

NEW



 **ArcBox**TM
Making solar even safer

 **Marley**

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The number of solar installations is growing fast and with it the risk that mistakes assembling DC connectors lead to fires. Simple errors in installation that can cause an arc fault to develop include: poorly crimped joints, cross-mating connectors from different manufacturers, assembling electrodes while wet and incomplete insertion that doesn't engage the connector locking mechanism.

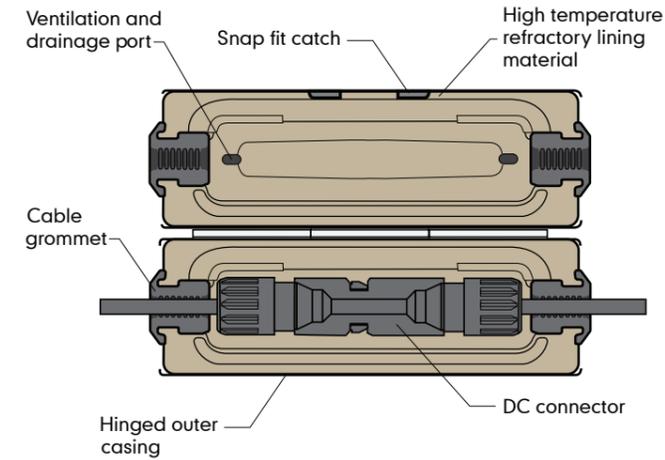
The ArcBox enclosure simply snaps around a DC connector to ensure that if an arc ever occurs it is safely contained and doesn't spread to combustible materials in or around the solar installation. The effectiveness of the product has been independently verified by the KIWA fire test laboratory and Loughborough University.

- BIPV
- Combustible Roofs
- High-Consequence Locations

BIPV solar installations are one application for the ArcBox since DC cabling is installed near combustible building materials. Flat roof solar installations above roof coverings such as single ply membrane or asphalt is another. Some buildings, if put out of use even temporarily, would have high knock-on consequences – hospitals, schools, care homes, and factories are applications where risks must be carefully controlled.

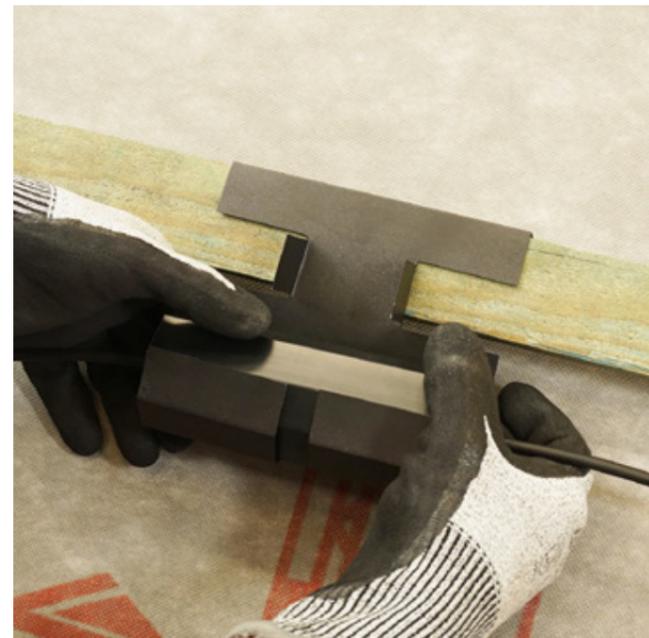
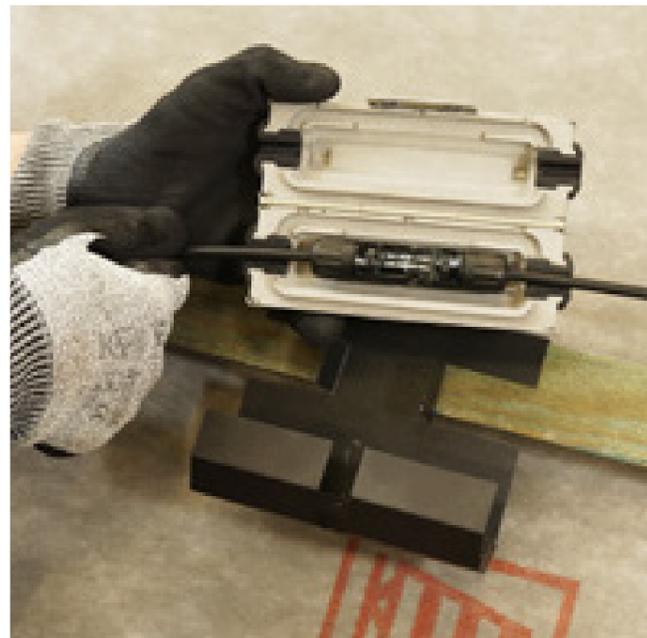
Specification

Length	150mm
Width	50mm
Height	48mm
Weight	410g
Ambient temperature	-40°C to +85°C
Conductor size	4mm ²
Certification	Independently tested by KIWA in accordance with NEN 6063 and with >5 minutes arcing without spread of fire to surrounding roofing materials. Independently confirmed by the University of Loughborough Department of Engineering that temperature under load remains within connector manufacturer's guidelines.



Components

Code	Description	Price
4081796	 ArcBox Solar Connector Enclosure	£21.71
4081797	 ArcBox Batten Mount 25mm	£1.54



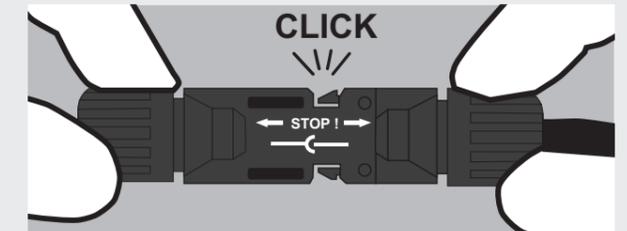
Configurator and installation guide

Use the Marley Configurator to build the array of solar panels and roofing kits for any roof. The configurator also calculates the kWp output, so you can easily achieve the correct size and performance of system. You can also view our installation video and guide.

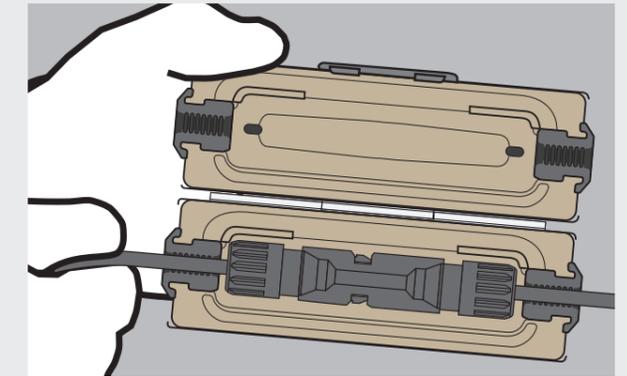
marley.co.uk/solarinstall

Installation

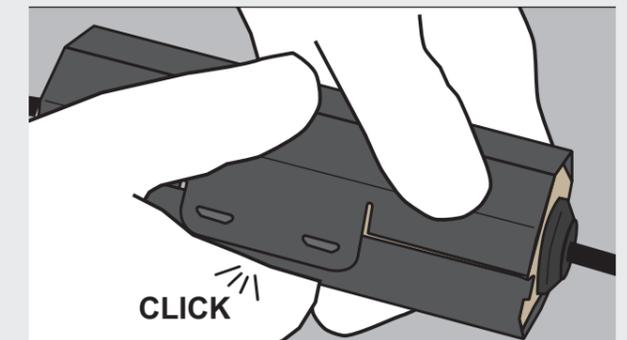
It only takes 2 clicks



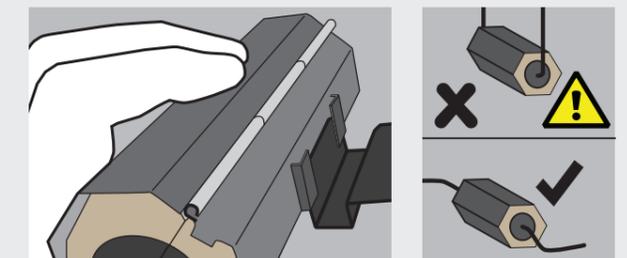
1. Join the DC connector following the manufacturer's instructions. **Observe local regulations on mixing connectors.**



2. Place the DC connector inside the ArcBox with the cables in the split grommet.



3. Close the ArcBox and ensure the catch has clicked into place.



4. Mount the ArcBox on a suitable hanging point. **Do not suspend the ArcBox on the cables.**

FAQs

Why did we create the ArcBox?

ArcBox improves fire safety in solar PV installations. The number of solar installations is growing fast and with it the risk that mistakes assembling DC connectors lead to fires. Roof integrated solar installations have their DC connectors near combustible materials such as tile battens, roofing membrane, rafters, and insulation. This increases the risk that an electrical fault develops into a more serious fire. Some in-roof solar systems have highly combustible plastic cladding behind the solar panels and in the electrical installation zone.

So, are DC Connectors unsafe?

Solar PV installations are very safe. Research in the UK and Netherlands has found very low incidence of fires compared to the number of installations. See this blog for more detail: solarblogger.net/2022/03/how-safe-is-solar-pv.html

Although toasters are more dangerous, the difference is that the solar installation is spread across the building and a fire can result in more widespread damage and bigger insurance claims. UK research found that the DC connectors were the second most likely cause of a solar fire, with the number one risk being the DC isolator switch. In the Netherlands DC isolator switches are not much used, with installers preferring to install inverters with an integrated isolator. In this market the DC connector is thought to be the source of more than 80% of solar fires. Simple errors in installation that can cause an arc fault to develop include

- poorly crimped joints
- cross-mating connectors from different manufacturers
- assembling electrodes while wet which can lead to corrosion and over-heating
- damage to the connector during or after installation and
- Incomplete insertion that doesn't engage the connector locking mechanism.

How does the ArcBox work?

The ArcBox enclosure simply snaps around a DC connector to ensure that if an arc ever occurs it is safely contained and doesn't spread to combustible materials in or around the solar installation.

The internal lining is made from a 'refractory material' more normally found in the form of bricks or blocks that line crucibles and furnaces, developed in a way to be able to manufacture this material into a shape with much finer details.

The enclosure has ventilation and drainage ports to keep the DC connector at its rated operating temperature and to allow moisture that gets inside to drain away.

The ArcBox has an EPDM (rubber) split grommet at each end which supports the cables either side of the connector. The connector itself is held in free air and is not in contact with any material. The grommets prevent rainwater from flowing into the ArcBox along the wires.

Once clipped around the DC isolator has a mounting feature on the outside of the ArcBox is slotted over a bracket to allow it to be secured. Marley will provide brackets suitable for in-roof installation – that hook around a roofing batten. (Currently available for 22/25mm battens but other versions to follow).

Has the ArcBox been tested independently? Does it have Certification?

The effectiveness of the product has been independently verified by the KIWA fire test laboratory and Loughborough University.

At KIWA a test rig was set up with two types of roof build up (UK cold roof and NL warm roof) and Marley SolarTile® roof integrated solar panel and tiles. A modified DC isolator was installed behind the panel that allowed an arc to be controllably created within the connector. In both cases where an ArcBox was used there was >5 minutes arcing without spread of fire to surrounding roofing materials. During the test, the cable has to be fed into the ArcBox to keep the arc going. At the end of the test the connector is completely destroyed. Testing at Loughborough University has confirmed that the ventilation around the connector while inside the ArcBox is sufficient to keep the DC connector within manufacturers recommended temperature at rated current flow

Can it be with used on other mounting systems?

The ArcBox mounting system will be made available open source (online later, by request currently) to allow manufacturers of other solar mounting systems (ground mount, flat roof, pitched roof) to create attachment points for their own product ranges.

Can it fit all DC Connectors?

We have tested it with a Staubli MC4 Connector and a 4mm² cable. It is compatible with any MC4 "compatible" connector that will fit in the enclosure and close. We will be confirming a full list shortly.

Why do you need the ArcBox if you already have Arc Fault Detection / AFCI?

We believe the ArcBox will work in conjunction with Arc Fault detection and adds that extra layer of protection. Like a seat belt and an air bag.

Are we recommending fitting to every connector?

Yes. The site-crimped connectors are the highest risk connectors and another (cheaper) option is to only use ArcBox for these connectors, but there are still risks / failure modes for factory made connectors too (incomplete insertion, wet, damaged, cross-mated) Where is it manufactured? It will be manufactured in the Far East.

Where can you buy the ArcBox?

We will be making the ArcBox available to everyone. It will be available through our existing distributors, but any wholesaler will be able to buy the ArcBox. We will sell to other in-roof solar market participants and encourage them to join us in spreading best practice solar safety. This is a policy decision based on our belief that a product aimed at improving solar safety should be available to all, and that since the product is patented we have a duty to enable its widest possible use for the good of the industry as a whole.



Tell me more

Call 01283 722588 Email info@marley.co.uk Or visit marley.co.uk

Marley, Lichfield Road, Branston, Burton upon Trent, DE14 3HD

