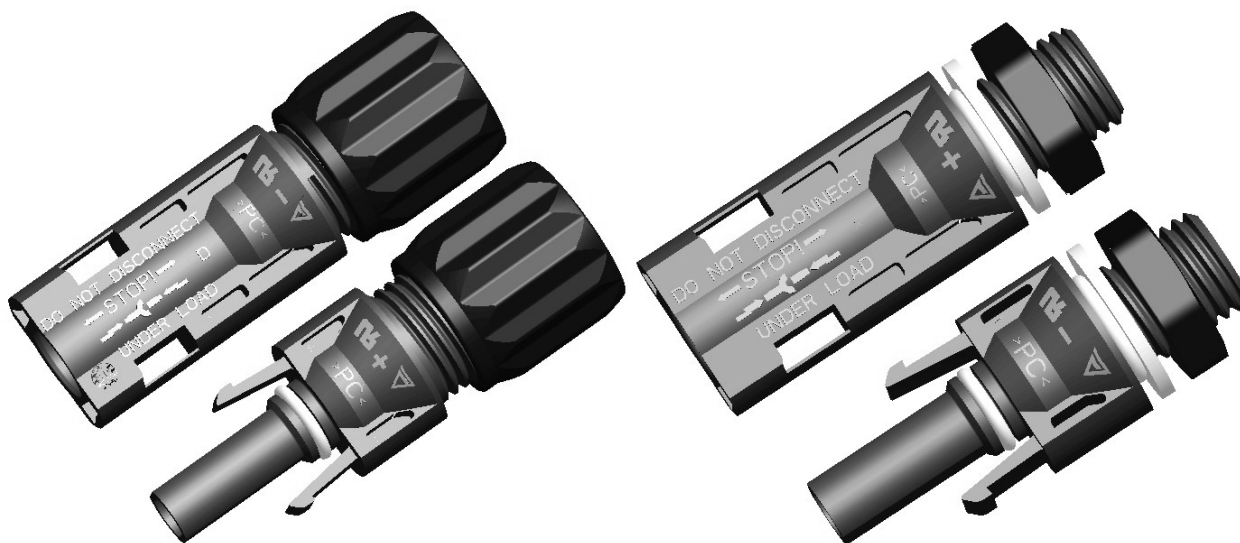
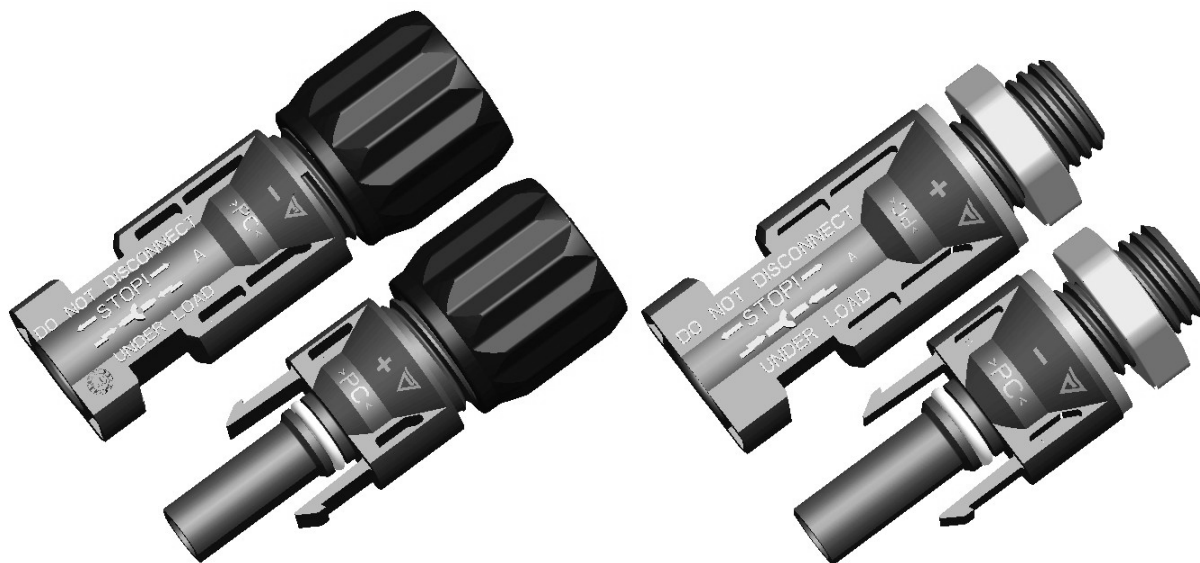


太阳能连接器H4系列

PV Connector H4 Series



H4 太阳能连接器
H4 PV CONNECTOR



H4-H 太阳能连接器
H4-H PV CONNECTOR

编制 (Prepared by) : Jimly Wu
日期 (Date) : 2015-12-03

审核 (Checked by) : Allen Wan
日期 (Date) : 2015-12-03

目 录
Table of Contents

| | | |
|---|-------|----|
| 1. 警告 Caution | ..... | 3 |
| 2. 技术参数 Technical data | ..... | 4 |
| 3. 产品信息 Product information | ..... | 4 |
| 3.1 产品图片 Product picture | ..... | 5 |
| 3.2 连接器料号 Connector part number | ..... | 6 |
| 3.3 卷装冲压端子料号 Stamping forming contact part number for reel | ..... | 6 |
| 4. 工具及应用 Tools & application | ..... | 7 |
| 4.1 工具 Tools | ..... | 7 |
| 4.2 剥线流程 Cable preparation and stripping process | ..... | 8 |
| 4.3 机加端子压接流程 Crimp process for cold forming contacts | ..... | 9 |
| 4.4 冲压端子压接流程 Crimp process for stamping forming contacts | ..... | 10 |
| 5. 组装流程 Assembly process | ..... | 13 |
| 5.1 线端连接器组装 For Cable connector assembling | ..... | 13 |
| 5.2 板端连接器组装 For bulkhead connector assembling | ..... | 16 |
| 5.3 连接器对插及解锁 Connector mating and un-mating | ..... | 17 |
| 6. 电缆状态 Cable routing | ..... | 18 |
| 7. 更新记录 Revision record | ..... | 19 |

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) 安费诺连接器配合状态符合IP68（水下1米一小时）密封性能。
The connectors are IP68 mated, 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) H4 系列连机器沿其轴向可承受最大 44LB 拉力, 如图 1.1 所示。但不可使用如图 1.2 所示非连接器轴向力来拉连接器。
The H4, H4-H and Enlarge H4 can withstand the pull force 44Lb MAX. along the direction of picture 11.1 shows at the coupling interface. The force like picture 1.2 shows is forbidden.



图 1.1
picture 1.1



图 1.2
picture 1.2

2. 技术参数:

Technical data

| | |
|-------------------|---|
| 额定电压 : | 1000V DC (IEC/TUV) |
| Electrical rating | 1500V DC (UL) |
| 额定电流: | TUV 31A @85°C; 29A @90°C; (2.5mm ² / 14 AWG) |
| Current rating | 42A @85°C; 39A @90°C; (4mm ² / 12 AWG) |
| | 53A @85°C; 49A @90°C; (6mm ² / 10 AWG) |
| | 65A @85°C; 65A @90°C; (10mm ² / 8 AWG) |
| | U L 15A (14 AWG) |
| | 20A (12 AWG) |
| | 30A (10 AWG) |
| | 50A (8 AWG) |

保护等级: 连接器互配状态IP68 ,连接器分离状态 IP2X
Protection degree: IP68 mated and IP2X unmated

安全等级: II
Safety class

可使用温度范围: -40°C to +90°C
Operation Temperature Range

持证方: Amphenol Industrial Operations
License holder

地址: 40-60 Delaware Avenue, Sidney, New York State 13838-1395, USA
Full Address

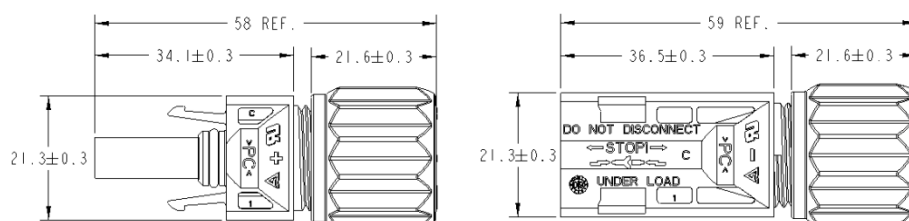
3. 产品信息

Product information

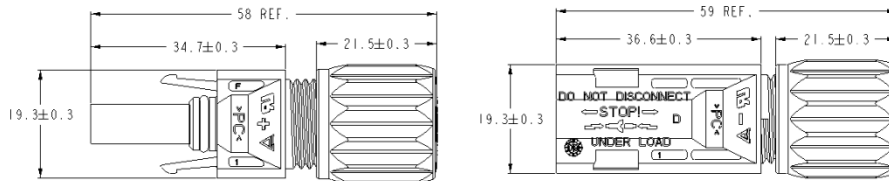
3.1) 产品图片:

Product pictures

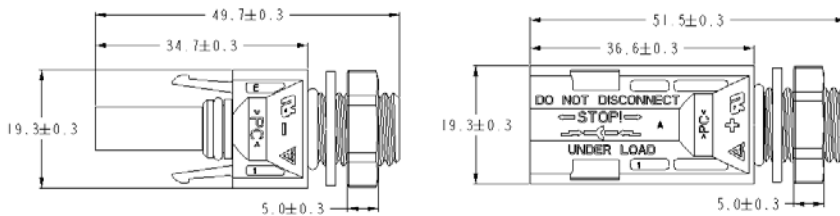
加大H4线端连接器 (TUV&UL双认证):
Enlarge H4 cable connector (TUV&UL DUAL APPROVALS)



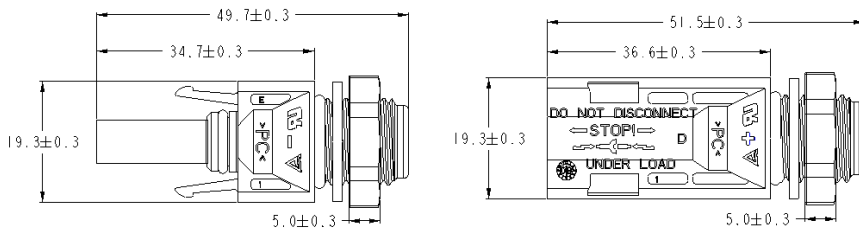
H4线端连接器 (TUV&UL双认证):
H4 cable connector (TUV&UL DUAL APPROVALS)



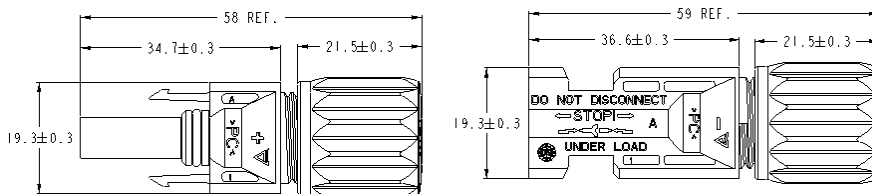
H4 M12板端连接器 (TUV&UL双认证):
H4 bulkhead M12 connector (TUV&UL DUAL APPROVALS)



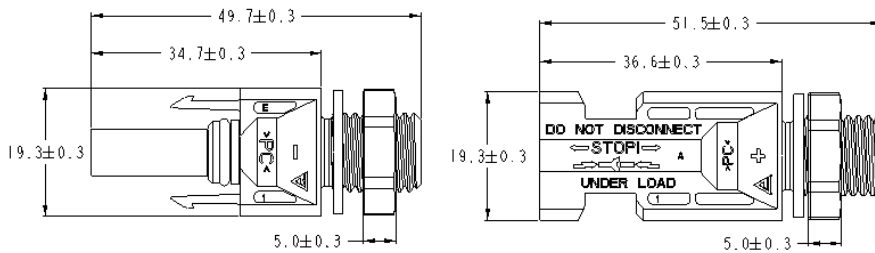
H4 M14板端连接器 (TUV&UL双认证):
H4 bulkhead M14 connector (TUV&UL DUAL APPROVALS)



H4-H线端连接器 (TUV单认证):
H4-H cable connector (TUV APPROVAL)



H4-H M12板端连接器 (TUV单认证) :
 H4-H bulkhead M12 connector (TUV APPROVAL)



3.2) 连接器料号:

Connector part number

| H4 Connector Part Number Logic Code | | | |
|---|--------------------------------------|---|---|
| Product Line H4 Helios H4 | Product Type C Connector | Gender F Female + M Male - P Mated pair | CONNECTOR TYPE C H4 cable connector M H4 bulkhead M12 N H4 bulkhead M14 B H4-H bulkhead M12 D H4-H cable gland E Enlarge H4 |
| CABLE SIZE 0 Less contacts 2 2.5 mm ² /14 AWG 4 4 mm ² /12 AWG(C&F) 4\6 mm ² /10\12 AWG(S&F) 5 4-6 mm ² /10&12 AWG 6 6 mm ² /10 AWG 8 10 mm ² /8 AWG | APPROVALS T TUV U UL D DUAL | PACKAGING I 800pcs/box and 1pcs bag C 1000pcs/box and 100pcs bag M 1000pcs/box and 500pcs/bag | VARIATIONS S Stamping Forming contact BLANK Cold Forming contact |

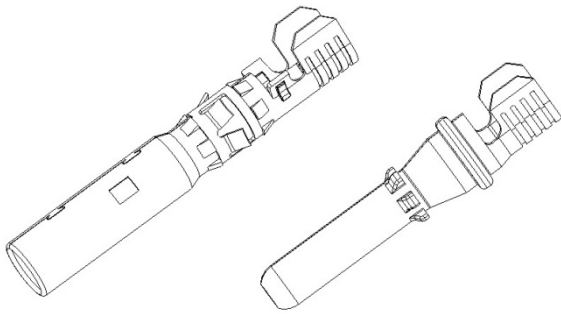
3.3) 卷装冲压端子料号:

Stamping forming contact part number for reel

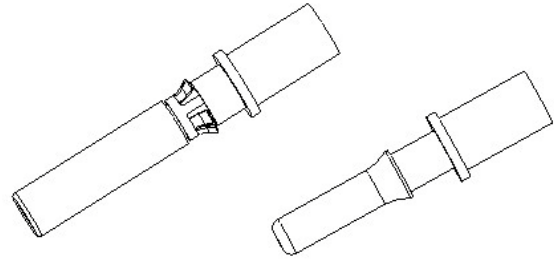
| H4 S&F Contact Part Number Logic Code(only for reel type) | | | |
|---|--|----------------------------------|--|
| Product Line H4 Helios H4 | Product Type F Stamping Forming contact | Gender F Female + M Male - | CABLE SIZE 2 1.5 mm ² /16 AWG 2.5 mm ² /14 AWG 4 4 mm ² /12 AWG 6 mm ² /10 AWG |
| PACKAGING 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:

Crimp tool for cold forming contact
(2.5/4.0/6.0/10mm²端子)
(for 2.5/4/6/10mm² contact)

H4TC0001



机加工端子钳口:

Crimping die for cold forming contact:
(2.5/4.0/6.0/10mm²端子)
(for 2.5/4/6/10mm² contact)

H4TD0001



冲压端子压接钳:

Crimp tool for stamping forming contact:
(2.5/4.0/6.0mm²端子)
(for 2.5/4/6mm² contact)

H4TC0002



冲压端子钳口:

Crimping die for stamping forming contact:
(2.5/4.0/6.0mm²端子)
(for 2.5/4/6mm² contact)

H4TD0002



剥线钳 (2.5/4.0/6.0mm²光伏线):

Strip tool for 2.5/4/6mm² PV cable

H4TS0000



H4&H4-H连接器蓝色扳手:
Wrench tool for H4&H4-H Cable connector

H4TW0001



加大H4连接器蓝色扳手:
Wrench tool for Enlarge H4 Cable connector

H4TW0004



H4&H4-H连接器套筒:
Open-end back cap spanner for H4&H4-H

H4TTW100



加大H4连接器套筒:
Open-end back cap spanner for Enlarge H4

H4TTW400



工具箱:
Complete tool kit for installers

H4TK0000



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 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 4. 2.1 to 4.2.3.



图 4.2.1
Picture4. 2.1



图 4.2.2
Picture 4.2.2

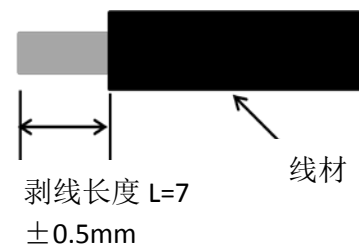


图 4.2.3
Picture4. 2.3

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(H4TC0001)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 及图 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 (H4TC0001) 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 and 4. 3.5 . The pull-out forces have to meet below table 4.3.1 requirement.

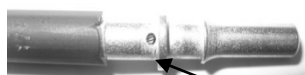


图 4.3.1
Picture4. 3.1



图 4.3.2
Picture4. 3.2

检查孔
Inspection hole

公端子
Male contact

母端子
Female contact

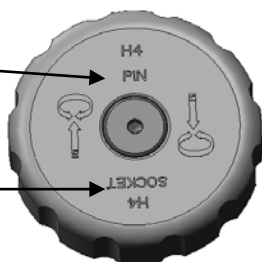


图 4.3.3
Picture4. 3.3



图 4.3.4
Picture 4.3.4

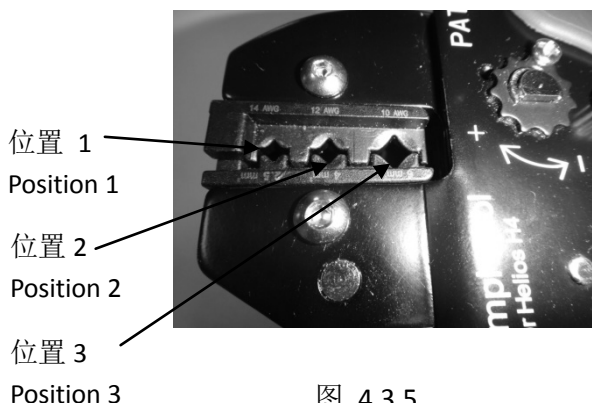


图 4.3.5
Picture 4.3.5

| 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 |

表格 4.3.1
Table4. 3.1

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.

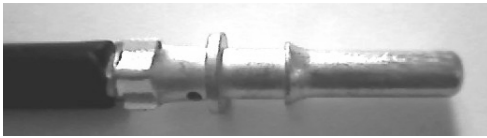


图 4.3.6

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 (H4TC0002)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 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 (H4TC0002) 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 4. 4.1 to 4.4.5. The pull-out force should meet below table 4.4.1 requirement.



图 4.4.1

Picture 4.4.1



图 4.4.2

Picture 4. 4.2

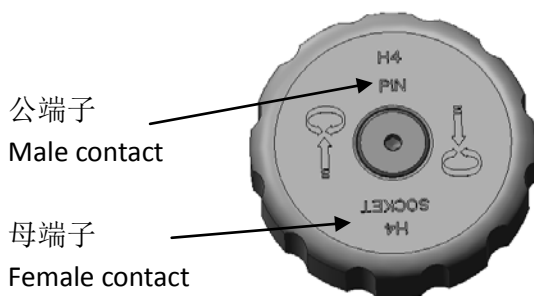


图 4.4.3

Picture 4.4.3



图 4.4.4

Picture 4.4.4

位置 1
Position 1
位置 2
Position 2
位置 3
Position 3

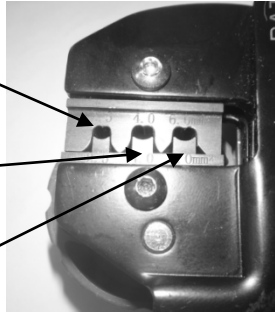


图 4.4.5
Picture 4.4.5

| 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. 223N |
| 2 | 12AWG/4.0 mm ² | Min. 312 N |
| 3 | 10AWG/6.0 mm ² | Min. 356 N |

表格 4.4.1
Table 4.4.1

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.

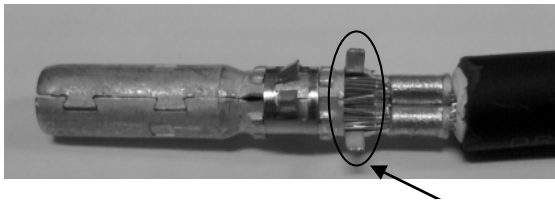


图 4.4.6
Picture 4.4.6

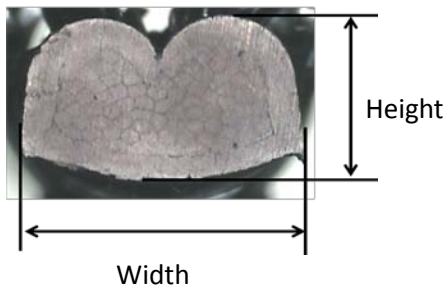
定位翅膀(不可被压接)
Locator wings should not be crimped



图 4.4.7
Picture 4.4.7

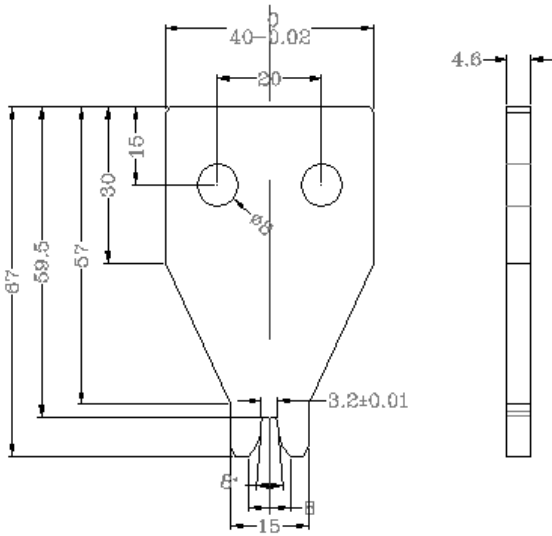
客户使用自动打端子机进行压接时, 建议的压接规范如表格 4.4.2,压接刀模尺寸要求如下图 4.4.8 到图 4.4.13(单位: mm),

The customer wants to 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 pictures 4.4.13 (Unit: mm).



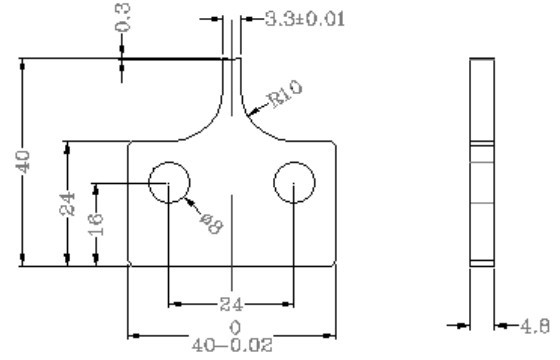
| 电缆规格 Cable Size | 铆接高度(A) Crimping Height(A) | 铆接宽度(B) Crimping Width(B) |
|---------------------------|-------------------------------|------------------------------|
| 14AWG/2.5 mm ² | 2.10±0.05mm | 3.40±0.10mm |
| 12AWG/4.0 mm ² | 2.39±0.05mm | 4.00±0.10mm |
| 10AWG/6.0 mm ² | 2.70±0.05mm | 4.25±0.10mm |
| H/W Ratio(高度/宽度比率): | | 50% ≤ X ≤ 75% |
| Compression Ratio(压缩比率): | | 70% ≤ X ≤ 90% |

表格 4.4.2
Table 4.4.2



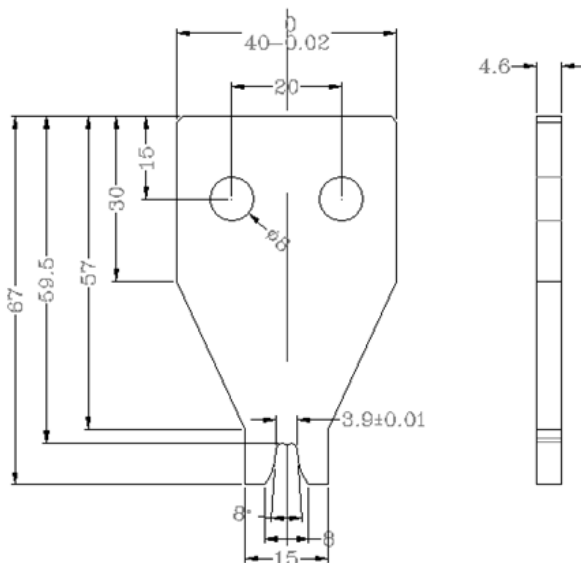
2.5mm²/14AWG 上刀模
2.5mm²/14AWG Up Blade

图4.4.8
Picture 4.4.8



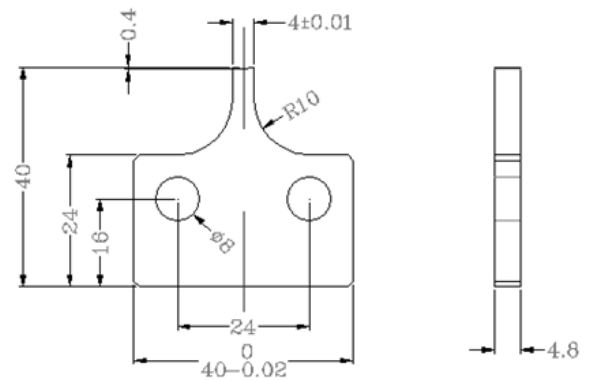
2.5mm²/14AWG 下刀模
2.5mm²/14AWG Down Blade

图 4.4.9
Picture 4.4.9



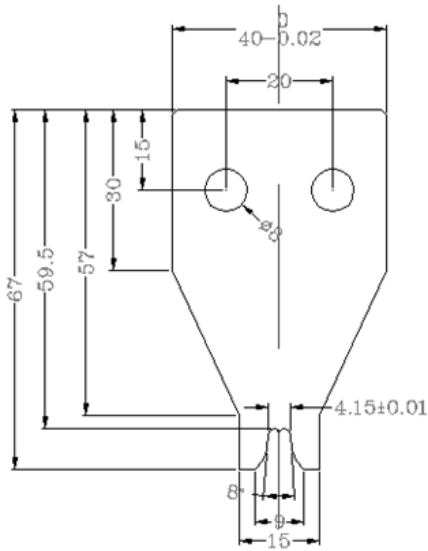
4.0mm²/12AWG 上刀模
4.0mm²/12AWG Up Blade

图 4.4.10
Picture 4.4.10



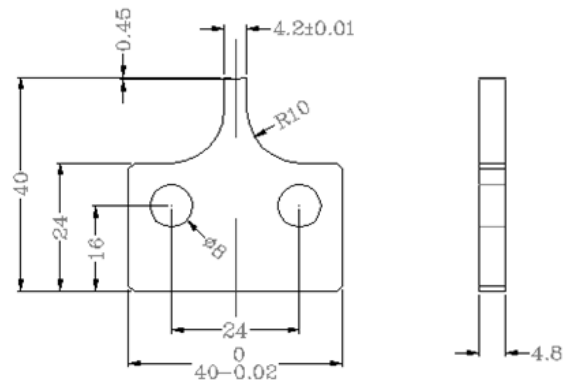
4.0mm²/12AWG 下刀模
4.0mm²/12AWG Down Blade

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 assembling

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的应用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 4.2 to 4.4) See below pictures 5.1.1 to pictures 5.1.4.

母端连接器

Female connector:



图5.1.1
Picture 5.1.1

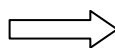


图 5.1.2
Picture 5.1.2

公端连接器

Male Connector:



图 5.1.3

Picture 5.1.3

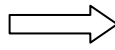


图 5.1.4

Picture 5.1.4

5.1.2) 锁紧螺帽

Tightening the back cap

H4 及 H4-H 连接器锁紧螺帽的扭矩: 2.6 N·m 到 2.9 N·m。

H4 and H4-H connector back cap must be screwed up with a properly torque range 2.6 to 2.9 N·m.

加大 H4 连接器锁紧螺帽的扭矩: 3.2 N·m 到 3.5 N·m。

Enlarge H4 connector back cap must be screwed up with a properly torque range 3.2 to 3.5 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和帽子组装时的受力面, 如图 5.1.5

See the acting point when connector was screwed by body and cap, as below picture 5.1.5

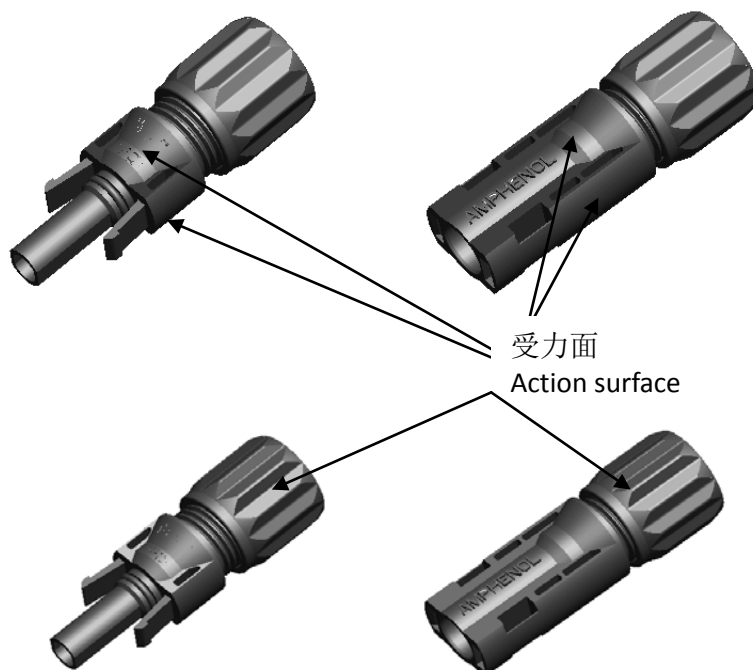


图 5.1.5

Picture 5.1.5

客户在现场安装时，可使用安费诺蓝色扳手(H4 和 H4-H 使用 H4TW0001,Enlarge H4 使用 H4TW0004)组装连接器，客户用机器组装连接器时，可使用安费诺专用连接器套筒进行组装(H4 和 H4-H 使用 H4TTW100，加大 H4 使用 H4TTW400)如图 5.1.6 及图 5.1.7。

Amphenol specified wrench tool (H4TW0001 for H4&H4-H and H4TW0004 for Enlarge H4) can be used in this step or electric torque controlled wrench tool with as well as the Amphenol open-end back cap spanner (H4TTW100 for H4&H4-H and H4TTW400 for Enlarge H4). See below picture 5.1.6 and 5.1.7.

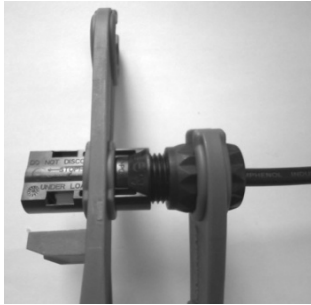


图 5.1.6

Picture 5.1.6

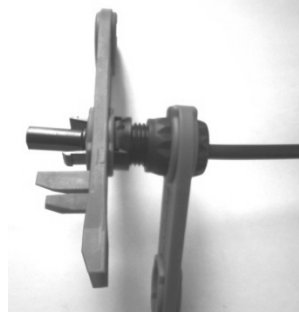


图 5.1.7

Picture 5.1.7

5.1.3) 备注:

Notes

- 1> H4 及 H4-H 连接器线材外径要求为 $\phi 4.5\text{mm}$ 到 $\phi 7.8\text{mm}$ ，加大 H4 连接器线材外径要求为 $\phi 7.6\text{mm}$ 到 $\phi 9.3\text{mm}$ 。
The cable range of H4 and H4-H connector is from $\phi 4.5\text{mm}$ to $\phi 7.8\text{mm}$, Enlarge H4 connector is from $\phi 7.6\text{mm}$ to $\phi 9.3\text{mm}$.
- 2> 适用 H4 及 H4-H 连接器导线的线芯数为 7 到 140 根，适用加大 H4 连接器导线的线芯数为 19 到 77 根。
The number of conductor strands for H4 and H4-H is from 7 to 140. The number of conductor strands for Enlarge H4 is from 19 to 77.
- 3> 扭矩要求只针对太阳能线材。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, 1Min, without contact) which H4, H4-H and Enlarge H4 PV connector assembled with different PV cable.
- 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).

5.2) 板端连接器安装

For Bulkhead connector assembling

5.2.1) 板端安装

Panel mounting

不论是水平安装还是垂直安装，孔间距最小要求25mm,面板壁厚最大5mm来安装连接器，并用1.1 N·m到1.4N·m扭矩扭紧螺母，如图5.2.1及图5.2.2 (单位: mm)。

Drill the box wall according to the illustration. For both horizontal and vertical mounting we recommend a minimum Distance X=25mm, the wall thickness need be 5mm MAX. The nut must be screwed up with a Properly torque range 1.1 to 1.4 N·m See below picture 5.2.1 to picture 5.2.2(unit: mm).

对于D型孔，使用扁平密封件进行密封；对于圆型孔，使用O型密封件加扁平密封件进行密封。

For the D-hole, we just only use the flat gasket for sealing. For the round hole, we use the O-ring and flat gasket for sealing.

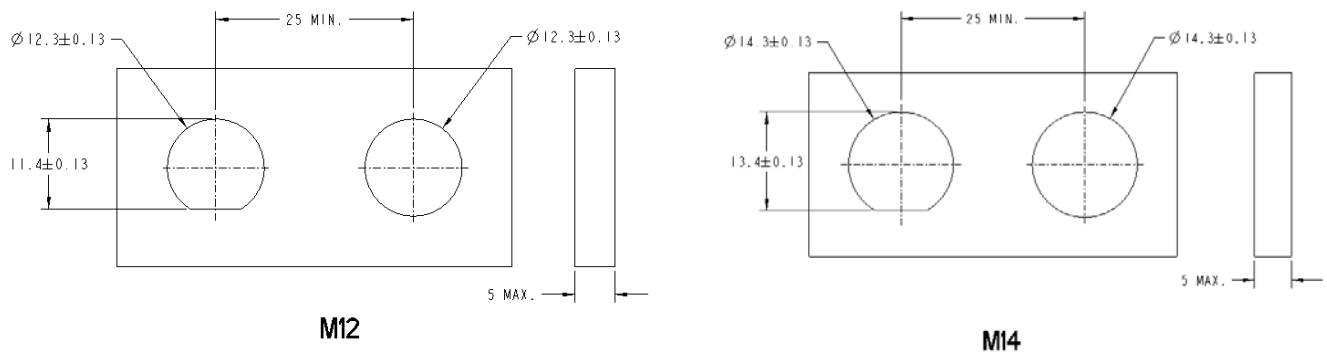


图5.2.1

Picture 5.2.1



图 5.2.2

Picture 5.5.2

5.2.2) 压接端子及插线

Crimped contacts with cable

将已打好端子的线材从连接器后端插入，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的应用4.2到4.4) 见下图5.2.3到图5.2.4

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.



图 5.2.3
Picture 5.2.3



图 5.2.4
Picture 5.2.4

5.3) 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 H4 连接器及加大 H4 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 H4 and Enlarge H4 connector complies with the NEC 2008 690.33, a tool is required to disconnect the connector once mated.

安费诺提供蓝色扳手(H4TW0001)和解锁工具(H4TU0000)用于安费诺 H4 系列连接器连接器的解锁，蓝色扳手(H4TW0004)用于加大 H4 连接器解锁，如图 5.3.1 及图 5.3.2。

Amphenol specified wrench tool (H4TW0001) or Universal tool (H4TU0000) should be used in this step for H4 series, and wrench tool (H4TW0004) should be used for Enlarge H4. See below picture 5.3.1 and 5.3.2.

蓝色扳手解锁

WRENCH TOOL DISCONNECT



图5.3.1
Picture 5.3.1

万能解锁工具解锁

UNIVERSAL TOOL DISCONNECT



图5.3.2
picture 5.3.2

H4-H 连接器可直接用手打开。

The H4-H can be disconnected by hand.

6. 电缆状态:

Cable routing

电缆根部建议保留 20mm 未折弯长度, 避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 of cable.



图 6.1
picture 6.1

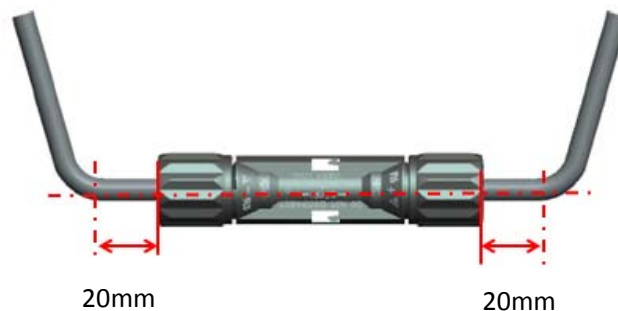


图 6.2
picture 6.2

7.更新记录

REVISION RECORD

| 版本 REV | 内容 DESCRIPTION | 日期 DATE |
|-----------|---|--------------|
| A | 初次发行 FIRST RELEASE | July/28/2011 |
| B | 更新排版 IMPROVED LAYOUT | Sep/6/2011 |
| C | 更新扭矩 UPDATE TORQUE | Nov/3/2011 |
| D | 增加冲压端子信息 UPDATE THE S&F REQUIREMENT | Dec/8/2011 |
| E | 增加加大H4连接器信息 ADD ENLARGE H4 CONNECTOR REQUIREMENT | July/24/2012 |
| F | 更新电气性能参数 UPDATE ELECTRIACL RATING | Aug/22/2013 |
| G | 更新压接尺寸 UPDATE CRIMPING DIMENSIONS | NOV/26/2013 |
| H | 增加组装工具料号 UPDATE ASSEMBLY TOOL PN | JAN/4/2014 |
| I | 增加板端连接器信息 ADD BULKHEAD CONNECTOR REQUIREMENT | NOV/17/2014 |
| J | 增加注释及线材要求 ADD ASSEMBLY NOTES AND CABLE ROUTING | Sep/20/2015 |
| K | ME更新冲压自动机的压接规范 ME UPDATE THE CRIMPING SPEC OF AUTOMATIC CRIMPING MACHINE | Dec/03/2015 |

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