

# Photovoltaic main catalog

Solarline | Connectors for renewable energy



## STÄUBLI ELECTRICAL CONNECTORS

## Long-term solutions – Expert connections



**Stäubli Electrical Connectors is a leading international manufacturer of high-quality electrical contacts and connector systems and solutions for industrial applications. We are part of the Stäubli mechatronics group, the technology leader in connection solutions, robotics and textile machinery.**

**Pioneering contact technology for increased efficiency**

The entire Stäubli Electrical Connectors product range meets market expectations for high performance, the highest number of mating cycles, and long-lasting reliability for safe, durable operation. Our proven **MULTILAM technology** is ideal for all types of connections in industrial applications. Customers in the **power transmission and**

Stäubli develops, produces, sells and services products for markets with the highest productivity and safety standards. As recognized specialists, our focus is always on solutions and customers. Many new developments got their start here and are now becoming established as worldwide standards.

**distribution** sector rely on our consistent, loss-free transmission performance in all voltage ranges. The **automotive industry** depends on our high-efficiency connections for spot-welding applications in production lines. Harsh conditions in the **transportation sector** require high vibration resistance, maximum reliability, and compact design. These attributes are vitally important for railway and e-mobility applications. The safety

Our customers depend on our expertise and our active support, even when dealing with unusual challenges. With Stäubli, you're entering into a long-term partnership built on reliability, dedication, and exceptional quality in both products and services.

and reliability of our products are essential for **test and measurement technology**.

In the growing field of **alternative energy**, our products have been setting standards since the 1990s. About half of the solar energy generated worldwide is transmitted through safe, long-lasting, high-performance Stäubli connectors.

# Applications and benefits



**Offering a wide range of connection systems and accessories for photovoltaics, plug connectors, junction boxes and cables, we have been connecting any type of PV installation to the sun for more than 20 years. As a pioneer and global market leader for PV connectors, Stäubli has been setting the industry standard since the introduction of the original MC4 connector. In 2017, over 1 billion original MC4 connectors were installed to connect more than 150 GW which comes up to almost 50 % of the PV power worldwide.**

Thanks to the tried and tested MULTILAM advanced contact technology, our connectors keep your PV installation up and running efficiently and safely.

These apparently minor components can have a massive impact. Outstanding reliability and consistently low contact resistance guarantee:

- Low service cost and reduced downtime
- Elimination of risks for hotspots and fire
- Low power losses

Stäubli PV connectors guarantee proper operation over their whole lifetime (>25 years). By minimizing risk and maximizing the return in the long term, our components influence LCOE positively and have a decisive impact on the bankability of photovoltaic projects.



[www.staubli-alternative-energies.com](http://www.staubli-alternative-energies.com)

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# Safety note

Plug connectors not manufactured by Stäubli are sometimes described by their manufacturers as being “Stäubli compatible” due to their ability to mate with Stäubli connectors. This, however, is not true: by doing so, they do not conform to the requirements for a safe electrical connection with long-term stability. For that reason, we accept no liability if these non-approved connectors are mated with Stäubli original connectors.

**Stäubli has not recognized any products from third-party suppliers as being plug-compatible with the MC4 family and does not intend to do so in the future.** Using unsuitable components or combining plugs from different manufacturers poses significant risks (high failure rates, fire, etc.) and is not permitted under any circumstances.

Please note that all certifications are voided when such a plug combination is used.

Statements made by TÜV and UL confirm this: TÜV Rheinland LGA Products GmbH, based in Cologne, stresses that compatibility can be confirmed “only for products of the same type family from the same manufacturer” and that the current certificate for the MC4 connector family is based “on positive results of tests on products with corresponding mating parts of the MC4 family.” As there is uncertainty in the case of warranty claims involving combined PV connector pairs from different manufacturers, “the PV installation inspectors are obliged to criticize the use of such combinations.” It is also stated in UL file QIJQ2.E343181 that only “connectors within a product family are

approved by UL.” UL clearly distances itself from declaring compatibility of components from different manufacturers due to uncertainty over long-term behavior.



# General information

## Colour code

For those items available in various colours, replace the asterisk “\*” with the appropriate colour code.

21	black	22	red
23	blue	29	white

## Changes/Provisos

All data, illustrations and drawings in the catalogue have been carefully checked. They are in accordance with our experience to date, but no responsibility can be accepted for errors. We also reserve the right to make modifications for design and safety reasons. When designing equipment incorporating our components, it is therefore advisable not to rely solely on the data in the catalogue but to consult us to make sure this information is up to date. We shall be pleased to advise you.

## Copyright

The use of this catalogue for any other purpose, in whatever form, without our prior written consent is not permitted.

## RoHS ready

Directive 2011/65/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## Symbols



**Accessories or special tools exist for this product**



**The assembly instruction MA000 is available for this product**



**Check out the interactive content for this product**



UNLIMITED POSSIBILITIES FOR CONTACT SOLUTIONS  
 MULTILAM Technology



**MULTILAM** are specially formed and resilient contact elements. All Stäubli Electrical Connectors products benefit from the unique and outstanding performance of the **MULTILAM Technology**.

Thanks to their constant spring pressure, MULTILAM louvers ensure continuous contact with the contact surface, resulting in a constantly low contact resistance.

MULTILAM Technology allows to find solutions for connectors within the severest constraints and in certain products for up to 1 million mating cycles.

This makes the MULTILAM Technology the best choice for applications with demanding requirements:

- Reliable and longlife operation due to constantly high performance
- Safe operation under highest environmental demands on temperature, vibration and shock
- Suitable for data and signal contacts as well as high-current connectors
- Automated solutions with a high number of mating cycles



INTRODUCTION

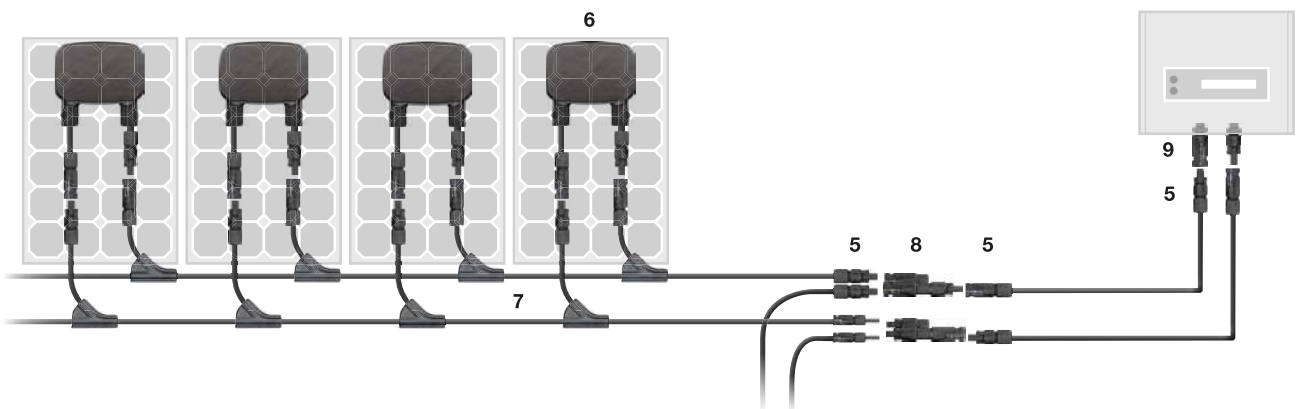
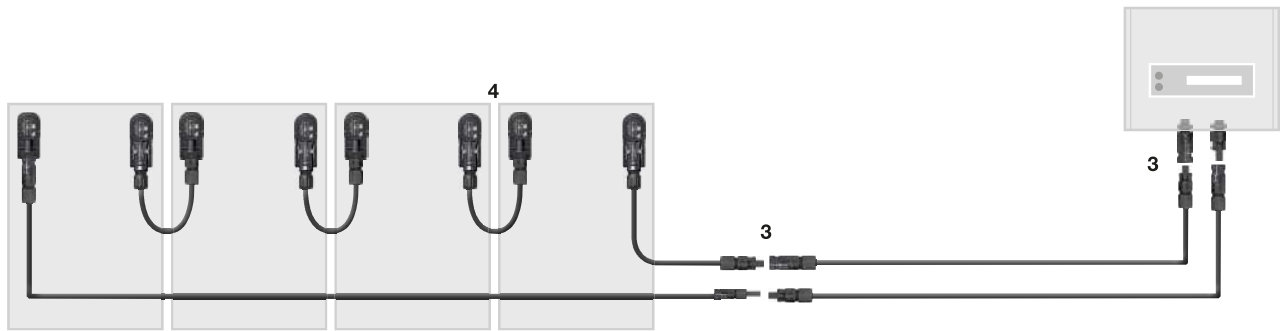
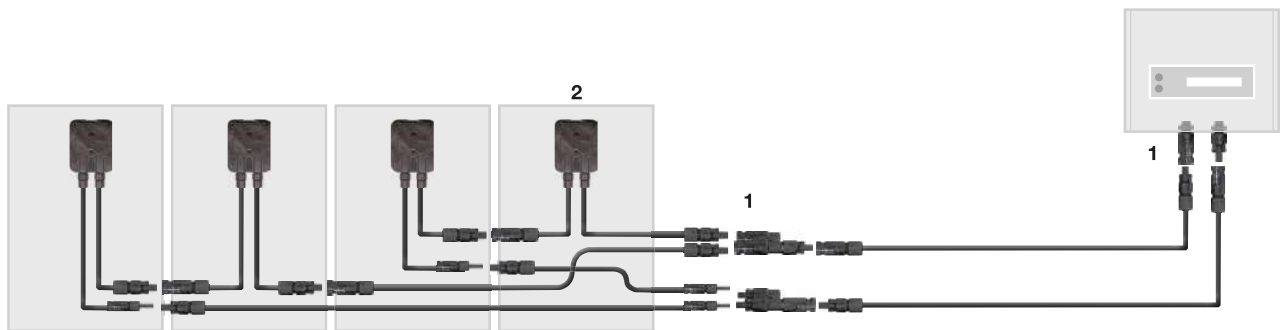
# Application possibilities of the Stäubli product portfolio

**Examples of a PV field installation**

The upper example shows the MC4 plug connector system (1) and a customized, two-pole junction box (2).

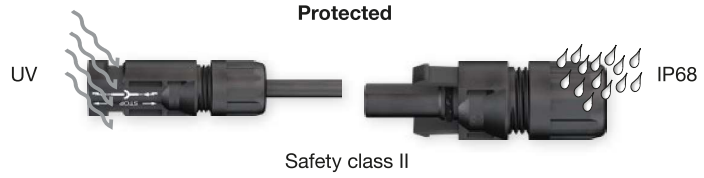
The illustration in the middle shows the MC4 plug connector system (3) and the single-pole PV-JB/TB (4).

At the bottom an example of a PV roof installation with MC4 plug connector system (5), junction box (6) branch cable (7), branch socket/plug (8) and MC4 panel receptacles (9).



**PLUG CONNECTORS**

# Advantages of the MC4 connector range



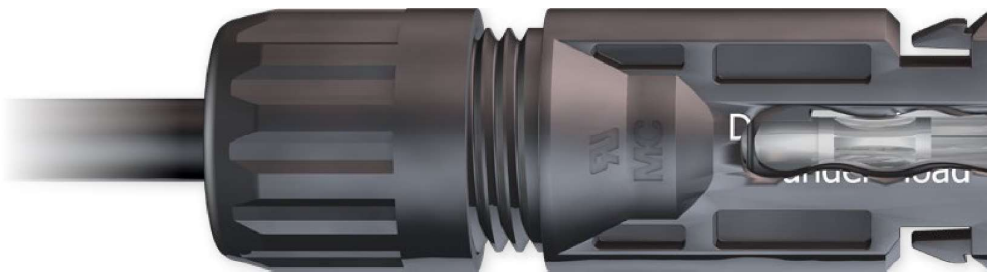
**Proven MULTILAM technology with high long-term stability**



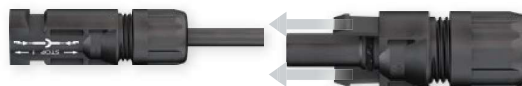
More than 50 years of experience and core competence

**Range of cable cross-sections**

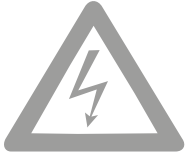
- |                     |   |   |        |
|---------------------|---|---|--------|
| 10 mm <sup>2</sup>  | ○ | ○ | 8 AWG  |
| 6 mm <sup>2</sup>   | ○ | ○ | 10 AWG |
| 4 mm <sup>2</sup>   | ○ | ○ | 12 AWG |
| 2.5 mm <sup>2</sup> | ○ | ○ | 14 AWG |
| 1.5 mm <sup>2</sup> | ○ |   |        |



**Locking system**



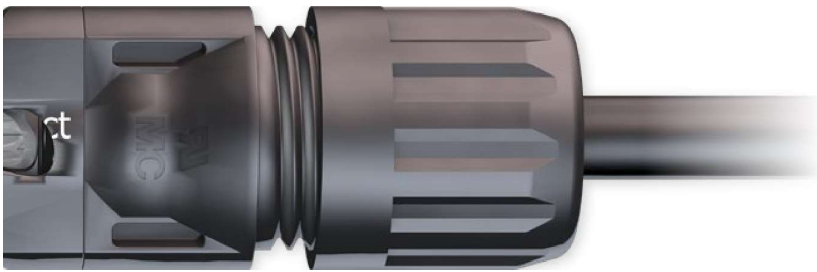
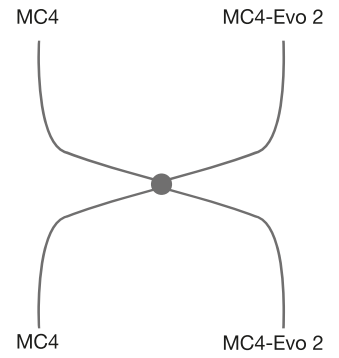




**Voltage level**

TÜV 1000 V/1500 V  
UL 1000 V/1500 V

**Compatibility**



**Certificates**



These products are certified by TÜV Rheinland LGA GmbH



cTÜVus



UL recognized



EAC



CSA



JET



JET

















CQC

**Safety locking device**

NEC 2014



# Overview of plug connectors

		Approvals <sup>1)</sup>
<b>Plug connectors</b>		
MC4		TÜV EAC   
MC4-Evo 2		TÜV   
MC4-Evo AC		TÜV 
<b>Panel receptacles</b>		
MC4		TÜV EAC  
MC4-Evo 2		TÜV 
<b>Branch connectors</b>		
MC4		EAC 

## Legend





Assembly with tool



Available as ready-assembled product



For assembly on site

Features	Salt mist spray test	Rated current	Rated voltage (max.)				Locking system (UL)	Degree of protection		Safety class	Ambient temperature range	Sealing caps	Page
			Category	TÜV (V DC)	UL/CSA (V DC)	TÜV (V AC)		UL (V AC)	mated				
	VI	22.5/30/45/50	1500	1500	-	-	Locking	IP65 IP68	IP2X	II	-40 ... +85 (TÜV)	×	12 14
	VI	22/39/45/53/69	1500	1500	-	-	Locking	IP65 IP68	IP2X	II	-40...+85 (TÜV)	×	16 18
	-	16/20/26/32/43	-	-	250	600	Locking	IP65 IP67	IP2X	II	-40...+85	×	20
	-	22.5/39/45/51	1250	1500	-	-	Locking	IP65 IP68	IP2X	II	-40...+85	×	22 24
	-	32/42/47	1500	1500	-	-	Locking	IP65 IP68	IP2X	II	-40...+90 (UL)	×	26 28
	-	50	-	1500	-	-	Locking	IP67	IP2X	II	-40...+85 (UL)	×	30



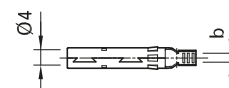
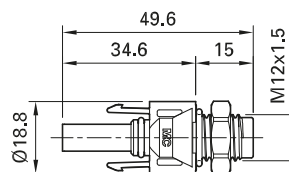
Suitable for customer-specific assembly

<sup>1)</sup> Certifications are in some cases limited to specific types or still pending. Details are given on the relevant product pages.

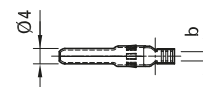
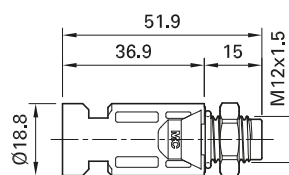
# Female and male panel receptacle MC4

Female and male panel receptacles as individual part (including insulating part)

PV-ADBP4-S2...



PV-ADSP4-S2...



Order No.	Type	Female cable coupler	Male cable coupler	Conductor cross section			Approvals		
				mm <sup>2</sup>	AWG	b (mm)	TÜV	UL	CSA
32.0076P0001-UR	PV-ADBP4-S2/2.5-UR	x		2.5	14	3	x	x	x
32.0077P0001-UR	PV-ADSP4-S2/2.5-UR		x	2.5	14	3			
32.0078P0001-UR	PV-ADBP4-S2/6-UR	x		4; 6	12; 10	5			
32.0079P0001-UR	PV-ADSP4-S2/6-UR		x	4; 6	12; 10	5	x		
32.0150P0001	PV-ADBP4-S2/10	x		10		7.2			
32.0151P0001	PV-ADSP4-S2/10		x	10		7.2			

**Note:**

For more detailed information concerning the suitable cable gland range, please consult MA275.



Sealing caps page 43

Special socket wrench insert page 47

Unlocking tool page 48



Assembly Instructions MA275

[www.staubli.com/electrical](http://www.staubli.com/electrical)

- MC4 panel-receptacle connectors are the interface between an inverter or junction box or junction and a branch cable
- Mounting directly by means of screw thread or in perforated plate with plastic nut (included in delivery)
- Rapid, precise plugging
- Protection class IP68 (1 m/1 h) guarantees the highest connection safety
- Mating compatibility with MC4 connector family
- Includes sealing element for enclosure

Technical data	
Connector system	Ø 4 mm
Rated voltage	1250 V DC (TÜV) 1500 V DC (UL)
Rated current TÜV (85°C)	22.5 A (2.5 mm <sup>2</sup> ; 14 AWG) 39 A (4 mm <sup>2</sup> ; 12 AWG) 45 A (6 mm <sup>2</sup> ; 10 AWG) 51 A (10 mm <sup>2</sup> )
Rated impulse voltage	16 kV (1250 V)
Ambient temperature range	-40°C...+85°C (TÜV/UL)
Upper limiting temperature	105°C (TÜV)
Degree of protection, mated unmated	IP65; IP68 (1 m/1 h) IP2X
Overvoltage category/Pollution degree	CATIII/3
Contact resistance of plug connectors	≤0.25 mΩ
Safety class	II
Contact system	MULTILAM
Type of termination	Crimping
Contact material	Copper, tin plated
Insulation material	PC/PA
Locking system (UL)	Locking type
Flame class	UL94-V0
TÜV-Rheinland certified, in accordance with IEC 62852	R60127181
UL recognized component, in accordance with UL 6703	E343181
CSA certified, in accordance with UL 6703	250725

**Note:**

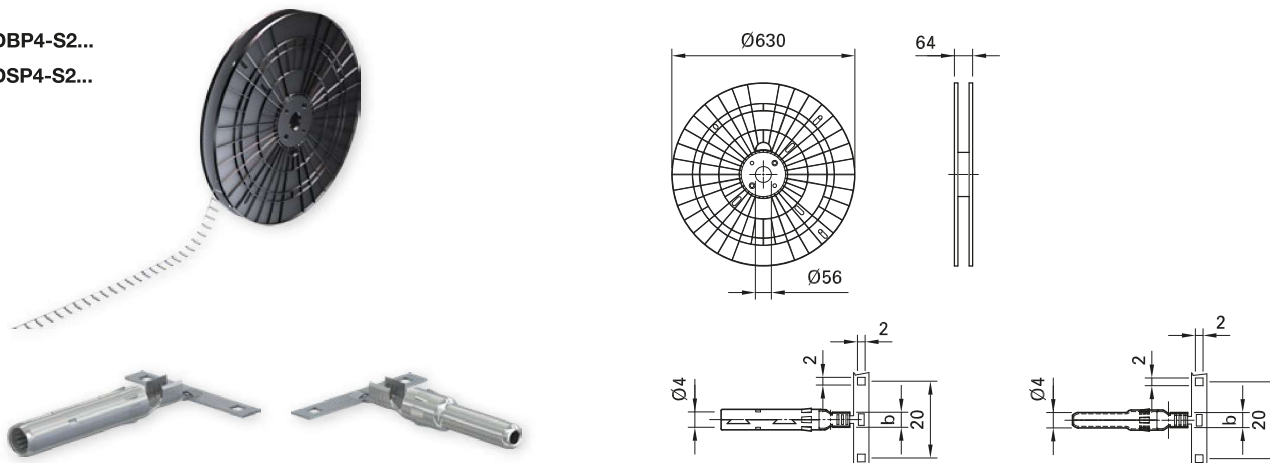
Custom made special versions with cable are also available. Lengths and choice of cable ends on request, see page 50

# Female and male panel receptacle MC4

Contacts on carrier band (including insulating part)

PV-ADBP4-S2...

PV-ADSP4-S2...



Order No.	Type	Female cable coupler	Male cable coupler	Conductor cross section		b (mm)	Crimping tool	Contacts per Reel <sup>2)</sup>	Approvals		
				mm <sup>2</sup>	AWG				TÜV	UL	SP
32.0076P2000-UR	PV-ADBP4-S2/2.5-UR	x		2.5	14	3	<sup>1)</sup>	2000			
32.0077P2000-UR	PV-ADSP4-S2/2.5-UR		x	2.5	14	3	<sup>1)</sup>	2000			
32.0078P2000-UR	PV-ADBP4-S2/6-UR	x		4; 6	12; 10	5	<sup>1)</sup>	2000	x	x	x
32.0079P2000-UR	PV-ADSP4-S2/6-UR		x	4; 6	12; 10	5	<sup>1)</sup>	2000			
32.0150P1700	PV-ADBP4-S2/10	x		10		7.2	<sup>1)</sup>	1700			
32.0151P1700	PV-ADSP4-S2/10		x	10		7.2	<sup>1)</sup>	1700	x		

**Note:**

For more detailed information concerning the suitable cable gland range, please consult MA275.



Sealing caps page 43

Special socket wrench insert page 47

Unlocking tool page 48



Assembly Instructions MA275

[www.staubli.com/electrical](http://www.staubli.com/electrical)



- Feeder bands for fully automatic assembly
- Tools specially designed for MC4 available for automatic crimping
- Process reliability as result of specially developed supply reel

Technical data	
Connector system	Ø 4 mm
Rated voltage	1250 V DC (TÜV) 1500 V DC (UL)
Rated current TÜV (85°C)	22.5 A (2.5 mm <sup>2</sup> ; 14 AWG) 39 A (4 mm <sup>2</sup> ; 12 AWG) 45 A (6 mm <sup>2</sup> ; 10 AWG) 51 A (10 mm <sup>2</sup> )
Rated impulse voltage	16 kV (1250 V)
Ambient temperature range	-40°C...+85°C (TÜV/UL)
Upper limiting temperature	105°C (TÜV)
Degree of protection, mated unmated	IP65; IP68 (1 m/1 h) IP2X
Overvoltage category/Pollution degree	CATIII/3
Contact resistance of plug connectors	≤0.25 mΩ
Safety class	II
Contact system	MULTILAM
Type of termination	Crimping
Contact material	Copper, tin plated
Insulation material	PC/PA
Locking system (UL)	Locking type
Flame class	UL94-V0
TÜV-Rheinland certified, in accordance with IEC 62852	R60127181
UL recognized component, in accordance with UL 6703	E343181
CSA certified, in accordance with UL 6703	250725

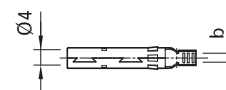
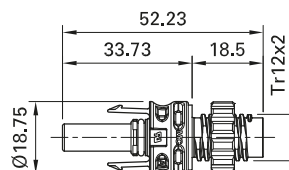
<sup>1)</sup> Information about a semi-automatic crimp device or assembly device on request

<sup>2)</sup> Reel type subject to alterations

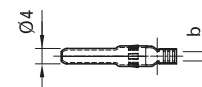
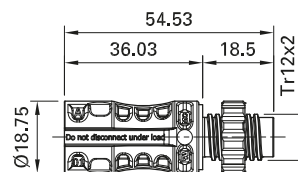
# Female and male panel receptacle MC4-Evo 2

Female and male panel receptacles as individual part (including insulating part)

## PV-ADB4-EVO 2



## PV-ADS4-EVO 2



Order No.	Type	Female cable coupler	Male cable coupler	Conductor cross section			Approvals	
				mm <sup>2</sup>	AWG	b (mm)	TÜV	RA
32.0020P0001-UR	PV-ADB4-EVO 2/2,5-UR	x		2.5	14	3	x	x
32.0021P0001-UR	PV-ADS4-EVO 2/2,5-UR		x	2.5	14	3		
32.0022P0001-UR	PV-ADB4-EVO 2/6-UR	x		4.0; 6.0	12; 10	5		
32.0023P0001-UR	PV-ADS4-EVO 2/6-UR		x	4.0; 6.0	12; 10	5		

**Note:**

For more detailed information concerning the suitable cable gland range, please consult MA285.



Sealing caps page 43

Unlocking tool page 48



Assembly Instructions MA285

[www.staubli.com/electrical](http://www.staubli.com/electrical)

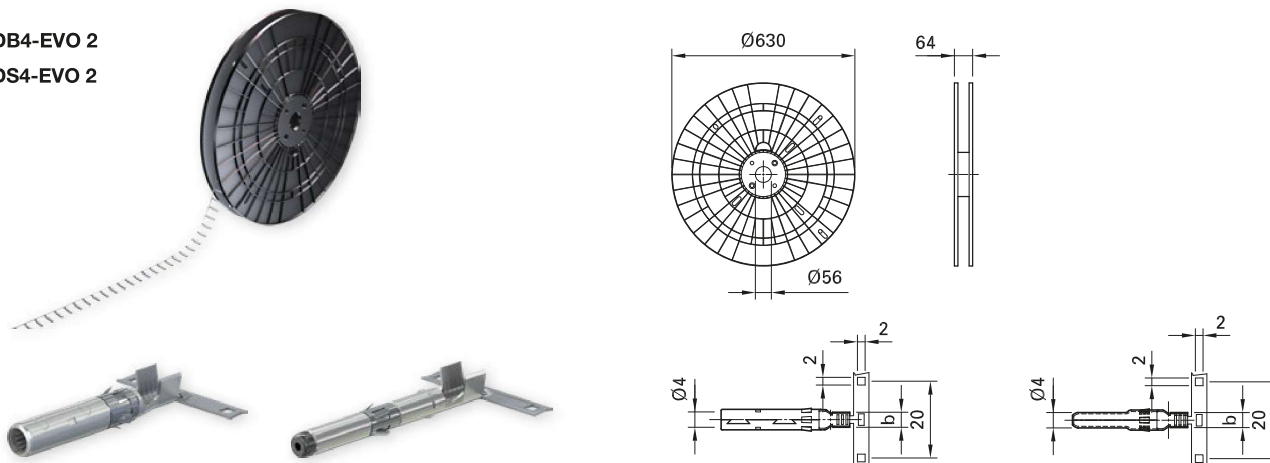
- MC4-Evo 2 panel-receptacle connectors are the interface between the inverter or the distributor housing and string
- Assembly directly via the threads or in the perforated plate with the plastic nut (contained in scope of delivery)
- Thanks to the D shape, the threaded connection is secured against turning
- For 1500 V DC (IEC), 1500 V DC (UL) approved unobstructed
- Degree of protection IP68 (1m/1h) guarantees highest connection safety
- Fast and clean connection
- Plug compatible with the original MC4 plug connector family
- With preassembled flat seal

Technical data	
Connector system	Ø 4 mm
Rated voltage	1500 V DC (TÜV) 1500 V DC (UL)
Rated current TÜV	32 A (2.5 mm <sup>2</sup> / 14 AWG) 42 A (4.0 mm <sup>2</sup> / 12 AWG) 47 A (6.0 mm <sup>2</sup> / 10 AWG)
Rated impulse voltage	16 kV (1500 V)
Ambient temperature range	-40°C...+85°C (TÜV) -40°C...+90°C (UL)
Upper limiting temperature	115°C
Degree of protection, mated unmated	IP65; IP68 (1m/1h) IP2X
Overvoltage category/Pollution degree	CATIII/3
Contact resistance of plug connectors	≤ 0,2 mΩ
Safety class	II
Contact system	MULTILAM
Type of termination	Crimping
Contact material	Copper, tin plated
Insulation material	PA
Locking system (UL)	Locking type
Flame class	UL94-V0
TÜV-Rheinland certified, in accordance with IEC 62852	R60127171
UL recognized component, in accordance with UL 6703	E343181

# Female and male panel receptacle MC4-Evo 2

Contacts on carrier band (including insulating part)

PV-ADB4-EVO 2  
PV-ADS4-EVO 2



Order No.	Type	Female cable coupler	Male cable coupler	Conductor cross section		Crimping tool	Contacts per Reel <sup>2)</sup>	Approvals		
				mm <sup>2</sup>	AWG			b (mm)	TÜV	®
32.0020P2000-UR	PV-ADB4-EVO 2/2,5-UR	x		2.5	14	3	1)	2000	x	x
32.0021P2000-UR	PV-ADS4-EVO 2/2,5-UR		x	2.5	14	3	1)	2000		
32.0022P2000-UR	PV-ADB4-EVO 2/6-UR	x		4.0; 6.0	12; 10	5	1)	2000		
32.0023P2000-UR	PV-ADS4-EVO 2/6-UR		x	4.0; 6.0	12; 10	5	1)	2000		

**Note:**

For more detailed information concerning the suitable cable gland range, please consult MA285.



Sealing caps page 43

Unlocking tool page 48



Assembly Instructions MA285

[www.staubli.com/electrical](http://www.staubli.com/electrical)

- Feeder bands for fully automatic assembly
- Tools specially designed for MC4-Evo 2 available for automatic crimping
- Process reliability as result of specially developed supply reel

Technical data	
Connector system	Ø 4 mm
Rated voltage	1500 V DC (TÜV) 1500 V DC (UL)
Rated current TÜV	32 A (2.5 mm <sup>2</sup> / 14 AWG) 42 A (4.0 mm <sup>2</sup> / 12 AWG) 47 A (6.0 mm <sup>2</sup> / 10 AWG)
Rated impulse voltage	16 kV (1500 V)
Ambient temperature range	-40°C...+85°C (TÜV) -40°C...+90°C (UL)
Upper limiting temperature	115°C
Degree of protection, mated unmated	IP65; IP68 (1m/1h) IP2X
Overvoltage category/Pollution degree	CATIII/3
Contact resistance of plug connectors	≤ 0,2 mΩ
Safety class	II
Contact system	MULTILAM
Type of termination	Crimping
Contact material	Copper, tin plated
Insulation material	PA
Locking system (UL)	Locking type
Flame class	UL94-V0
TÜV-Rheinland certified, in accordance with IEC 62852	60127171
UL recognized component, in accordance with UL 6703	E343181

<sup>1)</sup> Information about a semi-automatic crimp device or assembly device on request

<sup>2)</sup> Reel type subject to alterations