


HVP-HD1400 Header Application Specification

HVP-HD1400 公端高压连接器 应用规范



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CONTENT 目录

1. SCOPE 适用范围	3
1.1 Content 内容	3
1.2 Processing notes 加工说明	3
2. APPLICABLE DOCUMENTS 适用文件	3
2.1 TE Connectivity Documents 泰科电子文件	3
2.1.1 Customer Drawings 客户图纸	4
2.1.2 Specifications 规范	4
3. CONDITION OF DELIVERY AND PACKAGING 交货和包装状态	5
3.1 HVP-HD1400 Header ASSY HVP-HD1400 公端	5
3.2 Packaging and Storage 包装和贮存	6
4. FINAL EXAMINATION 终检	7
4.1 Visual Examination 外观检查	7
4.2 Electrical Tests 电气测试	7
5. HEADER ASSY INSTRUCTIONS 公端连接器安装说明	7
5.1 Pre installation inspection for header 安装前公端连接器检查	7
5.2 Pre installation inspection for Busbar aggregate 安装前铜排安装面检查	10
5.3 Assemble Header ASSY to Mounting Surface of Aggregate 公端连接器组装到安装面板	14
5.4 Assemble Header ASSY with Busbar 公端连接器组装到汇流排	16
5.5 Assemble Header ASSY Through Hole with Busbar 通孔公端连接器组装到汇流排	17



- ◆ **This connector is intended for use in high-voltage applications. Special care must be applied to ensure that the connector functions as intended.**
- ◆ **If you suspect that the connector has been modified, damaged, contaminated or other wise compromised, please discontinue it use immediately.**
- ◆ **This connector should only be serviced by a trained and qualified technician.**

1. SCOPE 适用范围

1.1 Content 内容

This specification covers the requirements for application of HVP-HD1400 High Voltage connector. The HVP-HD1400 connector system is designed to meet LV215 specifications (vibration refers to ISO16750-3 while salt spray refers to VDA233-102), there are 70mm²、95mm²、120mm² and 150mm² four kinds of metric wire size (acc. to ISO 6722-1 class D, ISO 19642-9 class D). The connector incorporates conductive EMC shields to reduce radiated emissions in the application.

The HVP-HD1400 header can be divided into two kinds: 90Deg and 180Deg. All of them have 1POS、2POS、3POS, equipped with twelve different keying or polarizing configurations. The connector system incorporates the 14mm round contacts, integrated High Voltage Interlock (HVIL) System and High Voltage Finger Protection(IPXXB). The plastic housing is molded in orange to denote a high voltage system.

该规范涵盖了HVP-HD1400高压连接器的应用要求。HVP-HD1400连接器系统的设计符合LV215规范(振动符合ISO16750-3, 盐雾符合VDA233-102), 有70mm²、95mm²、120mm²以及150mm²四种公制线径(符合ISO 6722-1 class D, ISO 19642-9 class D 标准)。该连接器采用导电EMC屏蔽, 以减少应用中的辐射。

HVP-HD1400连接器有90°以及180°两大类, 可分为1POS、2POS、3POS三种, 有12种不同的键位。连接器系统包含14毫米圆形电源连接系统和高压互锁(HVIL)系统和高压手指防护(IPXXB)要求。外壳采用橙色模制, 表示高压系统。

1.2 Processing notes 加工说明

The processor is responsible for ensuring the quality of the manufacturing process and the proper function of the system. The warranty and liability is excluded, if quality deficiency or damages occurs by failing compliance to this specification or using not specified, not released tools or not released connector components.

If you suspect that the plug has been altered, damaged or contaminated or is otherwise at risk, please stop use and operation immediately

加工者负责确保制造过程的质量和系统的正常功能。如果由于未遵守本规范或使用未定义的、未发布的工装或未发布的连接器组件而导致质量异常或损坏, 则不承担保修和责任。

如果您怀疑插头已被更改、损坏或污染, 或者存在其他风险, 请立即停止使用和操作

2. APPLICABLE DOCUMENTS 适用文件

The following mentioned documents are part of this specification. If there is a conflict between the information contained in the documents and this specification or with any other technical documentation supplied, the last valid customer drawings take preference.

以下提到的文件是本说明书的一部分。如果文档中包含的信息与本规范或提供的任何其他技术文档之间存在冲突, 则以最新有效的客户图纸优先。

2.1 TE Connectivity Documents 泰科电子文件

This Application Specification based on the latest valid customer drawings.

本应用规范基于最新的有效客户图纸。



2.1.1 Customer Drawings 客户图纸

Table 1: Customer drawings / 客户图纸

Header side (Include interface) / 公端(包括应用面板)	
2399606	HVP-HD1400 1POS HEADER ASSY,180DEG
2399607	HVP-HD1400 2POS HEADER ASSY,180DEG
2399608	HVP-HD1400 3POS HEADER ASSY,180DEG
2399609	HVP-HD1400 1POS HEADER ASSY,90DEG
2399610	HVP-HD1400 2POS HEADER ASSY,90DEG
2399611	HVP-HD1400 3POS HEADER ASSY,90DEG
2407804	HVP-HD1400 HEADER SHIPPING CAP
2414096	HVP-HD1400 1POS HEADER ASSY,180DEG, THROUGH HOLE
2414097	HVP-HD1400 2POS HEADER ASSY,180DEG, THROUGH HOLE
2414098	HVP-HD1400 1POS HEADER ASSY,90DEG, THROUGH HOLE
2414099	HVP-HD1400 2POS HEADER ASSY,90DEG, THROUGH HOLE

2.1.2 Specifications 规范

Table 2: TE-specifications / 泰科规范

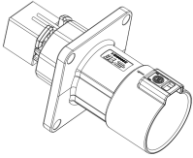
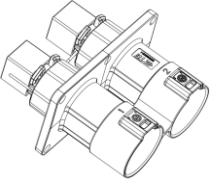
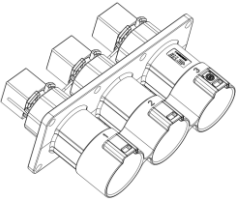
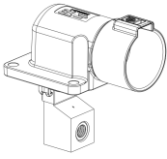
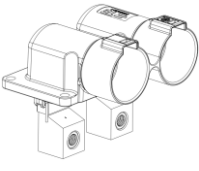
Specifications	Description
108-160345	Product specification 14MM contact system
108-160407	Product specification HVP-HD1400 connector
114-94737	Application specification 14MM contact system

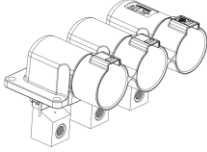

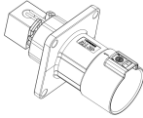
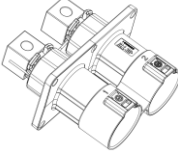
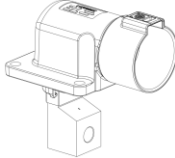
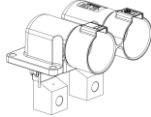
114-160223	Application specification HVP-HD1400 plug standard cable
114-160418	Application specification HVP-HD1400 plug high flex cable
114-160222	Application specification HVP-HD1400 header

3. CONDITION OF DELIVERY AND PACKAGING 交货和包装状态

3.1 HVP-HD1400 Header ASSY HVP-HD1400 公端

Table 3: HVP-HD1400 Header ASSY / HVP-HD1400公端

Description 描述	Picture 图片	Base Number 基础料号
HVP-HD1400 1POS HEADER ASSY,180DEG		2399606
HVP-HD1400 2POS HEADER ASSY,180DEG		2399607
HVP-HD1400 3POS HEADER ASSY,180DEG		2399608
HVP-HD1400 1POS HEADER ASSY,90DEG		2399609
HVP-HD1400 2POS HEADER ASSY,90DEG		2399610

HVP-HD1400 3POS HEADER ASSY,90DEG		2399611
HVP-HD1400 HEADER SHIPPING CAP		2407804
HVP-HD1400 1POS HEADER ASSY,180DEG THROUGH HOLE		2414096
HVP-HD1400 2POS HEADER ASSY,180DEG THROUGH HOLE		2414097
HVP-HD1400 1POS HEADER ASSY,90DEG THROUGH HOLE		2414098
HVP-HD1400 2POS HEADER ASSY,90DEG THROUGH HOLE		2414099

3.2 Packaging and Storage 包装和贮存

The products should be used on a “first in, first out” basis to avoid storage contamination, please refer to the latest valid customer drawings.

为避免存储污染，产品应以“先进先出”的原则使用，也请参见最新的有效客户图纸。

Store condition: Temperature:0~30℃, humidity:<60%

储存条件：温度：0~30℃，湿度：<60%

Reference shelf life: 6 months

参考保质期：6个月



If these silver-plating products are not used up in the line after the package is opened. It shall be packed in the original way within 4 hours.

如果镀银的产品整箱在产线打开包装后没有用完，必须要打开包装4个小时内按照原始的方式重新包装。

4. FINAL EXAMINATION 终检

4.1 Visual Examination 外观检查

After processing the connector assembly, completeness & correctness has to be checked according to customer drawings and free of damage.

在装配连接器后，必须根据客户图纸进行完整性、正确性检查，且不能损坏。

During the storage period, the product surface may be oxidized and discolored. These oxide layers are composed of Silver sulfide. The contact resistance to the electrical performance of the product is not affected and is identical to the brand new state.

在储存期限内，产品表面可能有氧化变色现象，这些氧化层是由硫化银组成的，对产品的电气性能的接触电阻并不受影响，和全新状态完全相同。

The copper exposed at the bottom of round pin (not higher than the hole for plating process) is allowed due to non-functional area here, as shown in Figure 1 and Figure 2.

由于圆柱端子内侧的底部不是功能区域，该区域露铜是允许的（不高于电镀工艺孔），见下图1和图2。

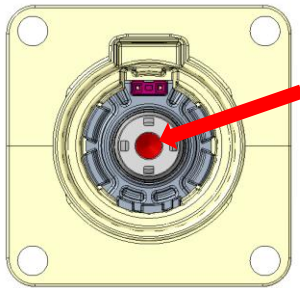


Figure 1: 180deg header

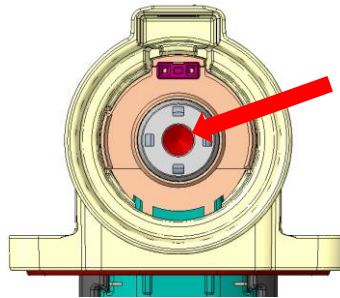


Figure 2: 90deg header

4.2 Electrical Tests 电气测试

Applicator should ensure the electrical characteristic values according to product specification TE-108-160407 chapter 3.4. Test parameters should not exceed the specification in Chapter 3.4.

使用方依据产品规范TE-108-160407第3.4章保证电气特性。测试参数不应超出第3.4章的值。

5. HEADER ASSY INSTRUCTIONS 公端连接器安装说明

5.1 Pre installation inspection for header 安装前公端连接器检查

Suitable for 2399607、2399608、2399610、2399611、2414097、2414099.

适用料号 2399607、2399608、2399610、2399611、2414097、2414099。

The cross section of HVIL wires is 0.5mm², which physical characteristics are acc. to ISO 6722, operating temperature range can meet the requirements of -40°C-150°C, withstand voltage ≥ 4KV.

HVIL 线缆的截面积是 0.5mm²，结构尺寸参考 ISO 6722，工作温度范围可以满足-40°C-150°C，耐压 ≥ 4KV。

Check before installation, the HVIL wires must be inside the housing hook, as shown in Figure 3.

安装前做相关检查，HVIL 线缆必须在塑胶卡扣内，如图 3。

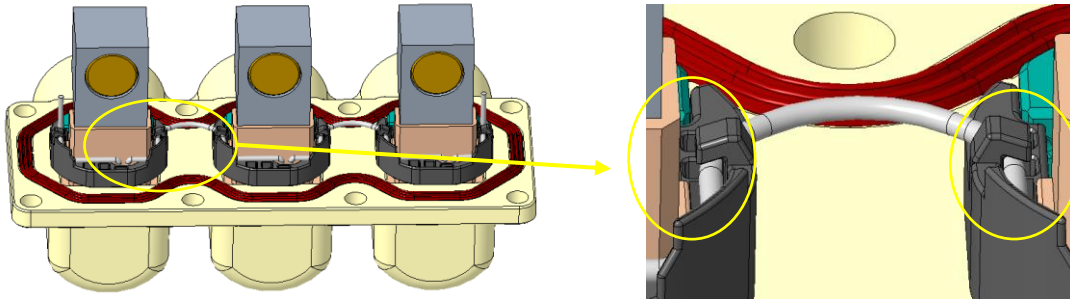


Figure 3

If the HVIL wire is not in the plastic hook due to accidental touch before installation, as shown in figure 4. It can be re-installed manually, as shown in Figure 5, put the wire again in the position inside the hook.

如果 HVIL 线缆在安装前因为意外碰触导致不在塑胶卡口内，见图 4。这种情况可以被手工重新组装恢复，根据图 5 所示，再次将导线再放入钩子下面的位置里。

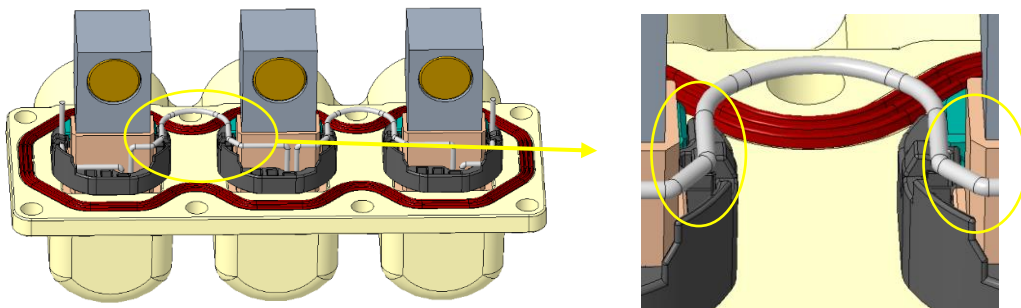


Figure 4

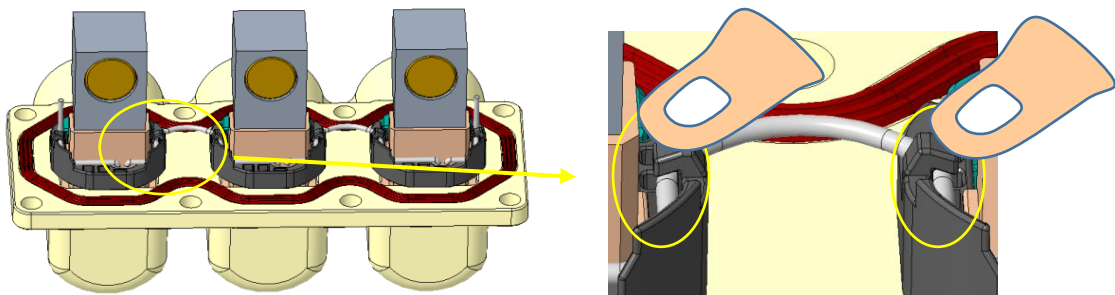


Figure 5

If one side outlet mode is required, the customer can add some protection sleeve to wrap the intermediate wires according to the demand.

如需要单侧出线方式，客户依照需求可增加套管来包裹中间线缆。

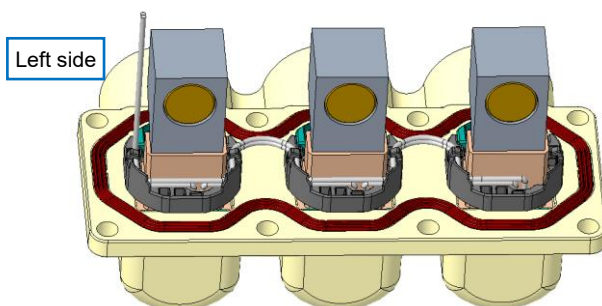


Figure 6 : One side outlet mode (90deg Left side)

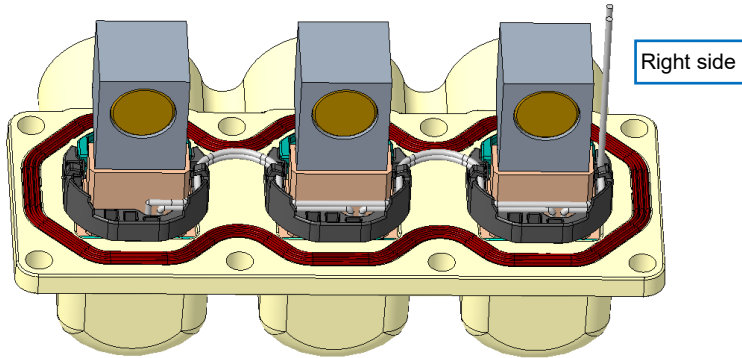


Figure 7 : One side outlet mode (90deg Right side)

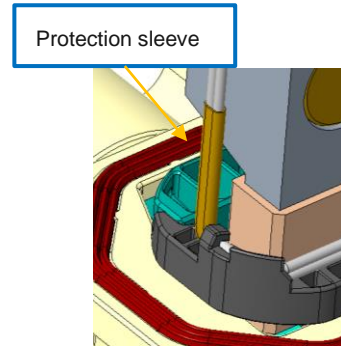


Figure 8 : Protection sleeve (Optional)

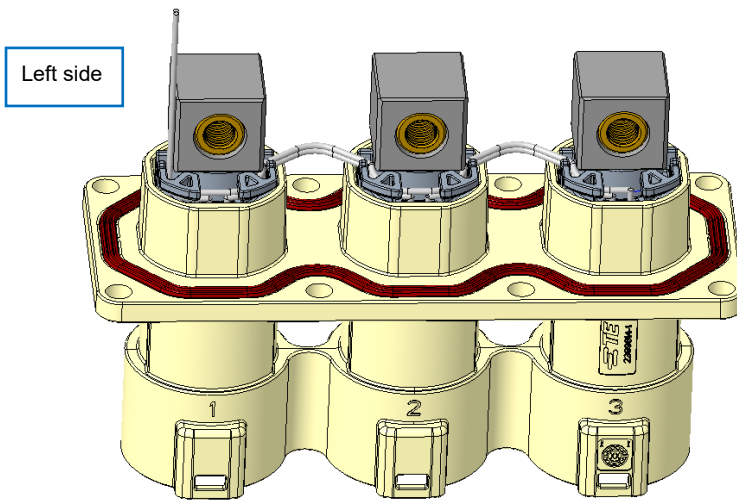


Figure 9 : One side outlet mode (180deg Left side)

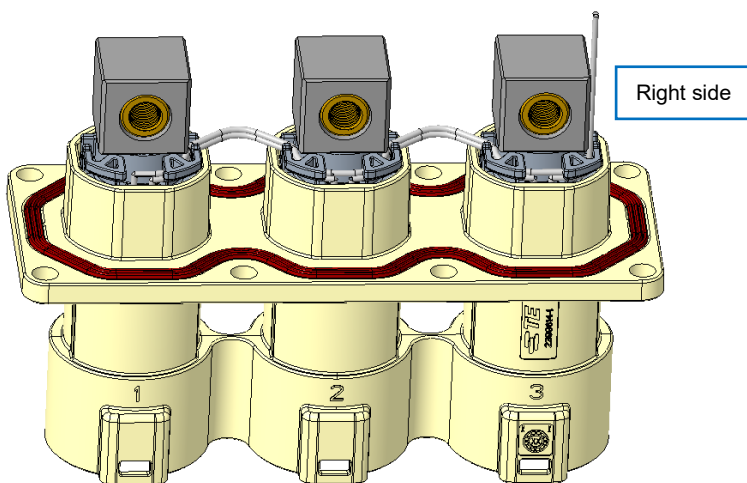


Figure 10 : One side outlet mode (180deg Right side)

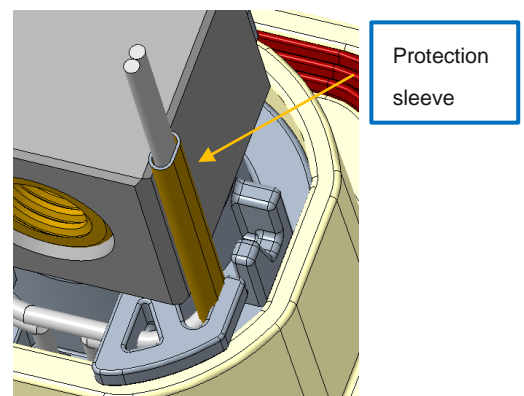


Figure 11 : Protection sleeve (Optional)

5.2 Pre installation inspection for Busbar aggregate 安装前铜排安装面检查

Suitable for 2399607、2399608、2399610、2399611、2414097、2414099.

适用料号 2399607、2399608、2399610、2399611、2414097、2414099。

Considering the lateral force which occurs during the assembling with misalignment will lead to the deviation of contacts position on the header, busbar with flexible/ multi-layered material or flexible structure is recommended to be used for power connection to cover the mounting gap.

考虑到因为错位安装产生的侧向力会导致 header 里端子位置的偏移，推荐使用多层铜排或其他柔性结构铜排来吸收掉安装间隙。

If a rigid busbar will be used, below instruction need to be followed:

Please check the position of mounting surface of aggregate before installation, as shown in Figure 12 and Figure 14.

如果一个刚性铜排会被使用，需要参照如下说明：

请在安装前做铜排安装面位置的相关检查，尺寸建议值如图 12 和图 14。

The diameter of aggregate mounting hole must be designed large enough to avoid tolerance-related lateral forces acting on the header and tolerances must be considered throughout the assembly sequence, that no additional side forces act on the header busbar.

铜排安装孔的直径必须设计得足够大，以避免零部件的相关尺寸公差导致侧向力作用在连接器上，并且在整个组装顺序过程中也必须考虑装配公差，以确保没有额外的侧向力施加在连接器端子上。

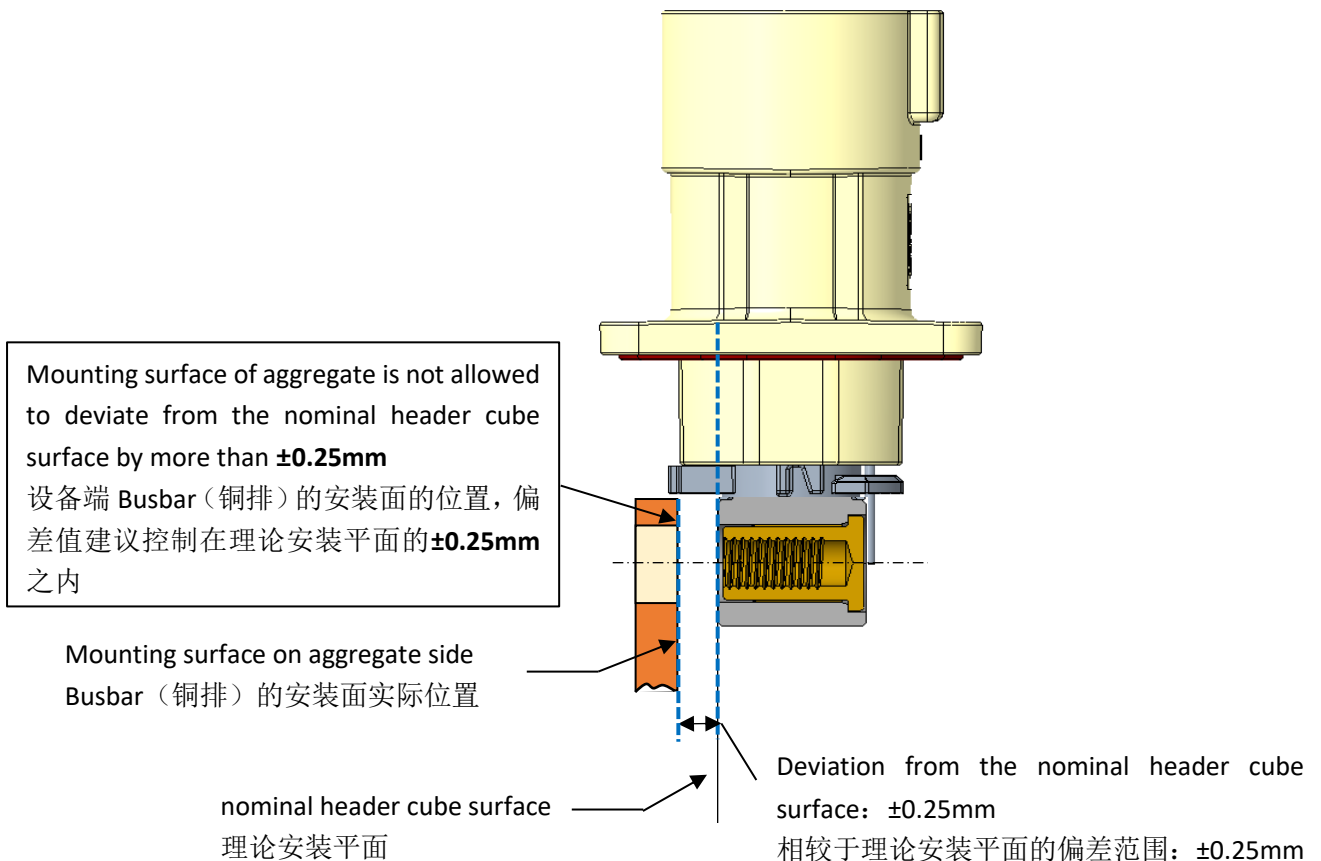


Figure 12 : Deviation from the nominal header cube surface(180deg Front Side)

Valid also for all other threader insert orientations within cube for 1pos,2pos and 3pos header variants.

同时也适用于端子安装面的其他几个方向。

Right side and Left side are not available for 2pos and 3pos header.

右面和左面不适用于 2 位和 3 位连接器。

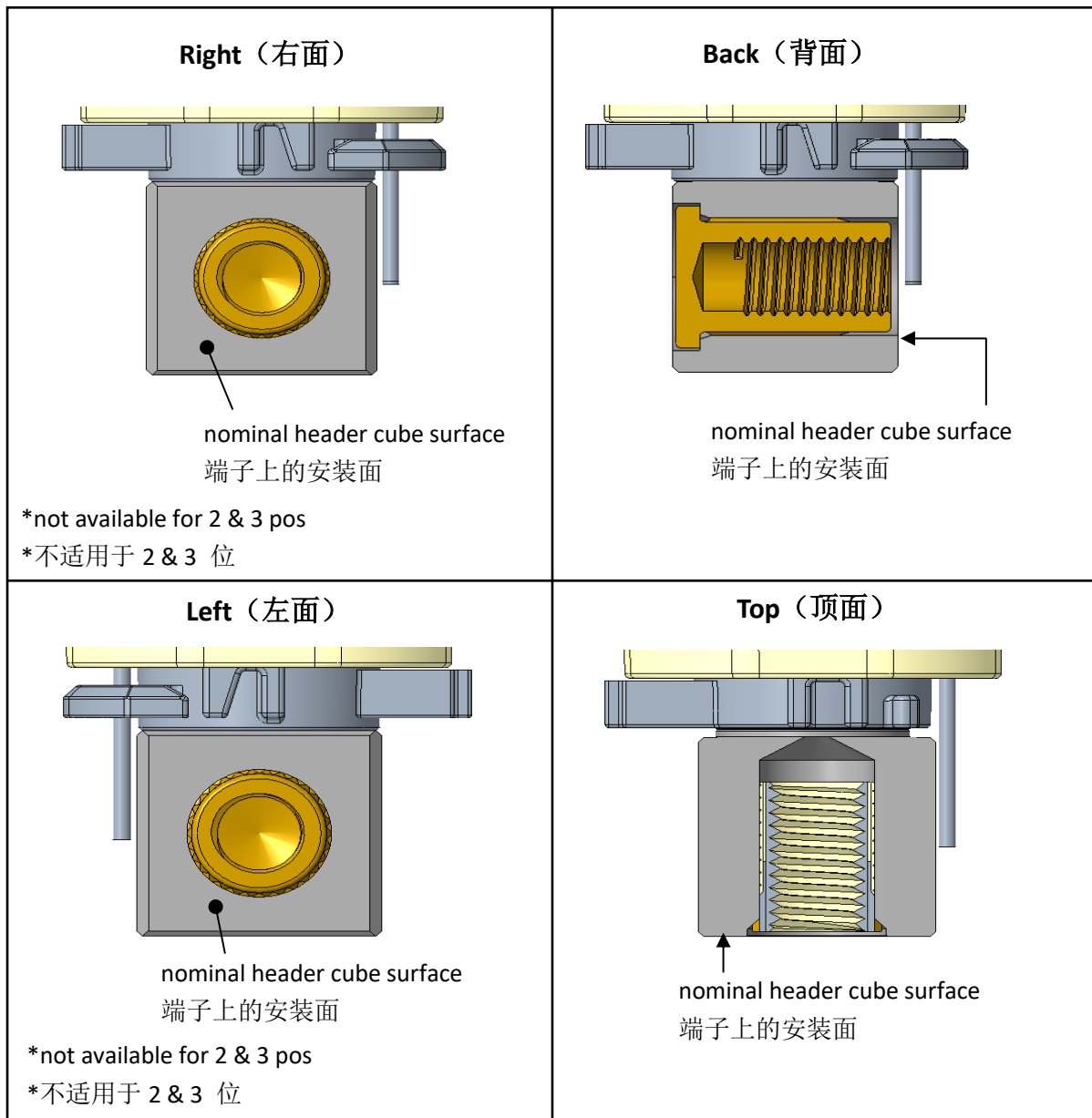


Figure 13 : Nominal header cube surface (180deg)

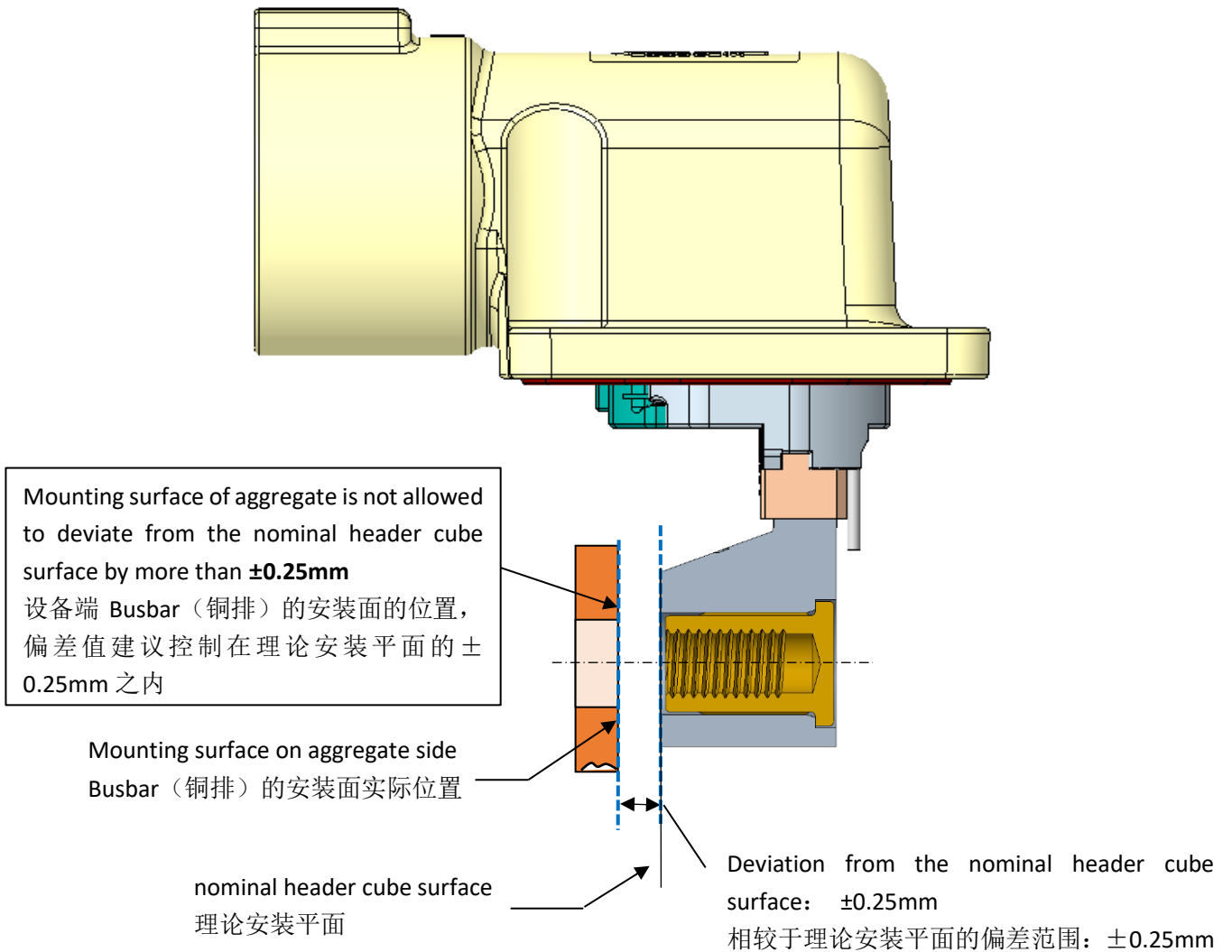


Figure 14 : Deviation from the nominal header cube surface (90deg Front Side)

Valid also for all other threader insert orientations within cube for 1pos,2pos and 3pos header variants.

同时也适用于端子安装面的其他几个方向。

Right side and Left side are not available for 2pos and 3pos header.

右面和左面不适用于 2 位和 3 位连接器。

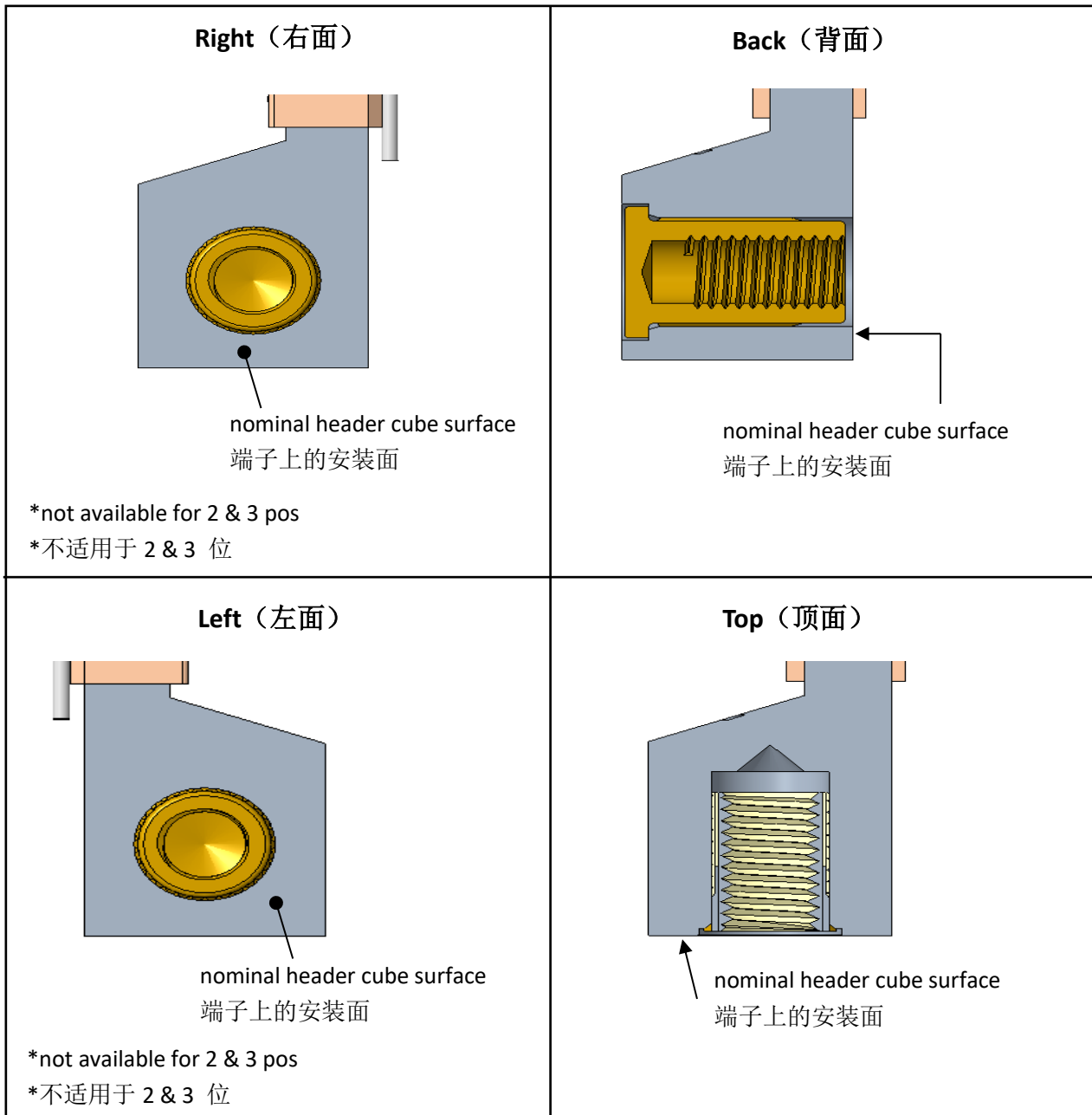


Figure 15 : Nominal header cube surface (90deg)

5.3 Assemble Header ASSY to Mounting Surface of Aggregate 公端连接器组装到安装面板

Application system requires installation panel, interface dimensions could be found in latest customer drawing.
应用系统需有安装面板，界面尺寸请见最新客户图纸。

Four bolts of M5 are used to fix the one position header ASSY on the panel, while two position header ASSY need six bolts and three position header ASSY need eight bolts.

It is recommended to use M5 bolts with screw heads and washers with a diameter of 9 to 11 millimeters. The recommended installation torque is 6 ± 0.5 N·m.

Zinc nickel plating is recommended for stainless or carbon steel screws in applications requiring high corrosion resistance.

一位、两位、三位公端连接器固定到面板上需要4、6、8颗螺栓。
推荐使用螺丝头带直径9~11毫米垫片的M5螺栓，安装扭矩建议 6 ± 0.5 牛·米。
对于需要高耐腐蚀性的应用，建议使用锌镍镀层的不锈钢或碳钢螺栓。

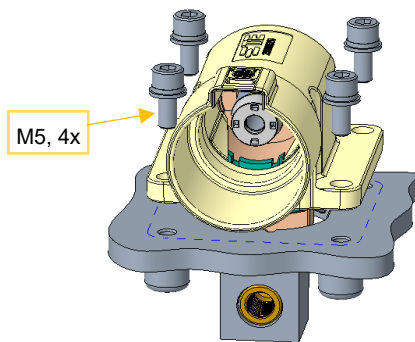


Figure 16 : Assemble header to the panel (90° 1Pos)

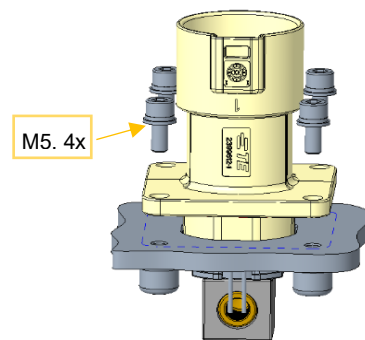


Figure 17 : Assemble header to the panel (180° 1Pos)

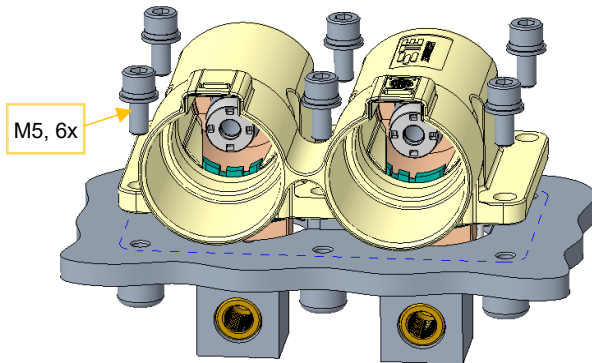


Figure 18 : Assemble header to the panel (90° 2Pos)

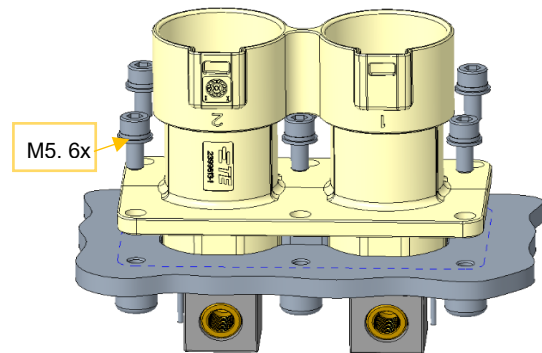


Figure 19 : Assemble header to the panel (180° 2Pos)

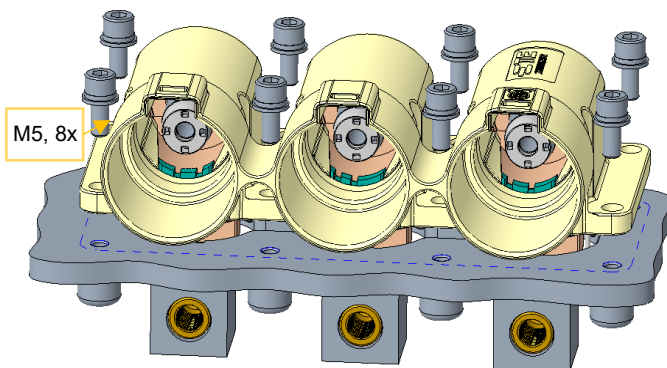


Figure 20 : Assemble header to the panel (90° 3Pos)

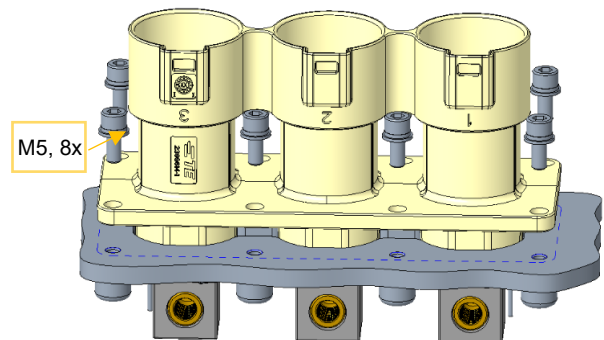


Figure 21 : Assemble header to the panel (180° 3Pos)

Attention: Please pay attention to the keying or polarizing configurations, refer to the drafts for more details.

注意：适配时请注意极性，更多细节请参考图纸。

For all design variants, the requirements for power connection are according to customer drawings 2399606、2399607、2399608、2399609、2399610、2399611、2414096、2414097、2414098 and 2414099. It's requested that the power connection design should fulfill the requirements for creepage and clearance distance according to DIN EN 60664-1. The lateral force which occurs during the assembling of ring tongue/busbar must not lead to the deviation of contacts position on the interface side to the plug. The primary function of the HV power terminals is power transmission and not mechanical stabilization/fixation of internal system components. Therefore, the use of the HV power terminals as mechanical fixation shall be avoided. Other provisions for the mechanical fixation of components connecting with the HV power terminals shall be foreseen somewhere else in the system. (e.g. Sole fixation of a busbar by the HV terminals shall be avoided as it can lead to the busbar exerting lateral force on the terminals due to its own weight in a vibration condition.)

对于所有不同种类的设计，电源连接要求请参照2399606、2399607、2399608、2399609、2399610、2399611、2414096、2414097、2414098、2414099客户图纸，请注意，根据DIN EN 60664-1，设计必须满足爬电和间隙距离的要求。环舌/母线组装过程中产生的侧向力不得导致安装面板上的端子位置与插头偏离。高压端子的主要功能是电流传输，而不是内部系统部件的机械稳定/固定。因此，应避免使用高压端子作为机械固定。应在系统的其他地方预见与高压端子连接的部件的机械固定的其他规定。（例如，应避免高压端子单独固定母线，因为这可能导致母线在振动条件下由于自身重量而在端子上施加横向力。）

It is advisable to pre-insert all the bolts into the holes before gradually tightening them one by one. This approach ensures that all bolts are correctly positioned and aligned before the final tightening process.

To ensure consistent bolt installation, it is recommended to cross-arrange the tightening of bolts. The suggested sequence for installation is as follows:

建议将所有螺栓预先插入孔中，然后逐个逐渐拧紧。这种方法可确保所有螺栓在最终拧紧过程之前正确定位和对齐。

为了确保螺栓安装的一致性，建议交叉安排螺栓的拧紧。建议的安装顺序如下：

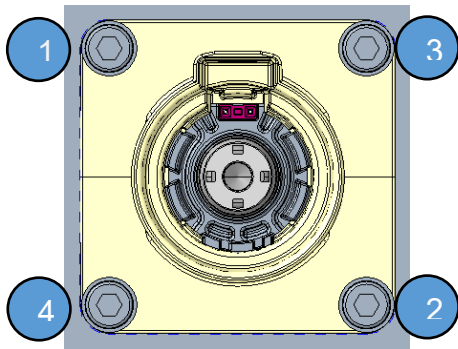


Figure 22 : Installation Sequence (1Pos)

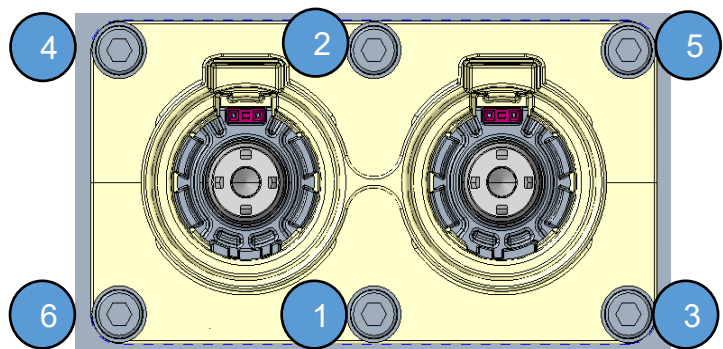


Figure 23 : Installation Sequence (2Pos)

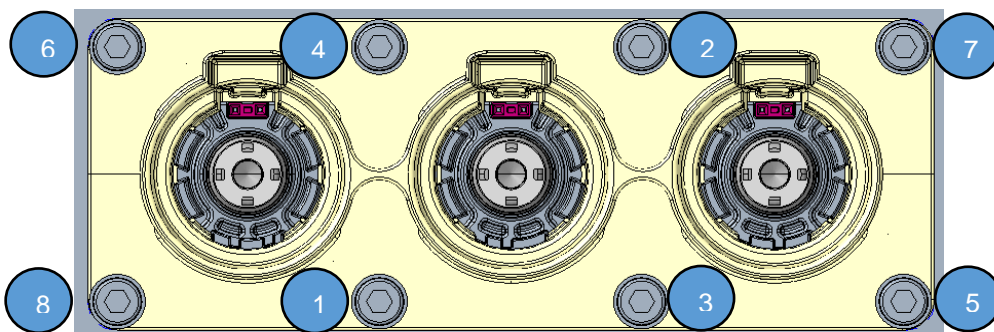


Figure 24 : Installation Sequence (3Pos)

5.4 Assemble Header ASSY with Busbar 公端连接器组装到汇流排

It takes one bolt of M8 to assemble one position header ASSY with busbar, while two position header ASSY need two bolts and three position header ASSY need three bolts.

It's recommended that using M8 bolts, RH(right-handed), and the tightening torque is better to be 15 ± 1.5 N·m.

使用一颗M8螺栓将公端连接器与汇流排连接，两位、三位的公端连接器分别需要两颗、三颗螺栓。推荐使用M8螺栓，右旋拧入，安装扭矩建议 15 ± 1.5 牛·米。

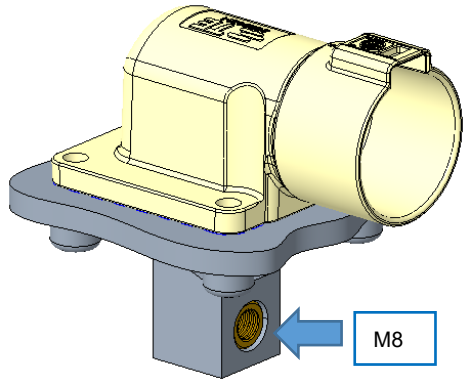


Figure 25 : Assemble header with busbar (90° 1Pos)

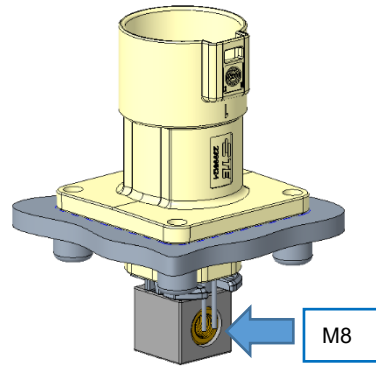


Figure 26 : Assemble header with busbar (180° 1Pos)

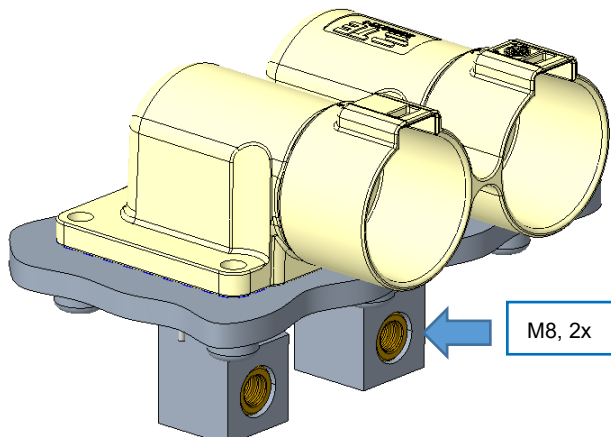


Figure 27 : Assemble header with busbar (90° 2Pos)

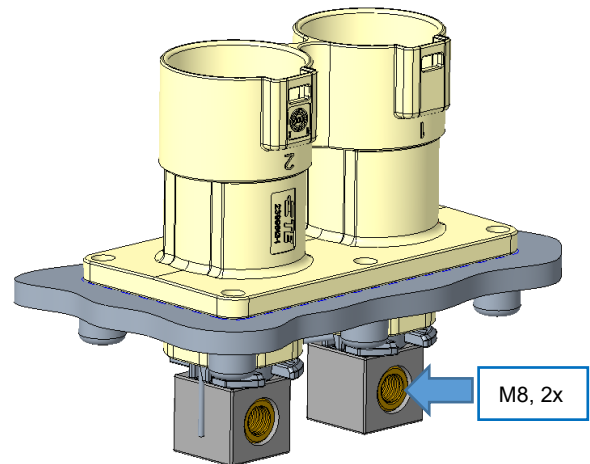


Figure 28 : Assemble header with busbar (180° 2Pos)

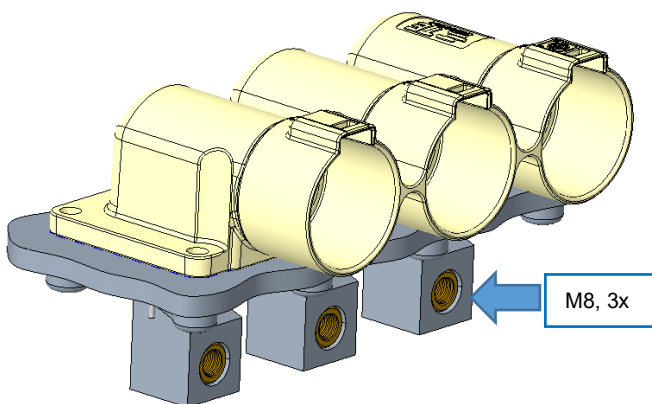


Figure 29 : Assemble header with busbar (90° 3Pos)

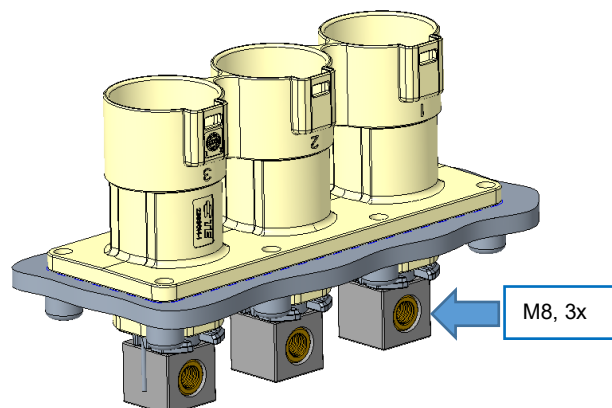


Figure 30 : Assemble header with busbar (180° 3Pos)

5.5 Assemble Header ASSY Through Hole with Busbar 通孔公端连接器组装到汇流排

It takes one bolt of M8 to assemble one position header ASSY with busbar, while two position header ASSY need two bolts and three position header ASSY need three bolts.

It's recommended that using M8 bolts, and the tightening torque is better to be 15 ± 1.5 N·m.

使用一颗M8螺栓将公端连接器与汇流排连接，两位、三位的公端连接器分别需要两颗、三颗螺栓。推荐使用M8螺栓，安装扭矩建议 15 ± 1.5 牛·米。

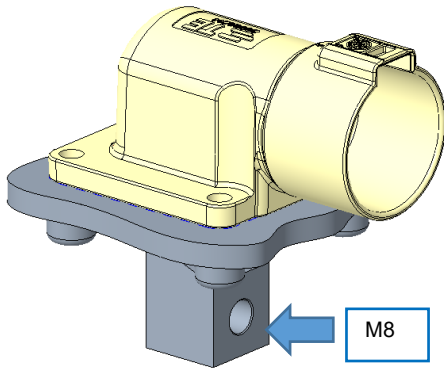


Figure 31 : Through hole header with busbar (90° 1Pos)

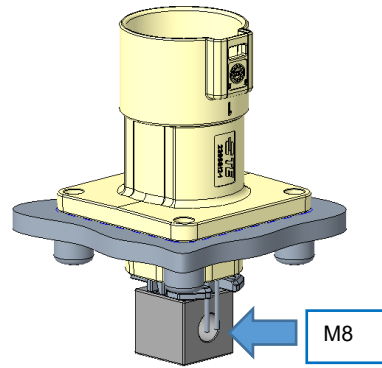


Figure 32 : Through hole header with busbar (180° 1Pos)

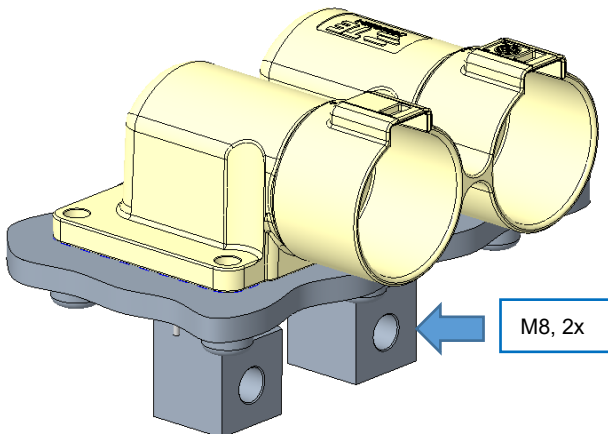


Figure 33 : Through hole header with busbar (90° 2Pos)

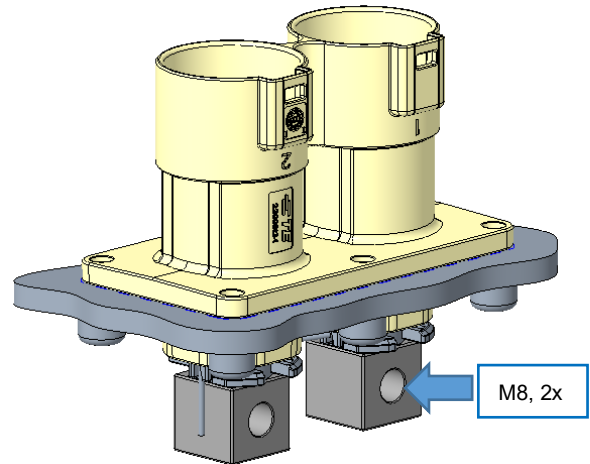


Figure 34 : Through hole header with busbar (180° 2Pos)