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## Two Position Cable-to-Board Power Connector System (Right Angle/Straight) with Coding Contacts

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**NOTE**

*The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts*

**1. SCOPE**

## 1.1. Content

This specification covers the performance, test and quality requirements for the cable connector plug and two board connectors. The cable connector plug assembly is used to connect to the pc-board connector assembly (by means of front panel connection). The cable connectors are in two position configurations. A cable connector plug consists of: 2 position housing suitable for standard- and power-timer contacts, latch, and contacts for 3 different codings.

The cable connector plug mates a two position male board connector (right angle or straight), fixed with a latch device, through the front panel.

## 1.2. Qualification

When tests are performed on subject product, procedures specified in this product 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 extent 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. TE Documents

- 501-19131 Test report. Cable/Board Power Connector assy. (right angle or straight)
- 114-19110 Application specification Cable/Board Power Connector System. (Right angle or straight)
- 114-18037 Application specification Standard Power Timer Contact
- 108-18025 Product specification Standard Power Timer Contact.

**3. REQUIREMENTS**

## 3.1. Design and Construction

Products shall be of design, construction and physical dimensions as specified on the applicable customer product drawings C-1982295, C-2042274 and C-1982299, C-2178186.

## 3.2. Materials and Finish

- Housing cable connector - PBT Glass filled.
- Housings board connector - Liquid crystal polymer (LCP) glass filled, color black, UL 94V-0.
- Contacts power - Copper alloy, silver plated.
- Contacts coding - Copper alloy, under layer nickel plated, contact place selective gold plated.

3.3. Ratings

<b>Operating voltage</b>	500 Vrms.
<b>Current</b>	26 Ampere max. per contact at 65 °C (all contacts simultaneous) for C-1982299 and 30 Ampere max. Per contact at 65° C for C-2178186.
<b>Operating temperature</b>	20°C to 65°C.
<b>Durability</b>	50 cycles.

3.4. Performance and Test Description

The product is designed to meet mechanical and environmental performance specified in this paragraph as tested per test sequence specified in Para 3.5. 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 mated condition.

VISUAL		
Test Description	Performance Requirements or Severity	Procedures
Examination of product	Meets requirements of product drawing and applicable instructions on customer drawing, instruction sheet, and application specification.	Visual, dimensional and functional per applicable inspection plan.

Table 1

<b>ELECTRICAL</b>		
Termination resistance power contacts	<p>Max. open voltage 20mV.  Max. current 100 mA DC.  All contacts to be ensured.  Measuring points shall be as indicated in Figure 2  Termination resistance 1:  Requirement: 0, 8 m<math>\Omega</math> max. (Initial)  0, 8 m<math>\Omega</math> max. (Final)  Termination resistance 2:  Requirement: 0,3 m<math>\Omega</math> max. (Initial)  0, 3 m<math>\Omega</math> max. (Final)</p>	In acc. With IEC 60512-2-1
Termination resistance coding contacts	<p>Max. open voltage 20mV.  Max. Current 100 mA DC.  All contacts to be measured.  Measuring points shall be as indicated in Figure.2  Termination resistance 3:  Contacts:  Requirement: 15 m<math>\Omega</math>max. (Initial)  <math>\square</math>R 5 m<math>\Omega</math>max. (Final)</p>	In acc. With IEC 60512-2-1
Insulation resistance	<p>Test voltage 100V DC or AC peak.  Duration: 1 minute.  Test between adjacent contacts.  Requirement: 5x10<sup>3</sup> M<math>\Omega</math> min. initial  10<sup>3</sup> M<math>\Omega</math> min. final</p>	In acc. with IEC 60512-3-1
Voltage proof	<p>Test voltage 750 Vrms for adjacent Contacts and coding contacts unmated.  Duration 1 minute.  Requirement: no break-down or flash-over</p>	In acc. With IEC 60512-4-1
Short-circuit capacity power contacts	<p>Test current 3000 A/ 10 ms mated  Cable board connector.  Max 5 operations.  Executed by customer.</p>	
Electrical load and temperature	<p>Oven temperature: 65°C  Current: 26 A, all contacts charged for C-1982299  30 A,  All contact charged for C-2178186  Duration: 1000 hrs  Requirement: <math>\Delta</math>T 30°C max.</p>	In acc. with IEC 60512-9-2
Current temperature derating curve	<p>Temperature rise: 30°C maximum over ambient temperature (65°C) at 20 A for C-1982299 and 30A for C-2178186</p>	In acc. with IEC 60512-5-2 test 5b

Table 2

<b>MECHANICAL</b>		
<b>Test Title</b>	<b>Severity Requirements</b>	<b>Procedure</b>
Vibration sinusoidal	10-500 Hz sweeping 1 oct./min., displacement 0,75mm Peak/accel. 10 g , 30 minutes in each 3 mutual perpendicular axes. 3x10 Sweep cycles. No Physical damage. No discontinuity > 1 µsec.	In acc. with IEC 60512-6-4
Physical shock	Subject connector to 50 g half sine Shock pulses of 11 ms duration. 6 shocks in two directions of 3 mutual Perpendicular axes.	In accordance with IEC 60512-6-3
Insertion/withdrawal forces No latch	Mate and unmate connector-pair Speed: 2 mm/sec.Rest: 30 s min. Total mating force 40 N max. Total un-mating force 20 N min Mating-force 15 N max./power contact l.p. Unmating-force 2 N min./power contact l.p. For Gold to Gold Power Contacts Mating- force 20N max / power contact. Un-mating Force 10N min / power contact.	In accordance with IEC 60512-13-2
Insertion forces during wrong polarization. Board connector mounted in fixture.	Apply 250 N straight force at the cable connector, in mating direction during 10 Sec.	In accordance with IEC 60512-15-1
Latch activation.	Force to open latch 20 N max	
Mechanical operation.	Mate and unmate connector-pair Rate: 500 cycles/hour. Speed: 10 mm/s Operation cycles: 50 total.	In accordance with IEC 60512-9-1
Contact retention force in cable connector.	Apply 50 N straight force at a contact of the cable connector, in unmating Direction during 10 sec. Requirement:Max.displacement 0,2 mm	In accordance with IEC 605115-1
Coding contact activation.	The coding contacts shall only make contact when power contacts are mated. See fig.3	--
Cable pull in five directions up-down-right-left-straight.	Cable connector mated on board connector. Pull on pair of wires with 60 N forces, during 10 sec.requirement: No functional damage, latch should be In place.	In accordance with IEC 60512-17-3
Retention force latch Cable/Board connector	Apply 100 N straight force at the cable Connector, in unmating direction.	In acc. with IEC 60512-15-1

Table 3

ENVIRONMENTAL		
Test Title	Performance / Severity Requirements	Procedure
Rapid change of Temperature.	-40°/90°C, 0,5 hrs / 0,5 hrs, 5 cycles	In accordance with IEC 60512-11-4.
Climatic sequence	Dry heat 90° C, 16 Hrs 1 <sup>st</sup> damp heat cycle 25°/55° C, RH 93 % 24 H 93% 24 H	In accordance with IEC 60512-11-1
Damp/heat steady state	Temperature 40°C, RH 93%; duration: 56 days	In accordance with IEC 60512-11-3
Corrosion mixed flowing gas	Temperature 25°C, RH 75%, Cl2 10 ppb, NO2 200 ppb, H2S 10 ppb, SO2 200 ppb. Duration: 10 days	In accordance with IEC 60512-11-7
Resistance to soldering heat board connector	Specimens were subject to the reflow profile. Shown in Figure 1.	TE 109-201, Method C

Table 4

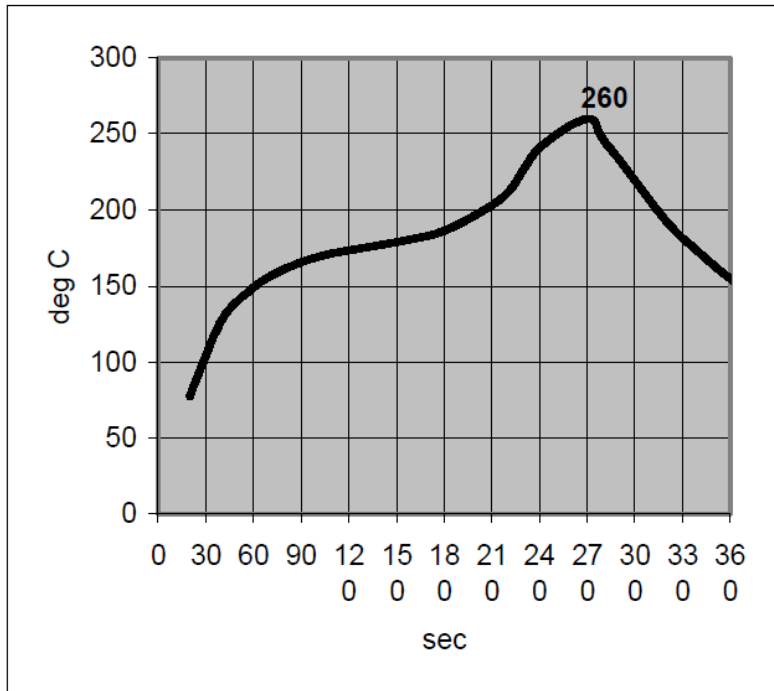


Figure 1

3.5. Additional Test and Measuring Details

A. Termination Resistance Measurement.

Termination resistance shall be measured as indicated in Figure 2.

Bulk of wire is not included in the requirement and therefore it shall be measured and documented separately.

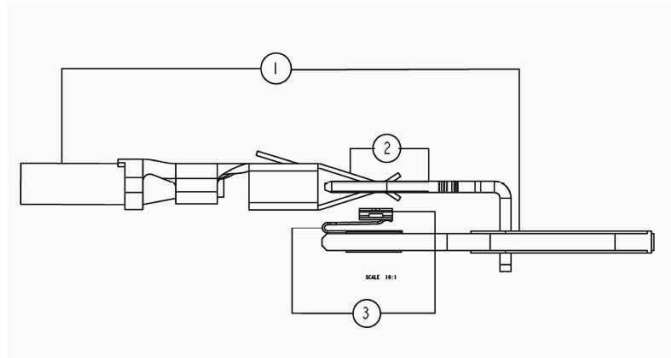


Figure 2

B. Activation of the Coding Contacts

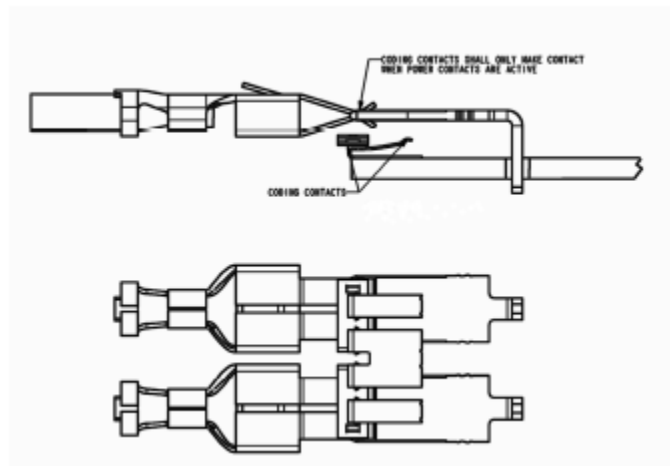


Figure 3

3.6. Product Qualification and Requalification Test Sequence

TEST	TEST-GROUP (a)					
	1	2	3	4	5	6
	TEST-SEQUENCE (b)					
Examination of product	1,13	1,9	1,6	1,17	1,3	1, 3[c]
Termination Resistance	2,5,	2,4,6,8	2,5	2,6,10,14		
Insulation Resistance				3,7,11,15		
Voltage proof				4,8,12,16		
Current derating curve	3					
Current temperature	4					
Vibration sinusoidal			3			
Short circuit capacity power contacts						2
Physical shock			4			
Mechanical operation (half of number)		3,7				
Insertion force during wrong polarization	7					
Latch activation force	8					
Latch retention force	9					
Cable pull in 5 directions	10					
Contact retention in insert	11					
Coding contacts activation	12					
Rapid change of temperature				5		
Climatic sequence				9		
Damp/heat steady state				13		
Corrosion mixed flow gas		5				
Short-circuit capacity power contacts						
Resistance to soldering heat, board conn.					2	
Insertion/Withdrawal Force	6					

- a) See paragraph 4.1
- b) Numbers indicate sequence in which tests are performed.
- c) Executed by the customer

Table 5

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#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification testing

###### Sample Selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

Unless details to perform test require otherwise, plugs shall be terminated on cables according to Applicable instructions and requirements specified in appropriate Application Specification and Instruction Sheet.

Unless otherwise specified all test groups shall consist of a minimum of five connectors of applicable type. Qualification inspection shall be verified by testing samples

##### 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 on verification that product meets requirements of Para 3.4. Failures attributed to Equipment, test set-up, test sub-components 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 re-submittal.

##### 4.4. Quality conformance inspection

Applicable TE 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.