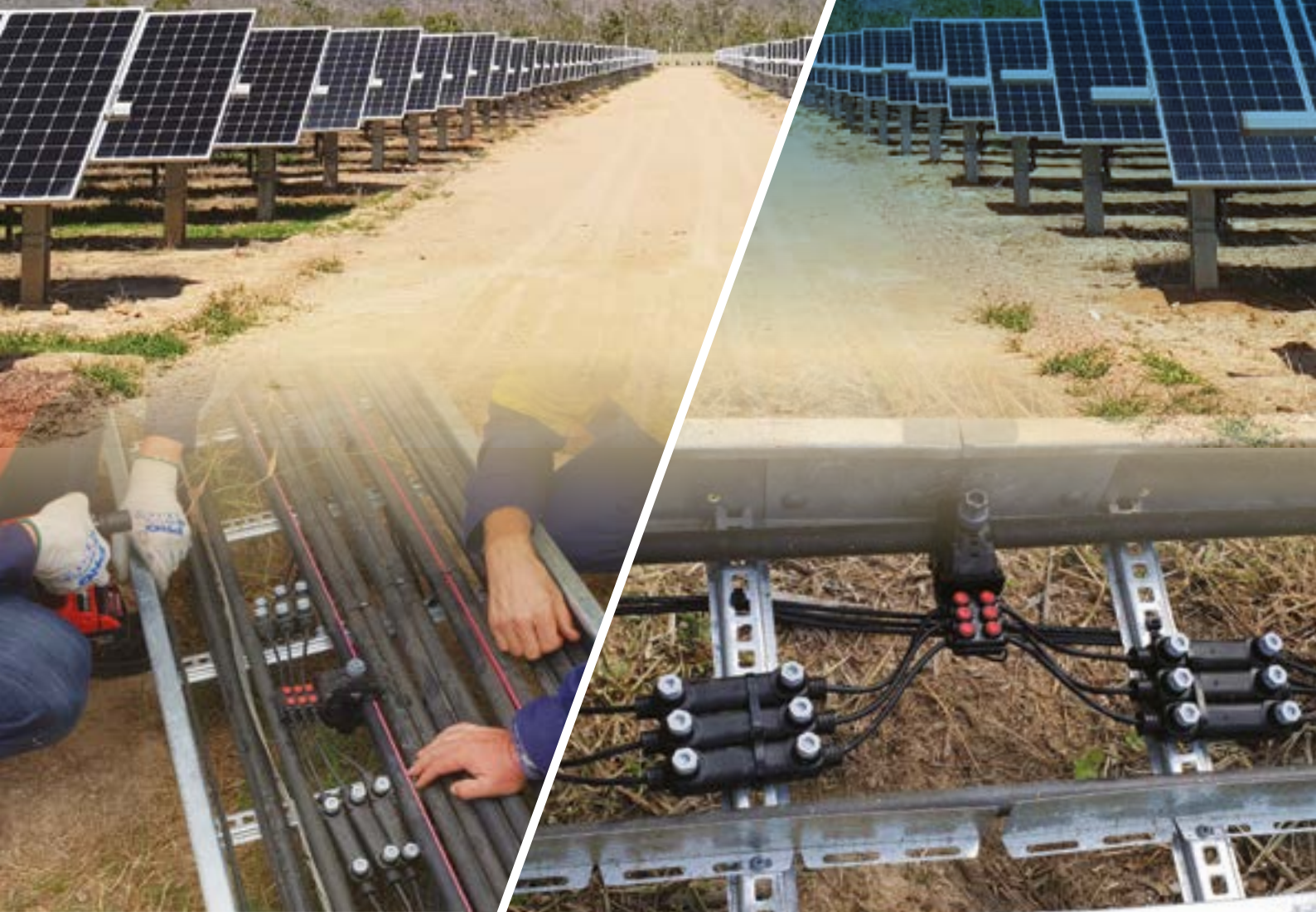
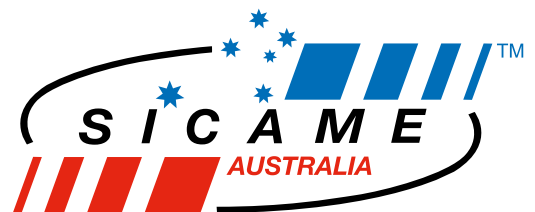


# Large Scale Solar Catalogue



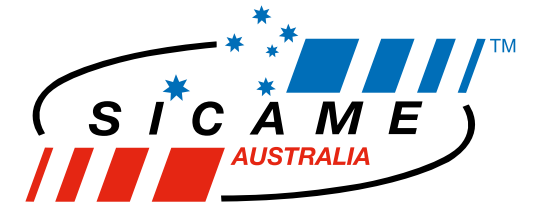
ENERGY IS OUR BUSINESS

SICAME AUSTRALIA





# Welcome



“Sicame is a worldwide industrial group specialising in products and services relating to the distribution of electrical energy.”

Comprising of 52 companies across 5 continents, our group supplies product used to build and maintain electrical networks all over the globe.

We specialise in the development and manufacture of specialised power distribution products, for both utility and commercial networks.

In Australia, we have established a strong reputation as a leading supplier of insulation piercing connectors and associated electrical equipment. Our products have been widely adopted by electrical utilities across Australia highlighting the quality and functionality of the product we have to offer. Furthermore, we are accredited to the ISO 14001 and 9001 environmental and quality standards.

In response to the increase in opportunities for our product in Solar farm applications, this catalogue seeks to illustrate the solutions we can provide for this market with specific reference to the panel string to DC Bus System.

As a proud Australian manufacturer, with in house design and testing capabilities, we have a unique set of attributes that enable us to efficiently offer solutions pieced together with components which have already been successfully adopted in both domestic and international markets.

**We look forward to assisting you find your solution.**



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## Engineering and Design Capabilities

Our factory, located in Brisbane Australia, has NATA accredited electrical and mechanical testing laboratories. Using state of the art software packages and the laboratories, our Engineering Team can design and test products in house without having to rely on external resources.

The Sicame Australia facilities are fully accredited to ISO 9001 and ISO 14001.

## Manufacturing Capabilities

Our 5000m2 site has the capacity to handle workload of both small and large scale projects. Our range of capabilities include pressure injection moulding, over moulding, precision machining, cold forging along with assembly. Our manufacturing facilities are staffed by a very competent and dedicated production team and supported by our engineering team.



Underwater Dielectric Testing



Heat Cycle Testing



Electrical Laboratory



Machining Centre



Moulding Centre

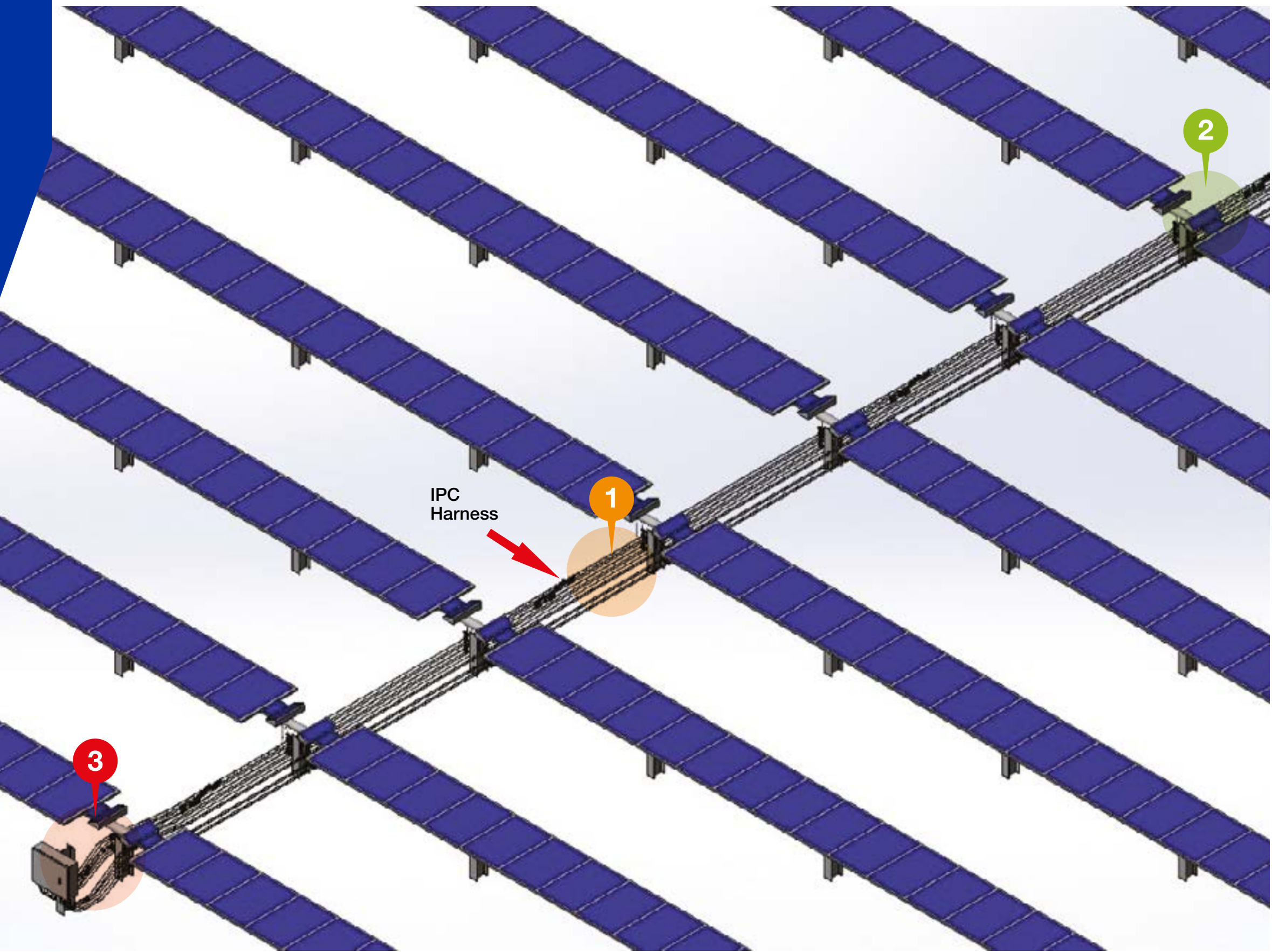


Harness Assembly





# IPC Harnessed to DC Bus



1

**IPC Solar Harness**  
Used to connect each string onto the main DC Bus. Plug & Play, pre-wired and fused.

2

**DC Bus**  
Used to efficiently connect the strings back to the inverter. Cable tray or strung bus installation.

3

**DC Isolation Box**  
Used to Disconnect the DC Bus, Surge protection and O/H to U/Ground Junction point.



## IPC Solar Harness

### ■ DC IPC Solar Harness System

The Sicame DC IPC Solar Harness system uses our insulation piercing connector technology to attach to a double insulated busbar.

The IPC's are equipped with shear head bolts which operate at a predetermined torque ensuring a reliable connection with the busbar.

This harness is factory kitted to improve on site installation time and furthermore requires minimal tooling for installation.

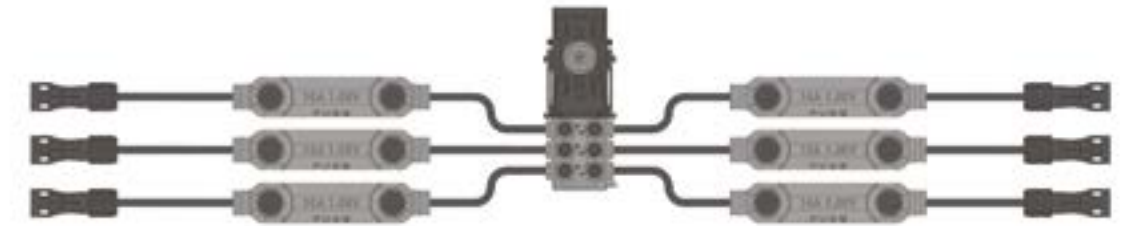


- Sicame Insulation Piercing (IPC) Technology, with no stripping of the Insulated Busbar
- 1500VDC rated system
- Inline Fuse ratings from 15, 20, 25, 30, 35 & 40
- Factory kitted and harnessed for minimal site installation time
- Plug and Play Installation
- Minimal Tooling required onsite - Standard Impact Driver + cable jig
- Solar cable to EN50618:2014 and TUV2PfG 1169/08.07
- Type Tested to Australian and International standards
- Dielectric testing to 6.5kV - 300mm underwater
- Completely sealed and voltage tested underwater
- IPX8 equivalent
- In-built test point for resistance and point to point commissioning checks
- Black or Red bolts for polarity identification (+ or -)
- Pre-terminated MC4 connectors for a plug and play solution onsite
- Suitable for Copper or Aluminium stranded cable
- String leads from 4-10mm<sup>2</sup> and harnessed to required length

## IPC Solar Harness

### ■ DC IPC Solar: 6-WAY Harness

- Capable of connecting 1- 6 Solar Panel strings
- Shear head bolt technology - Predetermined shear bolt torque system
- Bus Cabling from 95-500mm<sup>2</sup>, double insulated



### ■ DC IPC Solar: 4-WAY Harness

- Capable of connecting 1-4 Solar Panel strings
- Shear head bolt technology - Predetermined shear bolt torque system
- Bus Cabling from 35-120mm<sup>2</sup>, double insulated



### ■ DC IPC Solar: 2-WAY Harness

- Capable of connecting 2 Solar Panel strings
- Shear head bolt technology - Predetermined shear bolt torque system
- Bus Cabling from 35-240mm<sup>2</sup>, double insulated



## DC Isolation Boxes

### ■ DC 1-Way to 5-Way design

Sicame's Range of customisable DC Isolation boxes are manufactured in St Malo, France within a designated and purpose built enclosure factory.

The Enclosures are specifically designed to be modular and can be built to any dimensional specification and customised according to the project requirements.

Sicame also has the capability of locally assembled 1-way DC Isolation Boxes using ARED cabinets manufactured by Claved in Spain. These are fitted in our factory to a range of enclosure sizes and are particularly suitable for smaller sized solar farms. Locally assembly enables facilities quicker delivery times to the customer.



- Strong mechanical resistance against shock loadings (IK 10 as per IEC 62262 standard)
- IP 54 or IP66 Protection degree (as per IEC 60529 standard)
- High resistance to heat, fire and abnormal heat (as per IEC 60695-2-10 and 11 standard - glow wire at 960°C)
- High dielectric strength
- Resistance to weathering, including UV testing, Resistance to corrosion
- 40 years manufacturing experience of closures for utility and industrial networks
- Lightweight material - Thermoplastic or Glass Reinforced Fibre
- Double skinned walls for greater thermal performance
- 1-Way Claved boxes – Solid door rotating on two invisible hinges, opening angles >90 degrees

- Factory wired, kitted and tested
  - » DC PV2 tested - pad lockable load break switches (2 or 4 pole)
  - » 2-Pole Surge Arrestor
  - » 1500VDC cabling
  - » Lockable Cabinet with custom key lock
  - » Cable entry/exit glands
  - » IP55 Ventilation glands
  - » Pre-wired earthleads
  - » Pole Mounting Brackets
  - » Sun shade optional

## PV String Combiner Box

### ■ Combiner Box

- Strong mechanical resistance against shock loadings (IK 10 as per IEC 62262 standard)
- IP 66 protection degree (as per IEC 60529 standard)
- High resistance to heat, fire and abnormal heat (as per IEC 60695-2-10 and 11 standard - glow wire at 960°C)
- High dielectric strength
- Resistance to weathering, including UV testing, resistance to corrosion
- Lightweight material - glass reinforced fibre
- Double skinned walls for greater thermal performance
- Factory wired, kitted and tested
- DC PV2 tested - pad lockable load break switches (2 or 4 pole)
- 2 pole Surge Arrestor
- 1500VDC rated fuse holders and cartridges (internal or external fusing available)
- 1500VDC cabling
- Lockable cabinet with custom key lock
- Cable entry/exit glands
- Ventilation glands - IP55 or IP66
- Pole mounting brackets
- String monitoring available
- External or internal switch handle.
- Sun shade optional





# DC Strung Bus

## Above Ground Strung Bus System

Stringing the DC bus overhead on the tracker structures allows for faster and more cost effective installation practices.

- Used with double insulated CCT conductor
- 95-300mm<sup>2</sup> conductor range
- Up to 4 off parallel DC busses (+&-) can be strung per structure
- Modular designed system
- Reduces installation time and project capital
- Increases current capacity of the DC bus by reducing the de-rating factors applied (compared to cable tray or underground)

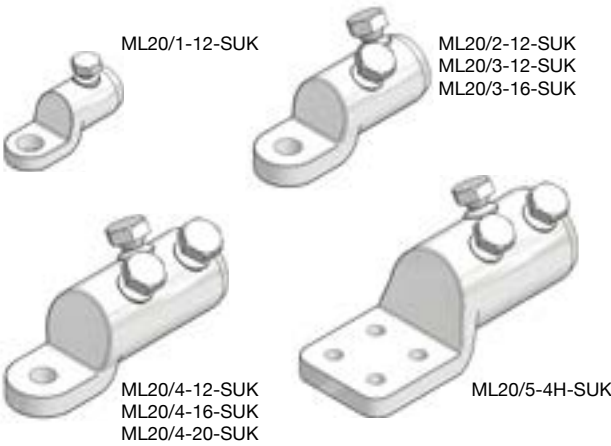


# Mechanical Lugs

## ML20 Range

The 'ML20' range of mechanical terminations are manufactured from a single piece hot forging thereby ensuring a water proof connection.

The range of connectors utilise the Hepworth shear head technology in the form of direct acting clamping bolts.



'-SUK' Connector Reference	Stranded Core C.S.A (mm2)				
	Screw Pack 1 (Assembled)		Connector Reference	Screw Pack 2 (Assembled)	
	Min	Max		Min	Max
ML20/1-12-1-SUK	25	50	ML20/1-12-2-SUK	70	95
ML20/2-12-1-SUK	70	95	ML20/2-12-2-SUK	120	150
ML20/3-12-1-SUK	120	150	ML20/3-12-2-SUK	185	240
ML20/3-16-1-SUK			ML20/3-16-2-SUK		
ML20/4-12-1-SUK	240	300	ML20/4-12-2-SUK	300	400
ML20/4-16-1-SUK			ML20/4-16-2-SUK		
ML20/4-20-1-SUK			ML20/4-20-2-SUK		
ML20/5-4H-10-SUK	400	500	ML20/5-4H-2-SUK	500	630

**Material:** Aluminium Alloy (Electro-Tinned)

**Test Specification:** BS EN 61238-1 : 2003 - Compression & Mechanical Connectors for power cables for rated voltages up to 36kV.

## Mechanical In-line Connectors

**Piranha series** – This versatile connector accommodates a vast array of cable types, sizes and constructions.

- Ideal for cable fault repairs
- Waterproof to IP67 equivalent
- Insulation piercing both sides of the connector
- Torque controlling shear-heads for correct contact pressure





## Auxiliary Boxes

Sicame's range of customised Auxiliary boxes are manufactured in Barcelona, Spain and St Malo, France. These both are built within a designated and purpose-built enclosures factory.

These are made of glass fibre reinforced polyester & double skinned thermoplastic materials. The enclosures can be built to any dimensional specification and customised to any project requirements.



### ■ AC Tracker Boxes (TCDB)

These are ideal for using on tracker beams to control the rotation of solar panels in the direction of sunlight to achieve maximum output. They use 4-pole and 1-pole MCBs on 400Vac and 240Vac circuits respectively.

These are made of glass fibre reinforced polyester at the Claved factory and come in many different sizes.

### ■ DC Isolation Boxes for Battery storage

Ideal for changeover at sunrise and sunset times by using a low voltage contactor operating via a relay signal, avoiding any back feed into the solar PV array preventing the battery to discharge overnight.

These are made of glass fibre reinforced polyester at the Claved factory and come in many different sizes.

### ■ Battery Boxes

Ideal for battery storage connections especially on off-grid networks and critical areas of uninterruptible power supplies such as hospitals, data control centres, etc.

These are made of thermoplastic double skinned material at the Seifel factory and can be flat packed during transport making it logistically easier.

## Wireless String Monitoring

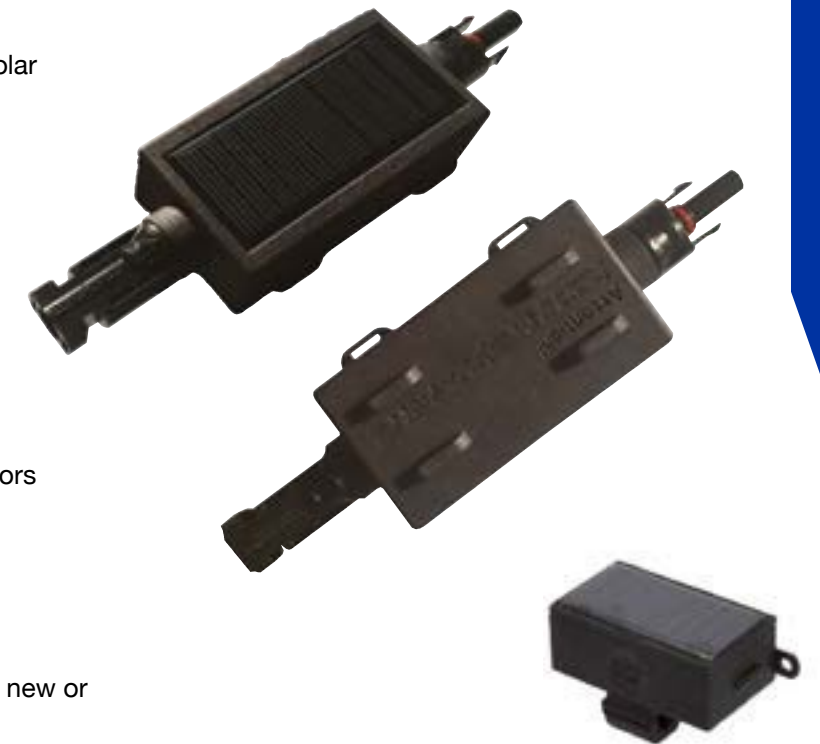


### ■ Solar String Monitoring Module

Maintenance-free wireless current sensor for solar string monitoring.

- Current monitoring 0-30 A
- 1500 VDC rated system
- Wireless
- Full autonomy
- Easy to install by MC4 Connector
- Easy to implement in any SCADA system
- IOT platform ready
- Radio channel connection up to 1000 sensors 200m of radius
- No battery and no maintenance needed
- Losses savings by real time fault detection

Can be installed temporarily or permanently on new or existing solar farms.



Up to 1000 modules connected to one SM Hub

Up to 100 hubs on one solar farm

No battery or maintenance needed



# Separable Connectors

## Application

Sicame front 'T-body' and rear coupling screened elbow connectors are fully submersible when mated with suitable bushing or plugs. The products are used to terminate polymeric cable so that they can be connected to apparatus such as transformers, switchgear and other equipment.

Available in 24, 36 and 42kV voltage classes.

The Sicame T-body connectors are suitable for indoor or outdoor applications and can be used for all polymeric cable types (XLPE, ETP etc.) with copper or aluminium conductors. The design is especially suited for the harsh offshore and wind farm environment, where long runs and large cable sizes are needed.

## Key Features

- Provides a fully shielded and submersible connection when mated with the proper bushing or plug
- High quality peroxide cured EPDM insulating body
- Type 'C' 630A interface (1250A interface for the 42 kV)
- Mounting can be vertical, horizontal or any angle in between
- No minimum phase clearance requirements
- 100% electrical tested at factory.

All our references are tested in accordance with IEC 60502-4.

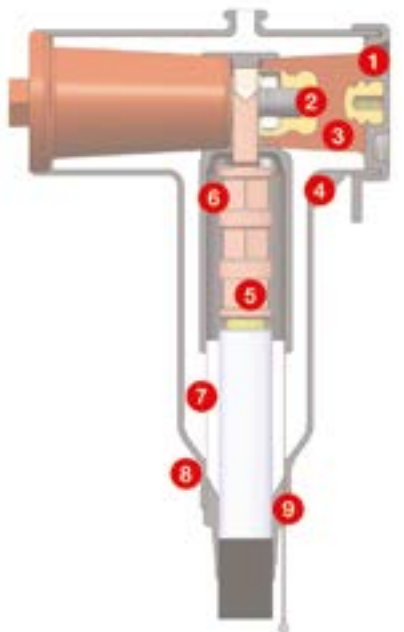
## Surge Arrestors



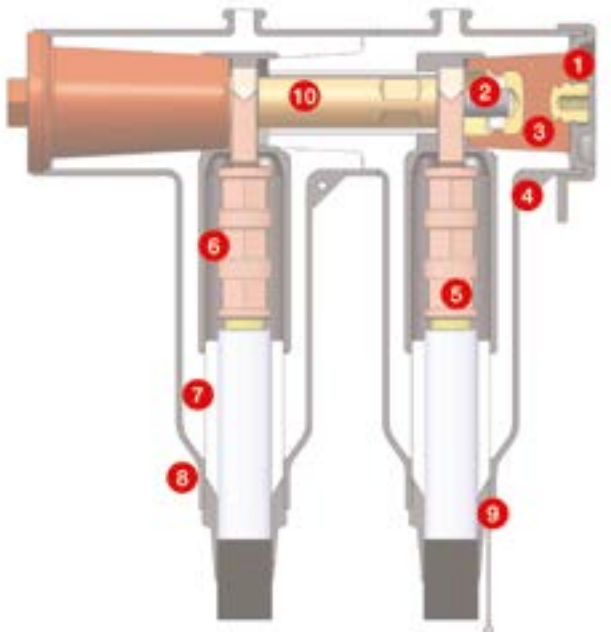
# Separable Connectors

## Detailed Composition of the Sicame CST/CSC Series

- Rubber End Cap**  
Molded EPDM conducting rubber end cap protects and grounds the insulating plug test point.
- Stud**  
Stainless steel studs.
- Insulating Plug**  
Molded epoxy insulating plug provides excellent electrical, thermal and mechanical reliability.
- Drain Wire Tab**  
Drain wire table provide a convenient point to connect drain wire to ensure grounding of the connector shield.
- Compression Connector / Shearbolt Connector**  
Compression connector / shearbolt connector made of aluminium, copper or bimetel (aluminium/copper).
- Conducting Insert**  
Precision molded peroxide cured conducting insert provides corona-free electrostatic shielding of the compression connector.
- Insulation Layer**  
High quality peroxide cured EPDM insulation is mixed and formulated in-house for complete control of rubber characteristics.
- Conducting Shield**  
Precision molded peroxide cured conducting shield provides ground shield continuity.
- Cable Adapter**  
Molded cable adapter, sized to fit the cable insulation, provides stress relief for the terminated cable.
- Contact Rod**  
Copper made contact rod provides a consistant current transfer path.



Front T-body connector



Coupling (rear) T-body connector



## MV Cable Junction Cabinets

### ■ 33kV Junction Box

- Streamlining 33kV AC underground reticulation (two cables to one junction point)
- Above ground for ease of access and maintenance
- Double door entry design
- Powder coated 1.6mm thick galvanised steel construction
- Strengthened internal chassis with through wall bushings mounted
- Suitable for push on T-Connectors IEC TYPE C 630A
- Capable of integrating surge protection - rear T-Body connection
- Integrated earth bar
- Integrated cable clamps for mechanical stress relief
- Cable glands inclusive
- Three point lockable cabinet
- Lifting hooks and x 4 mounting points
- Separable gland plates (3mm aluminium) for ease of cable termination.
- Bespoke olutions available



## MV Safety Equipment

### ■ Operating Sticks

We also offer a range of CATU safety products to assist with installing and maintaining solar farms sites. Operating sticks manufactured to IEC-61235 IEC-60855. The range consists of sectional, fixed, telescopic and shot-gun.



### ■ Gloves

CATU insulating gloves for protection whilst working on live electrical cable. Class 00 through class 4 are available.



### ■ Detectors

Testing equipment to determine where electricity is present.



### ■ Portable Earthing Devices

All portable earths are manufactured to IEC-61230. Sicame customises earths to all customers requirements.



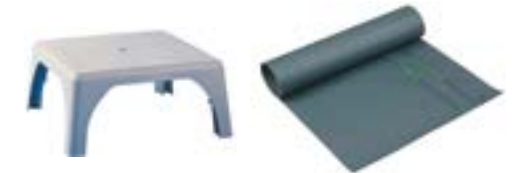
### ■ Arc Flash protection

Arc Flash kits available form 4 cal to 100 cal IEC61482-2 NFPA 70E.



### ■ Mats

High quality dielectric rubber insulating mats from class 0 to class 4 CEI61111.



### ■ Rescue kits

LV Rescue kits are supplied in accordance to Australian and state standards.







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