

Amphenol

太阳能连接器UTX线端系列安装手册

PV Connector UTX cable Series Instruction Manual



UTX 线端连接器
UTX PV CABLE CONNECTOR

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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) 安费诺不承担对于未依照此安装手册要求安装而产生的任何责任。

Amphenol declines any liability in the event of failure to comply with this assembly instructions.



9) UTX连接器沿其轴向可承受最小44Lb测试拉力，但是不能长时间施加外力在连接器上。如图1.1所示。但不可使用如图1.2所示非轴向力来拉连接器。

The UTX can withstand the pull force 44Lbs MIN., But can't apply external force on the connector for a long time along the direction of picture 1.1 shows at the coupling interface. The force as shown in picture 1.2 shows is forbidden.



图1.2
Picture 1.1



图1.2
Picture 1.2



10) 那些可与Amphenol零件相匹配, 非Amphenol原厂的连接器以及有时被称为可与“Amphenol兼容”的连接器, 它们不符合安全长期稳定的电气要求, 并且出于安全方面的考虑, 不允许它们与Amphenol零件连接.如果这些连接器 (未经Amphenol认证) 与Amphenol零件连接并产生损害, 对此我们不承担任何责任。

Connectors not made by Amphenol which can be mated with Amphenol elements and in some cases are also described as “Amphenol-compatible” do not conform to the requirements for safe electrical connection with long-term stability, and for safety reasons must not be plugged together with Amphenol elements .Amphenol can therefore accept no liability for damage which occurs as a result of mating these connectors which lack Amphenol approval with Amphenol elements.



11) 安费诺已知接触或使用化学品可能引起产品被污染, 腐蚀, 导致产品性能的衰减、或出现产品开裂的情形, 禁止这些化学品与产品接触
见文件: WI -S047-ENG Rev.B。

A warning to our customers and users of product to prevent exposure of the chemicals to our product. These chemicals may cause corrosion, degradation of performance, or cracking of product and might lead to potential safety issues in applications. See file: WI -S047-ENG Rev.B。

2.技术参数:

Technical data

额定电压: Electrical rating	1500V DC (UL/TUV/JET)		
额定电流: Current rating	TUV (IEC 62852, 85℃) JET: UL (UL 6703):	25A (2.5mm ² / 14 AWG) / 30A (14 AWG) / 15A (14AWG)	35A (4mm ² / 12 AWG) / 40A (12 AWG) / 20A (12AWG)
保护等级: Protection degree:	连接器互配状态IP68 ,连接器分离状态 IP2X IP68 mated and IP2X unmated		
安全等级: Safety class	II		
可使用温度范围: Operation Temperature Range	-40℃ to +90℃		
持证方: License holder	Amphenol Industrial Operations		
地址: Full Address	40-60 Delaware Avenue, Sidney, New York State 13838-1395, USA		
制造商: Producer	Amphenol Technology (Shenzhen) Co.,Ltd		
电话: Telephone	+86-755-29918389		

3.工具及应用

Tools & application

3.1)工具:

Required tools

机加工端子压接钳:

Crimp tool for cold forming contact
4.0mm² (12AWG)到10.0mm²(8AWG)端子
2.5mm²(14AWG)到6.0mm²(10AWG)端子
for 4-10mm² / 2.5-6.0mm² contact



UTXTC0004
UTXTC0005

冲压端子压接钳:

Crimp tool for stamping forming contact:
2.5(14AWG)到6.0平方(10AWG)端子
from 2.5(14AWG)to 6.0 mm² (10AWG)



UTXTC0003

剥线钳 (2.5/4.0/6.0mm²光伏线) :

Strip tool for 2.5/4/6mm² PV cable



H4TS0000

端子深度探测工具

Contact depth inspection tool



UTXTT0001

母端防尘帽:

Female protect caps



UTXPF

公端防尘帽:

Male protect caps



UTXPM

机加工端子钳口:

Crimping die for cold forming contact:
4.0mm² (12AWG)到10.0mm²(8AWG)端子
2.5mm²(14AWG)到6.0mm²(10AWG)端子
for 4-10mm² / 2.5-6.0mm² contact



UTXTD0004



UTXTD0005

冲压端子钳口:

Crimping die for stamping forming contact:
2.5(14AWG)到6.0平方(10AWG)端子
from 2.5(14AWG)to 6.0 mm² (10AWG)



UTXTD0003

UTX连接器蓝色扳手:

Wrench tool for UTX



UTXTWA001

UTX连接器套筒:

Open-end back cap spanner



H4TTW100

3.2) 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。注意不要伤及铜丝，见下图3.2.1到图3.2.3。
Amphenol specified strip tool (H4TS0000) can be used in this step. First adjust the stripper stopper, then put the cable in corresponding notch to strip the length of 7 ± 0.5 mm. Strip cable are careful not to nick conductors. See below pictures 3.2.1 to 3.2.3.



图 3.2.1
Picture 3.2.1



图 3.2.2
Picture 3.2.2

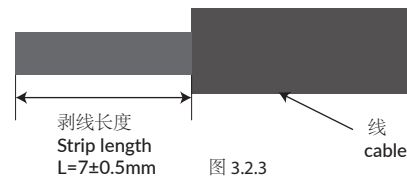


图 3.2.3
Picture 3.2.3

3.3) 机加工端子压接流程:

Cold Formed contacts' crimping process

使用安费诺压线钳(UTXTC0004/ UTXTC0005)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3.3.1到3.3.5。压接后端子电缆拔出力要求需要满足表3.3.1。
Amphenol specified crimp tool (UTXTC0004/ UTXTC0005) can be used in this step. Insert striped cable into contact barrel and insure all conductor strands are captured in the contact barrel and the conductors are 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 4.3.1 to 4. 3.5. The pull-out forces have to meet below table 4.3.1 requirement.

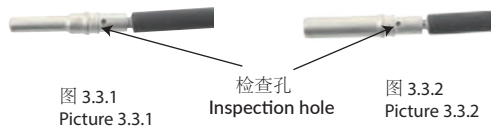


图 3.3.1
Picture 3.3.1

检查孔
Inspection hole

图 3.3.2
Picture 3.3.2

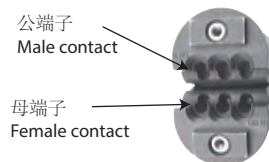


图 3.3.3
Picture 3.3.3



图 3.3.4
Picture 3.3.4



端子压接好后的效果见图3.3.6及图3.3.7。
See below pictures 4. 3.6 and 4.3.7 for crimping result.

图 3.3.5
Picture 3.3.5

位置 Position	电缆规格 Cable size	电缆拔出力要求 Cable pull-out force
1	14AWG/2.5 mm ²	Min. 223 N
2	12AWG/4.0 mm ²	Min. 312 N
3	10AWG/6.0 mm ²	Min. 356 N
3	8AWG/10.0 mm ²	Min. 401 N
Compression Ratio(压缩比率): 60%≤ X ≤80%		

表格3.3.1
Table 3.3.1



图 3.3.6
Picture 3.3.6



图 3.3.7
Picture 3.3.7

3.4) 冲压端子压接流程:
Stamping & Forming contacts' crimping process

使用安费诺压接工具 (UTXTC0003)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，小心不要伤到定位翅膀，见图3.4.1至图3.4.5。压接后端子电缆拔出力要求需要满足表3.4.1要求，
Amphenol specified crimp tool (H4TC0003) 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 crimping die, Be careful for not hurting the locator wings. See below pictures 3. 4.1 to 3.4.5. The pull-out force should meet below table 3.4.1 requirement.



图 3.4.1
Picture 3.4.1



图 3.4.2
Picture 3.4.2



图 3.4.3
Picture 3.4.3



图 3.4.4
Picture 3.4.4

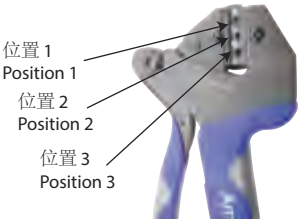


图 3.4.5
Picture 3.4.5

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

表格3.4.1
Table3.4.1

端子压接好后的效果见图3.4.6及图3.4.7。
See below pictures 3.4.6 and 3.4.7 for crimping result.



图 3.4.6
Picture 3.4.6



图 3.4.7
Picture 3.4.7

客户使用自动打端子机进行压接时, 建议的压接规范, 如下图及其表格3.4.2。
The customer wants to use the automatic crimping machine, we suggest that the contact crimping spec, as following the picture shown and table 3.4.2.



高度Height
宽度Width

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 mm ²	2.10±0.05mm	3.40±0.05mm
12AWG/4.0 mm ²	2.39±0.05mm	4.00±0.05mm
10AWG/6.0 mm ²	2.70±0.05mm	4.25±0.05mm
H/W Ratio(高度/宽度比率): 50%≤ X ≤75%		
Compression Ratio(压缩比率): 70%≤ X ≤90%		

表格4.4.2
Table 4.4.2

4. 组装流程:

Assembly process

4.1) 线端连接器安装

For Cable connector assembling

4.1.1) 线端连接器安装步骤

Cable connector assembling process

a)准备好线端连接器,如图4.1.1

Prepare the connectors, see picture 4.1.1

b)压接端子及插线

Crimped contacts with cable

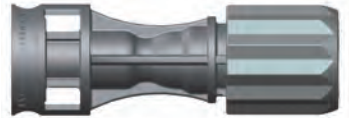
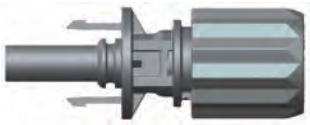


图4.1.1
Picture 4.1.1

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3.2到3.4), 见下图4.1.2到图4.1.5

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 crimping and cable stripping per tool application from 3.2 to 3.4). See below pictures 4.1.2 to 4.1.3.

母端连接器
Female connector



图4.1.2
Picture 4.1.2

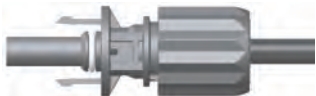


图4.1.3
Picture 4.1.3

公端连接器
Male Connector:



图4.1.4
Picture 4.1.4



图4.1.5
Picture 4.1.5

c) 端子检测
Contact of inspection

可通过端子探测工具确认端子是否插到位。连接器边缘要落在端子深度探测工具白色区域内。见下图4.1.6到图4.1.7。
Can use the contact depth inspection tool to confirm whether the contact is right seated or not. The edge of connector should be located within the white area of the contact depth inspection tool. See below picture 4.1.6 to 4.1.7.

母头连接器
For Female connector



白色区域
White area



公头连接器
For Male connector



图 4.1.6
Picture 4.1.6

连接器边需要在白色区域中间
Edge of connector should be in the middle of white area.



图 4.1.7
Picture 4.1.7

4.2) 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

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4.1.8。

See the acting point when connector was screwed by body or cap, as below picture 4 4.1.8



图4.1.8

Picture 4.1.8

客户选择现场安装，可使用安费诺蓝色扳手(UTXTWA001) 组装连接器。如果客户使用扭力扳手组装连接器，可用安费诺专用连接器套筒(H4TTW100)进行组装,如图4.1.9及图4.1.12。

Amphenol specified wrench tool (UTXTWA001)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 4.1.9 and 4.1.12.



图 4.1.9
Picture 4.1.9

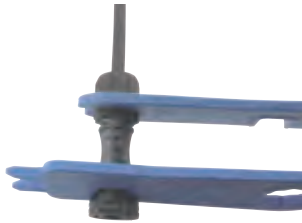


图 4.1.10
Picture 4.1.10

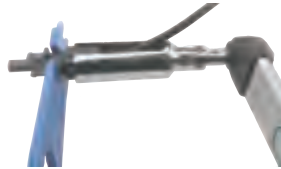


图 4.1.11
Picture 4.1.11



图 4.1.12
Picture 4.1.12

4.1.3) 备注: Notes

1. UTX连接器线材外径要求为 $\phi 5.3\text{mm}$ 到 $\phi 7.65\text{mm}$ 。

The cable range of UTX PV connector is from $\phi 5.3\text{mm}$ to $\phi 7.65\text{mm}$.

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.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).

4. 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.从2017年10月起，仅适用于EN50618认证的线材。

From October 2017 Only valid in connection with cables certified according EN50618

4.3.定货号 Ordering PN

连接器选型:

Connector order number:

How to Order a Connector (please choose one code per position, below)

Product Line	Product Type	Gender	Contact type	Cable Size		Certifications	Packaging	
UTX (H4 series)	C (Connector)	F Female	A Stamped and Formed contact (S&F)	0	Without Contact	A Dual TÜV / UL/ JET Certified	I	1 pc/bag
				2	2.5mm ² / 14AWG		C	100 pcs/bag
		M Male	B Cold Formed contact (CF)	4*	4.0mm ² /12 AWG & 6.0mm ² /10AWG(S&F) 4.0mm ² /12AWG(CF)			400 pcs/bag
				6	6.0mm ² / 10AWG		M	400 pcs/bag

卷装冲压端子选型:

Stamped and Formed contacts order number:

How to Order S&F contacts on Reels (please choose one code per position, below)

Product Line	Product Type	Gender	Cable Size		Packaging	
UTX (UTX series)	F (S&F contact)	F Female	2	2.5mm ² / 14AWG	R	2000pcs/reel
		M Male	4	4.0mm ² /12 AWG & 6.0mm ² /10AWG		

Note: if ording contacts in 2000pcs/reel version, need to order contact and plastic housing seperately. Contact's ordering code refers to this table, plastic housing should be chosen as UTXCF0AM for female housing and UTXCMA0AM for male housing.

5. 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5.1和图5.2。

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 5.1 and 5.2.

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 of cable.



图 5.1
Picture 5.1



图 5.2
Picture 5.2

6. 连接器对插前防尘保护:

Connector dust protection before mating:

连接器安装过程中，如未能及时对插公母头连接器，需要用防尘帽（母头使用UTXPF，公头使用UTXPM）组装保护，以防止连接器内部被污染。如图6.1和图6.2。

In the process of connector assembly, the connect need be protected by dust cap (female end use UTXPF and male end use UTXPM) if connector can't be mated in time, so as to prevent the internal of connector be contaminated. See picture 6.1 and 6.2.



图 6.1
Picture 6.1



图 6.2
Picture 6.2

7. 存储注意事项:

Note on storage:

我们建议连接器零件的存储温度为-30℃--+60℃，相对湿度低于70%。连接器零件不能暴露在因直接降雨、冷凝等带来的水汽中。确保零件不能与酸、碱、瓦斯、丙酮或者任何其他会影响材料使用的化学物质接触。如果以上条件得到满足，连接器的零件存储时间长达两年时间。

We recommend that you store connector components at temperature between -30℃ to +60℃ and with a relative humidity of less than 70%. The components must not be exposed to moisture due to direct rainfall, condensation, etc. Ensure that the individual components do not come into contact with acids, alkalis, gases, acetone or any other chemical substance that could impact the materials use. If these conditions are met, the components can be stored for a maximum period of up to two years from the date of manufacture.



WARNING

警告

安费诺已知接触或使用以下化学品可能引起产品被污染，腐蚀，导致产品性能的衰减、或出现产品开裂的情形，禁止这些化学品与产品接触。

A warning to our customers and users of product to prevent exposure of the following chemicals to our product. These chemicals may cause corrosion, degradation of performance, or cracking of product and might lead to potential safety issues in applications.

Lists of all known chemicals:
已知化学品清单如下表:

Classify分类	Chemical Name化学品名称
Commonly used chemicals 常用化学品	Grease 黄油、Lubricate oil 润滑油、Rust inhibitors防锈剂、Stamping oil冲压油、Engine Oil机油、Banana Oil天那水、WD40、Insecticide杀虫剂、Oily sealing agent油性封孔剂、Doduconta B25 Kontaktol、Evabrite S、Virex TB强氧化性消毒剂、Suma Lima L3餐具清洗剂、Suma Rinse餐具清洗剂、Plasticizer增塑剂
Grease 脂类	Molykote EM-50L(Dow Corning)、Molykote PG-641(Dow Corning)
Oils 油类	Die Cut(OELHELD), Machine Oil KV46(Nippon Oil)
Mould Release Agent 脱模剂	Pelicoat S-6(Chukyo-Kasei)
Binder 粘合剂	Chemlok(LORD)
Alcohols 醇类	Isopropyl alcohol(IPA)乙丙醇
Fatty hydrocarbons 脂肪族化合物	Heptane庚烷、Hexane乙烷、Cyclohexane环己烷、Liquid paraffin液状石蜡
Acid,Alkali,Salt 酸碱类	Salt acid盐酸、Sulfuric acid 硫酸、Nitric acid硝酸、Phosphoric acid磷酸、Acetic acid醋酸、Ammonia氨气/氨水、Sodium hydroxide氢氧化钠
Halogenated hydrocarbon 族碳化合物	Freon氟利昂、Carbon tetrachloride四氯化碳、Trichloromethane氯仿/三氯化碳、Virex 256烷基二甲基氯化铵
Ketone 酮类	Acetone丙酮、Methyl ethyl ketone甲基乙基酮/丁酮
Aromatic Hydrocarbon 芳香族碳氢化合物	Toluene甲苯、Xylene二甲苯、Cresol甲酚
Other, Organic solvent 其他/有机溶剂	Ethyl acetate乙酸乙酯、Butyl acetate乙酸丁酯、Tributyl phosphate磷酸三丁酯、Kerosene煤油、Gasoline汽油、Varnish清漆、Esters酯类、Ethers醚类、Amines胺类、Glacial acetic acid冰醋酸
Adhesion sealant 粘合密封材料	APF125(Wacker Chemical)
Potting Material 填充材料	KE-200(ShinEtsu)、CX-200(ShinEtsu)

Remarks: Chemicals not listed in the above table (other oils & chemicals in manufacturing process & in solar farm sites), it is the responsibility of user to validation such chemicals not affect our product performance.

备注：对于不在此列表内的其他在生产制造过程和产品安装过程中可能接触或使用的化学品需用户自行确认对产品无影响后方可使用。

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