

DESIGN OBJECTIVES

108-101133

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. Tyco Electronics/AMP makes no representation or warranty, express or implied, that the product will comply with these requirements, Further, Tyco Electronics/AMP reserves the right these requirements based on the results of additional testing and evaluation. Contact TycoElectronics /AMP Engineering for further information. If necessary, This document will become the Product Specification at successful completion of testing.

1. Scope:

1.1) Contents.

This specification covers the performance, tests and quality requirements for an electrical control unit connector, 2&3&4 positions for several Tyco Electronics MCP 2.8K Sensor contacts.

1.2) Qualification


When tests are performed on the subject product line, the procedures specified in Tyco 109 series specifications shall be used. All inspections shall be performed using the applicable Inspection Plan and Product Drawing.

2. Applicable Documents:

The following documents form a part of this Specification to the extent specified herein. In the event of conflict between the requirements of this Specification and the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1) TE Specifications:

- a) 109-1 Series: Test Specification, Requirements for Test Methods
- b) Product specification:
108-18509-1 Product Specification for 2.8mm Sensor Contact System
- c) Application specification
114-18144-1 Application Specification for 2.8mm Sensor Contact System

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LTR	REVISION RECORD	DATE	DR	APVD	PAGE 1/7	TITLE 2&3&4Pos Plugs for EDC7 Sensors		

2.2) General Documents

- 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
- F ISO 16750
Road vehicles environmental conditions and testing for electrical and electronic equipment.
- G SAE/USCAR-2 Revision 4;
Performance specification for automotive electrical connector systems

3. Requirements:

3.1) Design and Construction:

Product shall be of the design, construction and physical dimension specified in the applicable product drawing.

3.2) Materials:

Details are shown in the product drawing.

3.3) Ratings:


- A Voltage: < 50V
- B Current carrying capability: See specification 108-18509-1
- C Temperature range: -40 to +120 °C

3.4) Degree of Protection

IP X9K


3.5) Performance and Test Descriptions

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

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3.6) Requirements and procedures (Fig. 1)

	Test items	Requirements	procedures
VISUAL INSPECTION	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: $\cong 30N$	Acc. To ISO 8092-2 4.6.2
	3.6.3 Contact Retention Force	Retention force: $\cong 60N$	Acc. To ISO 8092-2 4.7.2 A constant force is applied on the cable in axial direction and is held for 10s.
	3.6.4 Connector Insertion and Removal Force	Insertion and removal force: $\cong 75N$	Acc. To SAE/USCAR-2 5.4.2.4
	3.6.5 Twisting Test	Contact resistance (Specified Current) 30mV/A Max. (Final)	Test method B of AMP Spec. 109-5215
	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


	Test items	Requirements	procedures		
MECHANICAL TEST	3.6.7 Mechanical Shock Test	No abnormalities in appearance; No electrical discontinuity greater than 1us shall occur.	Duration: total 18shocks; 6 directions Vibration shape: Half-sine $a=400m/s^2$ $t=6ms$		
	3.6.8 Vibration Test	No abnormalities in appearance; No electrical discontinuity greater than 10us shall occur. Contact resistance (Specified Current) 30mV/A Max. (Final)	Acc. To: ISO 16750-3 4.1.3.2.2 Test VI Equipment mounted on engine or gearbox		
ELECTRICAL TEST	3.6.9 Contact Resistance (Low Level)	$R < 10 m \Omega$ (Initial) $R < 30 m \Omega$ (Final)	Acc. To: AMP Spec. 109-5311-1		
	3.6.10 Contact Resistance (Specified Current)	10mV/A Max (Initial) 30mV/A Max (Final)	Acc. To: AMP Spec. 109-5311-2		
	3.6.11 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°C Humidity: 45~55%RH Duration: 60s		
	3.6.12 Insulation Resistance	Value and nature of the test voltage: 500V direct voltage $R_{insu} > 100M \Omega$	Acc. to ISO 16750-2 (4.10)		
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	Test items	Requirements	procedures
ENVIRONMENT TEST	3.6.13 Cold Test	Contact resistance (Low Level) 10m Ω Max. (Initial) 30m Ω Max. (Final)	Short time: 120h, -40°C AMP Spec. 109-5108
	3.6.14 Dry Heat Test	Contact resistance (Low Level) 10m Ω Max. (Initial) 30m Ω Max. (Final)	Short time 120h: +120°C AMP Spec. 109-5104
	3.6.15 Watertight Sealing	98 kpa Min. (Initial) 29.4kpa 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.
	3.6.16 Humidity Steady State	Contact resistance (Low Level) 10m Ω Max. (Initial) 30m Ω Max. (Final)	Mated connector, 90~95%R.H.,60°C 96hours AMP Spec. 109-5105
	3.6.17 Thermal Shock	Contact resistance (Low Level) 10m Ω Max. (Initial) 30m Ω Max. (Final)	Mated connector -50°C/30min.,120°C/30min. Making this a cycle, Repeat 100cycles. AMP Spec. 109-5103
	3.6.18 Water Splash	IPX9K	Acc. To DIN 40050 part 9

Para g.	Test Item	Test Group							
		TG1	TG2	TG3	TG4	TG5	TG6	TG7	TG8
3.6.1	Visual Inspection	1,4	1,4	1,5	1, 8	1,8	1,7	1,7	1,7
3.6.2	Contact Insertion Force	2							
3.6.3	Contact Retention Force	3							
3.6.4	Connector Insertion and Removal Force		2						
3.6.5	Twisting Test			3					
3.6.6	Drop Test		3						
3.6.7	Mechanical Shock Test				5				
3.6.8	Vibration Test				6				
3.6.9	Contact Resistance (LLCR)					2,5	2,5	2,5	2,5
3.6.1 0	Contact Resistance (Specified Current)			2,4	2,7				
3.6.1 1	Dielectric Strength				3				
3.6.1 2	Insulation Resistance				4				
3.6.1 3	Cold Test						4		
3.6.1 4	Dry Heat Test							4	
3.6.1 5	Watertight Sealing					3,6	3,6	3,6	3,6
3.6.1 6	Humidity Steady State								4
3.6.1 7	Thermal Shock					4			
3.6.1 8	Watertight Splash					7			
Test Sample Amount		3	3	3	3	3	3	3	3

Numbers indicate sequence in which tests are performed.

Fig.2

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4. QUALIFICATION TEST

4.1 Sample selection

Samples shall be prepared in accordance with applicable specification. Each test group shall consist of five pieces.

4.2 Test sequence

Qualification test shall be conducted as sequence specified in Fig.2

4.3 Re-qualification test


If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall co-ordinate re-qualification testing, consisting of all or part of original testing sequence as determined by developments, product, quality and reliability engineering.

4.4 Acceptance

Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

4.5 Quality conformance inspection

Applicable AMP quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable production drawing and this specification

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