EN

ArcBox™

solar connector enclosure

Reducing Fire Risks in Solar PV

V1.5

ArcBox

Reducing Fire Risks in Solar PV

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.

- 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 ashphalt 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.

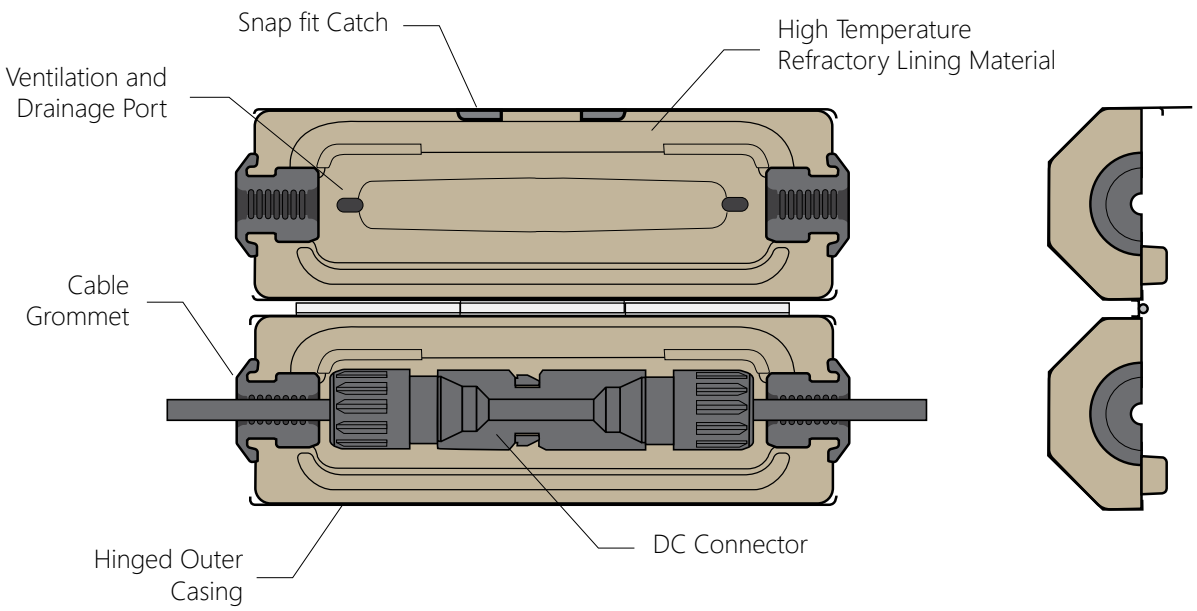
Arc-induced fire under flat roof mounted solar at ZAG fire testing laboratory

How It Works

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, Loughborough University and and the Slovenian National Building and Civil Engineering Institute (ZAG).

Electric arcing is very energetic and results in incredibly high temperatures - far in excess of the melting temperature of metals. Painstaking research by engineers at Viridian Solar has resulted in the development of new manufacturing technologies that can form the complex shapes required for ArcBox from materials found in crucibles and furnaces and previously available only as simple bricks or blocks.

With its patented design, the two hinged halves of the ArcBox snap together to completely enclose the DC connector within this high-temperature material while suspending it in free air between cable sealing grommets at each end. Ventilation and drainage ports keep the connector within its operating temperature limits while carrying its rated current and prevent the accumulation of moisture around the connector.



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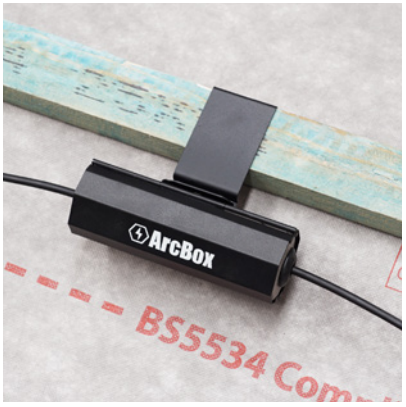
Simple Installation

Place DC connector into enclosure with cables laid in grommet

Snap the casing shut



Slot onto a mounting bracket - see below

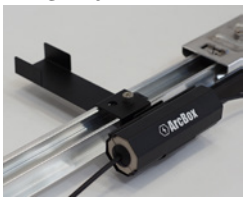
Mounting Options

A range of brackets is available to mount ArcBox within different solar systems.

ARC-M01

ARC-M01 fixes to a solar panel rail with either 8mm or 10mm T-Bolt. The bracket can be rotated before fixing to align the ArcBox with the cabling route. Works with Schletter FixGrid, Sunfixings, K2 Dome fix, Van der Valk ValkPro and many more.

ARC-M02

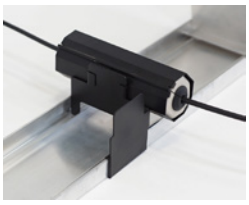


ARC-M02 is suitable for rail widths up to 40mm and fixes with an 8mm or 10mm T-Bolt. The ArcBox is attached to one of three mounting points offering different orientations. This is ideal when fitting under a parallel mounted low-profile solar module, for example in pitched roof applications. Works with Sunfixings, K2 Dome fix, Van der Valk ValkPro and many more.

ARC-M03

ARC-M03 for the Esdec FlatFix System. The bracket slides onto an Esdec cable clip accessory to provide three orientation options for attaching the ArcBox.

ARC-M04



ARC-M04 for Renusol FS Pro and FS10 Systems.

For roof-integrated solar systems a batten bracket hooks over tile battens to hold the ArcBox in the batten space behind the solar panels or solar tiles.

ARC-BM25	for batten thickness 22-25mm
ARC-BM30	for batten thickness 30mm
ARC BM40	for batten thickness 38mm

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Applications

ArcBox is decreasing fire risks across every solar PV sector - residential, commercial, and utility scale, from ground mount to pitched and flat roof and BIPV applications.

We recommend taking a risk-based approach to the decision whether to apply ArcBox to every connection or only the higher risk site-made connections. A risk assessment might take into account the combustibility of nearby materials, for example roof coverings, or materials used in solar mounting systems and the consequences of any fire damage - the risks associated with an evacuation of the building , or the impact of the building being out of use for some time.

Specification

Length	mm	150
Width	mm	50
Height	mm	48
Weight	g	410
Ambient Temperature	°C	-40 +85
Compatible Cable Size	mm^2	4 - 6
Compatible Cable Outside Diameter	mm	5.4 - 6.4
DC Connector maximum length	mm	110
DC Connector maximum diameter	mm	20

Certification

Independently tested by KIWA and with >5 minutes arcing without spread of fire to surrounding roofing materials in a BIPV pitched roof use case.
Independently tested by Slovenian National Building and Civil Engineering Institute (ZAG) >5 minutes arcing without spread of fire to surrounding roofing materials in a flat roof use case.
Independently confirmed by the University of Loughborough Department of Engineering that temperature under load remains within connector manufacturers' guidelines.

kiwa tested 0607-L-21

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Viridian Solar, 68 Stirling Way, Papworth, Cambridge, UK. CB23 3GY
www.viridian.solar

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