Z-Pack Slim UHD Power Connector System

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. Tyco Electronics makes no representation on warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics reserves the right to change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further information, if necessary.

1 SCOPE

1.1 Content

This specification covers performance, test and quality requirements for the Tyco Electronics* Z-Pack Slim UHD Power Connector System. This connector system interconnects two printed circuit boards. Both receptacle and plug connectors are connected to the printed circuit board with plated thru-hole compliant press-fit leads.

1.2 Qualification

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extend specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 Tyco Electronics Documents

114-19122	Application Specification
501-19XXX	Qualification Test Report (Z-Pack Slim UHD High Speed Connector System)

2.2 Tyco Electronics Drawing

C-1982257	Receptacle Connector (Vertical)
C-1852260	Plug Connector (Right-angle)

2.3 Other Documents

IEC 60512	Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068	Basic environmental testing procedures.

DR. R. Daamen	DATE 23 June 2008	APVD.	DATE xx Xxx xx

EC:

3 REQUIREMENTS

3.1 Design and Construction

Products shall be of design, construction and physical dimensions as specified on the applicable product drawing.

3.2 Materials and Finish

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3 Ratings

A.	Voltage:	**60** V AC
B.	Current:	15 A/contact (fully loaded)
C.	Temperature:	-55 °C to 105 °C
D.	Durability:	250 cycles

3.4 Performance and Test Description

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in Paragraph 3.6.
Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and are performed with connectors in fully mated condition.

VISUAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
3.4.1	Visual examination	Meets applicable requirements specified on product drawing, customer drawing, and application specification.	Visual, dimensional and functional per applicable inspection-plan. In accordance with IEC 60512-1-1.
ELECTRICAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
3.4.2	Contact resistance	Max. open voltage 20 mV. Max. current 100 mA DC. Requirement: Initial 20 mΩ max. Increase 10 mΩ max. after test.	In accordance with IEC 60512-2-1. See paragraph 3.5.1.
3.4.3	Insulation resistance	Test voltage: 100 VDC. Duration: 1 minute. Measure between adjacent contacts. Requirement: 10.000 MΩ min.	In accordance with IEC 512-3-1.
3.4.4	Voltage proof	Test voltage: 500 VAC. Duration: 1 minute. Test between adjacent contacts. Requirement: No break-down or flash-over.	In accordance with IEC 60512-2-4a.
3.4.5	Current load cyclic	Test current 19 A(125% of rated current). 1 cycle is 45 min. ”on” & 15 min. ”off”. Number of cycles: 20. Test shall be conducted with all contacts charged simultaneously.	In accordance with IEC 60512-9-5.
3.4.6	Temperature rise	Test shall be conducted with all contacts charged simultaneously. Requirement: ΔT 30 °C max. at 19 A (125% of rated current).	In accordance with IEC 60512-5-1.

MECHANICAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
3.4.7	Mating force	Connectors aligned. Speed: 10 mm/s. Requirement: 1.2 N/contact max X nr of contacts	In accordance with IEC 60512-7-13b.
3.4.8	Un-mating force	Connectors aligned. Speed: 10 mm/s. Requirement: 0.1 N/contact min X nr of contacts.	In accordance with IEC 60512-7-13b.
3.4.9	Mechanical operation	Mate / un-mate 250 cycles. Connectors aligned. Speed: 2 mm/s. Rate: 10 cycles/minute. Requirement: No functional damage. Contact resistance. Insertion force.	In accordance with IEC 60512-9-1.
3.4.10	Vibration sinusoidal	10-500 Hz sweeping, 1 octave/minute. Amplitude 0.35 mm max., acceleration 50 m/s^2 max. 15 minutes in each of 3 mutual perpendicular axes. Printed circuit boards mutually fixated. Requirement: No physical damage. Contact discontinuity 1 μs max. Contact resistance.	In accordance with IEC 60512-6-4. See paragraph 3.5.2.
3.4.11	Shock test	Pulse shape: Half sine. Peak acceleration: 490 m/s^2. Duration of pulse: 11 ms. Apply 3 shocks in each direction of 3 mutual perpendicular axes (18 shocks). Requirement: No physical damage. Contact discontinuity 1 μs max. Contact resistance.	In accordance with IEC 60512-6-3. See paragraph 3.5.2.
3.4.12	Retention force	Force to unseat connector 0.25 mm from board. Speed: 0.5 mm/s. Requirement: **XX** N/column average min. (plug) **XX** N/column average min. (receptacle).	In accordance with IEC 60512-5-8b (male) or IEC 60512-5-8a (female). See paragraph 3.5.4.

ENVIRONMENTAL			
Para	**Test Description**	**Performance Requirement or Severity**	**Procedures**
3.4.13	Cold	Temperature -55 °C. Duration 96 hours. Recovery: 2 hours at ambient atmosphere. Requirements: No physical damage. Contact resistance.	In accordance with IEC 68-2-1-Ab.
3.4.14	Dry heat	Temperature 125 °C. Duration 96 hours. Recovery: 2 hours at ambient atmosphere. Requirements: No physical damage. Contact resistance.	In accordance with IEC 68-2-2-Bb.
3.4.15	Rapid change of temperature	-55 °C / +125 °C, variation ± 5 °C/minute. 25 cycles. Requirements: No physical damage. Contact resistance.	In accordance with IEC 68-2-14-Nb.
3.4.16	Damp heat cyclic	Temperature 25-55 °C, RH 90-100% for 6 cycles of 24 hours each. Transition time: 3 hours. Recovery: 2 hours at 25 °C, RH 75%. Requirements: No physical damage. Contact resistance. Insulation resistance.	In accordance with IEC 68-2-30-Db.
3.4.17	Damp heat steady state	Temperature 40°C, RH 95% for 21 days. Requirements: No physical damage. Contact resistance. Insulation resistance.	In accordance with IEC 60512-11-3.
3.4.18	Mixed flowing gas corrosion	96 hours. H_2S 0.1 ppm, SO_2 0.5 ppm. Temperature 25 ± 2 °C, RH 75%. Recovery: 1 hour at ambient atmosphere. Requirements: Contact resistance	In accordance with IEC 60068-2-60 Test Ke.

3.5 Additional Test and Measuring Details

3.5.1 Contact resistance

Contact resistance shall be measured as indicated in figure 1.
Contact path bulk of connected parts is not included in the requirement.

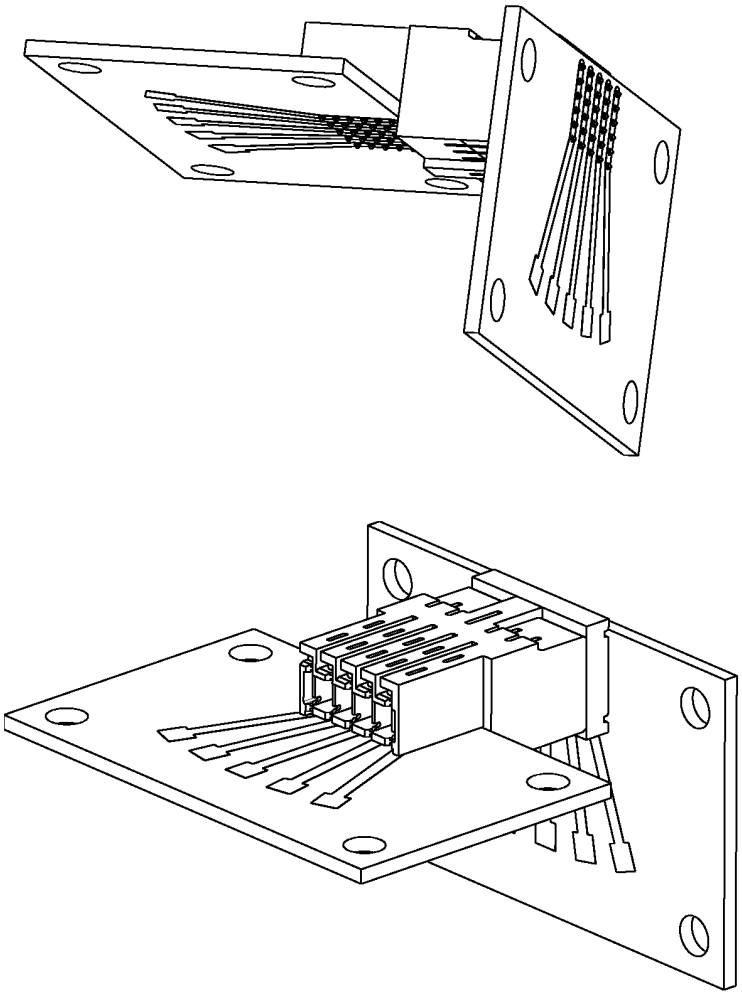

Figure 1. Contact resistance measurement.

3.5.2 Test frames

Test-frames shall provide mechanical stability of the connector in relation to its mating part and shall cover the requirements specified in the Tyco Electronics application specification.

During Vibration, an electrical circuit is checking that no electrical contact interruptions occur that exceed the requirement.

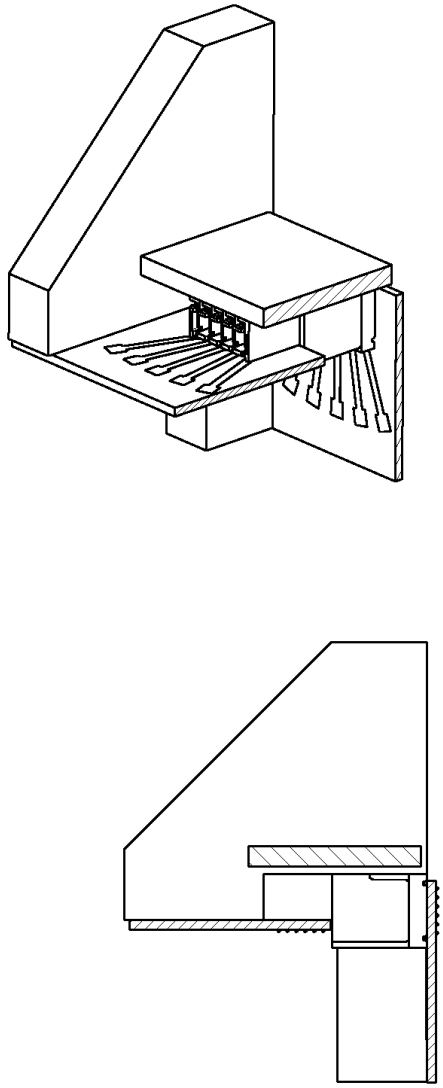

Figure 2. Vibration and Physical shock mounting feature.

3.5.3 Retention force

For testing the mechanical connection to the board, forces shall be applied as indicated in figure 4.

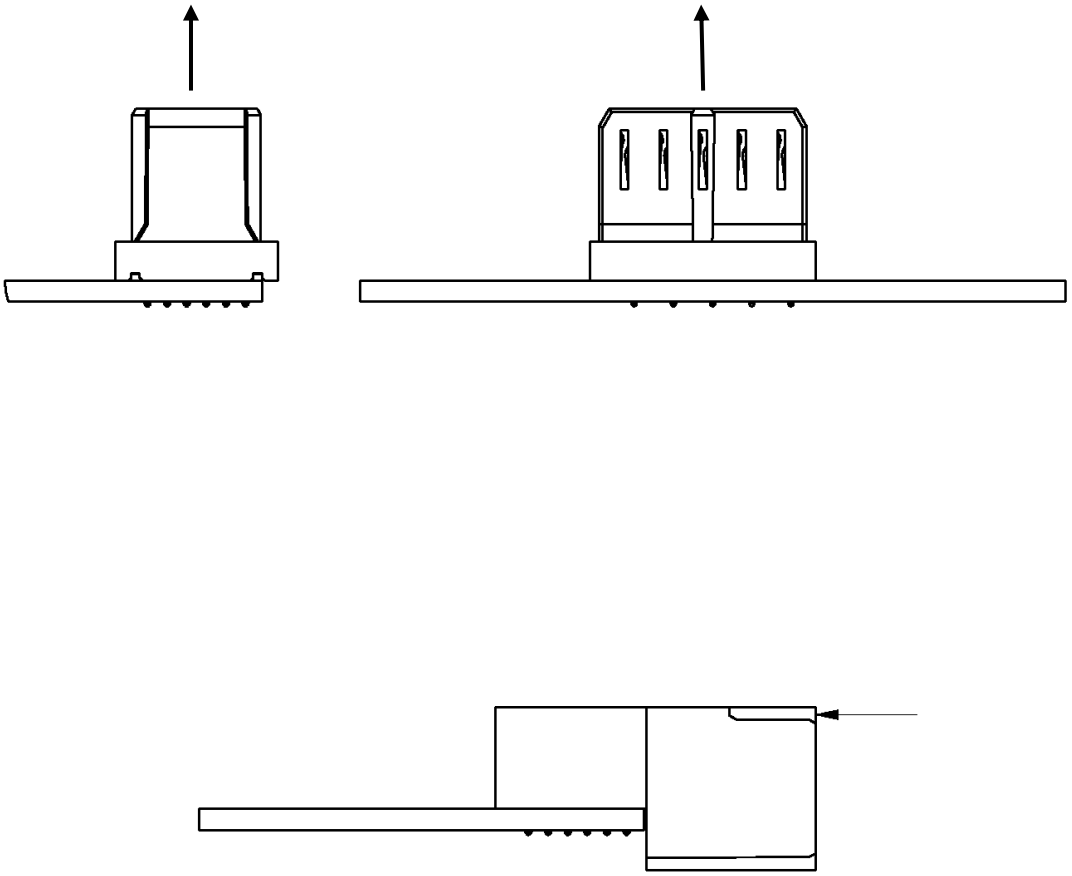

Figure 4. Retention force measurement.

3.6 Product Qualification and Requalification Test Sequence

Test or examination	TEST- GROUP (a)				
	1	2	3	4	5
	TEST-SEQUENCE (b)				
Examination of product	1,15	1,15	1,13	1,11	
Contact resistance	2,6,9,12	2,4,6,8,10, 12	2,4,6,8,10	2,4,6,8,10	
Insulation resistance		13	11		
Voltage proof		14	12		
Current load cyclic			5		
Temperature rise			3		
Insertion force	3,7				
Withdrawal force	4,8				
Durability	5	3		3(c),9(c)	
Vibration sinusoidal	10				
Physical shock	11				
Retention force			7		
Damp heat steady state			9		
Cold		9			
Dry heat		7			
Rapid change of temperature		5			
Damp/heat cyclic		11			
Mixed gas				5	

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Perform 50% of the durability cycles before, and 50% of the durability cycles after the mixed gas testing.

Sample description	Number of described samples in test groups				
	1	2	3	4	
Connector mounted on PC-board	5	5	5	5	

4 QUALITY ASSURANCE PROVISIONS

4.1 Qualification testing

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.
Unless otherwise specified, all test-groups shall consist of a minimum of 5 connectors of which all contacts shall be tested.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in paragraph 3.6.

4.2 Requalification testing

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

4.3 Acceptance

Acceptance is based upon verification that product meets requirements of paragraph 3.4. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmittal.

4.4 Quality conformance inspection

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