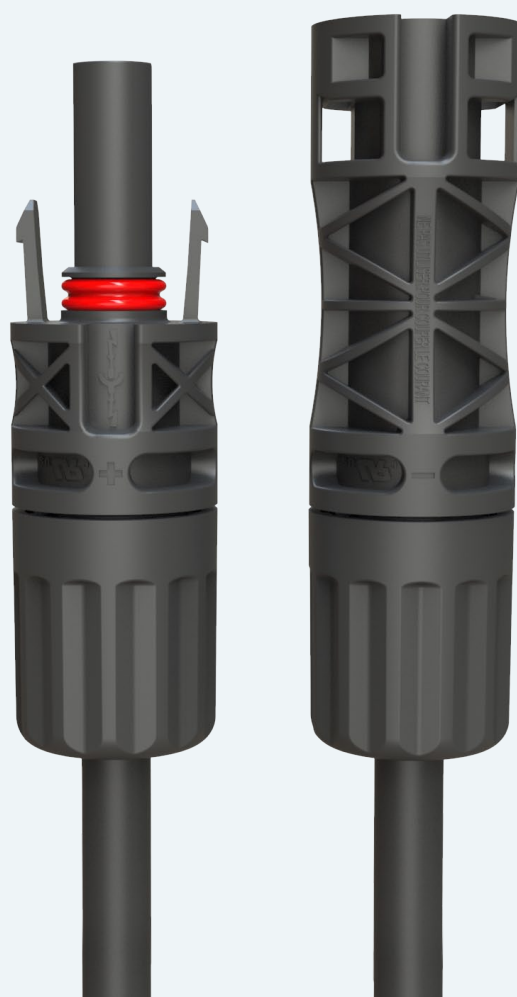


安装说明书

Installation Instructions

QC4.10-efs (Mate 连接器)

QC4.10-efs (Mate connector)



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1.警告 Warning

1.1 在自行安装时，如果所有的零件和工具不是快可所规定的，或者忽略了准备和安装操作，我们将不保证产品安全性和技术参数一致性。

During yourself installation, if the used part and tool are not ruled by QC or if you ignore the preparation and operation, we won't insure the safety and compatible of the product technology yourself installation.

1.2 为防止电击，在拆装时 PV 连接器必须断开电源。

For protecting against electric shock, please cut off the power when installing PV connector.

1.3 终端产品必须提供防电击功能。

The final products must be supplied with the function electric shock proof.

1.4 不建议使用 PVC 电缆。

PVC Cable is not recommended.

1.5 在负载情况下拔出：在有负载的情况下，不能拔出 PV 插头连接器！关掉 DC/AC 直流 - 交流变频器或打开 DC 交流电路断路器，使 PV 接头连接器处于无负载的状态，则可在允许范围内带电插拔。

Don't pull out the PV connector under loading. Turn off the DC/AC inverter or turn on DC circuit interrupter, making PV connector in unloading. Then insert and extract under voltage is permitted.

1.6 建议不要使用无镀锡电缆，因为电缆铜线被氧化后，压接部位的接触电阻可能会超过允许值。

H07RN cables without tinned are not recommended. Because the contact resistance of crimping place will probably exceed the permitted value since the copper wires are oxidized.

1.7 断开的连接器必须使用防护帽，以防止灰尘和水进入。

Sealing cap must be used for disconnected connector, avoiding dust and water.

1.8 插入部件防水等级 IP68。它们不能长久置于水下使用。不要将 QC-PV 连接器放在屋顶表面。

Waterproof degree for inserted parts is IP68. They can't be put under water for long time. Don't put QC-PV connector on the roof of surface.

1.9 在对产品进行维修时，在距离产品空间距离 1.2m 内，只有专业的维修人员或经过培训的人员才可进入维修。

During the maintenance of the product, only professional maintenance personnel or trained personnel can enter the maintenance within 1.2m distance from the product space.

1.10 在对产品进行维修时，人员需使用工具来接触产品，并且人体距离产品的最小距离需满足 $\geq 60\text{mm}$ 。

When repairing the product, use tools to touch the product, and the minimum distance between the human body and the product must be at least 60mm.

1.11 产品不得在含有烃、酚、酮、氨合物等与塑料有腐蚀的环境中使用。安装过程中，禁止在连接器里添加或涂抹任何油脂及润滑剂。（详见耐化学品附表 8.1）

Do not use under hydrocarbon, phenol, Ammine and plastic corrosive environment. During installation process, do not add any grease and lubricant in the connector. (See 8.1)

2.技术参数 Product Specifications



PV- 正极连接器 PV- Female Connector

PV- 负极连接器 PV- Male Connector

性能参数 Performance Parameters

名称 Product Name	QC4.10-efs (Mate 连接器) QC4.10-efs (Mate connector)	
认证 Certificate	TUV 证书编号 TUV Certificate NO	R50578420
		No.B 077362
	UL 证书编号 UL Certificate NO	E340004
额定电流 Rated Current	TUV	41A for 2.5mm ²
		46A for 4.0mm ²
		55A for 6.0mm ²
	UL	30A for 14AWG
		35A for 12AWG
		50A for 10AWG
适用电缆外径 Applicable Cable Diameter	堵头一 Plug 1	OD 5.5-5.9mm
	堵头二 Plug 2	OD 5.8-6.2mm
	堵头三 Plug 3	OD 6.2-6.6mm
	堵头四 Plug 4	OD 6.6-7.0mm
	堵头五 Plug 5	OD 7.0-7.4mm
防护等级 IP Degree	IP68/IP65	
额定电压 Rated Voltage	TUV2000V/UL2000V	

温度范围 Temperature Range	-40℃~ +85℃
温度上限 Temperature Upper	115℃
过电压类别 Overvoltage Class	III
污染等级 Class Of Pollution	2
接触电阻 Resistance Of Connector	≤ 0.2mΩ
额定脉冲电压 Rated Pulse Voltage	27.2KV/30KV
端子材质 Terminal Material	铜, 镀锡 Copper, tinned
绝缘材料 Insulant	PA
阻燃等级 Flame Retardant Rating	UL94: V-0

UL 命名 UL NOMENCLATURE

NOMENCLATURE:

QC4.10 – x x x x x x x x

A B C D E F G H

Where:

A – Maximum System Voltage

a6 – 2000V

B – Connector Type

none – Locking type

b1 – Latching type

C – PV Wire Type

c12-2000V, 12AWG, 48/0.30 (str/dia)

c13-2000V,12AWG,56/0.285 (str/dia)

c14-2000V,10AWG,84/0.285 (str/dia)

c15-2000V,14 AWG, 41/0.25 (str/dia)

c16-2000V,8 AWG, 77/0.4 (str/dia)

D – Material of Connector Housing

d6 – Type A3XZG5 R04 (f1)

d7 – Type PA66 T303 GF BK - D(f1)

E – Material of Cover Nut

e2 - A3XZG5(f1)

e4 - PA66 T303(XX)GF BK - D(f1)

F - construction

f2 - Connectors with 18.7 mm outer diameter (Mate Construction)

G – Type of Pin Crimp Connector and Socket Crimp Connector:

g1 – Without equipped with Electric

H– Polymeric Material of Cable Hook:

h1 – Type FR370(j)(f1)

h2 – Type PA66 T303 00GF BK-D(f1)

Caution:

1.For Copper Stranded Wire Only.

2.The product installation and use meet the requirements of PV modules.

3.The connector is considered to be in compliance with UL 6703, Connectors for Use in Photovoltaic Systems, Edition 1, Revision Date 06/10/2021 only when assembled in the manner specified by these assembly instructions.

This connector is suitable for use only with Class B and C stranded copper conductors (See NFPA 70, National Electrical Code, Edition 2020, AMD 1 - 17, Revision Date 04/12/2022, Chapter 9, Table 10).

UL 命名 UL NOMENCLATURE

NOMENCLATURE: QC4.10-efs

Remark: QC4.10-efs is a general designation. The prefix letter “e” 、 “f” 、 “s” denotes different technical and design meanings.

1.e=1 or 2

e=1 denotes rated voltage 2000V with baffle plate;

e=2 denotes rated voltage 2000V without baffle plate;

2.f=4 or 5 or 6 or 7

f=4 denotes rated current 41A with stamping;

f=5 denotes rated current 46A with stamping;

f=6 denotes rated current 55A with stamping;

f=7 denotes rated current 70A with turning;

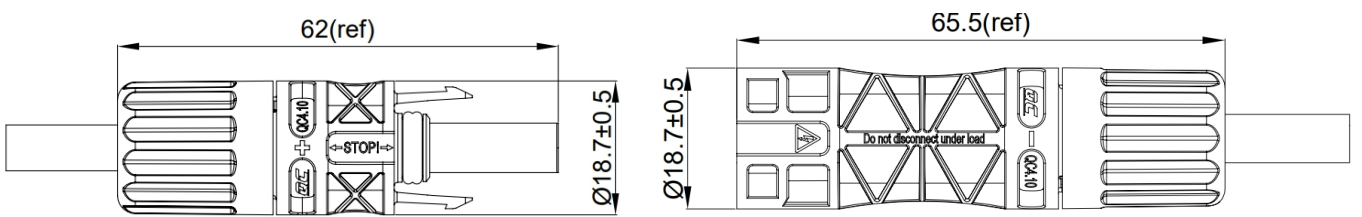
3.s= 2 (Mate constructure)

3.产品信息 Product Information

3.1 产品图片 Picture

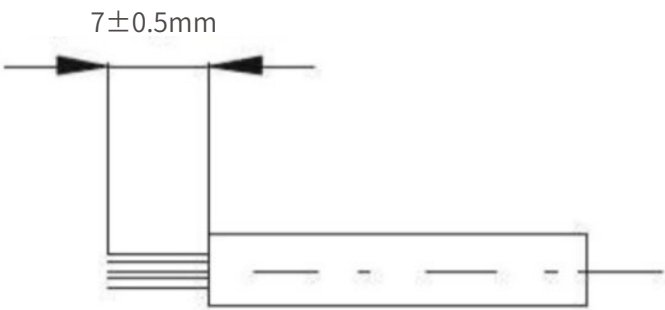


3.2 产品图纸 (预组装状态) Drawing (pre-install status)



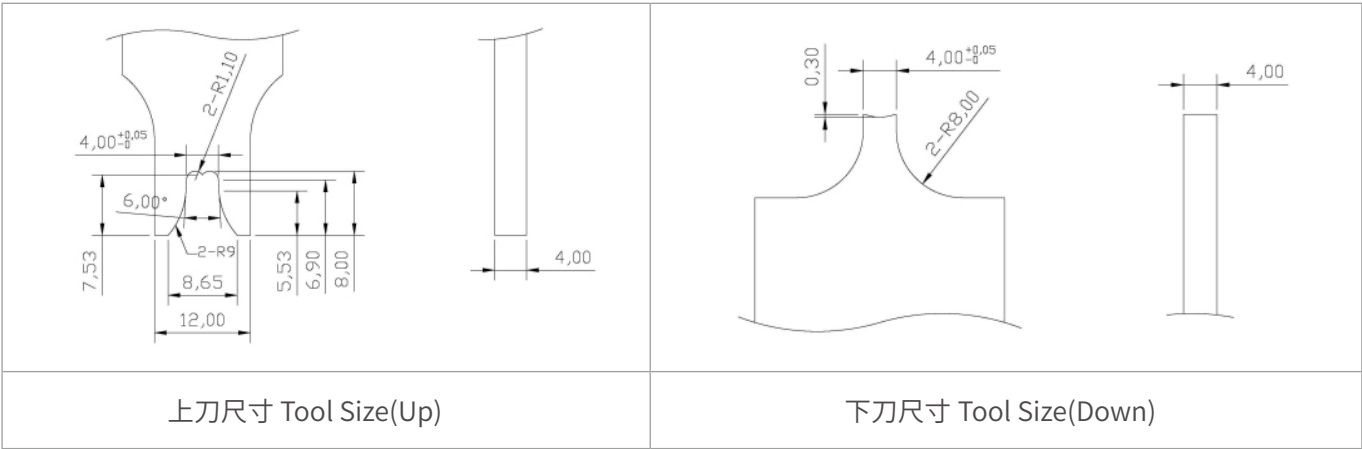
4. 机器组装工艺流程 Machine assembly process

4.1 剥线 Stripping

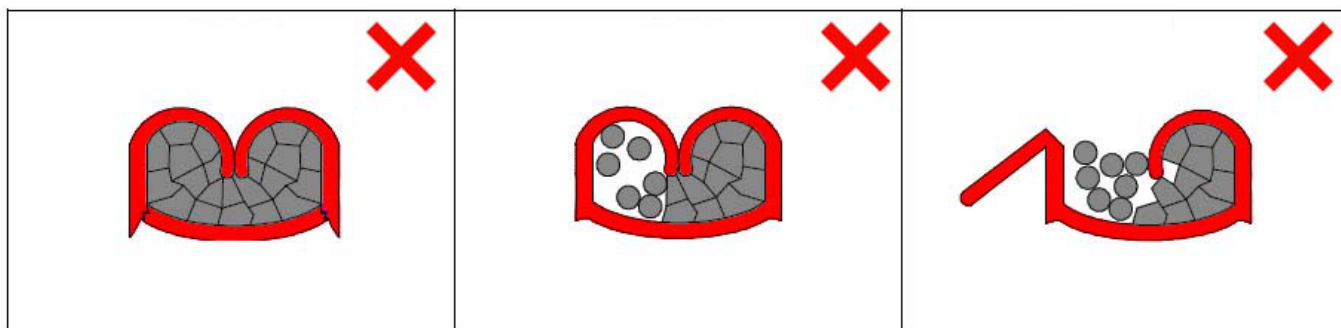
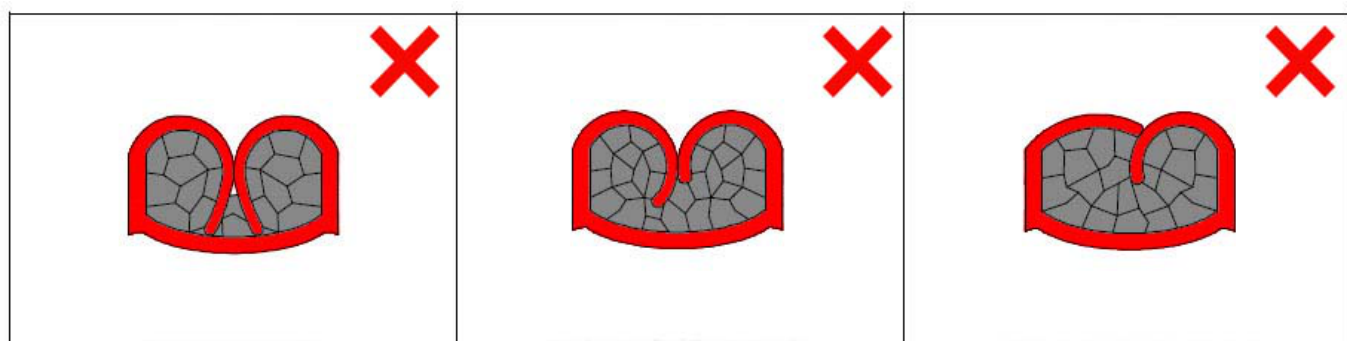
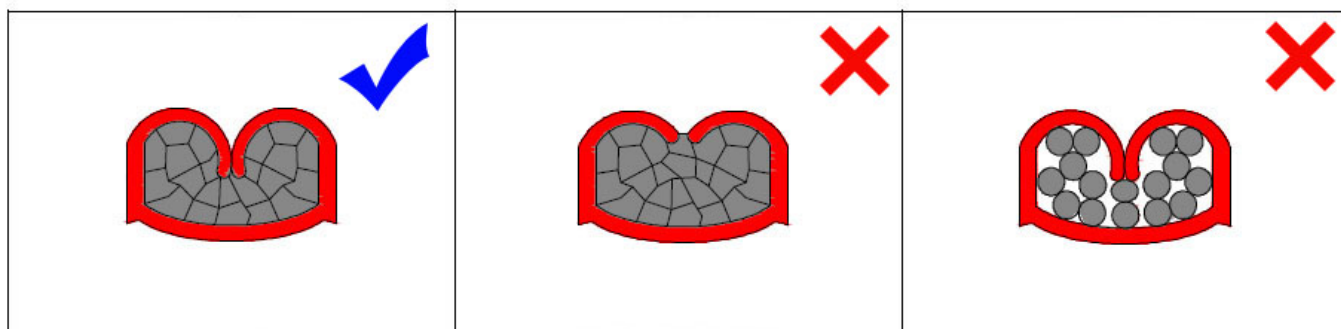
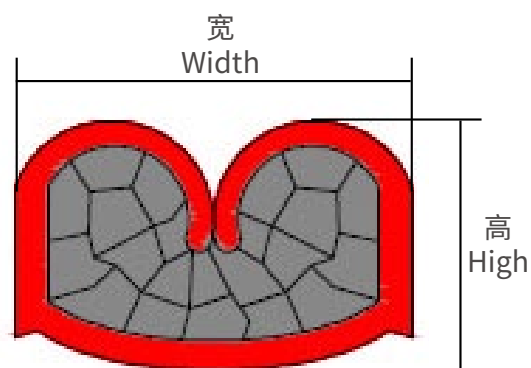


剥线尺寸：7±0.5mm

4.2 铆接 Crimping



电缆规格 Cable Spec	铆接高度 (H) Crimping(H)	铆接宽度 (W) Crimping(W)
2.5mm ² /14AWG	2.6±0.1mm	3.8±0.1mm
4.0mm ² /12AWG	2.1±0.1mm	4.1±0.1mm
6.0mm ² /10AWG	2.6±0.1mm	4.3±0.1mm
10.0mm ² /8AWG	3.3±0.1mm	5.2±0.1mm
压缩比 Compression ratio: 70% ≤ X ≤ 90%		



4.3 线束组装 Cable assembly

将铆接好的线束插入正极负极绝缘本体，直至金属件与本体啮合，轻轻拉动导线，检查金属件是否啮合牢固。

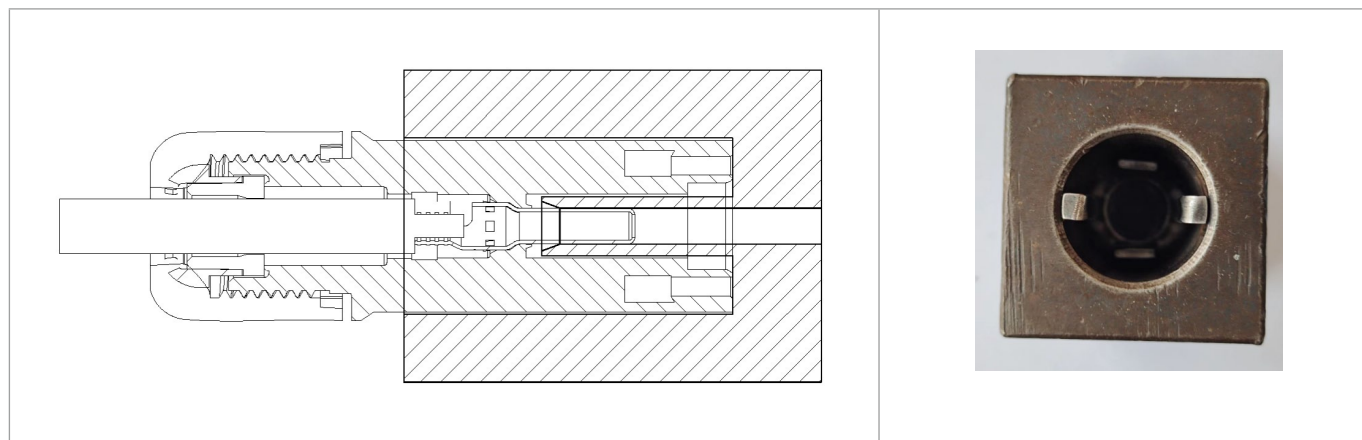
Push the riveted pin into the insulator until they engage. Pull lightly on the lead to check that the metal part has engaged.



4.4 螺帽组装 Nut assembly

在锁紧连接器螺帽时，定位治具须配有导正结构，方可使用。

When locking the connector nut, the positioning jig must be equipped with a guiding structure before it can be used.



序号 No.	线径 Cable Diameter(mm)	管控间隙 Control gap(mm)	参考扭力 Reference torque(N*m)	备注 (remark)
1	5.5 < OD ≤ 5.9	0 < X ≤ 0.6	3±1 N*m	生产前请校准设备的扭力，以更好满足间隙管控要求。 Please calibrate the torque of the equipment before production to better meet the gap control requirements.
2	5.8 < OD ≤ 6.2			
3	6.2 < OD ≤ 6.6	0 < X ≤ 0.8		
4	6.6 < OD ≤ 7.0			
5	7.0 < OD ≤ 7.2	0 < X ≤ 1.5		
6	7.2 < OD ≤ 8.5			

5. 人工组装工艺流程 Manual installation process

5.1 工具要求 Requirements for tools

安装工具要求 Installation tool requirements			
	(1) 工具箱 Tool Box 型号 Type: 02.04.003		(2) 扳手 1 套 =2 片 spanner 1 set=2 pieces 型号 Type: 04.06.1020
	(3) 剥线钳 Strip Clamp 型号 Type: 02.04.008 or 02.04.009		(4) 铆接钳 Rivet Clamp 型号 Type: 02.04.007 or 02.04.010

Mark	Crimping Range	
2.5/14	2.5mm ²	14AWG
4.0/12	4.0mm ²	12AWG
6.0/10	6.0mm ²	10AWG
10.0/8	10.0mm ²	8AWG

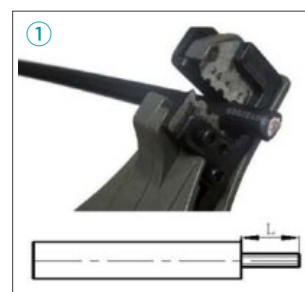
Mark	Riveting Range	
2.5/14	2.5mm ²	14AWG
4.0/12	4.0mm ²	12AWG
6.0/10	6.0mm ²	10AWG
10.0/8	10.0mm ²	8AWG

5.2 组装步骤 Assembly steps

① 剥线 Stripping

剥离电缆绝缘长度 : $L=7\pm0.5\text{mm}$ ，注意不要切断绝缘层下的线芯。

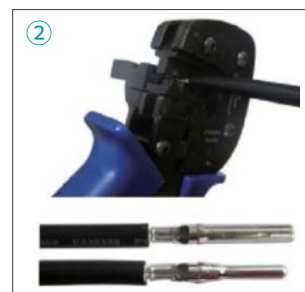
Strip the insulating layer of cable. $L=7\pm0.5\text{mm}$. pay attention not to cut off the wire core.



② 铆接插针插套 Riveting

需保证金属件和电缆线的同心度。铆接后电缆线与金属件的拉力需 $\geq 310\text{N}$ 。

Rivet terminal. Ensure the concentricity of metal parts and cable at same level, crimped metal parts and cable pull tension $\geq 310\text{N}$.



③ 插入 Insertion

将铆接好的插头插入插座或插头的绝缘套，直至其齿合。轻轻拉动导线，检查金属件是否齿合牢固。

Push the riveted pin into the insulator until they engage. Pull lightly on the lead to check that the metal part has engaged.



④ 安装螺帽 Install the cable gland

先用手预拧紧，再用扳手旋紧电缆螺帽（间隙参考 4.4 章节要求）。拧螺帽时，需保证电缆线与螺帽同心。连接器螺帽为可拆卸螺帽。原厂扳手可用于施工现场组装，不适用于工厂内部批量组装。

First screw it by hands, then lock tightly by spanner (pls refer the gap sheet for detailed gap from page one). Ensure the concentricity of cable and cable gland when screw cable gland. Cable gland is detachable, original factory spanner can assembly in site, but not suitable for mass quantity assembly.

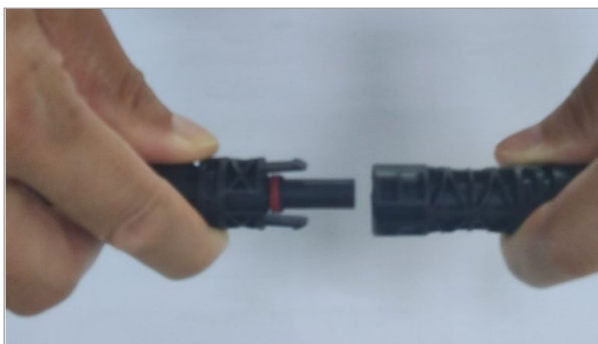


6.连接器对插及解锁 Connecting and disconnecting

6.1 连接器对插 Connecting

将连接器正负极对插，直到啮合。轻轻拉动，以检查是否啮合牢固。

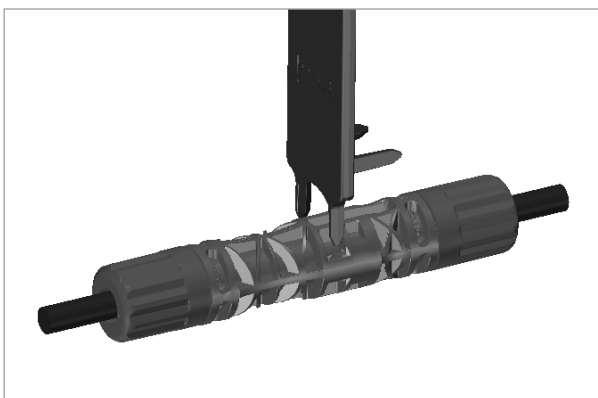
Plug the coupling together until they engage. And pull lightly to check correct engagement.



6.2 连接器解锁 Disconnecting

此插头连接，只能使用扳手工具解锁。

This connection can only be unlocked with spanner.

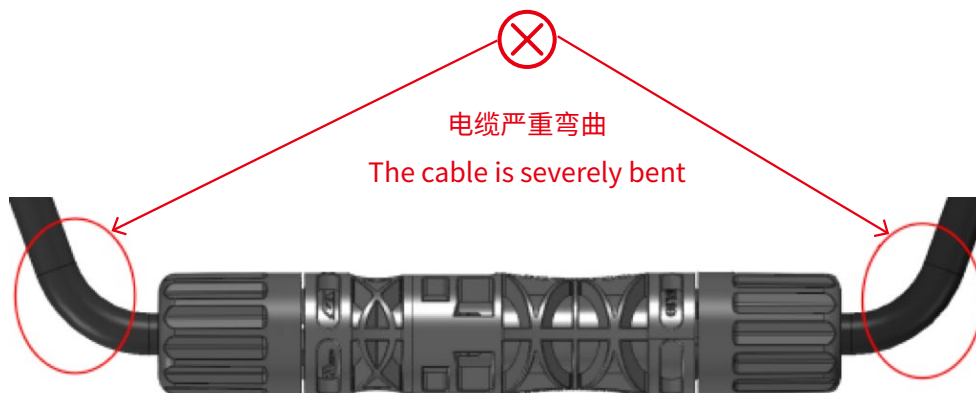


7. 线缆状态 Cable status

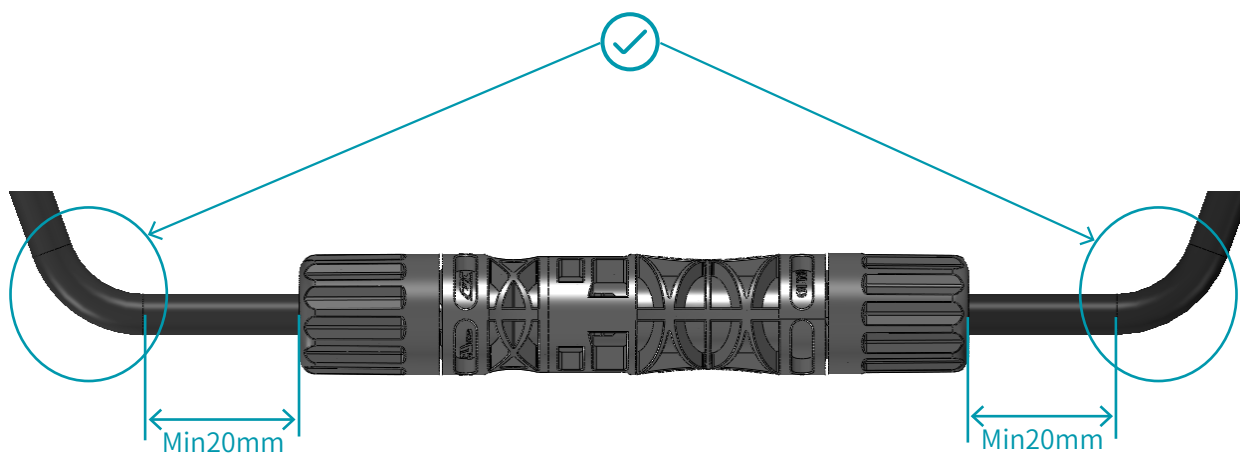
7.1 线缆接线 Cable's connection

电缆根部建议保留至少 20mm 未折弯长度，以免因线缆折弯产生的外力引起连接器密封件变形。

Please refer to the detailed instruction ones of the min bend radius given by manufacturer.



错误的电缆示意图 Wrong cable schematic



正确的电缆示意图 The correct cable diagram

注：请参考电缆生产商的最小弯曲半径的详细要求。

NOTE: Please refer to the cable manufacturer's minimum bend radius requirements for details.

7.2 接合状态 The state after connection



8. 附件 Annex

8.1 耐化学品附表 Chemical resistance form

Ingredient	Material	Manufacturer	Critical Stress (%) 23°C	Grade
黏合剂 Binder	KE45W/ KE4828W	Shin-Etsu Chemical	> 1.0	A
	TSE382W/ TSE392W	Momentive	> 1.0	A
	PV804/PV8101	Dow Corning	> 1.0	A
	APF125	Wacker Chemical	> 1.0	B
	VHB/TAPE 4941	3M	> 1.0	A
	Chemlok	LORD	0.2-0.5	C
填充剂 Filler	PV7010	Dow Corning	> 1.0	A
	KE200/CX 200	Shin-Etsu Chemical	> 1.0	A
	KE210F/CAT 210	Shin-Etsu Chemical	> 1.0	A
	RAKUSIL A/B	RAMPF	> 1.0	A
	VU4459/41 SVHF	Peters	0.2-0.5	C
脂类 Greases	Z260/ A7002	/	> 1.0	A
表面活性剂 Surfactant	Charmy V quick	Kao	> 1.0	A
导热复合物 Heat reactivator	SC102 compound	Dow Corning	> 1.0	A
脱模剂 Mold release	KF-96SP	Shin-Etsu Chemical	0.2-0.5	C
	PANDO 39D	Three Bond	< 0.2	D
	Telicoat S-6	Kukdong oil&chem	0.2-0.5	C
	Snowwhit EC	Netherlands	0.2-0.5	C
	Telicoat A	Kukdong oil&chem	> 1.0	A

Ingredient	Material	Manufacturer	Critical Stress (%) 23°C	Grade
防锈剂 Antirust	Antikor RS Aerosol	technik Gmbh	0.2-0.5	C
	D1 MIST	Yamaichi	0.2-0.5	C
	Barrier Guard PART II	Yamaichi	< 0.2	D
	TFP Spray	Sumico	< 0.2	D
	WD40	WD40	0.5-1.0	B
胶带粘胶剂 Adhesive	CEMEDINE SuperX No.8008	Cemedine	0.5-1.0	B
	CEMEDINE SuperX No.8008Y6	Cemedine	> 1.0	A
	CEMEDINE SuperX SX720B	Cemedine	0.2-0.5	C
	Chemlok 487A/B	LORD	< 0.2	D
	Chemlok 7701	LORD	< 0.2	D
醇酸碱 ALK	Methanol	/	> 1.0	A
	Ethyl alcohol	/	> 1.0	A
	Isopropyl alcohol	/	> 1.0	A
	Ethylene glycol	/	> 1.0	A
	25% Ammonium water	/	> 1.0	A
	50% sulfuric acid water	/	0.5-1.0	B
	Sodium chlorid	/	> 1.0	A
	60% phosphoric acid water	/	> 1.0	A
酮类 Ketone	Acetone	/	< 0.2	D
	2-Butanone	/	< 0.2	D
碳氢化合物 Hydrocarbon	Toluene	/	< 0.2	D
	Xylenes	/	< 0.2	D
	Cresol	/	0.5-1.0	B

Ingredient	Material	Manufacturer	Critical Stress (%) 23°C	Grade
油类 Oil	DiaCut	Oelheld	0.5-1.0	B
	Oily sealing agent	/	< 0.2	D
	Engine oil	/	< 0.2	D
	Base oil	/	< 0.2	D
	kerosene	/	< 0.2	D
	Gasoline	/	< 0.2	D
	varnish	/	< 0.2	D
	Forming oil	/	< 0.2	D
	Cutting oil	/	< 0.2	D
	Heat transfer oil	/	> 1.0	A
	Lube oil	/	< 0.2	D
	High temperature grease		> 1.0	A
	Dry oil	/	> 1.0	A
其它 Others	Hand cream	/	0.5-1.0	B
	Vaseline	/	> 1.0	A
	Olive oil	/	0.5-1.0	B
	Butter	/	0.2-0.5	C
	margarine	/	0.2-0.5	C
	Soybean oil	/	0.2-0.5	C

临界点说明 Chemical resistance form

Critical tress (%)	Remark	Grade
> 1.0	开裂的次要因素。 Secondary factor of cracking.	A
1.0-0.5	基本上在应力集中区域，会有一些开裂。需要特别注意化学品的使用。 Basically, there will be some cracking in the stress concentration area. Need to pay special attention to the use of chemicals.	B
0.5-0.2	不管有静态或动态的应力，都存在开裂的风险。特别注意不要与化学品接触。 Regardless of the static or dynamic stress, there is a risk of cracking. Special attention should not be in contact with chemicals.	C
< 0.2	与化学品接触，会有很高的开裂风险。 Exposure to chemicals will have a high risk of cracking.	D

备注：对于上表未列明的化学品，需经确认无影响后再使用

Remarks: For chemicals not listed in the above table, they must be confirmed to have no effect before use.

8.2 连接器责任免除条款 The Connector liability exemption clause

有违反下列情况之一者，并导致产品出问题，造成任何损失，我公司将不承担任何责任。

There exist following case, and lead to product goes wrong, any loss caused, product manufacturers will not take any responsibility.

1. 产品运输、仓储。

Product transportation and storage.

1.1 产品在运输、仓库过程中，不可与“8.1”表中有关化学品存放在一起，使产品经受这些化学品污染；

Products in the process of transportation, warehouse, can not stored with "8.1" in the table of chemicals together that lead the product pollution with these chemicals;

1.2 产品在运输、仓库过程中，不可对产品过分承压，撞击等破坏产品行为；

Products in the process of transportation, warehouse, can not pressure too much on products and such as impact damage behavior;

1.3 产品在运输、仓库过程中，常温存储，应注意避光、防水、防尘等方面防护，以免降低产品相关性能，电站现场应特别注意；

Products in the process of transportation, warehouse, should room temperature storage, avoid light, should waterproof, dustproof, and should be paid attention to protection, so as not to reduce product performance, pay special attention to product when in power station;

1.4 产品包装完整情况下存储时间 2 年。

The product is stored for 2 years with complete packing.

2. 产品安装、使用环境。

Product installing and operating environment.

2.1 产品正常工作环境温度 -40~+85℃；

The product health working environment temperature - 40 ~ + 85 °C ;

2.2 产品现场安装，需按照“快可”产品“安装使用说明书”操作；

The Product installing should be in accordance with the QC Solar product installation instructions;

2.3 产品在沿海、沙漠等粉尘、粉尘、灰尘多的地域使用，产品出厂前必须带防尘帽；

Products in the coastal, desert dust, dust more regional use, before the products leave the factory, they must take the dust cap;

2.4 产品在屋顶电站使用时，连接器不可直接放在屋顶表面；

Products used in roof power station, the connector shall not directly on the surface of the roof;

3. 产品与化学品兼容性见“表格 8.1-8.11”。

Products and chemical compatibility See table 8.1-8.11.

4. 连接器在未耦合情况下，产品将不能满足任何 IP 防护等级，也不能正常使用。

The connector under the condition of disconnect, the product will not be able to meet any IP protection grade, also can't normal use.

4.1 产品插合后满足 IP68 防护等级要求，但不能长期置于水下或屋顶上工作。

Products meet IP68 degree of protection requirement after connects, while it can't work under water for a long time, or on the roof.

4.2 连接器在未对插的情况下，不可长时间放置于户外，这样可能会造成金属件腐蚀，并使连接器性能降低。

Connector in the case of disconnect, should not placed in the outdoor for long time, so may be the cause of the corrosion of the metal, and lower the connector performance.

4.3 连接器在户外安装、使用过程中，如果不能及时对插，请做好连接器防护工作，将连接器端口插上“防尘帽”，防止连接器受到水、尘等的污染，影响产品使用性能。

Connector in the process of outdoor installation and use, if not to connect in time, please do a good job in the connector protection, put on the dust cap and protect the connector from water, dust and other pollution, affect the product performance.

5. 连接器在安装、使用过程中，不可将连接器过分碰撞，拖在水中、草丛中、地上等防止连接器使用前，内部受到污染，降低产品性能。

Connector in the process of installation and use should not be collision, drag in the water, grass, and the ground to prevent the pollution of inside the connector before use, reduce the product performance.

6. 连接器对插。

Connector connect right one.

6.1 “快可”品牌连接器必须与“快可”品牌连接器正、负极进行对插，不可与市场其它品牌连接器对插。

QC Solar brand connector must be connect with the brand "QC Solar", can not connect with other brands on the market.

6.2 如果客户现场需要与其它品牌连接器正、负极对插，请事先与生产厂家联系。

If the customer need connect with other brand connector, please contact the manufacturer in advance.

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