

# Eco2solar PV Site Guide

## Standard G98 Installation

(This document is to be used for supplementary information only and it does not replace the original specification or the pre-start meeting document)

# Contents

- Summary ..... 2
  - 1st fix..... 2
  - 2nd Fix..... 2
- The onsite roofing contractor..... 3
  - Roof Preparation Requirements..... 3
  - Viridian Systems..... 3
  - GSE Systems..... 4
  - Adhesive Flashing Installation Guidelines ..... 6
- The onsite electrical contractor ..... 8
  - Inverter Location..... 8
  - AC Cable Requirements ..... 9
  - DC Cable Requirements..... 10
  - Consumer Unit & Protective Device ..... 12
- Solar PV and the Distribution Network Operator (DNO)..... 13
- Post Commissioning..... 14
- Photovoltaic Electrical Layout – Generic ..... 15
- Eco2solar Inclusion & Exclusion Table..... 18
- Typical Consumer Unit, AC Isolator & Generation Meter Layouts..... 19
- Battery Systems and Hybrid Inverters ..... 20

## Summary

**Note that there is a MINIMUM 4 WEEK CALL OFF (from design approval) for 1<sup>st</sup> fixes for standard In-roof installations.**

**2<sup>nd</sup> fixes also require a MINIMUM of 4 WEEK CALL OFF following 1<sup>st</sup> fix**

Please quote your unique Site PV reference when calling off plots. This will be emailed to the Site Manager by our Customer Support team when your project goes live.

Note that the following **MUST** be in place prior to Eco2solar attending any plots for 1st or 2nd fix;

### 1st fix

- For standard In- Roof Viridian and GSE installs, the roof must have been felted and battened but left clear of tiles

### 2nd Fix

- There must be permanent mains power supplied by the Distribution Network Operator (DNO) to the plot (**generator supply is not safe for us to work with**)
- 1.2 x 2 meter working platform in the loft next to the loft access hatch
- A fixed structure of 2 x vertical timber upstands within a meter of the loft hatch 600mm apart to allow us to fix the fireproof board/inverters to
- A 6mm<sup>2</sup> Twin & Earth 6242Y cable running from the consumer unit to the inverter location for domestic installations under 4kw. Any systems above 4kw will require a bespoke schematic and cable specification
- A CAT5/6 shielded twisted pair (STP) running from the DNO utility meter (service head) to the inverter location
- A high integrity consumer unit fitted with a 16A type A Double Pole RCBO, in accordance with BS 7671 amendment 2 March 2022

**We will confirm with site, prior to attending, that all the above requirements are in place. If we attend and the plot is not ready for us to complete our work, a 'plot not ready' charge of £350 per plot will be chargeable.**

Further details on these requirements are available in this document.

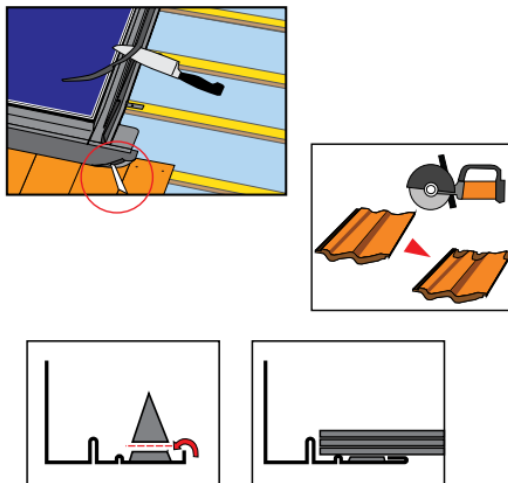
## The onsite roofing contractor

### Roof Preparation Requirements

- For any in-roof PV system, whether Viridian or GSE, the roof needs to be at **felt and batten stage** before Eco2 Solar attend site.
- It is the site roofers responsibility to dress/stick down the bottom flashing. For GSE systems A tube of adhesive sealant will be left with the site manager for the roofers to use.

### Viridian Systems

- Once the installation of the array is complete could you please draw your roofer's attention to the following points
  - To fit the bottom flashing ensure that the tiles are CLEAN AND DRY, remove the paper strip on the underside of the flashing and dress the flashing down onto the tiles. Ensure that the bitumen strip is well bonded to the tiles.
  - For some tile types it may be necessary to chamfer the high points of the tiles under the bottom flashing.
  - The outside edge of the side flashings can be flattened over.
  - The foam strip on the side flashing can be trimmed to within 10mm of its base, however not completely removed.

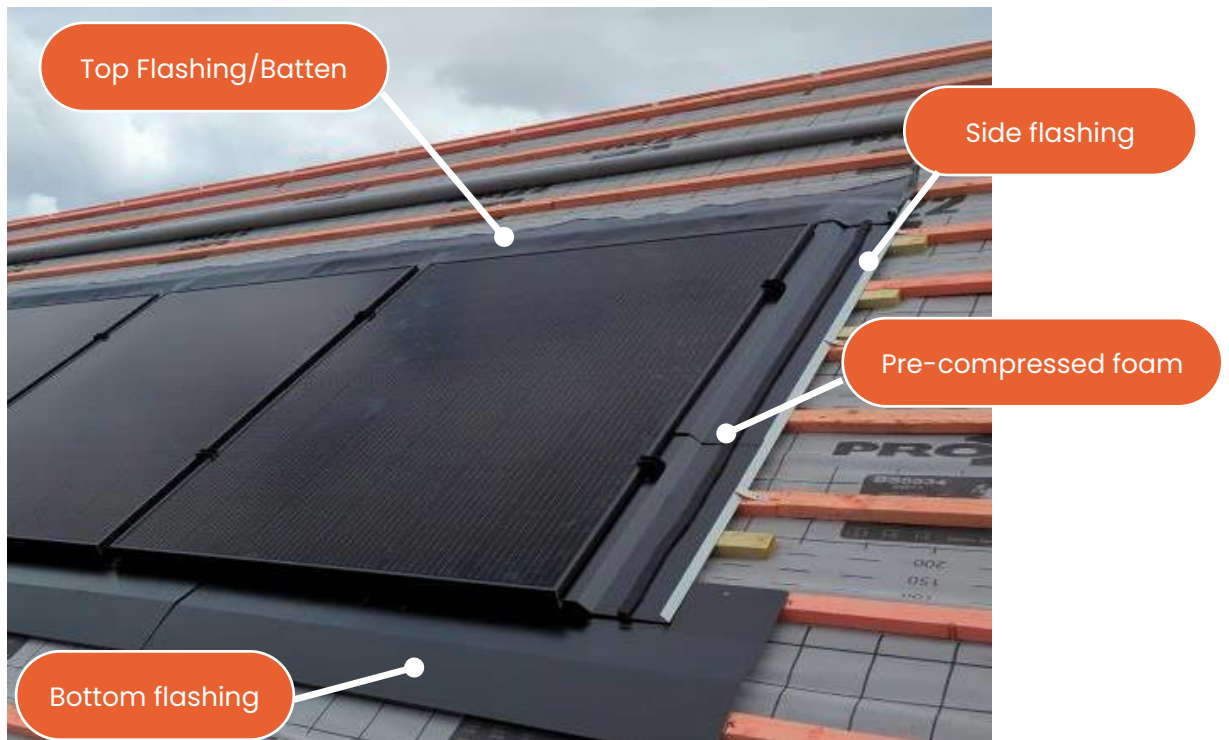


- The tiles will need to be cut in as close as possible around the array.



## GSE Systems

Once the installation of the array is complete could you please draw your roofer's attention to the following points.



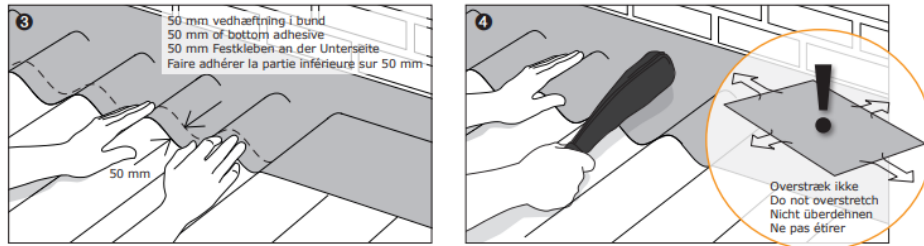
- The outside lip of the side flashing can be flattened slightly, if required.
- The pre-compressed foam will be installed by Eco2Solar and allowed to decompress prior to the roofers starting the tiling. This foam can be cut down to a minimum of 20mm if required.
- If a solid bottom flashing has been installed then the flashing can simply be lifted and the tiles fitted and fixed. The flashing will then need to be adhered to the tiles with a tube of adhesive sealant that Eco2Solar have left with the site manager.
- If a flexible bottom flashing has been installed, please ensure that the 6 points below are followed with particular attention paid to no.1 ENSURE APPLICATION AREA IS CLEAN AND DRY. This is vital to ensure that the product adheres correctly to the tiles.
- Top Flashing/Batten – Eco2Solar will leave the top flashing adhered to the solar array but leave the top free. This is to allow the roofing contractor to install an additional batten if they deem necessary. Once complete the contractor is to remove the cover tape and affix to the roof.



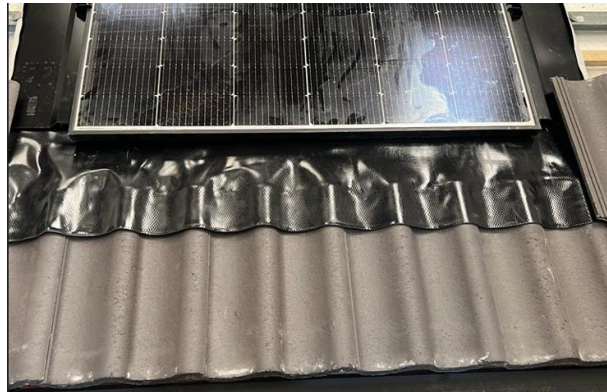
Top Flashing left loose for roofers

## Flexible Flashing Installation Guidelines (Roll Tiles)

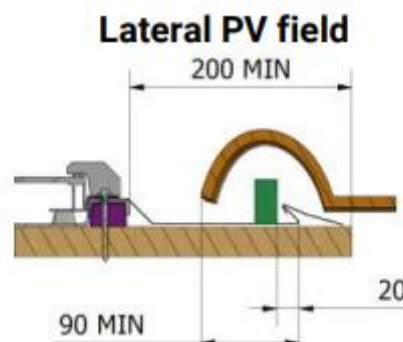
1. Ensure application area is clean and dry.
2. Form the flashing to the basic shape of roof using a leather roofers hammer
3. Apply the adhesive provided by Eco2Solar to the tiles



4. Apply firm pressure to create a watertight seal against the roof



- The tiles will need to be cut in as closely as possible around the array. The minimum distance from the edge of the flashing to the edge of the tile is 90mm



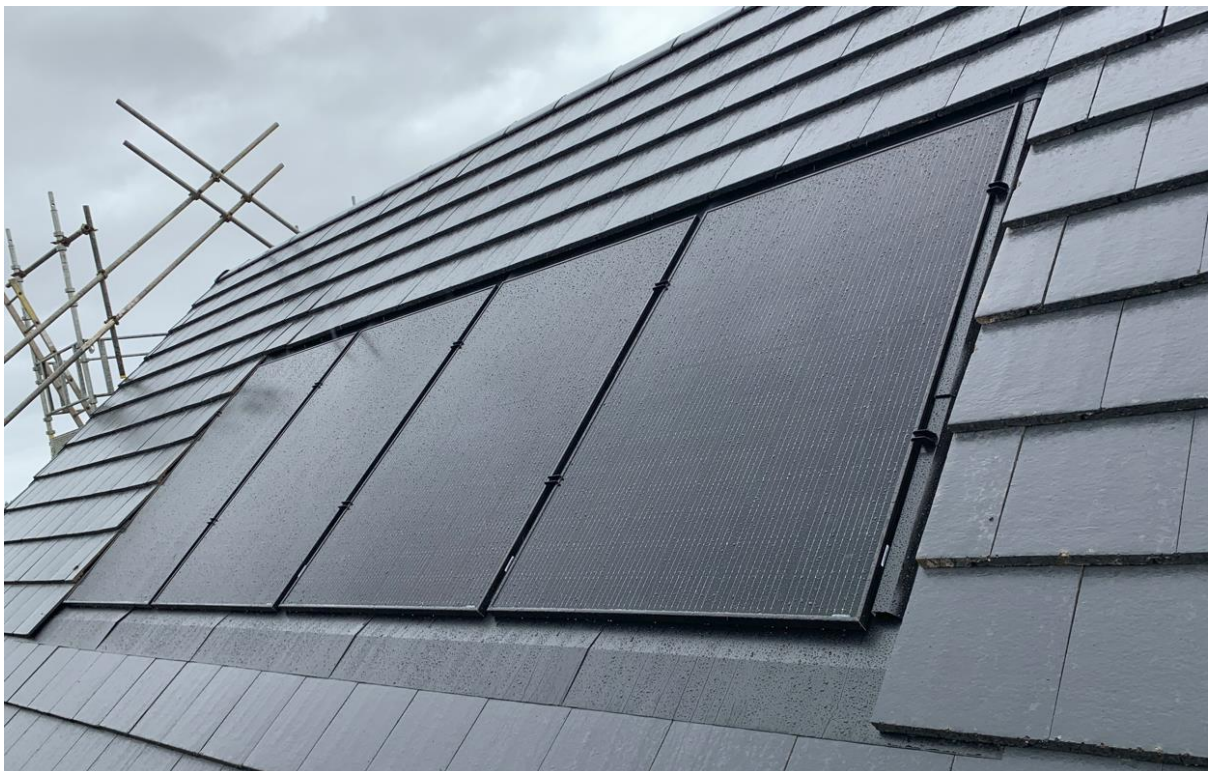
- Particular attention needs to be paid to the tiles across the top of the array.

**Example of an INCORRECT installation**

(a row of cut tiles needs to be added across the top of the solar panels)



**Example of a CORRECT installation**





## The onsite electrical contractor

Prior to work commencing the electrical contractor will have received:

- Specification of works at the quotation stage
- Drawings
- Again, specification of works at the pre-start meeting.

### Inverter Location

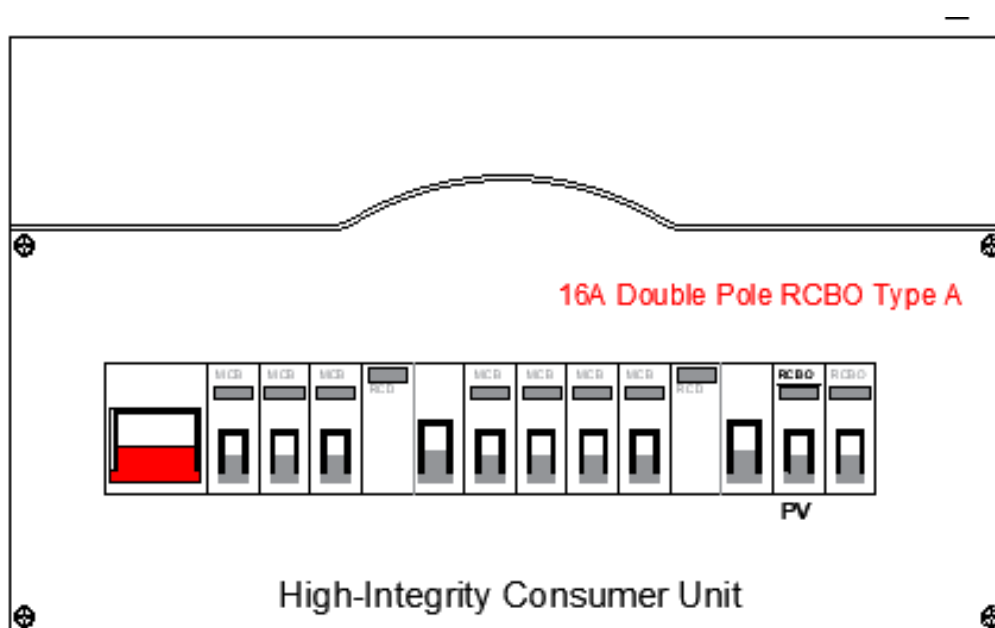
To ensure compliance with BS7671 and the Electricity at Work Regulations 1989 (HSR25) the house builder shall observe the following:

- Inverter shall be located close to the loft hatch (we advise within 1m) and not impede the use of a loft ladder
- 1200 x 2000mm working platform provided to allow safe access & egress for the electrician and maintenance personnel in the future
- Install 2 vertical upright posts approx. 600mm apart. This structure will be used to fix our fire-retardant board and inverter to.



## AC Cable Requirements

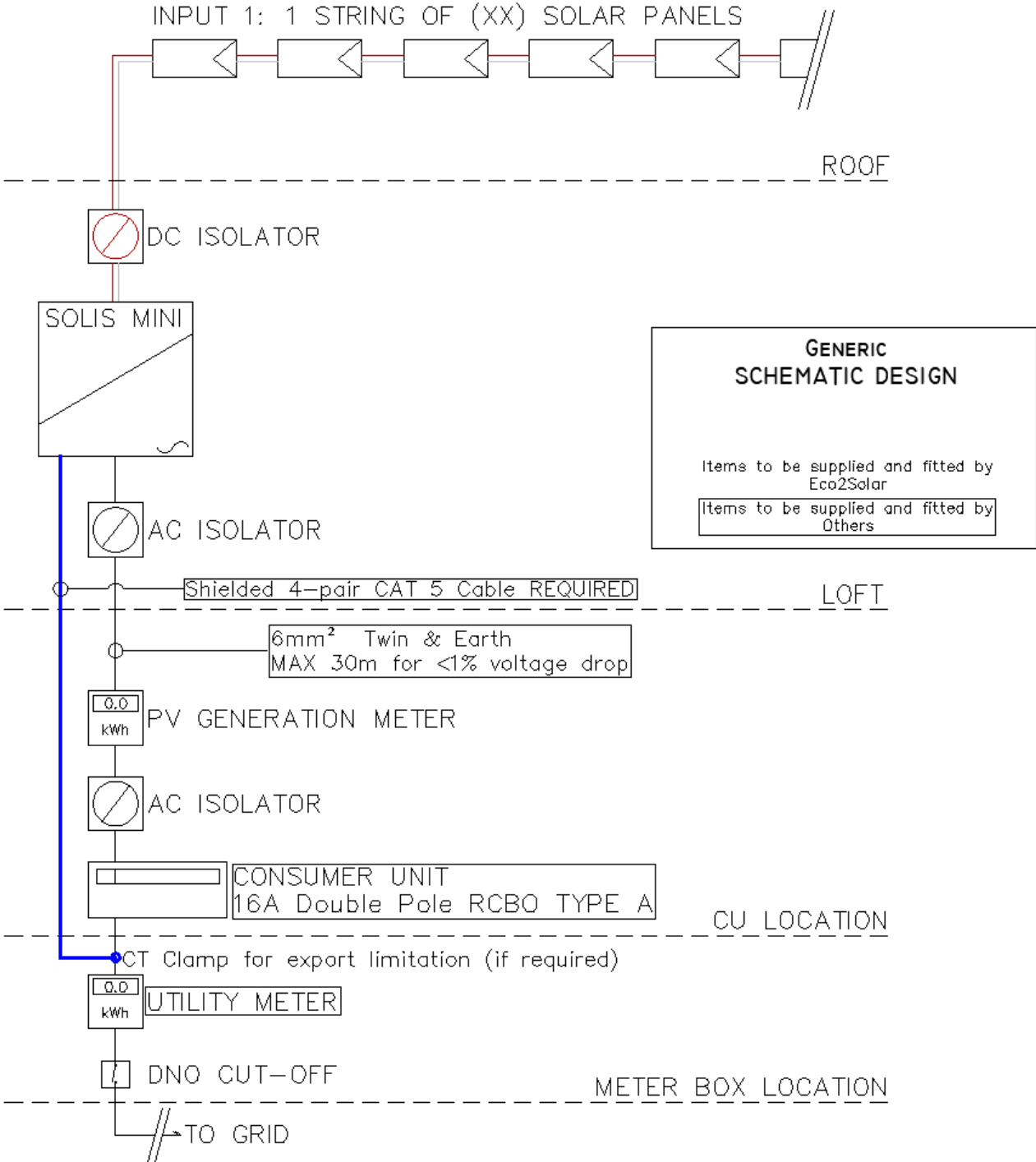
- The site electrical contractor shall install a continuous **6mm<sup>2</sup>** twin & earth 6242Y (Unless otherwise specified) from the consumer via a (local) loop and then to the loft space.
- Please leave approximately 2000mm of slack cable clipped above the insulation at the inverter location
- The supply cable shall be selected and erected so as to comply with the latest requirements of BS 7671.
- The PV system shall be installed on its own dedicated circuit where no other current using equipment is permitted.
- Consumer Unit – leave approximately 300mm inside the consumer unit. Please do not terminate the cable, Eco2solar will do this during T&C of the system.
- The local loop needs to project out 300mm so our electricians can install the AC isolator and Generation Meter
- The site electrical contractor shall also run a CAT5/6 shielded twisted pair (STP) from the DNO utility meter (service head) to the inverter location.



## DC Cable Requirements

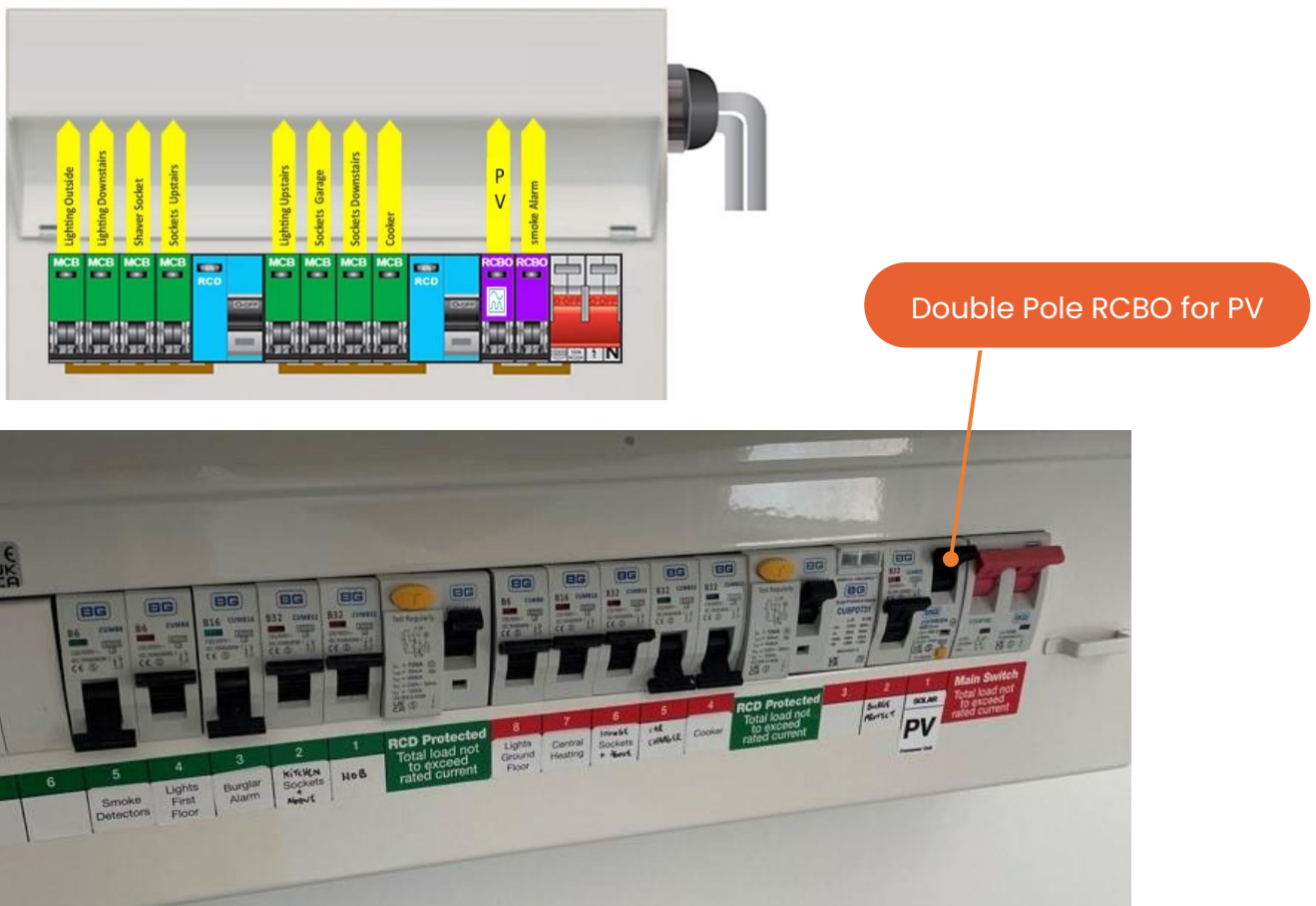
- DC cable in the loft space will be clipped direct to the timber work by Eco2solar installers unless other arrangements have been made prior.
- All other locations will be by design, please see drawing for specification.
- If the DC strings are run over a distance of 20m or buried in walls then there are two compliant methods available:
  - 2 Core Steel Wire Armoured Cable, sized as specification.
  - Or, Metallic conduit to contain double insulated Solar cables.
- Important Note: 6242Y T&E must **NOT** be used for DC strings or supplies.

# Solar PV Schematic for standard installations



## Consumer Unit & Protective Device

- Site are to provide a High Integrity consumer unit or similar fitted with a **16A type A Double Pole RCBO** (Unless otherwise specified) ready for the Eco2solar second fix.
- The installation of a high integrity consumer unit complies with BS 7161 Amendment 2 March 2022 (32 & 531.3.2) and the MCS/ECA guidance (2.3.1). Regulations state that every installation shall divide circuits to reduce the risk of unwanted tripping and to minimise any inconvenience.
- Note: RCBO Type AC Shall **not** be used where a load current contains DC components (531.3.3) i.e. Solar PV, EV charging etc.



- A High Integrity consumer unit will also future proof the installation should an EV charge point be required.

## Solar PV and the Distribution Network Operator (DNO)

Every site Eco2solar installs PV on requires a Distribution Network Operator (DNO) application to request that the load generated from the PV systems can be connected to the grid.

Eco2solar will submit this application to the DNO on the developer's behalf.

In order to submit this application, the developer needs to provide us with postal addresses, MPANs and a signed letter of authority for the site. If they do not issue us with the postal addresses and MPANs, we CANNOT submit the application.

The DNO approval process can take up to 60 days from receipt of application therefore we need to submit the DNO application at least 60 days before the first plot is due to be completed.

The DNO may issue a network study fee to allow connection. This cost will be passed directly to the developer for payment. Note that we cannot connect the PV arrays to the grid without payment of these charges.

In the event that we do need to connect the PV arrays to the grid prior to receiving approval, then we will 'Lock Off' the systems using a padlock. This padlock can be removed once the DNO have provided approval to connect. As soon as we have approval from the DNO to connect, we will provide a code which can be used to remove the padlock. Once you receive this code, remove the padlock and turn on the PV system using the isolator switch.

Note that the solar PV system has been fully installed, tested and commissioned by our professional engineers prior to being locked off.



**LEGAL NOTICE:** Please note that forced or unauthorised removal of the Solar PV padlock may lead to a DNO prosecution in court.

## Post Commissioning

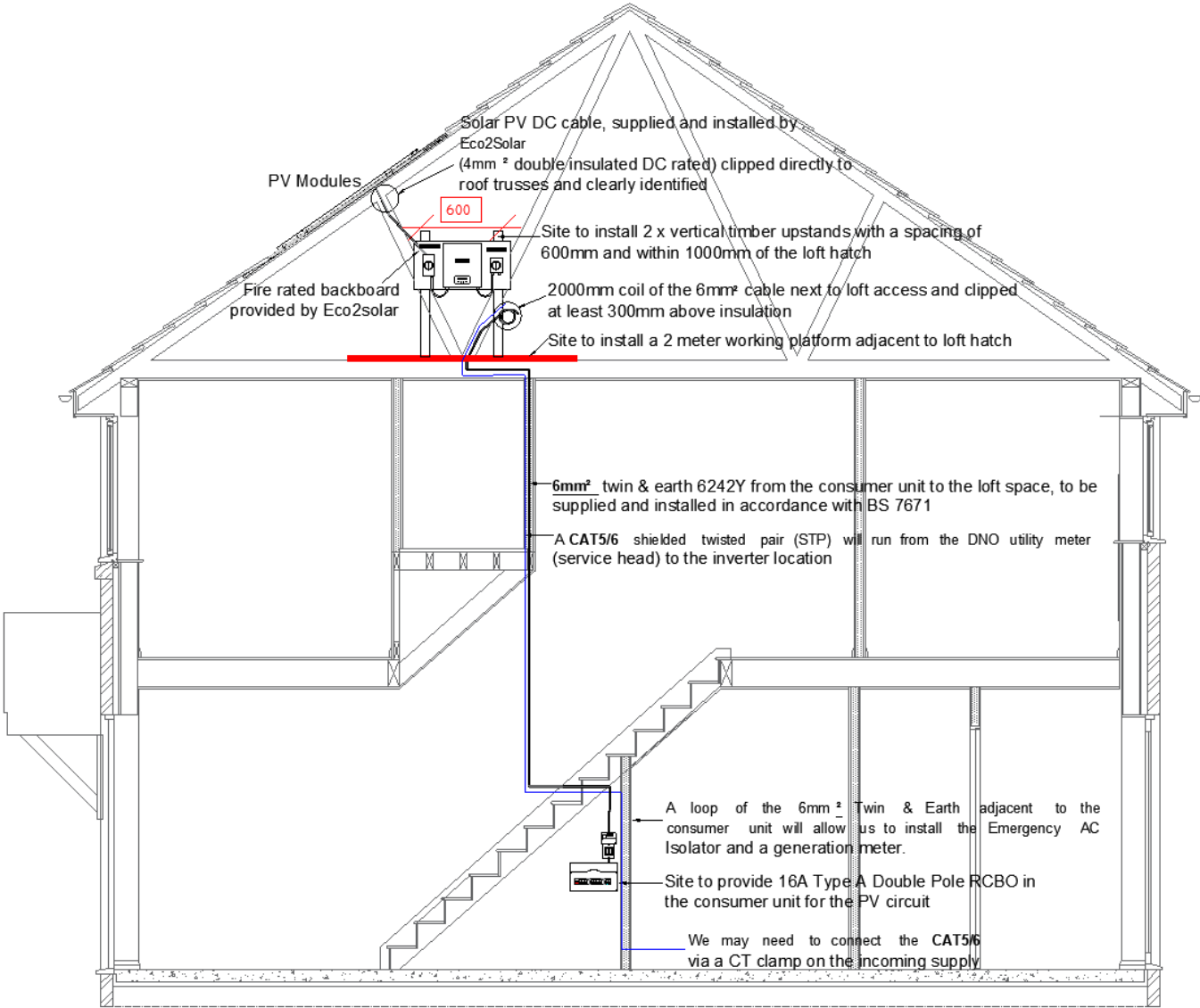
Once a plot has been commissioned, Eco2solar will supply the nominated contact at the developer with the following plot level information;

- MCS Certificate
- User Manual
- Installation Detail Sheet
- G98/G99 Commissioning Certificate

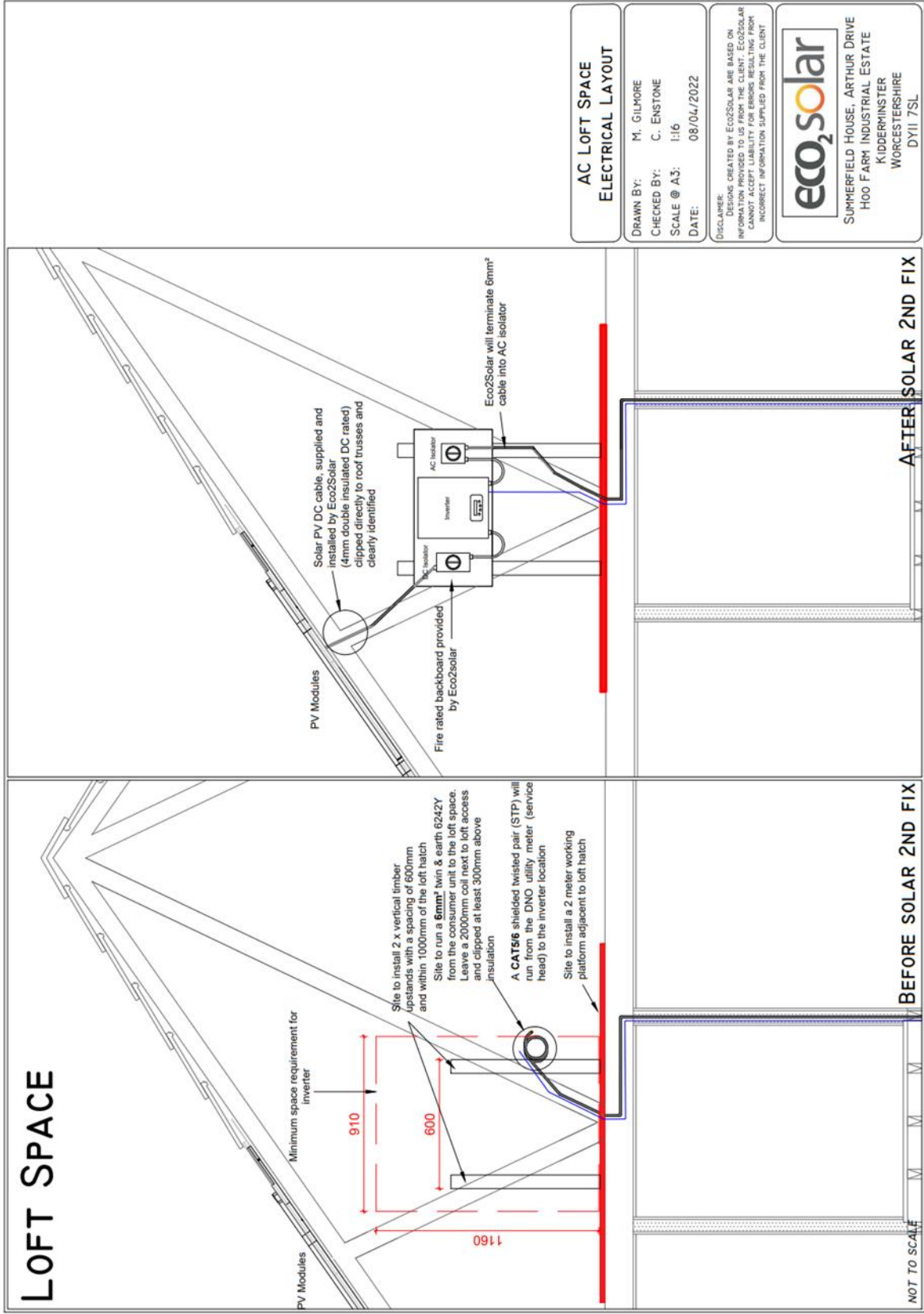
From the date of commissioning, Eco2solar has 10 days to generate the MCS Certificate. Any changes required to MCS Certificates AFTER the certificate has been generated will be subject to additional charges.

Eco2solar will notify the DNO of plot commissioning within 28 days from connection.

# Photovoltaic Electrical Layout – Generic







**AC LOFT SPACE  
ELECTRICAL LAYOUT**

DRAWN BY: M. GILMORE  
 CHECKED BY: C. ENSTONE  
 SCALE @ A3: 1:16  
 DATE: 08/04/2022

DISCLAIMER: DESIGNS CREATED BY ECO2SOLAR ARE BASED ON INFORMATION PROVIDED TO US FROM THE CLIENT. ECO2SOLAR CANNOT ACCEPT LIABILITY FOR ERRORS RESULTING FROM INCORRECT INFORMATION SUPPLIED FROM THE CLIENT

**eco<sub>2</sub>solar**  
 SUMMERFIELD HOUSE, ARTHUR DRIVE  
 HOO FARM INDUSTRIAL ESTATE  
 KIDDERMINSTER  
 WORCESTERSHIRE  
 DY11 7SL

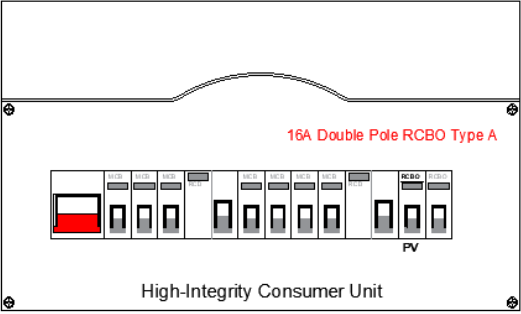
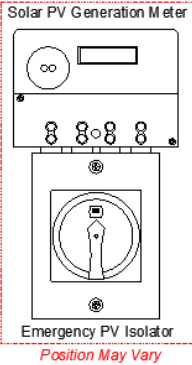
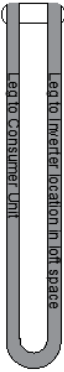
**AFTER SOLAR 2ND FIX**

**BEFORE SOLAR 2ND FIX**

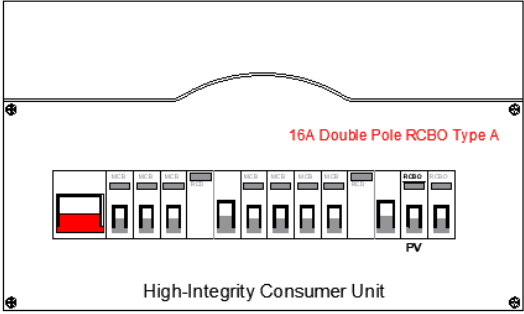
NOT TO SCALE

# CONSUMER UNIT

- The site electrical contractor shall install a continuous 6mm<sup>2</sup> twin & earth 6242Y from the consumer unit via a (local) loop and then to the loft space near the access hatch.
- The supply cable shall be selected and installed so as to comply with the latest requirements of BS 7671
- At the consumer unit location, the local loop needs to project out 300mm so our electricians can install the AC Isolator and Generation Meter
- Please leave approximately 300mm of cable inside the consumer unit. Please do not terminate the cable, Eco2solar will do this during T&C of the system.
- Please provide a 16A Double Pole RCBO Type A for the PV circuit
- In the loft space, please leave 2000mm of cable clipped above the insulation.



BEFORE SOLAR 2ND FIX



AFTER SOLAR 2ND FIX

## Eco2solar Inclusion & Exclusion Table

Inclusions/Exclusions	Supplied and Installed By	
	eco <sub>2</sub> solar	Others
MCS approved PV Panels	✓	
MCS approved fixing system for System Quoted	✓	
Single Core DC Cable	✓	
DC Isolators	✓	
Grid approved inverters	✓	
Generation Meter	✓	
AC Isolators x 2	✓	
DC works fully installed by Eco2Solar *	✓	
Commissioned by Eco2Solar	✓	
Full working drawings	✓	
DNO Application	✓	
User Manuals/Handover packs	✓	
Export limitation devices or cable (if required) at additional cost	✓	
6mm <sup>2</sup> AC supply cable installed from Consumer Unit (CU) /Distribution Board (DB) to inverter location		✓
* Supply & Install of DC extension cables in SWA where required		✓
CAT5/6 STP cable installed from DNO Utility meter to inverter location		✓
Type A Double Pole RCD/RCBO (see specification & schematic for Curve and Current rating)		✓
1.2m x 2m landing deck/platform next to the loft hatch		✓
Site to provide 2 x vertical timber upstands next to loft hatch 600mm apart to allow us to brace inverters to		✓
SWA or DC cable containment within the building (inverter location dependent)		✓
Connection charges or network study costs from DNO		✓
Heat/Smoke Detectors		✓
Production of BS7671 certificate for AC cable installed by others		✓
Lightning protection and surge protection for the PV system		✓
Sacrificial layer/membrane (if needed) on flat roof		✓
Cable entry provided by roofing contractors		✓
Installation of import/export meter or GSM meter		✓
Structural assessment / calculations to confirm roof can support the loads from the PV system		✓
Application for planning and building control approval		✓
Choice of electricity supplier, informing electricity supplier of installation or negotiation of SEG		✓
Safe working environment (scaffolding/edge protection)		✓
Site access/lifting equipment/banksman/slinger/signaller		✓
Off-loading facilities		✓
Site welfare & Parking		✓

# Typical Consumer Unit, AC Isolator & Generation Meter Layouts



Local loop left for isolator and meter

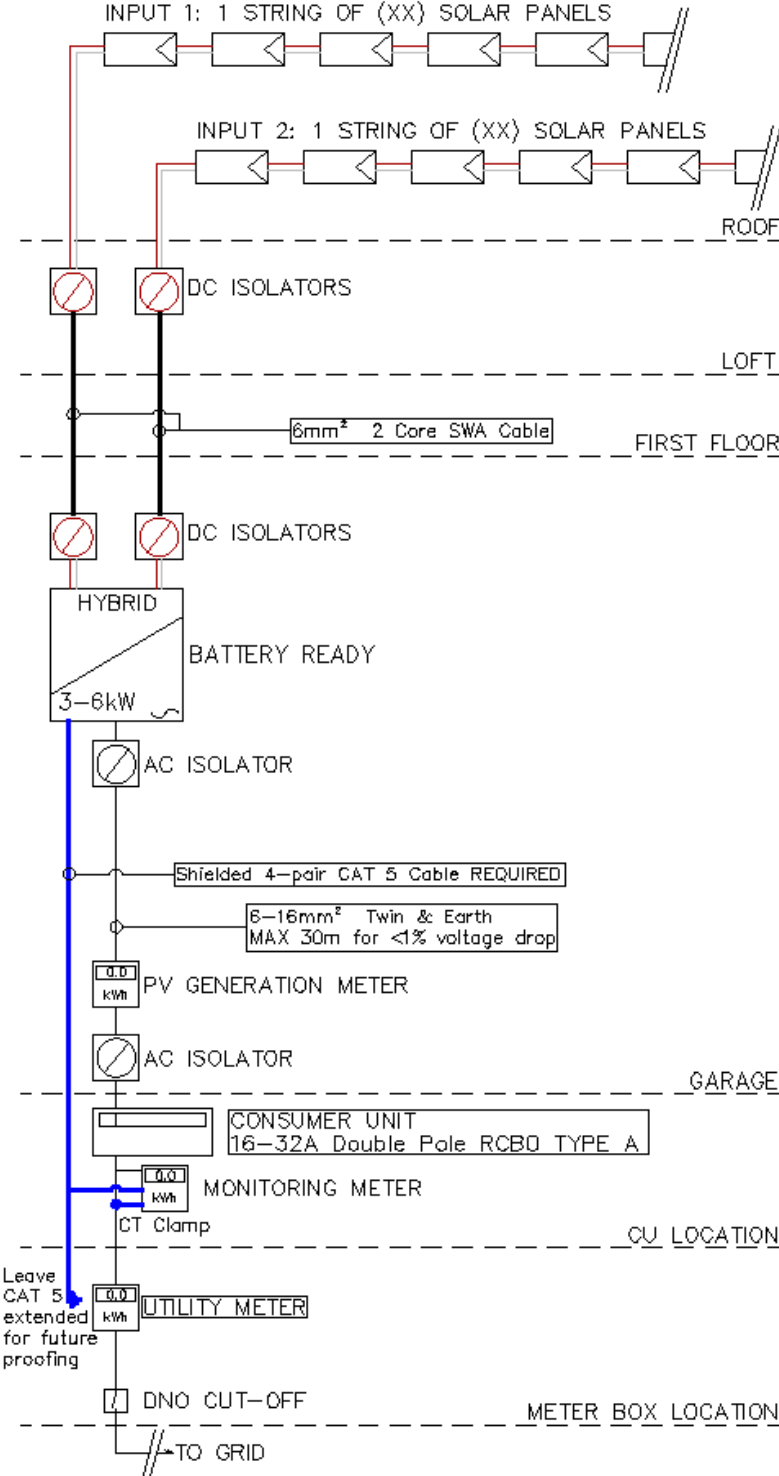


## Battery Systems and Hybrid Inverters

New Installation of Hybrid Inverters and batteries. Please note that some brands of hybrid inverters and batteries may require a different electrical configuration.

Item	Supplied and Installed By	
	Eco2Solar	Others
Hybrid Inverter	✓	
Battery (if applicable)	✓	
EM115 bidirectional meter	✓	
Monitoring/ Internet dongle	✓	
DC double pole 100A MCB (may be integral to battery)	✓	
6mm <sup>2</sup> Twin & Earth 6242Y supply from consumer unit to inverter location		✓
CAT5/6 STP cable installed from external meter box, via CU to inverter location		✓
High integrity Consumer unit to allow for an Double Pole RCBO or a dedicated RCD for the PV system		✓
Hybrid 3.0kW/3.6kW/ C20A 30mA Double Pole RCBO (Type A) Hybrid 5.0kW/6.0kW C32A 30mA Double Pole RCBO (Type A) Note: Hybrid inverters must have their own RCD protection, not shared with any other circuits.		✓
Suitable wall/ surface to mount the inverter capable of holding 35kg, with 400mm ventilation clearance on all sides.		✓
Battery units must be within 1m of the inverter and will require a firm base to stand on due to their weight (minimum load bearing required 150kg)		✓

**Solar PV Schematic for Battery-ready systems**



**GENERIC  
BATTERY READY SCHEMATIC  
DESIGN**

Items to be supplied and fitted by  
Eco2Solar

Items to be supplied and fitted by  
Others