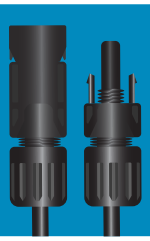
Solar PV Connector Safety

Connector issues can **cause fires / worker injuries**

Proper installation is important. Unskilled or untrained workers installing PV can lead to issues



Connectors provide connections **between the array**

- **No universal standard** for PV connector design
- Connectors with **high operating temperatures** may be the only warning sign of failure

Recommended Installation Practices

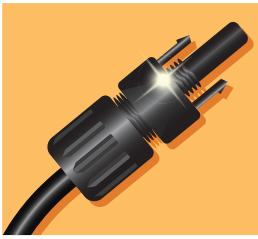
Same manufacturer or **manufacturer provided** tools

Proper tools must be used according to **manufacturer instructions**

Follow connector **manufacturer instructions**

Use only connector parts of the **same manufacturer**. Interoperability issues may exist when using connectors from **different manufacturers**

2020 NEC/UL6703 requires that two parts of connector pairs **must be tested together** and certified for intermatability (items must be listed, and to be listed, they have to be able to work together)



Ensure materials are **kept from becoming soiled** before installation. If damaged, soiled, or exposed to water before installation, **there is no way to clean**

Warning Signs

Loose or disconnected **connectors** or **screw nuts**

High temperatures. Melted, discolored, or cracked casing

High resistance due to soiling, corrosion, or foreign particles or **improper surface contact** on metal contacts

Increased alarms on monitoring systems (ground, isolation, loss of energy yield, and/or arc faults)

Moisture or **water ingress** – broken seal and / or separated connectors

Material degradation and **exposure to elements**

Why failures happen

- Improper installation
- Lack of training
- Faulty materials
- Soiled and dirty connectors
- Improper installation tools
- Mismatched connectors
- Counterfeit connectors

Diagnosing and Preventing Connector Failure

High temperature because of increased resistance

Use **thermal imaging** to find abnormal temperature readings. Connectors operating at **over 85°c** may be failing

Use **thermal imaging** to find connectors that are hotter than others

Thermal imaging on ground can identify issues, drone imaging may miss connector issues that are underneath modules

Visually inspect connectors to locate any physical or heat related damage

Issues with connectors can cause **power loss**, **fires**, or create **ground faults** that could be **lethal**

Issues impact **performance**, cause **downtime**, and have commercial / monetary **impacts**

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