



## Technical Data Sheet

# INVISIBLE SOLAR Rooftile

Photovoltaic module shaped like architectural element made of a polymeric compound non-toxic and recyclable. Built-in the module body there are monocrystalline silicon cells.

**4,5 Wp**  
INVISIBLE SOLAR ROOFTILE

**15** Rooftiles  
PER SQUARE METRE

**67,5 Wp**  
PER SQUARE METRE

EXAMPLE OF DIMENSIONS FOR A INVISIBLE SOLAR ROOFTILE SYSTEM

**1** kWp

**223** Rooftiles

**15** m<sup>2</sup>

### MODULE DATA

Dimensions (cm)	45.5 x 18 x 14 x 7(height)
Weight (kg)	1.50
Working temperature	-40°C / +85°C
Maximum static load (kg)	500,00 per piece
Protection	IP68
Flammability (UL94)	HB
Connections	screw connector

### MAIN FEATURES



#### Architectonic and aesthetic integration

Indistinguishable from terracotta can replace existing tiles.



#### Self-cleaning and de-polluting

The photocatalytic surface naturally activate itself endless.



#### Chemical and mechanical resistance

Not fear chemical solvents and atmospheric agents. Excellent resistance to compression and impact.



#### Non-toxic and recyclable materials

Are used non-toxic materials only, also from natural origins or resulting from the reuse. All recyclable.

### DISPOSAL AND RECYCLING STEPS

#### 1. Incineration

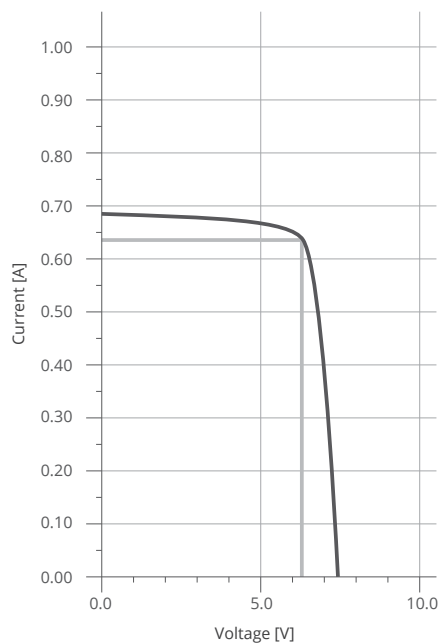
Compound will be reduced to non-toxic and reusable ashes (eg. making mixtures for building materials) when heated to a temperature of above 600°C. The reduction to ashes of polymers frees the built-in materials making them available individually.

#### 2. Reuse

Powders of backed clay, stone and so return to their original state. Copper connections are melted and available for be used again. Even silicon can be reused .

### ELECTRICITY PRODUCTION DATA

Isc (A)	Short-circuit current	0.76
Voc (V)	Open circuit voltage	7.48
Pp (W)	Peak power	4.5
Ipp (A)	Current at peak power	0.70
Vpp (V)	Voltage at peak power	6.39
Fill factor		79.48
Module $\eta$	Module efficiency	6.29
Celle $\eta$	Cell efficiency	9.77
Rser (Ohm)	Series resistance	0.805
Rsh (Ohm)	Series resistance	346.5



Measurement made at 25°C and 1.000W/m2.

### CERTIFICATIONS



28/10/2016



**dyaqua**  
INVISIBLE SOLAR

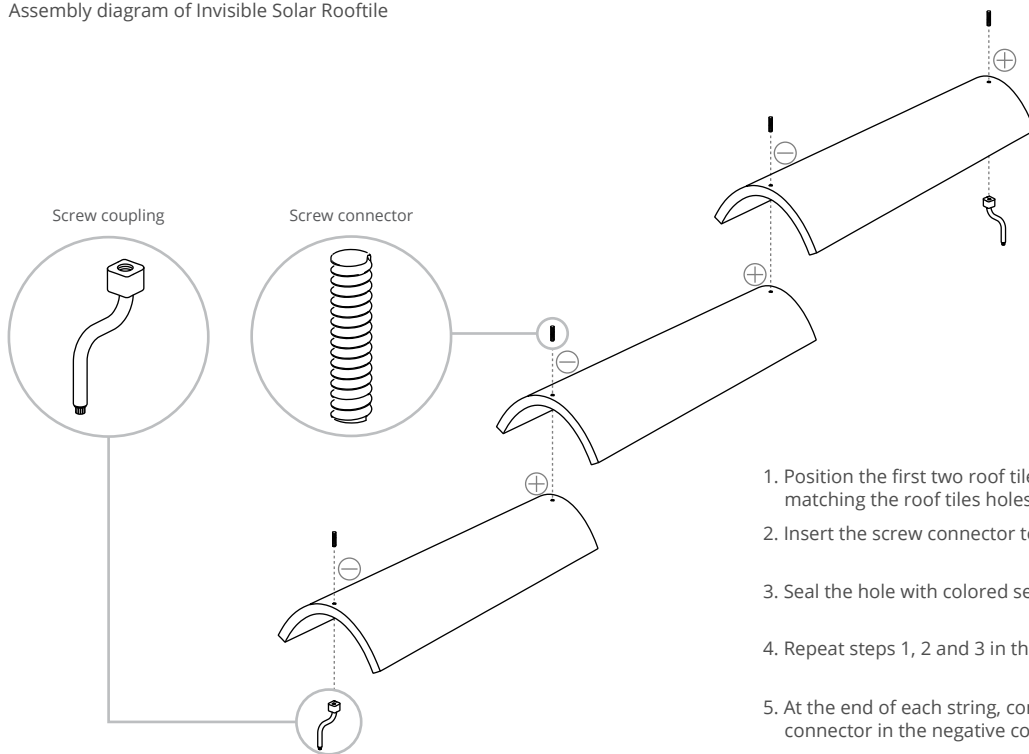
Web  
www.dyaqua.it

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## HOW TO INSTALL

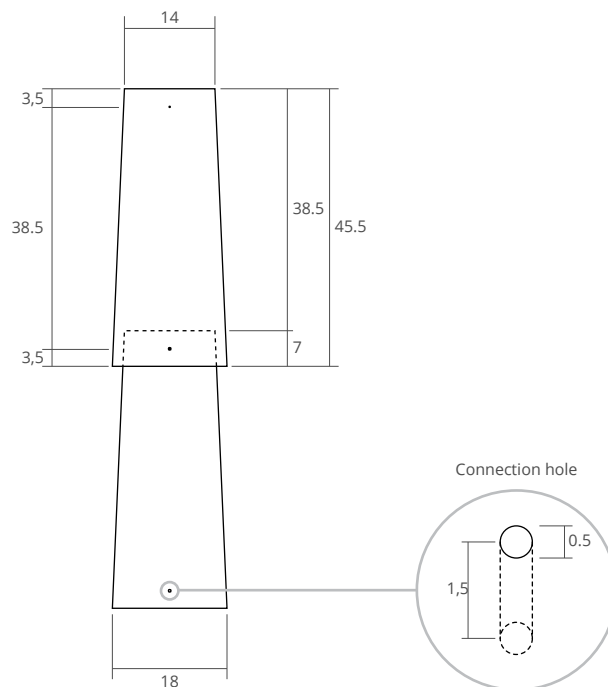
### Assembly diagram of Invisible Solar Rooftile



1. Position the first two roof tiles starting from the bottom of the roof matching the roof tiles holes.
2. Insert the screw connector to connect them to each other.
3. Seal the hole with colored sealant.
4. Repeat steps 1, 2 and 3 in the whole system area.
5. At the end of each string, connect the black screw coupling with a screw connector in the negative connection hole remained free.
6. At the beginning of each string, connect the red screw coupling (with bypass) with a screw connector in positive connection hole remained free.
7. Plug the screw couplings to the cables that lead to the inverter.

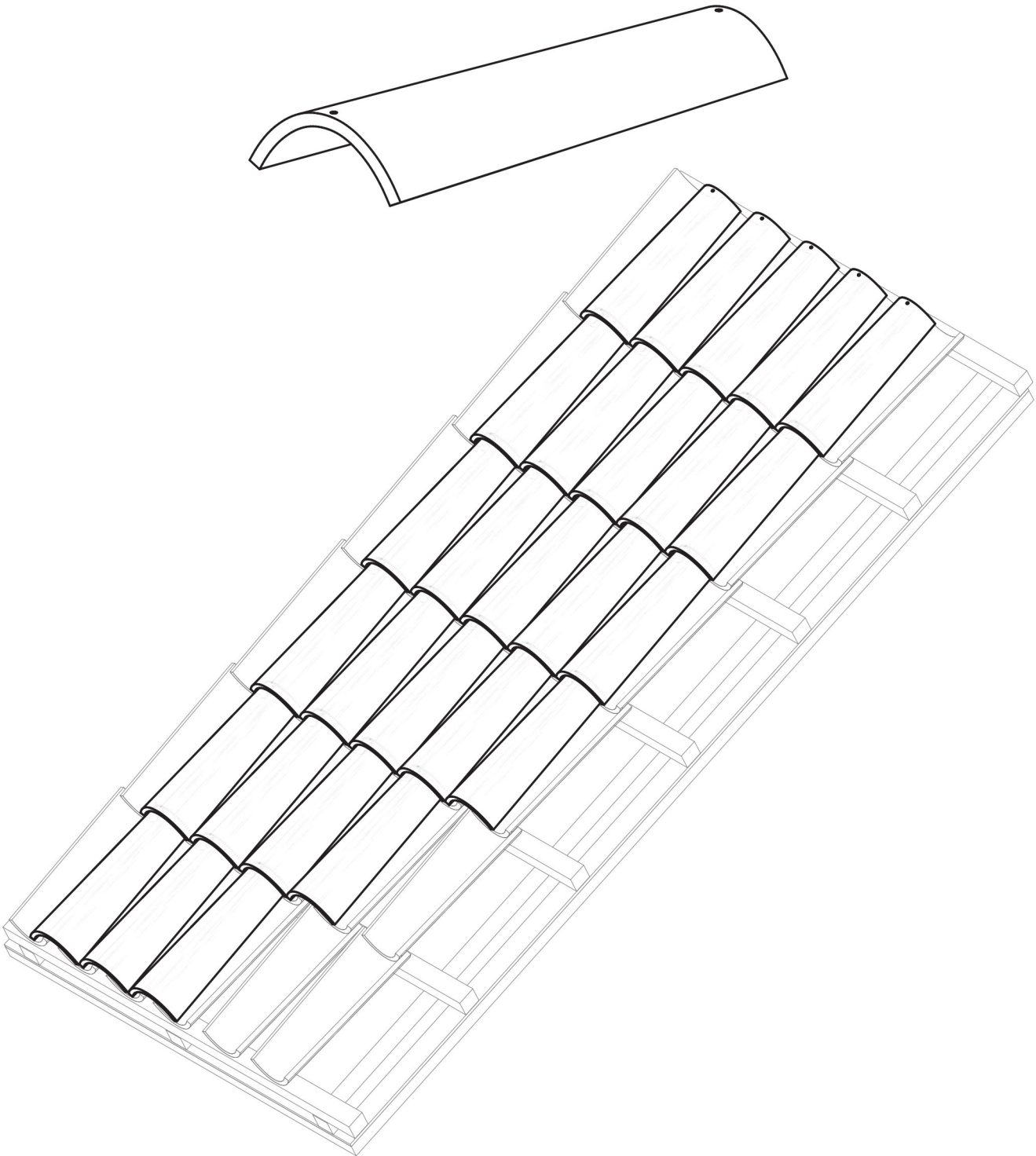
## DIMENSIONS

Scheme of measures of roof tile, overlapping and connection hole.



28/10/2016

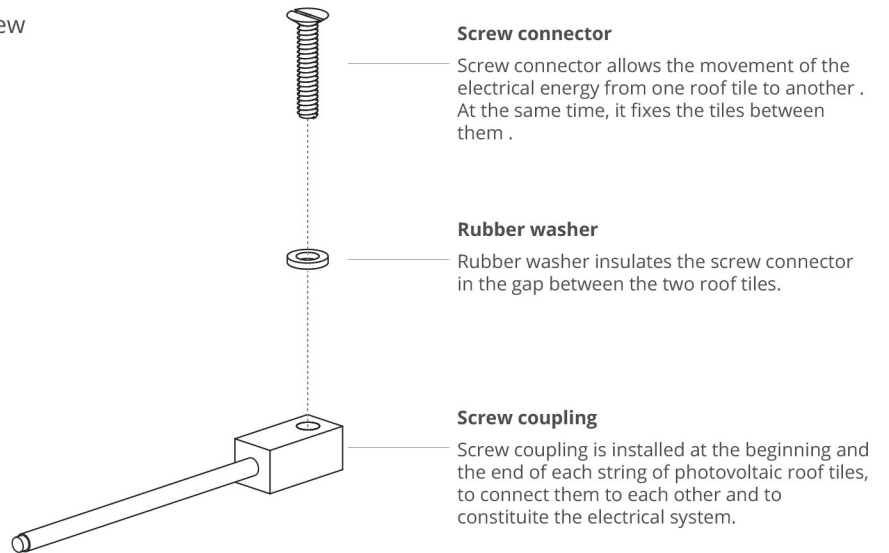
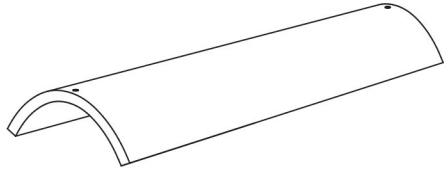
Invisible Solar Rooftile  
**INSTALLATION GUIDE**



dyaqua  
INVISIBLE SOLAR

## COMPONENTS

Dyaqua only provides Invisible Solar Rooftiles, screw connectors, rubber washers and screw couplings.



### Screw connector

Screw connector allows the movement of the electrical energy from one roof tile to another. At the same time, it fixes the tiles between them.

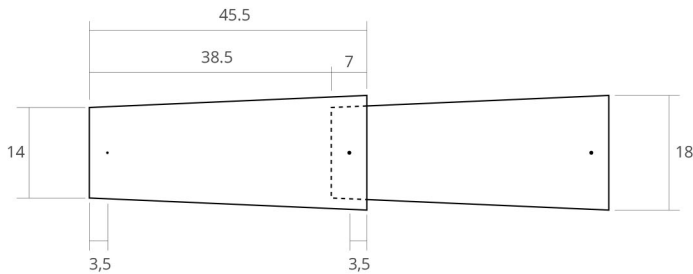
### Rubber washer

Rubber washer insulates the screw connector in the gap between the two roof tiles.

### Screw coupling

Screw coupling is installed at the beginning and the end of each string of photovoltaic roof tiles, to connect them to each other and to constitute the electrical system.

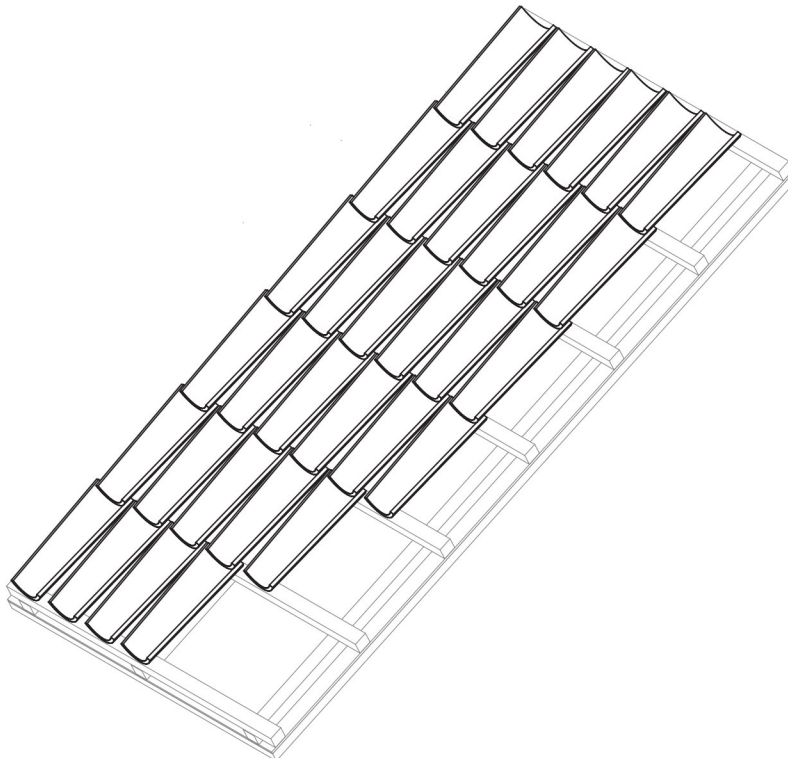
## DIMENSIONS



Invisible Solar Rooftile has a length of 45.5 cm. When installed, is surmounted by 7 cm by the next roof tile, so the surface area exposed to the sun is 38.5 cm.

These measures can't be changed because the screw connectors fix the roof tiles to one another.

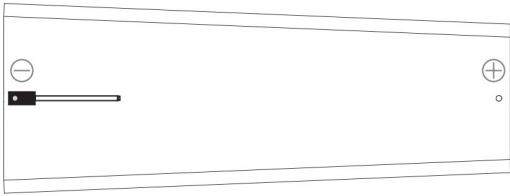
## STEPS



1

### Roof and underneath roof tiles

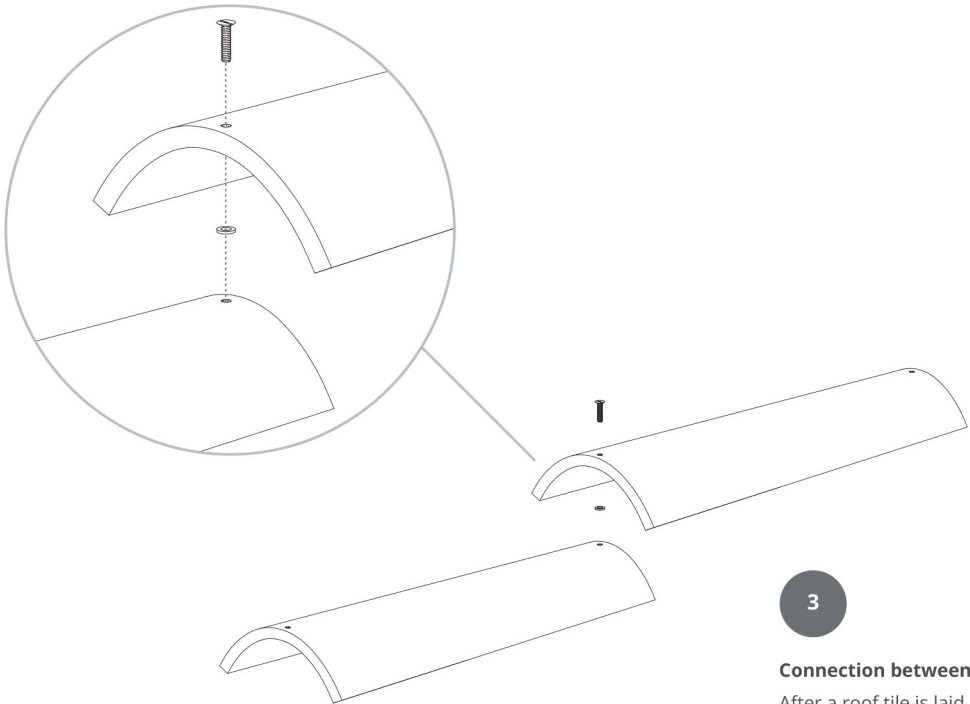
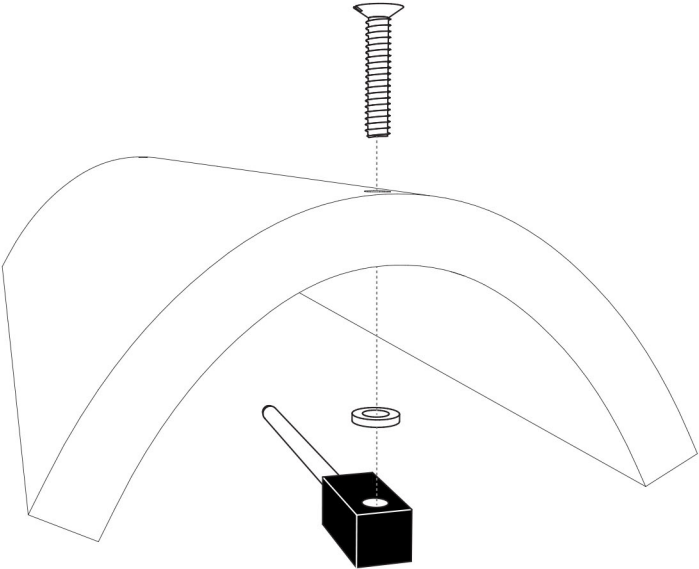
The overlap between Invisible Solar Rooftiles is fixed and, if necessary, you have to adjust the distance between the underneath roof tiles. Before you continue with the installation of the Invisible Solar Rooftiles, make sure the underneath roof tiles are accurately laid.



2

**Black screw coupling**

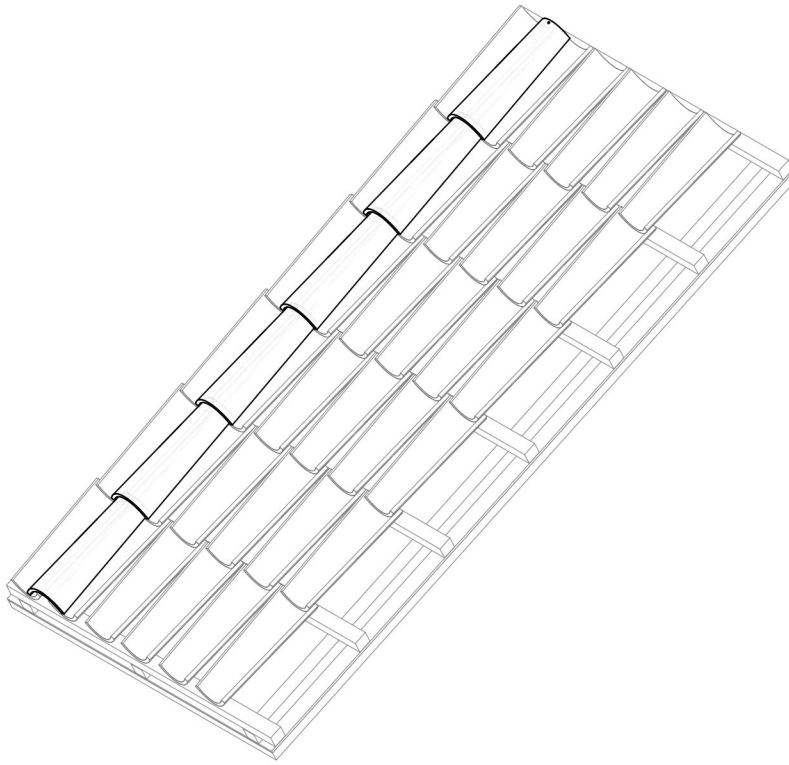
Connect the black screw coupling into the negative pole located in the larger head of the Invisible Solar Rooftile. Remember to insert the rubber washer between the screw coupling and the roof tile to isolate the screw connector.



3

**Connection between Invisible Solar Rooftiles**

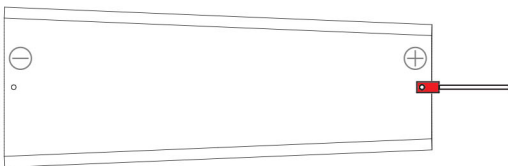
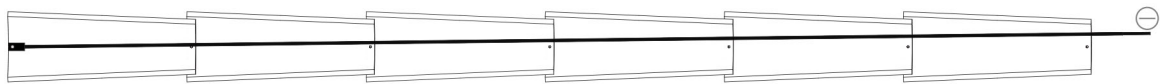
After a roof tile is laid, place a rubber washer so that it corresponds with the hole of its smaller head. Center the two holes while you are laying the larger head of the next roof tile and screw the screw connector.



4

**String**

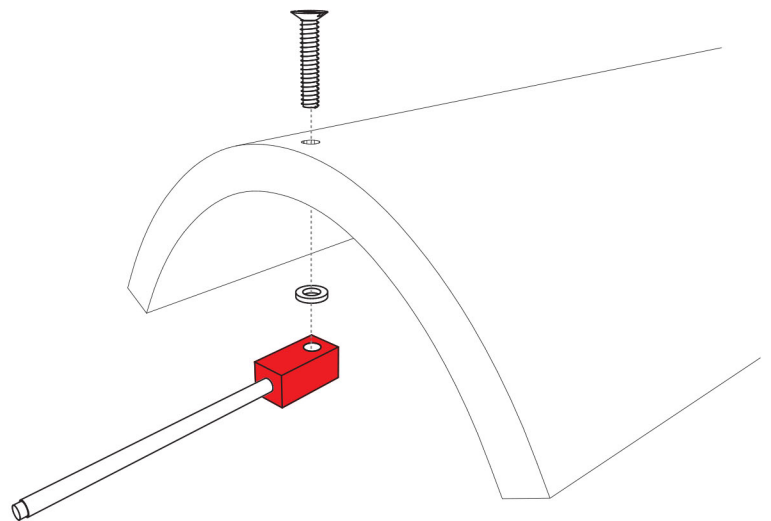
Start by laying the Invisible Solar Rooftile with the black coupling from the bottom of the roof pitch, the side with the coupling has to be put outwards. Continue with the installation by connecting the other tiles with screw connectors and extending the cable under the roof tiles up to the upper edge of the roof pitch. After you have composed the first string of Invisible Solar Rooftiles, seal the heads of Screw connectors with silicone, better if it has the same color of the roof tiles. Invisible Solar Rooftiles can be connected in series, therefore voltages will be summed of each tile.

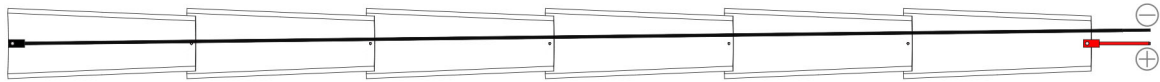


5

**Red screw coupling**

Connect the red screw coupling at the positive pole that corresponds to the smaller head of the Invisible Solar Rooftile. Remember to insert the rubber washer between the tile and the coupling. The red screw coupling contains an internal bypass diode to not allow the passage of electric current in the opposite direction and to avoid the lowering of the system yield.

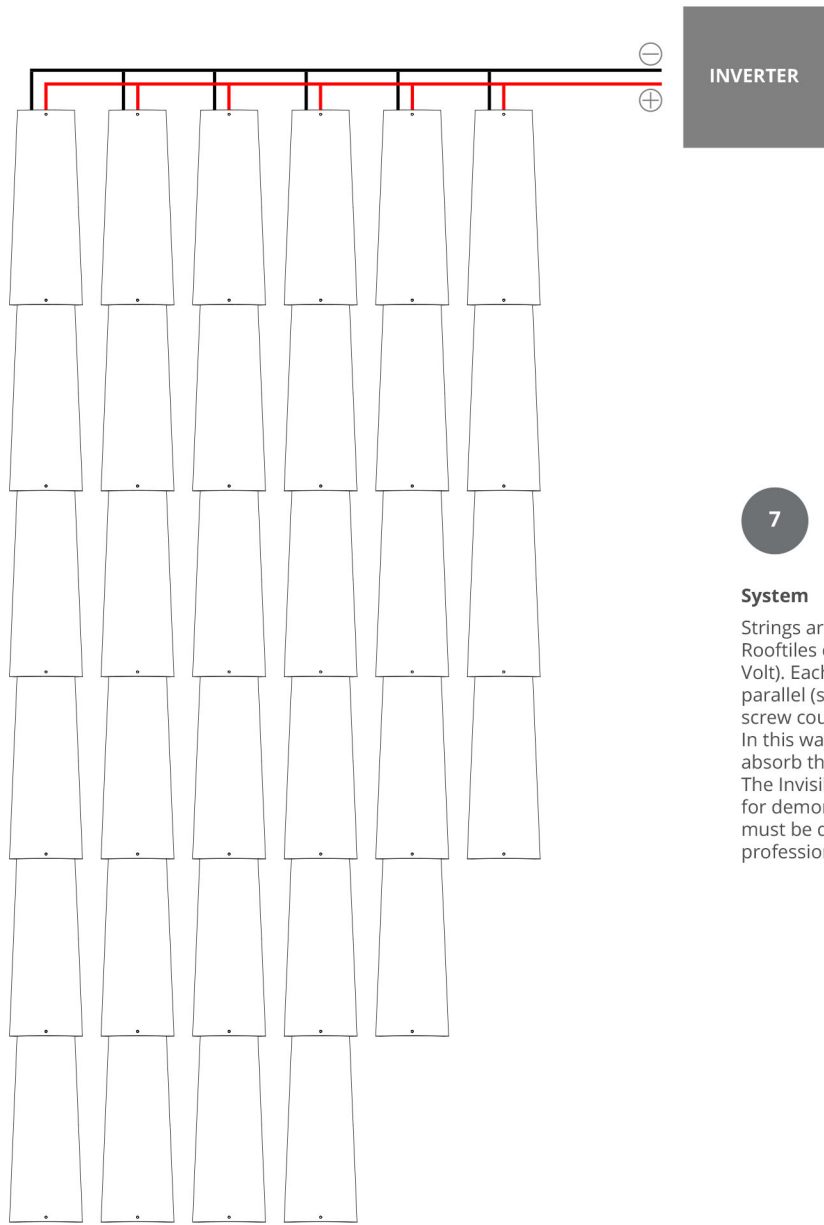




6

**Entire string**

By securing the black screw coupling inward you can pull the cable up to the top of the roof thus to have only one cable bundle that leads to the inverter.

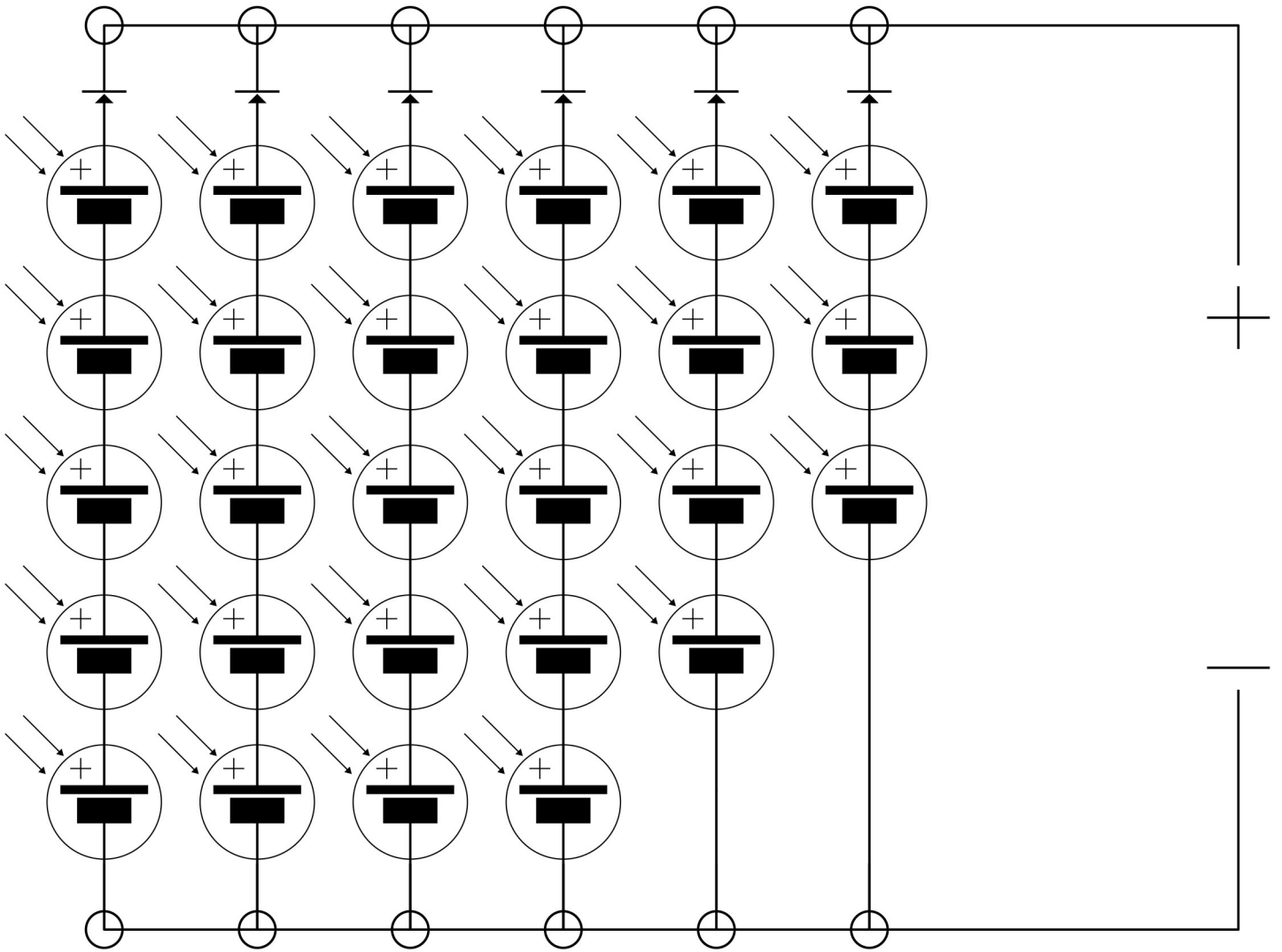


7

**System**

Strings are composed of Invisible Solar Rooftiles connected together in series (sum of Volt). Each string is connected to the other in parallel (sum of Ampere) and ends with a red screw coupling that has a bypass diode inside. In this way the strings that produce less do not absorb the energy produced by the others. The Invisible Solar Rooftile system presented is for demonstration purposes only: the system must be designed and installed by licensed professionals.

# SCHEME OF ELECTRICAL CONNECTIONS



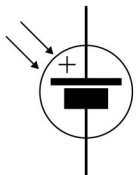
## LEGEND

1. The number of Invisible Solar Rooftiles in a string is variable.
2. The number of strings in a system is variable.
3. The placement of a diode for each string (series) allows you to connect strings with different voltage in parallel .

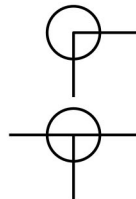


### Diode

Built-in bypass diode in the red screw coupling connects the positive pole at the end of the string with the cable that leads to the inverter.



**Electricity generator**  
Invisible Solar Rooftile



### Connectors

Standard connectors for photovoltaic cables.  
Connectors are not included in the supply.