2P,3P,4P Sensor Flat Connector SPECIFICATION

2 位,3 位,4 位传感器扁平连接器 产品规范

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1. SCOPE 适用范围

1.1 Content 内容

This specification covers the performance, test and quality requirements for 2P,3P,4P sensor flat connector (hereinafter referred to as 2P,3P,4P).
This specification applies to the product 2345388-1/2, 2345390-1/2, 2345394-1/2, but not limited to it.

本规范适用于 2P,3P,4P 传感器扁平连接器 (以下简称 2P,3P,4P) 的性能，测试和质量要求。
本规范适用但不仅限于以下产品料号：2345388-1/2，2345390-1/2，2345394-1/2。

1.2 Qualification 鉴定

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

本测试规范依照下面的规范及标准执行。所有的检验应依照合适的检验计划及产品图纸执行。

2. APPLICABLE DOCUMENTS 适用文件

2.1 Usable document 使用文件

In the event of conflict between the requirements of this specification and the drawing, the drawing shall take precedent.
In the event of conflict between the requirement of this specification and the referenced documents, this specification shall take precedent.

在本规范的要求与图纸发生冲突时，以产品图纸为准。在本规范的要求与参考文件发生冲突时，以本规范为准。

2.2 TE specifications 泰科电子规范

109-1: General requirements for Test Specifications / 测试通用规范
108-18509-1: Product Specification for 2.8mm Sensor Contact System
114-18144-1: Application Specification for 2.8mm Sensor Contact System

2.3 Other specifications 其他规范

A. IEC 60512
Connectors for electronic equipment tests and measurements

B IEC 60068
Electrical engineering, basic environmental testing procedures

C DIN 40050 part 9
Road vehicles, IP code, degree of protection.

D ISO 8092-2
Road vehicles –Connections for on-board electrical wiring harnesses

E ISO 16750
Road vehicles environmental conditions and testing for electrical and electronic equipment.

F SAE/USCAR-2 Revision 6;
Performance specification for automotive electrical connector systems

3. REQUIREMENT 要求

3.1 Design and Construction 设计和结构

Products must meet the design, construction and physical dimensions specified in the applicable product drawings.

产品必须满足产品图纸上的设计，结构和尺寸要求。

3.2 Material 材料

Description of the material sees the related product drawings.

材料描述见相关产品图纸。

3.3 Test parameters and tolerances 测试参数与公差

Table 1: Test parameters and tolerances

Requirement 要求	Tolerance 公差
Ambient temperature 环境温度	23°C ± 5°C
Relative humidity 相对湿度	45% to 75%
Atmospheric pressure 大气压力	96kPa ± 10kPa

3.4 Ratings 等级

A. Operating Temperature / 工作温度: -40~120°C
B. Storage Temperature / 储存温度: 5~40°C
C. Rated voltage / 额定工作电压: < 50 VDC
D. Current carrying capability / 载流能力: see specification 108-18509-1.

3.5 General Performance and Test description 通用性能和试验描述

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para.4. All testes must be performed at the test condition of the TE test specification 109-1 unless otherwise specified.

产品应能满足段落 4 中的电气，机械和环境等性能要求。所有试验均需按照 TE 规范 109-1 中的测试条件进行，除非另有说明。

3.6 Tests requirement and method summary 测试要求及方法

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in chapter 3.6 All test are performed at ambient environmental conditions per IEC 60512 unless otherwise specified

	Test items	Requirements	procedures
VISUAL INSPECTIO	**3.6.1 Visual Inspection**	Meets requirements of applicable production drawing	Visually, dimensionally and functionally inspected per applicable quality inspection plan.
MECHANICAL TEST	**3.6.2 Contact Insertion Force**	Insertion force: ≦30N	Acc. To ISO 8092-2 4.6.2
	3.6.3 Contact Retention Force	Retention force with primary lock (ref. 5.4.1.3.B6) (N): ≧60N Retention force with primary lock+ secondary lock (ref. 5.4.1.3.B8) (N): ≧100N Retention force with Primary + Secondary Lock after Temp/ Humidity and HTE (ref. 5.6.2, 5.6.3) (N) ≧70N	Acc. To SAE/USCAR-2 5.4.1
	3.6.4 Connector Insertion and Removal Force	Insertion force (Con. fully loaded) force: ≦75N(2P); ≦85N(3P); ≦ 110N(4P) Removal Force Connector latch completely disengaged (Con. fully loaded) force: ≦75N(2P,3P,4P) Removal Force Connector latch fully engaged (Con. Fully loaded) force: ≧120N	Acc. To SAE/USCAR-2 5.4.2
	3.6.5 Twisting Test	Contact resistance (Specified Current) 30mV/A Max. (Final)	AMP Spec. 109-5215 of test method B: 1.Twisting with about 78.4N; 2.Pull back and forth either side; 3.When mating start and end position. 4.repeat the test 10 times.
	3.6.6 Drop Test	No physical damage allowed Single fall, 2 transition,1m down to concrete floor	Acc. to ISO 16750-3 and IEC 60068-2-32
	3.6.7 CPA Engagement and Removal Force	1.CPA pre-lock to lock (with connector mated): 22N Max 2.CPA lock to pre-lock:5N~30N 3.CPA removal from pre-lock:30N Min	Acc. To: USCAR-2 5.4.5.2

	Test items	Requirements	procedures
MECHANICAL TEST	**3.6.8 Mechanical Shock Test**	No abnormalities in appearance; No electrical discontinuity greater than 1us shall occur.	Duration: total 18shocks; 6 directions Vibration shape: Half-sine a=400m/s2 t=6ms
	3.6.9 Vibration Test	No abnormalities in appearance; No electrical discontinuity greater than 10us shall occur. Contact resistance (Specified Current) 30mV/A Max. (Final)	Test method 1 (with Sn plating): Acc. To: ISO 16750-3, 4.1.2.1 Test I -- Passenger car, engine Rate of sine acceleration Frequency range 100–440 Hz Frequency variation 0,5octave/minute acceleration 100 Hz a=100 m/s^2 150 Hz a=150 m/s^{25} 200 Hz a=200 m/s^2 240 Hz a=200 m/s^2 270 Hz a=150 m/s^2 440 Hz a=150 m/s^2 Rate of wide-band-random-vibration Frequency range 10 - 2000 Hz Power spectral density 10 Hz 10.00 $(m/s^2)^2$/Hz 100 Hz 10.00 $(m/s^2)^2$/Hz 300 Hz 0.51 $(m/s^2)^2$/Hz 500 Hz 20.00 $(m/s^2)^2$/Hz 2000 Hz 20.00 $(m/s^2)^2$/Hz Total acceleration (RMS) 181 m/s^2 Test duration per main-axis 22h Temperature -40℃….+125℃ A cable strain relief fixed on the same vibration level at a distance of maximal 100 mm to the connector is necessary.
ELECTRICA TEST	**3.6.10 Contact Resistance (Low Level)** **Dry Circuit Resistance**	R < 10 m Ω (Initial) R < 30 m Ω (Final)	Acc. To: AMP Spec. 109-5311-1 USCAR 2-6, 5.3.1
	3.6.11 Contact Resistance (Specified Current)	10mV/A Max (Initial) 30mV/A Max (Final)	Acc. To: AMP Spec. 109-5311-2
	3.6.12 Dielectric Strength	Value and nature of test voltage: U= 500V (AC) Frequency: 50 or 60Hz No flash over or breakdown between adjacent contacts	Acc. to ISO 16750-2(4.9) Temperature: 30~40℃ Humidity: 45~55%RH Duration: 60s
	3.6.13 Insulation Resistance	Value and nature of the test voltage: 500V direct voltage R_{min} >100M Ω	Acc. to ISO 16750-2 (4.10)

	Test items	Requirements	procedures
ENVIROMENT TEST	**3.6.14 Cold Test**	Contact resistance（Low Level） 10mΩ Max. (Initial) 30mΩ Max. (Final)	Short time: 120h, -40℃ AMP Spec. 109-5108
	3.6.15 Dry Heat Test	Contact resistance（Low Level） 10mΩ Max. (Initial) 30mΩ Max. (Final)	Short time 120h: +120℃ AMP Spec. 109-5104
	3.6.16 Watertight Sealing	98 KPa Min. (Initial) 29.4 KPa Min. (Final)	Blow compressed air into mated pair of connectors through a small hole. Place the connector in 30cm deep water, And must withstand the air pressure of 9.8kpa(0.1kgf/cm^2) for 30s increase pressure at a rate of 9.8kpa each time until air leakage takes place.
	3.6.17 Humidity Steady State	Contact resistance（Low Level） 10mΩ Max. (Initial) 30mΩ Max. (Final)	Mated connector, 90～95％R.H.,60℃ 96hours AMP Spec. 109-5105
	3.6.18 Thermal Shock	Contact resistance（Low Level） 10mΩ Max. (Initial) 30mΩ Max. (Final)	Mated connector -50℃/30min.,120℃/30min. Making this a cycle, Repeat 100cycles. AMP Spec. 109-5103
	3.6.19 Water Splash (High Pressure Spra)	IPX9K	Acc. To DIN 40050 part 9 (USCAR 2-6, 5.6.7)
	3.6.20 Connector Cycling	10 Times	USCAR-2-6, 5.1.7
	3.6.21 Pressure/Vacuum Leak	No evidence of water or florescent dye shall be present in the interior of either mated connector	USCAR-2-6, 5.6.6 air pressure: 48 kPa (7psig) of Vacuum 15 seconds
	3.6.22 High Temperature Exposure	No defect, crack, could not affect their fit and function	USCAR-2-6, 5.6.3 125℃ 1008Hours
	3.6.23 Voltage Drop	≤50mV	USCAR-2-6, 5.3.2 MCON 1.2LL wire size 1.5mm^2
	3.6.24 Submersion	No evidence of water or florescent dye shall be present in the interior of either mated connector	USCAR-2-6, 5.6.5 125℃ chamber 2H 0℃ salt water 30 Minute

3.7 Test sequence 试验顺序

Table 2: Test Sequence

Parag.	Test Item	Test Group 组 别								
		TG1	TG2	TG3	TG4	TG5	TG6	TG7	TG8	TG9
3.6.1	Visual Inspection	1,4	1,4	1,5	1,8	1,8	1,8	1,7	1,3	1
3.6.2	Contact Insertion Force	2								
3.6.3	Contact Retention Force	3								12
3.6.4	Connector Insertion and Removal Force		2							
3.6.5	Twisting Test			3						
3.6.6	Drop Test		3							
3.6.7	CPA Engagement and Removal Force								2	
3.6.8	Mechanical Shock Test				5					
3.6.9	Vibration Test				6					
3.6.10	Contact Resistance (LLCR)					2,5	2,6	2,5		3,7
3.6.11	Contact Resistance (Specified Current)			2,4	2,7					
3.6.12	Dielectric Strength				3					
3.6.13	Insulation Resistance				4					5
3.6.14	Cold Test						4			
3.6.15	Dry Heat Test						5			
3.6.16	Watertight Sealing					3,6	3,7	3,6		
3.6.17	Humidity Steady State							4		
3.6.18	Thermal Shock					4				
3.6.19	Watertight Splash					7				11
3.6.20	Connector Cycling									2
3.6.21	Pressure/Vacuum Leak									4,9
3.6.22	High Temperature Exposure									6
3.6.23	Voltage Drop									8
3.6.24	Submersion									10
Test Sample Amount		**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**

The numbers indicate sequence in which tests are performed.

4. QUALITY 质量

4.1 Qualification test 鉴定

Samples must be in accordance with drawings and be taken in a random way in the production in progress.

样件必须与产品图纸一致，并且是生产过程中随机选取的。

4.2 Requalification test 重新鉴定

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by product engineering.

如果产品或者制造过程中有显著影响外观，装配和功能的设变，质保需要协调按照原先工程部定义的测试顺序，重新验证全部或者部分测试项目。

4.3 Acceptance 验收

Acceptance is based on verification that the product meets the requirements of section 3.6. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

归咎于测试设备，样件安装或者操作员的失误的失效不应判定产品不合格。当产品失效发生时，需要有纠正措施以及重新提交样件进行验证。在重新验证前，需确认已有纠正措施。

4.4 Quality conformance inspection 质量合格检验

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification

TE Connectivity 的质量检验计划将指定适用的质量标准。尺寸和功能要求，应按照适用的产品图纸和本规范。