

tyco / *Electronics*

GLOBAL INDUSTRIAL AND COMMERCIAL



SOLARLOK®
Interconnection System

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Product und Machine Literature

Order quickly and easily by fax:

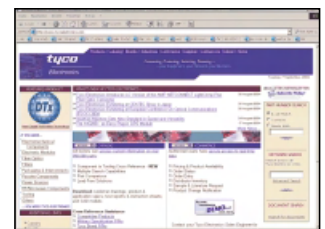
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A large product range has extensive product literature. You can request flyers, catalogs and brochures for each of the product sectors of relevance to you.

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The SOLARLOK Concept

System Features

Junction Box

- Variable wiring options
- Easy accessible
- Simple, fast and cost-effective assembly
- Flat, low profile design
- High current carrying capacity
- Good thermal balance
- Connectorized or direct wire configurations
- Up to four outputs possible
- Up to six internal rails
- Customer-specific solutions
- TÜV and UL approved

Connector

- Simple on-site processing
- Mating safety provided by keyed housings
- Semi-automatic assembly capability possible
- Multiple plugging and unplugging cycles
- Accommodates solar cable with different insulation diameters
- High current carrying capacity
- Wide temperature operating range
- TÜV and UL approved

Solar Cable

- Dual wall insulation
- Electron beam cross-linked
- Excellent resistance to U.V., water, ozone, fluids, salt, general weathering
- Excellent resistance to abrasion
- Halogen free, flame retardant, low toxicity
- Very low smoke emissions
- Excellent flexibility and stripping performance
- Different cable diameters
- Operating Temperature from -40 °C up to +110 °C
- Voltage Rating up to 2600 V DC
- IEC 60228 Class 5 (stranded tin plated copper and flexible)
- TÜV certified



Simple and Reliable System Interconnection of Individual Solar Modules Right to the DC/AC Converters

Market expansion of the formerly regulated energy supply sector, increased global environmental awareness and governments committing themselves to more stringent environmental targets have opened up new opportunities for the photovoltaic industry.

Having served a niche market in the past, the photovoltaics industry now has the opportunity to move into mass production, realizing economies of scale and gaining a greater market share of the world's energy mix.

Tyco Electronics will be contributing to the establishment of this environmentally-friendly technology with the introduction of its SOLARLOK connector system.

SOLARLOK delivers a flexible system solution for easy and reliable interconnections from photovoltaic modules to the DC/AC converter. The entire system concept is based on cost-effective and reliable processing of individual interconnection system components. This significantly reduces installation costs of the solar energy system.

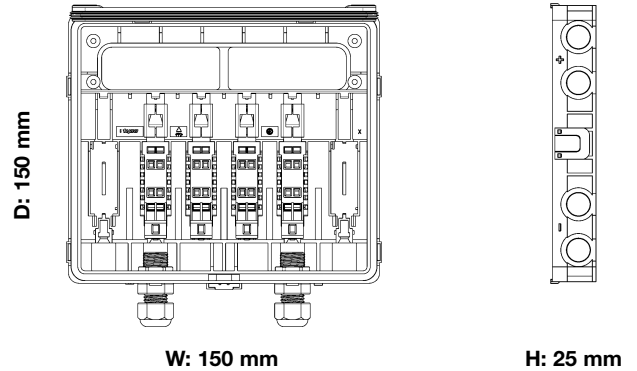
The junction box concept is based on a flexible, open system structure, which allows serial as well as parallel interconnection via direct wire connect or separable connectors. Within the junction box, up to six termination places rails are available for photovoltaic foil connection.

The male and female cable coupler was designed for high voltage and high current-carrying capacity in addition to the well-established IP 67 sealing requirement in the photovoltaic industry. Mating safety is provided by polarity keyed housings, fully shrouded contacts, reliable high cycle life, and squeeze to release connection system. In addition, a wide temperature range and fulfillment of worldwide standards for photovoltaic connection systems complement the robust product specification.

The design of the male and female receptacle for the junction box and the DC/AC converter follow the cable coupler "click philosophy" for quick and secure mating even in difficult mounting positions.

If required by the customer, the junction box can be delivered pre-configured with diodes, jumpers, plug connectors, and solar cable pigtails.

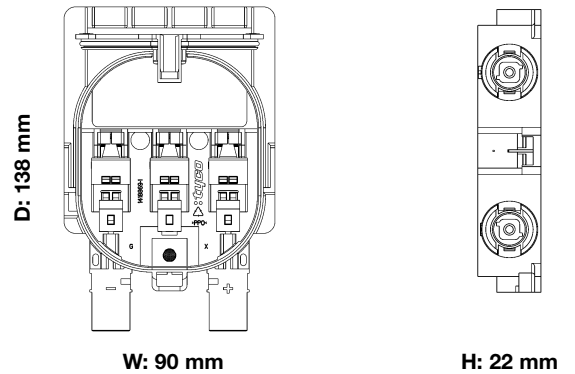
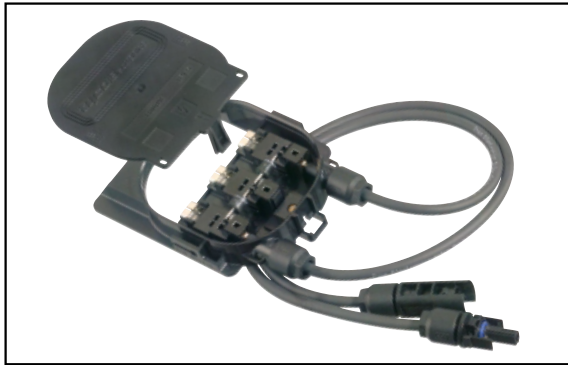
Junction Box – Serial Interconnection



SERIAL INTERCONNECTION							
Configuration	Part Number	Package Quantity	Interconnection Options			Contact Rails	Diodes
			Plug Connector		Direct Wire		
			Plus Keyed	Minus Keyed			
	1-1394723-8	20			□□	□□□□	
	2-1394723-7	20			□□	□□□□	□□□
	1-1394723-6	20			□□	□□□□□	
	2-1394723-5	20			□□	□□□□□	□□□□
	1394723-4	20			□□	□□□□□□	
	2-1394723-1	20	□	□		□□□□	
	1394723-3	20	□	□		□□□□□□	
	1740077-1*	20			□□	□□□□	□□□

*) Junction Box Assembly with two 100 cm long 4.0 mm² black solar cable and plug connector.

Junction Box – Serial Interconnection (continued)

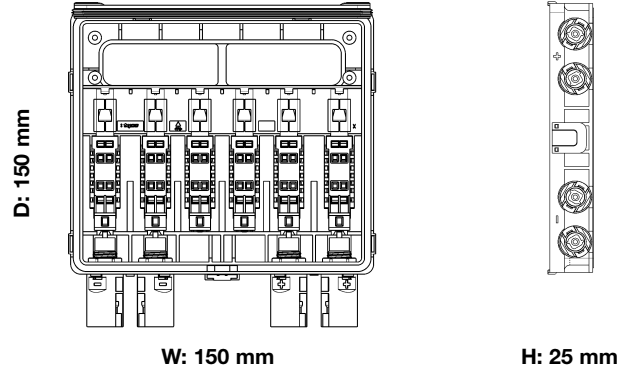


SERIAL INTERCONNECTION

Configuration	Part Number	Package Quantity	Interconnection Options			Contact Rails	Diodes
			Plug Connector		Direct Wire		
			Plus Keyed	Minus Keyed			
	1740220-4	80			□□	□□	
	1740220-2	80			□□	□□	
	1740220-3	80			□□	□□□	
	1740220-1	80			□□	□□□	□□
	1418867-2	80	□	□		□□	
	1418867-1	80	□	□		□□□	
	1740425-1*	48			□□	□□□	□□

*) Junction Box Assembly with two 85 cm long 4.0 mm² black solar cable and plug connector.

Junction Box – Parallel Interconnection



PARALLEL INTERCONNECTION						
Configuration	Part Number	Package Quantity	Interconnection Options			Contact Rails
			Plug Connector		Direct Wire	
			Plus Keyed	Minus Keyed		
	1394723-5	20	<input type="checkbox"/>	<input type="checkbox"/>		□□□□□
	1394723-6	20			□□□□	□□□□□□
	1394723-9	20			□□□□	□□□□

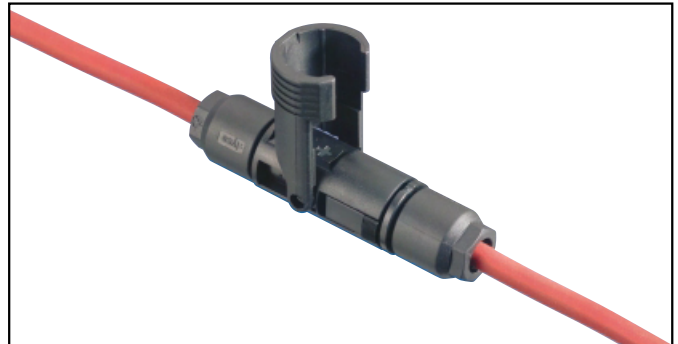
Cable Coupler



Female Cable Coupler



Male Cable Coupler



Cable Coupler with Connector Latch Locking Clip

Cable Coupler Polarity	Wire Size			Cable Coupler				Part Number	Package Quantity
	2.5 mm ² (AWG 14)	4.0 mm ² (AWG 12)	6,0 mm ² * (AWG 10)	Female Cable Coupler		Male Cable Coupler			
				Plus Keyed	Minus Keyed	Plus Keyed	Minus Keyed		
Plus Coupler	<input type="checkbox"/>			<input type="checkbox"/>				1394462-1	100
	<input type="checkbox"/>					<input type="checkbox"/>		1394461-1	100
Minus Coupler	<input type="checkbox"/>				<input type="checkbox"/>			1394462-2	100
	<input type="checkbox"/>						<input type="checkbox"/>	1394461-2	100

Plus Coupler		<input type="checkbox"/>		<input type="checkbox"/>				1394462-3	100
		<input type="checkbox"/>				<input type="checkbox"/>		1394461-3	100
Minus Coupler		<input type="checkbox"/>			<input type="checkbox"/>			1394462-4	100
		<input type="checkbox"/>					<input type="checkbox"/>	1394461-4	100

Plus Coupler			<input type="checkbox"/>	<input type="checkbox"/>				5-1394462-5	100
			<input type="checkbox"/>			<input type="checkbox"/>		6-1394461-5	100
Minus Coupler			<input type="checkbox"/>		<input type="checkbox"/>			5-1394462-6	100
			<input type="checkbox"/>				<input type="checkbox"/>	6-1394461-6	100

Male Cable Coupler – Not Keyed – for Serial Interconnection

Neutral	<input type="checkbox"/>							6-1394461-1	100
Neutral		<input type="checkbox"/>						6-1394461-2	100
Neutral			<input type="checkbox"/>					6-1394461-4	100

Connector Latch Locking Clip

								1534226-1	100
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*) Only in conjunction with the Tyco Electronics Solar Cable (Part No. **956299-1**).

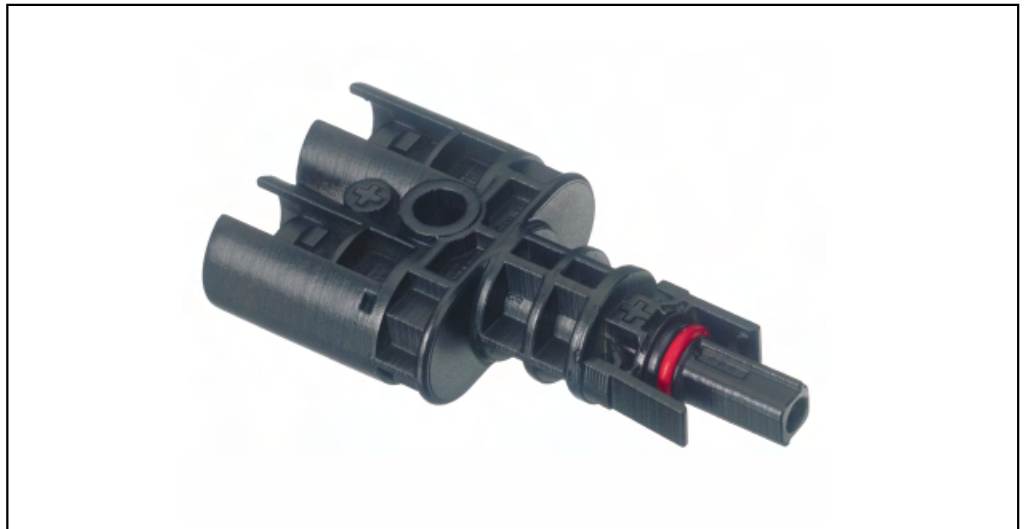
T-Branch Connector

**Parallel Interconnection
using T-Branch Connector
(Male-to-Male)**



T-Branch Connector		Part Number	Package Quantity
Plus Keyed	Minus Keyed		
<input type="checkbox"/>		1534611-1	20
	<input type="checkbox"/>	1534611-2	20

**Parallel Interconnection
using T-Branch Connector*
(Female-to-Male)**



T-Distributor		Part Number	Package Quantity
Plus Keyed	Minus Keyed		
<input type="checkbox"/>		1740277-1	20
	<input type="checkbox"/>	1740277-2	20

*) Available III, 2005

DC/AC Converter Receptacle



O-Ring and Metal Nut



Flat Seal and Plastic Nut



With Cover

Wire Size		Keying		Part Number	Package Quantity	Remarks
2.5 mm ² (AWG 14)	4.0 mm ² (AWG 12)	Plus	Minus			
<input type="checkbox"/>		<input type="checkbox"/>		1394738-1	100	O-Ring and Metal Nut
<input type="checkbox"/>			<input type="checkbox"/>	1394738-2	100	
	<input type="checkbox"/>	<input type="checkbox"/>		1394738-3	100	
	<input type="checkbox"/>		<input type="checkbox"/>	1394738-4	100	

<input type="checkbox"/>		<input type="checkbox"/>		1740210-1	100	Flat Seal and Plastic Nut
<input type="checkbox"/>			<input type="checkbox"/>	1740210-2	100	
	<input type="checkbox"/>	<input type="checkbox"/>		1740210-3	100	
	<input type="checkbox"/>		<input type="checkbox"/>	1740210-4	100	

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1394739-1	100	Cover
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Solar Cable

Product Facts

- Dual wall insulation
- Electron beam cross-linked
- Excellent resistance to UV, water, ozone, fluids, salt, general weathering
- Excellent resistance to abrasion
- Halogen free, flame retardant, low toxicity
- Very low smoke emissions
- Excellent flexibility and stripping performance
- Wire size from 2.5 mm² up to 6.0 mm²



As part of expanding the SOLARLOK Product Line, Tyco Electronics has specified a wire that is designed to meet the harsh environmental conditions typical in the wiring of photovoltaic installations.

The flexible, dual wall, halogen free and cross linked solar wire offers long term stability and TÜV approval.

Its outstanding features include: high resistance against environmental conditions like humidity, UV-radiation and ozone.

In addition, it has excellent resistance to abrasion and temperature extremes.

The wire has a high dielectric withstand voltage and with its fine-stranded, tin plated copper conductor, it is easy to handle and to strip.

Material and Finish

Conductor:
Stranded tin plated copper

Insulation:
Electron beam cross-linked Polyolefin

Sheath:
Electron beam cross-linked halogen free Polyolefin

Color:
Black, blue, red

Standards:
IEC 60228 classe 5 (Stranded tin plated copper and flexible); TÜV certified

Mechanical Features

Max. Conductor Temperature
Continuous: +110 °C
At Short Circuit: +250 °C

Min. Operating Temperature
Free Installation: -25 °C
Fixed Installation: -40 °C

Wire Size Range:
2.5 mm² (AWG 14),
4.0 mm² (AWG 12),
6.0 mm² (AWG 10)

Min. Bending Radius:
5 x cable wire diameter,
fixed installation

Electrical Features

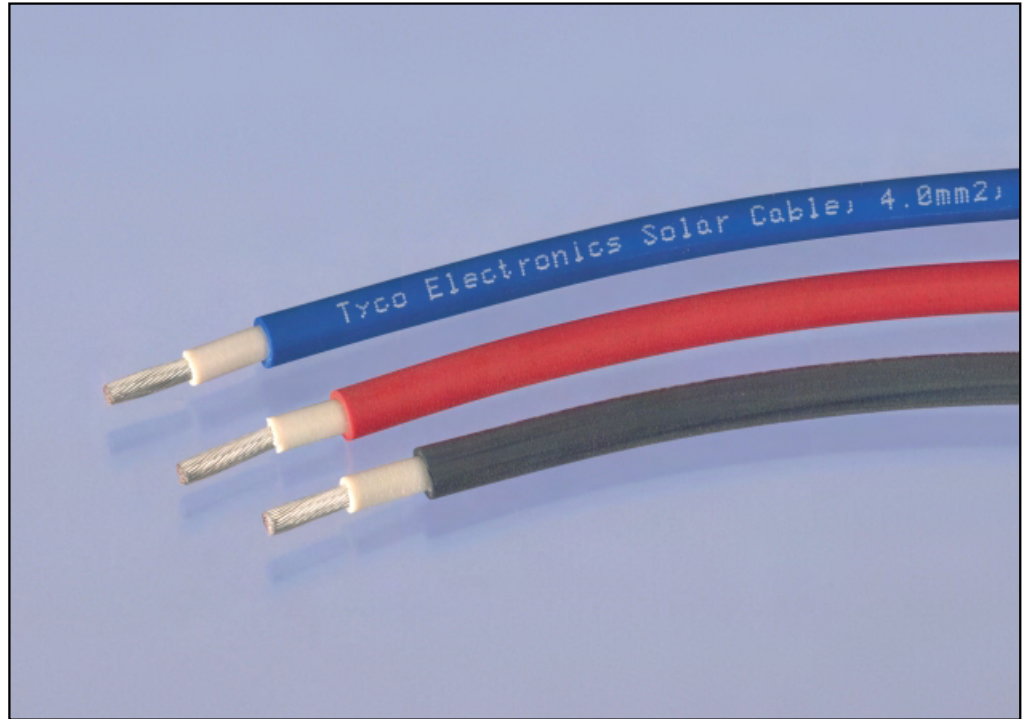
Voltage Rating U₀/U:
1,800/3,000 V AC / 2,600 V DC

Test Voltage for 5 Minutes:
6000 V

Max. Current Carrying Capacity (Free in Air):
36 A up to 116 A (size dependant)

Solar Cable, 1-Pole

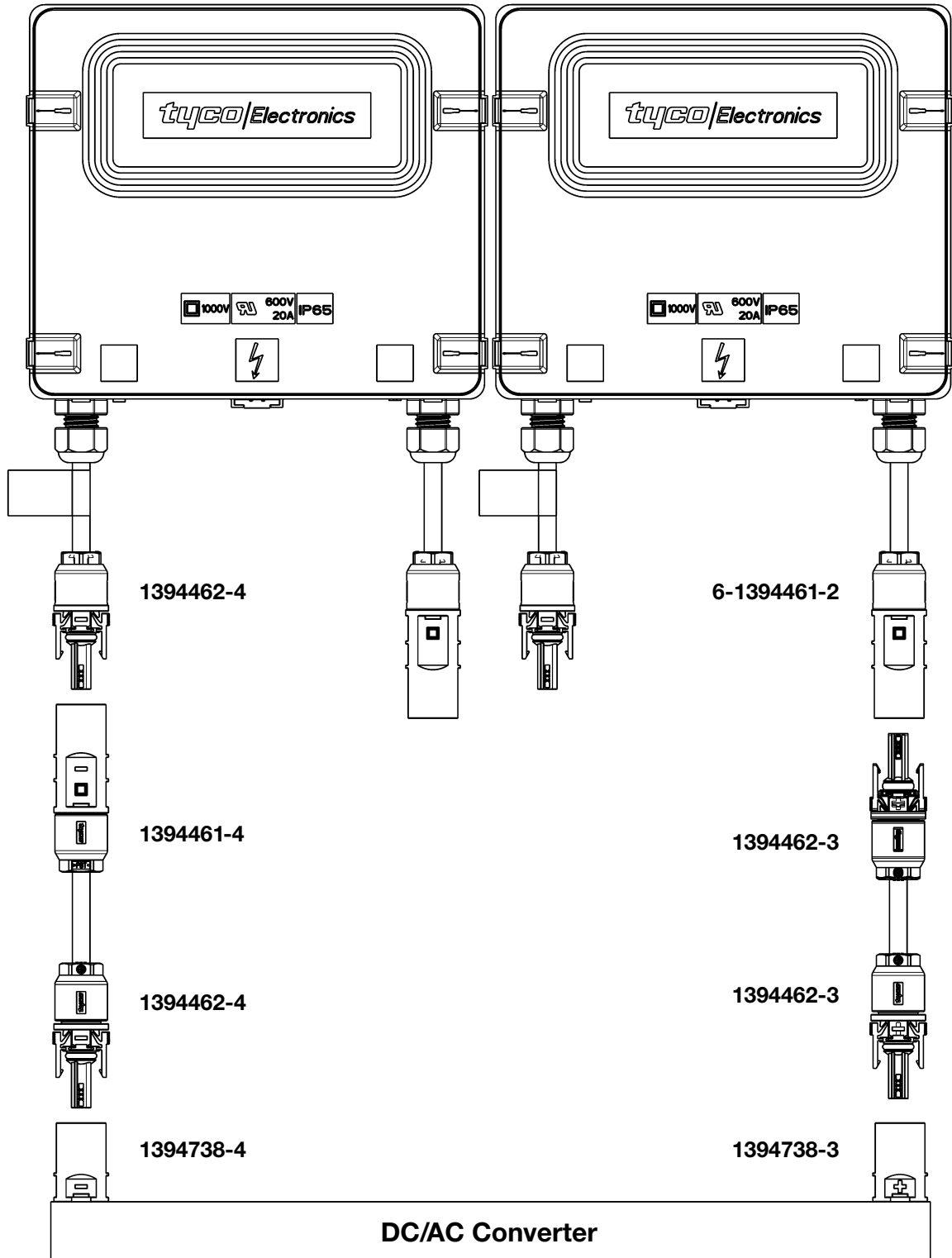
**Tyco Electronics
Solar Cable, 1-Pole**



Wire Size Range (mm ²)	Outer Diameter		Color	Part Number	Package Quantity (m)
	(mm)	(Inch)			
2.5	5.1	0.20	Black	956297-1	500
				1-956297-1	100
			Red	956297-2	500
				1-956297-2	100
			Blue	956297-3	500
				1-956297-3	100
4.0	5.7	0.22	Black	956298-1	500
				1-956298-1	100
			Red	956298-2	500
				1-956298-2	100
			Blue	956298-3	500
				1-956298-3	100
6.0	6.2	0.24	Black	956299-1	500
				1-956299-1	100
			Red	956299-2	500
				1-956299-2	100
			Blue	956299-3	500
				1-956299-3	100

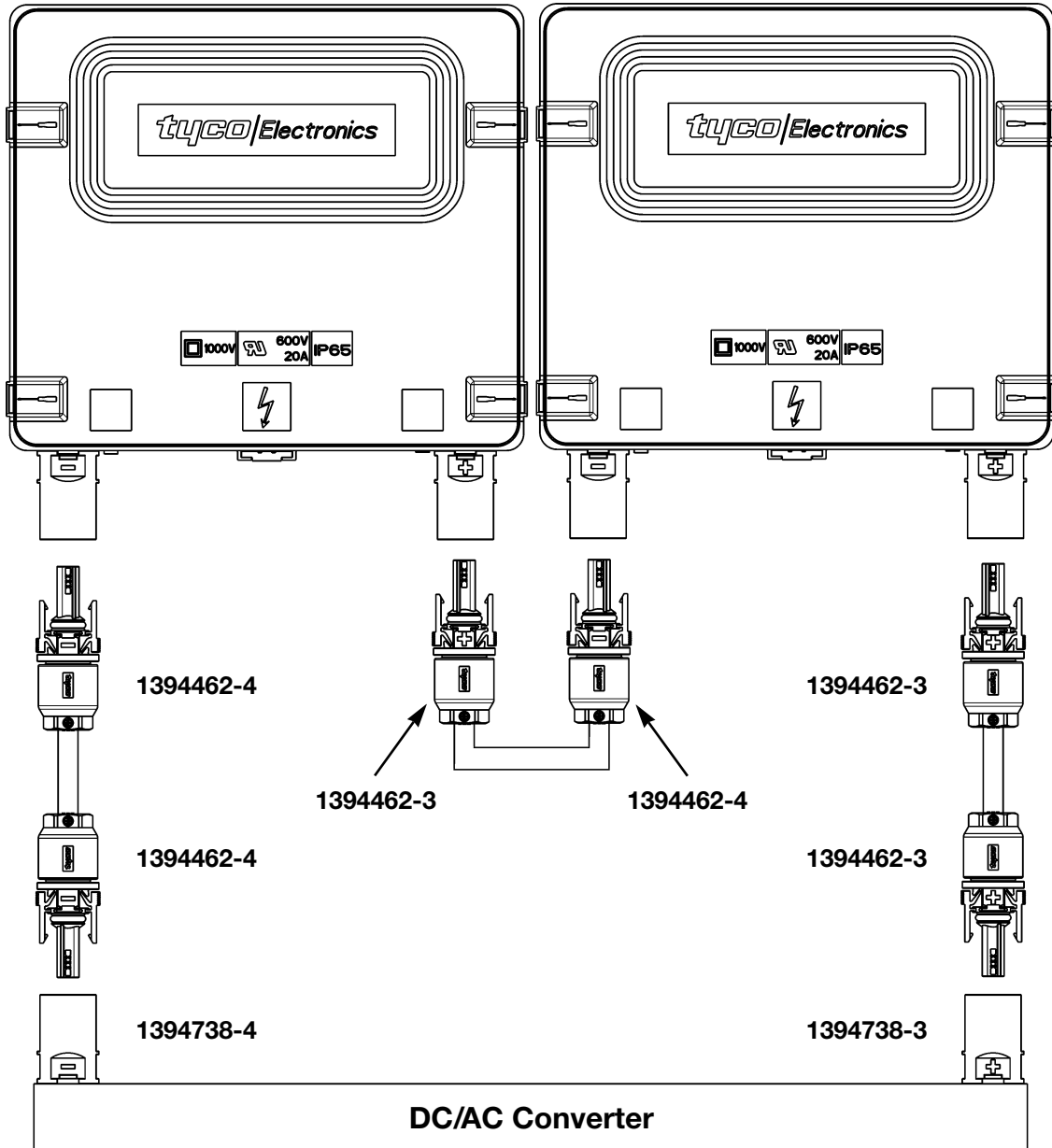
Interconnection Examples

**Serial Interconnection for Junction Boxes with Cable Glands
(4.0 mm² Wiring)**



Interconnection Examples (continued)

**Serial Interconnection for Junction Boxes with Plug Connectors
(4.0 mm² Wiring)**



Application Tooling

Cable Assembly Tooling



Hand Crimping Tool
incl. Vario Crimp Head and Locator
Part Numbers
1-1579004-1 (1.5 + 2.5 mm²)
1-1579004-2 (4.0 + 6.0 mm²)

Vario Crimp Head
7-1579001-8 (1.5 + 2.5 mm²)
7-1579001-9 (4.0 + 6.0 mm²)



Hand Crimping Tool
incl. Vario Crimp Head and Locator
Part No. **1579004-8**
(for 1.5 + 2.5 + 4.0 + 6.0 mm²)

Die Set
Part No. **6-1579001-6**
(for 1.5 + 2.5 + 4.0 + 6.0 mm²)



Extraction Tool
suitable for all wire sizes
Part No. **1102855-3**



Insulation Stripper
includes length stop for all wire sizes: 1.5 mm², 2.5 mm², 4.0 mm² and 6.0 mm².
Suitable for Tyco Electronics Solar Cable.
Part No. **1-1579002-2**

SOLARLOK Electric Terminator CS 200

Base Machine:
Part No. **539630-1**



Adapter for Vario Crimp Head:
Part No. **1579000-4**

Vario Crimp Head (1.5 and 2.5 mm²):
Part No. **7-1579001-8**

Vario Crimp Head (4.0 and 6.0 mm²):
Part No. **7-1579001-9**

Vario Crimp Head (AWG 10):
Part No. **8-1579001-2**

Vario Crimp Head (AWG 12):
Part No. **5-1579001-5**

Vario Crimpkopf (AWG 14):
Part No. **5-1579001-4**

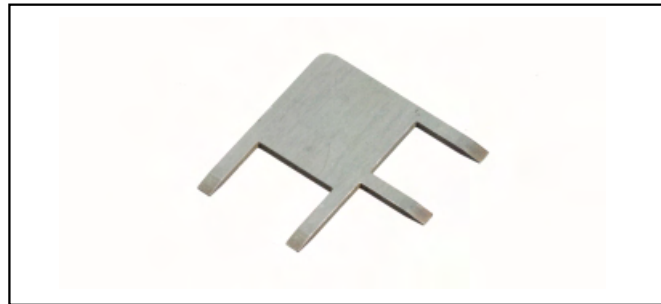
Application Tooling (continued)

**Junction Box
Assembly Tooling**



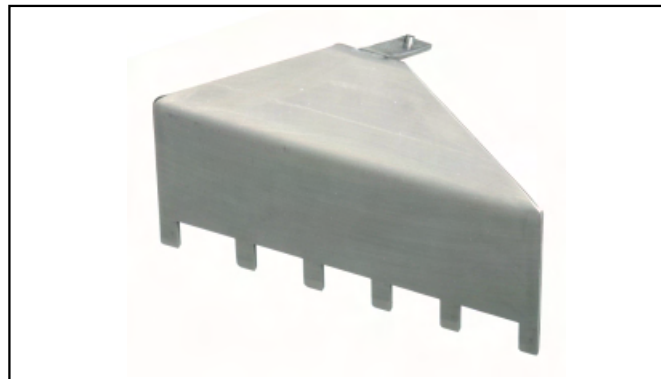
Wire Spring Clamp Tool

Part No. **1579007-2**



**Diode/Jumper
Spring Clamp Tool**

Part No. **1579007-5**



Foil Spring Clamp Tool

Part No. **1579007-3**

Field Service Kit

Part No. **1534858-1**
(Metric Wire)



Kit includes the following parts:

- 100 Cable Coupler (Housings, Plus and Minus coded)
- Crimp Contacts (4.0 and 6.0 mm²)
- Strain Relief
- Seals
- **Hand Crimp Tool:**
Part No. **1-1579004-2**
- **Extraction Tool:**
Part No. **1102855-3**
- **Insulation Stripper:**
Part No. **1-1579002-2**

Assembly and Installation Guidelines

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SOLARLOK Plug Connector

Attention: This connector is to be used only to interconnect firmly fixed cables.

Do not disconnect under load.

Current path should only be disconnected using approved disconnect devices.

Cable assemblies shall be labeled with Part No. **1394470-1**.

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

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.

2. Termination of the Cable Wires and Crimping of the Contacts

SOLARLOK connectors use different crimp contacts for various wire gauges.

Possible wire gauges are 1.5 mm², 2.5 mm², 4.0 mm², 5.3 mm² und 6.0 mm² resp. AWG 16, 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.

3. Handling of the Connectors

3.1 Selection of Sealing Grommet for Cable Connectors

Use only appropriate wire gauges.

Besides the standard seal/pinch ring combination further five different seals are available.

- 4.0 mm grommet inner diameter (for insulation diameter from 3.2 to 4.3 mm), Part No. **1394465-5**
- 5.0 mm grommet inner diameter (for insulation diameter from 4.3 to 5.3 mm), Part No. **1394465-1**
- 6.0 mm grommet inner diameter (for insulation diameter from 5.3 to 6.2 mm), Part No. **1394465-2**
- 7.0 mm grommet inner diameter (for insulation diameter from 6.2 to 7.2 mm), Part No. **1394465-3**
- 8.0 mm grommet inner diameter (for insulation diameter from 7.2 to 8.0 mm), Part No. **1394465-4**

The grommet has to be matched with the outer diameter of the solar cable (see customer drawing, Part No. **1394461** and Part No. **1394462**) and the pinch ring (Part No. **1418677-2**) must be applied.

Assembly and Installation Guidelines (continued)

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

- ① Stripping the Wire (please refer to application specification # 114-74013)



Fig. 1

- 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.



Fig. 2

- ③ Place seal/pinch ring combination into the connector housing until it stops.

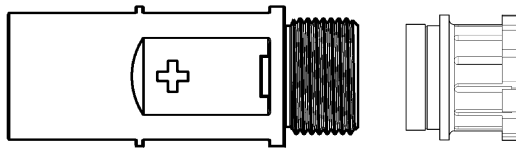


Fig. 3

- ④ Place backshell onto the connector housing.

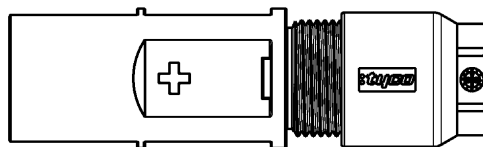


Fig. 4

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

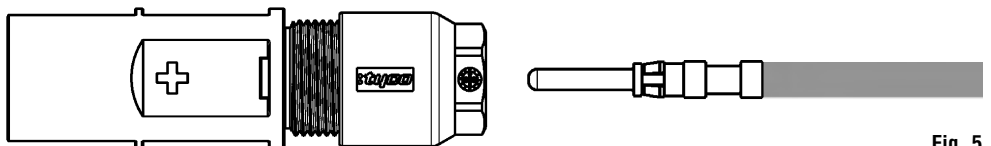


Fig. 5

- ⑥ Tighten backshell nut to 1.5 Nm

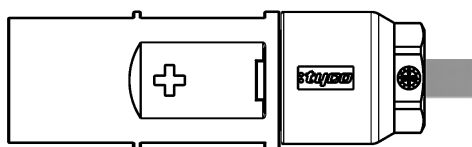


Fig. 6

Assembly and Installation Guidelines (continued)

3.2 Connector Latching

When mating the SOLARLOK connectors, ensure the following:

- Connectors labeled with a plus or minus are keyed and can only be mated to similarly marked and keyed connectors.

CAUTION:

The “neutral” designated pin connectors incorporate no keying features and must only be used for Serial Interconnection of Photovoltaic Modules. The neutral product should not be used where maintaining polarity is critical.

The polarity of the “neutral” connector must be labeled with Part No. **1394725-1** or Part No. **1394725-2** nearby the connector.

- The connector system is fully latched only when the latches are flush with the mating connector.
- After the connector is fully latched, the optional latch locking clip may be snapped into place.

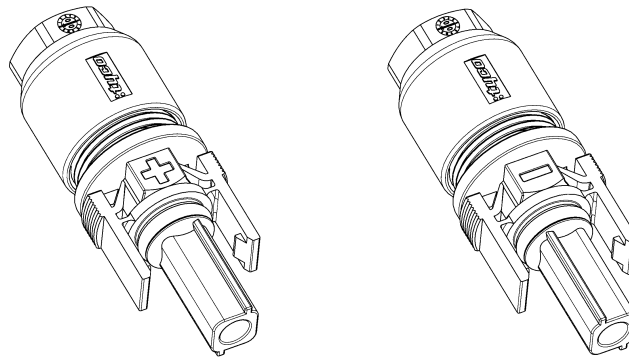


Fig. 7
(Female Connector)

3.3 Disconnecting

CAUTION: This connector must not be disconnected under load.

Disconnect circuit from load before unplugging connectors.

Cable assemblies should be labeled using Tyco Label, Part No. **1394470-1**.

Unmating of the connector

CAUTION: Do not disconnect the connector under load!

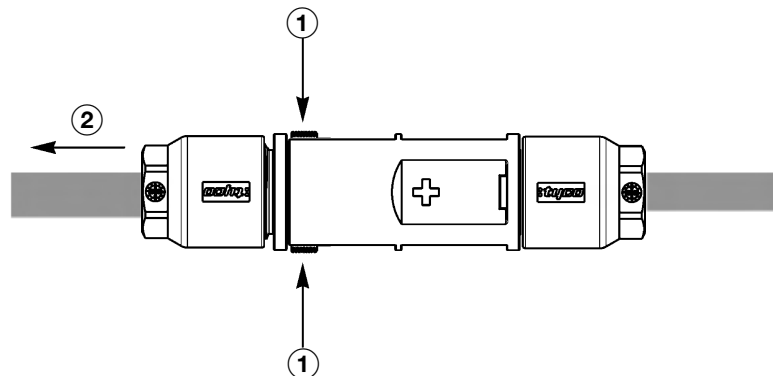


Fig. 8

- ① The locking mechanism is opened by depressing the latches.
- ② Pull out the connectors. While depressing the latches, disconnect the connector by pulling the connector halves apart.

Assembly and Installation Guidelines (continued)

3.4 DC/AC Converter Receptacle

- ① Place a single wire seal onto the wire and strip wire (single wire seals are not available with every version).



Fig. 9

- ② Crimp the contact using the correct applicator for the wire gauge (# 114-74013)



Fig. 10

- ③ Place O-ring onto the connector housing; push in wire to stop until contact locks into the housing

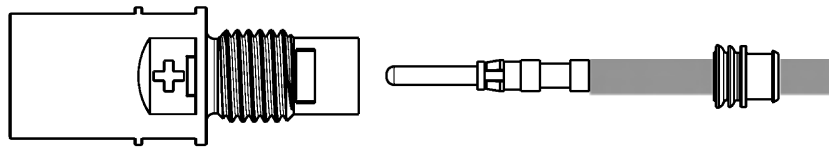


Fig. 11

- ④ Push seal into the housing

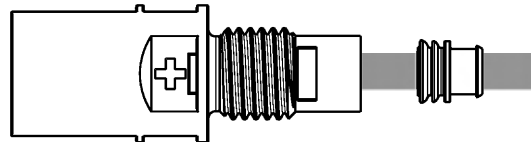


Fig. 12

- ⑤ Assembly of the cover cap (not available with every version) and mounting in front panel

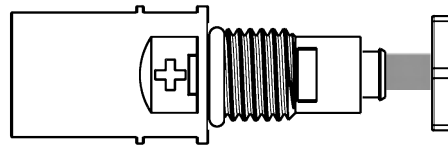


Fig. 13

- Required panel mount hole diameter: Diameter 12.5 mm.
- The panel thickness must not be under 1.0 mm.
- For environmental protection of the unmated connector, use of the covering cap is recommended.

Cover:
Part No. **1394739-1**

4. Application Examples

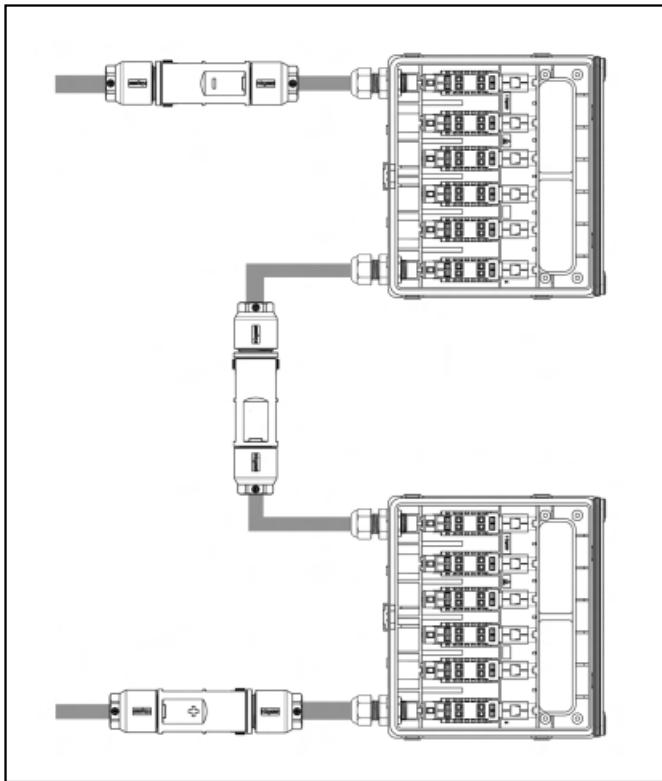


Fig. 14: Serial (Wire Diagram)

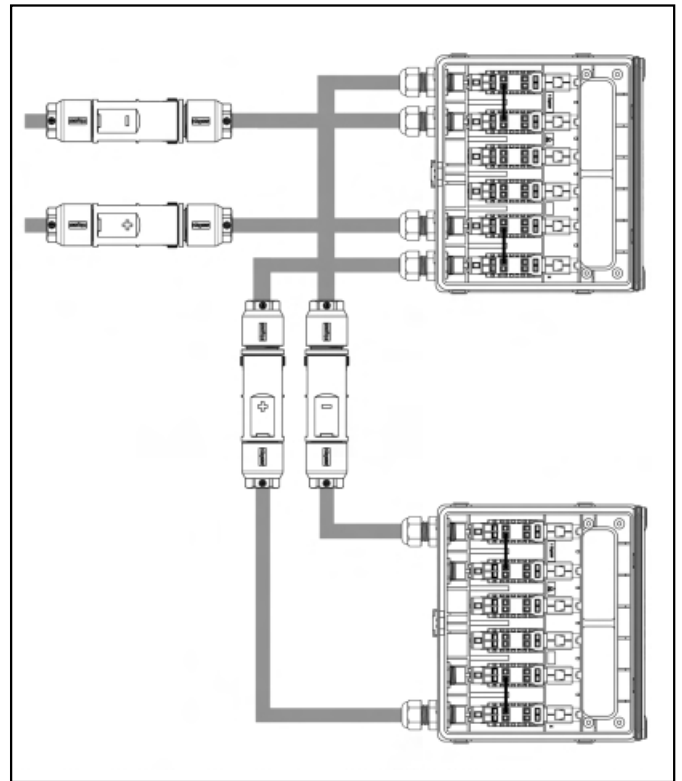


Fig. 15: Parallel (Wire Diagram)

5. Storage

See Product Specification 108-18701

6. Tooling

- The following tools are available for the contact crimping (please specify wire gauge required):
 - Hand Tool, integral Locator and Die (Part No. **1-1105851-8**), use 'HVT' position on locator
 - Hand Tool, only (Part No. **539973-1**)
- An extraction tool (Part No. **1102855-3**) is needed to disassemble the connector components. This tool is used to unlock the contact retention features, after which the contact can be removed and re-used if necessary.

Technical Description

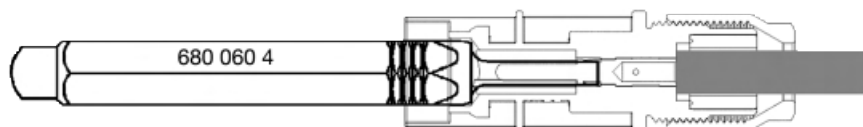


Fig. 16

Technical Data

Materials

Socket and Pin Contacts:	CuZn
Housing:	PPO, weatherproof against UV radiation and ozone

Color

Connector, Junction Box:	Black
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Electrical Features

Withstanding Voltage:	1000 V DC
Current Rating:	25 A
Contact Resistance:	≤ 5 mΩ
Contact Resistance (typical):	1 mΩ
Protection Class:	II

Mechanical Features

Junction Boxes

Dimensions:	150 x 150 x 25 mm or 90 x 138 x 22 mm, respective ly
Temperature Range:	–40 °C to +105 °C
Wire Size Range:	up to AWG 12
Protection Degree:	IP 65, closed

Connector

Dimensions:	Diameter 18 mm, (diameter 0.71 inch)
Temperature Range:	– 40 °C to +105 °C
Wire Size Range:	AWG 14, AWG 12, AWG 10 stranded wire
Protection Degree:	IP 67, mated
Contact Finish:	silver plated,
Mating Cycles:	50, silver plated
Unmating Force:	30–40 Newton
Additional Features:	Coded housing ensures mating safety Contact voltage-proof Connector with crimp technology

Standards	IEC 61215, 61646, Protection Class II, UL 1703
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Subject to Change.

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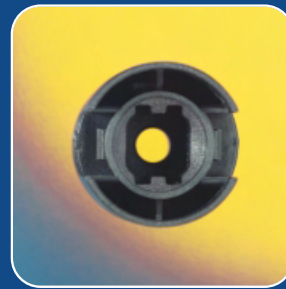
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