

PL28X-301-XX-3-S 10.0 单芯弯插头组装规范 PL28X-301-XX-3-S 10.0 1POS Right Angle Plug Assembly Manual



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第一部分：产品介绍

Part 1：Introduction to products

1.1：料号信息 Part number information

PL28X-301-XX-3-M-S(LV216)

Key & Color

键位	Color
X 键	OR
Y 键	BK
U 键	YL
V 键	GN
W 键	RE
T 键	BL

高压互锁

0：无
1：有

HVIL

0：NO
1：WITH

Cable Size

mm2
50
70

G3 Connector

Blank: 96H Salt Spray
M: 500H Salt Spray
H: 720H Salt Spray

1.2：键位及颜色区分 Key and color differentiation

颜色不同 different colors

键位	A	B	C	D
X	84	108	108	156
Y	60	132	84	156
U	60	84	108	132
V	84	156	132	156
W	60	156	60	132
T	84	132	60	108

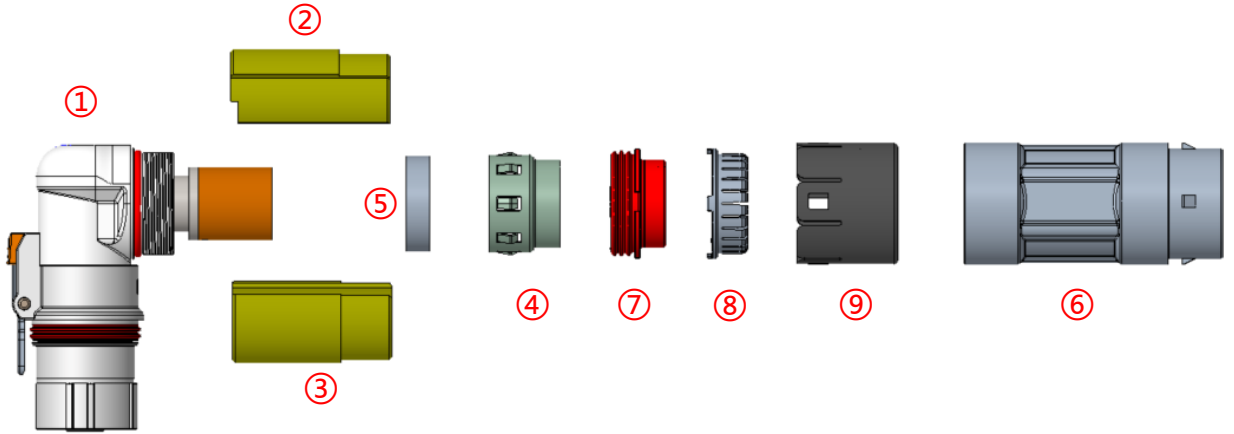
1.3：对配头型号 Mating receptacle: PL00(X)-30(1)-10XX-3

1.4：主要参数 Major Spec

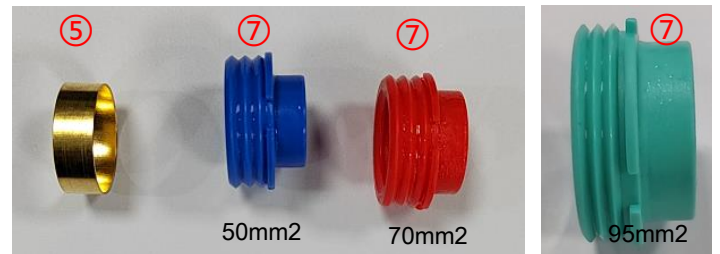
- 1.4.1 工作温度 Operating temperature: -40 °C ~+140°C
- 1.4.2 额定电压 Operating voltage: 1500 VDC
- 1.4.3 防护等级 Protection class: IP67 & IP68 & IP2X
- 1.4.4 带自动二次锁扣 Automatic secondary lock
- 1.4.5 尾部接线方向可正反转向90° Rotate function of wire
- 1.4.6 额定电流 Current rating(Connector Only):
50mm2-250A, 70mm2-300A, 95mm2-350A
- 1.4.7 详情请参照产品图 Please refer to the product drawing for details

第二部分：产品示意图

Part 2 : Exploded View



- ① 端子组件 Terminal assembly ×1
- ② 塑料绝缘筒1 Plastic insulated set-1 ×1
- ③ 塑料绝缘筒2 Plastic insulated set-2 ×1
- ④ 屏蔽环 Shielding Ring ×1
- ⑤ 压接环 Crimping Sleeve ×1
- ⑥ 后壳 Back Shell ×1
- ⑦ 密封圈 Seal ×1
- ⑧ 线夹 Wire Clip ×1
- ⑨ 尾盖 Tail Cover ×1



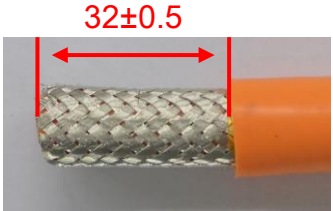
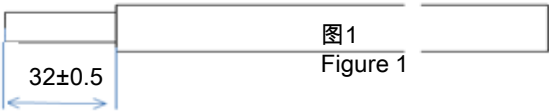
本文件中图例仅供参考，具体颜色与大小以实物为准。

The figure in this document is for reference only. The specific color and size are subject to actual objects.

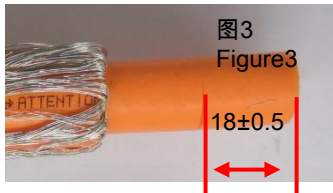
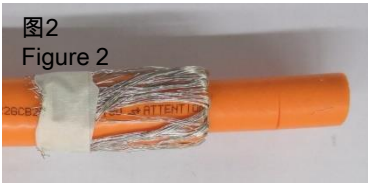
第三部分：插头组装 (50/70mm2)

Part 3: Plug Assembly(50/70mm2)

步骤1：选取合适线缆（参考手册最后的附录），按照要求的长度与数量切剥线，剥线尺寸如图1。
Step1：Select the right cable(refer to the appendix), cut and strip cables according to actual requirements, Strip dimension is shown in Figure 1.

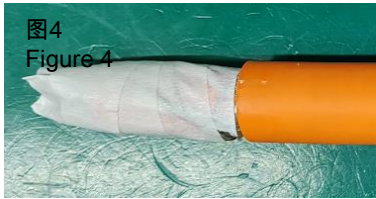


步骤2：将编织均匀打散如图2示反折固定在外被上。
Step2：Break the braiding evenly and fix the braid to the outer jacket as shown in Figure 2.



步骤3：按图3示尺寸剥芯线。
Step3：Strip the insulation as shown in Figure 3.

步骤4：将编织返回前端，用美纹纸固定如图4。
Step4：Return the braiding to the front end and secure it with the textured paper as shown in Figure 4.



步骤5：依次在线材上穿入配件如图5示。
Step5：Insert the accessories on the wire in turn as shown in the figure5.

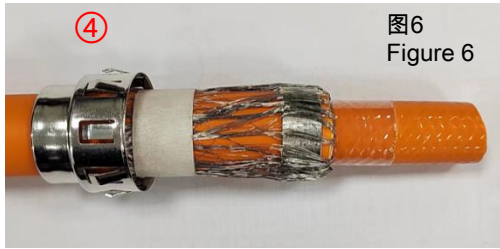


- ⑥ 后壳 Back Shell
- ⑤ 压接环 Crimping Sleeve
- ⑦ 密封圈 Seal
- ⑧ 线夹 Wire Clip
- ⑨ 尾盖 Tail Cover

注意配件方向
Note the direction of accessories

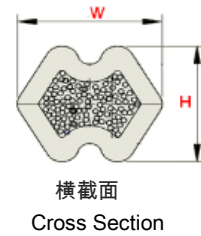
步骤6：将压接环推至齐外被口，编织均匀返折固定在其上，套上屏蔽环④如图6示。

Step6：Push the crimping ring to the end of jacket, Folded and fixed shielding on jacket evenly, then put on the shielding ring ④ as shown in Figure 6.



步骤7：将端子组件①穿入芯线上，调试好端子机，将端子紧靠外被压接好，压接刀模与压接高宽度、拉力等要求参照手册最后附表。

Step7：Insert the terminal assembly ① into the conductor, Adjust the terminal machine, and crimp the terminal close to the jacket. The crimp die and crimp height, width and tension requirements refer to the appendix.



(1) 建议使用安费诺指定线材（型号详见手册后附录），如果客户选用其它电缆，请联系安费诺业务，协商订制零配件

Recommend to use assigned cable. (See appendix for details.) If you need to use customized cable, Please contact local sales for product extensions

(2) 压接高度和拉力需要配合压接截面的金相分析，客户才能判断压接质量合格，芯线压缩比要求为 80~90%。

Customers need to reconfirm cross section on crimping area and pull out force test to confirm the quality of crimp process, Terminal crimping must meet the compression ratio of conductor requirements: 80~90%.

(3) 横截面仅供参考（其他举例：等边六变形的横截形状），客户负责采购压接工具或刀模

Cross section only reference tooling geometry (other ex. Hexagon dimensions),customer will take liability for sourcing tools or dies

步骤8：在端子上卡入塑料绝缘筒1，再卡入塑料绝缘筒2。

Step8：Clamp the plastic insulated set-1 on the terminal, then clamp the plastic insulated set-2.

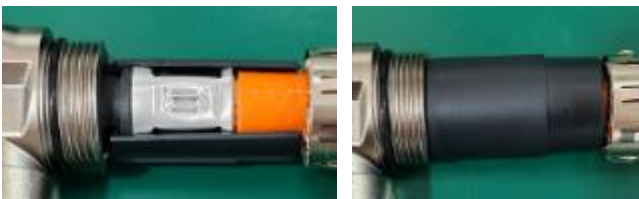


图8
Figure 8

步骤9：将压接环推到底并固定，再将屏蔽环推到底，散开编织，齐屏蔽环外沿将编织修剪整齐如图9示。

Step9：Push the crimping ring to the bottom and fix it, then push the shielding ring to the bottom, scatter the braid, and trim the braid to the outer edge of the shielding ring, as shown in Figure 9.



图9
Figure 9

步骤10：将压接环压紧在线材上，压接刀模与压接高度、拉力要求等参照表1，压接过程避免铜套移位。

Step10：Crimp the crimping sleeve on the cable, Crimp die and crimp height and pull force refer to Table 1. To avoid the shielding ring slide in the crimp process.

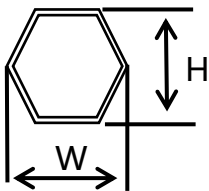


图10
Figure 10

表1：铜环压接规格&拉拔力要求

Table2：Copper Ring Crimping spec & retention force requirements

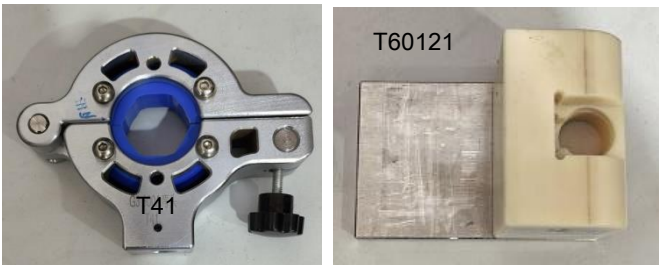
线材尺寸 Cable Size	压接模具 Crimp die	压接高度 Crimping height H(mm)	参考抗拉拔力 Retention Force
50mm2	BZW-6C	16.50±0.15	150N
70mm2	BZW-6C	18.90±0.15	150N

步骤11：将扭力设定为10~12N.m，将接头插入对配冶具固定，将扭力扳手箭头方向与拧紧方向一致，将接头后盖拧紧，拧紧时听到“咔”声响表示已拧到位。

Step11：Set the torque to 10~12N.m, insert the connector into the matching tool, and tighten the back shell of the connector in the same direction as the arrow of the torque wrench. When tightening, a click sound indicates that the connector is screwed into place.



图11
Figure 11



灰色镀层产品使用扳手头 T41，使用方法参照 8P1199

Gray coating products use wrench head T41, the use method refer to 8P1199

步骤12：将密封圈推到接头底部，再将线夹推至接头底部如图12示，也可以将线夹套在密封圈上用治具将其推到底。

Step12 : Push the seal to the bottom of the connector, and then push the wire clip to the bottom of the connector as shown in Figure 12, or you can put the wire clip on the seal and push it to the bottom of the connector with the fixture shown in Figure 12.



图12
Figure 12

步骤13：盖上尾盖如图13，完成组装，注意尾盖卡扣需完全装到位。

Step13 : Cover the tail cover as shown in Figure 13, complete the assembly, pay attention to the tail cover buckle should be fully installed in place.



图13
Figure 13



步骤14：建议客户参考下面的测试参数，对线束进行绝缘电阻测试和耐压测试。
Step14：Insulation resistance and dielectric withstand voltage tests are obligated to be done according to below test parameters to guarantee the good electric performance of the whole harness.

14-1 绝缘电阻测试
14-1 Insulation Resistance Test

Positions 位置	Test voltage/time 测试电压/时间	测试时间 (推荐) Test Time (recommended)	Insulation resistance 绝缘电阻
Cable(power) to shell 电缆芯线到壳体	1000 VDC	5S	> 500 MΩ
Cable(power) to HVIL 电缆芯线到高压互锁	1000 VDC	5S	> 500 MΩ
HVIL to shell 高压互锁到壳体	500 VDC	1S	> 100 MΩ

14-2 耐压测试
14-2 Dielectric Withstand Voltage Test

Positions 位置	Test voltage 测试电压	测试时间 (推荐) Test Time (recommended)	Leakage Current 漏电流
Cable(power) to shell 电缆芯线到壳体	5000 VDC	10S	< 5mA
Cable(power) to HVIL 电缆芯线到高压互锁	5000 VDC	10S	< 5mA
HVIL to shell 高压互锁到壳体	500 VDC	1S	< 5mA

14-3 推荐的测试对配头为PL00X-300-XX-3，测试用端子型号为AC-CP003073。
14-3 The recommended test connector is PL00X-300-XX-3, and the terminal PN for the test connector is AC-CP003073.

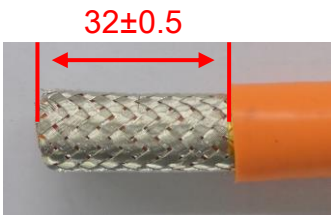
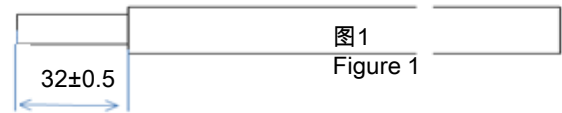
14-4 测试说明:
14-4 Test note:

警告:建议的电气测试及其参数应根据终端应用要求进行审查，以确保安全性并防止损坏其他部件。
提供的参数是基于连接器峰值1500VDC额定。提供的测试参数可能超出电缆组件或设备上使用的其他部件/材料的限制。
caution: Recommended electrical tests and their parameters should be reviewed against end application requirements to ensure safety and to prevent damage to other components. Parameters provided are based on the connectors and their peak 1500VDC rating. Test parameters provided may exceed the limit of other components/materials used on the cable assembly or device.

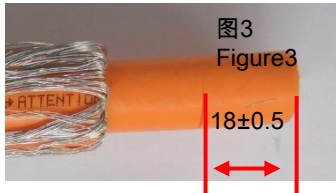
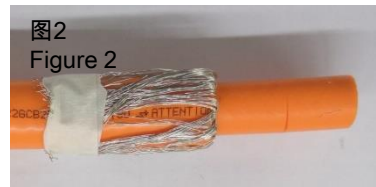
第四部分：插头组装 (95mm2)

Part 4: Plug Assembly(95mm2)

步骤1：选取合适线缆（参考手册最后的附录），按照要求的长度与数量切剥线，剥线尺寸如图1。
Step1：Select the right cable(refer to the appendix), cut and strip cables according to actual requirements, Strip dimension is shown in Figure 1.



步骤2：将编织均匀打散如图2示反折固定在外被上。
Step2：Break the braiding evenly and fix the braid to the outer jacket as shown in Figure 2.



步骤3：按图3示尺寸剥芯线。
Step3：Strip the insulation as shown in Figure 3.

步骤4：将编织返回前端，用美纹纸固定如图4。
Step4：Return the braiding to the front end and secure it with the textured paper as shown in Figure 4.



步骤5：依次在线材上穿入配件如图5示。
Step5：Insert the accessories on the wire in turn as shown in the figure5, Do not insert part ⑤ for 50mm2 product.

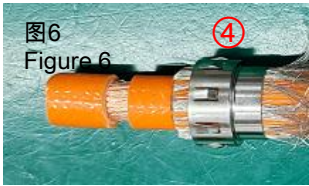


- ⑥ 后壳 Back Shell
- ⑤ 压接环 Crimping Sleeve
- ⑦ 密封圈 Seal
- ⑧ 线夹 Wire Clip
- ⑨ 尾盖 Tail Cover

注意配件方向
Note the direction of accessories

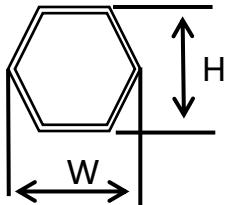
步骤6：将编织均匀返回在外被上，套上屏蔽环④如图6示。

Step6：Return the braiding to the outer jacket evenly, and then put on the shielding ring ④ as shown in Figure 6.



步骤7：将端子组件①穿入芯线上，调试好端子机，将端子紧靠外被压接好，压接刀模与压接高宽度、拉力等要求参照手册最后附表。

Step7：Insert the terminal assembly ① into the conductor, Adjust the terminal machine, and crimp the terminal close to the jacket. The crimp die and crimp height, width and tension requirements refer to the appendix.



(1) 建议使用安费诺指定线材（型号详见手册后附录），如果客户选用其它电缆，请联系安费诺业务，协商订制零配件

Recommend to use assigned cable. (See appendix for details.) If you need to use customized cable, Please contact local sales for product extensions

(2) 压接高度和拉拔力需要配合压接截面的金相分析，客户才能判断压接质量合格, 芯线压缩比要求为 80~90%。

Customers need to reconfirm cross section on crimping area and pull out force test to confirm the quality of crimp process,

Terminal crimping must meet the compression ratio of conductor requirements: 80~90%.

(3) 横截面仅供参考（其他举例：等边六变形的横截形状），客户负责采购压接工具或刀模

Cross section only reference tooling geometry (other ex. Hexagon dimensions),customer will take liability for sourcing tools or dies

步骤8：在端子上卡入塑料绝缘筒1，再卡入塑料绝缘筒2，最后将屏蔽环前推到底至绝缘筒上如图8所示，此时间隙约1mm，注意移动时不可使编织跟着移动。

Step8：Clamp the plastic insulated set-1 on the terminal, then clamp the plastic insulated set-2, and finally push the shielding ring to the bottom of the insulation set, as shown in Figure 8. At this time, the gap is about 1.5mm, pay attention to do not make the braiding move when moving the ring.



图8
Figure 8

步骤9：将编织反折在屏蔽环上，剪留5+/-1mm，套上压接环如图9示。

Step9：Fold the braid over the shielding ring, trim to 5+/-1mm, and cover it with the crimping ring as shown in Figure 9, Refer to Figure 9-1 for 50mm2 products process.



图9
Figure 9

步骤10：将压接环压紧在线材上，压接刀模与压接高度、拉力要求等参照表1，压接过程避免铜套移位。

Step10：Crimp the crimping sleeve on the cable, Crimp die and crimp height and pull force refer to Table 1. To avoid the shielding ring slide in the crimp process.

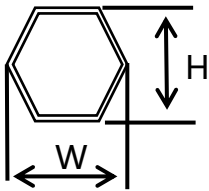


图10
Figure 10

表1：铜环压接规格&拉拔力要求

Table2：Copper Ring Crimping spec & retention force requirements

线材尺寸 Cable Size	压接模具 Crimp die	压接高度 Crimping height H(mm)	参考抗拉拔力 Retention Force
95mm2	BZW-6C	22.30±0.15	150N

步骤11：将扭力设定为10~12N.m，将接头插入对配冶具固定，将扭力扳手箭头方向与拧紧方向一致，将接头后盖拧紧，拧紧时听到“咔”声响表示已拧到位。

Step11：Set the torque to 10~12N.m, insert the connector into the matching tool, and tighten the back shell of the connector in the same direction as the arrow of the torque wrench. When tightening, a click sound indicates that the connector is screwed into place.



图11
Figure 11



灰色镀层产品使用扳手头 T41，使用方法参照 8P1199

Gray coating products use wrench head T41, the use method refer to 8P1199

- 步骤12：将密封圈推到接头底部，再将线夹推至接头底部如图12示，也可以将线夹套在密封圈上用治具将其推到底。
- Step12：Push the seal to the bottom of the connector, and then push the wire clip to the bottom of the connector as shown in Figure 12, or you can put the wire clip on the seal and push it to the bottom of the connector with the fixture shown in Figure 12.



图12
Figure 12

- 步骤13：盖上尾盖如图13，完成组装，注意尾盖卡扣需完全装到位。
- Step13：Cover the tail cover as shown in Figure 13, complete the assembly, pay attention to the tail cover buckle should be fully installed in place.



图13
Figure 13



步骤14：建议客户参考下面的测试参数，对线束进行绝缘电阻测试和耐压测试。
Step14：Insulation resistance and dielectric withstand voltage tests are obligated to be done according to below test parameters to guarantee the good electric performance of the whole harness.

14-1 绝缘电阻测试
14-1 Insulation Resistance Test

Positions 位置	Test voltage/time 测试电压/时间	测试时间 (推荐) Test Time (recommended)	Insulation resistance 绝缘电阻
Cable(power) to shell 电缆芯线到壳体	1000 VDC	5S	> 500 MΩ
Cable(power) to HVIL 电缆芯线到高压互锁	1000 VDC	5S	> 500 MΩ
HVIL to shell 高压互锁到壳体	500 VDC	1S	> 100 MΩ

14-2 耐压测试
14-2 Dielectric Withstand Voltage Test

Positions 位置	Test voltage 测试电压	测试时间 (推荐) Test Time (recommended)	Leakage Current 漏电流
Cable(power) to shell 电缆芯线到壳体	5000 VDC	10S	< 5mA
Cable(power) to HVIL 电缆芯线到高压互锁	5000 VDC	10S	< 5mA
HVIL to shell 高压互锁到壳体	500 VDC	1S	< 5mA

14-3 推荐的测试对配头为PL00X-300-XX-3，测试用端子型号为AC-CP003073。
14-3 The recommended test connector is PL00X-300-XX-3, and the terminal PN for the test connector is AC-CP003073.

14-4 测试说明:
14-4 Test note:

警告:建议的电气测试及其参数应根据终端应用要求进行审查，以确保安全性并防止损坏其他部件。
提供的参数是基于连接器峰值1500VDC额定。提供的测试参数可能超出电缆组件或设备上使用的其他部件/材料的限制。
caution: Recommended electrical tests and their parameters should be reviewed against end application requirements to ensure safety and to prevent damage to other components. Parameters provided are based on the connectors and their peak 1500VDC rating. Test parameters provided may exceed the limit of other components/materials used on the cable assembly or device.

线缆压接的参考规范
Reference specification for cable crimping

线缆料号 Cable PN	电线尺寸 Cable Size	导体结构 (mm) Conductor	导体外径 (mm) Conductor OD	电线外径 (mm) Wire OD	压接高度 H(mm) Crimping height	压接宽度 W(mm) Crimping Width	参考保持力 Retention Force	刀模编号 Crimping Tool No.
76H00189B	50mm²	1656*0.21 Max	10.5	15.5±0.3	12.7±0.3	17.05±0.3	2800N	TY-104
760000S0A	70mm²	2272*0.21 Max	12.50	17.8±0.4	12.25±0.3	17.1±0.3	3400N	TY-105
76H00335D	95mm²	2850*0.21 Max	14.80	20.5±0.4	13.4±0.3	15.45±0.3	4200N	BZW-6C



机器压接保压时间推荐为 2.5S
The recommended crimping holding time
for machine crimping is 2.5S

接头装配说明
Connector Installation instructions

- 1：接头对插与拨出方法参照 8P1248：PowerLok G3 接头通用安装说明。
For details about how to insert and remove the connector, see the 8P1248：PowerLok G3 Connector General Installation instructions.
- 2：线束固定要求参照8P1248：PowerLok G3 接头通用安装说明。
Wiring harness fixing requirements Refer to the 8P1248: PowerLok G3 Connector General Installation instructions.

参考文件
Reference Documents

- 1：IPC/WHMA-A-620D 线缆及线束组件的要求与验收。
IPC/WHMA-A-620D Requirements and Acceptance for cable and wire harness Assemblies.
- 2：端子拉力标准参照 IEC-60512-16-4。
Terminal tensile strength test refer to IEC-60512-16-4.
- 3：端子金相分析参照 SAE/USCAR-21 Rev 4。
The cross-section analysis is referred to SAE/USCAR-21 Rev 4.

版本记录 Revision history

序号 Number	变更内容 Content of change	日期 Date
00	新出试行版 New trial version	2024/03/20
01	增加实物颜色区分图片 Add real pictures to distinguish color	2024/05/31
02	更正电线外径 Correct the outside diameter of the wire	2024/07/03
03	剥芯线尺寸由19更改为18，剥外被尺寸由33更改为32 The insulation strip dimension is changed from 19 to 18, the jacket strip dimension is changed from 33 to 32	2025/04/09
04	增加测试用对配头及端子推荐 Add the recommended test connector and terminal	2025/06/03
05	增加95mm2产品 Add the 95mm2 product	2025/06/19



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