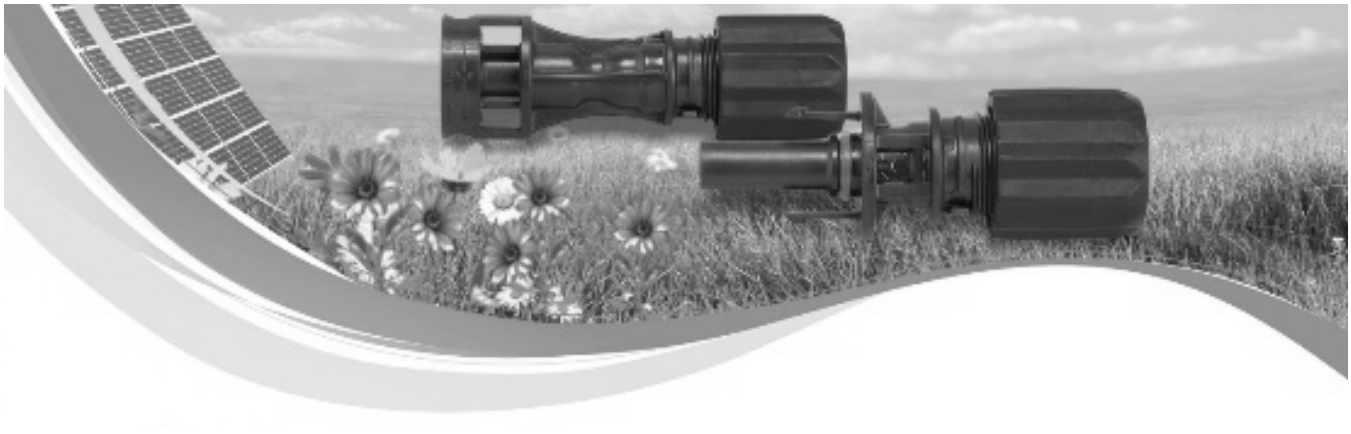
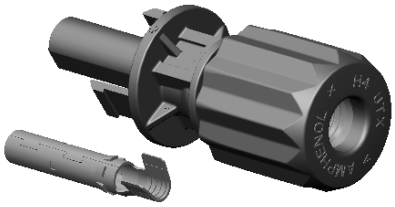
太阳能连接器UTX系列
PV Connector UTX Series





UTX 太阳能连接器
UTX PV CONNECTOR

UTX-XL 太阳能连接器
UTX-XL PV CONNECTOR

编制(Prepared by):	Johnny Wang	审核(Checked by):	Allen Wan
日期（Date）:	2015-12-04	日期（Date）:	2015-12-04

目 录
Table of Contents

1.警告
Caution

1) 连接器在安装或拆卸过程中必须断开电源。
The connector must be isolated and disconnected from the power supply during the assembling or disassembling process.

2) 不可带电插拔。
Do not disconnect under load.

3) 推荐使用光伏电缆线。
The use of PV cable is recommended.

4) 推荐使用镀锡线芯线材。
The use of tin plated cable is recommended.

5) 安费诺连接器符合IP68（水下1米一小时）密封性能。
The connectors are IP68 rated, and can be positioned for short time under 1MT of water.

6) 该产品应由有相应资质或经过专家培训的,具备相关安全应用规范的专业人员安装。
The connector is considered to be in compliance with UL 6703 only when assembled in the manner specified by assembly instructions.

7) 该连接器只适用于B类和C类的铜导线(参考NFPA NEC 70第9章,表格10)。如果与其他等级的铜导线使用，连接器应做标记。参考电缆导体标准：UL 486A-486B。
This connector is suitable for use only with Class B and C stranded copper conductors (See NFPA NEC 70 Chapter 9, Table 10)".If the connector is found to be suitable for use with other stranding classes, the connector shall be marked with those class conductors. See the Standard for Wire Connectors, UL 486A-486B.

8) UTX和UTX-XL太阳能连接器壳体应避免与如下表1到表2的化学品接触。
Some chemicals should be avoided to contact with body of UTX and UTX-XL PV connector, refer to the following table1 and table2.

表1：化学品
Table 1: Chemical

化学品名 **Chemical Name**	制造商 **Manufacture**	临界应变值 **Critical strain**	等级 **Rank**
脂类 **Grease**			
Z260	HASCO	1.2	A
A7002	HASCO	1.2	A
Molykote EM-30L	Dow Corning	>1.5	A
Molykote EM-50L	Dow Corning	0.44	C

Molykote PG-641	Dow Corning	0.87	B
油类 **Oils**			
Silicone Oil KF96	ShinEtsu Silicones	>1.5	A
Silicone Oil SH200	ShinEtsu Silicones	>1.5	A
Dia Cut	OELHELD	0.6	C
Machine Oil KV46	Nippon Oil	0.56	B
脱模剂 **Mould Release Agent**			
Pelicoat B	Chukyo-Kasei	>1.5	A
Pelicoat S-6	Chukyo-Kasei	0.39	C
粘合剂 **Binder**			
Chemlok	LORD	0.08	D
表面活性剂 **Surfactant**			
Charmy VQuick	Kao	1.0	A
醇类 **Alcohols**			
Ethyl Alcohol	/	1.2	A
Isopropyl alcohol(IPA)	/	0.9	B
酸碱类 **Acid, Alkali**			
Sulfuric acid(50% sol)	/	>1.5	A
Ammonia water(25% sol)	/	>1.5	A
Phosphoric acid(60% sol)	/	>1.5	A
Sodium Chloride (sat.)	/	>1.5	A
其他类 **Other**			
TBP(plasticizer)	/	0.11	D
Gasoline	/	〈0.10	D

表 2： 粘合密封与填充材料

Table 2 : Adhesion bond & potting resin

应用方面 **Application**	产品名称 **Product Name**	制造商 **Manufacture**	临界应变值 **Critical strain** **23℃**	等级 **Rank**
粘合密封材料 **Adhesion Sealant**	KE45W	ShinEtsu Silicones	>1.5	A
	KE4828W	ShinEtsu Silicones	>1.5	A
	TSE382W	Momentive	>1.5	A
	TSE392W	Momentive	>1.5	A
	PV 804	Dow Chemical	>1.5	A
	PV 8101	Dow Chemical	>1.5	A
	APF125	Wacker Chemical	0.6	B
	VHB	3M	>1.5	A

	TAPE 4941			
填充材料 **Potting Material**	KE-200 CX-200	ShinEtsu Silicones	0.41	C
	KE-210F CAT-210	ShinEtsu Silicones	>1.5	A
	PV7010	ShinEtsu Silicones	1.5	A

表3 ：临界开裂点说明

Table 3: Explanation of the critical crack point

临界应变值 Critical strain (%)	注解 Remark	等级 Rating
〉1.0	开裂的次要因素等级 Not primary factor of cracking, May be secondary factor in some case of cracking.	A
1.0~0.5	应力开裂的应力集中区域。特别注意化学品的利用 May be a primary factor of stress cracking at the stress concentrated region. Special care of chemical use is required.	B
0.5~0.2	在运输使用过程中有开裂的风险，特别注意不能与化学品接触。 Risk of cracking under static or dynamic strain during assembly, transportation, or use. Special care for no contact to chemical is required part design.	C
0.2〉	与化学品接触开裂的风险很高 High risk of cracking only contact with chemical.	D

2.技术参数:
Technical data

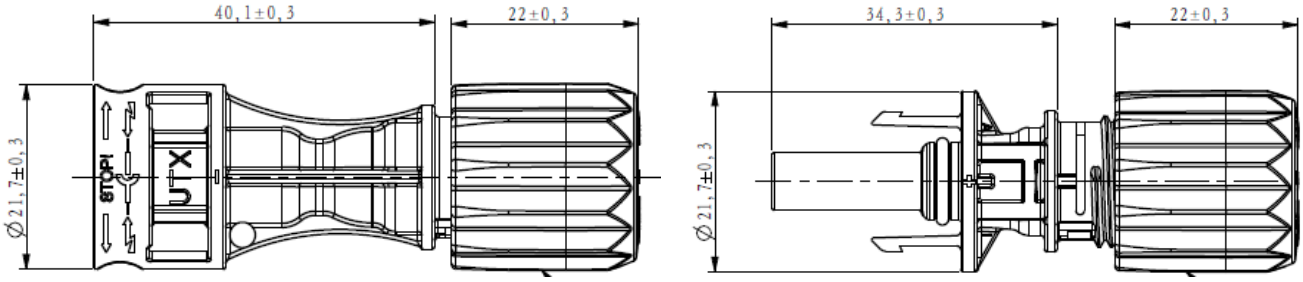
额定电压: Electrical rating	1500V DC (UL/TUV/JET)	
	1000V DC (ETL)	
额定电流: Current rating	TUV :	31A @85℃; 29A @ 90℃; (2.5mm²/14 AWG)
		42A @85℃; 39A @ 90℃; (4mm²/12 AWG)
		53A @85℃; 49A @ 90℃; (6mm²/10 AWG)
		75A @85℃; 69A @90℃; (10mm²/ 8 AWG)
	JET:	30A (2.5mm²/14AWG)
		40A (4.0mm²/12AWG)
		50A (6.0mm²/10AWG)
	ETL/UL:	15A (14AWG)
		20A (12AWG)
		30A (10AWG)
		50A (8AWG)

保护等级: Protection degree	互配状态IP68,分离状态IP2X IP68 mated and IP2X unmated
安全等级: Safety class	II
可使用温度范围: Operation Temperature Range	-40℃ 到 +90℃ -40℃ to +90℃
持证方: License holder	Amphenol Technology (Shenzhen) Co., Ltd.
地址: Full Address	Building C, 2nd Industrial Zone of Xia Shi Jia, Jiangshi Community, gongming Sub-district, Baoan, Shenzhen, Guangdong, 518103 P. R. China

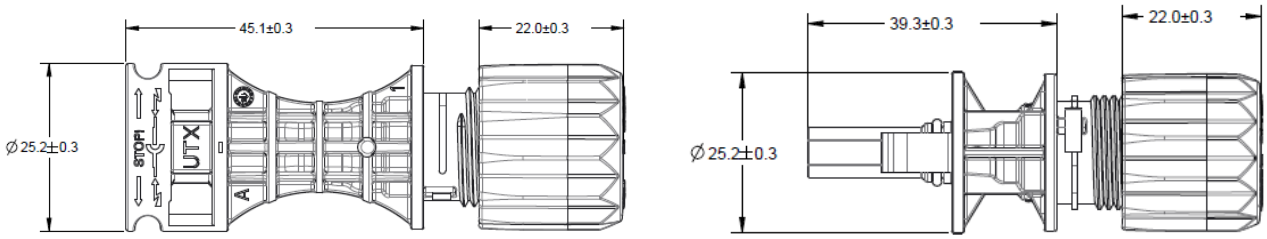
3.产品信息
Product information

3.1) 产品图片:
Product pictures

UTX 线端连接器（TUV&UL&JET&ETL认证）:
UTX cable connector (TUV&UL&JET&ETL APPROVALS)



UTX-XL 线端连接器（TUV&UL双认证）:
UTX-XL cable connector (TUV&UL APPROVALS):



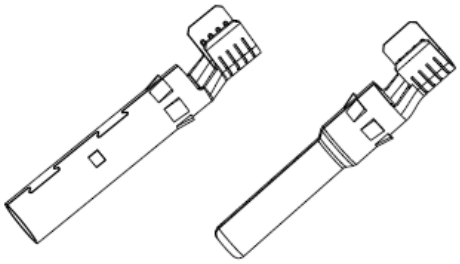
3.2) 连接器料号:
Connector part number

UTX Connector Part Number Logic Code			
Product Line UTX UTX Connector	Product Type C Cable connector	Gender F Female + M Male -	CONNECTOR TYPE A Stamping forming contact for UTX B Cold forming contact for UTX L Cold forming contact for UTX-XL
CABLE SIZE 0 Less contacts 2 2.5 mm^2/14 AWG 4 4&6 mm^2/10&12 AWG for stamping forming contact 4mm^2/12 AWG for cold forming contact 6 6 mm^2/10 AWG (only for cold forming contact) 8 10 mm^2/8 AWG	APPROVALS A TUV/UL/JET/ETL Approvals FOR UTX TUV/UL Approvals FOR UTX-XL	PACKAGING I 800pcs/box and 1pcs bag C 800pcs/box and 100pcs bag M 800pcs/box and 400pcs/bag for UTX 500pcs/box and 250pcs/bag for UTX-XL	VARIATIONS

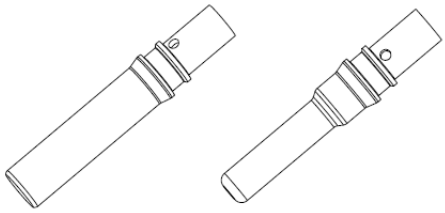
3.3) 卷装冲压端子料号:
Stamping forming contact part number for reel

H4 S&F Contact Part Number Logic Code(only for reel type)			
Product Line UTX UTX Connector	Product Type F Stamping Forming contact	Gender F Female + M Male -	CABLE SIZE 2 2.5 mm^2/14 AWG 4 4 mm^2/12 AWG 6 mm^2/10 AWG
PACKAGING R 2000 pcs/reel	VARIATIONS		

备注：机加工端子无单独料号。
Note: Cold forming contacts are supplied standard with the connectors.



冲压端子
Stamping forming contact



机加工端子
Cold forming contact

4.工具及应用
Tools & application

4.1) 工具:
Required tools

机加工端子压接钳: UTXTC0001
Crimp tool for cold forming contact
（2.5/4.0/6.0/10mm²端子）
(for 2.5/4/6/10mm² contact)

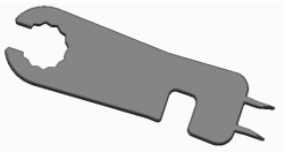
机加工端子钳口: UTXTD0001
Crimping die for cold forming contact:
（2.5/4.0/6.0/10mm²端子）
(for 2.5/4/6/10mm² contact)

冲压端子压接钳: UTXTC0002
Crimp tool for stamping forming contact:
（2.5/4.0/6.0mm²端子）
(for 2.5/4/6mm² contact)

冲压端子钳口: UTXTD0002
Crimping die for stamping forming contact:
（2.5/4.0/6.0mm²端子）
(for 2.5/4/6mm² contact)

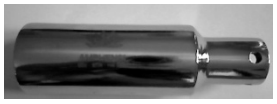
剥线钳（2.5/4.0/6.0mm²光伏线）: H4TS0000
Strip tool for 2.5/4/6mm² PV cable

UTX连接器蓝色扳手: UTXTWA001
Wrench tool for UTX:



UTX-XL连接器蓝色扳手: UTXTWL001
Wrench tool for UTX-XL:

UTX连接器套筒: H4TTW1000
Open-end back cap spanner:



4.2) 剥线流程:
Cable preparation and stripping process

使用安费诺剥线工具(H4TS0000)剥线时，首先调整卡位将线材放置合适位置，剥去线皮长度 7.0±0.5 mm。请注意不要伤及铜丝，见下图 4.2.1 到图 4.2.3。
Amphenol specified strip tool (H4TS0000) can be used in this step. First adjust the stripe stopper, then put the cable in corresponding notch to strip the length of 7±0.5mm. Be careful NOT to nick conductors. See below pictures from 4. 2.1 to 4.2.3.

图 4.2.1
Picture4. 2.1

图 4.2.2
Picture 4.2.2

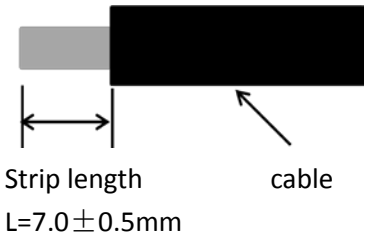


图 4.2.3
Picture4. 2.3

4.3) 机加工端子压接流程:
Crimp process for cold forming contacts

使用安费诺压线钳(UTXTC0001)压线时，首先将已剥好的线材线芯放入端子孔内并确保所有线芯都在端子孔内（可从检查孔确认线芯是否到位）然后将带线材的端子放入对应的压线钳钳口，并对应正确的定位器孔位，如图 4.3.1 到 4.3.5。压接后端子电缆拔出力要求需要满足表 4.3.1。
Amphenol specified crimp tool (UTXTC0001) can be used in this step. Insert striped cable into contact barrel and insure all conductor strands are captured in the contact barrel (conductors should be visible in the inspection hole). Crimp contact barrel by using the 4-ident crimping die, by putting the contact barrel with striped cable in the corresponding crimping locator. See below pictures from 4.3.1 to 4. 3.5. The pull-out forces have to meet table 4.3.1 requirement.

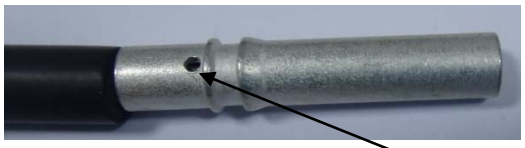


图 4.3.1
Picture4. 3.1

图4.3.2
Picture4. 3.2

检查孔
Inspection hole

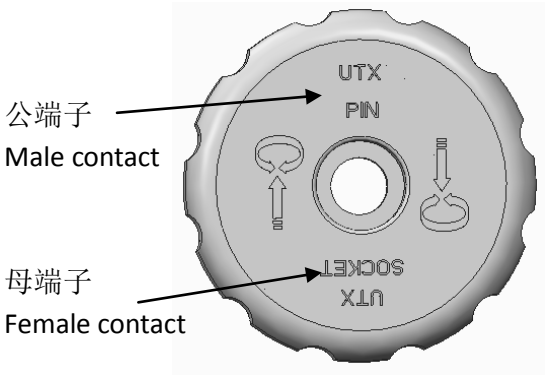


图 4.3.3
Picture4. 3.3

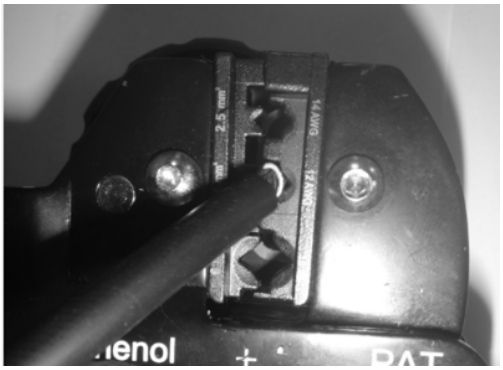


图 4.3.4
Picture 4.3.4

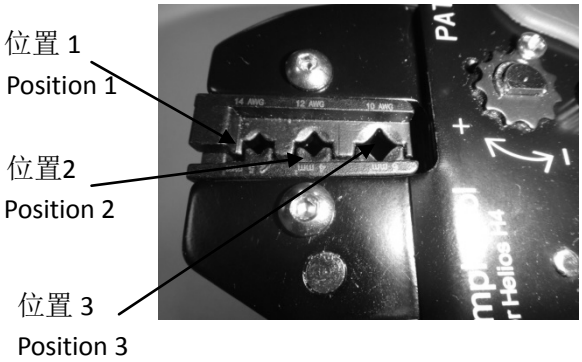


图 4.3.5
Picture 4.3.5

表格 4.3.1 （Table 4.3.1）		
位置 Position	电缆规格 Cable size	电缆拔出力要求 Cable pull-out force
1	14AWG/2.5 mm²	最小 223 N Min. 223 N
2	12AWG/4.0 mm²	最小 312 N Min. 312 N
2	10AWG/6.0 mm²	最小 356 N Min. 356 N
3	8AWG/10.0 mm²	最小 401 N Min. 401 N

端子压接好后的效果见图 4.3.6 及图 4.3.7.
See below pictures 4. 3.6 and 4.3.7 for crimping result.

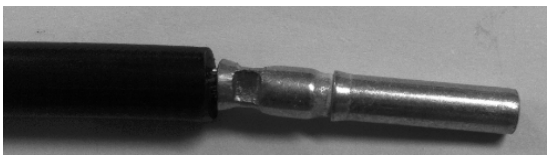


图 4.3.6
Picture 4.3.6

图 4.3.7
Picture4.3.7

4.4) 冲压端子压接流程:
Crimp process for stamping forming contacts

使用安费诺压接工具 (UTXTC0002)压线时，首先将已剥好的线材线芯放入端子槽内，并确保所有线芯都在端子槽内，然后将要压接的端子放入压线钳钳口，并对应正确的定位器孔位压接，见图 4.4.1 至图 4.4.5. 压接后端子电缆拔出力要求需要满足表 4.4.1 要求。

Amphenol specified crimp tool (UTXTC0002) can be used in this step. Insert striped cable into contact barrel and insure all conductor strands are captured in the contact barrel. Crimp contact barrel by using the corresponding crimping die, See below pictures from 4. 4.1 to 4.4.5. The pull-out force has to meet below table 4.4.1 requirement.

图 4.4.1
Picture 4.4.1

图 4.4.2
Picture 4.4.2

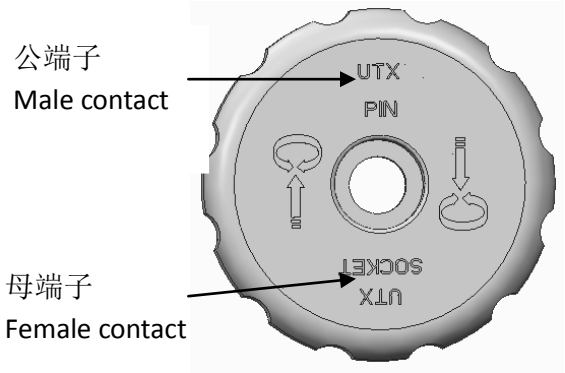


图 4.4.3
Picture 4.4.3

图 4.4.4
Picture 4.4.4

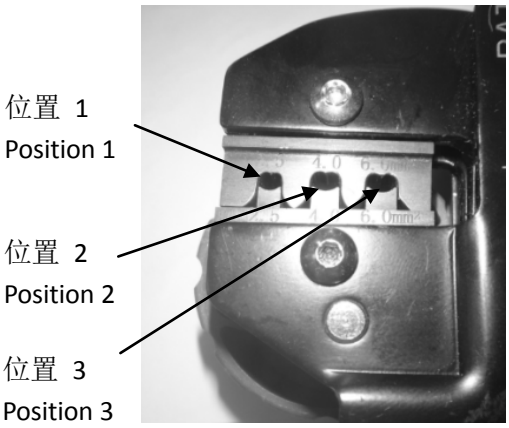


图 4.4.5
Picture 4.4.5

表格 4.4.1 （Table 4.4.1）		
位置 Position	电缆规格 Cable size	电缆拔出力要求 Cable pull-out force
1	14AWG/2.5 mm²	Min. 223 N
2	12AWG/4.0 mm²	Min. 312 N
3	10AWG/6.0 mm²	Min. 356 N

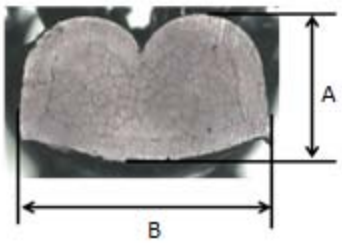
端子压接好后的效果见图 4.4.6 及图 4.4.7。
See below pictures 4.4.6 and 4.4.7 for crimping result.

图 4.4.6
Picture 4.4.6

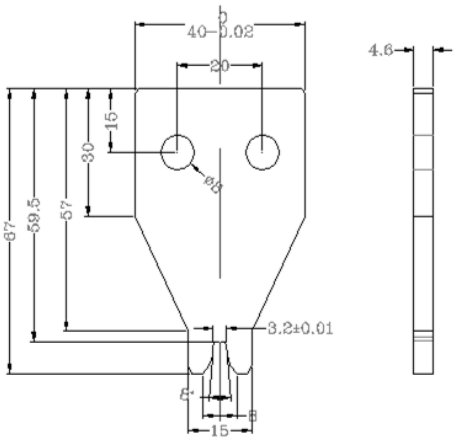
图 4.4.7
Picture 4.4.7

客户使用自动打端子机进行压接时，建议压接规范如表格 4.4.2，压接刀模尺寸要求如下图 4.4.8 到图 4.4.13(单位: mm)。

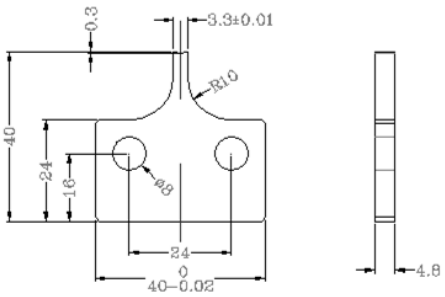
If customer use the automatic crimping machine, we suggest that the contact crimping spec should meet the table 4.4.2 requirement. The suggestion dimensions of crimping tool as below pictures 4.4.8 to 4.4.13 (Unit: mm).



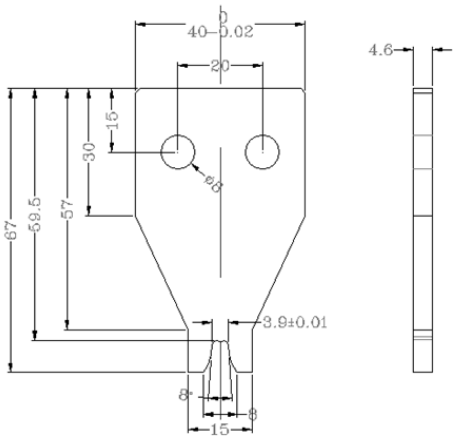
表格 4.4.2（Table 4.4.2）		
电缆规格 Cable Size	铆接高度(A) Crimping Height(A)	铆接宽度(B) Crimping Width(B)
14AWG/2.5 mm²	2.10±0.05mm	3.40±0.10mm
12AWG/4.0 mm²	2.39±0.05mm	4.00±0.10mm
10AWG/6.0 mm²	2.70±0.05mm	4.25±0.10mm
H/W Ratio(高度/宽度比率)：50%≤ X ≤75%		
Compression Ratio(压缩比率)：70%≤ X ≤90%		



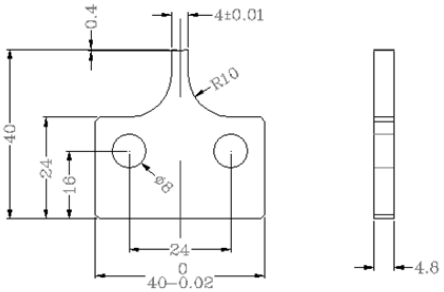
2.5mm² /14AWG 上刀模
2.5mm² /14AWG Up Blade
图4.4.8
Picture 4.4.8



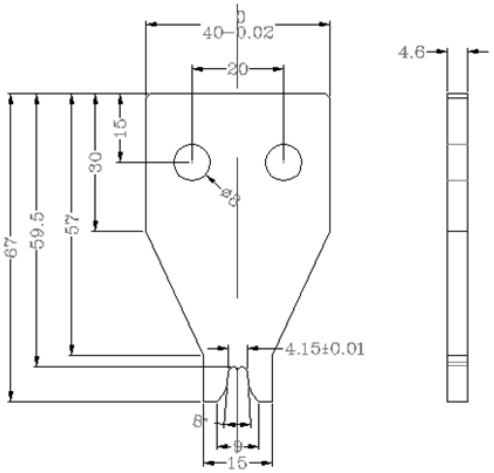
2.5mm² /14AWG 下刀模
2.5mm² /14AWG Down Blade
图 4.4.9
Picture 4.4.9



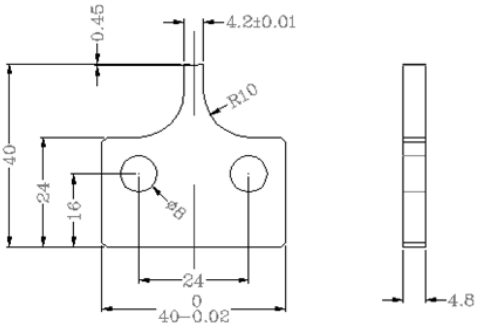
4.0mm² /12AWG 上刀模
4.0mm² /12AWG Up Blade
图 4.4.10
Picture 4.4.10



4.0mm² /12AWG 下刀模
4.0mm² /12AWG Down Blade
图 4.4.11
Picture 4.4.11



6.0mm² /10AWG 上刀模
6.0mm² /10AWG Up Blade
图4.4.12
Picture4. 4.12



6.0mm² /10AWG 下刀模
6.0mm² /10AWG Down Blade
图 4.4.13
Picture 4.4.13

5. 组装流程:
Assembly process

5.1) 线端连接器安装:
For Cable connector

5.1.1) 压接端子及插线
Crimped contacts with cable

将已压接好的端子从连接器后端插入，当插到位后会听到“滴”的卡位声，端子插入后不可再拔出，(端子的压接方法及剥线请参考工具应用4.2到4.4)，见下图5.1.1到图5.1.4。
Insert contact cable assembly into back of male and female connector. A “click” should be heard or felt when the contact cable assembly is seated in correct position. Contacts cannot be removed once seated. (Contacts are crimped per tool application from 4.2 to 4.4). See below pictures 5.1.1 to 5.1.4.

母端连接器
Female PV Connector

图5.1.1
Picture 5.1.1

图 5.1.2
Picture 5.1.2

公端连接器
Male PV Connector

图 5.1.3
Picture 5.1.3

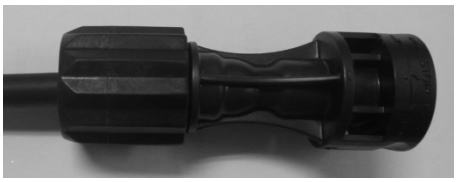


图 5.1.4
Picture 5.1.4

5.1.2) 锁紧螺帽
Tightening the back cap

UTX 连接器需用 3.5 N・m 到 4.0 N・m 的扭矩锁紧螺帽。
UTX PV connector back cap must be screwed up with a properly torque range from 3.5 to 4.0 N·m

UTX-XL 连接器用 4.0 N・m 到 4.5 N・m 扭矩锁紧螺帽。
UTX-XL PV connector back cap must be screwed up with a properly torque range from 4.0 to 4.5 N·m.

在锁紧螺帽时，不论是使用帽子还是本体进行连接器组装都不会影响连接器的功能,客户可以根据自己的组装工艺选择组装方式。
Whether the connectors were screwed by cap or body, there is no any effect on the functionality. Customer can choose the different screwed method according to their manufacturing processes..

以下是连接器通过本体或帽子组装时的受力面，如图 5.1.5 到图 5.1.8。
See the acting point when connector was screwed by body or cap, as below picture from 5.1.5 to picture 5.1.8

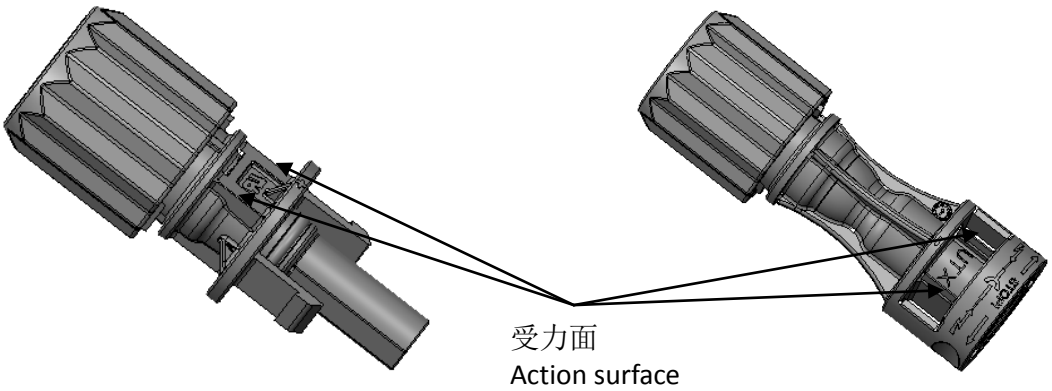


图 5.1.5
Picture 5.1.5

图 5.1.6
Picture 5.1.6

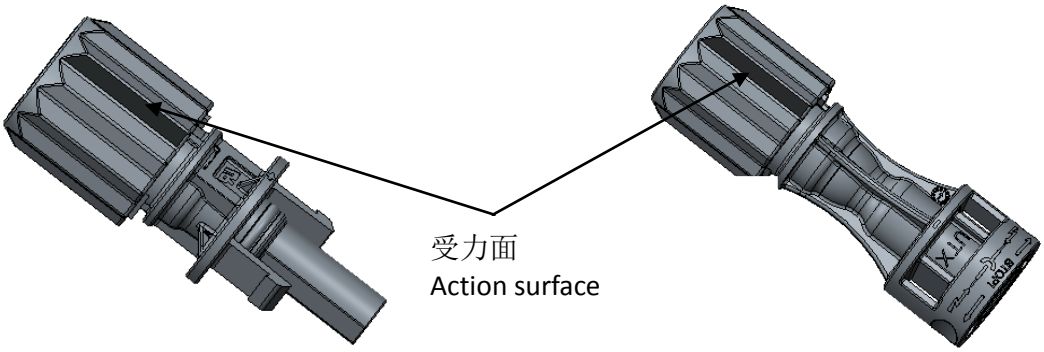


图 5.1.7
Picture 5.1.7

图 5.1.8
Picture 5.1.8

客户选择现场安装，可使用安费诺蓝色扳手(UTX 使用 UTXTWA001, UTX-XL 使用 UTXTWL001)组装连接器，如果客户使用机器组装连接器，可用安费诺专用连接器套筒(H4TTW100)进行组装，如图 5.1.9 及图 5.1.10。
Amphenol specified wrench tool (UTXTWA001 for UTX and UTXTWL001 for UTX-XL) can be used in this step or electric torque controlled wrench tool with as well as the Amphenol open-end back cap spanner (H4TTW1000). See below picture 5.1.9 and 5.1.10.

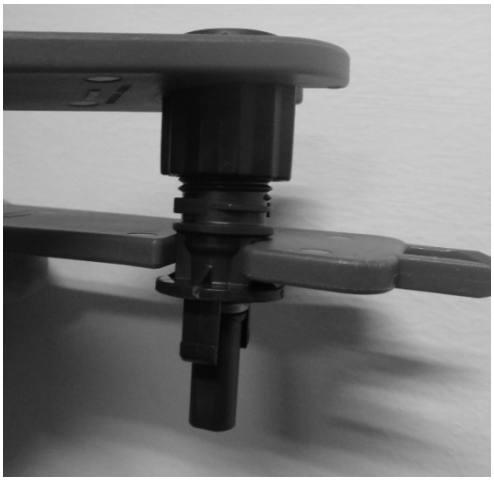


图 5.1.9
Picture 5.1.9

图 5.1.10
Picture 5.1.10

5.1.3) 备注：
Notes

1. UTX 连接器线材外径要求为 ø5.3mm 到 ø7.65mm，UTX-XL 连接器线材外径要求为 ø7.9mm 到 ø9.3mm。
The cable range of UTX PV connector is from ø5.3mm to ø7.65mm, UTX-XL is from ø7.9mm to ø9.3mm.

2.适用 UTX 连接器导线的线芯数为 19 到 105 根。
The number of conductor strands for UTX is from 19 to 105.

3.适用 UT-XL 连接器导线的线芯数为 19 到 84 根。
The number of conductor strands for UTX-XL is from 19 to 84.

4.扭矩要求只针对安费诺太阳能线材。不同的线材组装完成后都需达到 IP68 及拉力测试要求（无端子状态下吊重 20Lb，一分钟）。

These torque force apply to Amphenol PV cable only. The cable assembly should pass IP68 and Pullout test (20Lb, Min, without contact) which UTX and UTX-XL PV connector assembled with different PV cable.

5.线材线芯只能用铜线芯。
A statement that the conductor type is limited to copper wire only ("Copper" or "CU" are acceptable).

5.2) 连接器对插及解锁
Connector mating and un-mating

公端和母端连接器对插直到听到“滴“的卡位声说明对插到位。安费诺 UTX 连接器及 UTX-XL 连接器符合 NEC 2008 690.33 标准，所以需要工具进行解锁。
For mating, align the 2 half connectors and mate them together by hand until a “click” is heard and/or felt. For un-mating, since the Amphenol UTX and UTX-XL connector complies with the NEC 2008 690.33, a tool is required to disconnect the connector once mated.

安费诺蓝色扳手(UTX 使用 UTXTWA001，UTX-XL 使用 UTXTWL001)或万能解锁工具(H4TU0000)用于安费诺 UTX 系列连接器的解锁，如图 5.2.1 及图 5.2.2。
Amphenol specified wrench tool (UTXTWA001 for UTX and UTXTWL001 for UTX-XL) or Universal tool (H4TU0000) should be used in this step. See below picture 5.2.1 and 5.2.2.

蓝色扳手解锁
WRENCH TOOL DISCONNECT

图5.2.1
Picture 5.2.1

万能解锁工具解锁
UNIVERSAL TOOL DISCONNECT

图5.2.2
picture 5.2.2

6. 电缆状态:
Cable routing

电缆根部建议保留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，如图6.1和图6.2。
In order to avoid the cable bend force lead to a visible deformation in the sealing portion of the insulation, the cable need keep at least 20mm straight length. See picture 6.1 and 6.2.

电缆最小弯曲半径请参考电缆生产厂商详细要求。

Refer to cable manufacturer’s specification for minimum bending radius.

图 6.1

Picture 6.1

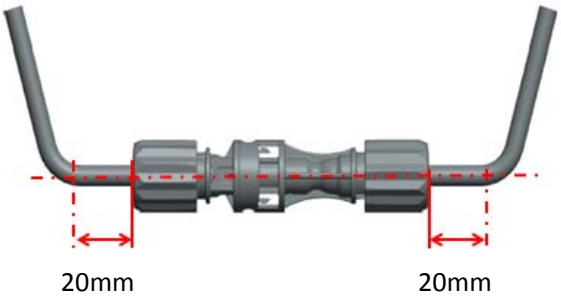


图 6.2

Picture 6.2

更新记录
REVISION RECORD

版本 REV	描述 DESCRIPTION	日期 DATE
A	首次发行 FIRST RELEASE	May/13/2014
B	UTX-XL 信息更新 Update information for UTX-XL	Aug/19/2014
C	UTX和UTX-XL 信息更新 Update information for UTX and UTX-XL	AUG/15/2015
D	更新压接规范 Update the crimping specification	Dec/4/2015

Amphenol Industrial Operations
40-60 Delaware Avenue
Sidney, NY 13838-1395
USA
Tel: 1-520-285-5114 1-888-364-9011
Fax: 1-520-397-7169

Amphenol Industrial Operations Europe
Via Barbaiana 5
I-20020 Lainate (MI)
ITALY
Tel: +39 02 93254.204
Fax:+39 02 93254.444

Amphenol Middle East Enterprises FZE
Office C-37 PO Box 21107
Ajman Free Zone
UAE
Tel: +9716-7422494
Fax:+9716-7422941

Amphenol Technology Shenzhen Ltd
Building C, 2nd Industrial Zone of Xia Shi Jia,
Jiangshi Community, Gongming Sub-district,
Guangming New District, Shenzhen, PRC
CHINA
Tel: +86 755 2881 8389
Fax:+86 755 2991 831