

**2 POS CABLE-to-BOARD POWER CONNECTOR SYSTEM (RIGHT ANGLE / STRAIGHT)
WITH CODING CONTACTS**

"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 2 board connectors. The cable connector plug assy is used to connect to the pc-board connector assembly (by means of front panel connection).

The cable connectors are in 2 position configurations. A cable connector plug consists of: 2 pos position housing suitable for standard- and power-timer contacts, latch, and contacts for 3 different codings.

The cable connector plug mates a 2 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 extend specified herein. Unless otherwise specified, latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

2.1 Tyco 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.

DR. R.Annokkee

DATE 21 may 07

APVD J.Broeksteeg

DATE 21 may 07

Product Specification

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.

3.2 Materials and Finish.

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

3.3 Ratings

- A. Operating voltage - 500 Vrms.
- B. Current - 20 Ampere max. per contact at 65 °C (all contacts simultaneous).
- C. Operating temperature - -10°C to 65°C.
- D. Durability - 50 cycles.

Product Specification

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

ELECTRICAL			
3.4.2.	Termination resistance power contacts	Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured. Measuring points shall be as indicated in fig.2 Termination resistance 1: Requirement: 0,8 mΩ max. (Initial) 0,8 mΩ max. (Final) Termination resistance 2: Requirement: 0,3 mΩ max. (Initial) 0,3 mΩ max. (Final)	In acc. With IEC 60512-2-1
3.4.3	Termination resistance coding contacts	Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured. Measuring points shall be as indicated in fig.2 Termination resistance 3: <u>Contacts:</u> Requirement: 15 mΩ max. (Initial) ΔR 5 mΩ max. (Final)	In acc. With IEC 60512-2-1
3.4.4	Insulation resistance	Test voltage 100V DC or AC peak. Duration: 1 minute. Test between adjacent contacts. Requirement: 5x10 ³ MΩ min. initial 10 ³ MΩ min. final	In acc. with IEC 60512-3-1

Product Specification

3.4.5	Voltage proof	Test voltage 750 Vrms for adjacent contacts and coding contacts unmated. Duration 1 minute. Requirement: no break-down or flash-over	In acc. with IEC 60512-4-1
3.4.6	Short-circuit capacity power contacts	Test current 3000 A/ 10 ms mated cable board connector. Max 5 operations. Executed by Customer.	
3.4.7	Electrical load and temperature	Oven temperature: 65°C Current: 20 A, all contacts charged Duration: 1000 hrs Requirement: ΔT 30°C max.	In acc. with IEC 60512-9-2
3.4.8	Current temperature derating curve	Temperature rise: 30°C maximum over ambient temperature (65°C) at 20 A	In acc. with IEC 60512-5-2 test 5b

M E C H A N I C A L			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.9	Vibration Sinusoidal	10-500 Hz sweeping 1 oct./min., displacement 0,75mm peak/accel. 10 g , 30 minutes in each of 3 mutual perpendicular axes. 3x10 sweep cycles.No Physical damage. No discontinuity > 1 μ sec.	In acc. with IEC 60512-6-4
3.4.10	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 acc. with IEC 60512-6-3
3.4.11	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.	In acc. with IEC 60512-13-2
3.4.12	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 acc. with IEC 60512-15-1
3.4.13	Latch activation	Force to open latch 20 N max	
3.4.14	Mechanical operation	Mate and unmate connector-pair Rate: 500 cycles/hour.Speed: 10 mm/s Operation cycles: 50 total.	In acc. With IEC 60512-9-1
3.4.15	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 acc. with IEC 605115-1
3.4.16	Coding contact activation	The coding contacts shall only make contact when the power contacts are mated. See fig.3	
3.4.17	Cable pull in 5 directions	Cable connector mated on board	In acc. with

Product Specification

	up-down-right-left-straight	connector. Pull on pair of wires with 60 N forces, during 10 sec. Requirement: No functional damage, latch should be in place.	IEC 60512-17-3
3.4.18	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

ENVIRONMENTAL			
3.4.19	Rapid change of Temperature	-40°/90°C, 0,5 hrs / 0,5 hrs, 5 cycles	In acc. with IEC 60512-11-4
3.4.20	Climatic sequence Dry heat 1 st Damp heat cycle Cold 2 nd Damp heat cycle	90°C, 16 hrs 25°/55°C, RH 93%, 24 hrs -40°C, 2 hrs 25°/55°C, RH 93%, 24 hrs	In acc. with IEC 60512-11-1
3.4.21	Damp/heat steady state	Temperature 40°C, RH 93%, Duration: 56 days	In acc. with IEC 60512-11-3
3.4.22	Corrosion mixed flowing gas	Temperature 25°C, RH 75%, Cl ₂ 10 ppb, NO ₂ 200 ppb, H ₂ S 10 ppb, SO ₂ 200 ppb. Duration: 10 days	In acc. with IEC 60512-11-7
3.4.23	Resistance to soldering heat board connector	Specimens were subject to the following reflow profile. Fig 1	Tyco 109-201,method C

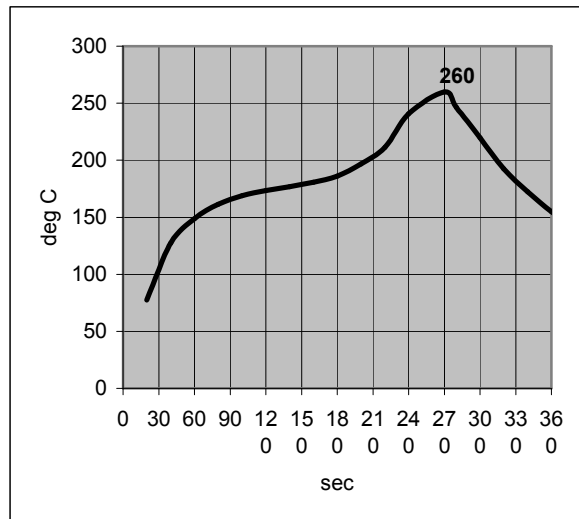


Figure 1

Product Specification

3.5. Additional Test and Measuring Details.

3.5.1 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.

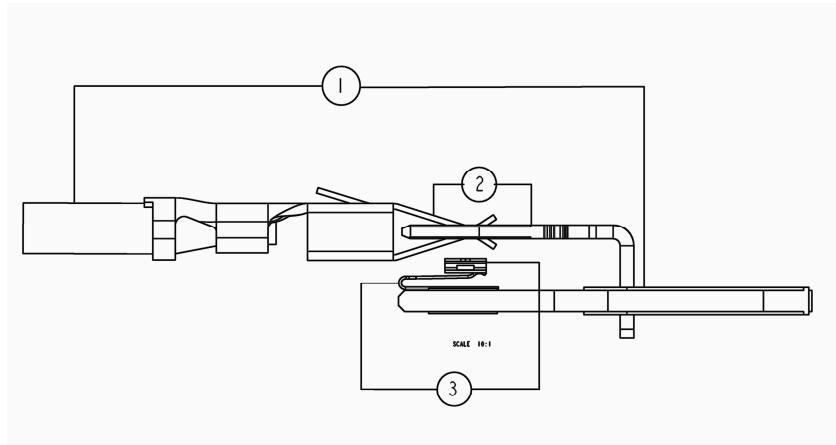


Figure 2

3.5.2 Activation of the coding contacts.

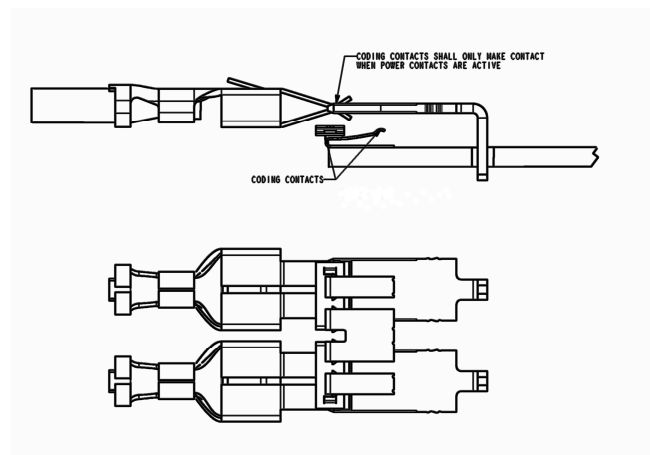


Figure 3

3.7 Product Qualification and Regualification Test Sequence.

Product Specification

Test or examination	TEST-GROUP (a)					
	1	2	3	4	5	6
	TEST-SEQUENCE (b)					
Examination of product	1,14	1,9	1,6	1,17	1,3	c
Termination resistance	2,5,6	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						1
Physical shock			4			
Insertion/withdrawal force	7					
Mechanical operation (half of number)		3,7				
Insertion force during wrong polarization	8					
Latch activation force	9					
Latch retension force	10					
Cable pull in 5 directions	11					
Contact retention in insert	12					
Coding contacts activation	13					
Rapid change of temperature				5		
Climatic sequence				9		
Damp/heat steady state				13		
Corrosion mixed flowing gas		5				
Short-circuit capacity power contacts						
Resistance to soldering heat, board conn.					2	

a) See Para 4.1

b) Numbers indicate sequence in which tests are performed.

c) Executed by the customer.

Product Specification

4 QUALITY ASSURANCE PROVISIONS.

4.1 Qualification Testing.

Sample Selection.

Samples shall be prepared in accordance with applicable instructions and shall be selected 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 5 connectors of applicable type. Qualification inspection shall be verified by testing samples as specified in Para 3.7.

4.2 Requalification Testing.

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate re-qualification 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 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.