actual I_{sc} and V_{oc} and should be allowed for.

** This model may have suffixes indicating different options and functionality.

*** The current rating of the circuit breaker must be no greater than the current carrying capacity of the AC cable, refer to AS/NZS 3000.

For earthing arrangement and wiring diagram refer to “Earthing Arrangements – All Systems” on page 27.

EARTHING ARRANGEMENTS – ALL SYSTEMS



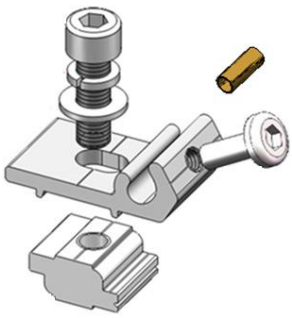
Earthing connections must be made so the removal of one component (e.g. a module) does not interrupt the earthing to other parts of a system (e.g. other modules). Daisy chaining is not permitted. The PV system earth connection must be directly connected to the switchboard earth link, not via the inverter earth connection. If the earth cable could be exposed to direct sunlight, it must have a physical barrier to protect the earth cable from this exposure.

Earth wires must be sized in accordance with requirements set out in Earthing and bonding arrangements of AS/NZS 5033.

Solahart approved Universal clamp with built-in earthing plates may be used to earth modules via the racking, instead of wiring directly to the module frames. Refer to “Earthing” on page 51 for more information.

Warning: Do not drill holes in the modules as this will void product warranty.

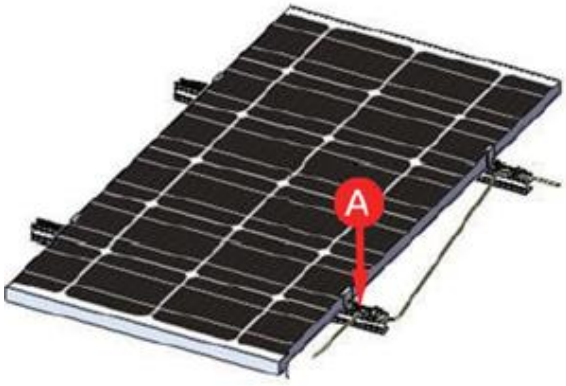
Where it is necessary to make an earthing connection to a rail, a Clenergy Earthing Lug may be used.

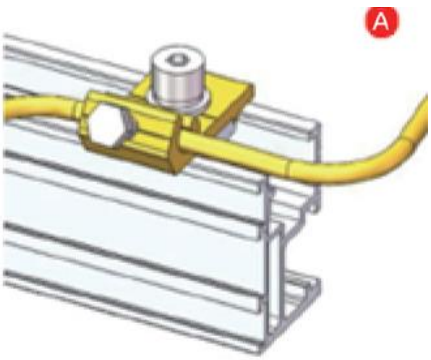


Clenergy Earthing Lug

Follow the steps below to attach the earthing cable to Clenergy ECO rail.

1. Slide Z-module into the top channel on the ECO rail and tighten the bolt to 13.5N.m.
2. Strip 20mm of earthing cable and insert the conductor into the provided copper tube.
3. Place the copper tube into the cable channel on the earthing lug and tighten the bolt to 10N.m. Pull the cable to ensure it is tight.
4. Check Resistance between rail and earthing cable conductor to ensure the bonding is made.





Note: the maximum earthing cable cross section area is 10mm^2.

INSTALLATION PROCEDURE

1. Planning – Design the system and layout. Refer to “Planning” on page 29.

Determine the spacing of the Rail Supports, using tables in section “Maximum Rail Support Spacing for Metal and Tile Roofs” starting on page 35, or “Maximum Rail Support Spacing for Tilt Leg Systems” starting on page 37, and considering the following factors (refer to “Planning” on page 29):

   a. Wind Region
   b. Terrain Category
   c. Roof Type
   d. Roof Pitch
   e. Roof Area
   f. Building Height
   g. Array Orientation

2. Install the Racking (Rail and Rail Supports). Refer to “Racking” on page 34.
3. Install the remainder of the roof top components as follows:
   a. Rooftop Isolator. Refer to “Rooftop Isolator” on page 44.
   b. Rooftop Wiring. Refer to “Wiring” on page 45.
   c. Power Optimizers. Refer to “Power Optimizers (SolarEdge only)” on page 47.
   d. PV modules. Refer to “PV Modules” on page 50.
4. Install the inverter. Refer to “Inverter” on page 55.
5. Install the energy meter (optional component). Refer to “Meter (SolarEdge Only)” on page 59.
6. Install the system labels. Refer to “Labelling” on page 62.
7. Commission the PV system. Refer to “Commissioning” on page 64.

PLANNING

INSTALLATION TOOLS

- 4,5 & 6 mm Allen keys or 4,5 & 6 mm Allen Key fittings to suit torque adjustable drill (for racking components and inverter)
- Torx T20 screwdriver (FIMER/ABB inverter systems only)
- Cordless torque adjustable drill
- Angle grinder with stone disk (for tile cutting if required)
- Electricians hand tools (screwdrivers, pliers etc.)
- String line
- Timber to shim tile roof interfaces (if required)
- An Android or IOS smart device

STRUCTURAL ASSESSMENT

The installer is responsible for ensuring that the building and building structures are capable of withstanding the additional loads and forces generated as a result of installing the PV system. For domestic dwellings, it is recommended that a structural engineering assessment is completed. For all other installations, a structural assessment is required to be completed by a qualified structural engineer.

COMMUNICATIONS DEVICES

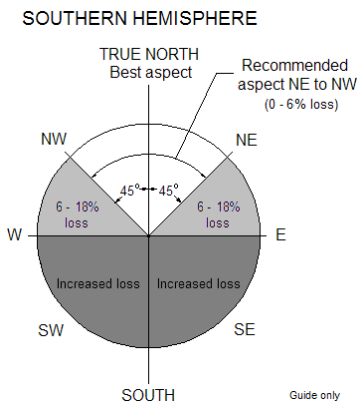
Complete installation of inverter communications devices requires the installer to register the communication device and inverter on the inverter manufacturer's web portal. Hence, to complete the communications equipment installation, the installer must have access to the PV system owner's internet connection. An example of items that should be organised prior to onsite installation are:

- Confirmation that an internet accessible network port is available
- Length of networking cable required from inverter to networking port
- Wi-Fi access including SSID and password
- PV system owner's network administrator permission and assistance to adjust firewall, network address translation (NAT) and port forwarding settings.

PV MODULE ORIENTATION AND INCLINATION

To maximize system output, install modules at optimum orientation and inclination (tilt) angles. The specifics of this will depend on the installation location and must be calculated by a qualified system designer. The ideal angle for mounting a module should result in the sun's rays falling perpendicular (i.e. at a 90° angle) to the module surface.

Note: All modules in each series string must have the same orientation and inclination to ensure that modules do not underperform due to a mismatching of each module's output.



Modules should be installed in a shade free position. Even minor or partial shading of the modules/array will reduce array/system output. A module is considered shade free when it is both:

- Free from shade or shadows all year round.
- Exposed to several hours of direct sunlight, even during the shortest days of the year.
- Modules must have an inclination between 3° and 75°. If installed in tropical regions, the minimum module inclination angle is 5°.

Note: The following information is provided as a guide only:

- Modules should be installed facing toward true north. Where this orientation is not practical, a system facing up to 45° (NW or NE) from true north is satisfactory however losses of up to approximately 6% will occur. A module facing due east or due west will experience a loss in performance of approximately 18%.

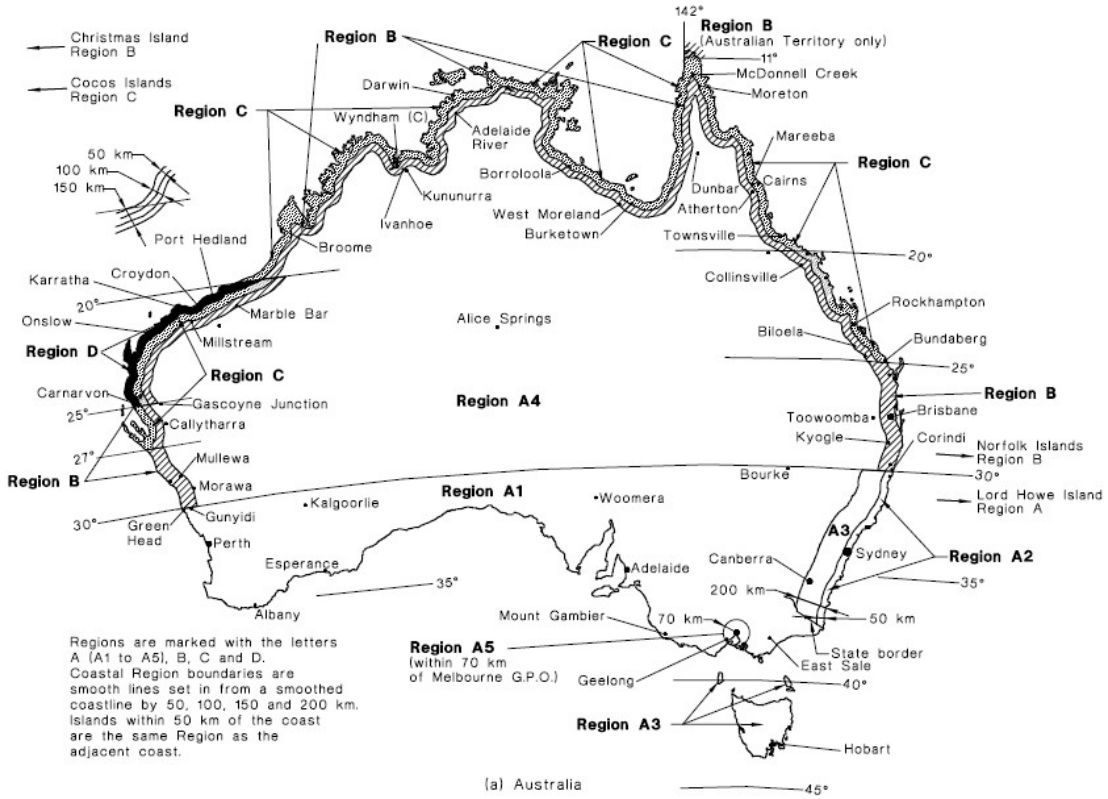
- Inclination of modules should be approximately equal to the local latitude angle. The latitude of some Australian cities is shown in the “Latitude of Some Australian Cities” on page 30. Modules may be installed at the roof angle for simplicity of installation and appearance, however, if inclination varies by ±15° or more from the correct inclination, performance losses of 4% or more will occur.
- Modules should be inclined at an angle of at least 10° to support the self-cleaning function of the glass.
- Losses for incorrect orientation and incorrect inclination will be compounded.
- If the roof angle is flat, adjustable or fixed tilt legs should be considered to optimise inclination depending upon area.
- For an installation at right angles to (across) a tile roof pitch, landscape tile roof hooks are required.
- Each module and its fittings including racking weighs approximately 25 kg.

LATITUDE OF SOME AUSTRALIAN CITIES

Adelaide	35°S	Cairns	17°S	Hobart	42°S	Port Hedland	20°S
Alice Springs	24°S	Canberra	35°S	Mildura	34°S	Rockhampton	24°S
Brisbane	27°S	Darwin	12°S	Melbourne	38°S	Sydney	34°S
Broken Hill	31°S	Geraldton	28°S	Perth	32°S	Townsville	19°S

WIND REGION

Use the wind region diagram shown below to determine the wind region of the installation site.



Wind region notes:

- Wind regions are predefined for all of Australia by Australian Standard AS/NZS 1170.2. The Wind Region has nothing to do with surrounding topography or buildings.
- Most of Australia is designated Region A which indicates a Regional Ultimate Basic Wind Velocity of 45 m/s.
- Some areas are designated Region B (57 m/s). Local authorities will advise if this applies in your area.
- Region C areas (66 m/s) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100 km inland.
- Region D (80 m/s) Australia's worst Cyclonic Region between Carnarvon and Pardoo in WA.
- This document only covers wind regions A, B and C.

TERRAIN CATEGORY

The terrain over which the approaching wind flows towards a structure must be assessed on the basis of the following category descriptions. For details refer to AS 1170.2 – 2011 Amdt 2-2012.

Terrain Category 2: Open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, with no more than two obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.

Terrain Category 3: Terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing or light industrial estates.

ROOF TYPE

Determine the roof type of the building where the PV modules are to be installed and select the appropriate rail support.

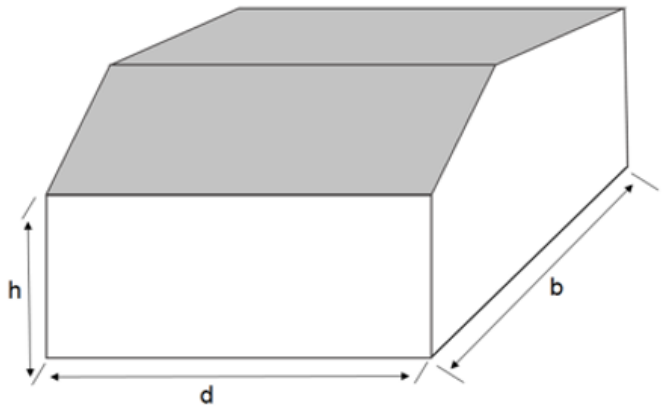
Rail support systems are available as follows:

Roof Type	Roof Pitch	Rail Support Category	Rail Support Name (Options)
Standard tile	5 - 30°	Tile roof interface	Tile interface (Portrait)
			Tile interface (Landscape)
Low profile tile			Flat tile interface
Slate			Slate interface
Metal	5 - 30°	Metal roof interface	Metal roof interface
Metal Corrugated	< 10° or < Latitude minus 15°	Tilt leg interface	10 - 15° adjustable tilt legs
			15 - 30° adjustable tilt legs
			30 - 60° adjustable tilt legs (for reverse tilt systems)

Note: For roof pitch more than 30°, consult Clenergy or Solahart for details on the design.

ROOF AREA

Assess the building dimension and determine the installation area on the roof (roof position area).



h = height, b = width and d = length.

Warning: If any part of the system array is located in one of the edge zones, the entire array must use the support spacing specified for the edge zones.

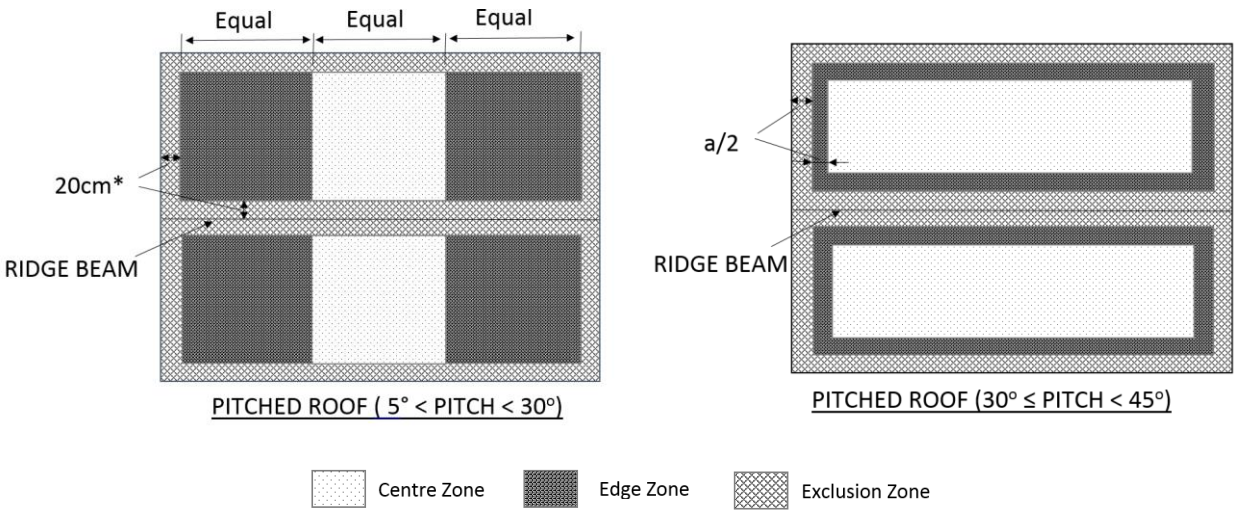
Note: In the diagrams below, a = minimum of 0.2d, 0.2b and 0.2h.

For flush mount system installed on a pitched roof (tile or metal):

The diagrams below show roof position areas designated as “Edge Zone” areas and “Centre Zone” areas for tile and metal roofs.

Note: the PV modules shall not be installed in “exclusion zone” areas.

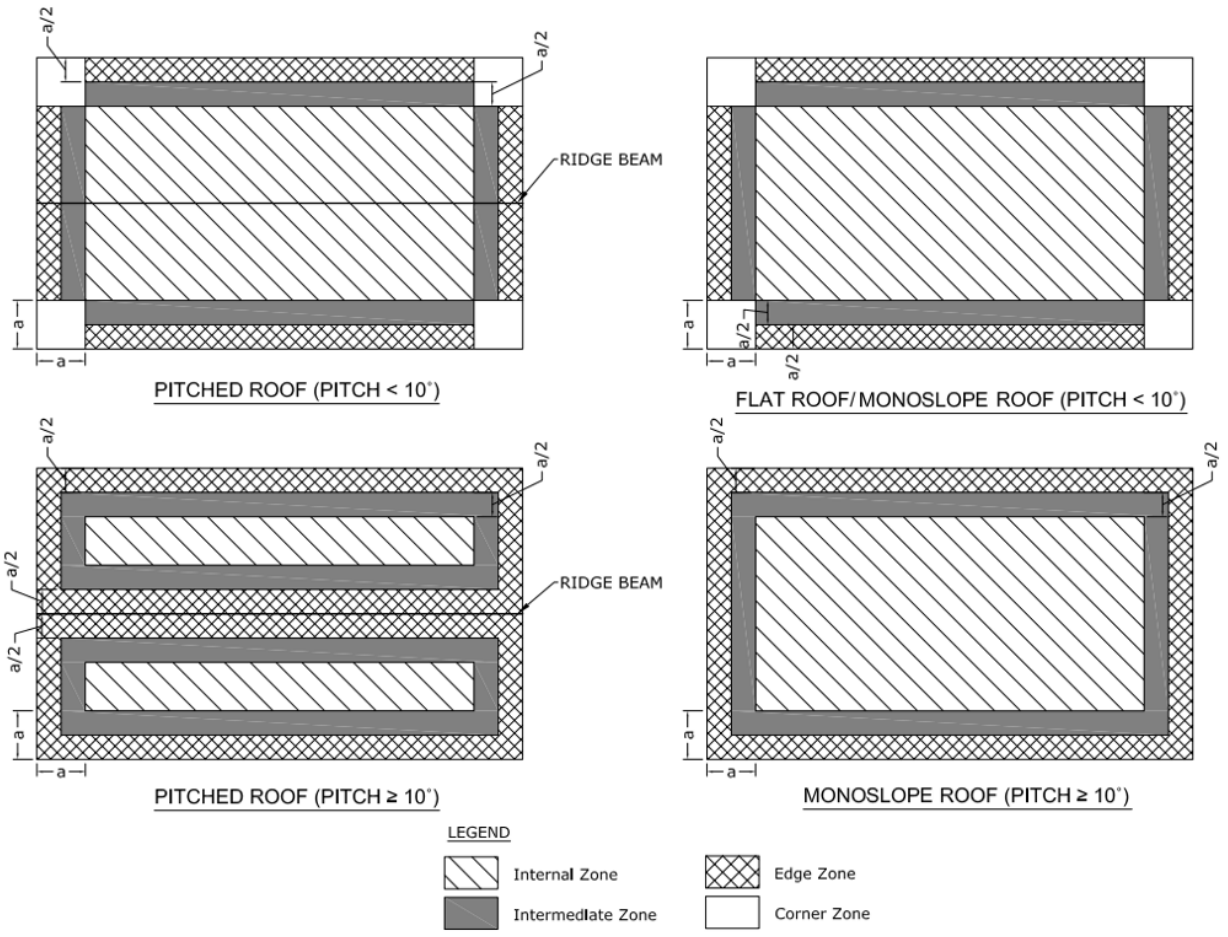
Edge zone areas are subject to higher wind loadings and therefore will require closer rail support spacing.



*This distance is twice the spacing between solar panel and roof (estimated spacing = 10 cm).

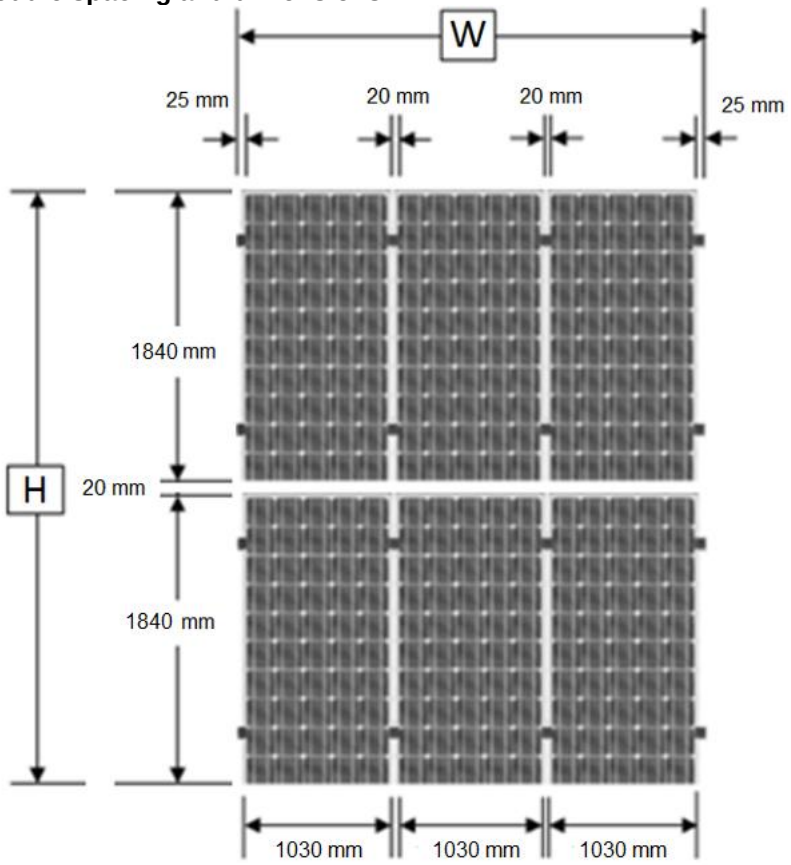
For tilt array systems:

The diagrams below show roof position areas designated as “Internal Zone” areas, “Edge Zone” areas, “Intermediate Zone” areas and “Corner Zone” areas.



Use the following diagram, tables and worked example to determine the minimum required roof area for the array when designing and installing Solarhart370S2 modules.

Module spacing and dimensions



H = Number of rows X (1840 mm + 20 mm) - 20 mm

W = Number of modules per row X (1030 mm + 20 mm) + (2 x 25 mm) - 20mm

Worked Example:

Number of rows: 2
Number of modules per row: 10
Total number of modules = 20

Calculating H:

$$H=N_{rows}\times(1{,}840+20)-20$$
$$H=2\times1{,}860-20$$
$$H=3{,}700\ \text{mm}$$

Calculating W:

$$W=N_{modules/row}\times(1{,}030+20)+(2\times25)-20$$
$$W=10\times1{,}050+50-20$$
$$W=10{,}530\ \text{mm}$$

Calculating $Area_{Roof}$ in mm^2:

$$Area_{Roof}=H\times W$$
$$Area_{Roof}=3700\times10{,}530$$
$$Area_{Roof}=38{,}961{,}000\ mm^2$$

Converting $Area_{Roof}$ in mm^2 to m^2:

$$Area_{Roof}=\frac{38{,}961{,}000}{1{,}000{,}000}=38.96\ m^2$$

Notes:

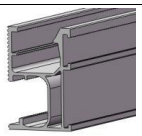
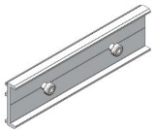
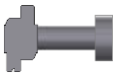
- Modules installed in portrait as per diagram.
- For tilt leg systems, row spacing must prevent shading of one row by another and needs to be calculated on an individual site basis, taking into account orientation, roof pitch and module inclination.
- All dimensions are in mm, unless otherwise stated.

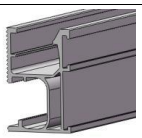
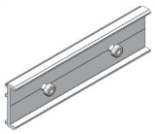
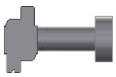
			Number of modules per row										
			1	2	3	4	5	6	7	8	9	10	…
Number of rows	1	H X W	1840 X 1080	1840 X 2130	1840 X 3180	1840 X 4230	1840 X 5280	1840 X 6330	1840 X 7380	1840 X 8430	1840 X 9480	1840 X 10530	
	2	H X W	3700 X 1080	3700 X 2130	3700 X 3180	3700 X 4230	3700 X 5280	3700 X 6330	3700 X 7380	3700 X 8430	3700 X 9480	3700 X 10530	
	⋮												

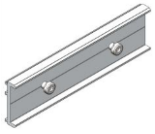
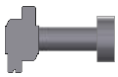
			Number of modules per row										
			1	2	3	4	5	6	7	8	9	10	…
	1	Area	1.99	3.92	5.85	7.78	9.72	11.65	13.58	15.51	17.44	19.38	
	2	Area	4.00	7.88	11.77	15.65	19.54	23.42	27.31	31.19	35.08	38.96	
	⋮												

RACKING

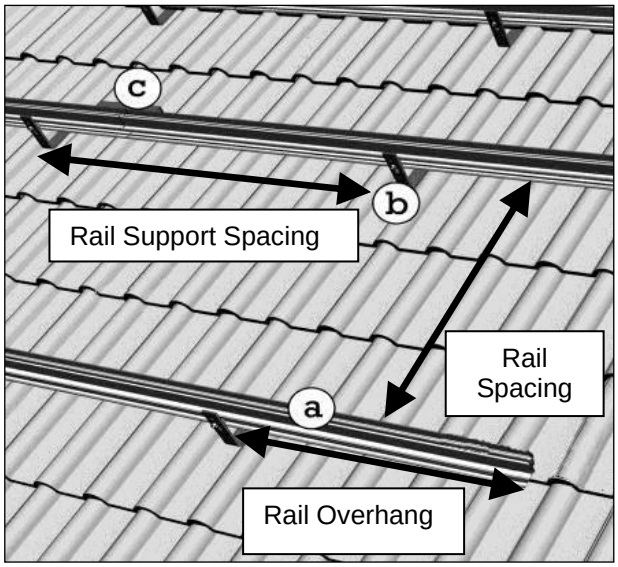
OVERVIEW OF RACKING COMPONENTS

Overview of components for tile roof				
				
Rail (a)	Rail splices (c)	Tile roof Interfaces (b)	Z-modules with Allen head bolt	Wood screws M6 x 80

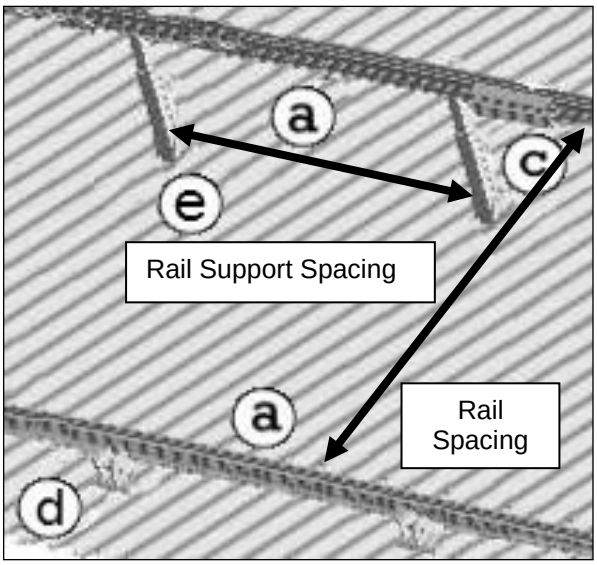
Overview of components for metal roof				
				
Rail (a)	Rail splices (c)	Metal roof interfaces (b)	Z-modules with Allen head bolt	Wood screws M6 x 90 *

Overview of components for adjustable tilt legs					
					
Rail (a)	Rail splices (c)	Z-modules with Allen head bolt	Front rail & leg foot (d)	Adjustable tilt leg (e)	Wood Screws M6x90 *

* **Note:** Screws must be fit for purpose e.g. screws used in metal purlins must be suitable for metal structures and have a TPI (threads per inch) of 14.



Tile & Metal Roof Diagram (Tile Roof shown)



Tilt Leg Diagram (Adjustable Tilt Leg shown)

MAXIMUM RAIL SUPPORT SPACING FOR METAL AND TILE ROOFS

Use the following tables to determine the rail support spacing for the relevant roof type based on the previously determined wind region, terrain category, roof pitch, roof position area (Edge Zone or Centre Zone) and maximum height of the installation. The spacing values below are in mm.

⚠ **Warning:** the following tables cover the only installations permitted for Solahart370S2 modules based on mechanical design load of 3600/2660 Pa.

⚠ **Warning:** Installation is prohibited if the spacing is N/A.

Roof Type	Terrain Category	Roof Pitch	**Wind Category A**					
			Roof Height					
			H≤10		10<H≤15		15<H≤20	
			Edge	Centre	Edge	Centre	Edge	Centre
Tile Roof Interface	2	<10°	1444	1588	1369	1506	1354	1489
		10° -20°	1415	1557	1342	1476	1327	1460
		20°-30°	1400	1540	1328	1461	1314	1445
	3	<10°	1615	1777	1532	1685	1515	1667
		10° -20°	1583	1741	1501	1651	1485	1634
		20°-30°	1567	1724	1486	1635	1470	1617
Tin Roof Interface	2	<10°	1496	1646	1469	1616	1432	1575
		10° -20°	1492	1641	1460	1606	1423	1565
		20°-30°	1487	1636	1460	1606	1418	1560
	3	<10°	1735	1909	1671	1838	1597	1757
		10° -20°	1726	1899	1666	1833	1588	1747
		20°-30°	1662	1828	1597	1757	1524	1676

Roof Type	Terrain Category	Roof Pitch	**Wind Category B**					
			Roof Height					
			H≤10		10<H≤15		15<H≤20	
			Edge	Centre	Edge	Centre	Edge	Centre
Tile Roof Interface	2	<10°	997	1097	893	982	819	901
		10° -20°	977	1075	875	963	802	882
		20°-30°	967	1064	866	953	794	873
	3	5°-10°	1116	1228	999	1099	916	1008
		10° -20°	1093	1202	979	1077	898	988
		20°-30°	1082	1190	969	1066	888	977
Metal Roof Interface	2	<10°	1157	1273	1047	1152	964	1060
		10° -20°	1157	1273	1042	1146	955	1051
		20°-30°	1148	1263	1037	1141	950	1045
	3	<10°	1524	1676	1423	1565	1285	1414
		10° -20°	1519	1671	1418	1560	1276	1404
		20°-30°	1423	1565	1368	1505	1248	1373

Roof Type	Terrain Category	Roof Pitch	Wind Category C					
			Roof Height					
			H≤10		10<H≤15		15<H≤20	
			Edge	Centre	Edge	Centre	Edge	Centre
Tile Roof Interface	2	<10°	647	712	N/A	N/A	N/A	N/A
		10° -20°	634	697	N/A	N/A	N/A	N/A
		20°-30°	628	691	N/A	N/A	N/A	N/A
	3	<10°	724	796	633	696	575	633
		10° -20°	710	781	620	682	563	619
		20°-30°	703	773	614	675	557	613
Metal Roof Interface	2	<10°	734	807	N/A	N/A	N/A	N/A
		10° -20°	730	803	N/A	N/A	N/A	N/A
		20°-30°	725	798	N/A	N/A	N/A	N/A
	3	<10°	1092	1201	946	1041	845	930
		10° -20°	1088	1197	936	1030	840	924
		20°-30°	1065	1172	918	1010	826	909
Metal Roof Interface (0.55 mm steel purlin)	2	<10°	551	606	N/A	N/A	N/A	N/A
		10° -20°	548	602	N/A	N/A	N/A	N/A
		20°-30°	544	598	N/A	N/A	N/A	N/A
	3	<10°	819	901	710	780	634	697
		10° -20°	816	898	702	772	630	693
		20°-30°	799	879	689	757	620	681

MAXIMUM RAIL SUPPORT SPACING FOR TILT LEG SYSTEMS

Use the following tables to determine the rail support spacing for the relevant roof type based on the previously determined wind region, terrain category, roof pitch, roof position area (Corner Zone, Edge Zone, Intermediate Zone or Internal Zone) and maximum height of the installation. The spacing values below are in mm.

⚠ **Warning:** the following tables cover the only installations permitted for Solahart370S2 modules based on mechanical design load of 3600/2660 Pa.

⚠ **Warning:** Installation is prohibited if the spacing is N/A.

Wind Region A, Roof Pitch between 1° and 10°								
Angle against horizontal (Φ)			(Φ) <15°		15° ≤ (Φ) ≤ 30°		30° < (Φ) < 60°	
Terrain Catogory			2	3	2	3	2	3
Roof Height	H<5m	Corner	648	693	N/A	480	N/A	N/A
		Edge	982	1051	N/A	734	N/A	N/A
		Intermediate	1297	1387	N/A	960	N/A	N/A
		Internal	1588	1699	N/A	1248	N/A	N/A
	5m<H<10m	Corner	583	624	N/A	393	N/A	N/A
		Edge	884	945	N/A	602	N/A	N/A
		Intermediate	1167	1248	N/A	787	N/A	N/A
		Internal	1459	1560	N/A	1023	N/A	N/A
	10m<H<15m	Corner	545	582	N/A	384	N/A	N/A
		Edge	825	882	N/A	587	N/A	N/A
		Intermediate	1089	1165	N/A	768	N/A	N/A
		Internal	1361	1456	N/A	998	N/A	N/A
	15m<H<20m	Corner	459	491	N/A	302	N/A	N/A
		Edge	696	745	N/A	462	N/A	N/A
		Intermediate	919	983	N/A	605	N/A	N/A
		Internal	1149	1229	N/A	786	N/A	N/A

Wind Region B, Roof Pitch between 1° and 10°								
Angle against horizontal (Φ)			(Φ) <15°		15° ≤ (Φ) ≤ 30°		30° < (Φ) < 60°	
Terrain Catogory			2	3	2	3	2	3
Roof Height	H<5m	Corner	461	493	N/A	N/A	N/A	N/A
		Edge	698	747	N/A	N/A	N/A	N/A
		Intermediate	922	986	N/A	N/A	N/A	N/A
		Internal	1152	1232	N/A	N/A	N/A	N/A
	5m<H<10m	Corner	392	419	N/A	N/A	N/A	N/A
		Edge	593	635	N/A	N/A	N/A	N/A
		Intermediate	783	838	N/A	N/A	N/A	N/A
		Internal	979	1047	N/A	N/A	N/A	N/A
	10m<H<15m	Corner	332	355	N/A	N/A	N/A	N/A
		Edge	503	538	N/A	N/A	N/A	N/A
		Intermediate	664	710	N/A	N/A	N/A	N/A
		Internal	829	887	N/A	N/A	N/A	N/A
	15m<H<20m	Corner	323	346	N/A	N/A	N/A	N/A
		Edge	490	524	N/A	N/A	N/A	N/A
		Intermediate	647	692	N/A	N/A	N/A	N/A
		Internal	809	865	N/A	N/A	N/A	N/A

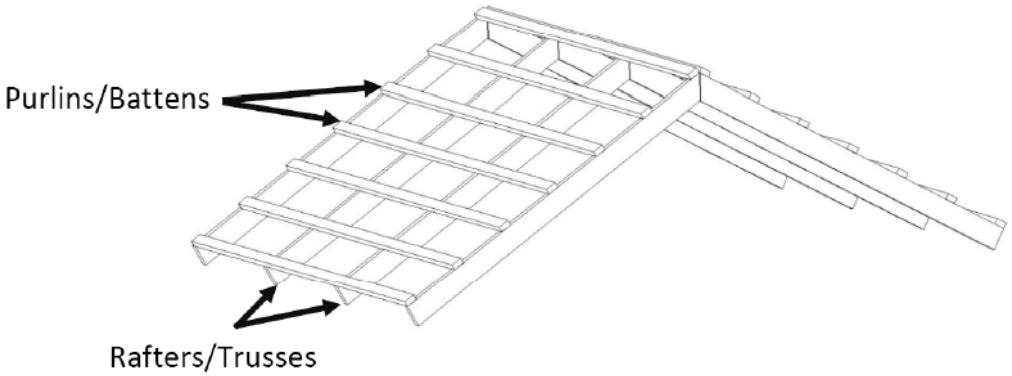
Wind Region C, Roof Pitch between 1° and 10°								
Angle against horizontal (Φ)			(Φ) <15°		15° ≤ (Φ) ≤ 30°		30° < (Φ) < 60°	
Terrain Catogory			2	3	2	3	2	3
Roof Height	H<5m	Corner	408	437	N/A	N/A	N/A	N/A
		Edge	619	662	N/A	N/A	N/A	N/A
		Intermediate	817	874	N/A	N/A	N/A	N/A
		Internal	1021	1092	N/A	N/A	N/A	N/A
	5m<H<10m	Corner	N/A	310	N/A	N/A	N/A	N/A
		Edge	N/A	470	N/A	N/A	N/A	N/A
		Intermediate	N/A	621	N/A	N/A	N/A	N/A
		Internal	N/A	776	N/A	N/A	N/A	N/A
	10m<H<15m	Corner	N/A	235	N/A	N/A	N/A	N/A
		Edge	N/A	356	N/A	N/A	N/A	N/A
		Intermediate	N/A	469	N/A	N/A	N/A	N/A
		Internal	N/A	587	N/A	N/A	N/A	N/A
	15m<H<20m	Corner	N/A	202	N/A	N/A	N/A	N/A
		Edge	N/A	305	N/A	N/A	N/A	N/A
		Intermediate	N/A	403	N/A	N/A	N/A	N/A
		Internal	N/A	504	N/A	N/A	N/A	N/A

Steel purlins must meet the following minimum requirements:

Roof interface	Minimum steel purlin specification
Metal roof interface	0.55 mm BMT 550 Grade or 0.75 mm BMT 450 Grade
Tilt leg interface	1.0 mm BMT 500 Grade

Roof interfaces must be fixed to rafters or purlins under the roof cladding. Screw minimum embedment into timber rafters or battens is 35 mm.

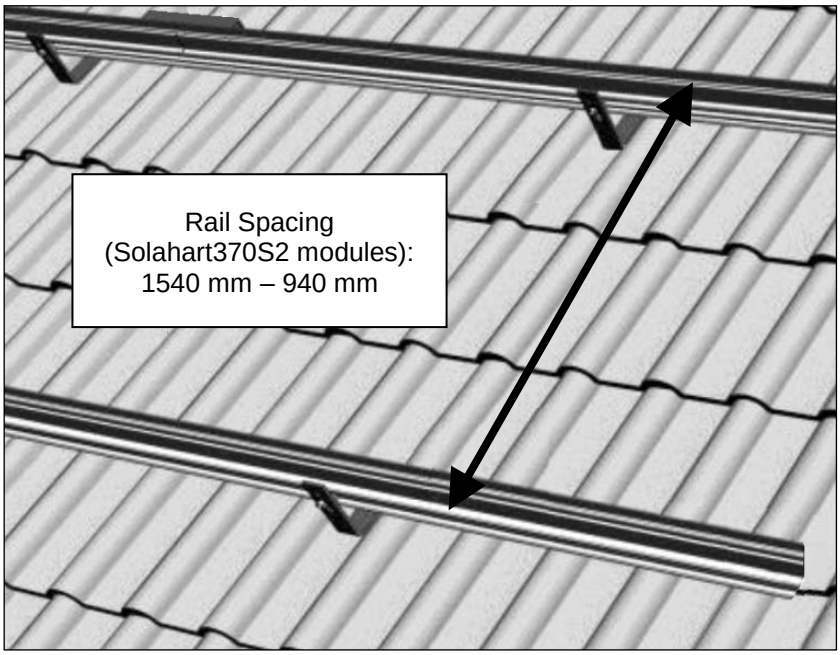
Note: Screws supplied with the roof interfaces are wood screws suitable for timber only. Screws used in metal purlins must be suitable for metal structures and have a TPI (threads per inch) of 14.



RAIL SPACING

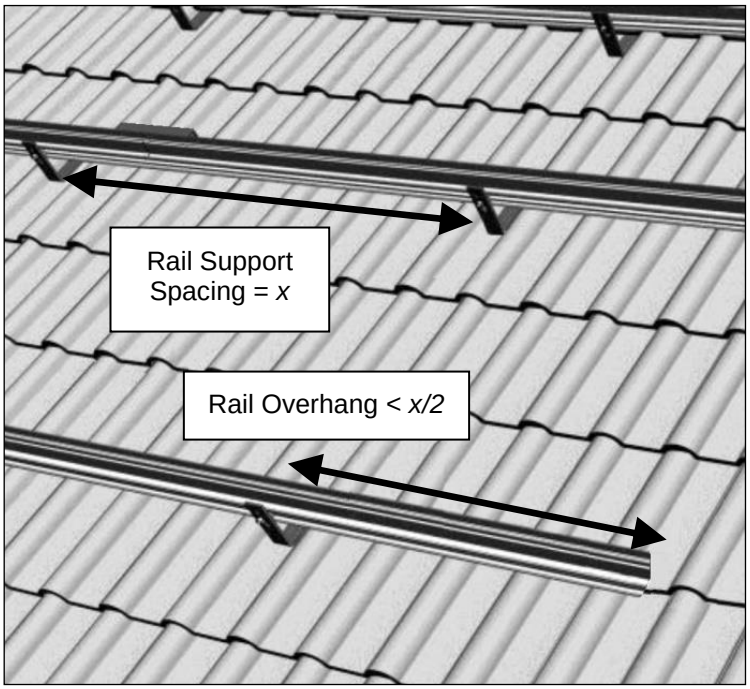
Rails should be spaced so that the module is clamped in the correct positions. Refer to “Module Mounting” on page 52.

In general, the rails may be spaced between 1540 mm and 940 mm apart.



RAIL OVERHANG

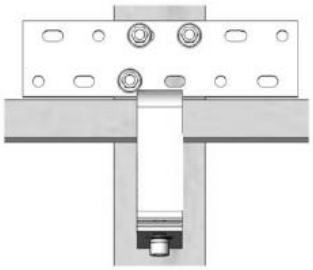
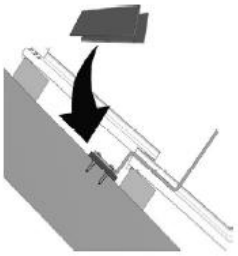
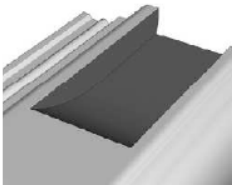
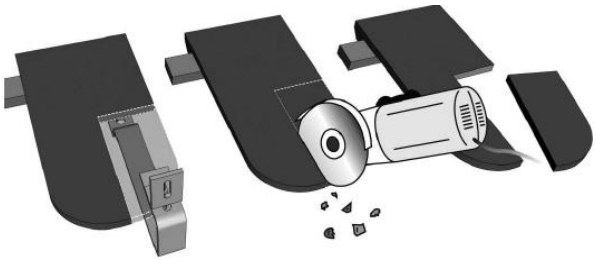
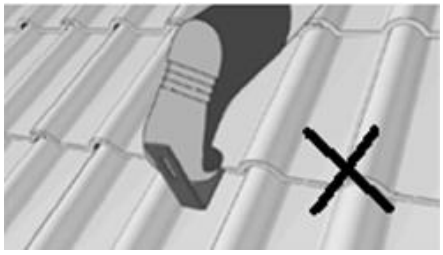
Rail end overhang must be no greater than 50% of rail support spacing. For example; if rail support spacing is 1200 mm, rail end overhang can be up to 600 mm. In this case, two rail support brackets can support a rail up to 2400 mm in length (1200 mm between brackets and 600 mm of overhang at each end).



Note: Drawings not to scale

TILE ROOF INSTALLATION

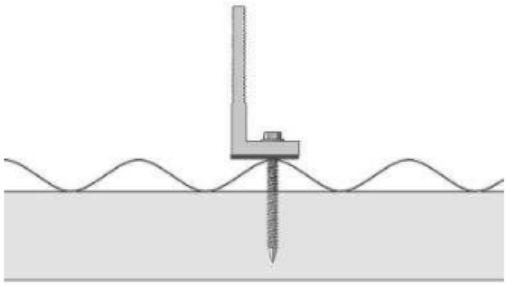
Note: The tile roof interface is only suitable for installation on timber rafters.

1. Determine and mark the position of the tile roof interfaces according to your plans. Remove the roof tiles at marked positions or, if possible, simply move the tiles up slightly.	
2. Fix the tile roof interfaces to rafters using three M6 X 80 mm wood screws. Ensure a 50 mm minimum screw embedment into the rafters. **Warning:** Tile roof interfaces must not press against roof tiles and must be fixed parallel with rafters. If necessary, pack underneath tile roof interfaces with timber.	 
3. For thick tiles (such as grooved tiles), if necessary, use an angle grinder to chase a recess (or remove raised groves) on the tile that covers the tile roof interface at the point where the interface protrudes through so that the tile lies flat. For thick tiles it may also be necessary to cut a recess into the tile located below the tile roof interface. Now proceed to installation of the rails. Refer to “Rail Installation” on page 43.	  
4. For thin tiles (such as slate, shingles), a portion of tile must be cut and removed from the tile above the tile roof interface, creating a recess. Suitable flashing must then be installed around the tile roof interface, with an overlap of at least 150 mm at the edges of the recess. Now proceed to installation of the rails. Refer to “Rail Installation” on page 43.	
Warning: Do not use tile roof interfaces as a climbing support as extreme loading of this point could cause damage to the tile below.	

METAL ROOF INSTALLATION

Note: Screws supplied with the roof interfaces are wood screws suitable for timber only. Screws used in metal purlins must be suitable for metal structures and have a TPI (threads per inch) of 14.

1. Determine and mark position of the metal roof interfaces according to your plans. Pre drill through roof cladding (on top of crest) at planned locations. Place the supplied rubber gasket under the metal roof interface and ensure that a weatherproof seal is made between the interface and the roof cladding.



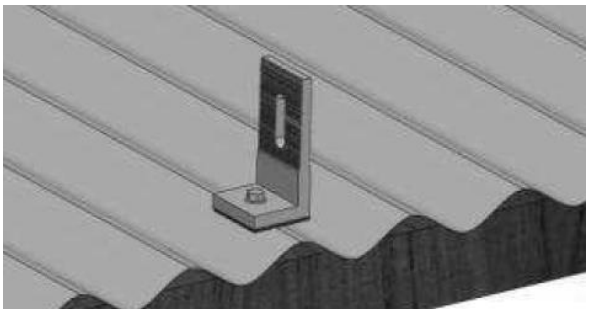
2. Fix the metal roof interface to the timber batten or rafter using the M6 x 90 mm screw supplied.

   Ensure a 35 mm minimum screw embedment for timber battens and rafters.

   If the interface is being fixed to metal purlins use screws suitable for metal structures with a TPI of 14.

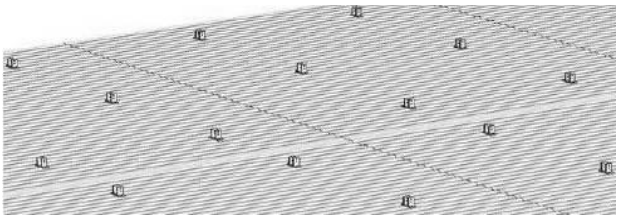
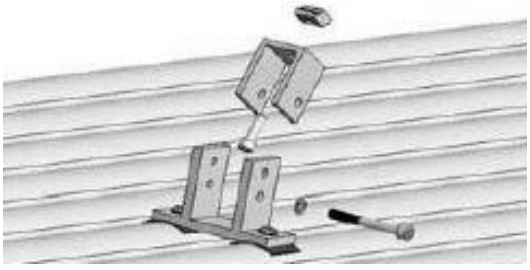
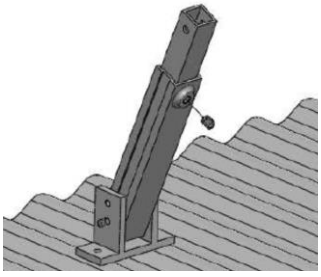
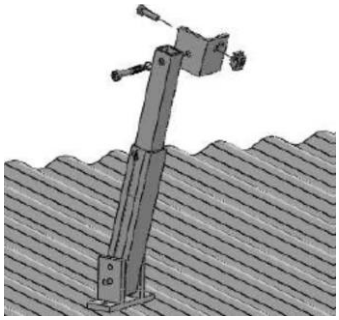
3. Check the metal roof interface to ensure that the fastening screw tightly fixes sealing gasket without damaging roof cladding.

   Now proceed to installation of the rails. Refer to “Rail Installation” on page 43.

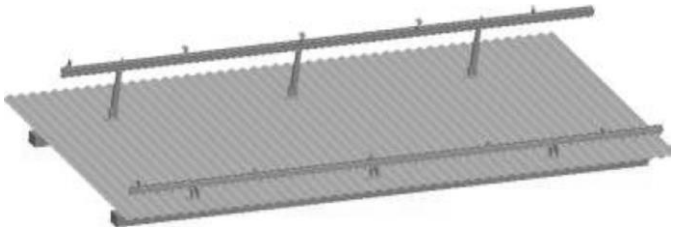
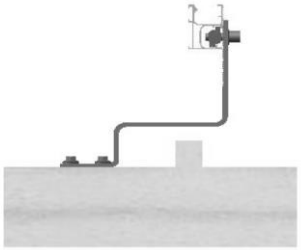
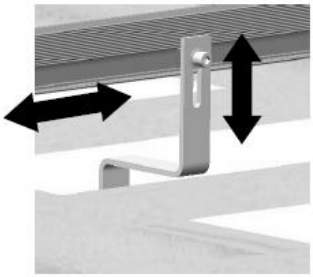
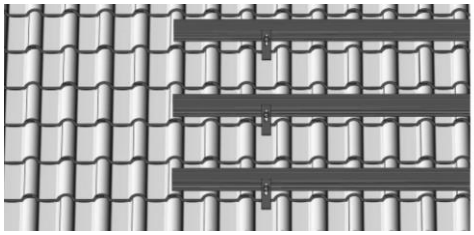
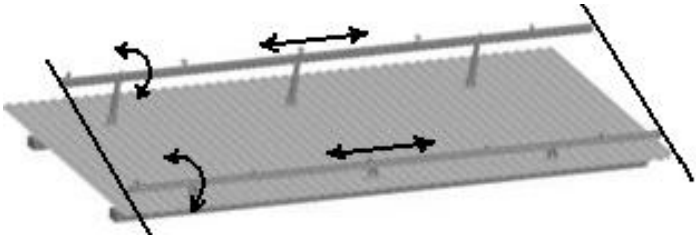
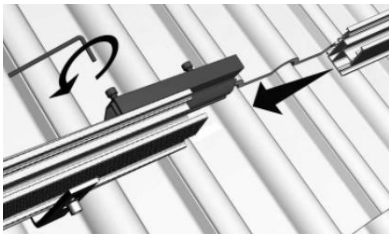
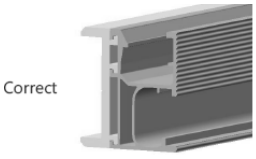


TILT LEG INSTALLATION

Note: Screws supplied with the tilt legs are wood screws suitable for timber only. Screws used in metal purlins must be suitable for metal structures and have a TPI (threads per inch) of 14.

1. Determine and mark position of front feet according to your plans. Pre drill through roof cladding (on top of crest) at planned locations. Place the supplied rubber gaskets under each foot and ensure that a weatherproof seal is made between the foot and the roof cladding.	
2. Fix the foot to the timber batter or rafter using a minimum of two M6 X 80 mm screws. Ensure a minimum screw embedment of 35 mm for timber battens and rafters. If the interface is being fixed to metal purlins use screws suitable for metal structures with a TPI of 14. Check the foot to ensure that the fastening screws tightly fix the sealing gaskets without damaging roof cladding.	
3. The U Bracket comes preassembled with the front foot. Loosely fasten Allen head bolt and nut to allow for later adjustment. Allen head bolt and Z-module on top of U bracket is utilised to attach rails in next step.	
4. Place rear legs into feet, insert Allen head bolt, washer, retaining washer and nut and fasten loosely to allow for later adjustment.	
5. Loosen the leg telescopic section Allen head grub screws. Adjust the leg length according to your plans and tighten the grub screws to 17 Nm.	
6. Fix the leg L bracket to the leg using the Allen head bolt, washer, retaining washer and nut and fasten loosely to allow for later adjustment. • Minimum back leg angle to horizontal is 30°. • Maximum back leg angle to horizontal is 90°.	

RAIL INSTALLATION

1. Install rails onto the roof interfaces. If the assembly consists of rails of different lengths, always begin with the shortest piece. Install the rail loosely onto the roof interfaces using the Allen head bolt, washer, retaining washer and Z-modules supplied (2 to 3 turns of the bolt are adequate for loose installation). Refer to step 2 for method of inserting Z-module into rail.	
2. For easy use of Z-modules ensure that Allen head bolt threads do not project through lower side of Z-module so that the Z-module is free to move. Position Z-modules in rail channel as shown and fasten loosely with 2 to 3 turns of Z-module Allen head bolt. The rail can then be freely moved along Z-modules.	
3. Adjust the vertical and horizontal position of the rail by taking advantage of the long hole in the tile and metal roof interfaces and the still loose connection of the rail Z-modules.	
4. Align all rail ends. Align the rail tilt orientation (use a string line if necessary). Tighten all previously loosely installed rail and feet Z-module Allen head bolts to a torque of 18-20 Nm.	 
5. To connect multiple rails together, slide a splice on to the rear side of the previously assembled rail. Tighten the first splice Allen head bolt to 18-20 Nm. Slide the next rail segment into the splice. An expansion gap at the rail joints is recommended. Leave a gap of approximately 10 mm between the rail joints and then tighten the second Allen head bolt to 18-20 Nm.	 

ROOFTOP ISOLATOR

The rooftop DC isolator must be mounted to the rail by following the steps below. To help prevent UV degradation, the rooftop isolator should be mounted as far from the north side of the array as possible.

When installing the rooftop isolator the following points should be observed:

- Ensure the IP rating of the isolator enclosure is maintained and that no moisture can enter.
- Cable glands and conduit adapters must be chosen to suit the type of cable or conduit used. E.g. cable glands designed for figure-8 cables must be chosen where figure-8 type solar DC cables are utilised.
- Any conduit adapters should be installed so that the conduit slopes downwards from the enclosure to prevent water ingress in adverse weather conditions.
- If water and/or condensation can form in the isolator enclosure, provision must be made for its harmless escape through suitably located drainage points in accordance with AS/NZS 3000 Clause 3.3.2.3. Conduit entering the isolator enclosure must have a drainage hole installed at the lowest point to facilitate the escape of any moisture.

Note: Install rooftop isolators before installing any PV modules.

Step 1: Mount the isolator enclosure onto the bracket using 4 x M4 12mm stainless steel bolts, nuts and washers as illustrated in Figure 1. Install screw cover caps and seal all mounting holes with silicon to prevent water ingress.	 Figure 1
Step 2: Mount the Z-modules loosely onto the isolator bracket as shown in Figure 2. Note: If the clearance below the PV modules is less than 110 mm, the Z-modules can be fitted onto the bottom two slots on the isolator bracket as shown in Figure 3.	 Figure 2  Figure 3
Step 3: Insert Z-modules into the channel of the rail and move the isolator bracket to the desired location. Insert an earthing plate in between the rail and the bracket as shown in figure 4. Tighten the bolts to 13-14 Nm. Note: Both Z-modules must be secured to the rail. Extend the rail if required.	 Figure 4

WIRING

WIRING

Only UV-resistant cables and connectors approved for outside use should be used. PV cable must be marked or labelled in accordance with AS/NZS 5033.

To minimise the risk of indirect lightning strikes, avoid forming closed loops when designing the system. Check to ensure that system wiring is correct before commissioning modules. If the measured open circuit voltage (V_{oc}) and short circuit current (I_{sc}) differ from specifications, a wiring fault may be present.

Recommended cable size for plug connectors is 4 – 6 mm^2, with an operating temperature range of -40 to +120°C. Plug connectors are polarised and should be firmly connected. All connections should be secure, tight and electrically and mechanically sound. Correct DC polarity should be observed at all times. Plug connectors should never be used to turn the system on or off (i.e. do not connect or disconnect plug connectors under load conditions).

Only use plug connectors supplied with your Solahart PV system, or which are the same type/model and from the same manufacturer as those on the PV module. Ensure that all plug connectors and plug wiring are in good electrical and mechanical condition and are not subjected to mechanical stress.

Ensure that all materials meet system requirements such as maximum voltage, current, moisture and temperature when exposed to sunlight.

Electrical ratings of the PV modules are within 3% of measured values at Standard Test Conditions (STC). Under normal conditions, a photovoltaic module may experience conditions that produce more current and/or voltage than that reported under STC. When designing a system, allow for increased output of a module as a result of conditions different to STC in accordance with the Clean Energy Council's "Grid-Connected Solar PV System - Design Guidelines for Accredited Installers" and AS/NZS 5033.

Ensure cables are fixed to the mounting structure and are not in contact with the roof or rear surface of module(s) by using restraining devices which are sunlight and UV-resistant.

Note: Plastic cable ties are not to be used as primary means of support.

A roof flashing such as a Dektite® must be used where wiring penetrates tile or metal roofing. Flashings must be sealed using an appropriate waterproofing compound such as silicone.

All wiring must be protected from mechanical damage and external wiring must be protected from UV and mechanical damage in such a manner that it will last the life of the system. All conduits shall comply with AS/NZS 2053.1 and if exposed to sunlight must be suitably UV rated and marked with the letter "T". Do not install wiring such that it is subject to permanent tension.

COMPONENT PLUG AND DC CABLE SIZING TABLE

Cabling	Plug	Cable Size	Plug Rating
Module fly leads	Pre crimped on fly leads	4 mm^2	IP67
Module DC extension leads	Supplied in BOS Kit	Min 4 mm^2	IP67
Wiring – Roof isolator to inverter isolator [(a)]	Not required – hard wired	Min 4 mm^2	N/A
Wiring – Inverter isolator to inverter	Supplied in BOS Kit	Min 4 mm^2	IP67

[(a)] = DC cable supplied by installer.

All cables/wiring are double insulated Solar DC type cable.

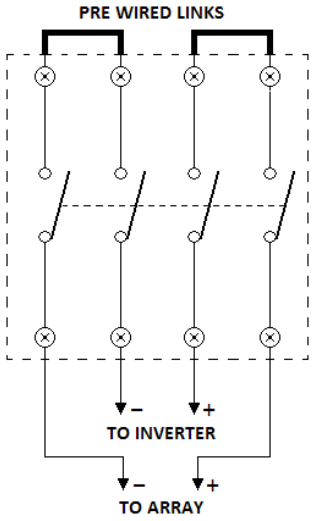
It is recommended the maximum voltage drop between the PV array and the inverter is 3%.

DC ISOLATOR WIRING

The DC isolators utilised in Solahart PV Systems are not polarity sensitive (non polarised type) however for uniformity they should be wired as shown in the DC isolator wiring diagram below.

Warning: DC isolator terminal screws must be tightened by hand only. Do not use power tools.

DC isolator wiring diagram



Once wired, the DC isolator should be left in the open position until system commissioning.

POWER OPTIMIZERS (SOLAREDGE ONLY)

Warning: Input and output connectors are not watertight until mated. Open connectors should be mated to each other or plugged with appropriate watertight caps.

Warning: Cutting the power optimizer input or output cables is prohibited and will void product warranty.

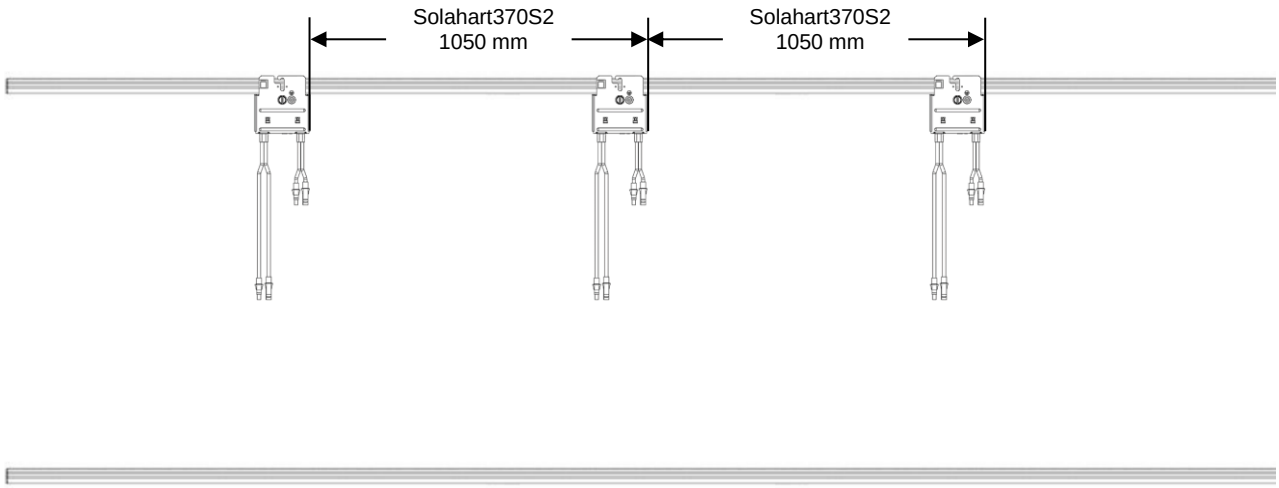
Warning: Do not connect / disconnect DC connectors or wiring while under load.

Warning: Only connectors of the same make and model may be connected together.

Note: Modules with SolarEdge power optimizers output a low safety voltage before the inverter is turned ON. As long as the power optimizers are not connected to the inverter or the inverter is turned OFF, each power optimizer will output a safe voltage of 1 V (±0.1 V).

MOUNTING THE POWER OPTIMIZERS

1. Determine and mark the power optimizer mounting locations on the rail:
    a. Power optimizers should be spaced approximately 1050 mm apart on the rail. See figure below.

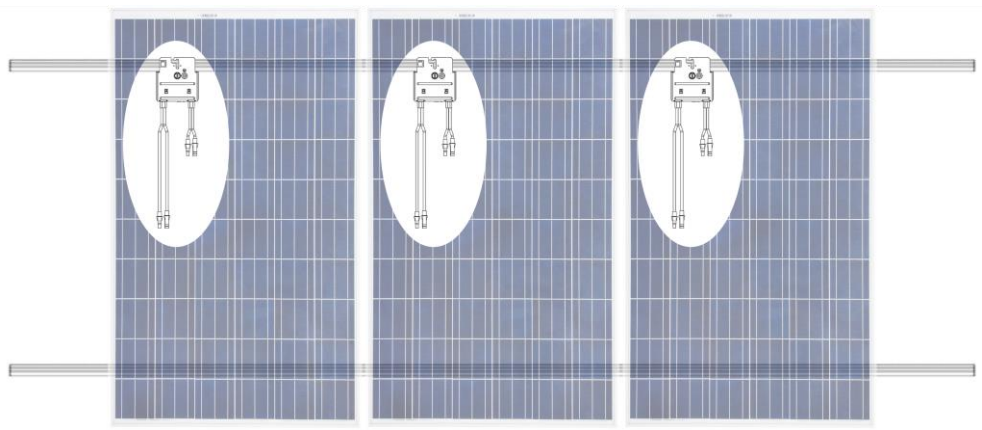


Note: Figure is not to scale.

    b. Power optimizers must be positioned so that they maintain a 25 mm clearance distance between the power optimizer and other surfaces to allow for heat dissipation.

Note: Ensure the junction box of each PV module is near the side of rail where the optimisers are mounted.

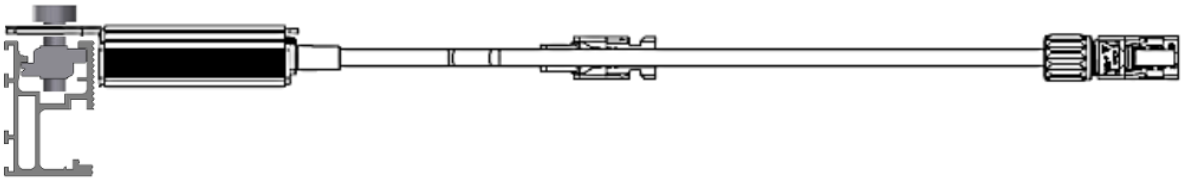
Note: Ensure clearance between power optimizers and PV module junction boxes.



2. Attach each power optimizer to the mounting rail using the Z-module assembly provided in the BOS kit. See figure below. Apply a tightening torque of 9.5 Nm.

Z-module assembly

Note: It is recommended that the power optimizers be placed face down to ensure clearance between the back of modules and power optimizers. See figure below.



Note: Figure is not to scale.

3. Verify that each power optimizer is securely attached to the rail.

4. Record power optimizer serial numbers and locations. This can be achieved through the use of a paper template or SolarEdge smartphone application. Refer to SolarEdge supplied documentation for more information.

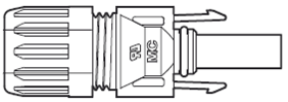
POWER OPTIMIZER WIRING PROCEDURE

Warning: Use insulated tools and wear PPE when performing wiring to prevent the risk of electric shock. It is suggested that modules be covered with an opaque material during wiring to reduce the voltage generated by the string.

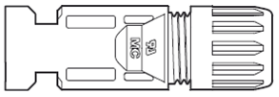
PV Module and power optimizer DC plug connectors are connected as follows:

Firmly push positive (+) plug into negative (-) plug until an audible “click” is heard, and then try to pull plugs apart. Incorrectly connected plugs will come apart whilst correctly connected plugs will not come apart unless the locking latches on either side of the positive (+) plug are depressed using an unlocking tool whilst plugs are pulled apart.

Note: Pull on plugs, do not pull on wiring.



+



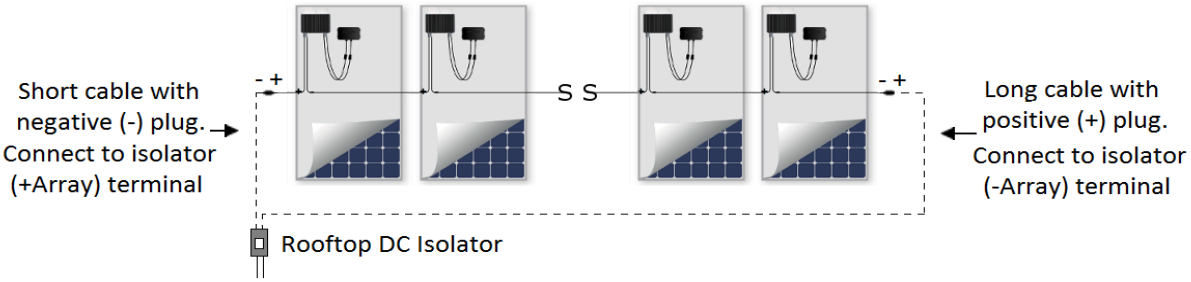
-

Warning: Do not connect / disconnect DC connectors or wiring while under load.

Warning: Only connectors of the same make and model may be connected together.

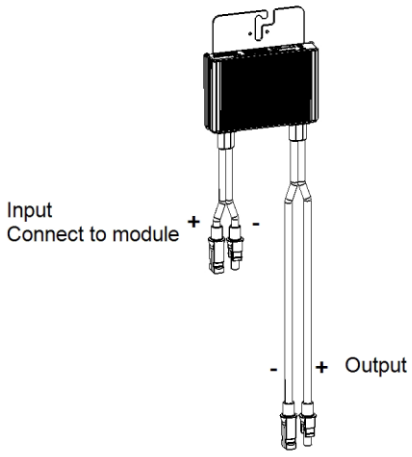
The following procedure should be adhered to whilst wiring power optimizer strings to prevent the risk of electric shock or inadvertent short circuiting of live cables whilst wiring the Rooftop DC Isolator:

1. Two extension leads per string should be constructed using the DC extension cable provided in the BOS Kit. One should be short to connect from the first power optimizer in the string to the DC isolator. The other should be sufficiently long to plug the end power optimizer in the string to the DC isolator (see the example schematic below).



2. Ensure the Rooftop DC Isolator is in the OFF position, strip 12 mm of insulation from the end of each extension lead and connect the two extension leads to the Rooftop DC Isolator terminals. The Rooftop DC Isolator should be wired in a consistent manner. Refer to “DC Isolator Wiring” on page 46.

3. Connect the first power optimizer’s positive output (+) cable plug to the Rooftop DC Isolator extension cable negative (-) plug. See figure below for power optimizer cable plug illustration.



Note: Image is for illustration purposes only. Refer to the label on the product to identify the plus and minus input and output connectors.

4. Connect each power optimizer’s negative output (-) cable to the following power optimizer’s positive output (+) cable.

5. Connect the last power optimizer’s negative output (-) cable to the Rooftop DC Isolator extension cable positive (+) plug.

6. Connect the first power optimizer’s input connectors to the first module’s connectors.

7. Repeat Step 6 for each module and power optimizer in the string.

8. Verify proper power optimizer connection by measuring the voltage of each string individually.

Note: Each power optimizer in the string will output a safe voltage of 1 V (±0.1 V). For example: 9 power optimizers connected in a single string should output a safe voltage of 9 V (±0.9 V).

Note: Ensure the modules are exposed to sunlight during this process; otherwise, the power optimizers may not be powered.

9. Repeat Steps 1 - 8 for each string in the PV array.

10. Your PV array wiring is now complete.

Note: The Rooftop DC Isolator should still be in the OFF position at the completion of this stage of the installation. It should not be turned ON until the correct stage of commissioning. Refer to “Solar Isolation Device(s) Test – Rooftop DC Isolator(s)” on page 65.

PV MODULES

PV MODULES

PV modules generate electricity as soon as they are exposed to sunlight and as such they can represent a danger. All warnings in this manual must be observed when handling solar modules to avoid the risk of fire, sparking and/or electrocution.

If modules are connected in series (summing voltage) the combined voltage must not exceed the inverter's maximum input voltage rating. For the maximum number of series connected modules permissible, refer to the relevant wiring diagram in this document for the inverter model installed.

The Solahart mounting system requires the use of modules of equal thickness for correct clamping.

Note: Ensure only modules of the same type (model & thickness) are clamped side-by-side and electrically connected.

MODULE HANDLING

Modules should be handled with care and protected from damage at all times. All warnings and instructions on the packaging should be observed. Follow these guidelines when unpacking, transporting or storing the modules:

- Store modules in a dry and properly ventilated room. The packaging is not weatherproof.
- Leave the PV modules in the original packaging until installation.
- Inspect the packaging and modules prior to installation. Report any damage to Solahart immediately.
- Note module serial numbers before installation and record serial numbers in the system documentation.
- Do not stack, step on, or drop modules. Do not allow any subject to fall on modules.
- Carry modules with the short side vertical using both hands and do not use the junction box or connection cables as a grip.
- Do not subject modules or backsheets to loads or stresses. Max torsion 10 mm/m.
- Do not use modules that have been dropped.
- Keep all electrical contacts clean and dry.
- Do not modify the module or drill additional holes in any part of the module. This will void the product warranty.
- Do not install modules in windy or wet weather.

Warning: Do not use modules which are broken or damaged. If the module front glass is broken or laminate back sheet is damaged in any way, hazardous voltages may be exposed.

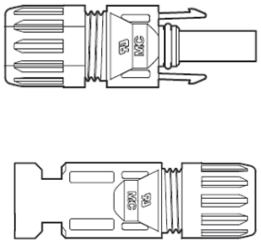
STRING WIRING PROCEDURE

Note: If you have completed the "Power Optimizer Wiring Procedure" on page 48, proceed to "Earthing" on page 51.

⚠ **Warning:** Use dry, insulated tools and wear PPE when performing wiring to prevent the risk of electric shock. It is suggested that modules be covered with an opaque material during wiring to reduce the voltage generated by the string.

PV Modules can only be connected with DC plug connectors as follows:

Firmly push positive (+) plug into negative (-) plug until an audible "click" is heard, and then try to pull plugs apart. Incorrectly connected plugs will come apart whilst correctly connected plugs will not come apart unless the locking latches on either side of the positive (+) plug are depressed using an unlocking tool whilst plugs are pulled apart.



Note: Pull on plugs, do not pull on wiring.
Note: Ensure that the cabling is not under stress.

Warning: Do not connect / disconnect DC connectors or wiring while under load.

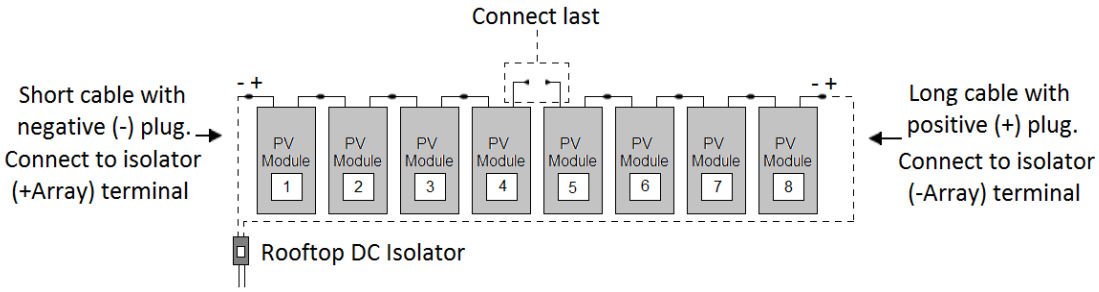
Warning: Do not connect any exposed cable ends. Do not touch "+" and "-" poles at the same time.

Warning: Only connectors of the same make and model may be connected together.

Use minimum 4 mm^2 copper wires insulated for minimum 90°C for field connections.

The following procedure should be adhered to whilst wiring module strings to prevent the risk of electric shock or inadvertent short circuiting of live cables whilst wiring the Rooftop DC Isolator:

1. Two extension leads per string should be constructed using the DC extension cable provided in the BOS Kit. One should be short to connect from the first module in the string to the DC isolator. The other should be sufficiently long to plug the end module in the string to the DC isolator (see the example schematic below).
2. Ensure the Rooftop DC Isolator is in the OFF position, strip 12 mm of insulation from the end of each extension lead and connect the two extension leads to the Rooftop DC Isolator terminals. The Rooftop DC Isolator should be wired in a consistent manner. Refer to “DC Isolator Wiring” on page 46.
3. Connect the first module positive (+) cable plug to the Rooftop DC Isolator extension cable negative (-) plug.
4. Connect each module’s negative (-) cable to the following module’s positive (+) cable as modules are being installed until the halfway point is reached i.e. fourth module in an eight module string.
5. Install and connect the remaining modules, but do not make the halfway connection, i.e. in an eight module string do not connect the fourth module negative (-) cable to the fifth module positive (+) cable (refer to wiring diagram below). These two cables will be connected at the end of this procedure.
6. Connect the last module’s negative (-) cable to the Rooftop DC Isolator extension cable positive (+) plug.
7. Complete the circuit by connecting the two string halves together by connecting the positive (+) and negative (-) cables of the two modules left previously disconnected in step 5.



Note: Modules may be connected in a different order provided that all modules in a string are connected in series.

Note: The Rooftop DC Isolator should still be in the OFF position at the completion of this stage of the installation. It should not be turned ON until the correct stage of commissioning. Refer to “Solar Isolation Device(s) Test – Rooftop DC Isolator(s)” on page 65.

⚠ **Caution:** Ensure all the plug connections are secured away from any water carrying surfaces.

EARTHING

All modules and rails must be earthed. Refer to “Earthing Arrangements – All Systems” on page 27. Earthing connections must be made by a suitably qualified person according to the relevant standards outlined on page 16. It is also recommended that a reliable lightning protection system be installed.

Stainless steel serrated washers must be used so the rail anodising is pierced, providing good electrical continuity. Stainless steel nuts, bolts and washers must be used and all ferrous metal in conductive connections should be specially treated to prevent corrosion (i.e. by spray painting or coating with a galvanising paint). Refer also to “Earthing Arrangements – All Systems” on page 27.

Universal Clamp with earthing plate

To earth modules and rails, use universal clamps with earthing plates when mounting modules. Install the clamps in accordance with the following instructions. When installed correctly, earthing plates will provide earth bond continuity between rails and modules whilst allowing removal of a module without affecting the earthing integrity of other components in the system. The rails must then be earthed by connecting a suitably sized earth wire. Refer to “Earthing Arrangements – All Systems” on page 27.

Universal clamps with Earthing Plate

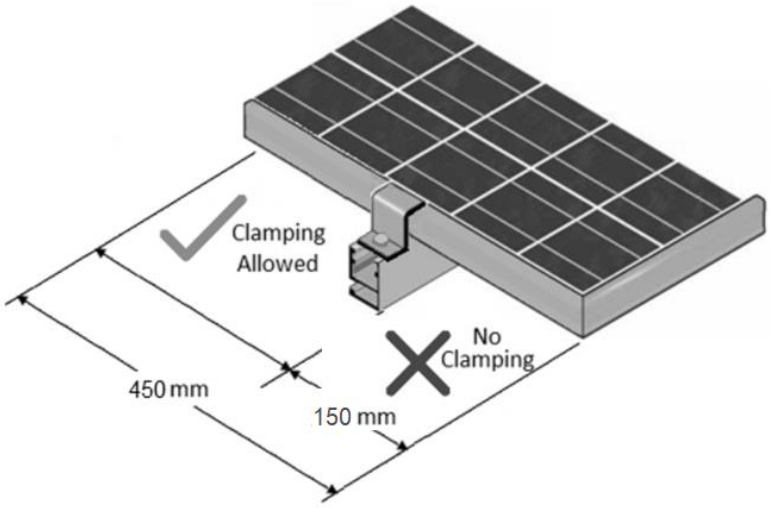
⚠ **Warning:** If rails are not of a continuous length, or rail splices do not provide satisfactory earth continuity, earth bond jumper cables must be used across rails or rail splices or each section of rail must have a separate earth wire connection.

Warning: All inverters supplied by Solahart are transformerless, functional earthing of PV array is strictly prohibited. Refer to AS/NZS 5033 for details.

MODULE MOUNTING

Fastening the modules to the mounting structure

Each module must be securely fixed to the mounting structure at a minimum of four points. The distance between the end clamp and the end of the rail should be a minimum of 25 mm. The mounting clamps must be fastened so the clamp lies completely within the range shown below for each type of module.



Note: Figure is not to scale

⚠ **Caution:** Ensure the clamps are not in contact with the front glass of the PV modules.

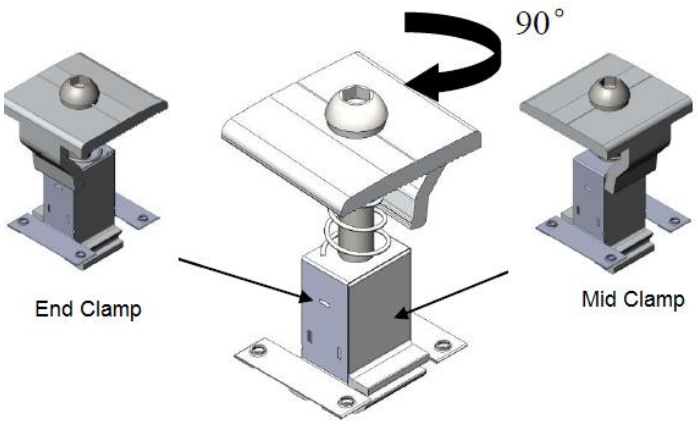
Caution: Ensure the junction box does not touch the structure under the panel.

⚠ **Caution:** PV modules can bend under load. Ensure there is no sharp object installed near the back side of the PV modules.

- ⚠ **Caution:** Ensure all the drainage holes on module frame are not covered.
- **Caution:** Ensure all modules are secured during installation.

Black Universal Clamps

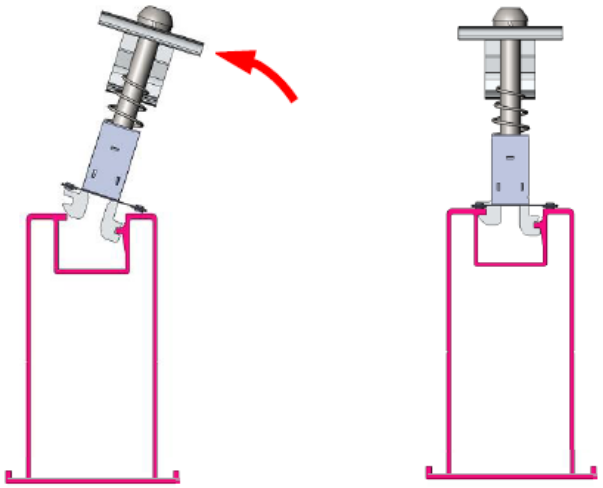
Black Universal Clamps with built-in earthing plates suit PV modules of thickness between 30 mm and 46 mm and can be used as either mid clamps or end clamps.



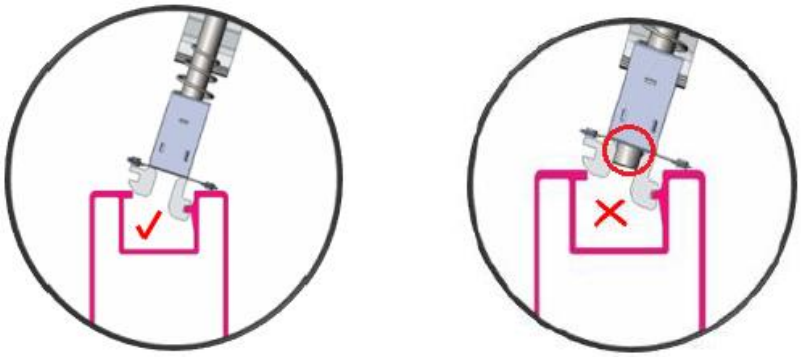
Twisting the head of Universal Clamp changes the functionality from end clamp to mid clamp.

Inserting the clamps

The universal clamp can be installed by inclining it to engage the channel on its lower part with the lower feature of the rail, and press down the universal clamp towards the other side to engage the channel on its upper part with the upper feature of the rail as shown in the figure below.

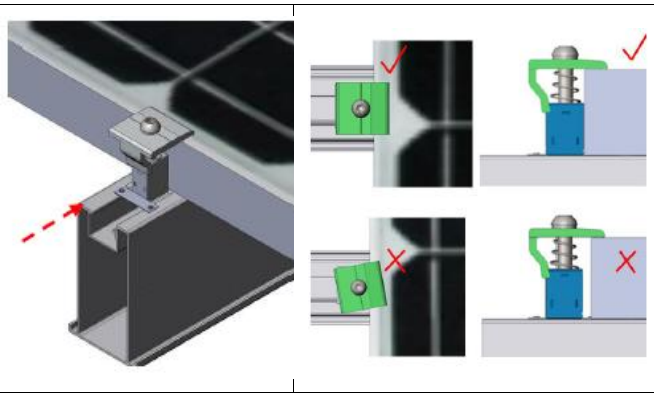


Note: before installing, ensure the Allen head bolt thread does not project through the lower side of the module.

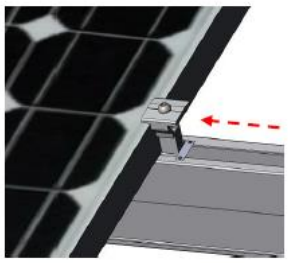


Module Mounting Procedure

1. When using as end clamp, slide the universal clamp to the position to be fastened. Ensure there is at least 25 mm from the rail end. Then slightly slide the PV Module frame onto the earthing plate of universal clamp. Make sure the frame of PV Module is fully in contact with the universal clamp. Ensure that the end clamps are tight against the module. Then tighten the universal clamp bolt to 13-14 Nm.



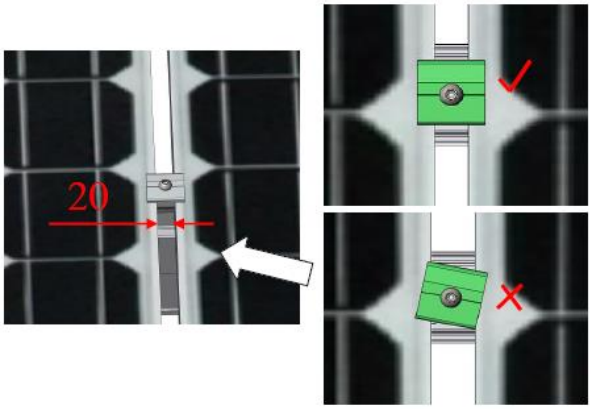
2. Inserting the clamps. Ensure the frame of PV module is fully in contact with the universal clamp.



3. Slightly slide the next PV Module into the other side of universal clamp, ensure the frame of PV Module is closely in contact with the universal clamp. Visually check to ensure the universal clamp and PV module are properly positioned. Then tighten the universal clamp bolt to 18-20 Nm.

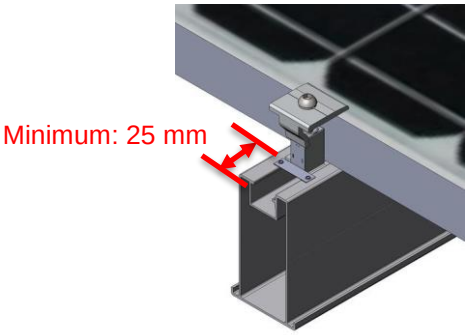
   Ensure both module frame edges are located on top of the protrusions of the earthing plate.

Repeat steps 2 and 3 for each remaining module in the row.



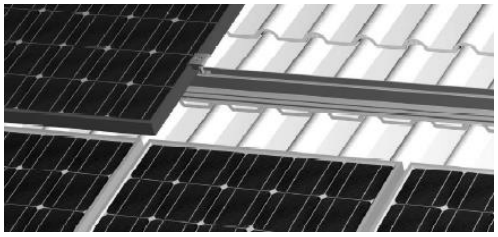
4. Place a universal clamp into the end of each rail. Ensure that the end clamps are tight against the module and are at least 25 mm from the rail ends.

   Ensure the frame of module is located on top of the protrusions of the earthing plate. Tighten the universal clamp bolts to 13-14 Nm.



5. Repeat steps 1 - 4 for each row of modules.

Note: Universal clamps may be temporarily placed between rows to ensure 20 mm uniform spacing between rows.



Module installation is now complete.

INVERTER

For inverter installation instructions and warranty exclusions refer to the documents supplied with the inverter. The following points must also be observed when installing the inverter:

Warning: Inverters have masses between 7 kg and 30 kg. Proper safe handling procedures must be employed when installing or handling these inverters.

- Inverters must be sheltered from direct sunlight and other sources of heat.
- Inverters must be installed in a well-ventilated place so as to allow good circulation of air around the unit. Avoid places where air cannot circulate freely around the unit.
- The inverter must not be installed in a location accessible to children.
- The mounting structure must be capable of supporting the inverter weight.
- If the inverter is to be mounted on a combustible surface such as wood, a heat resistant backing (such as a fibre cement board) must be installed behind the inverter. Backing must extend a minimum of 20 mm past all edges and sides of the inverter.
- Inverter mounting clearances and requirements outlined in the relevant inverter documentation must be adhered to. Ignoring recommended mounting instructions can cause permanent damage to the inverter from water ingress and can reduce inverter efficiency due to inadequate heat dissapation.
- Sealing plugs provided with the inverter must be inserted into any unused string inputs to maintain the inverter's IP rating. Verify the presence of watertight rubber cap seals on DC input connectors and install them should they be absent.
- When installing an inverter with a StorEdge Connection Unit, do not install fuses if a battery is not installed. Leave all fuses in their original packaging behind the plastic cover inside the StorEdge Connection Unit, clear from all electrical wires and components.

MULTI-CONTACT DC CONNECTIONS

Multi-Contact Safety Locking Clips must be installed over the negative connectors of all Multi-Contact DC connections at the inverter. The purpose of these devices is to prevent accidental disconnection of live DC at the inverter. When the Safety Locking Clip is in place, a custom tool is required to separate the connectors.

Multi-Contact (MC) Positive (+) Connector: PV-KBT4	Multi-Contact (MC) Negative (-) Connector: PV-KST4	Multi-Contact (MC) Safety Locking Clip: PV-SSH4
		

AC CABLE SIZING TABLE

Inverter AC cabling must be sized and installed in accordance with AS/NZS 3000, AS/NZS 3008.1.1 and any local applicable codes. Cables selected must have an appropriate current carrying capacity for the maximum current output of the inverter, and the Inverter AC isolator, taking into consideration relevant de-rating factors. For the nominal trip current of the AC breaker, refer to the "Wiring Diagrams" beginning on page 18.

Inverter Model	Maximum AC Output Current (A)	Inverter Model	Maximum AC Output Current (A)
UNO-DM-2.0-TL-BQ	10.0	UNO-DM-5.0-TL-BQ	22.0
GW2500-XS	12.0	UNO-DM-5.0-TL-SBQ	22.0
GW3000D-NS	13.5	SE5000-xxxxxxxxx*	27.0
GW3048-EM	23.6	SE5000H-xxxxxxxxx*	21.7
UNO-DM-3.3-TL-BQ	14.5	UNO-DM-6.0-TL-BQ	30.0
UNO-DM-3.3-TL-SBQ	14.5	UNO-DM-6.0-TL-SBQ	30.0
UNO-DM-4.0-TL-BQ	19.0	SE6000-xxxxxxxxx*	27.0
UNO-DM-4.0-TL-SBQ	19.0	SE6000H-xxxxxxxxx*	27.5
GW5000D-NS	22.8	SE8000H-xxxxxxxxx*	36.5**
GW5048D-ES	40.0**	SE10000H-xxxxxxxxx*	45.5**

* This model may have suffixes indicating different options and functionality.

** For these inverter models, phase ratings on three phase homes must be checked for circuit breaker ratings larger than the inverter's Maximum AC Fault Current.

Inverter AC cabling must have a voltage drop or rise less than 1% in accordance with AS/NZS 5033. For common PVC/PVC cable types operating at 75°C on a 230 V single-phase circuit, the following table provides for a voltage variation of less than 1%.

Inverter Model	Conductor cross section				
	2.5 mm^2	4.0 mm^2	6.0 mm^2	10.0 mm^2	16.0 mm^2
	Maximum cable length (m)				
GW2500-XS	10.7	17.1	25.5	42.9	N/A
GW3048-EM	N/A	N/A	13.0	21.8	N/A
GW3000D-NS	9.5	15.2	22.7	38.1	N/A
GW5000D-NS	N/A	N/A	13.4	22.6	N/A
GW5048D-ES	N/A	N/A	N/A	N/A	20.5
SE5000-xxxxxxxxx*	N/A	N/A	11.3	19.1	30.3
SE5000H-xxxxxxxxx*	N/A	N/A	13.3	22.4	35.6
SE6000-xxxxxxxxx*	N/A	N/A	N/A	19.1	30.3
SE6000H-xxxxxxxxx*	N/A	N/A	N/A	18.7	29.7
SE8000H-xxxxxxxxx*	N/A	N/A	N/A	N/A	22.4
SE10000H-xxxxxxxxx*	N/A	N/A	N/A	N/A	18.0

* This model may have suffixes indicating different options and functionality.

Notes:

- For FIMER/ABB inverters, refer to FIMER/ABB Quick Installation Guide for AC Cable sizing.
- If the installation requires different cabling or has installation conditions different to those specified above, the installer must undertake appropriate calculations to ensure the cabling is correctly sized.
- The installer must determine the current carrying capacity in accordance with AS/NZS 3008.1.1.

FIMER/ABB INVERTER CHANNEL CONFIGURATION

For FIMER/ABB inverters ensure that the input channel configuration ('independent' or 'parallel') is correct for the arrangement of stings in the PV array. Refer to FIMER/ABB Product Manual for details.

EARTH FAULT ALARMS

The installation of an earth fault alarm compliant with AS/NZS 5033 requirements is mandatory for all arrays. Inverters supplied by Solahart are able to communicate an earth fault in four different ways:

1. Inverter display
    - Some inverters supplied by Solahart display an Earth Fault Alarm message on the inverter display when an earth fault is present. Consult the specific inverter installation manual for details of the error message display on the inverter
    - Examples:
        - FIMER/ABB inverter display
        - GoodWe PV inverters (GW2500-XS, GW3000D-NS, GW5000D-NS)
        - SolarEdge SE5000-AUS20NNB2 & SE6000-AUS20NNB2 inverter
2. Inverter Built-in Audible Alarm
    - Some inverters supplied by Solahart come with built-in audible alarm which is triggered when an earth fault is present.
    - Examples:
        - GoodWe inverters
3. External alarm – Email Alert
    - Some inverters supplied by Solahart are able to communicate with a web portal that can be configured to send an email alert to the system owner when an earth fault is present.
    - Examples:
        - FIMER/ABB built-in Wi-Fi
        - SolarEdge Wi-Fi kit or integrated Ethernet
4. External alarm – Audible or Visual Alarm
    - Some inverters supplied by Solahart can switch a relay when an earth fault is present. The relay can be connected to an audible or visual alarm that meets AS/NZS 5033 requirements.
    - Examples:
        - FIMER/ABB configurable relay

FIMER/ABB Inverter Display

It may be possible to comply with earth fault alarm requirements without additional components. In this instance, the visual warning light and error information on the graphical display can be relied upon; however, this method of compliance requires the inverter be installed in a compliant location according to AS/NZS 5033 and/or local regulator.

FIMER/ABB configurable relay

All FIMER/ABB inverters currently supplied by Solahart are delivered with a configurable relay connection that on the occurrence of an inverter fault can be used to trigger an external audio and/or visual alarm. Please follow the instructions provided in the inverter product manual for maximum ratings, requirements and instructions on how to utilise the configurable relay connection.

GoodWe inverter display

It may be possible to comply with earth fault alarm requirements without additional components. In this instance, the visual warning light and error information on the graphical display can be relied upon; however, this method of compliance requires the inverter be installed in a compliant location according to AS/NZS 5033 and/or local regulator.

GoodWe built-in audible alarm

All Goodwe inverters currently supplied by Solahart are delivered with an audible fault alarm. In the occurrence of an Earth Fault, the internal audible alarm in the inverter will continue ringing for 1 minute and again every 30 minutes until the earth fault is resolved.

SolarEdge inverter display (SolarEdge backup inverters only)

It may be possible to comply with earth fault alarm requirements without additional components. In this instance, the visual warning light and error information on the graphical display can be relied upon; however, this method of compliance requires the inverter be installed in a compliant location according to AS/NZS 5033 and/or local regulator.

SolarEdge DC Safety Unit

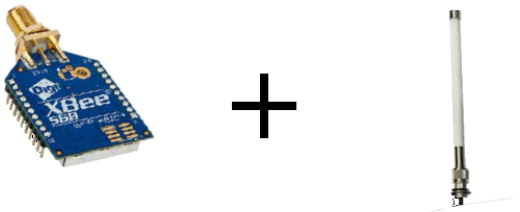
The SolarEdge HD Wave inverter has a built in DC Safety Unit. This unit provides cabling connections and isolation from the PV string(s) to the inverter.

Warning: Turning off the DC Safety Unit Switch does not discharge the capacitors inside the inverter. High DC voltage is still present. The inverter On/Off toggle switch must be turned off before removing the inverter cover(s).

SolarEdge Wi-Fi kit (SolarEdge backup inverters only)

The general installation process of the Wi-Fi kit is outlined below:

1. Prior to PV system commissioning, install the Wi-Fi kit as per supplied instructions
2. Commission the PV system as outlined in the Solahart Owner's Guide and Installation Instructions
3. Commission the Wi-Fi kit as per supplied instructions.
4. During the commissioning procedure, you will be asked to register the system. Please enter the login credentials supplied by the Solahart dealer or create a new profile for the PV system owner.
5. Once the system has been successfully registered, ensure the report configuration of AS/NZS 5033 is correctly activated.

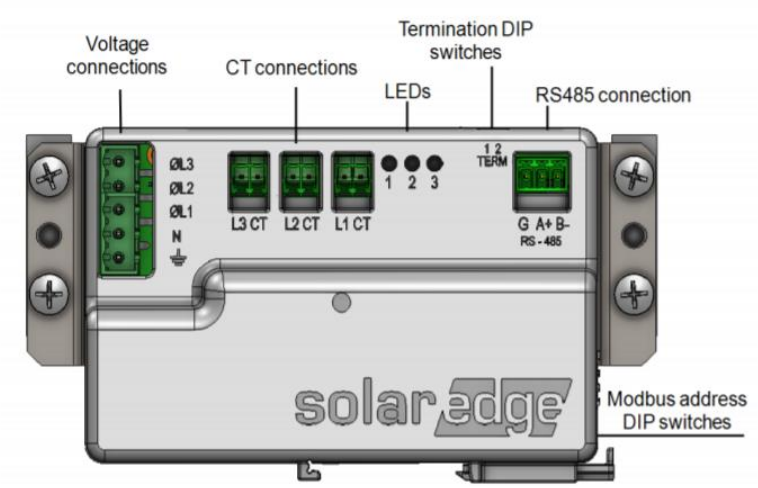


METER (SOLAREDGE ONLY)

Note: The meter is an optional accessory for use in battery systems and for zero export requirements.

Note: Refer to Installation Guide Energy Meter with Modbus Connection for Inverter firmware requirements.

Below is a diagram of this meter.



MOUNTING

Warning: Protect the meter from temperatures below -30°C or above 55°C, excessive moisture, dust salt spray, or other contamination, using an IP rated enclosure if necessary

Warning: Meter must be installed in an enclosure.

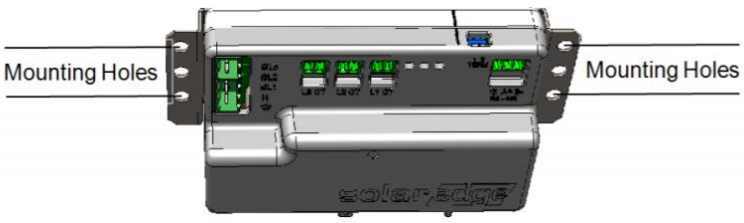
Warning: Do **NOT** use the meter as a drilling guide; the drill chuck can damage the screw terminals and metal shavings may fall into the connectors

NOTE: For Comms Cabling, the following cables requirements must be met.

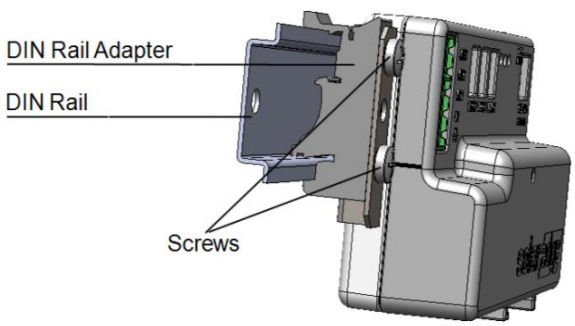
Cable Description	Cable Type	Conductor Size
Monitoring and control	Shielded data cable with minimum 2 twisted pairs, 600 V insulated. (Max Length: 10 m)	0.2 mm^2 – 1.5 mm^2

The SolarEdge meter can be mounted in one of two methods:

1. Attached directly onto a substrate through the four mounting holes marked in the figure below.



2. Attached to a DIN rail via the 2 DIN rail adaptors and 4 screws supplied with the meter.



WIRING AT METER

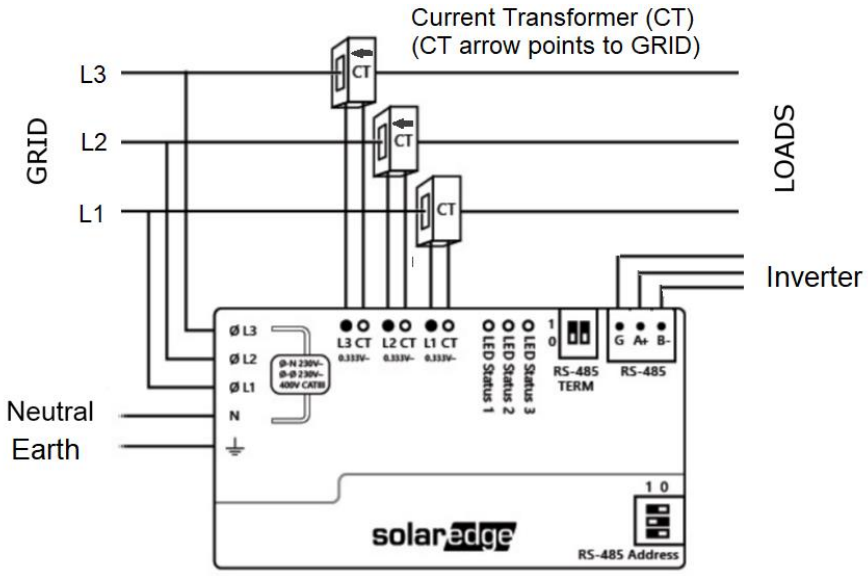
Warning: Isolate all sources of supply before attempting to wire the meter.
Warning: Do not place more than one voltage wire in a screw terminal.

The wiring procedure for SolarEdge meters is as follows:

1. Install cabling for neutral and earth.
2. Install cabling for each line voltage to the appropriate phase.

Note: The meter draws 10-30 mA and it shall be protected by a circuit breaker rated for 20 A or less.
Note: The meter is a final subcircuit and shall be protected by a RCD/RCBO in accordance with AS/NZS 3000.

3. Install cabling for the current transformers (CTs).
    a. To minimize current measurement noise, minimise the length of the CT wires.
    b. Match the CTs with their corresponding voltage phases.
4. Install each CT around the conductor to be measured with the arrow or label "THIS SIDE TOWARD SOURCE" pointing towards the grid, and secure with a nylon cable tie.Install cabling for the RS485 communications line
    a. Take note of the difference between the inverter and SolarEdge connector labelling.



SETTING DIP SWITCHES

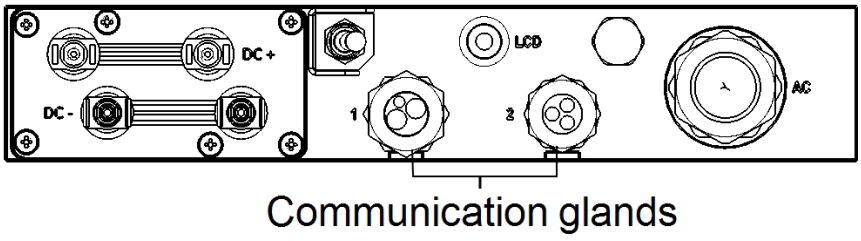
Set DIP switches on the meter as described below.

1. Set the termination DIP switches for Termination. Both switch 1 and switch 2 should be in position 0.
2. Set the address DIP switches for Modbus Address 2: Set switch 2 to position 1, and set switches 1 and 3 to position 0.

Note: Position 0 indicates the tab is set towards the front side of the meter; position 1 indicates the tab is set towards the back of the meter.

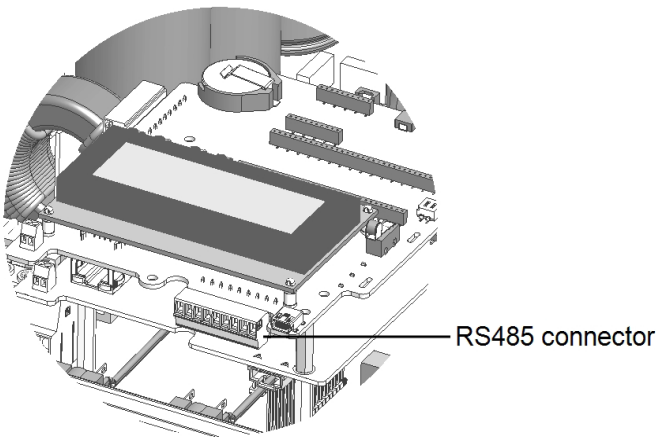
WIRING AT INVERTER

1. Remove the seal from one of the openings in the communication gland #2 at the bottom of the inverter and insert the RS485 wires from the meter through the opening.

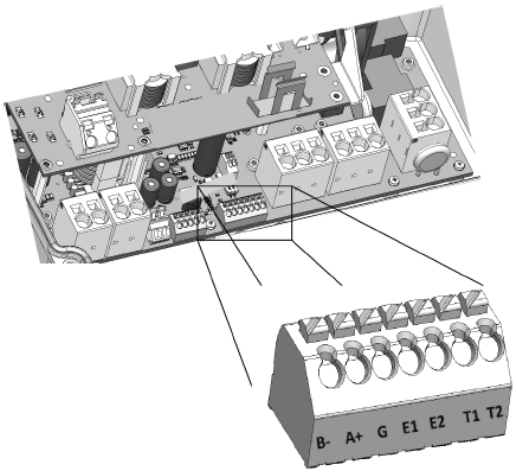


For an inverter / StorEdge Connection Unit with conduit entries, route the RS485 wires from the meter through the opening in the right hand side of the unit.

2. Remove the 9-pin RS485 connector located on the communication board.

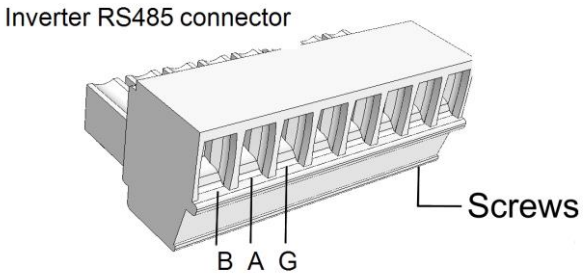


SolarEdge Inverter



SolarEdge Inverter with StorEdge Connection Unit

3. Remove the RS485 connector located on the communication board.

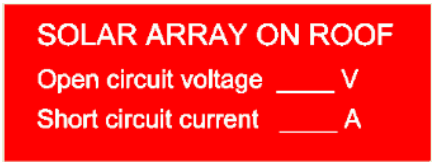


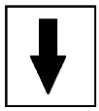
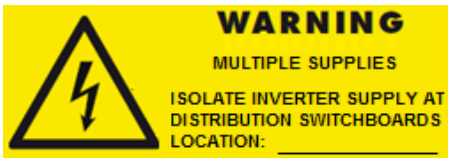
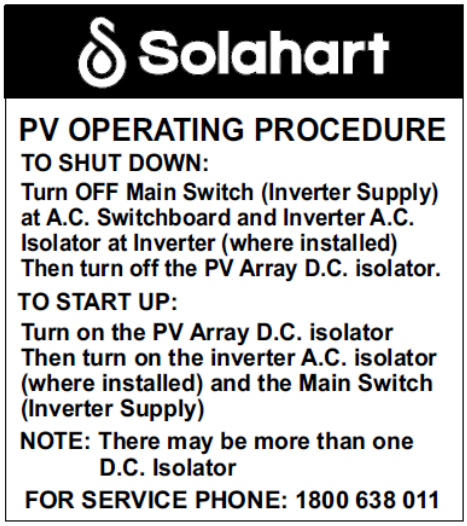
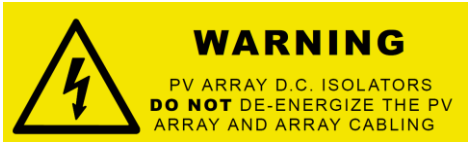
4. For configuration of other SolarEdge Devices including Inverter(s), refer to Installation Guide Energy Meter with Modbus Connection.

LABELLING

This information is supplied here as a guide only. Additional labels may be required depending upon the installation and local requirements. Labels must be constructed to AS 1319 and installed according to AS 4777.1, AS/NZS 5033 and any local regulations. Refer to aforementioned standards for more information.

The purpose of labelling is to clearly indicate that the electrical installation has multiple supplies and which circuits are affected by these supplies. Labelling also identifies the components that isolate the various supplies. Labels relating to the PV system must be placed on the switchboard to which the PV system is directly connected. If the PV system is directly connected to a distribution board, additional labels must also be placed on the main switchboard and all intermediate distribution boards. The following table details labels that are supplied in Solahart PV Systems.

Label	Colour	Location
	Black text on yellow background	Prominent position on the switchboard where the inverter is connected to
	White text on red background	Adjacent to main switch to grid supply
	White text on red background	Adjacent to the isolator for normal supply to the distribution board (applicable only when the inverter is connected to a distribution board)
	White text on red background	Solar inverter main switch if inverter is located adjacent to switchboard OR
 Solar plant location to be entered by installer	White text on red background	Solar inverter main switch if inverter is not located adjacent to main switchboard
 Values to be entered by installer **SOLAREDGE SYSTEMS ONLY:** Open circuit voltage: Inverter maximum DC operating voltage Short circuit current: Inverter maximum input current	White text on red background	Prominent position adjacent to meter box and building's main switchboard

Label	Colour	Location
	Reflective white text on reflective green background	Prominent position on or adjacent to the meter box
PV ARRAY D.C. ISOLATOR	Black text on white background	Rooftop and inverter Solar DC isolators
	Black text on white background	Next to “PV ARRAY D.C. ISOLATOR” label, pointing to the location of Inverter built-in DC Isolator (if Applicable)
INVERTER A.C. ISOLATOR	Black text on white background	Inverter AC isolator
 Distribution board number to be entered by installer i.e. DB1	Black text on yellow background	Main switchboard (applicable when the inverter is connected to a distribution board)
	Black and white	Prominent position adjacent to the inverter
	Black text on yellow background	Added below the shutdown sign (Solahart PV Operating Procedure)
	Black text on yellow background	Prominent position adjacent to the inverter

COMMISSIONING

Systems must be commissioned according to AS/NZS 5033. Commissioning tests are required to ensure that the system complies with the aforementioned standard. Commissioning information is provided here as a guide only and it is the installer's responsibility to ensure that the requirements of AS/NZS 5033 are met. A copy of the relevant commissioning documents must be provided to the owner and a copy kept by the installer.

Before starting any of the tests below, ensure that:

- The Main Switch (Inverter Supply) at the AC switchboard is in the OFF position.
- The Inverter AC Isolator at the inverter is in the OFF position (if installed).
- The Inverter DC Isolator(s) at the inverter are in the OFF position.
- The Rooftop DC Isolator(s) are in the OFF position.

Warning: Dangerous DC voltages may be present during the following commissioning procedure. Appropriate personal protective equipment should be used.

VERIFICATION OF MODULE AND RAIL EARTH RESISTANCE

This test is performed to ensure modules, rails and other mounting components are correctly earthed.

8. Using a multimeter set on the ohms scale, measure between each module and the system earth wire. Earth resistance must be 0.5 Ω or less.
9. Using a multimeter set on the ohms scale, measure between each rail and the system earth wire. Earth resistance must be 0.5 Ω or less.
10. Using a multimeter set on the ohms scale, measure between each mounting component and the system earth wire. Earth resistance must be 0.5 Ω or less.

STRING OPEN CIRCUIT VOLTAGE (V_{OC}) TEST

This test is performed to ensure the wiring polarity and continuity of the PV array is correct. Measurements should be made under stable irradiance conditions close to solar noon if possible. Where multiple strings are installed, this test procedure must be repeated for each string.

The voltage measurement obtained should be the number of modules in the string multiplied by the V_{oc} of one module. For example: For a string with 9 X Solahart315 modules: String V_{oc} = 9 X 40.29 V DC ≈ 363 V DC. Refer to "Voltage Tables for GoodWe and FIMER/ABB Systems" or "Voltage Tables for SolarEdge Systems" on page 24.

1. Ensure that the Inverter AC Isolator(s) are in the OFF position.
2. Ensure that the Inverter DC Isolator(s) are in the OFF position.
3. Ensure that the Rooftop DC Isolator(s) are in the OFF position.
4. Using a multimeter set on the DC voltage scale, measure between the string positive and negative terminals at the module side of the string Rooftop DC Isolator and compare the value obtained with the table below. For SolarEdge systems see note below.

   Note (SolarEdge systems only): Each power optimizer in a string will output a voltage of 1 V (±0.1 V). For example: 9 power optimizers connected in a string should output a voltage of 9 V (±0.9 V).
5. Repeat for each string.

The open-circuit voltage (V_{oc}) of every string must be measured before switching on the inverter and must be within 5% of the calculated value. If readings are outside the calculated value by more than ±5%, then connections must be verified for polarity, continuity and possible faults and repaired where necessary. Once verification has been satisfactorily completed, strings may then be connected to the inverter.

SOLAR ISOLATION DEVICE(S) TEST – ROOFTOP DC ISOLATOR(S)

This test is performed to ensure the Rooftop DC Isolator(s) are isolating the string(s) from the inverter when in the OFF position.

1. Ensure that the Inverter AC Isolator(s) are in the OFF position.
2. Switch all string DC Isolators to the ON position (Rooftop and Inverter DC Isolators).
3. Ensure that the PV system is operating under irradiance conditions greater than 500 W/m^2.
4. Switch the string Rooftop DC Isolator to the OFF position.
5. Disconnect string positive and negative DC plug connectors from inverter.
6. Using a multimeter set on the DC voltage scale, connect multimeter leads between the disconnected string plugs. Ensure leads are firmly connected. If a DC voltage is present, the Rooftop DC Isolator or system wiring is faulty and will require replacing or repairing.

   Note (SolarEdge systems only): Each power optimizer in a string will output a voltage of 1 V (±0.1 V). For example: 9 power optimizers connected in a string should output a voltage of 9 V (±0.9 V).
7. Switch the string Rooftop DC Isolator to the ON position. If a DC voltage is not present, the Rooftop DC Isolator or system wiring is faulty and will require replacing or repairing.
8. Switch the string Rooftop DC Isolator to the OFF position.
9. Reconnect string positive and negative DC plug connectors to inverter.
10. Repeat for each string.

SOLAR ISOLATION DEVICE(S) TEST – INVERTER DC ISOLATOR(S)

This test is performed to ensure the Inverter DC Isolator(s) are isolating the string(s) from the inverter when in the OFF position.

1. Ensure that the Inverter AC Isolator(s) is in the OFF position.
2. Switch all string DC Isolators to the ON position (Rooftop and Inverter DC Isolators).
3. Ensure that the PV system is operating under irradiance conditions greater than 500 W/m^2.
4. Switch the string Inverter DC Isolator to the OFF position.
5. Disconnect string positive and negative DC plug connectors from inverter.
6. Using a multimeter set on the DC voltage scale, connect multimeter leads between the disconnected string plugs. Ensure leads are firmly connected. If a DC voltage is present, the Inverter DC Isolator or system wiring is faulty and will require replacing or repairing.

   Note (SolarEdge systems only): Each power optimizer in a string will output a voltage of 1 V (±0.1 V). For example: 9 power optimizers connected in a string should output a voltage of 9 V (±0.9 V).
7. Switch the string Inverter DC Isolator to the ON position. If a DC voltage is not present, the Inverter DC Isolator or system wiring is faulty and will require replacing or repairing.
8. Switch the string Inverter DC Isolator to the OFF position.
9. Reconnect string positive and negative DC plug connectors to inverter.
10. Repeat for each string.

INSULATION RESISTANCE TEST

This test is performed to verify the insulation resistance between the positive DC string wiring and earth and the negative DC string wiring and earth are both greater than or equal to 1 Megaohm (1 MΩ) as required by AS/NZS 5033:2014 Clause D4.

An insulation tester capable of applying test voltages of 500 V and 1000 V is required to perform this test.

Warning: Live voltages of up to 600 VDC will be present during this test. Wear personal protective equipment to prevent the risk of electric shock and treat DC string wiring as if it were live at all times.

Warning: Do not permit any person to touch any part of the array whist the insulation test is being performed.

1. Ensure that the Inverter AC Isolator is in the OFF position.
2. Switch the Rooftop DC Isolator(s) to the ON position.
3. Switch the Inverter DC Isolator(s) to the OFF position.
4. Disconnect string positive and negative DC plug connectors from inverter.
5. Connect the insulation tester leads between the disconnected positive string plug and earth. Ensure test leads are firmly fixed in position.
6. Select the appropriate test voltage on the insulation tester according to the number of modules in the string (500 V for a string of 6-10 modules; 1000 V for a string of 11-14 modules).
7. Switch the Inverter DC Isolator to the ON position.

   Warning: The positive and negative string wiring is now live and will have up to 600 VDC present.
8. Activate insulation tester. The resistance measured must be greater than or equal to 1 MΩ.
9. Switch the Inverter DC Isolator to the OFF position.
10. Connect insulation tester leads between the disconnected negative string plug and earth. Ensure test leads are firmly fixed in position.
11. Switch the Inverter DC Isolator to the ON position.

    Warning: The positive and negative string wiring is now live and will have up to 600 VDC present.
12. Activate insulation tester. The resistance measured must be greater than or equal to 1 MΩ.
13. Switch the Inverter DC Isolator to the OFF position.
14. Reconnect string positive and negative DC connectors to the inverter.
15. For the Two String Configuration, repeat this procedure for the second string.

VERIFICATION OF INVERTER WIRING

This verification is performed to ensure the inverter is correctly and safely wired. Check the Positive and Negative connectors are fully engaged at the Inverter and any unused inputs have connectors with sealing plugs installed.

INVERTER COMMISSIONING

Warning: Do not turn on the inverter until all of the previous commission procedure tests/checks have been satisfactorily completed.

Turn on the PV system (refer to “To Turn PV System On” in the Solahart PV Systems Owner’s Guide) then commission the inverter according to the commissioning procedure described in the relevant inverter installation guide for the model inverter installed.

/ABB UNO-DM-TL-PLUS-Q series inverters must be commissioned through the inverter Built-in Wifi Web User Interface (UI). For details refer to FIMER/ABB instruction “Solar Inverter UNO-DM-1.2/2.0/3.0/3.3/4.0/4.6/5.0-TL-PLUS-Q Quick Installation Guide” and “Quick Installation Guide UNO-DM-6.0-TL-PLUS-Q”.

GoodWe XS and DNS series inverters are commissioned using the button or 'key' and inverter LED screen. For details refer to "GoodWe Inverter Commissioning for Single Phase PV Inverters" on page 68.

GoodWe EM and ES series inverters are commissioned using inverter built-in Web UI. For details refer to "GoodWe Inverter Commissioning for Single Phase Storage InvertersGoodWe Inverter Commissioning for Single Phase Storage Inverters" on page 68.

SOLAREDGE INVERTER COMMISSIONING USING SETAPP

The following inverter models are commissioned using the SolarEdge Inverter SetApp:

- SE5000H-AU000BWU4
- SE6000H-AU000BWU4
- SE8000H-AU000BWU4
- SE10000H-AU000BWU4

Prepare the inverter for commissioning

1. Ensure all circuit breakers, inverter and cables are correctly rated, mounted and installed.

2. Switch on the AC Circuit Breaker.

Follow the steps below to commission inverter:

1. Download the SolarEdge app "SetApp" onto an Android or IOS smart device from Play Store or App Store, respectively.

2. Open SetApp and log in using the SolarEdge monitoring Username and password provided by your Solahart dealership.

3. Scan inverter QR code; for multiple-inverter configuration, scan the master inverter first.

4. Follow the SetApp instructions to enable Wi-Fi connection between the smart device and the inverter.

5. Follow the SetApp instructions to upload firmware.

6. Follow the SetApp instructions to set country and language.

7. Follow the SetApp instructions to set communication and enable remote monitoring.

Note: If multiple inverters are connected in Master-Slave configuration, the master inverter protocol shall be set to "SolarEdge Master" under menu "Communication" -> "RS485-1". Then select "Slave Detect". Ensure all slave inverters are listed.

8. Follow the SetApp instructions to pair the power optimisers.

9. Select "Status" to verify if all parameters display correctly.

10. Repeat step 3-9 for all the other inverters.

GOODWE INVERTER COMMISSIONING FOR SINGLE PHASE PV INVERTERS

The following inverter models are commissioned using the button or 'key' and inverter LED screen:

- GW2500-XS
- GW3000D-NS
- GW5000D-NS

Prepare the inverter for commissioning

1. Ensure all circuit breakers, inverter and cables are correctly rated, mounted and installed.
2. Switch on the DC Isolator(s).
3. Switch on the AC Circuit Breaker.

Follow the steps below to commission inverter:

1. Wait for the inverter to start up. The inverter screen will settle on 'Configure Safety'
2. Long press the key to proceed to a menu of country settings.
3. Short press the key to scroll through the menu to the setting appropriate to the installation location.
4. To confirm the setting, do not press the key for 20 seconds.
5. Once confirmed, 'Normal' will be displayed. A green stable LED light indicates the inverter is active and running normally.

GOODWE INVERTER COMMISSIONING FOR SINGLE PHASE STORAGE INVERTERS

The following inverter models are commissioned using GoodWe mobile APP "PV Master":

- GW5000D-ES
- GW3048-EM

Prepare the inverter for commissioning

1. Ensure all circuit breakers, inverter and cables are correctly rated, mounted and installed.
2. Switch on the DC Isolator(s).
3. Switch on the AC Circuit Breaker.

Follow the steps below to commission inverter:

1. Download the GoodWe app "PV Master" onto an Android or IOS smart device from Play Store or App Store, respectively.
2. Connect to Wi-Fi network of the inverter named "Solar-WiFi"
3. Enter the Wi-Fi Password:12345678
4. Open APP "PV Master" and click on "Local configuration".
5. Check and confirm the work status of the inverter is in "Check Mode" and click on "Set" and choose "basic setting".
6. Type in the Installer password "goodwe2010" the click "Login".
7. Select country setting to be "Australia".
8. Select the appropriate work mode from "General Mode", "Back-yup Mode" or "Economical Mode".

   Warning: Don not Choose "Off-Grid Mode".
9. Select the correct battery model if applicable and click "set" then "yes" to restart the inverter automatically.

VERIFICATION OF SYSTEM OPERATION

This step is performed to verify the PV system is operating correctly.

1. Ensure all DC Isolators are in the ON position (Rooftop and Inverter DC Isolators).
2. Ensure the AC Isolator is in the ON position.
3. Ensure the PV system is operating under irradiance conditions greater than 500 W/m^2.

   Note (SolarEdge systems only): Follow system verification procedure outlined in the inverter installation manual supplied with the inverter. Skip Step 4 below.

4. After waiting for the inverter to connect to the grid, record the 'Input Voltage' for each string which will be alternately displayed on the inverter LCD screen. Check this 'Input Voltage' is within ±5% of the value for the number of modules in each string, according to the following table:

Solahart370S2 modules											
Number of modules	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Indicative String V_{mp} *	75	112	149	186	224	261	298	336	373	410	447

*Values measured at standard test conditions (STC) defined as: irradiance of 1000 W/m^2, Spectrum AM 1.5, and cell temperature 25°C. Variations from STC values will affect actual V_{mp} and should be allowed for.

ENGINEERING CERTIFICATION

MW Engineering
Melbourne

CIVIL & STRUCTURAL ENGINEERS
RESIDENTIAL - INDUSTRIAL - COMMERCIAL - PRODUCT DEVELOPMENT

info@mwengineering.melbourne
Phone: 1300 MWENG-0 (1300 69364-0)
www.mwengineering.melbourne
ABN 37 605 815 585

15 May 2020

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV ez-Rack Solar Roof Certification – TC2, 2.5, 3 – Wind Region A, B, C, D. Internal REF: **00115.** Project REF: **CL-10088-SM-REV-E.**

MW Engineering Melbourne, being Structural Engineers within the meaning of Australian regulations, have calculated the maximum spacings for the PV ez-Rack rail system for the following conditions:

- **Wind Loads to AS 1170.2-2011 AMDT 4-2016**
  - **Wind Terrain Category 2, 2.5 and 3**
  - **Wind average recurrence of 200 years**
  - **Wind Region A, B, C, D**
- **Solar panel length up to 2.2m**
- **Solar panel width up to 1.1m**

Attached are the tables showing the spacings according to Wind Region, roof pitch, and building height.

The values shown on these tables will be valid unless an amendment is issued on any of the following codes:

- AS/NZS 1170.0- 2002 AMDT 4-2016	General Principles
- AS/NZS 1170.1- 2002 AMDT 4-2016	Imposed Loadings
- AS/NZS 1170.2- 2011 AMDT 4-2016	Wind Loadings
- AS/NZS 1664.1- 1997 AMDT 1:1999	Aluminium Code
- AS 1684.2- 2010 AMDT 2-2013	Residential Timber Code
- AS 1720.1- 2010 AMDT 3-2015	Timber Code
- AS/NZS 4600: 2005	Cold Formed Steel Code
- AS 4100- 1998	Steel Structures
- AS/NZS 1252.2-2016	Bolting

Should you have any queries, do not hesitate to contact us.

Best Regards,

Alberto Escobar
Civil/Structural Engineer
BEng MIEAust NER
BRP EC 46542
RPEQ 18759
info@mwengineering.melbourne

May 2020

MW Engineering
Melbourne

CIVIL & STRUCTURAL ENGINEERS
RESIDENTIAL - INDUSTRIAL - COMMERCIAL - PRODUCT DEVELOPMENT

info@mwengineering.melbourne
Phone: 1300 MWENG-0 (1300 69364-0)
www.mwengineering.melbourne
ABN 37 605 815 585

20 August 2020

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV ez-Rack SolarRoof penetrative tilt interface certification – TC2, 2.5, 3 – Wind Region A, B, C and D. Internal REF: 00400.

MW Engineering Melbourne, being Structural Engineers within the meaning of Australian regulations, have calculated the maximum spacings for the PV ez-Rack rail system for the following conditions:

- **Wind Loads to AS 1170.2-2011 AMDT 4-2016**
  - **Wind Terrain Category 2, 2.5 and 3**
  - **Wind average recurrence of 200 years**
  - **Wind Region A, B, C and D**
- **Solar panel length up to 2.2 m**
- **Solar panel width up to 1.2 m**

Attached are the tables showing the spacings according to Wind Region, roof pitch, and building height.

The values shown on these tables will be valid unless an amendment is issued on any of the following codes:

- AS/NZS 1170.0- 2002 AMDT 4-2016	General Principles
- AS/NZS 1170.1- 2002 AMDT 4-2016	Imposed Loadings
- AS/NZS 1170.2- 2011 AMDT 4-2016	Wind Loadings
- AS/NZS 1664.1- 1997 AMDT 1:1999	Aluminium Code
- AS/NZS 1252.2-2016	Bolting

Should you have any queries, do not hesitate to contact us.

Best Regards,

Alberto Escobar
Civil/Structural Engineer
BEng MIEAust NER
BRP EC 46542
RPEQ 18759
info@mwengineering.melbourne

August 2020

Solahart Industries Pty Ltd (A.B.N. 45064945848)
Registered Office
1 Alan Street (PO Box 7508, Silverwater, 2128)
Rydalmere New South Wales 2116
Australia

For SERVICE Telephone - **1800 638 011**
or your nearest Solahart Dealer
For Sales Telephone - **1300 769 475**
or your nearest Solahart Dealer
www.solahart.com.au

Revision date: 2020 November

122332A