



## APPLICATION NOTE

# Considerations for the proper integration of PV DC connectors into single-axis tracker applications

PV DC connectors, such as Stäubli's MC4 portfolio, are pivotal components in establishing a reliable, safe, and long-lasting PV system. When integrating into systems with mechanical movement, such as tracked systems, be sure to install the connectors as specified in the assembly and installation instructions in order to ensure proper performance and product longevity.

A reliable and safe electrical connection starts with using high quality components. Proper field assembly of these products requires the installer to be diligent in making sure the right combination of connector and cable are being combined, using the manufacturer-specified tooling and supplied assembly instructions. Once the connector has been assembled, it should be

integrated into the PV system in a deliberate and appropriate fashion so that the product can fulfill its designed lifetime expectancy. This application note highlights the importance of not just isolating and protecting the connectors from static forces but, equally as important, the forces generated during dynamic movement that is inherent in tracker-based installations.



Scan to access illustrations.



### Application



### Challenge



### Solution

- Primarily at the end of row and/or in between tracker tables.
- Low-stranded conductors with limited flexibility

- Inadequately secured connectors may be exposed to cyclical mechanical loading and movements, that could induce fretting or excessive contact surface wear. This could lead to a shortened life expectancy and premature failure, imposing significant risks to PV assets.
- PV connectors should be protected from dynamic movement and mechanical stress, such as those caused by moving components of a PV tracker system by utilizing proper cable management installation techniques.

Follow all instructions of the assembly instruction and pay particular attention to the following:

#### Mechanical isolation of connector

When integrating a PV connector into an application where mechanical load is expected, assure the connector is appropriately secured and decoupled from both static and dynamic mechanical loads (for example: strain, bending load, torsion, and translational movement).

#### Connector placement

Place connectors in areas where no mechanical movement occurs. For example, do not install unsecured connectors between the DC collection and end of row so that the connectors hang freely as part of a dynamically moving cabling section.

#### Choose flexible conductors

Make use of high-flexible (highly flexible or high flexibility - unless "high-flexible" is a term of art) PV conductors in areas of constant movement (typically end of row and in between tracker tables). Be sure to follow the specific assembly and installation instructions and guidelines for such conductors.

#### Best practices

Follow best practices for wire management and connector system integration as explained in the assembly instructions provided with the PV connectors, as well as in system integration advisories, product guides, and all other product information.

### Stäubli Services

- **Wire management design and planning**
- **Training and educational program for field staff and system design teams**
- **QC field support and installation oversight.**



+1 707.838.0530



re.services.us@staubli.com

The strain relief measures described in the installation instructions aim to mechanically decouple the electrical contact from any possible static or dynamic load caused and induced by the installation or external factors, to prevent relative movement of the electrical contact. Any such relative movement may lead to an accelerated deterioration of the electrical contact itself, generating more heat, therefore causing higher temperatures, and possibly reducing the life expectancy of the connector. Larger and stiffer cables, as often used in eBOS applications for high-powered PV modules, are more susceptible to inducing such relative movement than smaller and more flexible cables.