PV Fact Sheet
12 | The crimp-free connector

How to create safe and durable electrical connections?

This fact sheet focuses on photovoltaic (PV) installations within the European Union. A critical component of such installations is the PV connector. These connectors are used to link string cables or to connect cables to inverters and combiner boxes.

Poor crimp connections in PV connectors remain one of the most common sources of failure in photovoltaic systems. Faulty crimps can occur due to environmental factors such as cold or wet weather, and challenging working conditions, such as on rooftops or in cramped attics. These issues can lead to heat losses, which in turn reduce the system's energy efficiency. In the worst-case scenario, they can cause hotspots at the connectors, potentially resulting in fires that may damage the underlying materials.

Figure 1: Example of bad crimp connections

In the worst-case scenario, they can cause hotspots at the connectors, potentially resulting in fires that may damage the underlying materials.

Figure 2: Example of burn marks on the connectors

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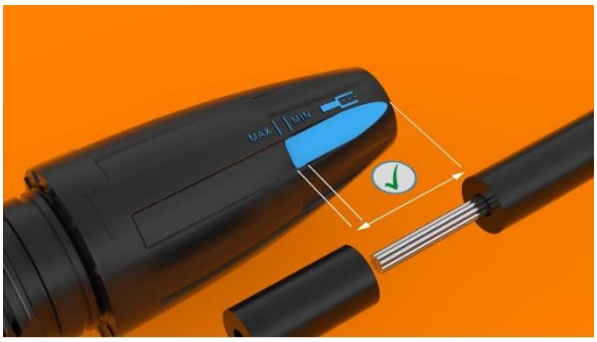
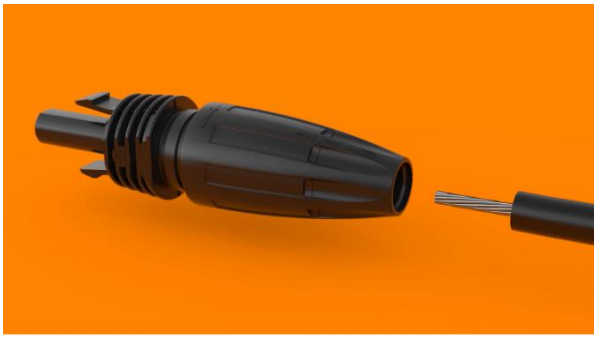
To mitigate these risks in a PV system, crimp-free connectors are available.
With these connectors, it is no longer necessary to insert the string cable into the metal contacts of the connector and compress it using a crimping tool. This step is handled internally by the built-in technology of the crimp-free connector.

Since this technology is typically hidden within the connector housing, this fact sheet explains in detail how the crimp-free PV connector works.



1. As with crimp connectors, the cable must first be stripped. For the PV-Stick, the stripping length is 15–16 mm. This can be easily checked using the notches on the connector’s end cap.



2. Insert the stripped conductor into the connector from the rear until it audibly clicks into place. During insertion, the stripped section is guided through a funnel that aligns all wire strands beneath a metal spring. This ensures that no strands protrude.

3. At a defined point, the spring is triggered and compresses the strands with a broad contact surface. This results in a very low contact resistance and establishes a secure electromechanical connection.

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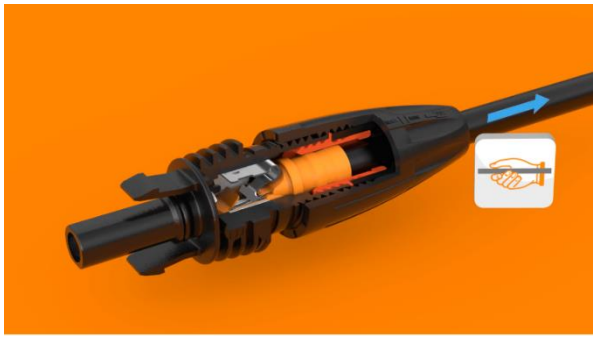
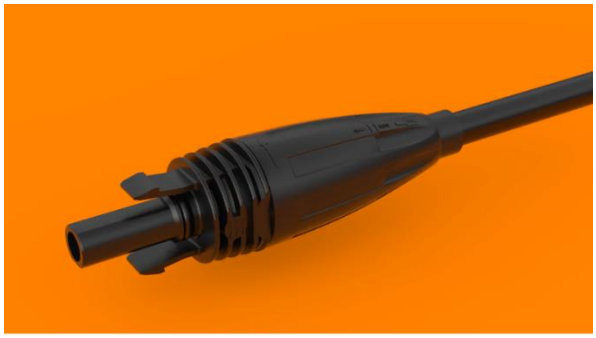


4. At a defined point, the spring is triggered and compresses the strands with a broad contact surface. This results in a very low contact resistance and establishes a secure electromechanical connection.



5. Finally, the plug's sealing cap must be firmly tightened to ensure protection against dust and moisture (IP68). When screwed tight, the plug must n ow be able to withstand a tensile load of at least 400N

PV connectors are subject to the same rigorous testing requirements in accordance with IEC 62852 and must be TÜV-certified. This also applies to Weidmüller's crimp-free PV connector. It combines the robustness of a traditional PV connector with significantly reduced operational risks, thereby contributing to the long life of the system.

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