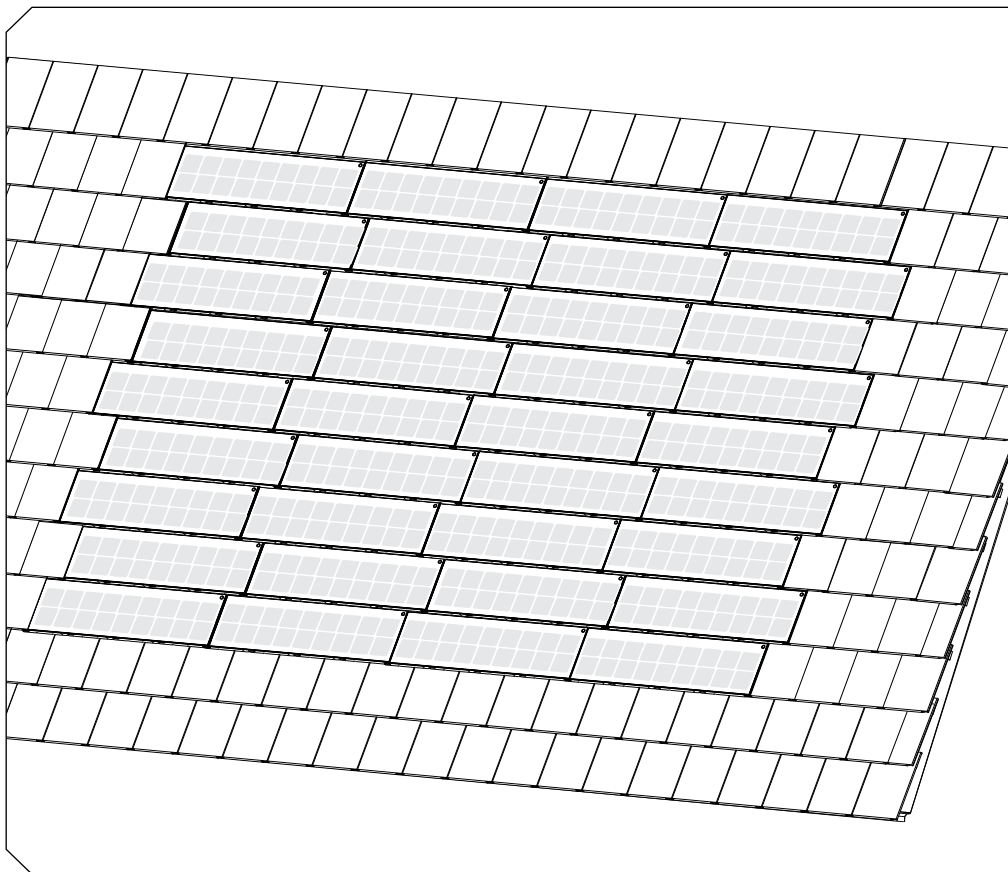




C21 solar tiles
& slates

Roof Installation Guide & Warranty

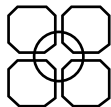
C21e Tile



For new builds and re-roofing with C21e Tile type M50-S38

On completion please return this guide to the Commissioning Electrician

Part Number 15196-01



solarcentury

Issue: 01
© Solarcentury 2012

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 a 60 unit C21e system, laid broken bond.
- The C21e solar electric roof tile will be referred to as a C21e or a C21e unit throughout.

Roof Installation Guide

Contents

TitlePage

1. Health and Safety	1
1.1 General Guidance	1
1.2 Electrical Hazards	1
1.3 Preparation for C21e Installation	2
2. Components	3
2.1 Equipment Required	3
2.2 The Roof Accessories Box	3
3. Pre-Installation Checks	5
4. Roof Preparation	6
4.1 General Recommendations	6
4.2 Marking the Area for the C21e System	7
4.3 Positioning the Field Cables ...	8
5. C21e Installation	9
5.1 Laying the Bottom Section of Roof Tiles	9
5.2 Laying the Right Section of Roof Tiles	10
5.3 Fitting the First C21e Column	11
5.4 Checking the C21e Cable Connections	15
5.5 Laying the Remaining C21e Columns	16
5.6 Completing the Cabling	17
6. Completing the Tiling	19
7. Liability	21
8. Warranty	22
Appendices	25
Appendix 1: C21e Tile Schematic - Typical Layout & Fixing Detail (GB)	25
Appendix 2: String Layouts	27
Appendix 3: String Checker User Guide	28
Appendix 4: Component List and Roof Dimensions	29

1. 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 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 layed according to British Standard 5534: 2003* 'Code of practice for slating and tiling (including shingles)' unless told otherwise.
- Install all components as specified within this guide to ensure weather tightness.

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.

- 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.
- All work must be carried out with the C21e system disconnected from the mains electrical supply.

**latest at time of print*

Roof Installation Guide

1. Health and Safety *continued*

1.3 Preparation for C21e Installation

Follow the guidance below to ensure the C21e units 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 how to connect the C21e cables together.
- 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 units in a weatherproof environment before installation.
- Carry the C21e units with both hands by the frame, and avoid scratching the glass.
- Only load as many C21e units 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 units. 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. Components

2.1 Equipment Required

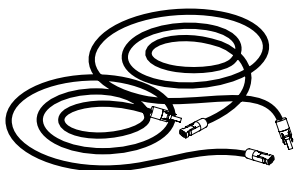
- Standard roofing tool kit
- C21e specific tools:
 - Screwdriver with pozi-drive head.
 - String checker with specialist touch proof test leads, to check cable connections (available to order from Solarcentury).

2.2 The Roof Accessories Box

When ordered as a complete system, the accessories box will contain the following components required for the on roof installation of the C21e units.

Components included in the standard accessories box:

Return Cables
(layout dependent, 1
per column)

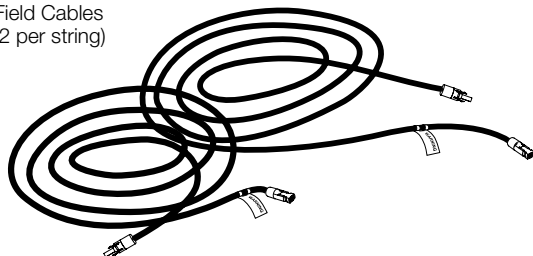


C21e Self Tapping Screws
(M4.5 X 45 Countersunk)



Screws are included within
each carton of C21e units.

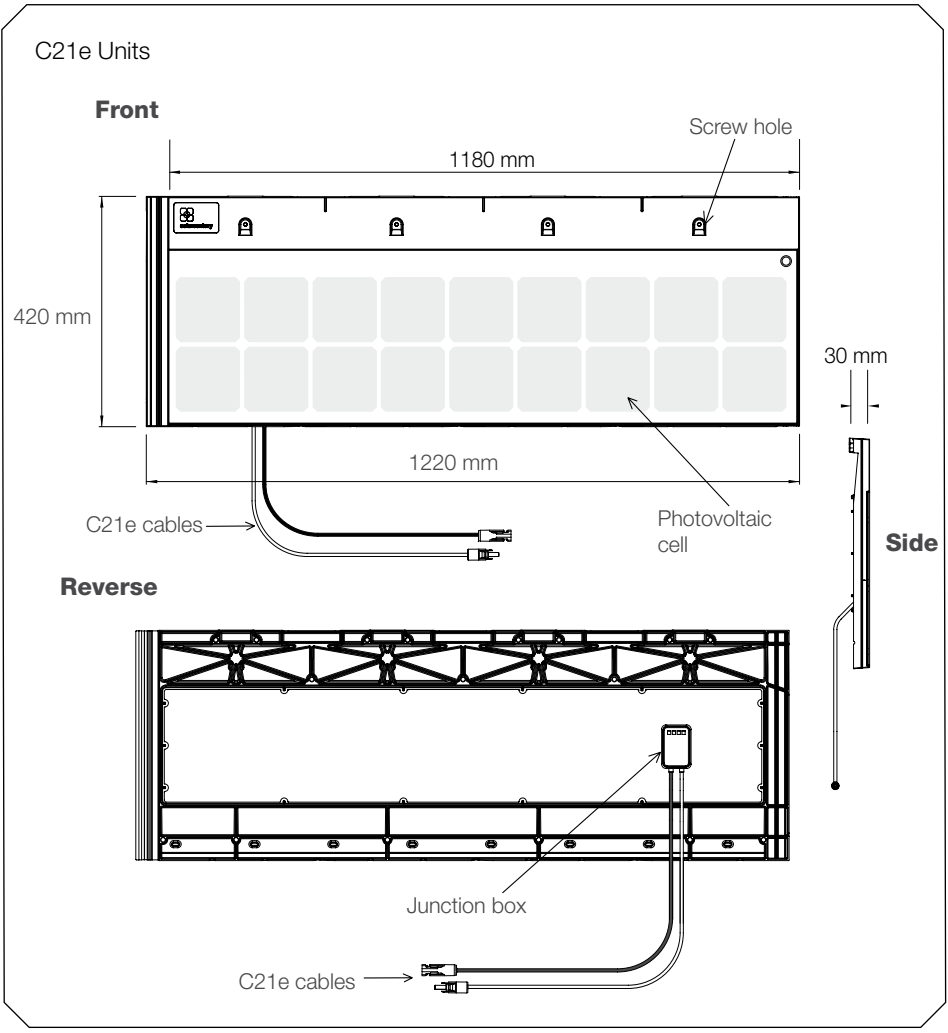
Field Cables
(2 per string)



The quantities of components vary by system size and layout (see Appendix 4 for details).

Roof Installation Guide

2. Components *continued*



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

3. Pre-Installation Checks

Before you go on to the roof, check that:

- Your roof tiles are compatible with the C21e units. See the C21e datasheet, available at www.solarcentury.com, for the up to date list of compatible tiles.
- Your accessories box contains the correct number of parts needed for your system size and layout (see Appendix 4).
- 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.

Roof Installation Guide

4. Roof Preparation

4.1 General Recommendations

A standard roof build up is suitable for use with C21e tiles, however we make the following recommendations:

- Use a breathable roofing membrane, or similar.
- Use 50mm x 25mm Tanalised battens nailed to rafters not exceeding 600mm centres, in accordance with BS 5534: 2003.
- Space the battens following the fixing specification for the conventional roof tiles (with a gauge no less than 300mm and no more than 345mm). Refer to the C21e Solar Electric Roof Tile datasheet for the full specification.



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

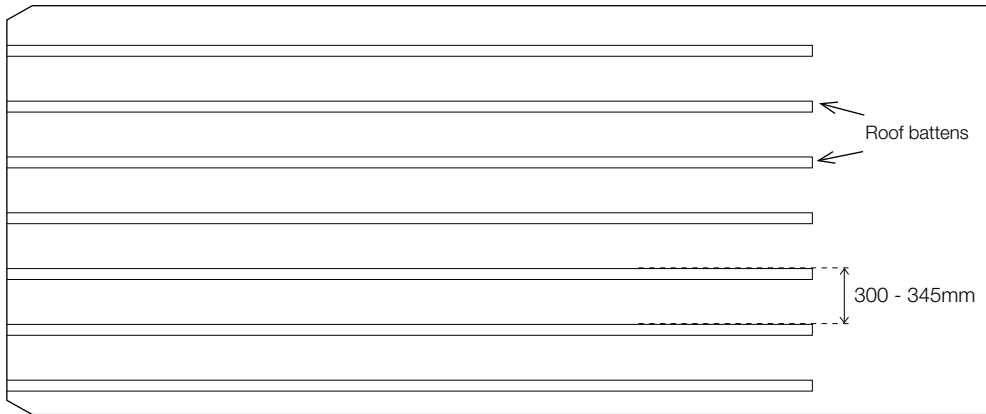


Diagram 1



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

4. Roof Preparation *continued*

4.2 Marking the Area for the C21e System

To make sure the C21e system is installed in the correct position on the roof, you must mark the area out before you begin (Diagram 2).

- Refer to the Appendices and your Architect's drawings to understand which layout to use and where the system will be located on the roof.

Design Rules

The area that the C21e system will cover on the roof has been calculated using the following design rules (Diagram 2). These rules exist to ensure a weathertight installation.

- Allow a minimum of one conventional tile between the edge C21e units and the verge or equivalent obstruction.
- Allow at least one course of conventional tiles below the C21e area, and at least one course of conventional tiles above the C21e area.
- Lay C21e tiles broken bond to match the fixing specification of the conventional tiles.
- The system is central to the roof and not close to any vents.

See Appendix 4 for more detail of required space for each C21e system size.

Consult the Site Manager or System Designer if the drawings do not conform to the above design rules.

The example C21e system in this guide uses 4 columns of 15 rows.

Roof Installation Guide

4. Roof Preparation *continued*

- When the layout and location of the C21e system has been identified, mark this area on the roof.

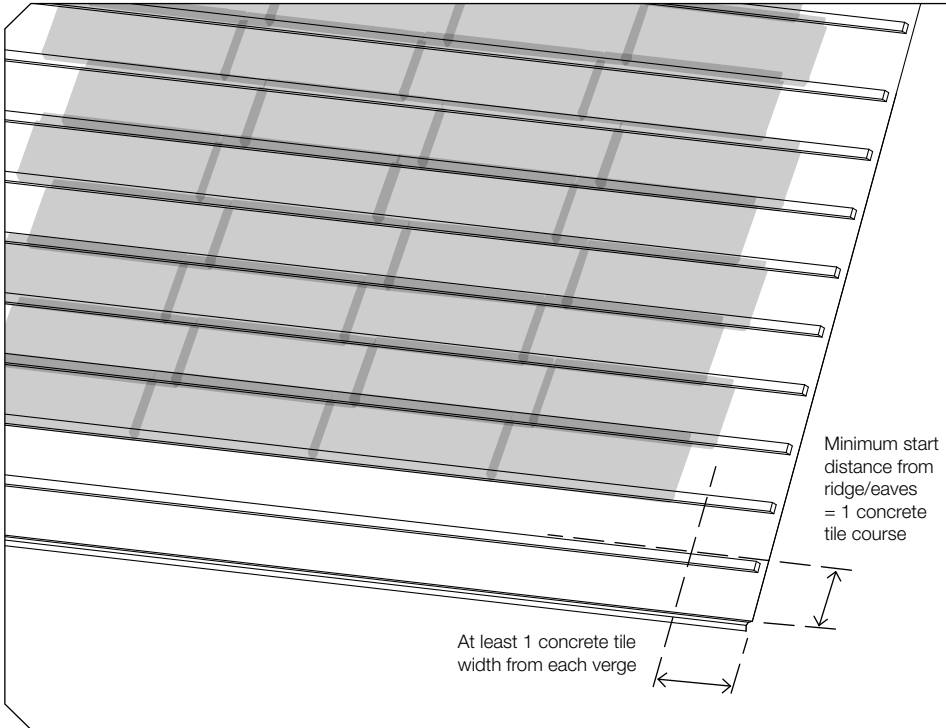


Diagram 2

4.3 Positioning the Field Cables

Before fixing the C21e units you must consider how the cables are connected and where they enter the roof space.

- Refer to the string diagram for an overview of cable positions and connections (Appendix 2).
- Identify where the Field Cables will need to enter the roof (at a suitable lap in the membrane).

5. C21e Installation

5.1 Laying the Bottom Section of Roof Tiles

- Lay the bottom courses of conventional roof tiles using standard practice from the eaves up to the area marked for the C21e system.



TIP: Before fixing the course of roof tiles below the marked area, check the spacing. Each C21e replaces four roof tiles; they should be laid broken bond to match the roof tiles (see Diagram 3 below). In some situations you may need to adjust the shunt of the roof tiles.

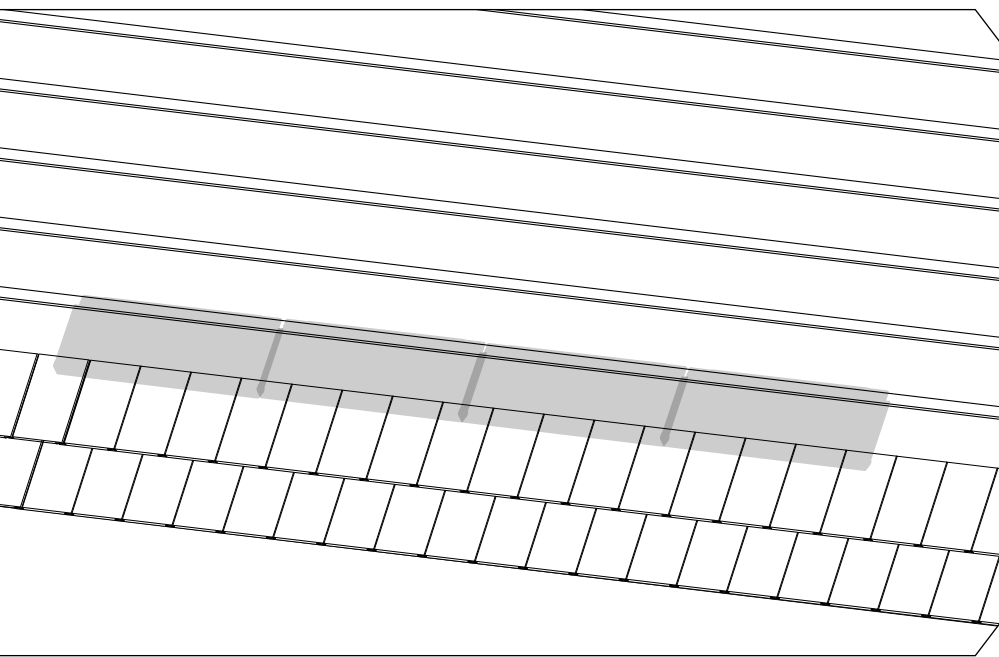


Diagram 3

Roof Installation Guide

5. C21e Installation *continued*

5.2 Laying the Right Section of Roof Tiles

- Install roof tiles to the right side of the C21e area as you would at a verge (i.e. using a whole tile or a tile and a half). This will ensure weather tightness and match the grain of the tiles below.

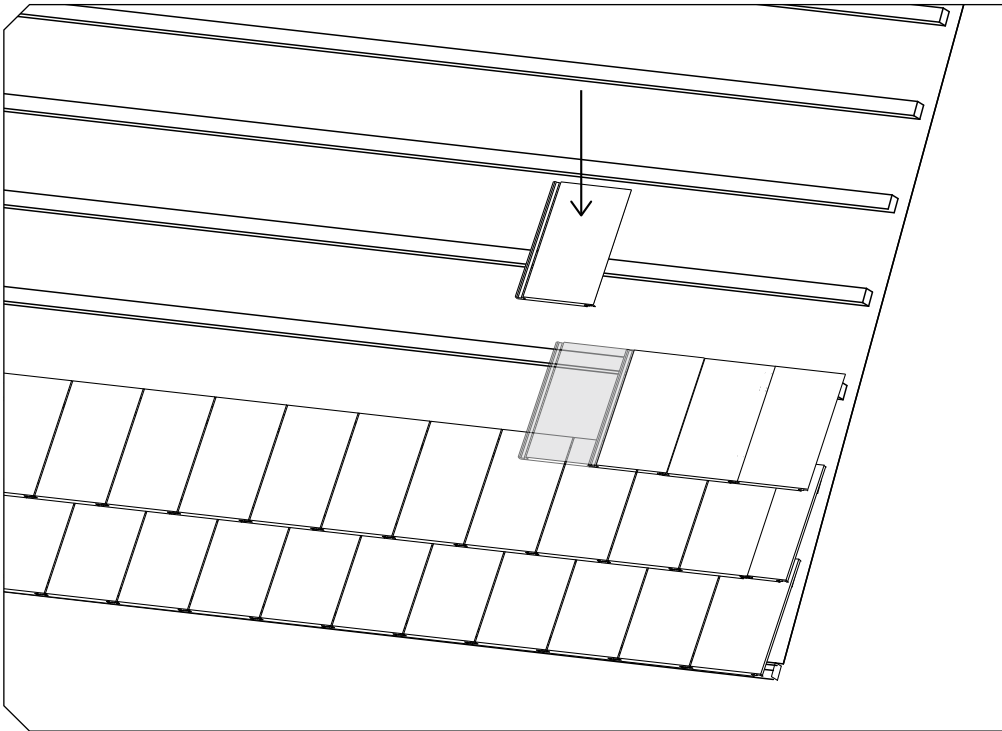


Diagram 4



WARNING: Make sure there is at least one roof tile between the edge of the C21e area and the verge of the roof (or equivalent obstruction).

5. C21e Installation *continued*

5.3 Fitting the First C21e Column

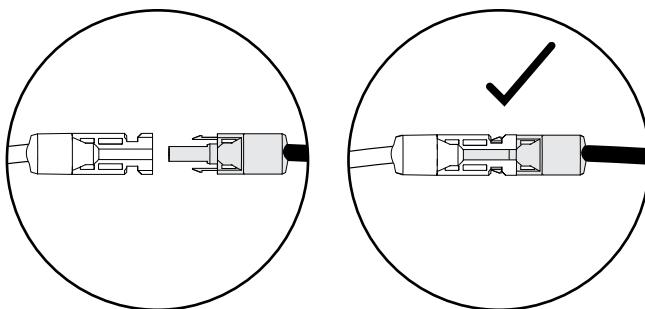
It is advised that the C21e units are laid column by column. This allows the C21e cables to be connected and tested as you go.

The first column of C21e units should begin on the lowest batten in the marked area and sit flush with the concrete tiles on the right.

- Lay the first C21e face down as shown in Diagram 5 and pass both C21e cables under the batten.
- Firmly connect the black C21e cable to the end of the Return Cable (Diagram 5a).
- Pass the Return Cable from the C21e tile, under the battens, to the top of the column.



TIP: The longer Field Cables (that enter the roof space) look similar to the Return Cables. To help distinguish between them, the Return Cables have a red tag and the Field Cables are marked with one of the following symbols: ★ ● ■ ▲



WARNING: Make sure there is no gap between any connectors as this will cause the system to fail.



TIP: To ensure a firm connection, push the connectors together until they click.

Roof Installation Guide

5. C21e Installation *continued*

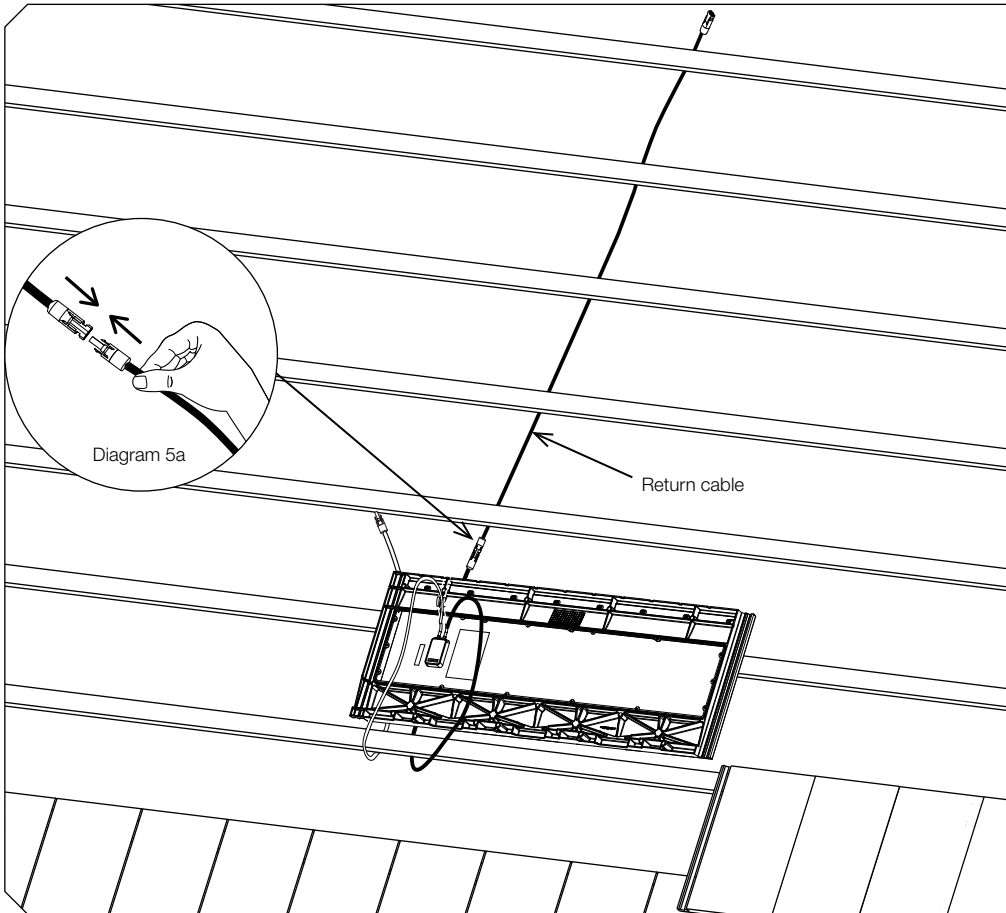


Diagram 5



WARNING: Ensure that there are no upstanding nails that could damage the glass surface of the C21e.



WARNING: Make sure that when you lay the Return Cables and C21e cables up the roof they lie close to each other. This is important throughout the installation to prevent electrical interference.

5. C21e Installation *continued*

- Turn the C21e unit the correct way round with the nib resting on the batten, as with a normal tile. The frame should interlock with the tile to its right (Diagram 6a).
- Use an electric screw driver and the screws provided to fix the C21e unit to the batten through the holes on the C21e frame (Diagram 6).

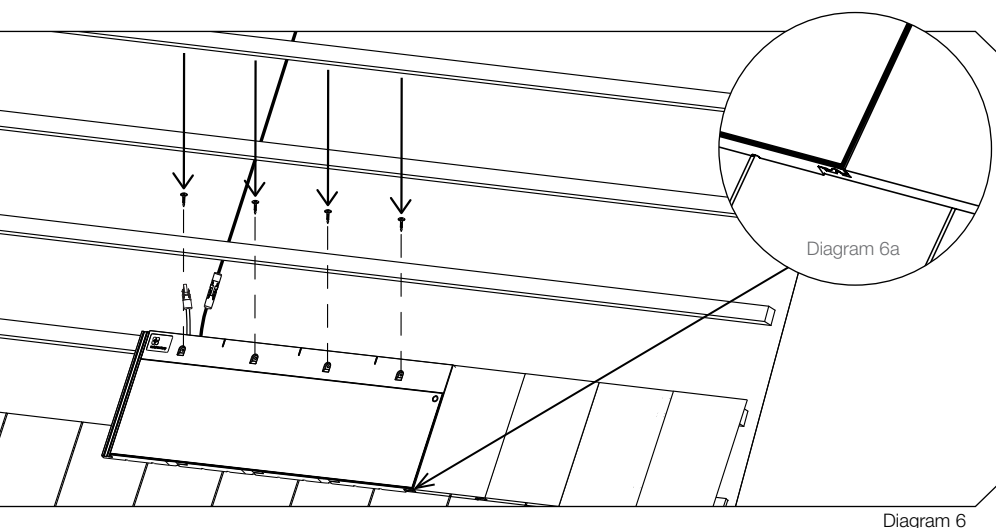


Diagram 6



WARNING: Only use the 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. Use the correct number of screws every time. Using any other screws will invalidate the warranty.



WARNING: Do NOT use a hammer to fix the C21e.



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



TIP: Work from right to left when tightening the screws to ensure the C21e tile fits correctly.

Roof Installation Guide

5. C21e Installation *continued*

- Install the right set of roof tiles on the batten above, ready for the next C21e unit, as explained in 5.2.
- Lay the next C21e face down on the batten. Firmly connect its black cable to the red cable from the C21e on the course below.

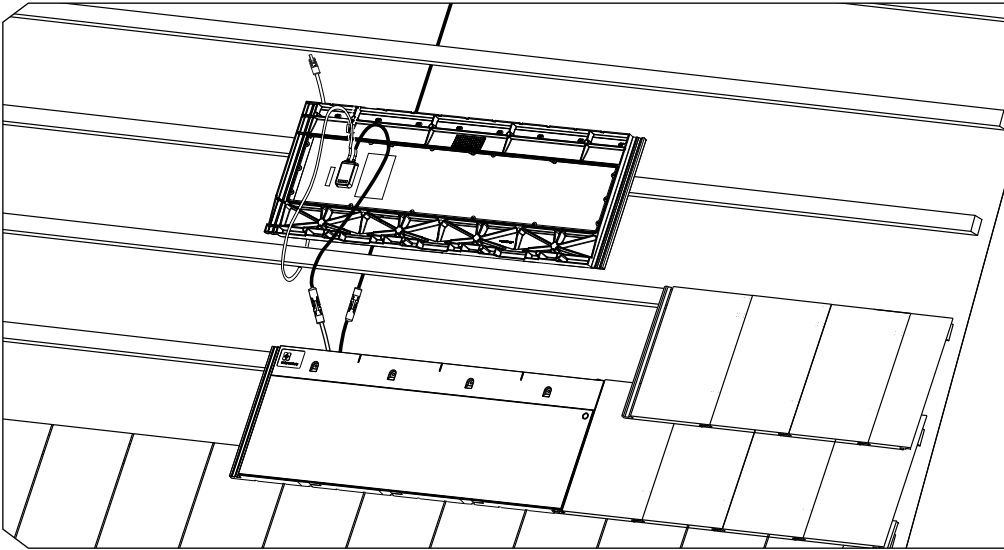


Diagram 7

- Pass the red cable from this C21e under the batten above ready to connect to the next C21e in the column.



WARNING: Ensure that the C21e cables lay close to the Return Cable and that the cables are not trapped between the tile and batten when fixing the C21e units.

- Turn the C21e unit the correct way round with the nib resting on the batten, as with a normal tile.
- Fix the C21e to the batten using the screws provided.



WARNING: The lower edge of the C21e frame should sit on the frame of the C21e below, but should never extend more than 20 mm onto the glass surface, or the cells will be shaded voiding the warranty.

- Lay the remaining C21e units in the column following the same method.

5. C21e Installation *continued*

5.4 Checking the C21e Cable Connections

- At the top of each column, ensure that the C21e cables 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 cable connections (Diagram 8).

- To carry out a string check follow the instructions in Appendix 3.

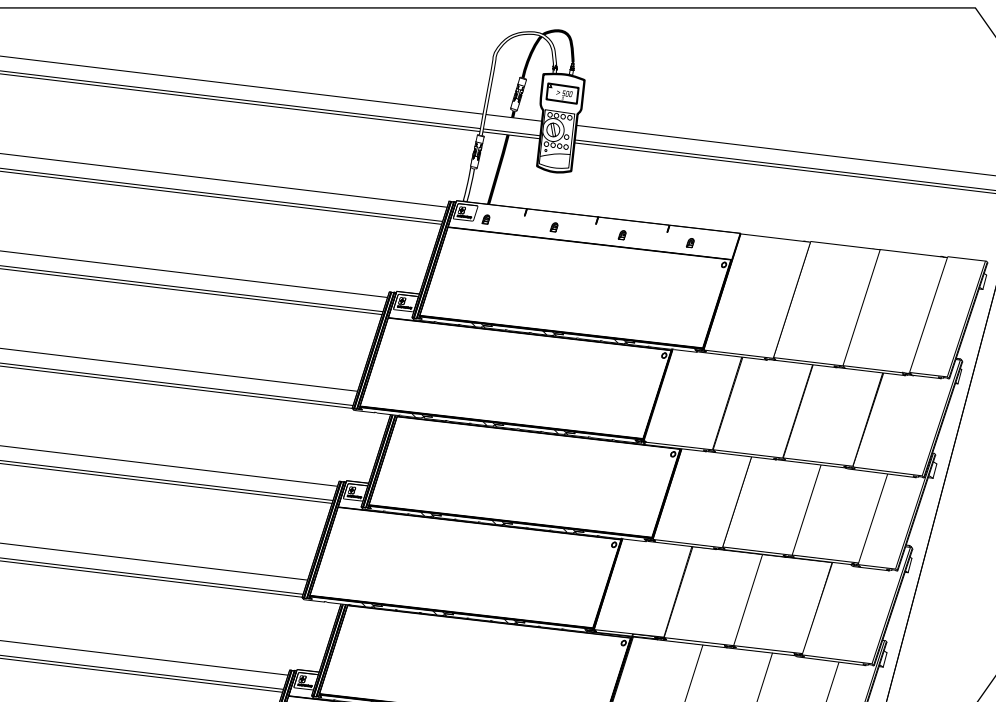


Diagram 8



WARNING: Always use safety leads with the string checker.
Never use standard meter probes to avoid risk of electrocution.

Roof Installation Guide

5. C21e Installation *continued*

5.5 Laying the Remaining C21e Columns

Start the next C21e column and follow the same method as described in 5.3:

- Lay the C21e face down and pass both C21e cables under the batten.
- Firmly connect the black C21e cable to a Return Cable ensuring no gap in connection.
- Run the Return Cable to the top of the column.
- Turn the C21e unit the correct way round with the nib resting on the batten, as with a normal tile.
- Ensure the frame of this tile links with the frame of the C21e to its right.
- Fix the C21e to the batten using the screws provided.
- Complete the column and carry out a string check as described in 5.4.
- Fit any remaining columns following the method above.

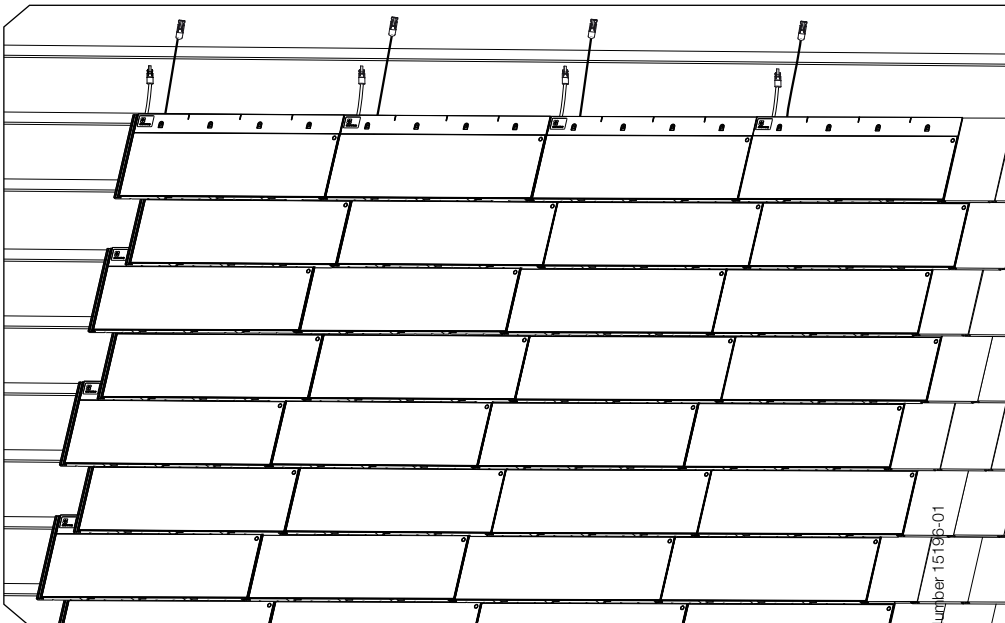


Diagram 9

5. C21e Installation *continued*

5.6 Completing the Cabling

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.

The following example explains how to connect a two string, 60 C21e unit system. For single string systems please refer to Appendix 2. Consult Appendix 4 to confirm the number of strings for the system size you are installing.

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 Diagram 10 for details.

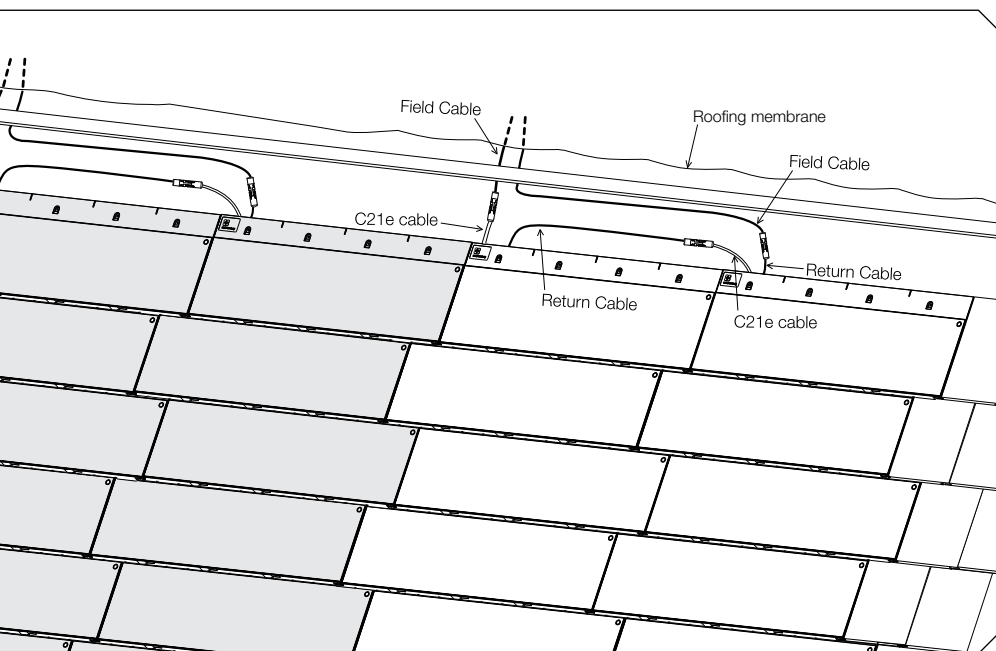


Diagram 10



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.

Roof Installation Guide

5. C21e Installation *continued*

For the first String:

- Start at the top of the first (right) C21e column and connect the 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 C21e column connect the remaining red C21e cable to a Field Cable (see Diagram 10).
- 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 2. 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.
- Take the ends of the Field Cables and push them through a lap in the membrane at the top of the last column in the String and into the loft space.

For the second String:

- Repeat the steps above starting at the top of the next column.
- You should be left with two identical arrays, with an equal number of C21e units in each string, as shown in Diagram 11 below.

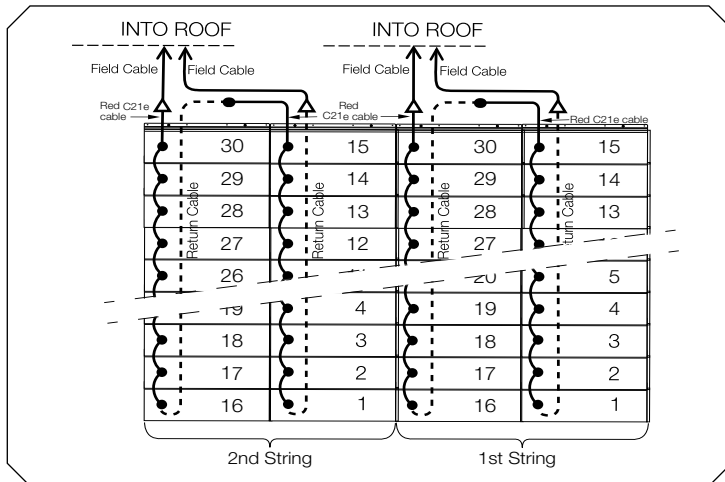


Diagram 11



WARNING: Ensure that the Field Cables and Return Cables at the top of the installation lie close to each other.

6. Completing the Tiling

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 concrete tiles can be laid.

- Install the concrete tiles on the left side of the C21e units as you would at a verge (i.e. using a whole tile or a tile and a half). This will ensure weather tightness and match the grain of the tiles below.

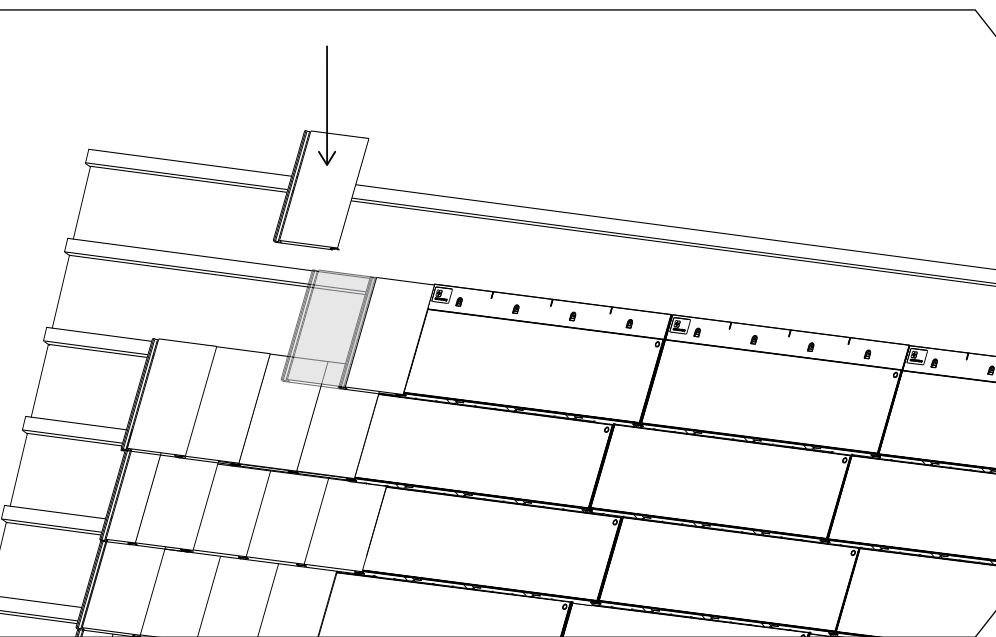


Diagram 12

- Lay a course of conventional tiles on the batten above the C21e units.



WARNING: The headlap should never exceed 120mm. A headlap greater than this will cover the PV cells and cause the system to fail, invalidating the warranty.

Roof Installation Guide

6. Completing the Tiling *continued*

- Continue laying the tiles for the remainder of the roof using standard practice.

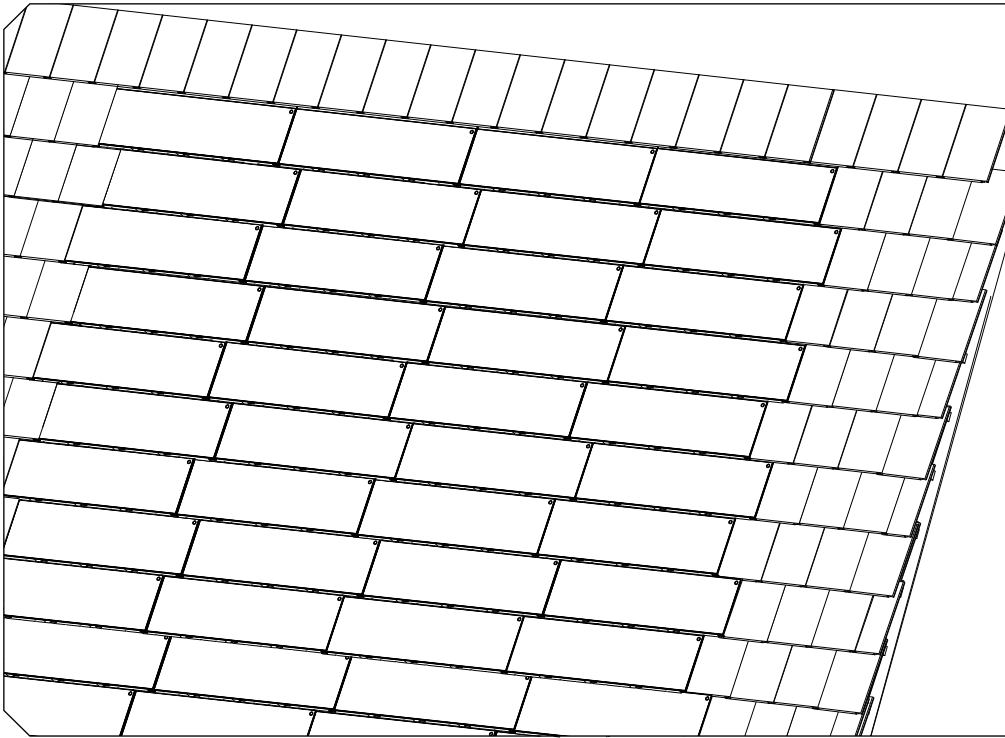


Diagram 13



WARNING: Take care not to drop tools or materials on the C21e units.



NOTE: Please remember to dispose of all unused materials safely, and recycle where possible.

7. 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.

Roof Installation Guide

8. Warranty

Product Warranty for C21e solar electric roof tiles in United Kingdom and Ireland

Model number: C21e Interlocking Tile M50-S38

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 rating¹ 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.

¹ 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/m², 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.

8. Warranty *continued*

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.

Roof Installation Guide

8. Warranty *continued*

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.


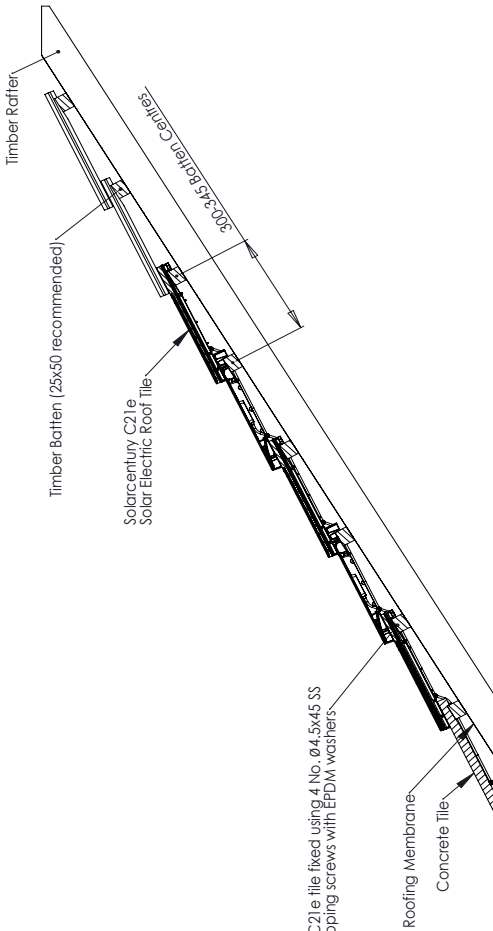
If after reviewing the Product Guide you are still concerned that the Product is not performing as it should, please contact your installer or maintainer in the first instance.

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:

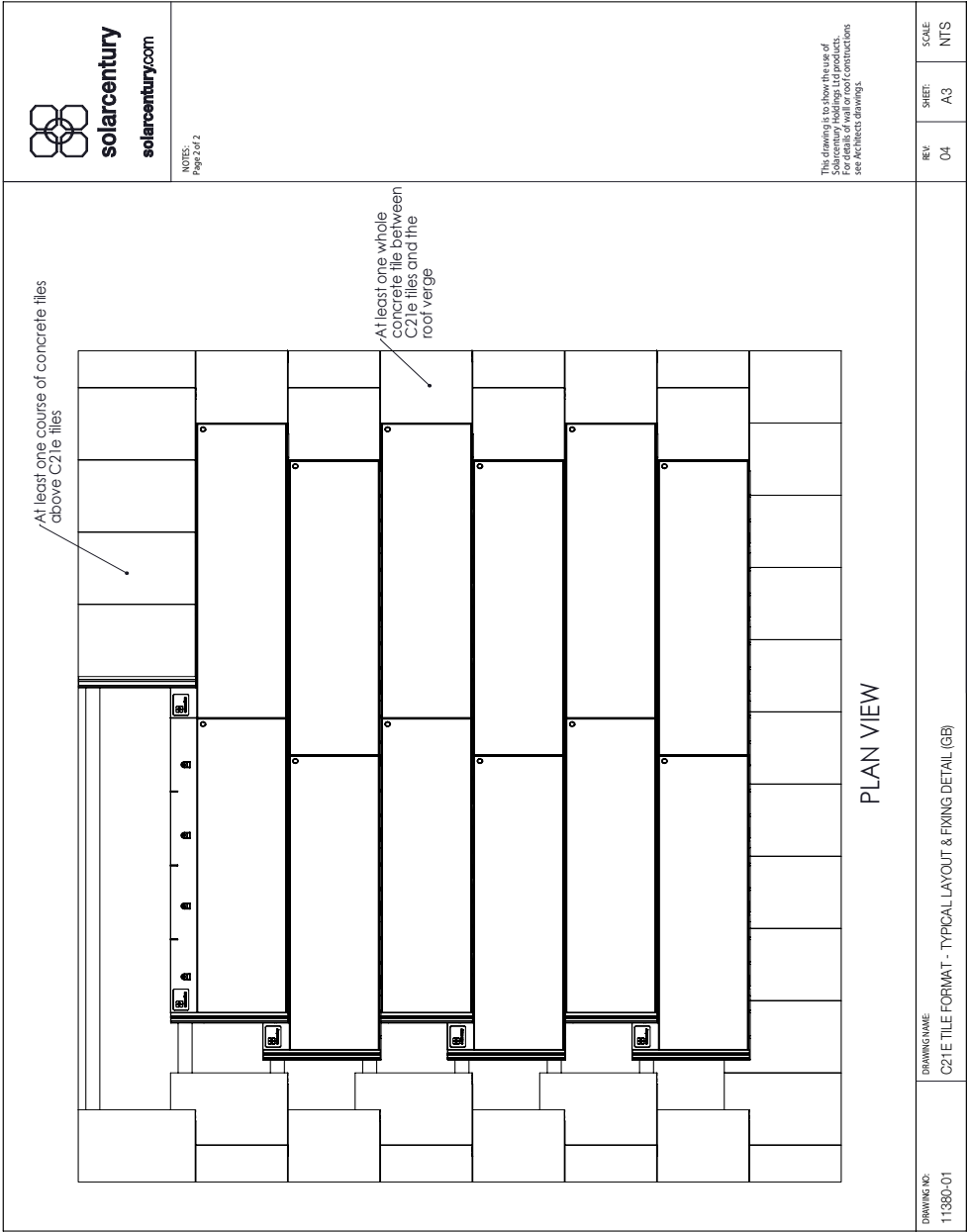
- Confirmation that you have reviewed the Product Guide but the results indicate that the Product may be failing to perform to the guaranteed standard;
- Confirmation that conditions (a) to (k) above are met;
- A detailed description of the Product failure, including supporting images;
- Adequate documentation 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
91-94 Lower Marsh
London SE1 7AB
020-7803-0180
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Appendix 1: C21e Tile Schematic - Typical Layout & Fixing Detail (GB)

 solarcentury solarcentury.com	<p>NOTES: Page 1 of 2</p> <p>This drawing is to show the use of Solarcentury C21e tiles on roof constructions. For details of wall or roof constructions see Architect drawings.</p>	<p>REV: 04</p> <p>SHEET: A3</p> <p>SCALE: NTS</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">  <p style="text-align: center;">SIDE VIEW</p> </div> <div style="width: 35%; text-align: right;"> <p>Timber Rafter</p> <p>Timber Batten (25x50 recommended)</p> <p>Solarcentury C21e Solar Electric Roof Tile</p> <p>300-345 Batten Centres</p> <p>Each C21e tile fixed using 4 No. Ø4.5x45 SS self tapping screws with EPDM washers</p> <p>Roofing Membrane</p> <p>Concrete Tile</p> </div> </div>		
DRAWING NO: 11380-01	DRAWING NAME: C21E TILE FORMAT - TYPICAL LAYOUT & FIXING DETAIL (GB)	

Roof Installation Guide



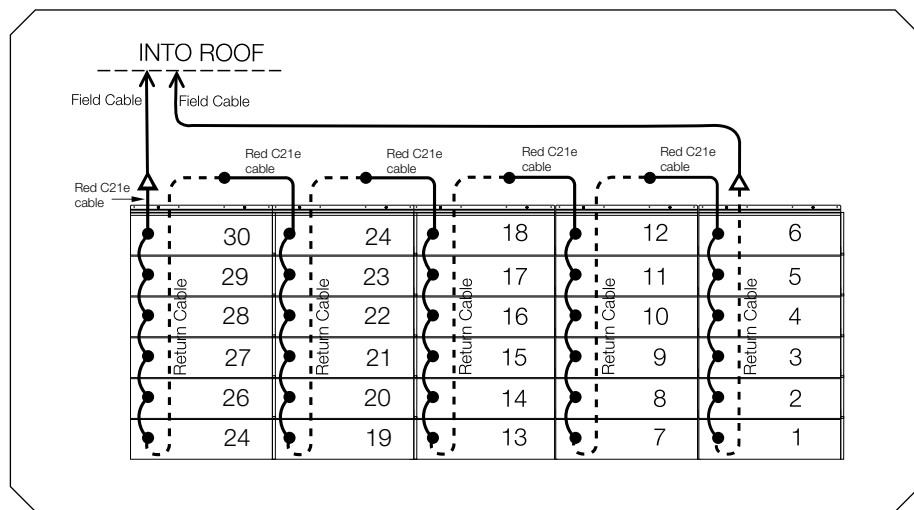
Appendix 2: String Layouts

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 Appendix 4.

Single String Systems (12 to 36, 48 and 54 units)

For these system sizes, all of the C21e units are connected together to form a single String, as shown in the example below:



30 C21e unit example

Two String Systems (42 and 60 to 80 C21e units)

For these system sizes, 2 strings are needed irrespective of the physical roof layout, as shown in the worked example in this guide, Section 5.6.

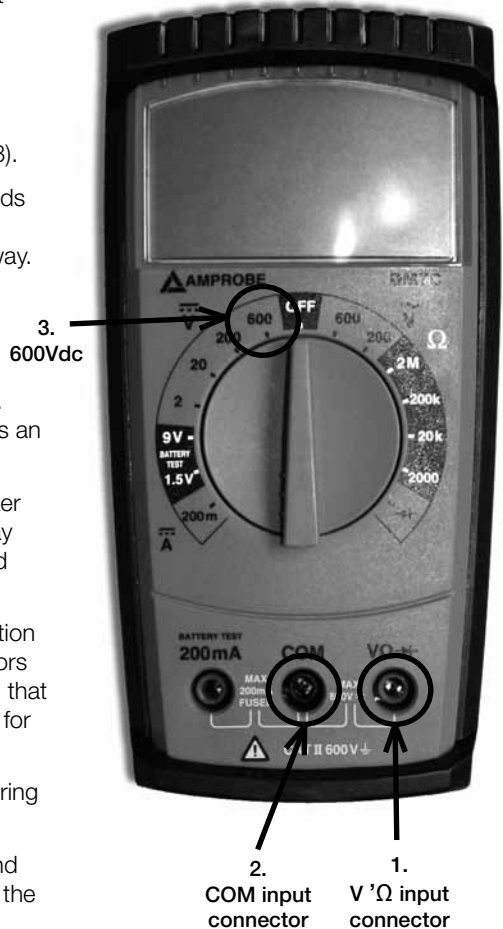


WARNING: The number of strings is dependent on the System Design for the size of the C21e array. This should not be changed. (See Appendix 4 for more details.)

Roof Installation Guide

Appendix 3: String Checker User Guide

1. Connect the red test lead to the V' Ω 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 units. Note the connectors will only connect one way.
4. The display will now read the DC voltage produced by the C21e Units.
5. The voltage will vary according to the amount of daylight falling on the C21e Units. Please refer to the table on the back page 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.

Appendix 4: Component List and Roof Dimensions

C21e System Size			C21e Layout Option ⁽¹⁾		Standard Roof Components Provided ⁽²⁾		
Number of C21e Units	kWp	Strings	Rows	Columns	Return Cables Qty ⁽⁴⁾ x Length (m)	Pairs of Field Cables	Screws
12	0.60	1	12	1	1 x 4.5m	1	48
			6	2	2 x 3m		
			4	3	3 x 2m		
			3	4	4 x 2m		
			2	6	6 x 2m		
			1	12	n/a		
18	0.90	1	18	1	1 x 6m	1	72
			9	2	2 x 4.5m		
			6	3	3 x 3m		
			3	6	6 x 2m		
			2	9	9 x 2m		
			1	18	n/a		
24	1.20	1	12	2	2 x 4.5m	1	96
			8	3	3 x 3m		
			6	4	4 x 3m		
			4	6	6 x 2m		
			3	8	8 x 2m		
			2	12	12 x 2m		
30	1.50	1	15	2	2 x 6m	1	120
			10	3	3 x 4.5m		
			6	5	5 x 3m		
			5	6	6 x 2m		
			3	10	10 x 2m		
			2	15	15 x 2m		
36	1.80	1	18	2	2 x 6m	1	144
			9	4	4 x 4.5m		
			6	6	6 x 3m		
			3	12	12 x 2m		
			2	18	18 x 2m		
			7	6	6 x 3m		
42	2.10	2	3	14	14 x 2m	2	168
48	2.40	1	12	4	4 x 4.5m	1	192
			8	6	6 x 3m		
			6	8	8 x 3m		
			4	12	12 x 2m		
			3	16	16 x 2m		
54	2.70	1	9	6	6 x 4.5m	1	216
			3	18	18 x 2m		
			15	4	4 x 6m		
60	3.00	2	10	6	6 x 4.5m	2	240
			6	10	10 x 3m		
			5	12	12 x 2m		
			3	20	20 x 2m		
			11	6	6 x 4.5m		
66	3.30	2	11	6	6 x 4.5m	2	264
72	3.60	2	18	4	4 x 6m	2	288
			12	6	6 x 4.5m		
			9	8	8 x 4.5m		
			6	12	12 x 3m		
			4	18	18 x 2m		
78	3.90	2	13	6	6 x 4.5m	2	312
80	4.00	2	20	4	4 x 10m	2	320
			10	8	8 x 4.5m		

- Notes:
- (1) Additional layouts may be possible for some system sizes, but will require additional Return Cables to those provided in the Standard Systems.
 - (2) The components provided in each system will support the layouts as shown, a small quantity of spare screws are provided.
 - (3) One Return Cable is provided per C21e column. The Cable length is dependent on the number of C21e rows in the layout.
 - (4) The dimensions stated are for guidance and are based on the C21e Design Rules for the compatible tiles listed on the datasheet.

Please refer to the C21e Tile datasheet for full specification details.

Roof Installation Guide

C21e System Size		C21e Layout Option ⁽¹⁾		Dimensions of C21 Array (laid broken bond, excluding border)		Total Recommended Roof Dimensions Required (including the tile border ⁽⁴⁾ , for compatible tiles with a 90mm headlap)		
Number of C21e units	kWp	Rows	Columns	Length (m)	Width (m)	Length (m)	Width (m)	Area (m²)
12	0.60	12	1	3.96	1.33	4.62	1.93	8.92
		6	2	1.98	2.51	2.64	3.11	8.21
		4	3	1.32	3.69	1.98	4.29	8.49
		3	4	0.99	4.87	1.65	5.47	9.03
		2	6	0.66	7.23	1.32	7.83	10.34
		1	12	0.33	14.31	0.99	14.91	14.76
18	0.90	18	1	5.94	1.33	6.60	1.93	12.74
		9	2	2.97	2.51	3.63	3.11	11.29
		6	3	1.98	3.69	2.64	4.29	11.33
		3	6	0.99	7.23	1.65	7.83	12.92
		2	9	0.66	10.77	1.32	11.37	15.01
		1	18	0.33	21.39	0.99	21.99	21.77
24	1.20	12	2	3.96	2.51	4.62	3.11	14.37
		8	3	2.64	3.69	3.30	4.29	14.16
		6	4	1.98	4.87	2.64	5.47	14.44
		4	6	1.32	7.23	1.98	7.83	15.50
		3	8	0.99	9.59	1.65	10.19	16.81
		2	12	0.66	14.31	1.32	14.91	19.68
30	1.50	15	2	4.95	2.51	5.61	3.11	17.45
		10	3	3.3	3.69	3.96	4.29	16.99
		6	5	1.98	6.05	2.64	6.65	17.56
		5	6	1.65	7.23	2.31	7.83	18.09
		3	10	0.99	11.95	1.65	12.55	20.71
		2	15	0.66	17.85	1.32	18.45	24.35
36	1.80	18	2	5.94	2.51	6.60	3.11	20.53
		9	4	2.97	4.87	3.63	5.47	19.86
		6	6	1.98	7.23	2.64	7.83	20.67
		3	12	0.99	14.31	1.65	14.91	24.60
		2	18	0.66	21.39	1.32	21.99	29.03
42	2.10	7	6	2.31	7.23	2.97	7.83	23.26
		3	14	0.99	16.67	1.65	17.27	28.50
		12	4	3.96	4.87	4.62	5.47	25.27
48	2.40	8	6	2.64	7.23	3.30	7.83	25.84
		6	8	1.98	9.59	2.64	10.19	26.90
		4	12	1.32	14.31	1.98	14.91	29.52
		3	16	0.99	19.03	1.65	19.63	32.39
		9	6	2.97	7.23	3.63	7.83	28.42
54	2.70	3	18	0.99	21.39	1.65	21.99	36.28
		15	4	4.95	4.87	5.61	5.47	30.69
		10	6	3.3	7.23	3.96	7.83	31.01
60	3.00	6	10	1.98	11.95	2.64	12.55	33.13
		5	12	1.65	14.31	2.31	14.91	34.44
		3	20	0.99	23.75	1.65	24.35	40.18
		11	6	3.63	7.23	4.29	7.83	33.59
72	3.60	18	4	5.94	4.87	6.60	5.47	36.10
		12	6	3.96	7.23	4.62	7.83	36.17
		9	8	2.97	9.59	3.63	10.19	36.99
		6	12	1.98	14.31	2.64	14.91	39.36
		4	18	1.32	21.39	1.98	21.99	43.54
78	3.90	13	6	4.29	7.23	4.95	7.83	38.76
80	4.00	20	4	6.6	4.87	7.26	5.47	39.71
		10	8	3.3	9.59	3.96	10.19	40.35

Notes:

Roof Installation Guide

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 Slates 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					

