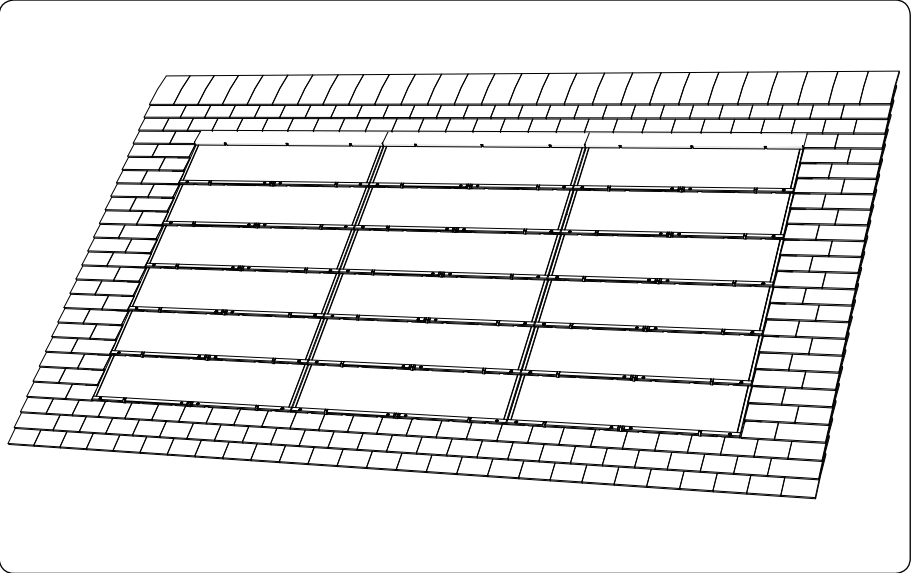


## C21e Plain Tile



For new builds and re-roofing with C21 solar electric plain tile type M50-S39

*On completion, please return the outer front and back page to the commissioning electrician  
(including the installation details and string check results)*

## Installation details

Please complete the information below.

Once the installation has been completed, this guide should be passed to the electrician who will be responsible for commissioning the system.

Installation address:

--

String voltage checks taken at:

Date	/		/		Time	:	
------	---	--	---	--	------	---	--

Checks taken by:

Company name	
Last name	
First name	
Contact number	

Notes:

- Within this guide the illustrations show an 18 unit C21e system, alongside plain roof tiles. Layouts for other system sizes are provided in the appendices.
- The C21 solar electric plain tile will be referred to as a C21e or a C21e unit throughout.

## Contents page

1.0 Health and safety	1	6.0 C21e cable connections	31
1.1 General guidance	1	7.0 Complete the C21e array	33
1.2 Electrical hazards	1	8.0 Disclaimer of liability	35
1.3 Preparation for C21e installation	2	9.0 Warranty	36
2.0 Components	3	Appendices	39
2.1 Equipment required	3	Appendix 1: C21e plain tile schematic -typical layout & fixing detail	39
2.2 The C21e plain tile carton	3	Appendix 2: String layouts	42
2.3 The roof accessories box	4	Appendix 3: Component list and roof dimensions	43
3.0 Pre-installation checks	5	Appendix 4: Adjusting the laid angle	45
4.0 Roof preparation	6	Appendix 5: String checker user guide	46
4.1 General recommendations	6		
4.2 Mark the area for the C21e system	7		
4.3 Position the field cables	9		
4.4 Lay the eaves tiles	9		
4.5 Position the C21e battens	10		
4.6 Lay the right hand section	11		
5.0 The C21e plain tiles	16		
5.1 Fit the first C21e plain tile	16		
5.2 Complete the first C21e column	20		
5.3 Check the C21e cable connections	22		
5.4 Fix the top interface	23		
5.5 Lay a middle C21e column	24		
5.6 Lay the left hand tiles	27		
5.7 Lay the final C21e column	30		

## 1.0 Health and safety

### 1.1 General guidance

- Construction (Design and Management) Regulations 2007 (CDM)\* and general construction site training must be followed.
- Safe working at heights training should be adhered to.
- Anyone handling photovoltaic (PV) modules should be trained in the correct manual handling practice.
- All appropriate health and safety regulations should be followed correctly.
- Avoid installing the system in poor weather conditions, including strong wind, rain, ice or snow.
- The tile courses should be laid according to British Standard 5534: 2003\* 'Code of practice for slating and tiling (including shingles)' unless instructed otherwise.
- Install all components as specified within this guide to ensure a weather tight finish and a valid warranty.
- No artificial concentrated sunlight should be directed on the C21e tile.

### 1.2 Electrical hazards

You must be aware of the following:



WARNING: PV modules produce a DC voltage whenever exposed to light. This voltage cannot be switched off.



WARNING: Care must be taken not to cut or damage cable insulation or expose bare wire.

- Each C21e tile is factory fitted with a single bypass diode. Please see the product datasheet for specifications. No additional bypass diodes are necessary. Removal or replacement of any diode without written authority of Solarcentury will invalidate the Solarcentury Product Warranty.
- PV modules are pre-wired with touch-proof connectors to prevent an electrical shock during general handling.
- PV modules do not present a risk as long as appropriate safety practices are followed at all times during installation.

## 1. Health and safety

- All work must be carried out with the C21e system disconnected from the mains electrical supply.
- C21e tiles are bonded within a polymer frame and are electrically isolated from the roof structure, so do not need earth grounding.
- Under normal conditions, the C21e tiles (and other photovoltaic modules) are likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of  $I_{sc}$  and  $V_{oc}$  identified on the product datasheet should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output.

## 1.3 Preparation for C21e installation

Follow the guidance below to ensure the C21e tiles are installed and handled correctly:

- Use this installation guide alongside your system design guide and roof schematic (see appendix 1) to determine the location and layout of the C21e system on the roof.
- Use this installation guide alongside the string diagram (see appendix 2) to understand the cabling and connections on the roof.
- Ensure all cable connectors are dry and free of dirt before making connections.
- Ensure no cable ends are left exposed to the weather during work breaks or after completion of works. Keep the C21e tiles in a weatherproof environment before installation.
- Carry the C21e tiles with both hands by the frame, and avoid scratching the glass.
- Only load as many C21e tiles onto the roof as you expect to install during the session.
- Secure or remove any uninstalled units before leaving the roof to avoid possible wind damage.
- Do NOT walk on the glass surface of the C21e tiles. While robust, extreme point pressure may cause the toughened glass laminate to shatter.
- Do not leave tools or unsecured materials above the C21e installation area, to avoid potential damage to the units.

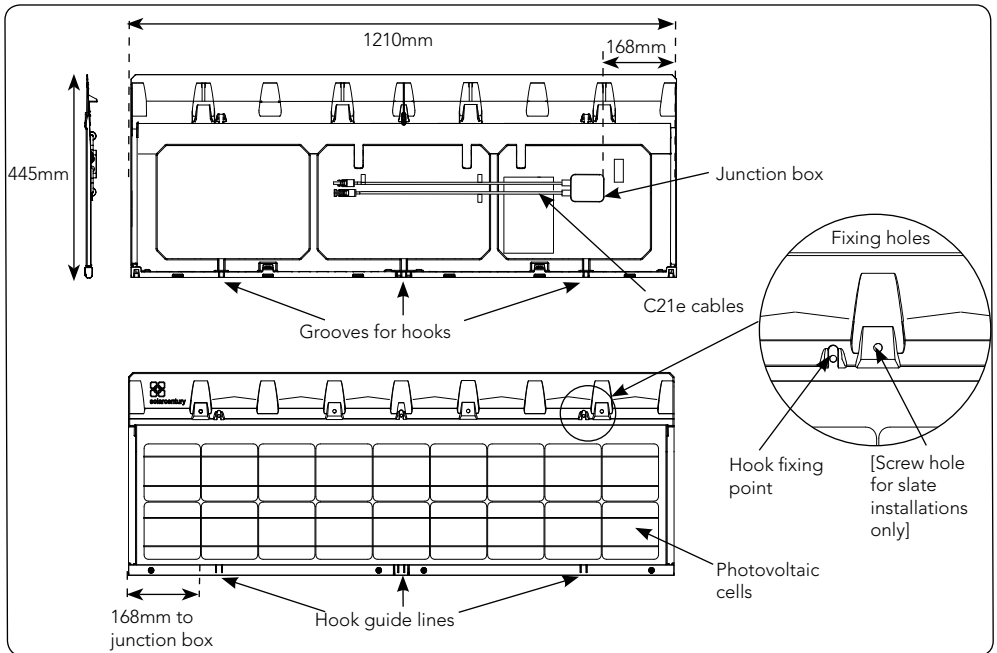
## 2.0 Components

### 2.1 Equipment required

- Standard roofing tool kit, including:
  - 38x25mm battens
  - Screws for the battens
- C21e tools:
  - Electric screwdriver (with Torx T20 drive supplied with this guide).
  - String checker including specialist touch proof test leads to check cable connections (available to order from Solarcentury).
  - Snips to trim the channel interface

### 2.2 The C21e plain tile carton

Each C21e carton contains six C21e units. The C21e plain tile has the following features:



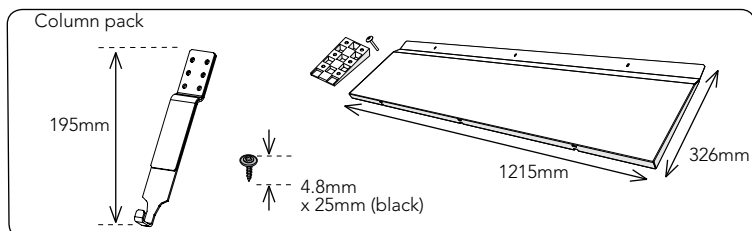
Please note: for visual simplicity, the photovoltaic cells have been removed on subsequent diagrams in this guide.

# Roof Installation Guide & Warranty

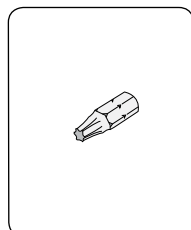
## 2. Components

### 2.3 The roof accessories box

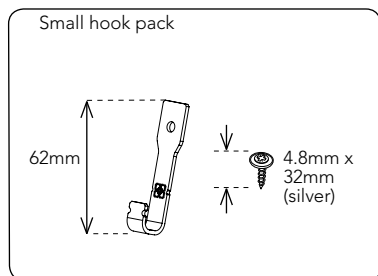
When a complete system is ordered, it will include a roof accessories box containing the following components required for installing the C21e array:



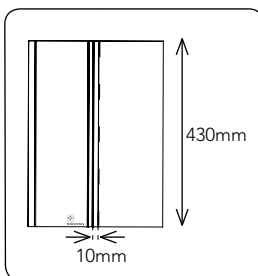
x3 starter hooks per C21e column and stainless steel screw with washer (Torx T20 drive)  
x1 top interface per C21e column (and wedges with screws to adjust angle, if required)



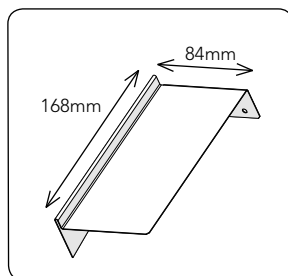
Torx T20 drive  
(included in installation guide)



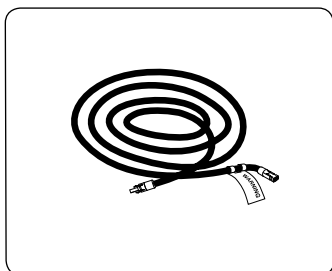
x3 small hooks per C21e unit and stainless steel screw with washer (Torx T20 drive)



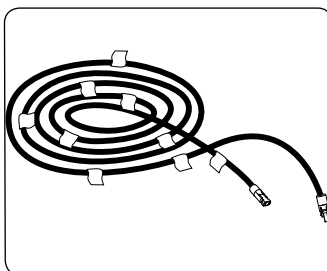
Flexible C21e soak tray  
Quantity specified at time of order



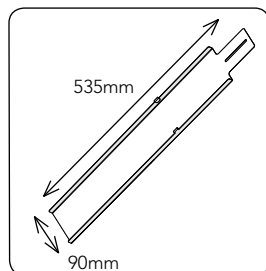
Channel interface  
x1 per tile/C21e interface



Return cables  
Length is layout dependent,  
x1 cable per column



10m field cables  
x2 per string



Channel  
x1 per C21e/tile interface

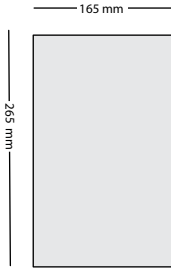
The quantities of components vary by system size and layout (see appendix 3 for details).

### 3.0 Pre-installation checks

Before you go on to the roof, check that:

- Your plain tiles are compatible with the C21e units.

Typical plain tile dimensions:



C21e plain tile is compatible with conventional clay and concrete single and double camber plain tiles from a range of manufacturers including;

- Cemex
- Dreadnought
- Imerys
- Keymer
- Koramic
- Marley (Eternit)
- Redland (Monier)
- Sandtoft

For the full compatibility list see [solarcentury.com/uk/c21e](http://solarcentury.com/uk/c21e)

- Your accessories box contains the correct number of parts needed for your system size (see appendix 3).
- The C21e units, particularly the glass surfaces, are undamaged.
- You have all the required tools including the string checker.
- All relevant site requirements have been checked and adhered to (including planning permission, building control or site rules).
- The C21e units will be situated on a roof pitch facing south (between south east and south west).
- The C21e units will be positioned in an unshaded location.
- You understand the roof schematic (see appendix 1).
- You understand the string layout (see appendix 2).
- You have read this guide in full.



## 4.0 Roof preparation

### 4.1 General recommendations

A standard roof build up is suitable for use with C21e plain tiles, no additional work is required to meet current UK building regulations, however we make the following recommendations when preparing the roof:

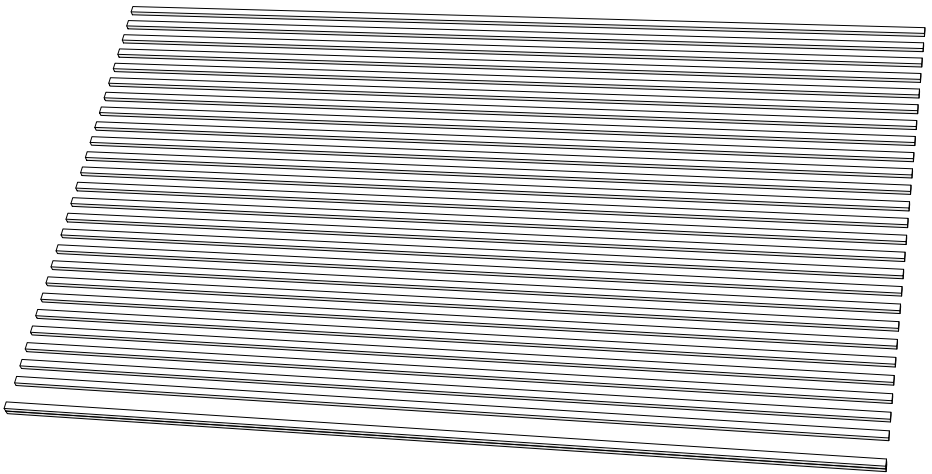


Diagram 1 (shown without rafters, for clarity)

- Use a breathable roofing membrane, or similar.
- For the plain roof tiles, use 38x25mm battens nailed to the rafters. Space them according to the tile manufacturer's specification.



**WARNING:** Ensure your battens are not wider than 38mm or they may interfere with the back of the C21e unit.



**WARNING:** If the batten gauge is not exactly 100mm, the laid angle for the top interface may need adjusting, to avoid the tiles kicking up. See appendix 4 for details.



**WARNING:** For 'warm roofs', eaves to ridge ventilation (or equivalent) should be provided to ensure adequate air flow behind the C21e units.



**WARNING:** Make sure there are no upstanding nails that could damage the cables or C21e glass.

## 4. Roof Preparation

### 4.2 Mark the area for the C21e system

To make sure the C21e system is installed in the correct position on the roof, mark out the area before you begin.

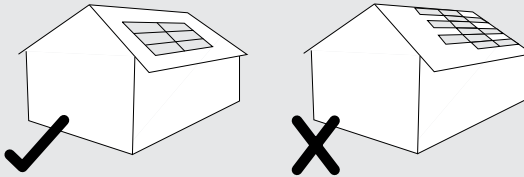
- Refer to the appendices and your architect's drawings to understand which layout to use and where the system should be located on the roof.

#### Design rules

The area that the C21e system will cover on the roof (diagram 3) has been calculated using the following design rules.

These rules exist to ensure a weathertight installation:

- Lay the C21e units and the top interface straight bond.
- Allow a minimum of 2.5 tile widths from the C21e area to the verges, or equivalent obstruction (one tile plus one tile and a half).
- Allow at least three courses of tiles below the C21e area and at least three above.
- Locate the C21e system central on the roof and not close to any vents.



See appendix 3 for further details of the space needed for different C21e system sizes.

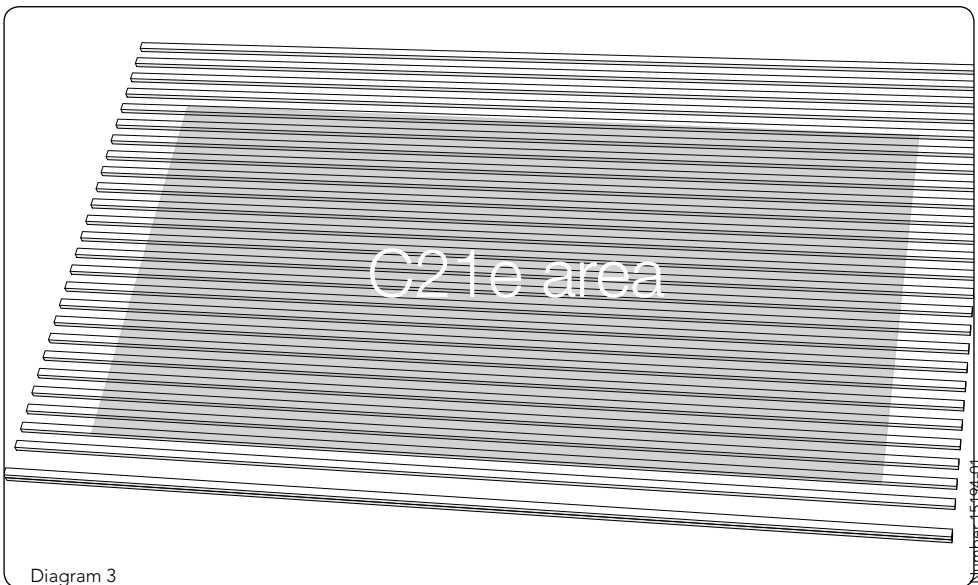
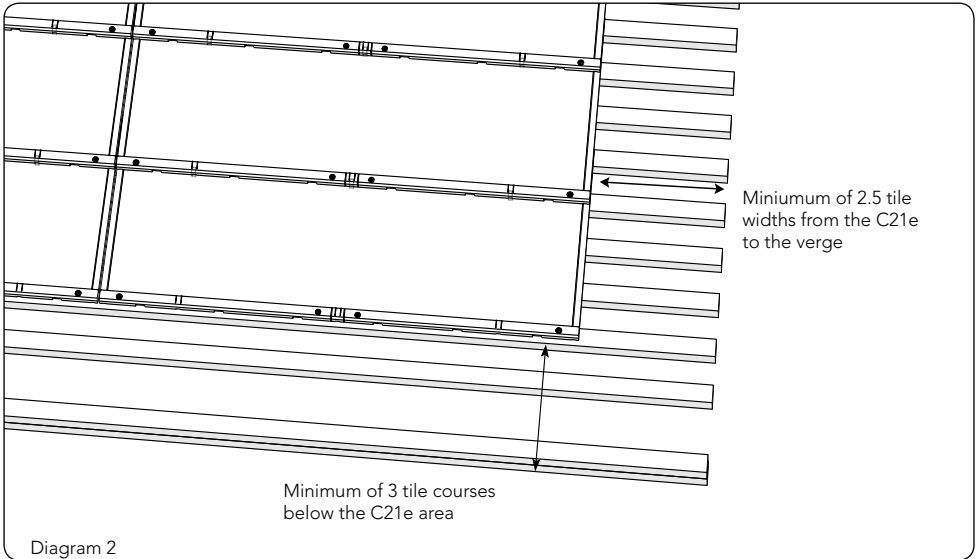
Consult the site manager or system designer if the drawings do not conform to the above design rules.

# Roof Installation Guide & Warranty

## 4. Roof preparation

The example C21e system in this guide uses 6 rows and 3 columns.

- Mark the layout and location of the C21e system on to the roof.



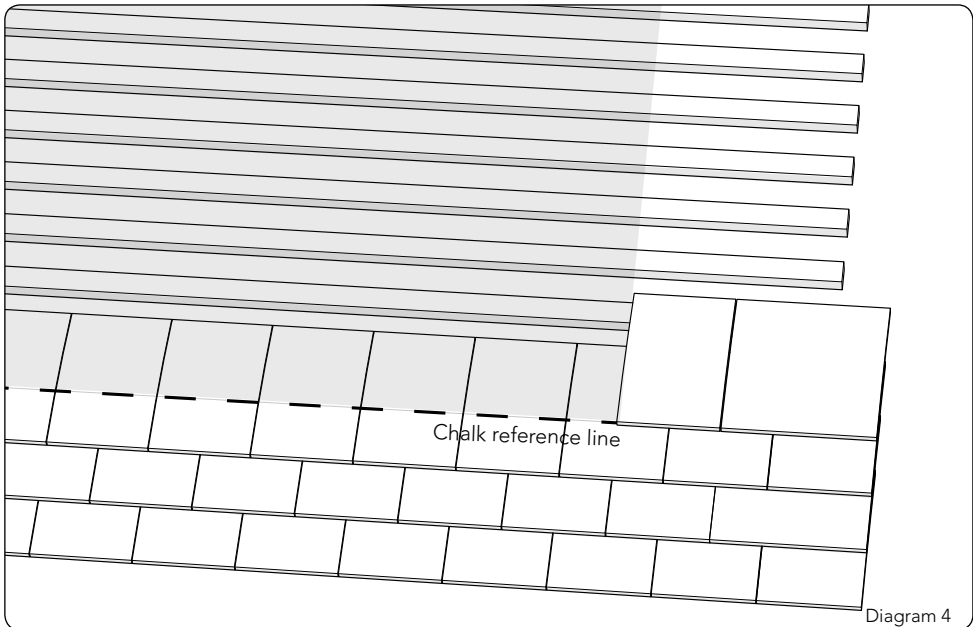
## 4. Roof preparation

### 4.3 Position the field cables

Before starting on the installation, think about how the cables are connected and where they can enter the roof space. The string diagram shows an overview of cable positions and connections (appendix 2).

- At the top of the C21e column, locate a position for the field cables to enter the roof (a lap in the membrane). You will need this later in the installation.

### 4.4 Lay the eaves tiles



- Tile from the eaves up to the area marked for the C21e system. Lay a minimum of 3 courses.
- Tile the first course on the right of the C21e area to the verge, using a whole tile or a tile and a half.
- Chalk from the tail of this course across the width of the C21e area. The bottom edge of the C21e units will line up with this reference line.

### 4.5 Position the C21e battens

Extra battens are needed for each C21e row - a supporting batten and a C21e batten. Refer to the roof schematic for an overview (see appendix 1).

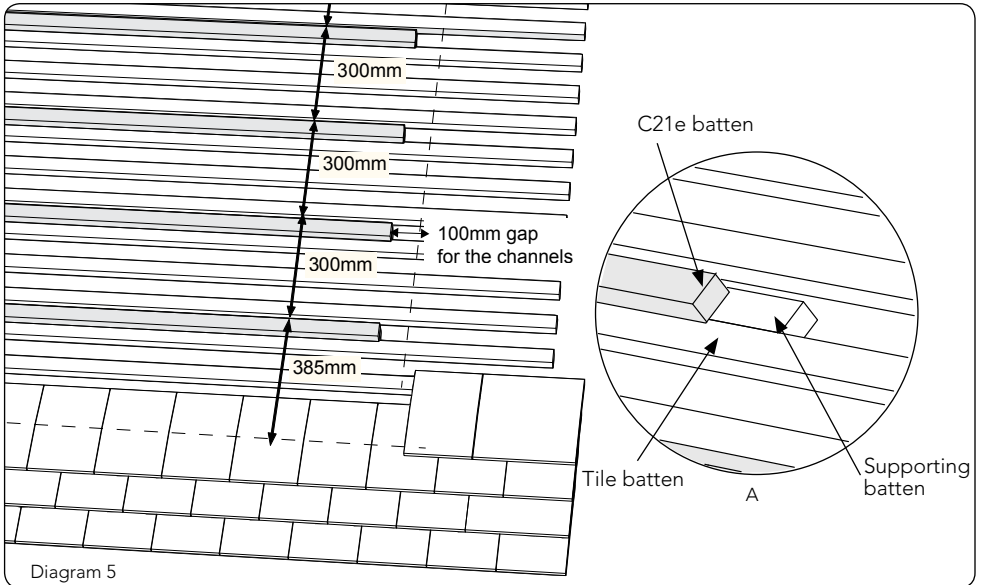


Diagram 5

- Chalk a line 100mm in from the edge of the C21e area for the channels to sit in (installed in the next step).
- Measure 385mm up the roof from the reference line. Screw a 38mm support batten alongside the existing tile batten. This will support the C21e batten.



**WARNING:** Supporting battens should start and finish on a rafter.

- Start again at the reference line, measure exactly 385mm up the roof and screw a 38mm batten (shaded in inset 5a) on top of the support batten. This is for the first C21e course.



**WARNING:** C21e battens should not extend over the 100mm channel gap.

- From the first C21e batten, measure up 300mm and add a support batten alongside the tile batten then screw a C21e batten on top. Repeat this to the top of the C21e area.

## 4. Roof preparation

### 4.6 Lay the right hand section

Tiles need to be fitted up the right hand side of the C21e area.

On each course between the tiles and the C21e system, a channel and channel interface need to be installed as described below. A soak tray is required in the corner.



- Trim the soak tray so it doesn't interfere with the C21e batten or tiles (the trim line is shown above). Push it behind the tile so the bottom edges align, and the top rests on a batten.



**WARNING:** The centre ridge of the soak tray should be on the right hand side and the Solarcentury logo on the bottom left.

# Roof Installation Guide & Warranty

## 4. Roof preparation

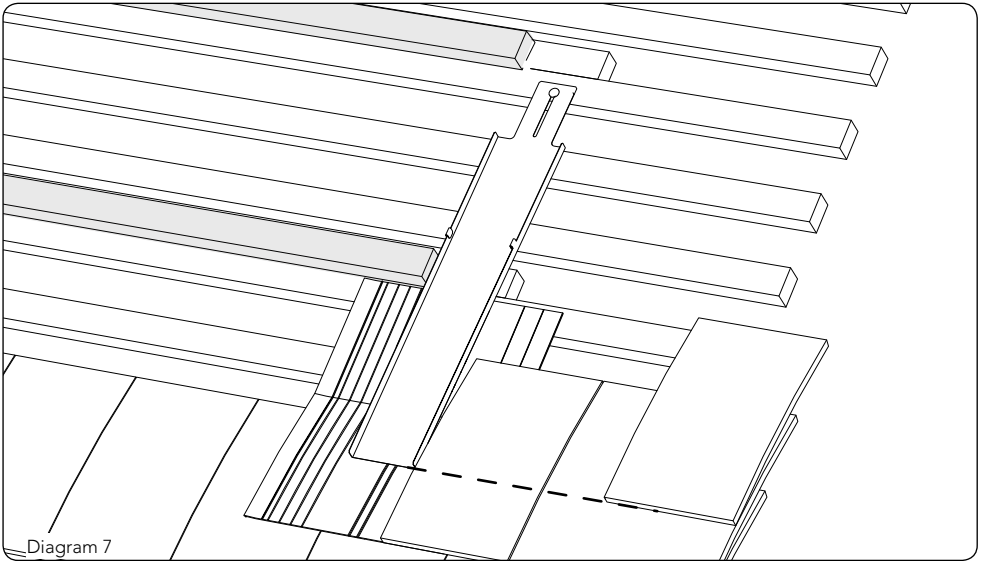


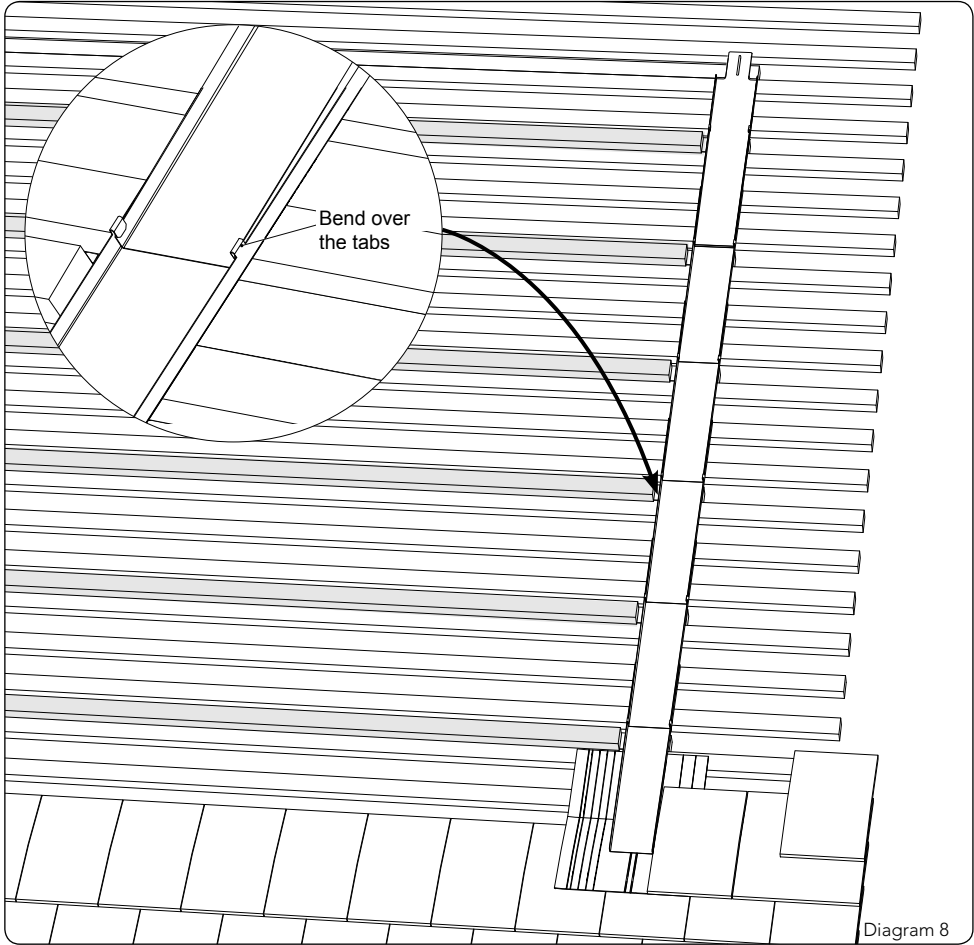
Diagram 7

- Install a tile on the next course.
- Place a channel in the space between the C21e batten (shaded above) and the tiles on the first course. Align the lower edge of the channel with the lower edge of the second tile course.
- Nail the top of the channel to a batten.



**WARNING:** The channel will not be visible when the C21e units have been laid.

#### 4. Roof preparation



- Add channels in the gap as shown at 150mm headlap; slide each into the next, nail them to the batten and use the tabs to secure them in place.



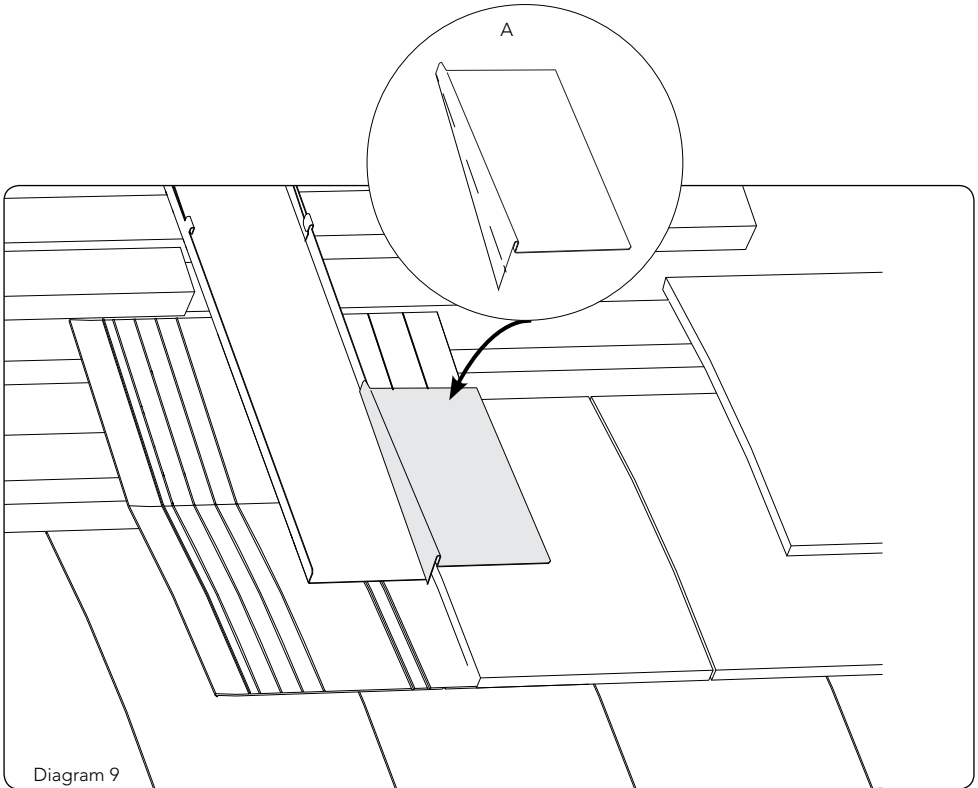
TIP: The tabs are set at 150mm as a guide.



WARNING: There should be one channel per C21e unit / C21e batten (shaded above).



## 4. Roof preparation



- Install a channel interface (shaded above) over the tile on the first course with the lip over the channel.



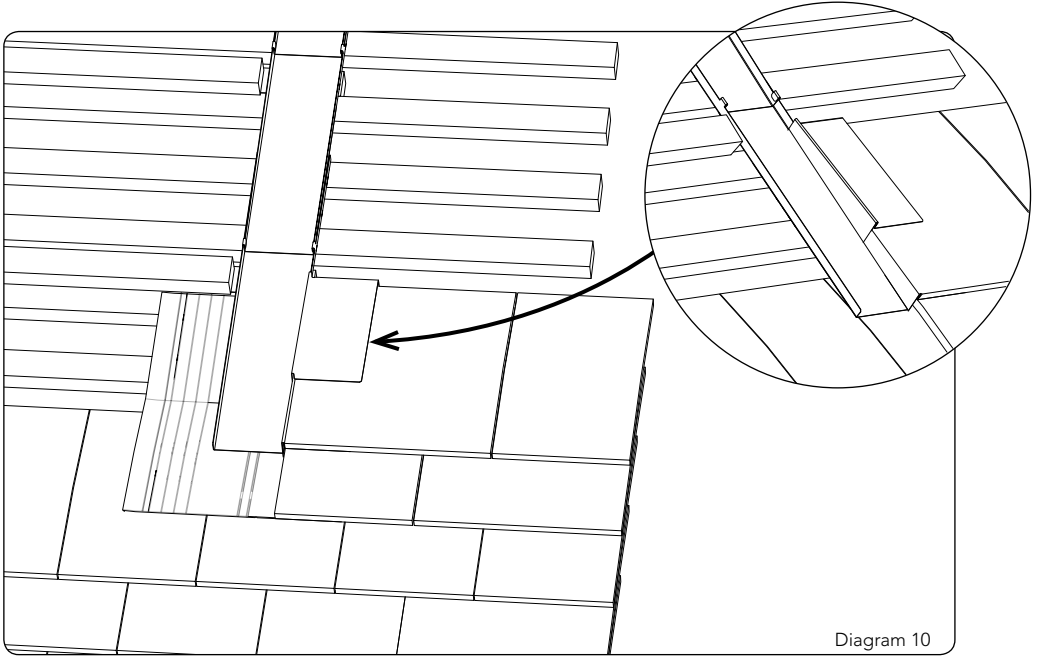
TIP: The first channel interface will kick up due to the shallower laid angle, so you will need to trim its diagonal edge to fit as shown in inset A.

- Complete the tiling on this course, from the verge to the channel, covering the channel interface.

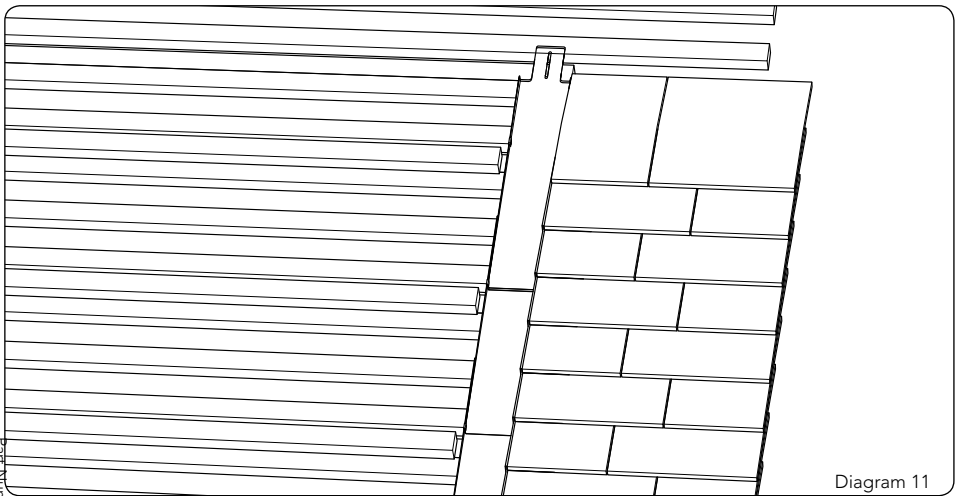


WARNING: The channel interface should not be visible when the tiles have been laid.

#### 4. Roof preparation



- Tile the next course and add a channel interface.



- Complete the tiling up the verge, adding a channel interface on each tile row, to the top of the channel.

## 5.0 The C21e plain tiles

### 5.1 Fit the first C21e plain tile

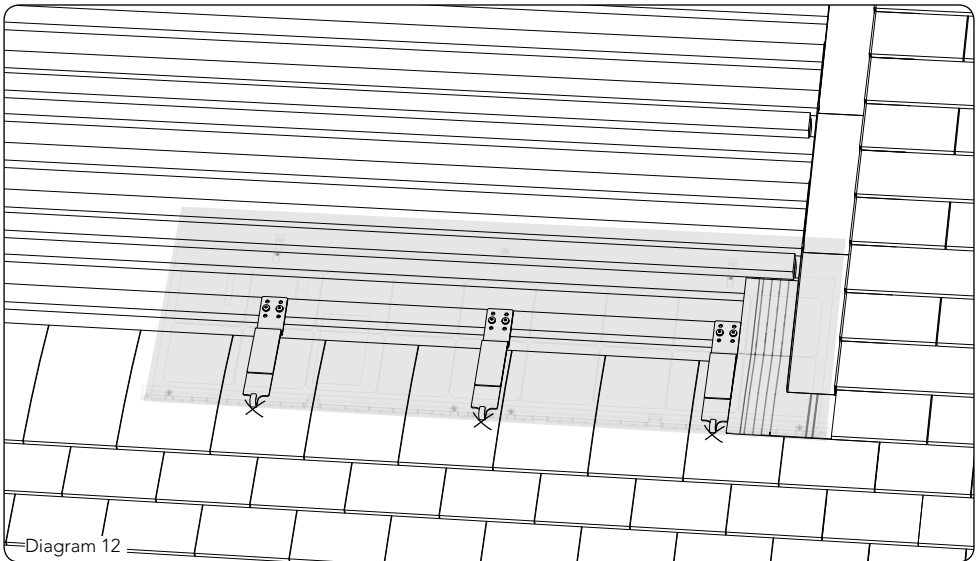
It is advised that the C21e tiles are laid column by column so you can connect and test the cables as you go.

- Temporarily position the top interface (see step 5.4 or your schematic) and aim to install the C21e column centrally to this.



TIP: Do this for each C21e column to ensure the columns are evenly spaced across the system and you are not left with a wide gap at one side.

Three large starter hooks are used to secure the front of each C21e on the bottom course. To position the hooks correctly, follow the method below.



- Temporarily place a C21e in position (shaded above) on the first C21e batten.
- There are three guide lines on the front of the C21e frame (shown in step 2.2), that indicate where the starter hooks clip in. Mark these on the tiles (X above).
- Remove the C21e and align 3 starter hooks to the marks on this tiles as above, and screw them into the closest batten. Use 2 screws per hook.



TIP: Use any 2 of the 6 screw holes to ensure the hook is fixed at the centre of the batten.

## 5. The C21e Plain Tiles

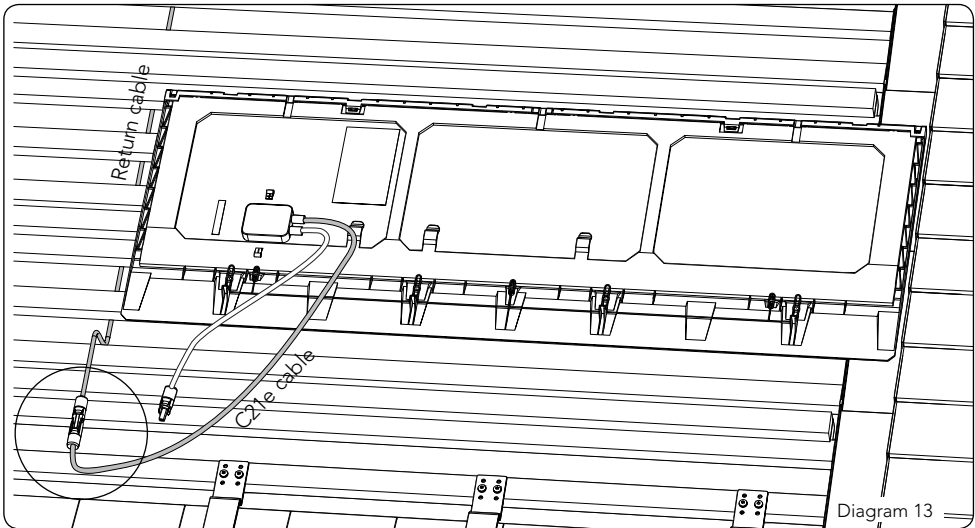


**WARNING:** Only use the hooks, screws and washers supplied. These form part of the system designed to provide a weather-tight seal and are correctly sized for the C21e units. Using any others will invalidate the warranty. Use the correct quantity every time.



**WARNING:** Ensure that there are no exposed nails or screws that could damage the glass on the C21e.

- Pass the length of a return cable (labelled below) from the bottom of the column, under the battens to the top.
- ✓ **TIP:** The longer field cables (that enter the roof space) look similar to the return cables, but the return cables have a red tag, and the field cables are marked with one of the following symbols: ★ ● ■ ▲



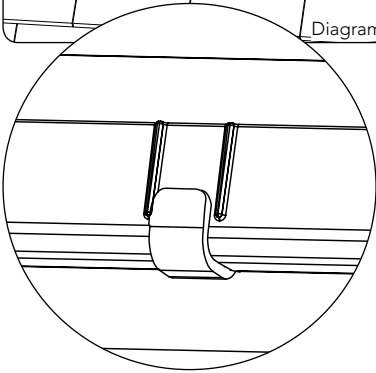
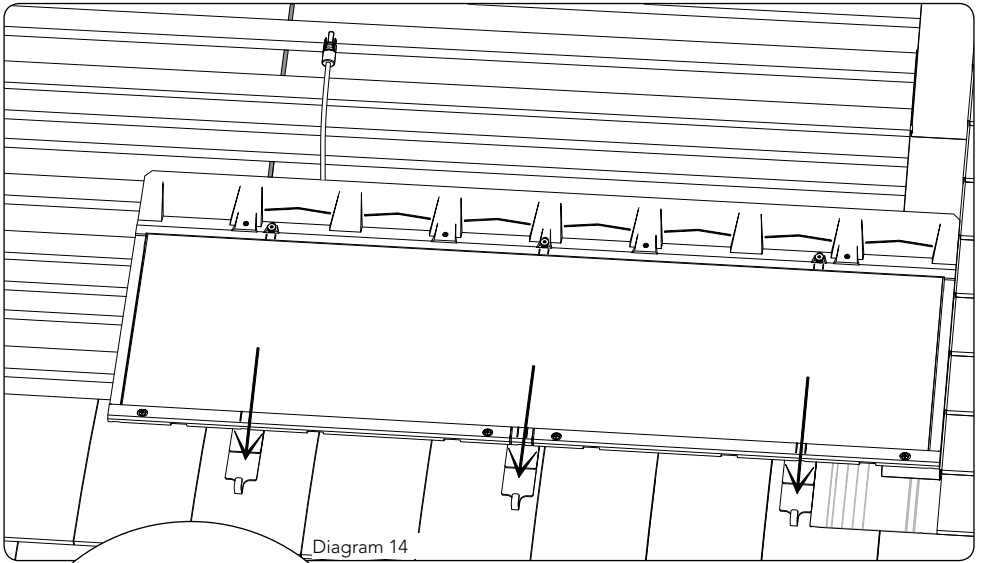
- Rest the first C21e face down on the roof, and firmly connect the black C21e cable to the end of the return cable.
- Pass the remaining red C21e cable under the batten up the roof.



**WARNING:** Make sure there is no gap between any connectors or the system may fail. Push the connectors together until they click.

# Roof Installation Guide & Warranty

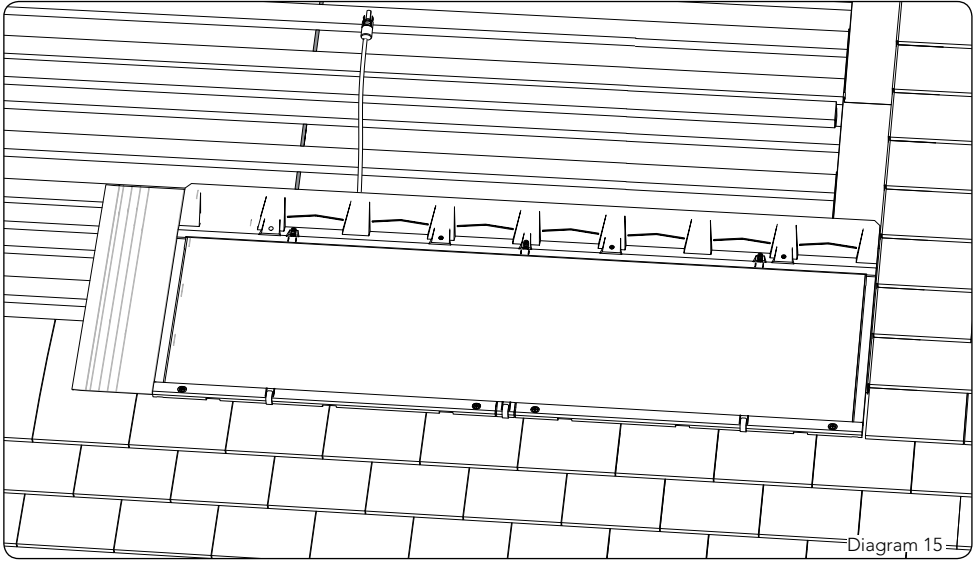
## 5. The C21e Plain Tiles



- Turn the C21e so the nib is resting on the batten, and clip the grooves in the front of the frame into the 3 large starter hooks.

The C21e should cover the gutter and sit against the tiles on the right.

## 5. The C21e plain tiles



- Fit a soak tray half way under the left edge of the C21e unit, resting on the C21e batten. The raised centre line on the soak tray should sit under the C21e.

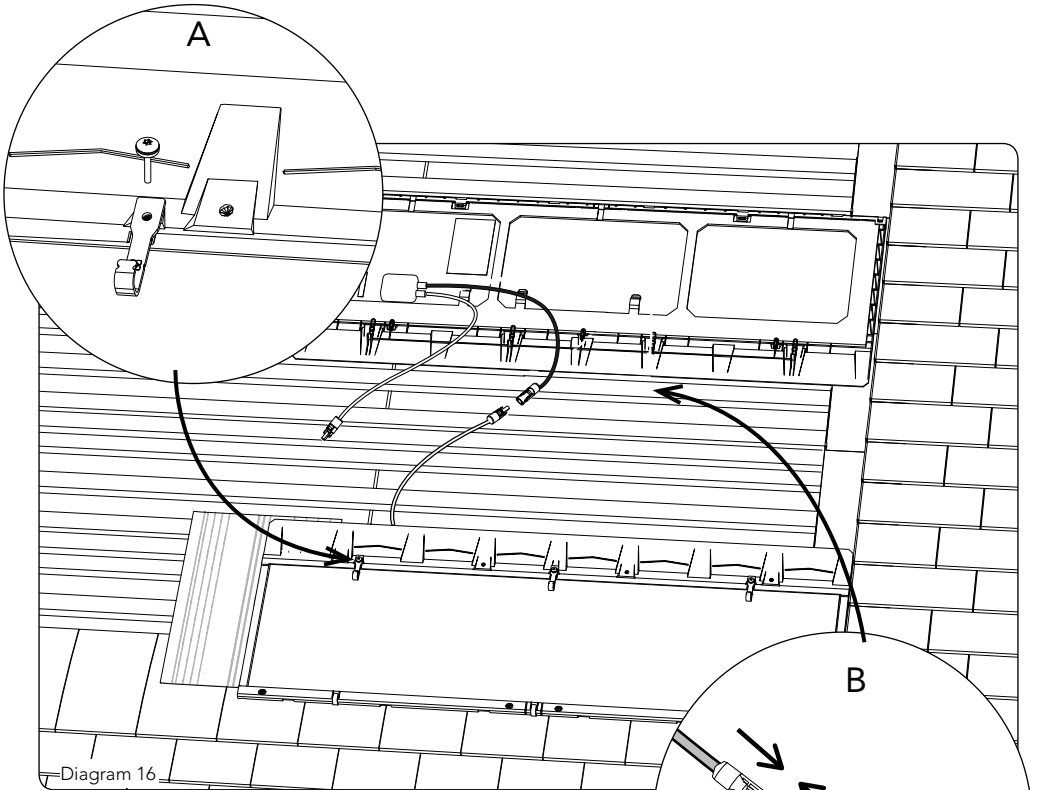


**WARNING:** Ensure that there is no risk of the cables being trapped or pierced when the C21e unit is fixed.



**WARNING:** The return cables and C21e cables should lie close to each other throughout the installation to prevent electrical interference.

### 5.2 Complete the first C21e column



- Fix 3 small C21e hooks into the hook fixing points on the C21e and into the batten. Ensure you use the correct holes (inset A).
- Rest the next C21e face down and firmly connect its black cable to the red cable from the C21e on the course below (inset B).
- As before, pass the red cable from this C21e under the batten above.

## 5. The C21e plain tiles

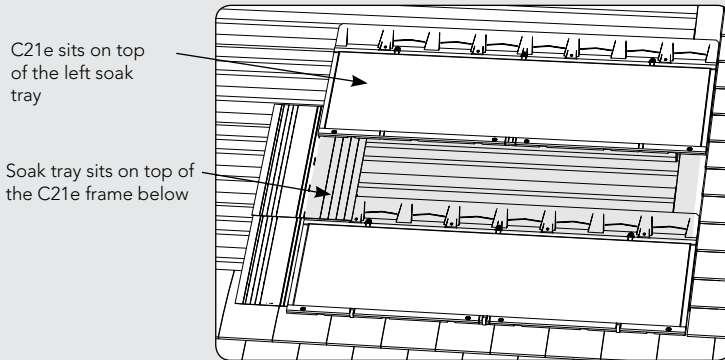
- Turn the C21e so the nib is resting on the C21e batten. Clip the grooves in the front of the frame into the 3 small C21e hooks.
- Place another soak tray half way under the left side of this C21e. It should sit over the frame of the C21e on the course below (see NOTE below).



**NOTE:** Middle soak trays between two C21e units should always sit on the C21e battens, and be aligned with the bottom of the C21e frame.

The raised centre line of the middle soak trays should sit beneath the C21e next to it.

The soak tray should be **over** the frame of the C21e on the course below. This will manage the flow of any water.





## 5. The C21e plain tiles

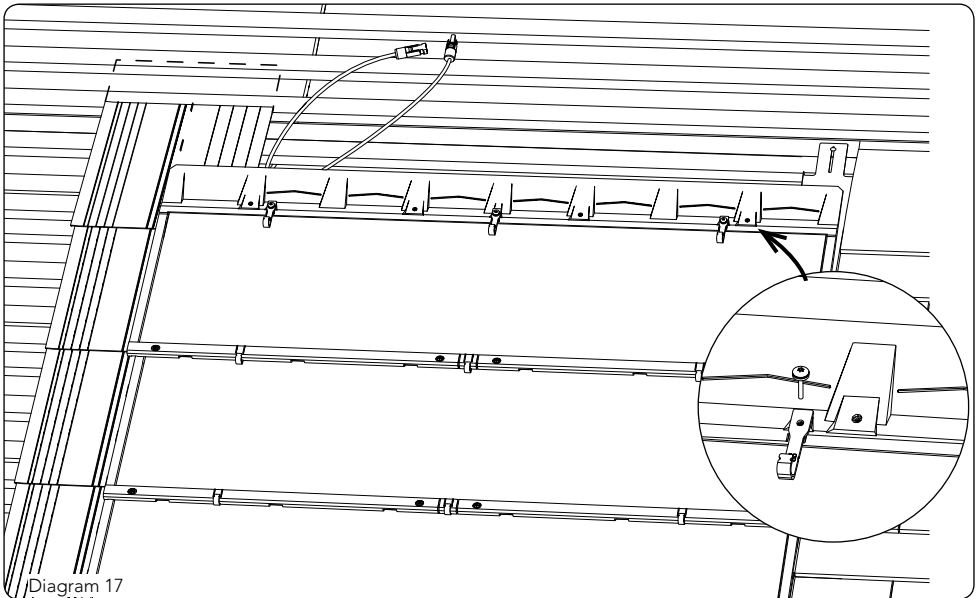


Diagram 17

- Screw in three small C21e hooks to secure this C21e, ready for the next.
- Complete the column by repeating this process. Remember to use the small C21e hooks, connect the cables and insert a left soak tray as you go.
- At the top C21e, add an extra soak tray under the left corner, over the soak tray on the course below. Trim the soak tray so it doesn't interfere with the tiles.

### 5.3 Check the C21e cable connections

- At the top of each column you should be left with the end of the black return cable and the end of the red cable from the last C21e unit. Ensure they are left in an accessible position. They will be connected later in the installation.

Solarcentury recommends that a string check is carried out for **each column** to check the cables are connected correctly.

- To carry out a string check follow the instructions in appendix 5 using the string checker.

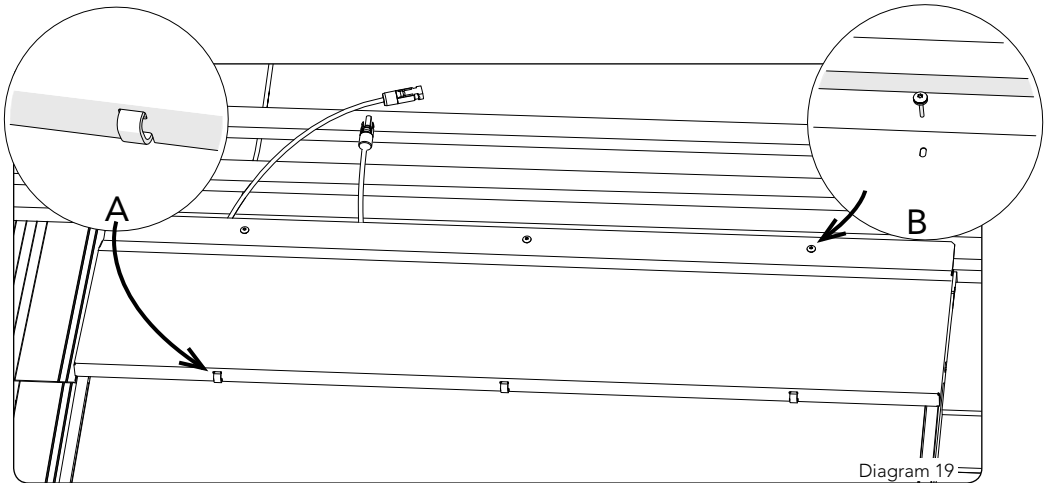
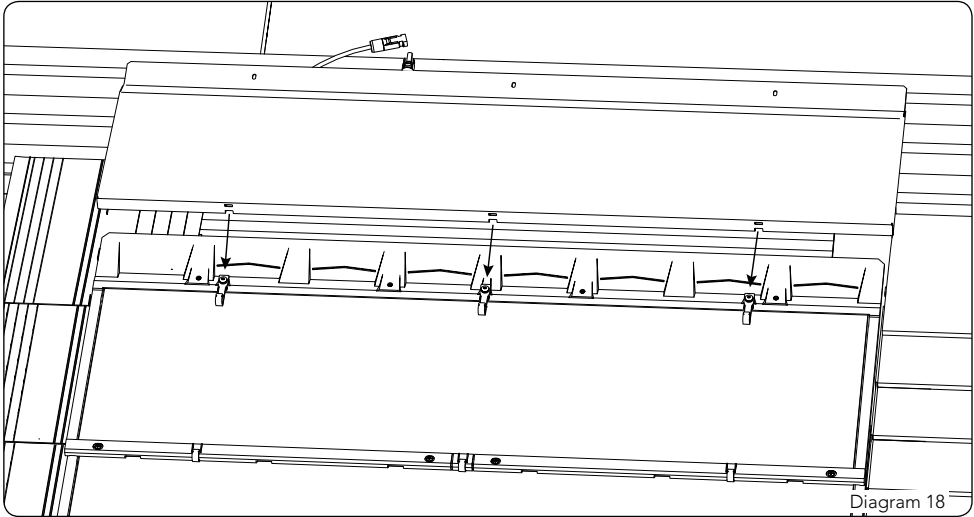


**WARNING:** Always use safety leads with the string checker.  
To avoid risk of electrocution, never use standard meter probes.

## 5. The C21e plain tiles

### 5.4 Fix the top interface

A top interface is required at the top of each C21e column for weatherproofing.



- At the top C21e, fit a top interface into the small hooks on the C21e below (A).
- Use three black screws to fix the top interface to the batten (B). You may need to add an extra batten for these screws.
- Ensure the cables remain accessible.



**WARNING:** Temporarily lay the tile course above the top interface and check the tiles lie flat. If the tile batten gauge is not exactly 100mm, the tile course above the top interface may kick up at the front. This can be corrected by adjusting the laid angle. See appendix 4.

### 5.5 Lay a middle C21e column

To install a middle column of C21e units, return to the bottom and work upwards.

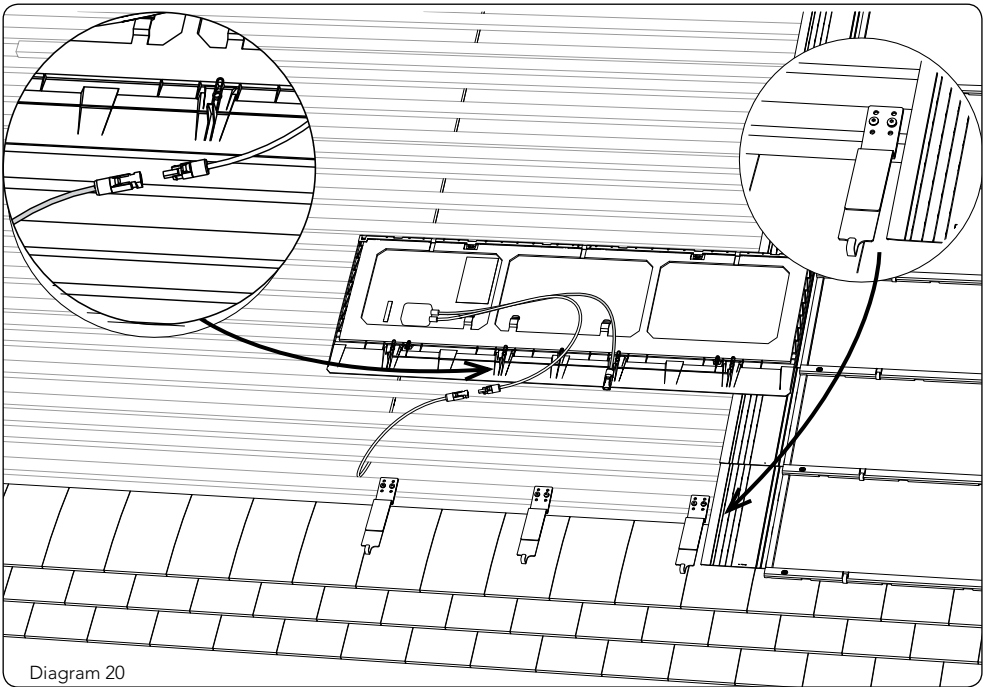
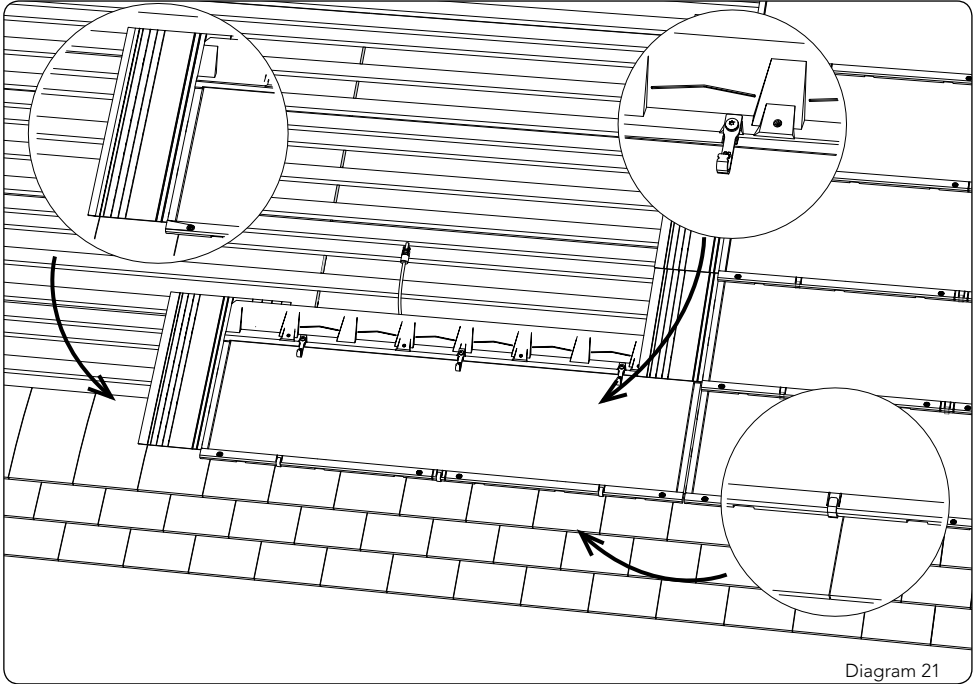


Diagram 20

Follow the method described in sections 5.1 to 5.4:

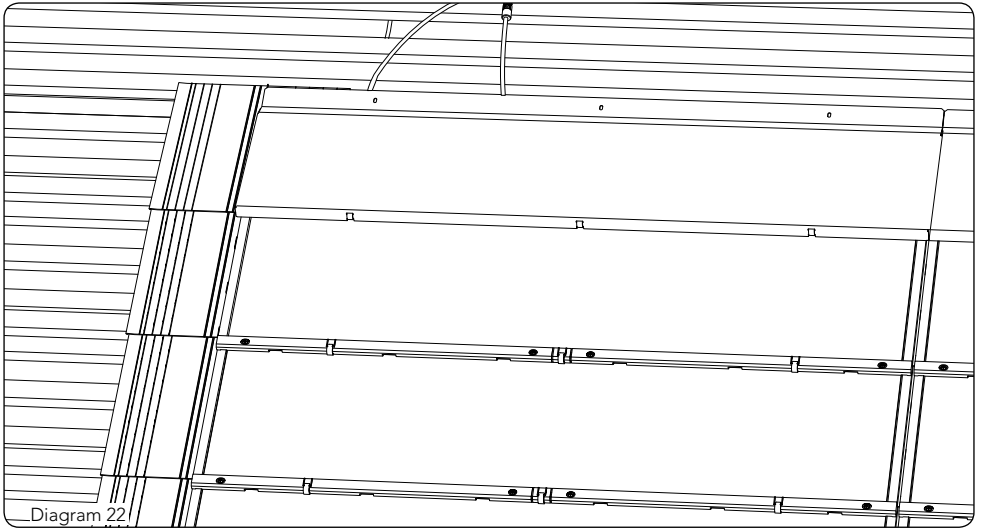
- Position and fix the starter hooks on the batten. Ensure they are central in the column.
- Pass the length of a return cable from the bottom of the column, under the battens to the top.
- Rest a C21e face down and firmly connect the black C21e cable to the end of the return cable.
- Pass the red C21e cable under the batten up the roof.

## 5. The C21e plain tiles



- Turn the C21e round and clip it into the starter hooks.
- Fit a soak tray under the left of the C21e unit on the C21e batten.
- Add 3 small C21e hooks to secure the C21e.

## 5. The C21e plain tiles

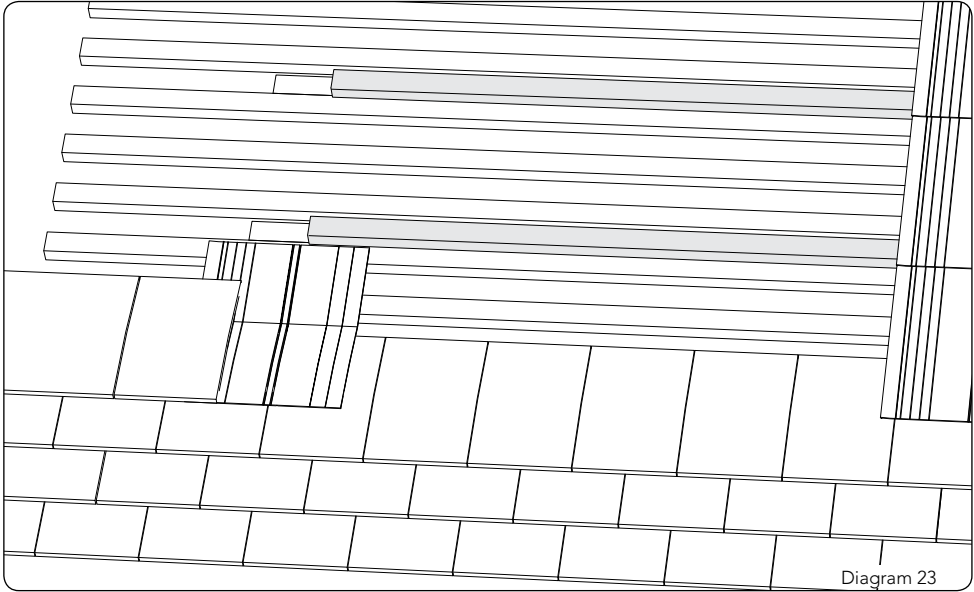


- Complete the column and test the connections.
- Fit the top interface, including a trimmed soak tray, as shown in step 5.4.

## 5. The C21e plain tiles

### 5.6 Lay the left hand tiles

For the left hand section, the tiles, soaks, channels and channel interfaces must be installed before the C21e column.



- Tile the first course on the left of the C21e area to the verge, using a whole tile and a tile and a half.
- Trim a soak tray so it doesn't interfere with the C21e batten or tiles. Push it behind the tile so the bottom edges align, and the top rests on a batten.

## 5. The C21e plain tiles

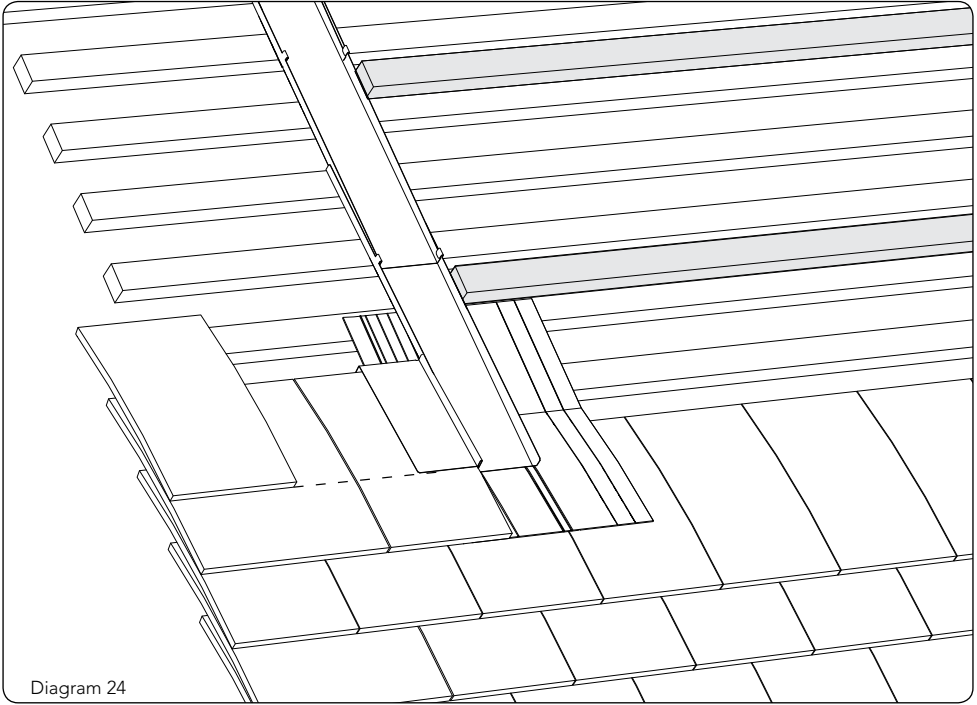


Diagram 24

- Install a tile on the next course.
- Nail a channel in the space between the C21e batten and the tiles on the first course.
- Add additional channels to the top of the gutter at 150mm headlap, sliding each into the next.
- Install a channel interface over the tile on the first course with the lip over the channel. Complete the tiling on that course, from the verge to the channel, over the channel interface.

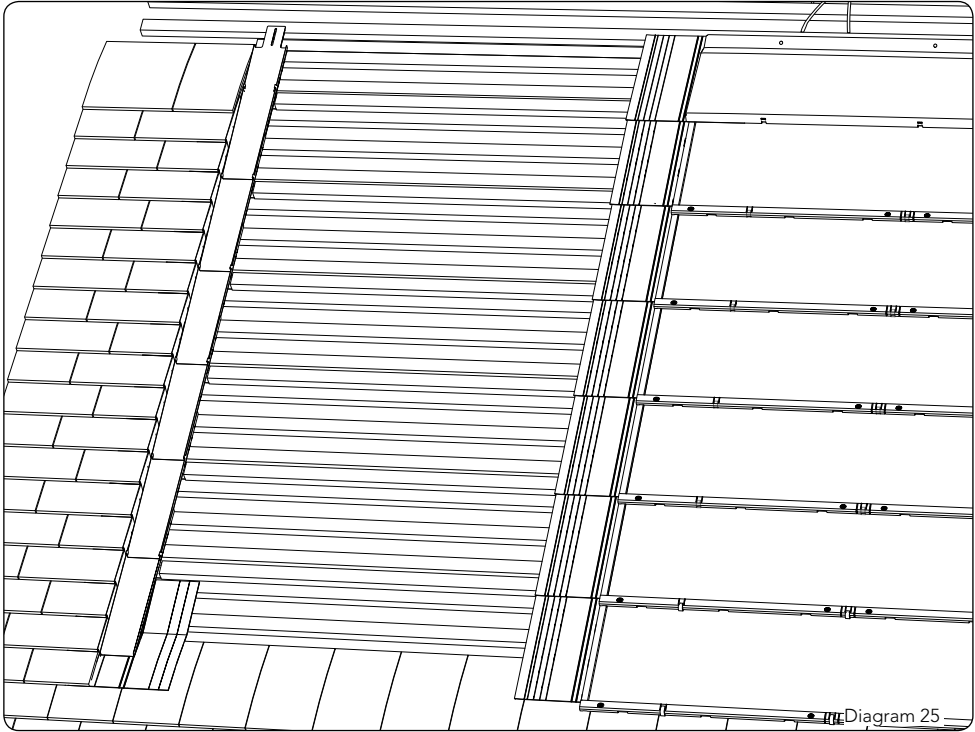


**WARNING:** There should be one channel per C21e unit / C21e batten.



**TIP:** The first channel interface will kick up, so you will need to trim its diagonal edge.

## 5. The C21e plain tiles



- Complete the tiling up the verge, adding a channel interface on each tile row, to the top of the channel.

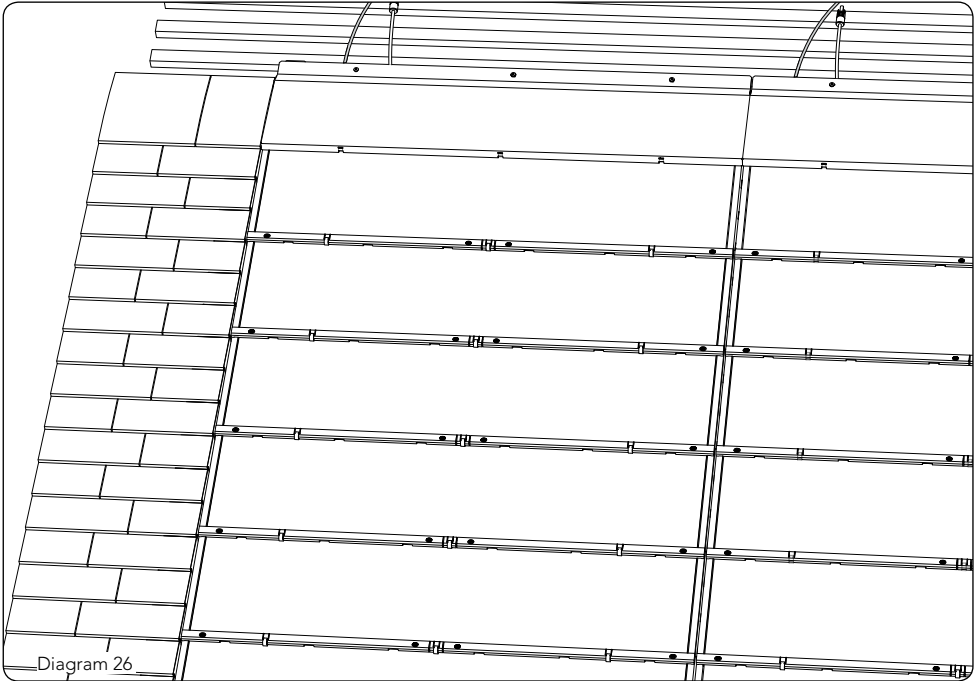


**WARNING:** The channel interface should not be visible when the tiles have been laid.



### 5.7 Lay the final C21e column

Fix a column of C21e units following the method described in sections 5.1 to 5.5:



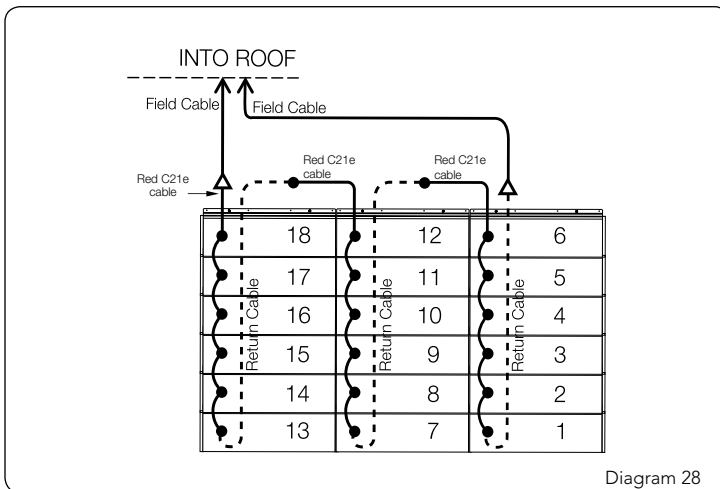
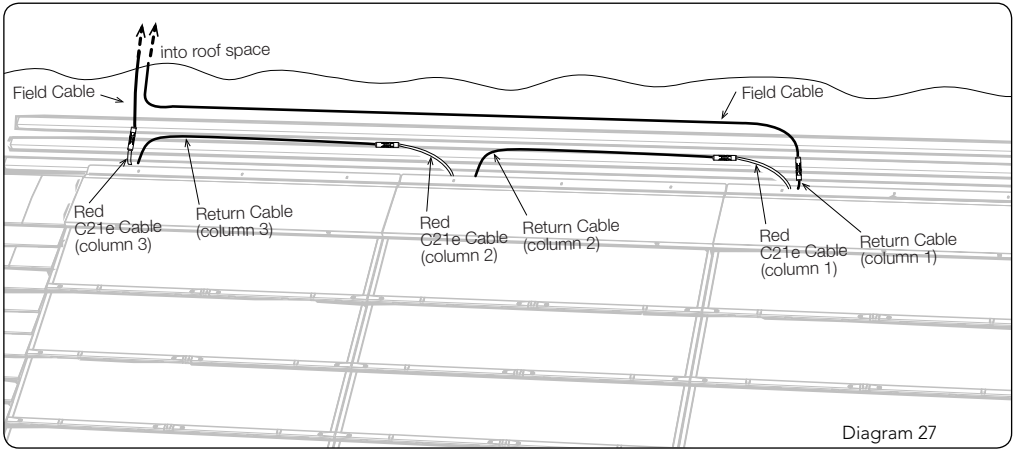
- Position and fix the starter hooks on the batten. Ensure they are central in the column.
- Pass the length of a return cable from the bottom of the column, under the battens to the top.
- Rest a C21e face down and firmly connect the black C21e cable to the end of the return cable.
- Pass the red C21e cable under the batten up the roof.
- Turn the C21e round and clip it into the starter hooks.
- DO NOT fit a soak tray to the left of the C21e unit in this column.
- Add 3 small C21e hooks to secure it.
- Complete the column and test the connections.
- Add a top interface.

## 6.0 C21e cable connections

When all the C21e units are fixed in place, the cables at the top of each column must be connected together to complete the string or strings, which will connect to the inverter.


The following example explains how to connect a single string, 18 C21e unit system. For two string systems refer to appendix 2.

appendix 3 can confirm the number of strings for the system size you are installing.



**WARNING:** Each string in an array should always have the same number of C21e units. Uneven strings will cause the system to fail and invalidate the warranty.

## 6. C21e cable connections

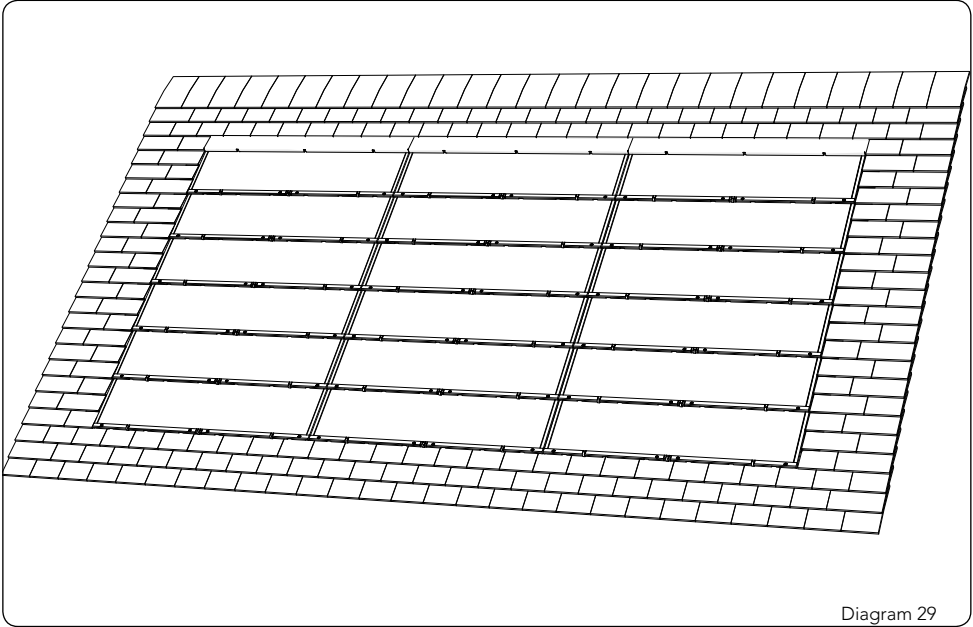
- Start at the right hand C21e column. At the top, connect the black return cable to a field cable (marked with one of the symbols ★ ● ■ ▲).
- At the top of each other column in this string, connect the return cable to the spare red C21e cable from the previous column. At the final left C21e column connect the remaining red C21e cable to a field cable with the same symbol as the field cable in column 1.
-  • Bring the field cables together above this column and carry out a string check for the completed string by following the instructions provided in appendix 5. Record the results on the reverse of this guide.
- Use a cable tie (or equivalent) to fasten the cables to the battens. Securing the cables will avoid potential stress if they are pulled from within the loft space during the electrical installation.
- Once secured, take the ends of the field cables and fit the supplied plug covers to protect them from any dust or moisture within the roof space. Push the cable ends through a lap in the membrane at the top of the final column and into the loft space (as identified in step 4.3).



**WARNING:** Ensure that the field cables and return cables at the top of the installation lie close to each other.

## 7.0 Complete the C21e array

When all the C21e units have been fitted, a string check for the system is complete, and the field cables passed into the loft space, the remaining tiles can be laid.



- Lay an eaves course of tiles on the batten above the C21e units. These will cover the top interfaces.
- Continue laying the tiles for the remainder of the roof using standard practice.

# Roof Installation Guide & Warranty

## 8.0 Disclaimer of liability

Instructions given in this guide are general guidelines only for the design, installation and use of the C21e units together with any associated components. Due to the wide variety of materials, equipment and sites which an installation may involve this guide cannot consider the individual technical requirements relevant to every individual project and/or site.

If you have detailed questions about any specific project and/or site please contact Solarcentury.

Before installing the C21e units, contact the appropriate authorities to determine the permissions, consents, approvals, licenses, installation and inspection requirements which apply to the site and the installation. Solarcentury accepts no responsibility or liability in this respect.

This guide is based on Solarcentury's knowledge and experience and is believed to be reliable but the guide does not constitute a warranty, express or implied.

Solarcentury does not assume responsibility and expressly disclaims liability for any loss, damage or expense arising out of or in any way connected with incorrect handling, installation, operation, use or maintenance of the C21e units.

No responsibility is assumed by Solarcentury for any infringement of patents or other rights of third parties that may result from use of the C21e units. No license is granted by implication or otherwise under any patent or patent rights.

Solarcentury reserves the right to make changes to the Product, the specifications or this guide, without prior notice.

Incorrect and/or faulty installation, operation, use or maintenance may be dangerous and may invalidate any warranty which may apply to the C21e units. End users should remember that the C21e units require professional installation using special tools and expert know-how.

No part of this guide may be reproduced in any form by any means without Solarcentury's express written consent.

## 9.0 Warranty

Product Warranty for C21e solar electric plain tiles in United Kingdom and Republic of Ireland

**Model number:** C21e Plain Tile M50-S39

This warranty applies to the Solarcentury Modules with the model numbers listed above which were purchased from Solarcentury or an authorised distributor, installer or reseller (an "Authorised Distributor") and purchased and installed in the territory indicated above.

In this warranty "Product" means each of the listed Modules individually.

In addition to your statutory rights, which are unaffected, Solarcentury guarantees that, from the date of original purchase from Solarcentury or its Authorised Distributor (or, in the absence of proof of purchase, from the date of manufacture):

### **A Materials and Workmanship – 10 years**

The Product shall be free from defects in materials and workmanship in manufacture for a period of 10 years.

### **B Power Output – 25 years**

- (1) The power rating of the Product will remain at 90% or more of its Peak Power rating<sup>1</sup> for 10 years; and
- (2) The power rating of the Product will remain at 80% or more of its Peak Power rating for 25 years.

If a Product fails to meet the standard guaranteed and the conditions below are met, then Solarcentury will, in its sole discretion: (a) repair or replace the defective Product with an equivalent product; or (b) refund the purchase price of the Product; or (c) provide the owner with additional PV modules required to make up the power lost or provide to the owner compensation for power lost up to a maximum value of the purchase price of the Product, such loss in power having been proved to have been suffered by the owner of the Product and determined by Solarcentury (in its sole and absolute discretion) to be due to defects in materials or workmanship.

Notwithstanding the above, if the Product is used in any non-land based applications, any Power Output warranty claims must be made within 10 years.

<sup>1</sup> In this context, the power rating of the Product will be that measured by or on behalf of Solarcentury under Standard Test Conditions (irradiance of 1000W/m<sup>2</sup>, light spectrum AM 1.5g and a cell temperature of 25 degrees Celsius) and may not equate to that produced by the Product under other conditions. The relevant "Peak Power" is defined in Solarcentury's Datasheet at the time of shipment.

## 9. Warranty

Solarcentury shall have no liability for any other costs or losses howsoever arising (and for the avoidance of doubt) this guarantee does not include the costs of labour or transport or any other associated costs including, without limitation, costs involved in removing or returning the Product to Solarcentury, or its re-installation. Any Product (or parts) replaced shall become the property of Solarcentury and the replacement Product shall only have the warranty cover for the remainder of the original warranty period.

### The conditions:

- (a) The Product is properly installed in a suitable location in accordance with Solarcentury's Datasheets and instructions for design, installation, operation and maintenance of the Product (together the "Product Guide") and in accordance with all applicable laws and standards as updated and applicable at the date of installation whether or not those standards are identified in the Product Guide;
- (b) The Product has not been removed from the location in which it was first installed, nor connected to, or used with, any unapproved device;
- (c) The Product has not, in Solarcentury's absolute judgment, been damaged during transportation, delivery, storage, handling or installation;
- (d) The Product has not, in Solarcentury's absolute judgment, suffered damage caused by extraneous causes such as structural movement of the roof, accident, an impact of significant force, fire, lightning, flood, severe weather, interference by animals, insect and pest infestation or other Acts of God or other events, howsoever caused, reasonably beyond Solarcentury's control;
- (e) The Product has not been subject to misuse, neglect, abuse, alteration or improper application;
- (f) The Product has not been exposed to conditions (including, where applicable, excessive levels of pollution or wind speeds) at the property where it was installed which are more adverse than those which the Product is designed to withstand as stated in the Product Guide;
- (g) The Product has been operated and maintained in accordance with the Product Guide;
- (h) The labels, serial numbers or barcodes on the Product or any of its components have not been altered, removed or made illegible;
- (i) Any alleged defect in materials is not merely cosmetic or due to normal and reasonable wear and tear of the Product;
- (j) Solarcentury has been paid in full for the Product;
- (k) A claim is notified: (i) in accordance with the procedure set out below, and as set out in the Product Guide; (ii) within the applicable warranty period set out above; and (iii) within two months of the first date on which problems with the Product were detected or ought to have been detected.

If any of the above conditions are not met then Solarcentury shall have no obligations under this guarantee and no rights shall accrue as a result of this warranty.



### Procedure for making a claim:

Before making a claim, you should review the Product Guide to make sure that you have followed all the guidance.

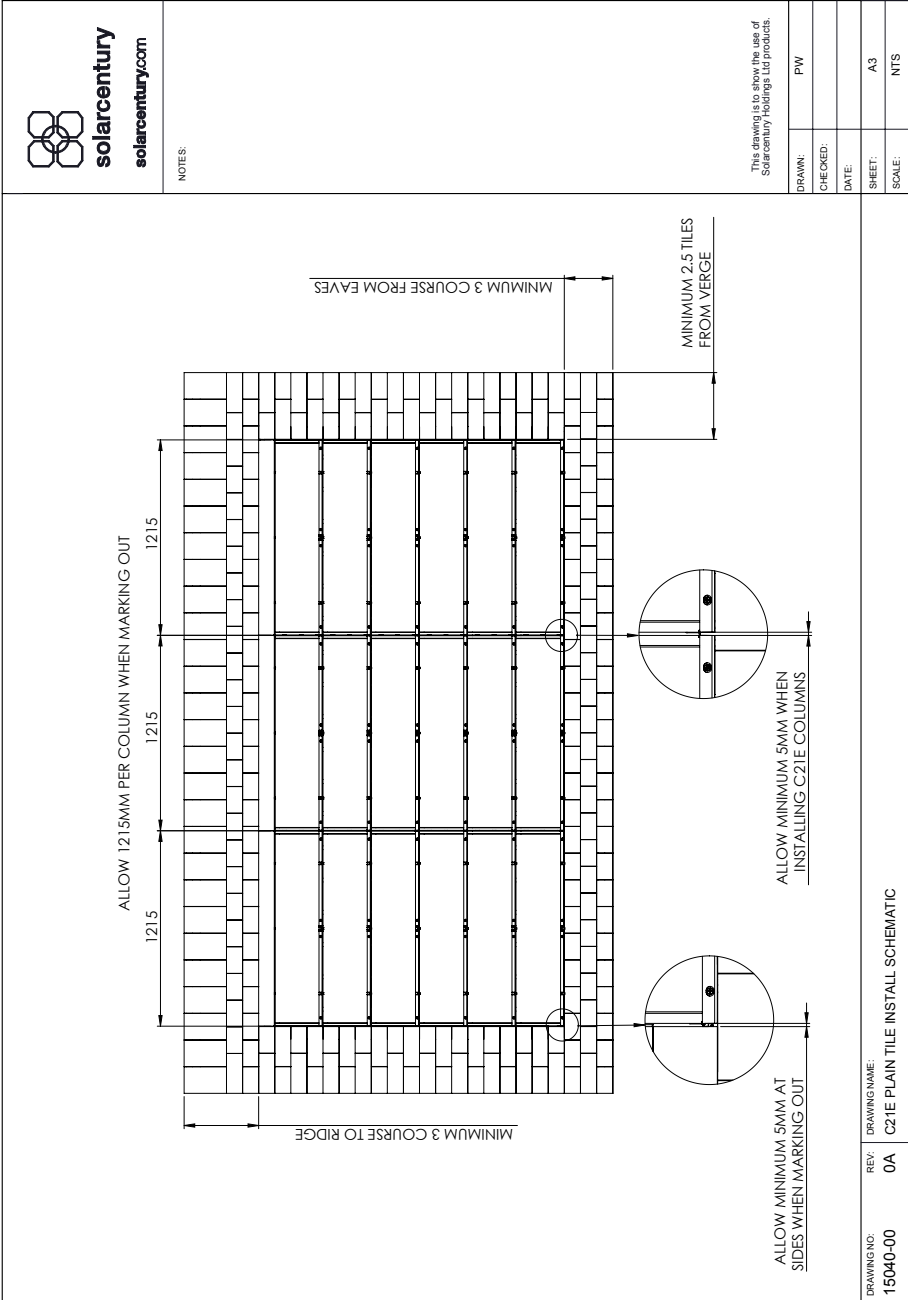
If after reviewing the Product Guide you are still concerned that the Product is not performing as it should, please contact your installer or maintainer in the first instance.


If your installer or maintainer considers the Product is not performing according to the warranty, please (together with the assistance of your installer or maintainer) provide Solarcentury with the details below so that we can consider your claim, marking your correspondence for the attention of the Solarcentury Customer Services. Please include:

- Confirmation that you have reviewed the Product Guide but the results indicate that the Product may be failing to perform to the guaranteed standard;
- Confirmation that conditions (a) to (k) above are met;
- A detailed description of the Product failure, including supporting images;
- Adequate documentation of proof of purchase (including details of purchase receipts);
- The Product's serial number; and
- Details of when and by whom the Product was purchased and installed and the address of the property at which it was installed.

Solar Century Holdings Limited  
50 Great Sutton Street  
London EC1V 0DF  
020 7549 1180  
customerservices@solarcentury.com

# Appendix 1: C21e schematic - typical layout & fixing detail



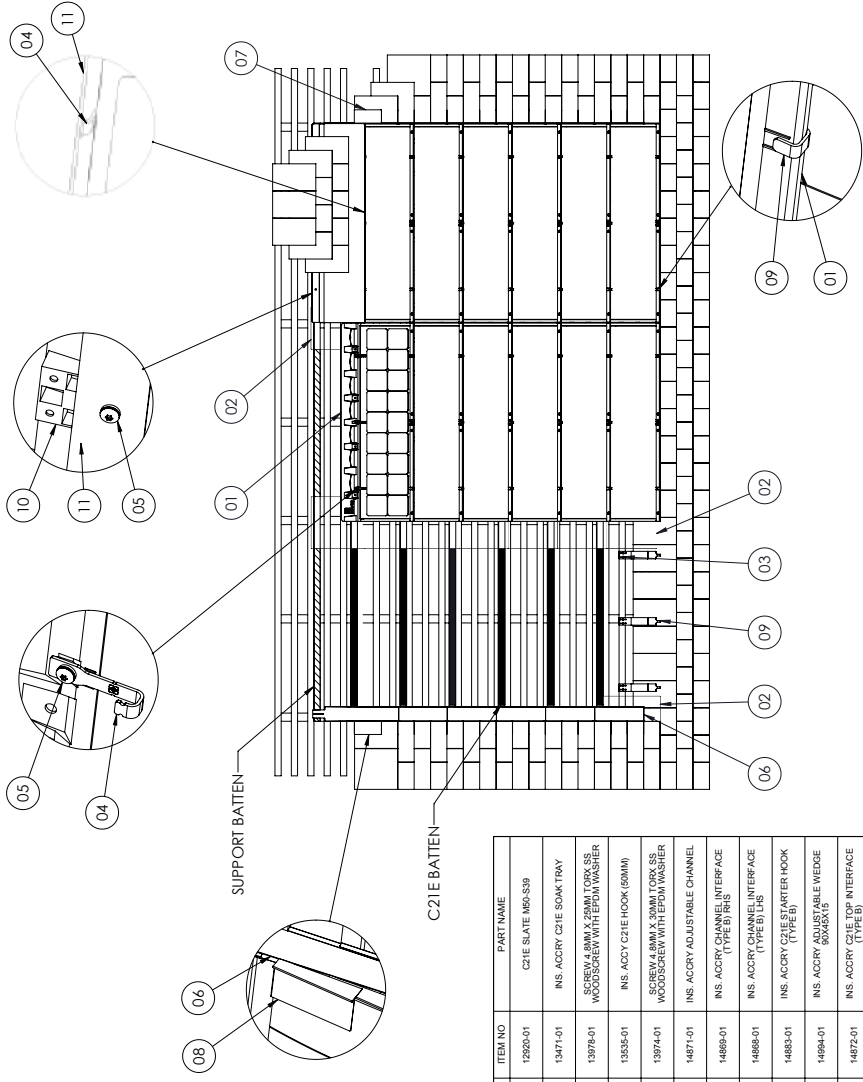


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NOTES:

This drawing is to show the use of Solarcentury Holdings Ltd products.

DRAWN:	PW
CHECKED:	
DATE:	
SHEET:	A3
SCALE:	NTS



SUPPORT BATTEN

C21E BATTEN

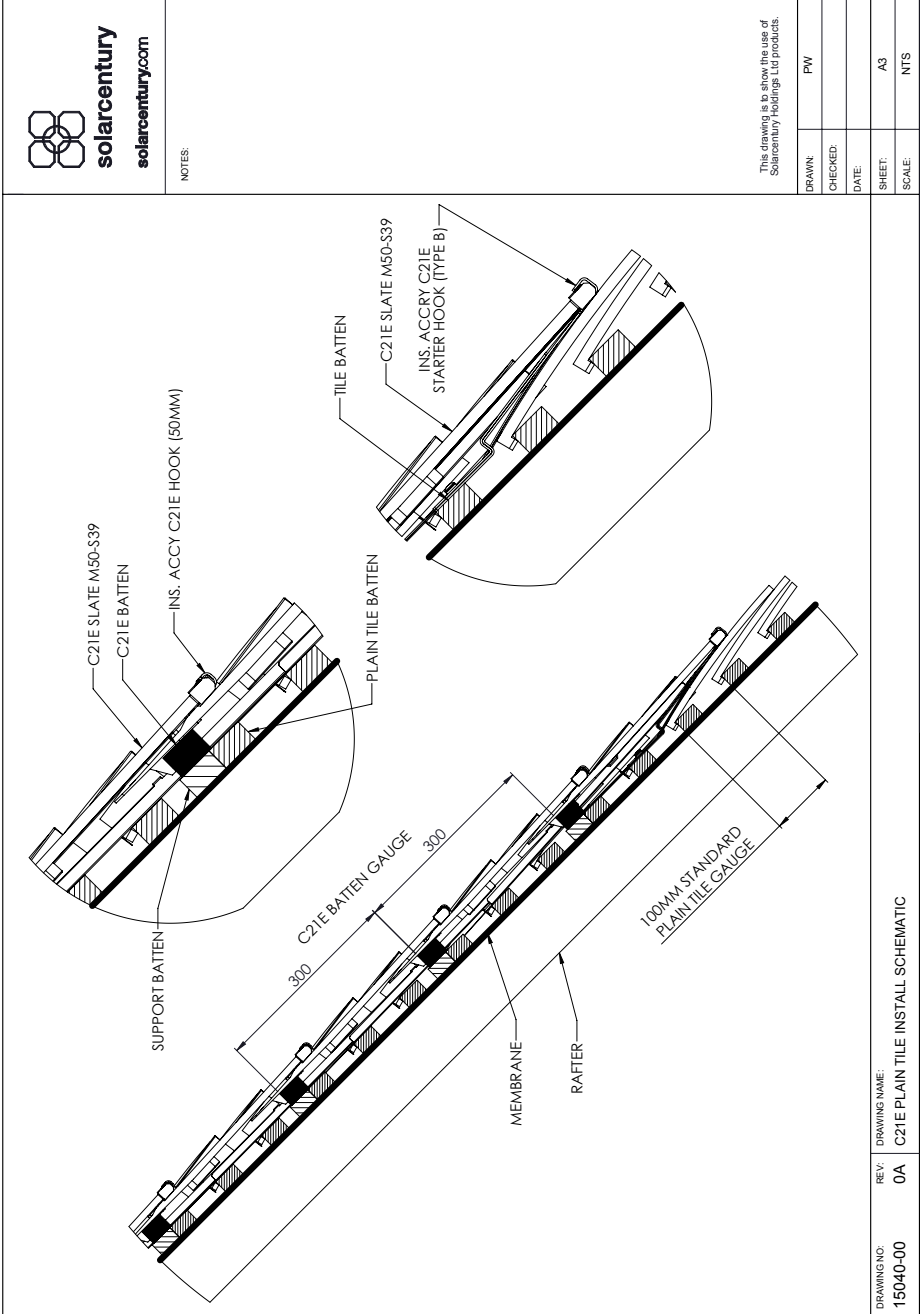
REF	ITEM NO	PART NAME
01	12920-01	C21E SLATE INS/S39
02	13471-01	INS. ACCRY C21E SOAK TRAY
03	13979-01	SCREW 4.8MM X 25MM TORX SS WOODSCREW WITH EPDM WASHER
04	13525-01	INS. ACCY C21E HOOK (50MM)
05	13974-01	SCREW 4.8MM X 30MM TORX SS WOODSCREW WITH EPDM WASHER
06	14871-01	INS. ACCRY ADJUSTABLE CHANNEL
07	14859-01	INS. ACCRY CHANNEL INTERFACE (TYPE B)RHS
08	14858-01	INS. ACCRY CHANNEL INTERFACE (TYPE B)LHS
09	14883-01	INS. ACCRY C21E STARTER HOOK (TYPE B)
10	14994-01	INS. ACCRY ADJUSTABLE WEDGE 80X45X15
11	14872-01	INS. ACCRY C21E TOP INTERFACE (TYPE B)

DRAWING NO: 15040-00

REV: 0A

DRAWING NAME: C21E PLAIN TILE INSTALL SCHEMATIC

Appendix 1



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NOTES:

This drawing is to show the use of Solarcentury Roofings Ltd products.

DRAWN:	PNW
CHECKED:	
DATE:	
SHEET:	A3
SCALE:	NTS

DRAWING NO: 15040-00  
 REV: 0A  
 DRAWING NAME: C21e PLAIN TILE INSTALL SCHEMATIC

## Appendix 2: String layouts

For all standard layouts, individual columns are connected in exactly the same way using the return cables. The length of the return cable will correspond to the layout selected at the time of ordering.

Final connection of the columns to form the string or strings should follow the guidance in section 6.0.

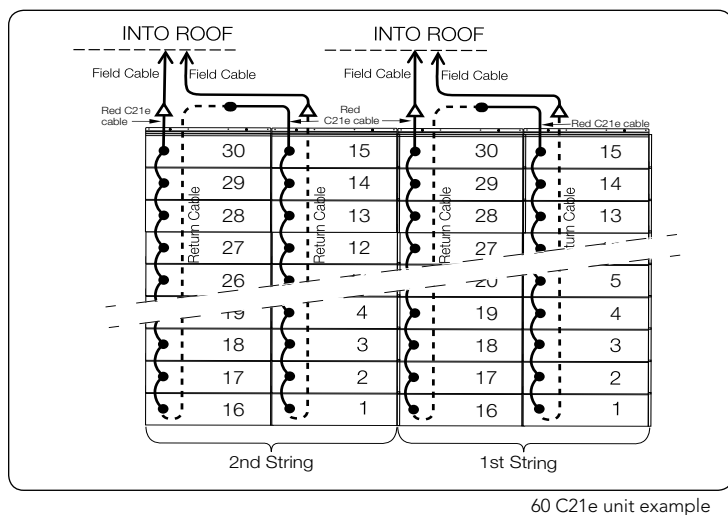
Single string systems (with 12 to 36, 48 and 54 C21e units)

For these standard system sizes, all of the C21e units are connected together to form a single string, as shown in the worked example in this guide.

Two string systems (with 42 and 60 to 80 C21e units)

For these standard system sizes, two strings are needed irrespective of the physical roof layout. For all two string systems you should consider the C21e units as two separate arrays, with an equal number of C21e units in each array.

For example, a system of 60 C21e units should be split evenly into two strings, each with 30 C21e units. See below for details:



NOTE: The number of strings is dependent on the system design for the size of the C21e array. This should not be changed. (See Appendix 3 for more details.)

## Appendix 3: Component list and roof dimensions

C21e system size			C21e layout option <sup>(1)</sup>		Dimensions of C21 array (excluding tile border)		Total roof dimensions required including the tile border <sup>(2)</sup>		
No. of C21e units	kWp	Strings	Rows	Columns	Length (m)	Width (m)	Length (m)	Width (m)	Area (m <sup>2</sup> )
12	0.60	1	12	1	3.70	1.23	4.47	2.05	9.15
			6	2	1.90	2.44	2.67	3.27	8.70
			4	3	1.30	3.66	2.07	4.48	9.25
			3	4	1.00	4.87	1.77	5.70	10.05
			2	6	0.70	7.30	1.47	8.13	11.90
			1	12	0.40	14.59	1.17	15.42	17.96
18	0.90	1	18	1	5.50	1.23	6.27	2.05	12.84
			9	2	2.80	2.44	3.57	3.27	11.64
			6	3	1.90	3.66	2.67	4.48	11.94
			3	6	1.00	7.30	1.77	8.13	14.34
			2	9	0.70	10.95	1.47	11.77	17.24
			1	18	0.40	21.88	1.17	22.71	26.45
24	1.20	1	12	2	3.70	2.44	4.47	3.27	14.58
			8	3	2.50	3.66	3.27	4.48	14.63
			6	4	1.90	4.87	2.67	5.70	15.18
			4	6	1.30	7.30	2.07	8.13	16.78
			3	8	1.00	9.73	1.77	10.56	18.63
			2	12	0.70	14.59	1.47	15.42	22.58
30	1.50	1	15	2	4.60	2.44	5.37	3.27	17.52
			10	3	3.10	3.66	3.87	4.48	17.32
			6	5	1.90	6.09	2.67	6.91	18.42
			5	6	1.60	7.30	2.37	8.13	19.22
			3	10	1.00	12.16	1.77	12.99	22.92
			2	15	0.70	18.24	1.47	19.06	27.92
36	1.80	1	18	2	5.50	2.44	6.27	3.27	20.46
			9	4	2.80	4.87	3.57	5.70	20.30
			6	6	1.90	7.30	2.67	8.13	21.65
			3	12	1.00	14.59	1.77	15.42	27.21
			2	18	0.70	21.88	1.47	22.71	33.26
			7	6	2.20	7.30	2.97	8.13	24.09
42	2.10	2	3	14	1.00	17.02	1.77	17.85	31.50
			12	4	3.70	4.87	4.47	5.70	25.43
48	2.40	1	8	6	2.50	7.30	3.27	8.13	26.53
			6	8	1.90	9.73	2.67	10.56	28.13
			4	12	1.30	14.59	2.07	15.42	31.83
			3	16	1.00	19.45	1.77	20.28	35.79
54	2.70	1	9	6	2.80	7.30	3.57	8.13	28.97
			3	18	1.00	21.88	1.77	22.71	40.07
60	3.00	2	15	4	4.60	4.87	5.37	5.70	30.55
			10	6	3.10	7.30	3.87	8.13	31.40
			6	10	1.90	12.16	2.67	12.99	34.61
			5	12	1.60	14.59	2.37	15.42	36.46
66	3.30	2	3	20	1.00	24.31	1.77	25.14	44.36
			11	6	3.40	7.30	4.17	8.13	33.84
72	3.60	2	18	4	5.50	4.87	6.27	5.70	35.68
			12	6	3.70	7.30	4.47	8.13	36.28
			9	8	2.80	9.73	3.57	10.56	37.63
			6	12	1.90	14.59	2.67	15.42	41.08
			4	18	1.30	21.88	2.07	22.71	46.89
78	3.90	2	13	6	4.00	7.30	4.77	8.13	38.72
80	4.00	2	20	4	6.10	4.87	6.87	5.70	39.10
			10	8	4.10	9.73	3.87	10.56	40.80

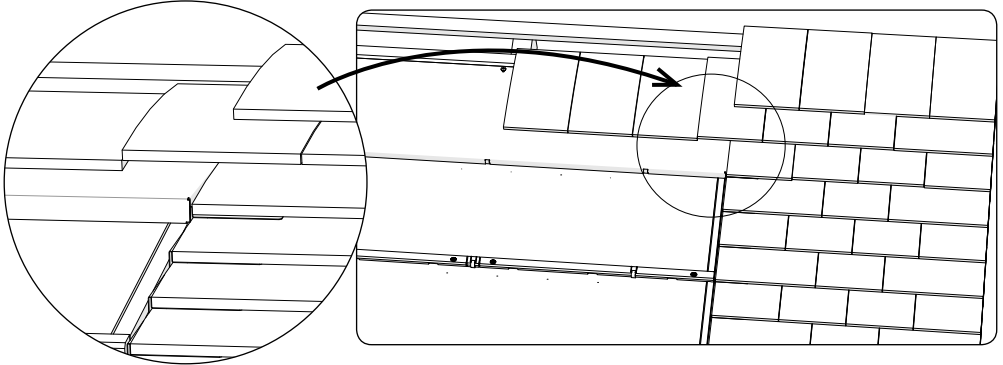
Notes: 1) Additional layouts may be possible for some system sizes, but will require additional accessories to those provided in the standard systems.  
2) For a conventional 265mm x 165mm plain tile fitted at 100mm gauge. The dimensions stated are for guidance and are based on the C21e design rules for the range of approved plain tile sizes as stated on the product datasheet.  
3) The components provided in each system will support the layouts as shown, a small quantity of spare screws and C21e small hooks are included.  
4) One return cable is provided per C21e column. The cable length is dependent on the number of C21e rows in the layout, as shown.  
5) The standard quantity of channel interfaces provided will support conventional plain tiles set out at a gauge of 100mm. For narrower gauges additional channel interfaces will be required.

# Roof Installation Guide & Warranty

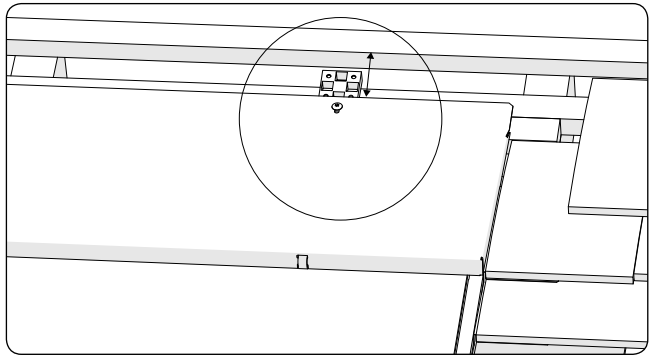
C21e system size		Standard roof components provided (For plain tile gauges below 100mm additional channel interfaces will be needed) <sup>(3)</sup>							
No. of C21e units	kWp	Return cables qty <sup>(4)</sup> x length (m)	Pairs of field cables	C21e soak trays (x10)	Pack C21e starter hooks (large x3)	Pack C21e hooks (small x18)	Pack adjustable channels (x2)	Pack channel interfaces (x3 left, x3 right) <sup>(5)</sup>	Top interface (x1)
12	0.60	1 x 4.5m	1	10	1	2	12	12	1
		2 x 3m		20	2		6	6	2
		3 x 2m		20	3		4	4	3
		4 x 2m		20	4		3	3	4
		6 x 2m		20	6		2	2	6
		n/a		30	12		1	1	12
18	0.90	1 x 6m	1	10	1	3	18	18	1
		2 x 4.5m		20	2		9	9	2
		3 x 3m		20	3		6	6	3
		6 x 2m		30	6		3	3	6
		9 x 2m		30	9		2	2	9
		n/a		40	18		1	1	18
24	1.20	2 x 4.5m	1	20	2	4	12	12	2
		3 x 3m		30	3		8	8	3
		4 x 3m		30	4		6	6	4
		6 x 2m		30	6		4	4	6
		8 x 2m		40	8		3	3	8
		12 x 2m		40	12		2	2	12
30	1.50	2 x 6m	1	20	2	5	15	15	2
		3 x 4.5m		30	3		10	10	3
		5 x 3m		40	5		6	6	5
		6 x 2m		40	6		5	5	6
		10 x 2m		40	10		3	3	10
		15 x 2m		50	15		2	2	15
36	1.80	2 x 6m	1	30	2	6	18	18	2
		4 x 4.5m		40	4		9	9	4
		6 x 3m		40	6		6	6	6
		12 x 2m		50	12		3	3	12
42	2.10	18 x 2m	1	60	18	6	2	2	18
		6 x 3m		50	6		7	7	6
48	2.40	14 x 2m	2	60	14	7	3	3	14
		4 x 4.5m		50	4		12	12	4
48	2.40	6 x 3m	1	50	6	8	8	8	6
		8 x 3m		60	8		6	6	8
		12 x 2m		60	12		4	4	12
		16 x 2m		70	16		3	3	16
54	2.70	6 x 4.5m	1	60	6	9	9	9	6
		18 x 2m		80	18		3	3	18
60	3.00	4 x 6m	2	60	4	10	15	15	4
		6 x 4.5m		60	6		10	10	6
		10 x 3m		70	10		6	6	10
		12 x 2m		70	12		5	5	12
66	3.30	20 x 2m	2	80	20	11	3	3	20
		6 x 4.5m		70	6		11	11	6
72	3.60	4 x 6m	2	70	4	12	18	18	4
		6 x 4.5m		70	6		12	12	6
		8 x 4.5m		80	8		9	9	8
		12 x 3m		90	12		6	6	12
		18 x 2m		90	18		4	4	18
78	3.90	6 x 4.5m	2	80	6	13	13	13	6
80	4.00	4 x 10m	2	70	4	14	20	20	4
		8 x 4.5m		90	8		10	10	8

## Appendix 4: Adjusting the laid angle

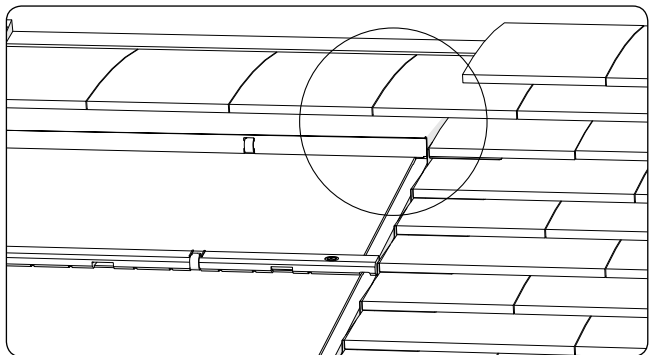
If the tile batten gauge was not exactly 100mm, the tile course above the top interface may kick up at the front creating a gap, therefore risking weathertightness.



- Insert plastic wedges between the top interface and batten to adjust the laid angle and close the gap.



- Secure the wedge by using the screws provided; fix through the top interface screw holes, through the wedges and into the batten.





## Appendix 5: String checker user guide

1. Connect the red test lead to the V' $\Omega$  input connector (1) and the black test lead to the COM input connector (2).
2. From the off position, turn the centre dial one place in an anti-clockwise direction. The function range is now set to 600Vdc (3).
3. Connect the opposite ends of the test leads to the output strings of the C21e tile or slate. Note the connectors will only connect one way.
4. The display will now read the DC voltage <sup>3.</sup> 600Vdc produced by the C21e units.
5. The voltage will vary on the amount of daylight falling on the C21e units. Please refer to the table as an approximate guide to the measurement.
6. If the value displayed on the string checker screen is below the figure for an overcast day then there is an error with the installation and string connection.
7. In this situation, retrace the string connection through from the start ensuring the connectors are pushed firmly together with no gaps and that the C21e units follow the stringing diagram for the given layout.
8. Once the reading is correct, switch the string checker to the OFF position.
9. You can now disconnect the test leads and continue with the C21e installation following the C21e On Roof Installation Guide.



Please refer to the user manual for full operating instructions.

String checkers with touch proof test leads are available to order from Solarcentury.

# Notes

## Notes

## String check results

Use the tables below to record the string voltages.

Once completed, this installation guide should be passed to the electrician who will be responsible for commissioning the system.

String checker voltage measurement table				
System size (total number of C21e units in the system)	Number of strings	Number of C21e units in each string	Voltage per string on sunny day	Voltage per string on overcast day
			SUN ☀️	CLOUD ☁️
12	1	12	137	109
18	1	18	205	164
24	1	24	274	219
30	1	30	342	274
36	1	36	205	164
42	2	21	239	192
48	1	48	274	219
54	1	54	308	246
60	2	30	342	274
66	2	33	376	301
72	2	36	410	328
78	2	39	445	356
80	2	40	456	365

Your recorded measurements:

	Weather conditions (please tick)	SUN ☀️	CLOUD ☁️
String 1			
String 2			