



Class 1

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1. SCOPE

This Specification contains the guidelines for the termination of wires to terminals by ultrasonic-weld. This specification applies to the automotive industry. In case of doubt the Chinese text is valid. Only valid in relation with specification 114-94391.

1. 内容

该文件为使用超声波焊接的端子和导线提供指导，并应用于汽车领域。
如有疑问，中文文本是有效的。仅与规范114-94391相关有效

2. REFERENCED DOCUMENTS

2. 参考资料

2.1. CUSTOMER DRAWING

with the dimensions and materials of the contacts.

2.1. 客户图

图面定义了端子的尺寸和材料

C-2401985(90°) & C-2400242(180°)

2.2. PRODUCT SPECIFICATION

2.2. 产品规格书

Refer to CSJ18 product specification 108-160469

2.3. NATIONAL / INTERNATIONAL STANDARDS

2.3. 本地和国际标准

LV216-2:2011 High-Voltage Shielded Electric Wiring in Motor Vehicles
114-94391 General Guideline for The Application of Ultrasonic Weld Connections

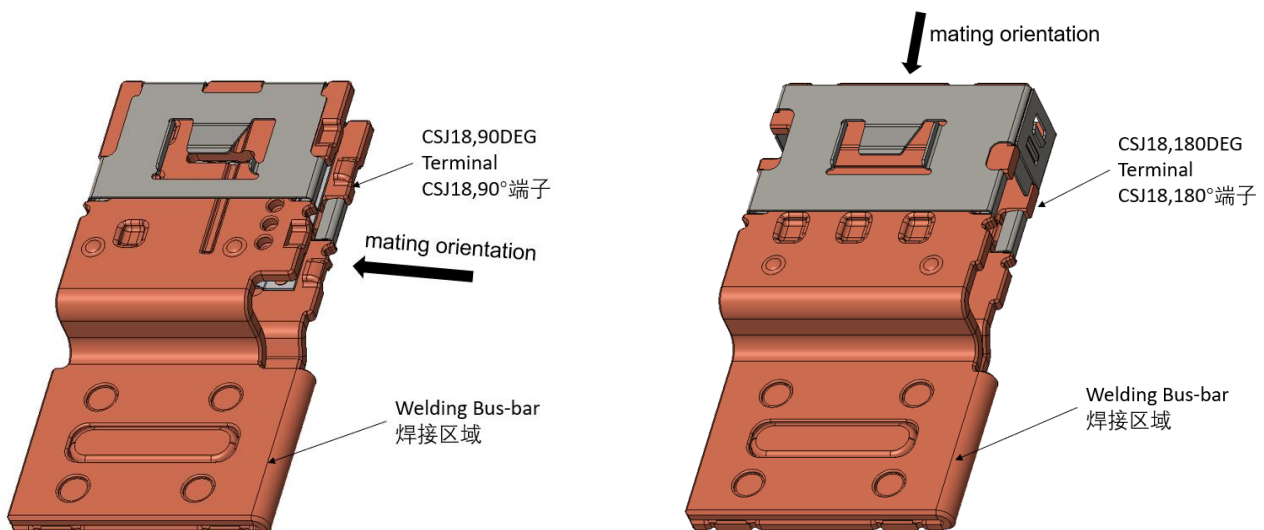
LV216-2:2011 电动汽车高压屏蔽电线
114-94391 超声波焊接应用的一般指导文件

3. DESCRIPTION

The following terms are used in this specification

3. 描述

规格书中用到以下描述.



4. TERMINALS

Table 1 shows all with this specification applicable CSJ18,90° & 180° terminal part numbers.

4. 端子

表格 1 中列出了和此规范相关的所有的端子料号及信息。

Conductor material 导体材料	Mating orientation 对配方向	Surface of weld pad 焊接面材料	Weld pad size UxW 焊接面尺寸 UxW	Wire size 线径	Part number 料号
Cu	90°	Cu	20.6mmx15.2mm	<u>25~70mm²</u>	<u>2401985-1</u>
Cu	180°	Cu	21.4mmx15.2mm	<u>25~70mm²</u>	<u>2400242-1</u>

Table / 表格 1

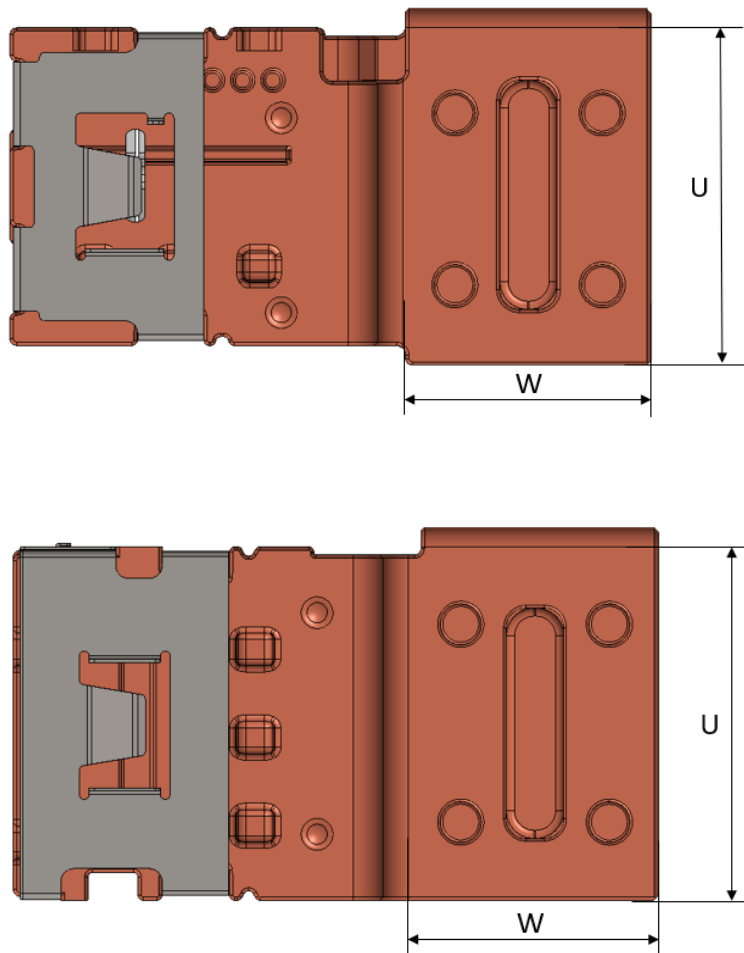


Figure / 图示 1 for table 1 / 表格 1 CSJ18,90deg & 180deg Terminal

5. MACHINE REQUIREMENTS

The contact system CSJ18,90deg & 180deg terminal is validated with ultra-sonic metal weld machine named SBT "WS" "WD" and Schunk "DS20-II" "LS-C". Only certified machines can be used to applicate.

A new product qualification must be provided by the user per TEC-109-18384

5. 设备要求

CSJ18,90° & 180° 端子已经用骄成 "WS" "WD" 和 雄克 "DS20-II" "LS-C" 超声波机台进行验证。只有经过验证的机台才能用于生产。

如果要使用其他的机台或者参数或导线，使用者应该按照 TEC-109-18384 标准提前进行验证。

6. JOURNAL

It is recommended to store the machine journal with all weld parameters and errors. The process data may be used for SPC (statistical process control).

6. 日志

建议将所有的生产参数和错误记录在机台的生产日志中。生产过程可能用到过程统计控制。

7. HANDLING OF PARTS

The use of appropriate gloves during handling, processing, assembly and packaging of contact sockets is recommended. It is also recommended to replace used gloves periodically. Welding area can not be touched during the entire handling process of the contact sockets.

7. 零件处理

在处理/制程/装配/包装的过程中要使用合适的手套，并定期更换手套。在整个过程中不能触碰焊接表面。

8. CONDUCTOR WELD CONNECTION

8. 导线焊接

8.1. POSITION OF CONDUCTOR END

8.1. 导线的形状位置

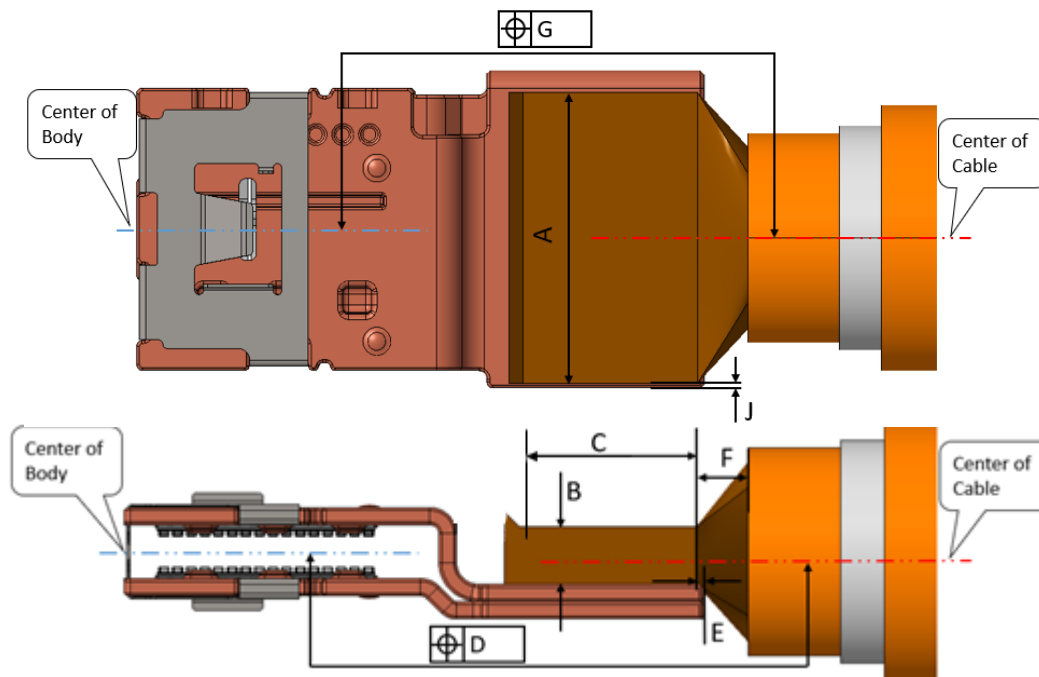


Figure / 图示 2 Design / 设计

9. WELD PARAMETER

The width of the welding header can be enlarged, and the welding height can not exceed 4.2mm;
Value C is not key dimension; E,F are key dimension.

9.1. FOR 25mm² Cu wire

SBT use machine WS:

- Width of sonotrode 10mm

Schunk use machine DS20-II:

- Width of sonotrode 10mm

CSJ18-90°(2401985-1)		
Unit(mm)-25mm ²	Min	Max
A	10.0	10.3
B	2.7	2.6
C	10.0	10.5
D	-0.5	0.5
E	1.0	1.5
F	1.5	2.0
G	-0.5	0.5
J	5.1	5.6

Dim.A can be 12mm or 13mm, if Pull-out force is more than 2000N, and CPK>1.67 for pull-out force following USCAR38, it is OK

9.2. FOR 35mm² Cu wire

SBT use machine WD:

- Width of sonotrode 13mm

Schunk use machine DS20-II:

- Width of sonotrode 13mm

CSJ18-90°(2401985-1)		
Unit(mm)-35mm ²	Min	Max
A	13.0	13.3
B	2.9	2.8
C	11.0	11.5
D	-0.5	0.5
E	1.4	1.9
F	1.5	2.0
G	-0.5	0.5
J	3.6	4.1

Dim.A can be 15mm, if Pull-out force is more than 2300N, and CPK>1.67 for pull-out force following USCAR38, it is OK

9. 焊接参数

25~70 mm² 焊头的宽度可以改大, 焊接高度不能超过 4.2mm;

C 值不是很重要。E,F 是重要的。

9.1. 用于 25mm² 铜导线

骄城用 WS 机台:

- 焊头宽度 10mm

雄克用 DS20-II 机台:

- 焊头宽度 10mm

CSJ18-180°(2400242-1)		
Unit(mm)-25mm ²	Min	Max
A	10.0	10.3
B	2.7	2.6
C	10.0	10.5
D	-0.5	0.5
E	1.0	1.5
F	1.5	2.0
G	-0.5	0.5
J	5.5	6.0

如果 A 是 12mm 或 13mm, 拉力大于 2000N, 按照 USCAR38, 拉力测试 CPK>1.67, 也是 Ok.

9.2. 用于 35mm² 铜导线

骄城用 WD 机台:

- 焊头宽度 13mm

雄克用 DS20-II 机台:

- 焊头宽度 13mm

CSJ18-180°(2400242-1)		
Unit(mm)-35mm ²	Min	Max
A	13.0	13.3
B	2.9	2.8
C	11.0	11.5
D	-0.5	0.5
E	1.4	1.9
F	1.5	2.0
G	-0.5	0.5
J	4.0	4.5

如果 A 是 15mm, 拉力大于 2300N, 按照 USCAR38, 拉力测试 CPK>1.67, 也是 Ok..

9.3. FOR 50mm² Cu wire

SBT use machine WL:

- Width of sonotrode 15mm

Schunk use machine DS20-II:

- Width of sonotrode 15mm

CSJ18-90°(2401985-1)		
Unit(mm)-50mm ²	Min	Max
A	15.0	15.3
B	3.6	3.5
C	12.0	12.5
D	-0.5	0.5
E	1.2	1.7
F	2.5	3.0
G	-0.5	0.5
J	2.6	3.1

Dim.A can be 16mm or 18mm, if Pull-out force is more than 2800N, and CPK>1.67 for pull-out force following USCAR38, it is SBT use machine WL OK.

9.4. FOR 70mm² Cu wire

SBT use machine WL:

- Width of sonotrode 18mm

Schunk use machine LS-C:

- Width of sonotrode 18mm

CSJ18-90°(2401985-1)		
Unit(mm)-70mm ²	Min	Max
A	18.0	18.3
B	4.2	4.1
C	12.0	12.5
D	-0.5	0.5
E	0.3	0.8
F	2.5	3.0
G	-0.5	0.5
J	1.1	1.6

Dim.A can be 20mm, if Pull-out force is more than 3400N, and CPK>1.67 for pull-out force following USCAR38, it is OK.

9.3. 用于 50mm² 铜导线

骄城用 WL 机台:

- 焊头宽度 15mm

雄克用 DS20-II 机台:

- 焊头宽度 15mm

CSJ18-180°(2400242-1)		
Unit(mm)-50mm ²	Min	Max
A	15.0	15.3
B	3.6	3.5
C	12.0	12.5
D	-0.5	0.5
E	1.2	1.7
F	2.5	3.0
G	-0.5	0.5
J	3.0	3.5

如果 A 是 16mm 或 18mm,拉力大于 2800N, 按照 USCAR38,拉力测试 CPK>1.67,也是 Ok.

9.4. 用于 70mm² 铜导线

骄城用 WL 机台:

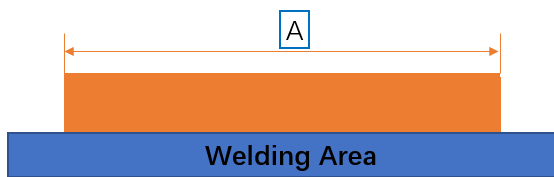
- 焊头宽度 18mm

雄克用 LS-C 机台:

- 焊头宽度 18mm

CSJ18-180°(2400242-1)		
Unit(mm)-70mm ²	Min	Max
A	18.0	18.3
B	4.2	4.1
C	12.0	12.5
D	-0.5	0.5
E	0.3	0.8
F	2.5	3.0
G	-0.5	0.5
J	1.5	2.0

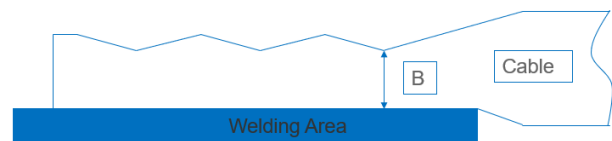
如果 A 是 20mm,拉力大于 3400N, 按照 USCAR38,拉力测试 CPK>1.67,也是 Ok.



For upper A, welding shape is as upper shown.
If the below show: Dim.B is different from the upper table.
Pull-out force must meet spec. and follow USCAR38.
CPK>1.67.



对于上面的 A,焊接后的形状如上;
如果是下面的焊头, Dim. B 和上表中不同;
拉力测试必须符合标准, 按照 USCAR 38 的标准,
CPK>1.67



10. INSPECTION OF WELD CONNECTION

10.1. DIMENSIONS OF THE WELD CONNECTION

As a control it is possible to check the height and width in the weld connection area. Both must be measured in the middle of the weld connection area. For measuring the height, it is recommended to use a calibrated crimp height micrometer or better. The measuring of the width is recommended with a calibrated sliding caliper.

Note:

The dimensions of height and width are only to control the travel dimensions of the welding tool. They are not for quality monitoring of the weld connection.

10.2. MECHANICAL SOLIDITY

The mechanical strength of the welded nugget must be checked each time the machine is set up. At least 3 parts must be checked for tensile force. The minimum values of 2000N(25mm² Cu)、2300N(35mm² Cu)、2800N(50mm² Cu) & 3400N(70mm² Cu).

Values for Cmk capability study: (CPK≥1.67)

Follow USCAR38

Pull Force ≥ 2000N(25mm² Cu)/2300N(35mm² Cu)/2800N(50mm² Cu) / 3400N(70mm² Cu)

10.3. VISUAL INSPECTION

The following failure catalogue shall not replace the required testing and serves as supporting material only.

10. 焊接部位的检测

10. 1. 焊接尺寸

管控要求, 需检测焊接区域中间位置的高度和宽度。
推荐用校准过的千分尺量测焊接高度, 用滑动式卡尺量测焊接宽度。

备注:

焊接高度和宽度尺寸只是用来控制焊接治具的运动行程。并不用于监测焊接的质量。

10. 2. 焊接强度

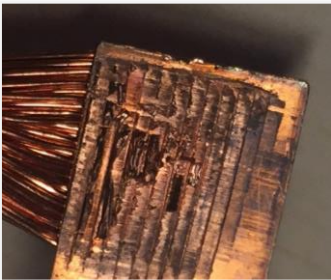
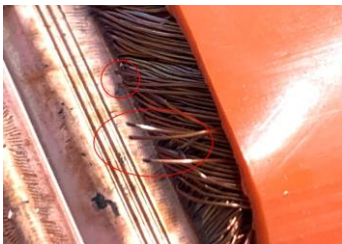
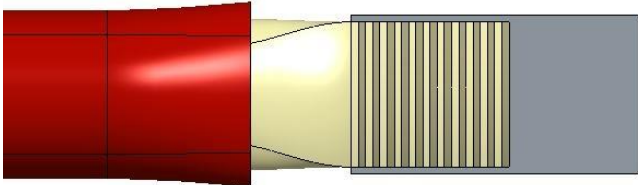
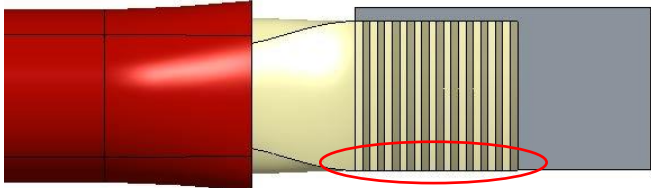
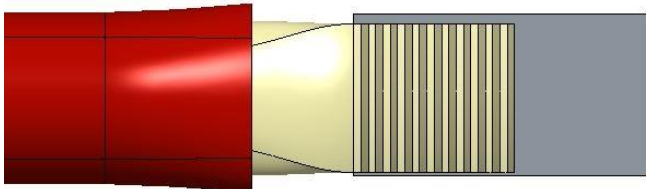
焊接的机械强度必须在每次机器安装时进行检查。至少要检查 3 个零件的拉力。拉力最小值为 2000N(25mm² Cu)、2300N(35mm² Cu)、2800N(50mm² Cu) & 3400N(70mm² Cu)。

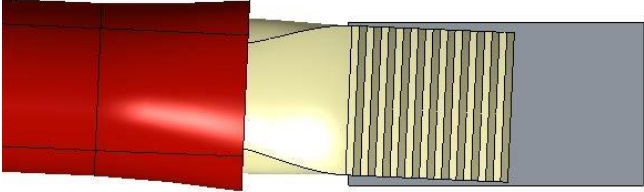
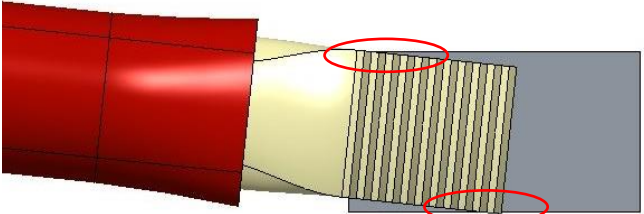
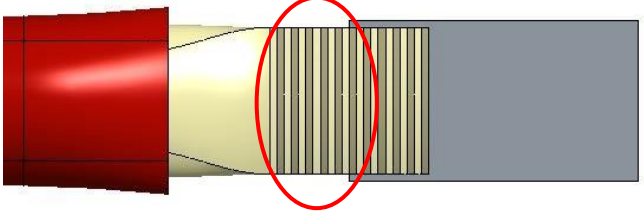
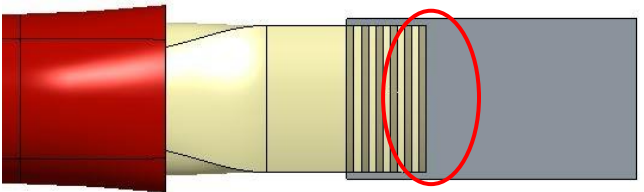
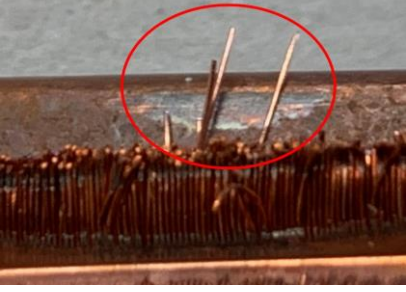
Cmk 能力值: (CPK≥1.67) Follow USCAR38

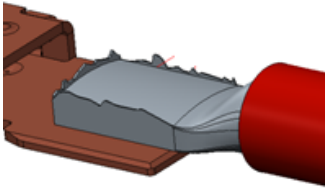
Pull Force ≥ 2000N(25mm² Cu)/2300N(35mm² Cu)/2800N(50mm² Cu) / 3400N(70mm² Cu)

10. 3. 外观检查

下列不良模式不应代替所需的测试, 仅作为辅助材料。

Darstellung		
	零件上的铁砧压痕，颜色变化不是质量标准 Anvil impression on the component. Color changes are not a quality criterion	合格零件 Good part
	工具磨损:零件上没有明显的砧形痕迹。 Tool wear: No clear imprint of the profile of the anvil on the part is visible.	不合格零件 Bad part
	剥线过程和焊接过程，超过3%的线芯断裂是不允许的。 More than 3% of individual wires cut after the welding process is forbidden, including the stripping process of the wire.	不合格零件 Bad part
	需满足尺寸 (A, B,G,H,J)要求 Requirements (A, B,G,H,J) fulfilled	合格零件 Good part
	只能在一边看到 bus-bar 边缘 edge only visible on one side	不合格零件 Bad part
	偏移量:边缘可见两边和尺寸满足 J 要求。 Offset: edge visible on both sides and dimension J fulfilled	合格零件 Good part

	倾斜量:边缘可见两边和尺寸满足 J 要求。 Sloping position: edge visible on both sides and dimension J fulfilled	合格零件 Good part
	倾斜位置:边缘仅在一侧可见 Sloping position: edge only visible on one side	不合格零件 Bad part
	工具位置不正确:接触处焊接不完整。需满足 E 尺寸要求。 Incorrect tool alignment: Welding not complete on the contact. Requirement of dimension E.	不合格零件 Bad part
	电线插入深度太短:需满足图 3 中 H 尺寸要求。 The wire insertion depth is too short: Requirement acc. Figure3, Dimension H	不合格零件 Bad part
	焊接位置的下部突出的铜线是不允许的 Protruding strands at the lower part of the weld nugget not allowed	不合格零件 Bad part
	伸出, 过长单线不得与焊垫重叠*1) Overhanging, too long single wires must not overlap the welding pad *1)	不合格零件 Bad part
	颜色变化不是质量标准。 Colour changes are not a quality criterion.	合格零件 Good part

	在 1000 伏以下使用时，焊接包侧面的直立铜线必须小于 3.2 毫米。*1) Upstanding strands at the side of the weld package must be shorter than 3.2 mm for applications up to 1000 V. *1)	不合格零件 Bad part
	最大毛刺高度不得超过允许的焊接高度*1)。 The maximum burr height must not exceed the permissible welding height.*1)	不合格零件 Bad part

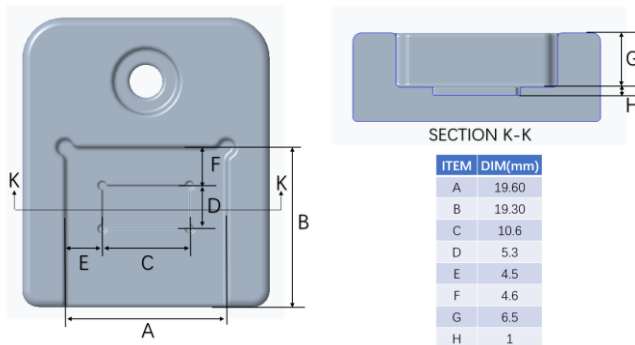
*1) 允许重工/ Reworking is allowed

10.4. BENDING TEST

The test sample is fixed in the welding area. The cable is bent twice by 90 ° (in the direction of the welding area) and then bent back into its original position. Individual strands must neither be broken nor get loose.

Add welding fixture drawing

CSJ18 90Deg weld fixture



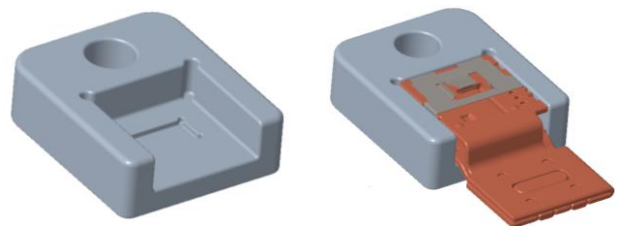
Ex:



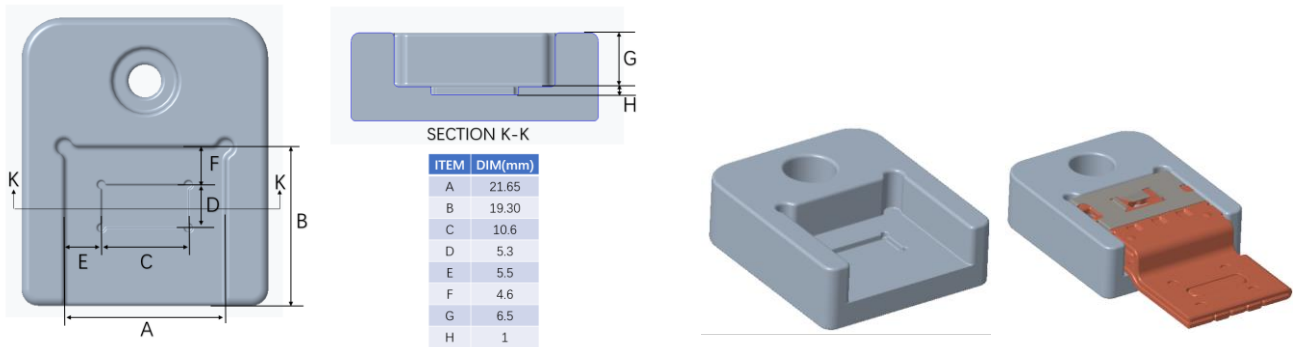
10.4. 弯折测试

试样固定在焊接区域内。电缆弯曲两次 90°(在焊接区域的方向)，然后弯曲回原来的位置。个别的线既不能断也不能松。

增加焊接夹具图

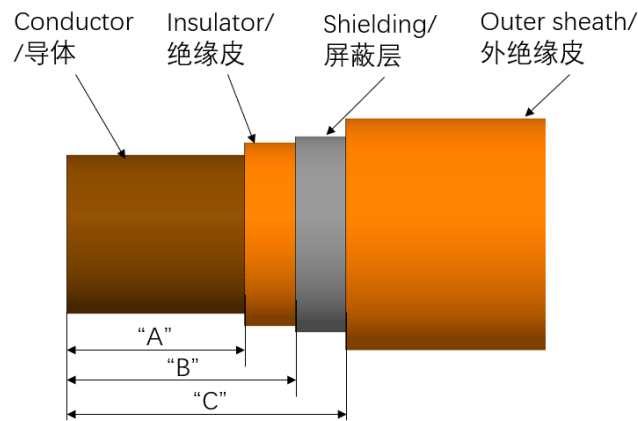


CSJ18 180Deg weld fixture



11. APPENDIX WIRES

11. 焊接使用的导线



Striping length/剥线长度				
2401985-1 & 2400242-1				
Wire size (mm ²)	25	35	50	70
Dim A	12 +0.5/-0	13 +0.5/-0	14 +0.5/-0	14 +0.5/-0
Dim B	See TE Spec. 114-160272 for CSJ1800 2Pos 180deg See TE Spec. 114-160273 for CSJ1800 2Pos 90deg			
Dim C				

Table 4/表格 4

Material 材质	Cross section 线径[mm ²]	Standard 标准	Identification 规格	Wire supplier 供应商	Color 颜色	Temperature range 耐温	Permissible voltage 耐压
CuETP	25	LV 216-2	QBP21-E-SIR 600/1000V(Ø0.21) (FHLR2GCB2G)	Force	Orange	-40° C~180° C	600V AC/1000V DC
CuETP	35	LV 216-2	QBP21-E-SIR 600/1000V(Ø0.21) (FHLR2GCB2G)	Force	Orange	-40° C~180° C	600V AC/1000V DC
CuETP	50	LV 216-2	QBP21-E-SIR 600/1000V(Ø0.21) (FHLR2GCB2G)	Force	Orange	-40° C~180° C	600V AC/1000V DC
CuETP	70	LV 216-2	QBP21-E-SIR 600/1000V(Ø0.21) (FHLR2GCB2G)	Force	Orange	-40° C~180° C	600V AC/1000V DC

TABLE 5/表格 5

注意事项:

如果要使用其他的机台或者参数及导线，使用者应该按照 TEC-109-18384 标准对焊接参数提前进行验证。

Note:

A new welding machine or cable must be validated per TEC-109-18384. That should differently machines and/or parameters be used.

LTR	REVISION RECORD	DWN	APP	DATE
1	Initial release	WZ.MA	WD.ZHANG	22 th Sep 2022
2	Updated paremeters	WZ.MA	WD.ZHANG	12 th Dec 2022
A	Go to Production	J.YAN	WD.ZHANG	22 th Nov 2023