

# Solarlok PV BAR Junction Box Assemblies

## Application Specification

### 1. Introduction

This specification covers the installation of the TE Connectivity Solarlok PV BAR Junction Box assemblies as well as the termination of its couplers, which is used as the primary electrical interface or junction for panel-based photovoltaic (PV) modules (solar panels) for grid or off-grid connected power generation

The PV BAR Junction Box assembly is designed to be assembled onto a solar panel. The solar panels are designed to be installed onto the roof using the junction box to interconnect solar panels to form arrays and connect the first and last solar panel to the remainder of the system.

Each PV BAR Junction Box assembly consists of a housing and two cable couplers (one male and one female). The housing contains four solder contact rails, three diodes, and cable (connecting the couplers to the solder contact rails). The solder contact rails are used for electrical connection to the solar panel. The diode provides electrical direction bypass current capability control. The back of the housing has a sealant channel used to hold the sealant that secures the junction box assembly to the solar panel. The front of the housing features a terminal potting window used to hold potting compound that will protect the solder contact rail connections from environmental conditions. The female coupler or over-mold housing are embossed with a positive or negative diode polarity symbol to indicate proper cable connection. The male coupler features locking latches that secure the connection. The female coupler has release locking latches which allow the couplers to be unplugged when a hand application tool is used. The housing has latches that mate with latch arms on the contact lid. The contact lid protects the terminal potting window once it has been filled.

When corresponding with TE Connectivity Personnel, use the terminology provided in this specification to facilitate your inquiries for information.

License holder: Tyco Electronics Austria GmbH, Schrackstrasse 1, 3830 Waidhofen/Thaya, Austria. Basic terms and features of this product are provided in *Figure 1*.

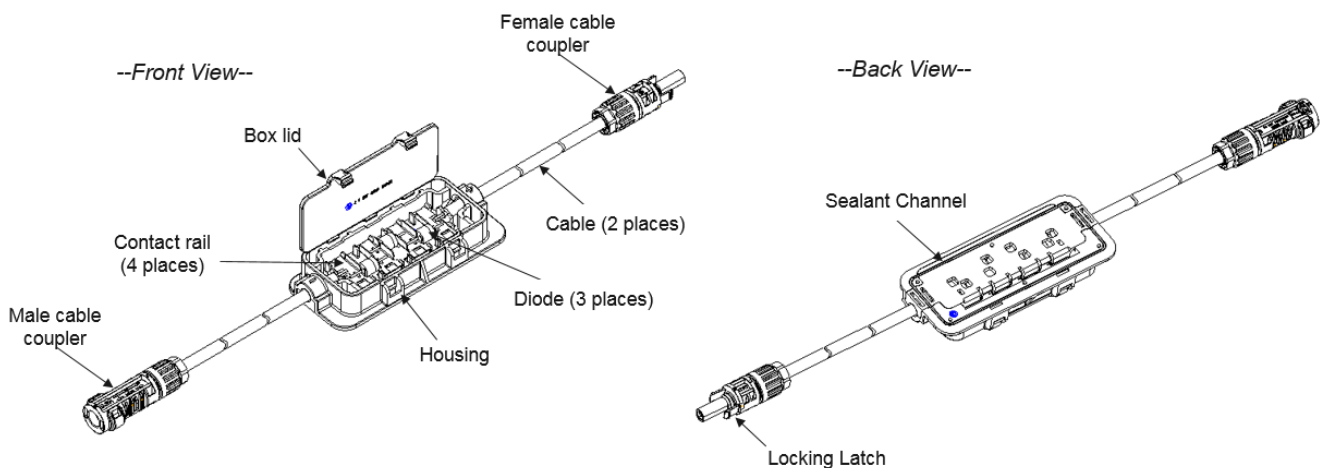


Figure 1

## 2. Supplementary Documentation

### 2.1 Customer Drawings

Customer Drawings for product part numbers are available from the service network. If there is a conflict between the information contained in the Customer Drawings and this specification or any other technical documentation supplied, Contact TE Connectivity Engineering.

Model code	Max working Voltage	Voltage (UL)	Voltage (TÜV)	Max impulse Voltage	Current
PVBAR4GAR3TA	120 V	1000 V dc	1000 V dc	12000 V dc	15 A
PVBAR4GAY3TA	120 V	1500 V dc	1500 V dc	16000 V dc	15 A
PVBAR4GAR3FA	120 V	1000 V dc	1000 V dc	12000 V dc	8.5 A
PVBAR4GAY3FA	120 V	1500 V dc	1500 V dc	16000 V dc	8.5 A
PVBAR4GBR3TA	120 V	1000 V dc	1000 V dc	12000 V dc	15 A
PVBAR4GBY3TA	120 V	1500 V dc	1500 V dc	16000 V dc	15 A
PVBAR4GBR3FA	120 V	1000 V dc	1000 V dc	12000 V dc	8.5 A
PVBAR4GBY3FA	120 V	1500 V dc	1500 V dc	16000 V dc	8.5 A

Dimensions and material specifications for the Solarlok PV BAR Junction Box products may be found in the above customer drawing.

### 2.2 Product Specification

Performance specification for the Solarlok PV BAR Junction Box products can be found in TE Connectivity specification 108-137167 –Solarlok PV BAR Junction Box.

### 2.3 Application Specification

Couplers shall be assembled per TE Connectivity Application specification 114-137077 to ensure correct connector assembly and crimp quality.

## 3. Solarlok Junction Box Assembly

### 3.1 General comments

Contaminants such as dust, moisture etc. can be detrimental to the assembly process. It is recommended that the work area and all components be as clean and dust-free as possible.

### 3.2 Installation guidelines

*The following application technical instructions are made as guidelines. These instructions do not excuse the user or installer of the Solarlok boxes from independently testing the adhesive tapes or silicone glues to determine the suitability for their proposed assembly process and application.*

#### 3.2.1 Content

This section describes the gluing of various Solarlok PV BAR Junction Box onto the rear side of the solar modules with the goal to secure the product in accordance with this specification.

This technique may be used on either glass panels or glass / Tedlar / PET PV panels.

### 3.2.2 Recommended adhesives

For the below two kinds of silicon sealants, sealants from the same silicone maker are recommended when operating in case of chemical compliance issue.

#### 3.2.2.1 Silicone sealant for adhesion (Bottom)

- Dow Corning PV804 Neutral Sealant, Black / White, for PV panel backside.
- Crevo CREVO709, Black / White, for PV panel backside.

#### 3.2.2.2 Silicone sealant for potting

- Dow Corning PV7326
- Crevo CV315

### 3.2.3 Equipment

The recommended adhesive is typically provided in cartridges. Refer to silicone maker's application instructions for adhesive applicator and application.

#### 3.2.4 Assembly aids

- Protective gloves, cleaning solvent, soft cloth
- Degreasing solvent, such as Isopropanol
- Small spatula, brush
- Dead weight- 1kg

#### 3.2.5 Adhesive foil

- Double-sided adhesive foils: apply per the valid material manufacturer's instructions for processing.
- The customer should independently test and verify the suitability of using adhesive foils on panel surfaces that are not entirely flat.

### 3.2.6 Safety instructions



**CAUTION:** Before beginning the junction box attachment process, obtain, review and follow manufacturer's material safety information.

The use of appropriate gloves and eye protection is recommended throughout the attachment process. Ensure adequate ventilation at all times during the attachment process. Refrain from eating, drinking or smoking in the vicinity. Do Not expose to open flames.

Silicon adhesive usage precautions:

- Avoid and prevent contact with eyes. In the event of eye contact, flush with water for 15 minutes and seek medical attention immediately
- Avoid prolonged contact with skin

### 3.2.7 Final assembly process using silicon adhesive

#### 3.2.7.1 Preparation

Place the PV panel face down on the work table. The attachment surface of the photovoltaic panel must be dry, oil-free and free of any contaminants. Thoroughly clean the attachment area with a clean, soft cloth and solvent. Similarly clean the bottom of the Solarlok PV BAR Junction Box.

Bend the photovoltaic panel foil tabs so that they extend perpendicular from the plane of the panel.

#### 3.2.7.2 Final attachment

The silicon adhesive needs to be applied only to the small peripheral recess on the bottom of the junction box. Before applying the adhesive, it is recommended that the junction box cover be opened to ease later attachment to the photovoltaic panel. A 5 mm ~10 mm wide band of adhesive applied to the recess is adequate.

During this process, ensure that silicon bead is continuous and free of gaps. If desired, the silicon bead may be smoothed with the small spatula to ensure a uniform and gap free surface.

To attach the junction box to the photovoltaic panel, thread the foil through the openings in the bottom of the junction box. Make sure the junction box is properly oriented on the bottom before firmly placing the junction box into its final position on the photovoltaic panel. At this point, the 1kg weight can be applied to the top of the junction box to ensure adequate adhesive coverage.

If desired, use the spatula to smooth any excess silicon that may have extruded out of the joint. Using a clean cloth, remove any excess adhesive drips that may have occurred during assembly. Keep the photovoltaic module assembly in the horizontal position until full cure is obtained.

Allow the sealant to fully cure according to the manufacturer's product specification or data sheet. The junction box assembly must be protected from external forces that could cause it to be moved during curing.

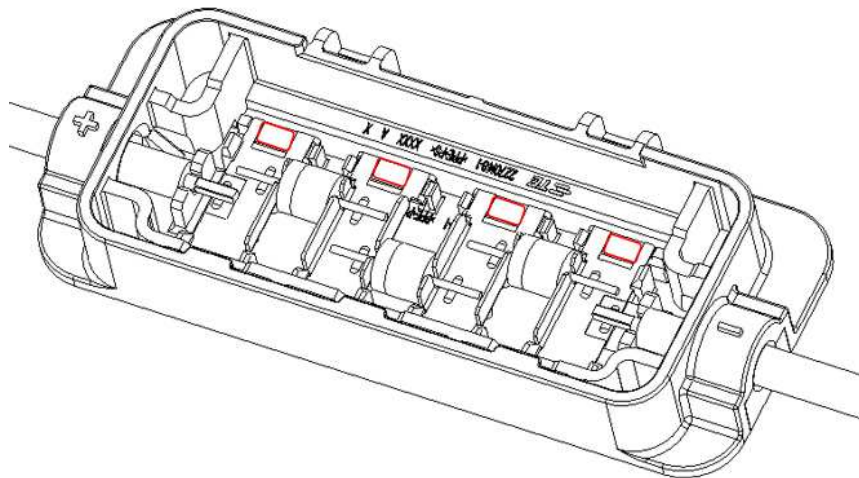
### 3.2.8 Wiring the Junction Box

#### 3.2.8.1 Foil Tab Connection

The foil tab extended from the PV panel requires a soldering connection with the contact rail of Solarlok PV BAR Junction Box, the recommended foil tab width is 6mm Max.

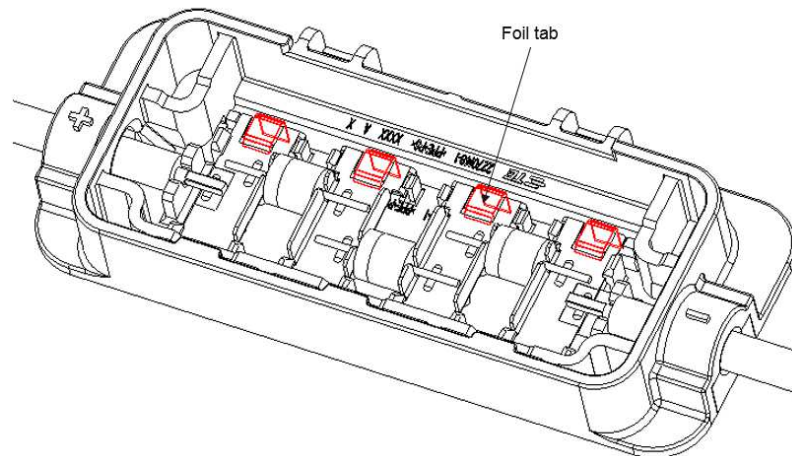
Follow following operation procedures to ensure a secure connection.

The contact rails of box are pre-soldered with solder wire or solder paste which lead free for environment compliance, finished as *Figure 2*.



**Figure 2**

Inserting the foil tap into the opening and using industry- approved soldering methods, solder the foils to the solder contacts, finished as *Figure 3*

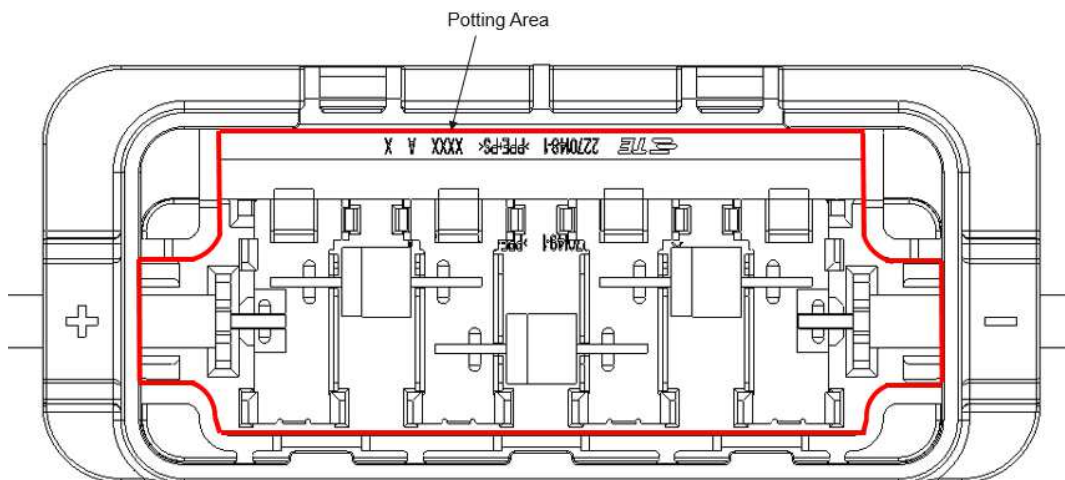


**Figure 3**

Test and approve the connections for electrical continuity.

### 3.2.9 Potting of the Junction Box

After fixing foil tab to the box, all the live parts should be completely encapsulated by a potting material. Fill the potting material into the box slowly until the potting material reach the potting amount indication face of the junction box, make sure the cable inside the box and all live parts are completely covered by potting material, as shown in *Figure 4* and *Figure 5*. The overall potting amount is about 40 cc.



**Figure 4**

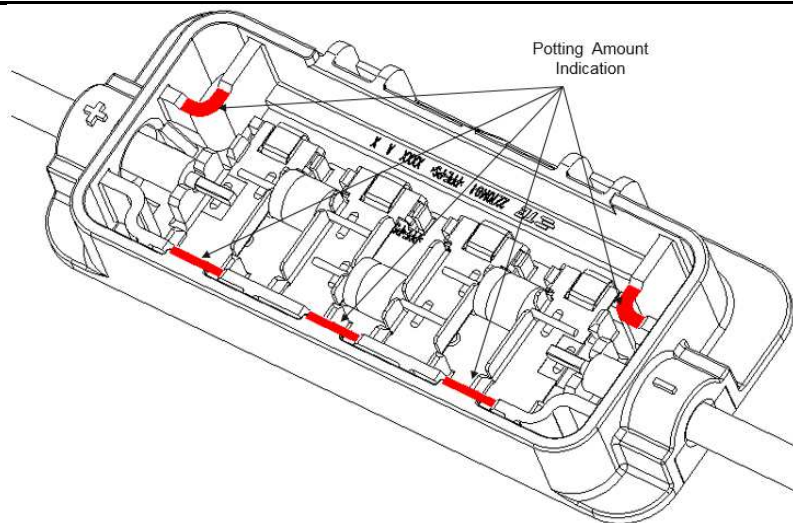


Figure 5



**CAUTION:** After potting and with the lid in place, the assembly must be protected from environmental extremes for seven days to permit adequate cure time. Refer to silicone maker's application instructions for operation details.

### 3.2.10 Junction Box Lid Assembly

For this junction box, the lid will be latched in the housing-lower part.



**CAUTION:** Make sure all the live parts are completely insulated by potting material before closing the lid.

To close the junction box lid, simply place the lid under the tap of the housing and press firmly until the lid is fully seated. When fully seated, the top edge of the lid should be even with the top of the box.

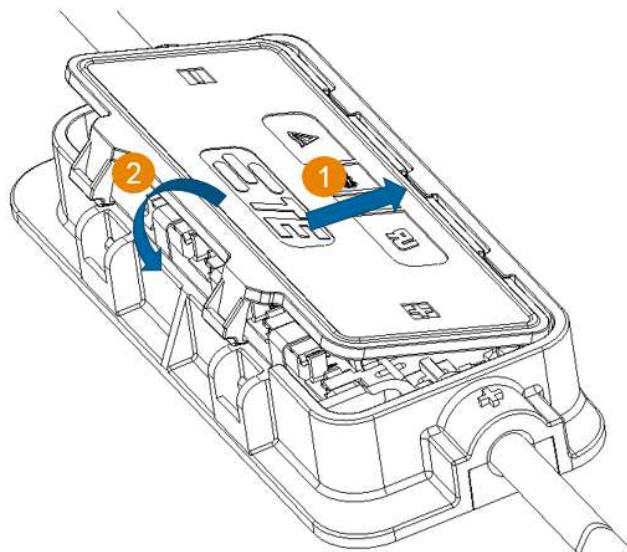


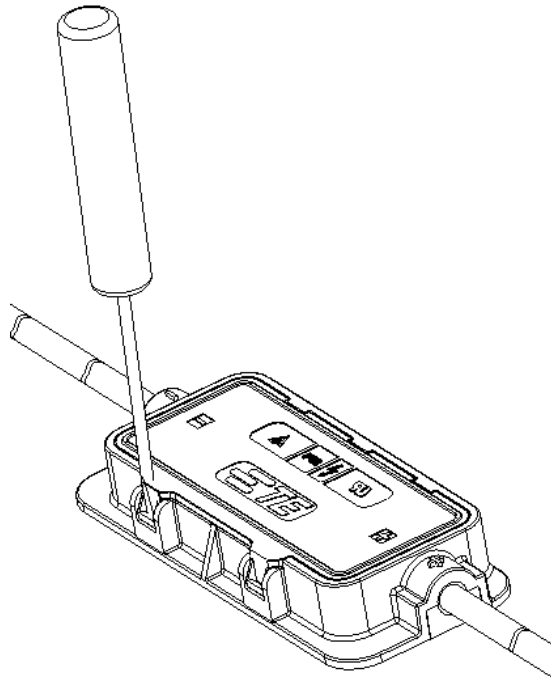
Figure 6





**CAUTION:** Components within the junction box may be energized and capable of inflicting severe injury or death. Re-open of lid is not recommended after mounting!! The junction box should be opened by authorized and trained personnel only if necessary!!!

*To open the lid of the junction box, the tip of a screwdriver having a 3 to 5 mm flat blade must be inserted into the release pocket of the lid, and then the lid must be pried free while simultaneously slightly lifting the front of the lid. See Figure 7.*



**Figure 7**

In order to ensure protection against shock the junction box **MUST** be disconnected from power sources while installing cables or couplers! Couplers are not intended for hot connect and disconnect.

To ensure protection against shock, this junction box must only be used fully assembled, with the lid closed and all external connections terminated.

#### 4. Connection



**CAUTION:** To avoid personal injury, the circuit load must be **DISCONNECTED BEFORE** connecting cable couplers. A cable coupler **MUST NOT** be plugged in under load. **Do not connect or disconnect underload!**

Connect the solar panels using the PV BAR junction box assemblies by plugging the female cable couplers into the male cable couplers. There should be an audible “click” when the couplers are fully mated. Make sure to observe the polarity symbol of the female cable coupler when making connections. **DO NOT pull or twist the cables.** Connect the first solar panel and last solar panel to the remainder of the system.



**CAUTION:** The cable must not be bent or crushed on the direct exit of the cable screw joint and cable gland on box side.  
**A minimum bending radius  $R \geq 5 \times$  Cable diameter must be maintained.**  
**Do not connect or disconnect underload!**

The cable must be routed in a way that the tensile stress on the conductor or connections is prevented, see Figure 8.

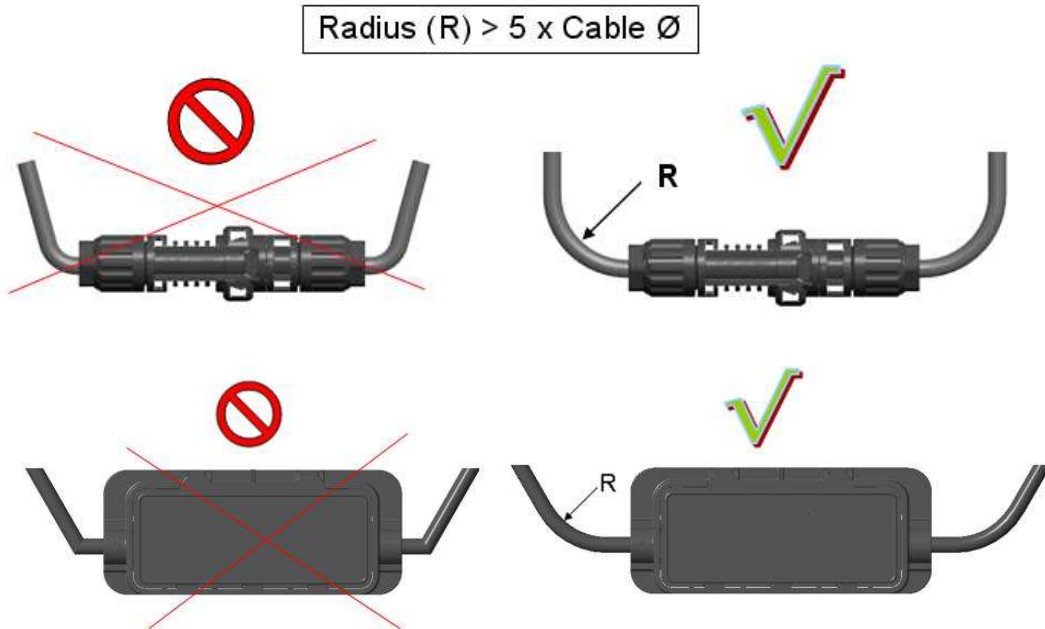


Figure 8

### 5. Disassembly



**CAUTION:** To avoid personal injury, the circuit load must be DISCONNECTED BEFORE a cable coupler is unplugged. A cable coupler **MUST NOT** be unplugged under load.  
**Do not connect or disconnect underload!**

A hand application tool (PN 1971903-1) is available for disconnecting the couplers.

1. The locking mechanism is opened by depressing the latches with hand application tool (PN 1971903-1) as shown in Figure 9.
2. Disconnect the coupler connection while the special tool insertion into the locking mechanism to depress the latches and pull the couplers apart.

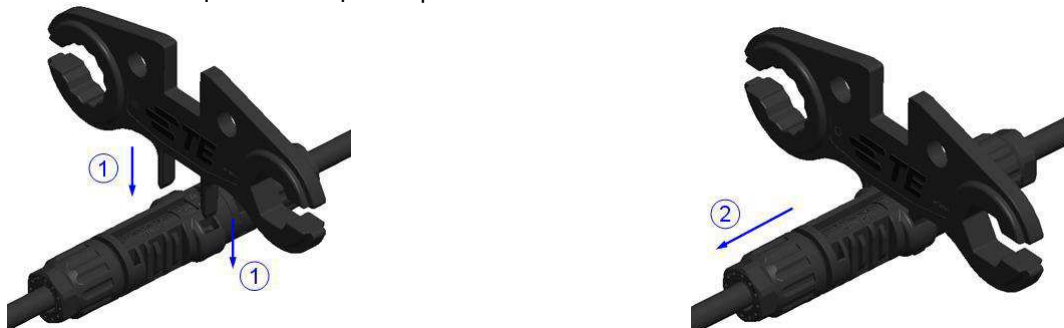


Figure 9

### 6. Removal and Repair

The PV BAR assembly cannot be removed from the solar panel without damage to both products. The PV BAR

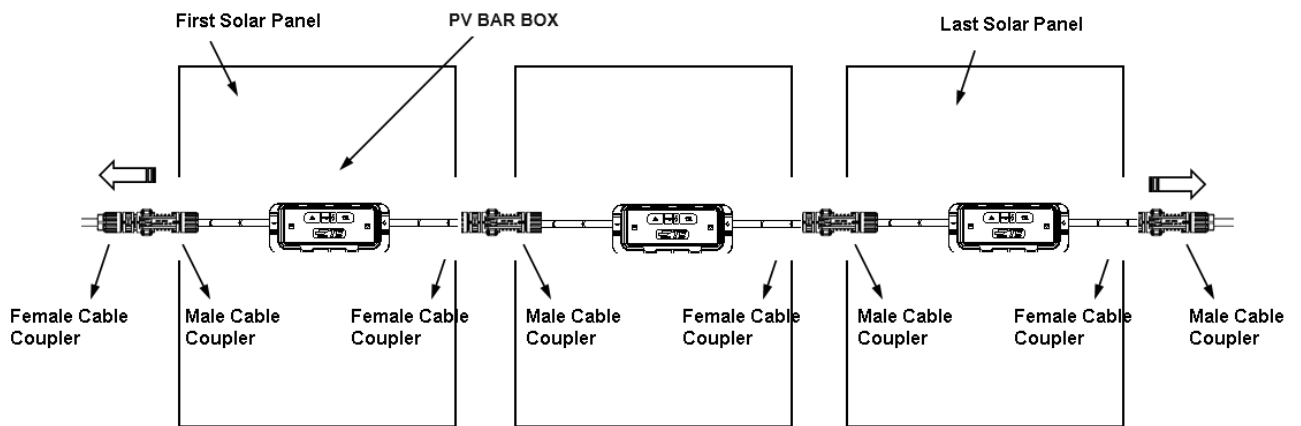


assemblies are not repairable. Damaged or defective product MUST NOT be used.

A cable coupler must be replaced after limited mating cycles of either coupler.

### 7. Applications Examples

*Overview of Connection of Solar Panels Using PV BAR Junction Box Assemblies as shown below  
Serial Wire Diagram (Ref)*



**Figure 10**

### 8. Storage

See product specification 108-137167.

## Annex A Documentation Change Record

Rev	Clause	Page	Change Description	DATE	DW N	APRD
A			New Release	06 MAY 2016	YZ	LW
B	Multiple	Multiple	Added new model codes and general readability	3 July 2018	CvS	MZ
C	§3.2.5	4	Added Adhesive foil	8 October 2018	CvS	MZ
D	Multiple	Multiple	Revised	21 November 2018	CvS	Mz
E	Multiple	Multiple	Layout and model codes	26 August 2019	CvS	MZ
E1	1	1	Added license holder	11 September 2019	CvS	MZ
E2	Multiple	Multiple	Added “ Do not connect or disconnect underload!”	24 September 2019	CvS	MZ