

Compact Medium SOLARLOK Junction Box

Application Specification

CONTENT

1. Introduction	2
2. Supporting Documents	2
2.1 Drawings	3
2.2 Product Specification	3
2.3 Application Specification	3
3. Solarlok Junction Box Assembly	3
3.1 General comments	3
3.2 Installation guidelines for Compact Medium Solarlok attachment to the PV module	4
3.2.1 Content	4
3.2.2 Recommended adhesives	4
3.2.3 Equipment	4
3.2.4 Assembly aids	4
3.2.5 Precautions	4
3.2.6 Final assembly process single component silicon adhesive	4
3.3 Wiring the Junction Box	5
3.3.1 Foil connection (For Potting)	4
3.3.2 Foil connection (For Non-potting)	5
3.4 Junction box lid assembly	5
4. Solarlok Plug Couplers	6
4.1 General Comments	6
4.2 Termination of the cable wires / crimping of the contacts	6
4.3 Handling of the Couplers	6
4.3.1 Selection of Sealing Grommet for Cable Couplers	6
4.3.2 Couplers Latching	8
4.3.3 Disconnecting	8
5. Applications Examples	9
6. Storage	9
7. Tools	9

1. Introduction

This specification covers the requirements for application of the Compact Medium SOLARLOK Junction Box Assemblies as well as the termination of its connectors.

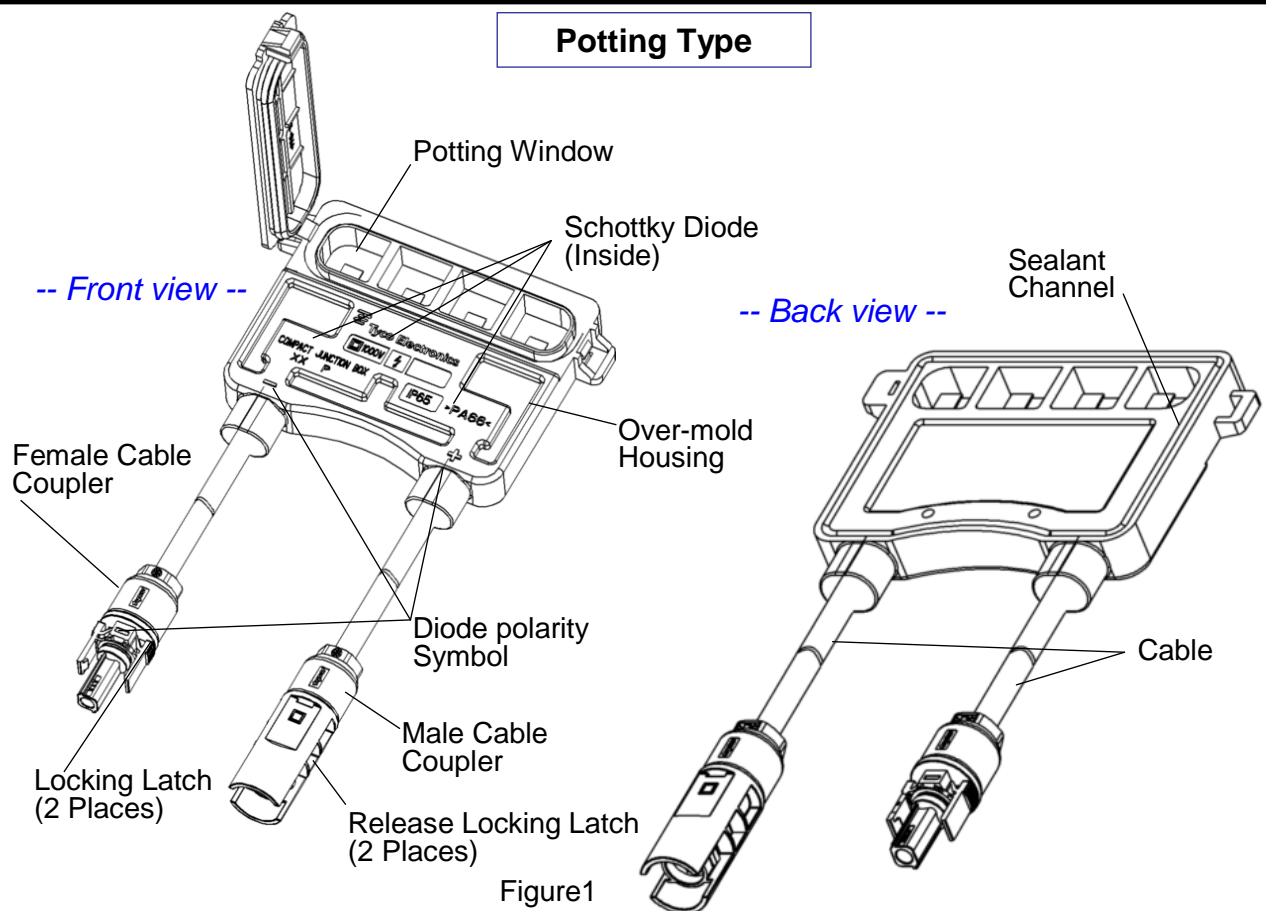
The Compact Medium SOLARLOK Junction Box Assemblies is designed to be assembled onto a solar panel. The solar panels are designed to be installed onto the roof using the Compact Medium SOLARLOK Junction Box Assemblies to connect one solar panel to another solar panel (except for the first and the last solar panels) and two home run cables to connect the first and last solar panel to the inverter located in the residence

There are two type junction box assemblies:

- ◆ Potting Type (Figure 1)
- ◆ Non-potting Type with Ω clip (Figure 2)

Each Compact Medium SOLARLOK Junction Box Assemblies consists of one over-mold housing and two cable couplers (one male and one female). The over-mold housing contains four contacts, three Schottky diode, and cable (connecting the couplers to the contacts). The contacts are used for electrical connection to the solar panel. The diode provides electrical direction control and enhanced thermal management. The back of the over-mold housing has a sealant channel used to hold the sealant that secures Junction Box Assemblies to the solar panel. For potting type, the front of the over-mold housing features a potting window used to hold the potting compound that will protect the solder contact connections from environmental conditions. The female coupler and over-mold are embossed with a positive or negative diode polarity symbol to indicate proper cable connection. The female coupler features locking latches that secure the connection. The male coupler has release locking latches that when depressed opens the locking mechanism to allow the couplers to be unplugged.

When corresponding with personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of this product are provided in Figure 1 and 2.



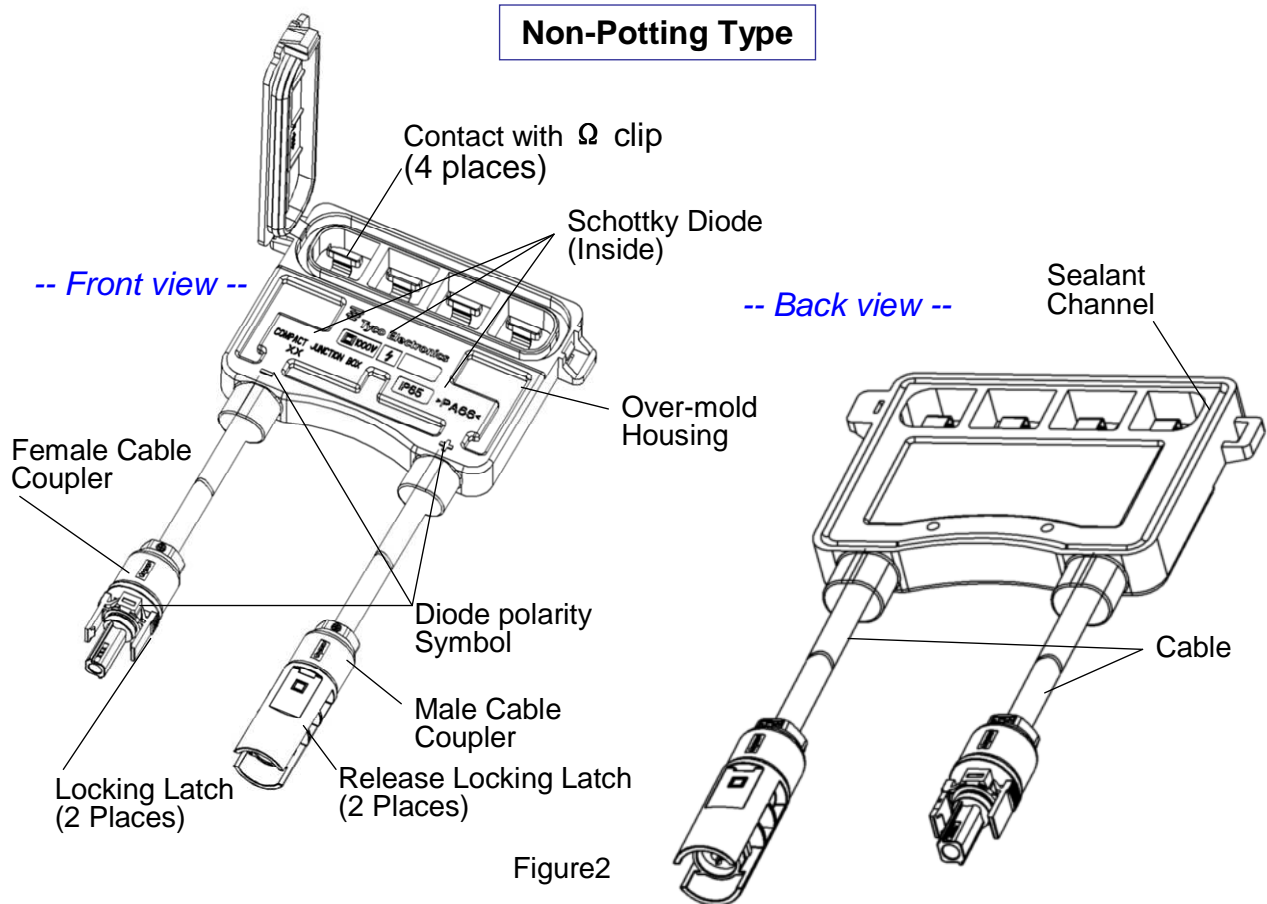


Figure2

2. Supporting Documents

2.1 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 Tyco Electronics Engineering.

PN 1971222	Compact medium SOLARLOK Junction Box
PN 1394461	PV male coupler 1 Pos.
PN 1394462	PV female coupler 1 Pos.
PN 1740873	Foil Ω Clip

2.2 Product Specification

Performance specification for the Compact Medium SOLARLOK Junction Box Assemblies can be found in Tyco product specification: 108-106026

2.3 Application Specification

Couplers shall be assembled per Tyco Electronics Application specification 114-18022 and 114-74013 to ensure correct connector assembly and crimp quality.

Please refer to HVT application specification 114-74013 for additional details on contact termination.

3. SOLARLOK Junction Box Assembly

3.1 General comments

Contaminants such as dust, moisture oil 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 for Compact Medium SOLARLOK attachment to the PV module

3.2.1 Content

The following describes the correct attachment method to be used to attach the Compact Medium SOLARLOK Junction Box Assemblies to backside of a panel.

This technique may be used on PV glass panel or PET backsheet.

3.2.2 Recommended Adhesives

3.2.2.1 Single component silicon adhesive

- Tonsan 1527, Gray/White, for glass PV panel backside.
- Dow Corning 7091, White, for glass PV panel backside.
- Dow Corning 8101F, White, for glass PV panel backside.

3.2.2.2 Potting silicone adhesive

- Tonsan 1521A/1521B
- Dow Corning PV7321

3.2.3 Equipment

The recommended adhesive is typically provided in 310ml cartridges for use with the appropriate adhesive applicator.

- Adhesive applicator
- Work table
- Store for boxes

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 Precautions



CAUTION: Before beginning the junction box attachment process, obtain, review and follow the 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.

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

3.2.6 Final assembly process single component silicon adhesive

3.2.6.1 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 Junction Box.

3.2.6.2 Final attachment

The silicon adhesive needs to be applied only to the small peripheral recess (sealant channel) 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 10 mm – 20 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.

A full cure requires 20 hours at room temperature before the photovoltaic module can be handled.

3.3 Wiring the Junction Box

3.3.1 Foil connection (For Potting)

The Foil exiting the PV panel is soldered to the contact of the Compact Medium SOLARLOK Junction Box

3.3.2 Foil connection (For Non-potting)

The Foil exiting the PV panel is terminated to the contact of the Compact Medium SOLARLOK Junction Box as shown in the **figure (3-5)** below:

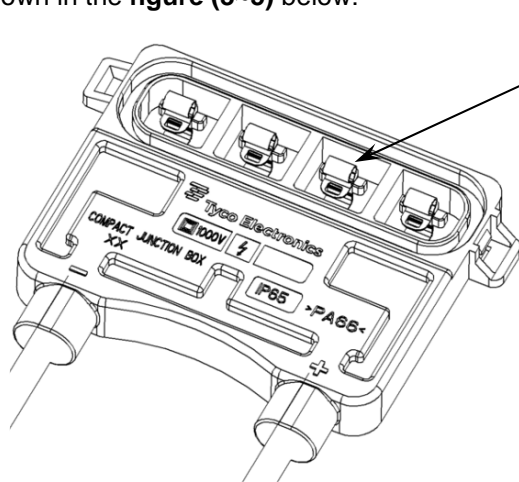


Figure 3

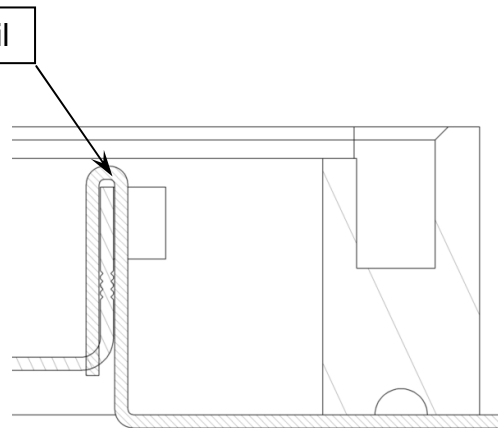


Figure 4

Then mount Foil Clip onto the Foil to form connection. Press it down till feeling stop force.

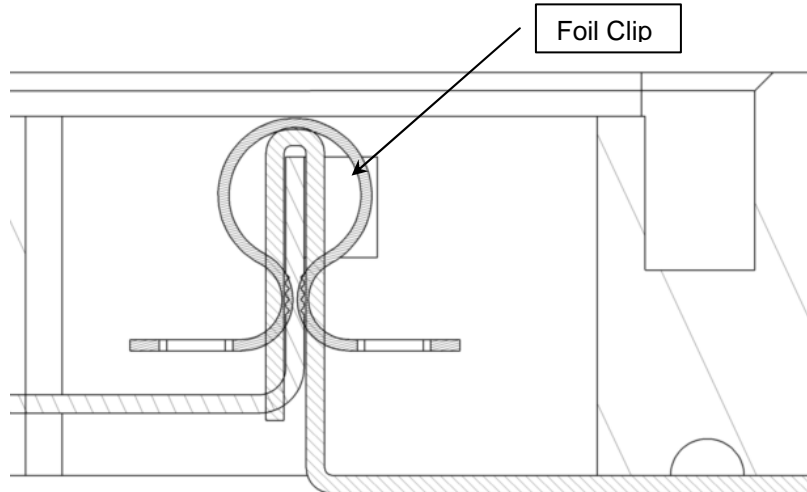


Figure 5

3.4 Junction Box Lid Assembly

To close the junction box lid, simply place the lid on the junction box 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.



CAUTION: the junction box should be opened by authorized and trained personnel only!!!

To re-open the junction box, a standard 3 mm to 5 mm (.125"~.2") screwdriver is used to pry open the lid.



CAUTION: Components within the junction box may be energized and capable of inflicting severe injury or death. Exercise extreme caution when opening the junction box!!!

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. Solarlok Plug Couplers



CAUTION: Do not disconnect under load!

Current path should only be disconnected using approved disconnect devices. Cable assemblies shall be labeled with PN 0-1718077-1



CAUTION: To protect against shock, ensure that conductors and their associated Couplers are separated from opposite polarity components.

4.1 General Comments

Any kind of pollution (dust, humidity, etc.) during the assembly process can degrade contact and connector performance. This applies in particular to the seals and the crimping of the contacts. A clean assembly environment is therefore essential.

4.2 Termination of the cable wires / crimping of the contacts

Couplers use different crimp contacts for various wire gauges. Possible wire gauges are 2.5 mm², 4.0 mm², 6.0 mm² or AWG 14, AWG 12 and AWG 10. The tools to be used are selected based upon the wire gauge. For the application specification, please refer to specification 114-74013.

4.3 Handling of the Couplers

4.3.1 Selection of Sealing Grommet for Cable Couplers

Use only wire which is released by Tyco Electronics AMP GmbH! Preassembled couplers of PN 1394461 and PN 1394462 are for wire diameter from 4.5mm up to 6.9mm. Insert wire with contact directly in the preassembled connector instead of mounting instructions points 3 up to 5.

Alternatively the cable grommet should be selected based upon the insulation diameter of the wire being used (see customer drawings PN 1394461 and PN 1394462). The grommet should not fit too hard on the wire because of the risk that the contact cannot insert correctly in the chamber. Five different seals are available:

Grommet diameter	Isolation Diameter Range	Cable Grommet	Pinch Ring PN
Ø 4 mm	3.3 bis 4.3 mm	0-1394465-5	0-1418677-1
Ø 5 mm	4.3 bis 5.3 mm	0-1394465-1	0-1418677-2
Ø 6 mm	5.3 bis 6.2 mm	0-1394465-2	0-1418677-2
Ø 7 mm	6.2 bis 7.2 mm	0-1394465-3	0-1418677-2
Ø 8 mm	7.2 bis 8.0 mm	0-1394465-4	0-1418677-2

Use PN 0-1418677-1 with AWG wires to fulfill tensile forces for UL

When assembling the couplers, the following sequence must be followed:

1. Stripping the Wire



Figure 6

2. Insert the stripped wire into the wire crimp barrel until it stops. While holding the wire in place, squeeze tool handles together until ratchet releases. For further information, please refer to application specification 114-74013.



Figure 7

Please have a look at the right position of the contacts in the applicator (especially with the hand tool). For easier handling use the locator.

3. Place screw nut onto wire preassembly connector



Figure 8

4. Press seal into the connector housing until its stops

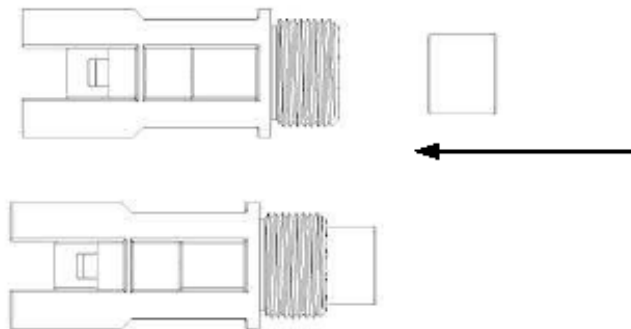


Figure 9

5. Push contact with cable into the connector housing until you hear the contact is locked into position

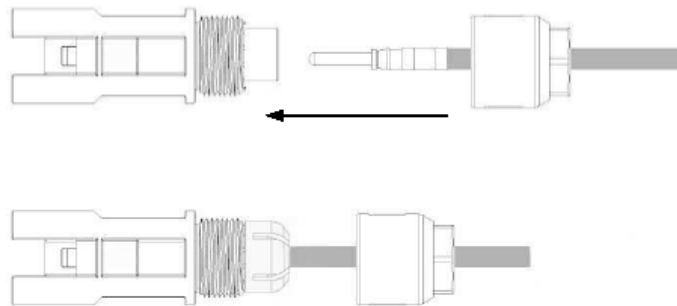


Figure 10

6. Screw nut onto coupler housing. Tighten backshell nut to max. 1.5 Nm depending on wire type



Figure 11

Press seal into the coupler housing until its stops

Cable Type	Tyco PN	Tightening torque	Tightening torque for preassembled couplers
------------	---------	-------------------	---

PV Cable, Black Studer, 4.0 mm ²	1971479-2	1.3 Nm + 0.2 Nm	1.3 Nm + 0.2 Nm
PV Cable, Black Nanyang, 4.0 mm ²	1971486-2	1.3 Nm + 0.2 Nm	1.3 Nm + 0.2 Nm
PV Cable, Black TE, AWG 12	1971456-2	1.3 Nm + 0.2 Nm	1.3 Nm + 0.2 Nm

4.3.2 Couplers Latching

When mating the couplers, ensure the following;

Couplers labeled with a + or – are keyed and can only be mated to similarly marked and keyed couplers.



Caution: The “neutral” designated pin-connectors incorporate no keying features and may be freely mated to either + or – keyed female-couplers. The neutral product should not be used where maintaining polarity is critical. It is only admitted for SERI couplers.

The polarity of the "neutral" couplers must be labeled with PN 1394725-1 or -2 nearby the couplers.

When mating the couplers system the following must be ensured:

- The plus- and minus-coded couplers can only be mated to a similarly coded connector.
- The connector system is fully latched only when the latches are flush with the mating couplers

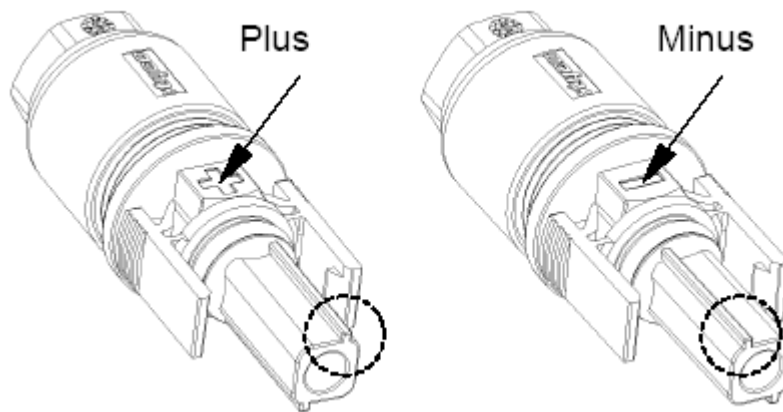


Figure 12 (Female coupler)

4.3.3 Disconnecting



CAUTION: Do not disconnect the couplers under load!

Disconnect circuit from load before unplugging couplers.

Cable assemblies should be labeled using Tyco Label PN 0-1718077-1

Un-mating of the couplers

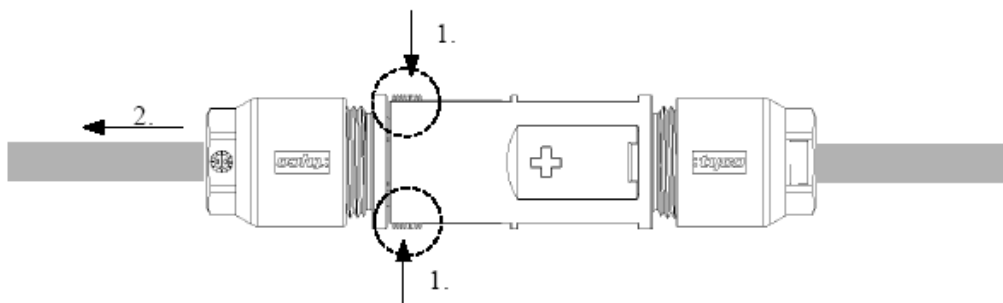


Figure 13

1. The locking mechanism is opened by depressing the latches as shown in Figure 13.
2. Pull out the couplers while depressing the latches, Disconnect the couplers by pulling the couplers halves apart

5. Applications Examples

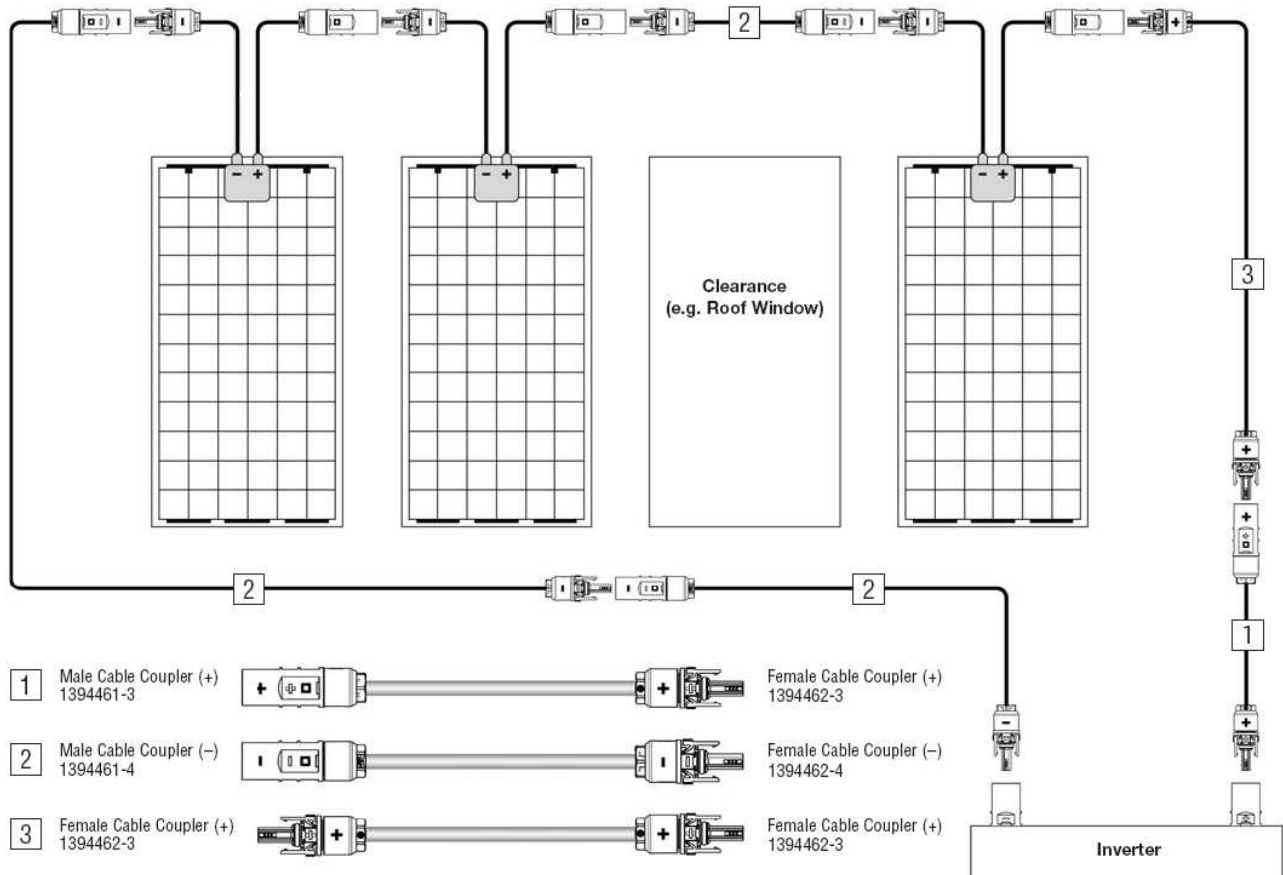


Figure 16

6. Storage

See Product specification 108-106026.

7. Tools

1. The following tools are available for the contact crimping (please specify wire gauge required): Hand Application Tool, integral Locator and Die (PN 0-1579004-8 (metric)) or PN 0-1579004-9 (AWG)), use 'HVT' position on locator
2. An extraction tool (PN 0-1102855-3) is needed to disassemble the couplers components. This tool is used to unlock the contact retention features, after which the contact can be removed and re-used if necessary.

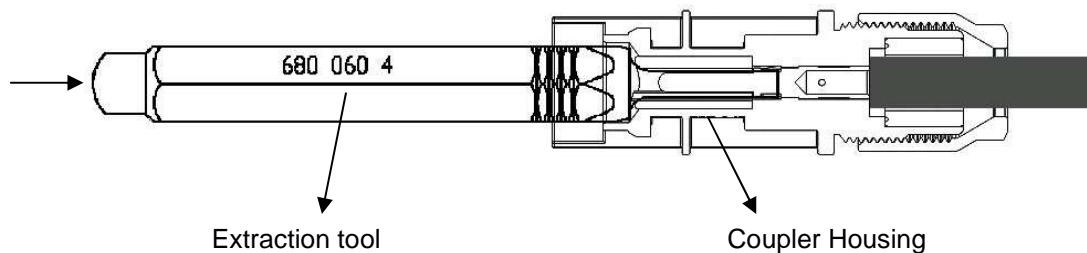


Figure 17

- Insulation stripper (PN 1-1579002-2) is recommended for stripping the wire
- To aid termination of cable in the junction box, an assembly aid tool, PN 0-1579007-2 is available to open the wire clip

- . To aid in the termination of diodes or jumpers between rails, assembly aid tool PN 0-1579007-5 is available
- . An assembly aid to open all PV panel foil tab clips is available, TYCO PN 0-1579007-3