

MA293 (cn_en)
装配说明

MA293 (cn_en)
Assembly instructions

MC4-Evo ready
光伏公连接器 PV-KST4-EVO ready
光伏母连接器 PV-KBT4-EVO 已就绪

MC4-Evo ready
PV male coupler PV-KST4-EVO READY
PV female coupler PV-KBT4-EVO READY

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插座
Female cable coupler
PV-KBT4-EVO READY
32.0030



插头
Male cable coupler
PV-KST4-EVO READY
32.0029



任选配件/Optional accessories

插座用保护帽
Sealing cap for female cable coupler
PV-BVK4
32.0716



插头用保护帽
Sealing cap for male cable coupler
PV-SVK4
32.0717



安全说明

安装说明的重要性

不遵守安装说明和安全须知可能会因触电、电弧、火灾或系统故障而导致危及生命的伤害。

- 请完全按照安装说明要求进行操作。
- 只可按照本安装说明和技术参数使用和安装产品。
- 安全妥善地保管安装说明，并将其移交给后续用户。

预期用途

该连接器用于连接光伏阵列直流侧的部件。

对人员的要求

仅电工或接受过电气指导的人员可以装配、安装和调试该系统。

- 电工是指接受过适当的专业培训，并具有适当的知识和经验的人员，能够识别和避免可能来自电力的危险。电工能够选择和使用合适的个人防护设备。
- 受过电气指导人员是指在电工的指导或监督下，能够识别和避免可能来自电力的危险的人员。

安装和装配的先决条件

- 切勿使用有明显损坏的产品。
- 只能使用史陶比尔批准的工具、材料和辅助设备。
- 仅经过批准的光伏电缆才可装配到连接器上。

安全装配和安装

隔离或断开连接后，带电部件可能仍然带电

- 仅在光伏组件断电时安装产品。

插入和拔出

- 在连接或断开连接器之前，务必切断光伏系统的电源。
- 切勿带负载插拔载的连接器。
- 切勿将史陶比尔连接器的公端或母端与其他制造商的连接器相连接。
- 切勿连接被污染的连接器的。

请勿调整或修理组件

- 仅安装一次连接器。
- 切勿在连接器装配好后进行调整。
- 更换有缺陷的连接器。

Safety instructions

Importance of the assembly instructions

NOT following the assembly and safety instructions could result in life-threatening injuries due to electric shock, electric arcs, fire, or failure of the system.

- Follow the entire assembly instructions.
- Use and install the product only according to this assembly instructions and the technical data.
- Safely store the assembly instructions and pass them on to subsequent users.

Intended use

The connector electrically connects components within the DC circuits of a PV array.

Requirements for personnel

Only an electrician or electrically instructed person may assemble, install, and commission the system.

- An electrician is a person with appropriate professional training, knowledge, and experience to identify and avoid the dangers that may originate from electricity. An electrician is able to choose and use suitable personal protective equipment.
- An electrically instructed person is a person who is instructed or supervised by an electrician and can identify and avoid the dangers that may originate from electricity.

Prerequisites for installation and assembly

- NEVER use an obviously damaged product.
- ONLY tools, materials and auxiliary means approved by Stäubli shall be used.
- ONLY approved PV cables shall be assembled to the connector.

Safe assembly and mounting

Live parts can remain energized after isolation or disconnection

- ONLY Install the product when the PV module is de-energized.

Mating and disconnecting

- ALWAYS de-energize the PV system before mating and disconnecting the connectors.
- NEVER disconnect the connectors under load.
- NEVER connect male or female part of Stäubli connector with connectors of other manufacturers.
- NEVER mate contaminated connectors.

Do NOT modify or repair component

- Mount connector only once.
- Do NOT modify connectors after assembly.
- Replace defective connectors.



所需工具

(图1)
剥线钳 PV-AZM...

电缆截面积 Conductor cross section		型号 Type	订货号 Order No.
mm ²	AWG		
1.5/2.5/4/6	-	PV-AZM-156	32.6027-156
4/6/10	-	PV-AZM-410	32.6027-410

Tools required

(ill. 1)
Stripping pliers PV-AZM...

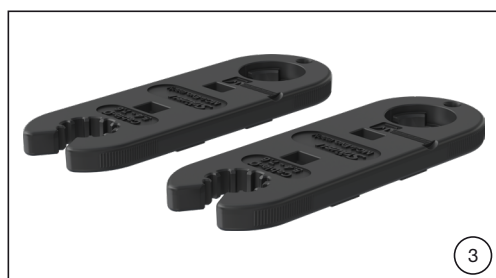
i 注
操作说明 MA267,
www.staubli.com/re-downloads.html

i Note
Operating instructions MA267,
www.staubli.com/re-downloads.html



(图2)
MC4-Evo 2 解锁工具
PV-MS-MC4-EVO 2
订货号:32.6066

(ill. 2)
Unlocking tool for MC4-Evo 2
PV-MS-MC4-EVO 2
Order No.: 32.6066



推荐工具

(图3)
MC4-Evo ready 开口扳手套件
MC4-MS-EVO READY
订货号:32.6070

Recommended tooling

(ill. 3)
Open-end spanner set for
MC4-Evo ready
MC4-MS-EVO READY
Order No.: 32.6070

电缆准备

可以使用电缆外径为 5.4 mm 至 7.6 mm、导体横截面为 4 mm² 和 6 mm² 的电缆。

连接到连接器的电缆应适用于光伏系统且应符合 IEC 62930 的要求。根据 IEC 60228, 柔性导体应为 5 级或 6 级。

Cable preparation

Cables with an outer diameter of 5.4 mm to 7.6 mm and nominal conductor cross-sections of 4 mm² and 6 mm² can be used.

Cables connected to the connector shall be suitable for use in photovoltaic systems and shall comply with the requirements of IEC 62930. The flexible conductors shall be class 5 or class 6 according to IEC 60228.

⚠ 注意

使用镀锡铜导体。切勿使用无镀层 (裸铜) 或已生锈的导体。所有史陶比尔光伏电缆均具有高品质的镀锡导体。出于安全考虑, 史陶比尔禁止使用 PVC 电缆或 H07RN-F 型号的未镀锡电缆。

⚠ Attention

Use tinned copper conductors. Do not use uncoated (bare) nor already oxidized conductors. All Stäubli PV cables have high-quality, tinned conductors. For safety reasons, Stäubli prohibits the use of PVC cables and the use of non-tinned cables of type H07RN-F.



(图4)

- 使用剥线钳将电缆绝缘层剥去 15 mm 至 16.5 mm。

(ill. 4)

- Use the stripping pliers and remove the cable insulation by 15 mm up until 16.5 mm.

⚠ 注意

剥线时, 请勿损坏或切断铜丝。

⚠ Attention

Do not damage nor cut any strands when stripping the cable.

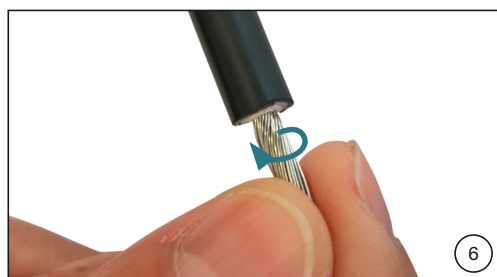


ⓘ 注

可以使用扳手套件上面的标记检查长度 (参考左图, 图5)。

ⓘ Note

The length can be checked using the assembly key (according to the figure on the left, ill. 5).



(图6)
绞合绞线

- 用两个手指轻轻绞合绞线, 以便将绞线压缩成一个扭曲的形状。

(ill. 6)
Twisting strands

- Use 2 fingers and gently twist the strands and by doing this compress the strands to one twisted shape.

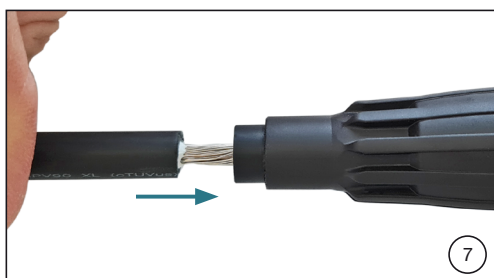
⚠ 注意

绞线错位或缺失会导致接触电阻增加。

⚠ Attention

Misaligned or missing strands could lead to an increased contact resistance.

连接器装配



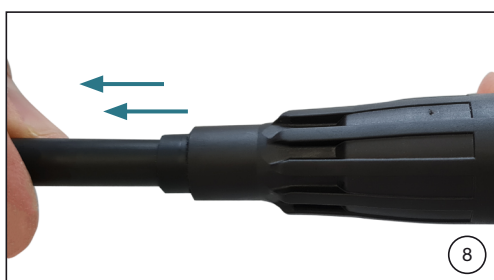
(图7)
电缆插入和嵌入

- 将电缆直接插入连接器中。
- 电缆锁紧(发出“咔嗒”声)。

Connector assembly

(ill. 7)
Cable insertion and locking

- Insert the cable straight into the connector.
- The cable latches (with an audible „click“).



(图8)
确认锁紧结构

- 轻轻拉动电缆。
- 轻轻拉动时, 电缆不应从连接器中退出。

(ill. 8)
Confirm the latch mechanism

- Gently pull the cable.
- The cable should not protrude the connector when slightly pulling.

拧紧连接器



(图9)

- 将本产品的螺母拧到底(扭矩约为3-4 Nm)。

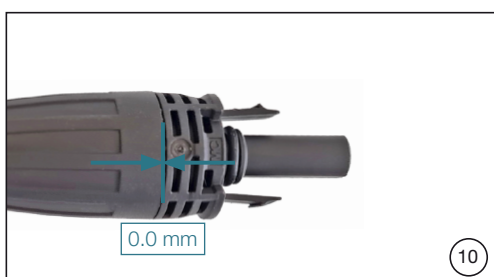
备注
i 可以手动拧紧连接器。但是, 建议使用配套装配工具(见图3)来完成这一装配步骤。

Fastening the connectors

(ill. 9)

- Bottom out the nut for this product (with a torque of approx. 3 – 4 N m).

Note
i It is feasible to screw the connector manually. Yet, it is recommended to use the set of assembly tools (see ill. 3) to carry out this manufacturing step.



(图10)

注意
△ 只有在连接器正确装配的情况下, 才能保证插入时的IP 防护等级!

(ill. 10)

Attention
△ The IP (ingress protection) class – when plugged in – is only guaranteed if the connector has been assembled on correctly!

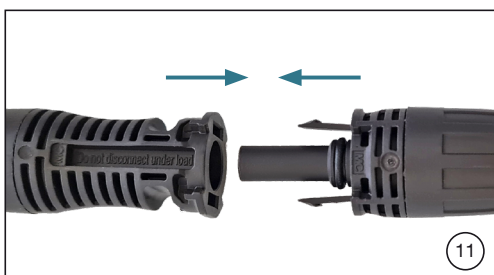
连接和断开电缆连接器

(图11 + 图12) 连接

- 将连接器插合在一起,直到它们锁定到位。

⚠ 注意

公母连接器必须插合到位,否则可能会导致卡扣永久变形,进而丧失锁定功能。必须验证正确的连接。

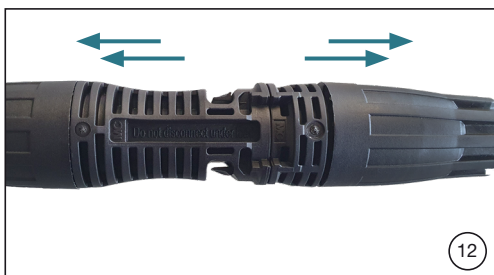


11

- 轻轻拉动连接器,检查连接器是否正确接合。

• 备注

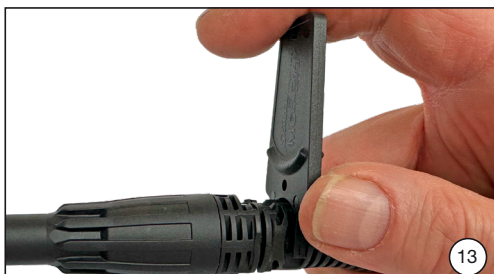
未插合的连接器必须配备史陶比尔保护帽,以防止污染。



12

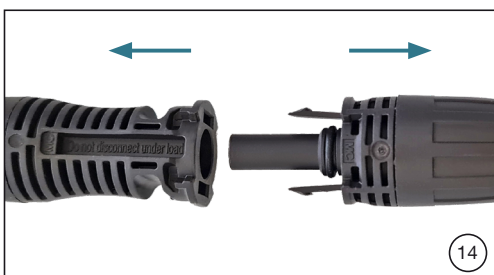
(图13 + 图14) 断开连接

- 将解锁工具推到夹子上。



13

- 断开先前连接的连接器



14

Mating and disconnecting the cable coupler

(ill. 11 + ill. 12) Mating

- Plug the line connectors together until they latch into place.

⚠ Attention

Assembly of not fully engaged connectors is not permitted as this could lead to a permanent deflection of clips and thus to a potential loss of the locking function. The correct mating has to be verified.

- Check that the connectors are correctly engaged by slightly pulling on the connectors.

• Note

Unmated connectors must be protected from any contamination using Stäubli sealing caps.

(ill. 13 + ill. 14) Disconnecting

- Push the unlocking tool onto the clips.

- Disconnect the previously mated connectors

安装注意事项

安装的一般注意事项

- 必须为未插合的连接器安装密封盖以防止受环境影响(湿气、灰尘等)。
- 连接器受污染时,切勿插合。
- 连接器不得与任何化学品接触。

电缆布线和电线管理

电缆从连接器出来应预留至少20毫米距离再进行弯折。弯折请参阅电缆制造商规格,获取最小弯曲半径。

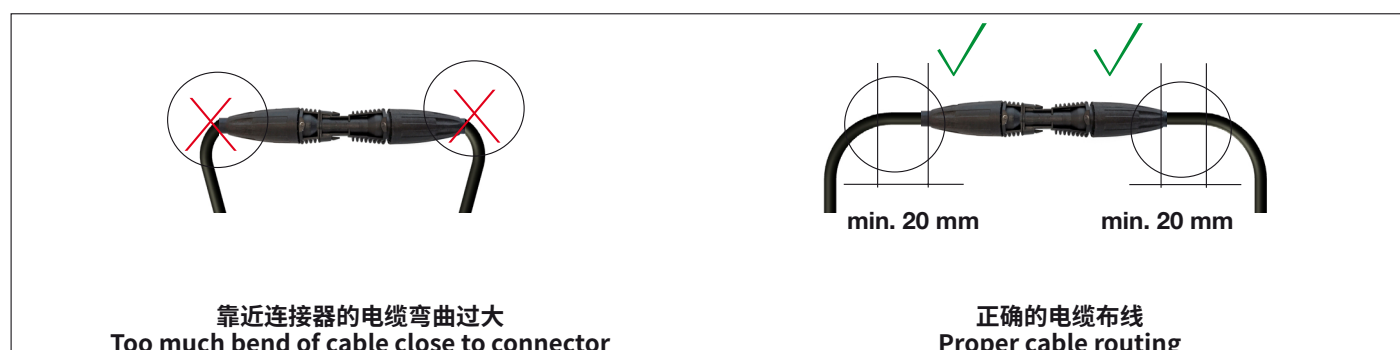
Notes on installation

General notes on installation

- Unmated connectors must be protected from environmental impact (moisture, dirt, dust, etc.) with sealing caps.
- Do not mate contaminated connectors.
- Connectors must not come into contact with any chemicals.

Cable routing and wire management

Cable management must allow a minimum of 20 mm of cable that exits directly from the cable seal without bending or stress. Refer to cable manufacturers specification for minimum bending radius.



被污染/损坏的连接器

- 切勿让连接器受到环境污染(如土壤、水、昆虫、灰尘)。
- 切勿让连接器的表面受到污染(如贴纸、油漆、热缩管)。
- 切勿将连接器直接置于屋顶表面。
- 请勿让连接器位于线束的最低点,以避免在连接器处积水。
- 连接器不得位于积水中。
- 不得将电缆扎带直接安装在连接器本体上。

Contaminated/damaged connectors

- Do not allow connectors to be contaminated by the environment (e.g. soil, water, insects, dust).
- Do not allow the connector to be contaminated on its surface (e.g. stickers, paint, heat shrink tubing).
- Do not allow that the connector is directly on the roofing surface.
- Do not allow the connector to be located at the lowest point of the wiring loom. This is to avoid water to be accumulated at the connector.
- Do not allow that the connector is in standing water.
- Do not allow cable ties to be mounted directly on the connector body.

机械应力

- 检查确认连接器没有受到永久性机械拉伸载荷或振动的影响。
- 电缆不得使连接器受到应力。

Mechanical stress

- Check that the connectors are not subjected to a permanent mechanical tensile load or vibration.
- Connectors shall not be under strain from cable management.

技术参数

Technical Data

型号名称	Type designation	PV-KST4-EVO READY PV-KBT4-EVO READY
连接系统	Connector system	Ø 4 mm
额定电压	Rated voltage	DC 1500 V (IEC 62852:2014+Amd.1:2020)¹⁾
额定电流	Rated current	30 A
额定脉冲电压	Rated impulse voltage	DC 16 kV (1500 V)
环境温度范围	Ambient temperature range	-40 °C ... +85 °C (IEC)
运输/存储温度范围	Transportation/storage temperature range	-30 °C ... +60 °C
运输/存储相对湿度	Transportation/storage relative humidity	< 70 %
温度上限	Upper limiting temperature	115 °C (IEC)
防护等级 (已插合)	Degree of protection, mated	IP65/IP68 (1 m, 1 h)
防护等级 (未插合)	Degree of protection, unmated	IP2X
过压类别	Overvoltage category	III
连接器接触电阻	Contact resistance of plug connectors	< 0,5 mΩ
连接器公母极性	Polarity of connectors	插座/Socket = +/阳极/positive 插头/Plug = -/阴极/negative
锁紧系统	Locking system	Locking-type
等级 (IEC)	Class (IEC)	II
接线类型	Type of termination	弹簧夹 (免工具连接) Spring clamp (tool free connection)
安全须知	Safety instruction	在负载下请勿断开 Do not disconnect under load
金属针材质	Contact material	铜、镀锡 / Copper, tin plated
绝缘材料	Insulation material	PA
TÜV Rheinland 认证, 符合 IEC 62852:2014 + Amd.1:2020	TÜV Rheinland certified according IEC 62852:2014+Amd.1:2020	R 60174999
可插合的连接器的类型	Mateable with connector type	仅针对MC4产品系列的连接器进行测试。 Tested exclusively in connection with connectors from the MC4 product family.

¹⁾ 连接器可与符合下表参数的电缆一起使用

¹⁾ The connectors are to be used with cables according to the following table

(Tab. 1)

可匹配的电缆型号 Allowed cable type	导体截面积 [mm ²] Wire cross-section [mm ²]	外径 [mm] Outer diameter [mm]
光伏电缆符合/PV cable according IEC 62930:2017 或/or EN 50618:2014	4.0/6.0	5.5 - 7.5 (± 0.1)

制造商/Manufacturer: Stäubli Electrical Connectors AG

Stockbrunnenrain 8
4123 Allschwil/Switzerland
Tel. +41 61 306 55 55
Fax +41 61 306 55 56
mail ec.ch@staubli.com
www.staubli.com/electrical