
Right Angle EP Connectors

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Right Angle Economy Power (EP) Connectors.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Successful qualification testing on the subject product line was completed on 23Jun09. The Qualification Test Report number for this testing is 501-707. This documentation is on file at and available from Engineering Practices and Standards (EPS).

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 of this specification and the product drawing, 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. Tyco Electronics Document

- ! 109-202: Test Specification (Component Heat Resistance to Wave Soldering)
- ! 501-707: Qualification Test Report (Right Angle EP Connectors)
- ! 502-1262: Engineering Report (Solderability and Component Heat Resistance to Wave Soldering Testing of Right Angle EP Connectors)

2.2. Industry Document

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Document

109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

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

3.3. Ratings

- ! Voltage: 250 volts AC/DC
- ! Current:

Connector Size	Wire Size (AWG)		
	18	20	22
2 Position	7.5 amperes	6.0 amperes	5.0 amperes
7 Position	6.0 amperes	5.0 amperes	4.0 amperes
12 Position	5.0 amperes	4.0 amperes	3.0 amperes

Figure 1

- ! Temperature: -25 to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 2. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	10 milliohms maximum initial. 20 milliohms maximum final.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 4.
Insulation resistance.	1000 megohms minimum initial. 500 megohms minimum final.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1.5 kilovolts AC at sea level. Test between adjacent contacts of mated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. See Figure 4.

Figure 2 (continued)

Test Description	Requirement	Procedure
MECHANICAL		
Sinusoidal vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10 to 55 to 10 Hz traversed in 1 minute with 1.5 mm maximum total excursion. Two hours in each of 3 mutually perpendicular planes. See Figure 5.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 50 cycles at a maximum rate of 500 cycles per hour.
Mating force.	9.8 N maximum per contact.	EIA-364-13. Measure force necessary to mate specimens with housing lock disabled at a maximum rate of 25.4 mm per minute.
Unmating force.	1.70 N minimum per contact on the 1 st cycle. 0.98 N minimum per contact on the 50 th cycle.	EIA-364-13. Measure force necessary to unmate specimens with housing lock disabled at a maximum rate of 25.4 mm per minute.
Post retention force.	29.4 N minimum	Measure post retention force at a maximum rate of 25.4 mm per minute.
Connector locking strength.	49.0 N minimum.	EIA-364-98. Measure connector locking strength at a maximum rate of 25.4 mm per minute.
Component heat resistance to wave soldering.	See Note.	These tests were not performed as part of qualification testing, see Engineering Report 502-1262 for test procedures and results.
Solderability.	Solderable area shall have a minimum of 95% solder coverage.	

Figure 2 continued)

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition I. Subject mated specimens to 25 cycles between -55 and 85°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity, steady state.	See Note.	EIA-364-31, Method II, Test Condition B. Subject mated specimens to 40 ± 2°C and 90 to 95% RH for 240 hours.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.

NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 3.

Figure 2 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Initial examination of product	1	1	1	1	1
LLCR	4,8	2,5			
Insulation resistance			2,6		
Withstanding voltage			3,7		
Temperature rise vs current				2	
Sinusoidal vibration	6				
Mechanical shock	7				
Durability	5				
Mating force	2,9				
Unmating force	3,10				
Post retention force					3
Connector locking strength					2
Thermal shock		3	4		
Humidity, steady state			5		
Humidity/temperature cycling		4			
Final examination of product	11	6	8	3	4

NOTE

- (a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Each test group shall consist of a minimum of 5 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

4.2. Requalification Testing

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

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall 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.

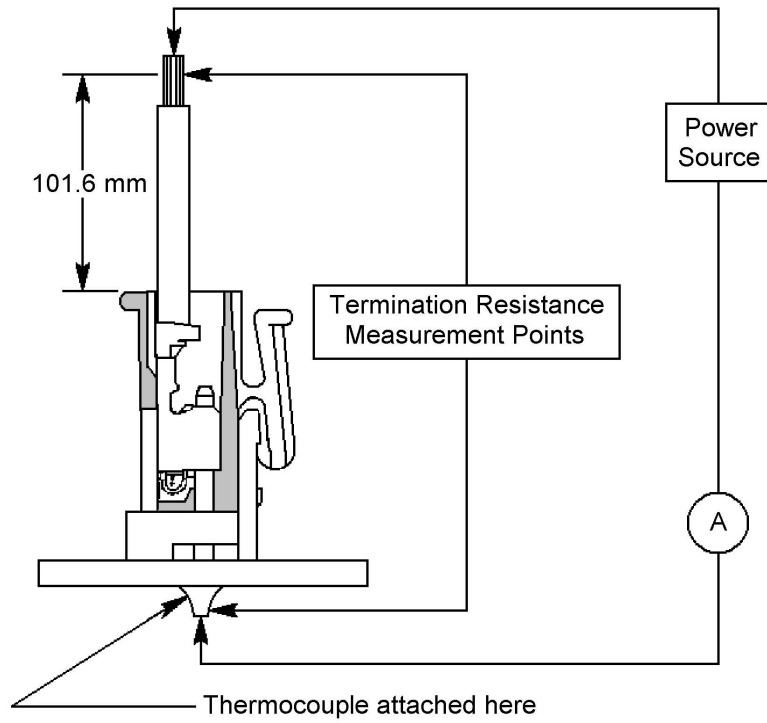


Figure 4
Low Level Contact Resistance and Temperature Rise vs Current Measurement Points

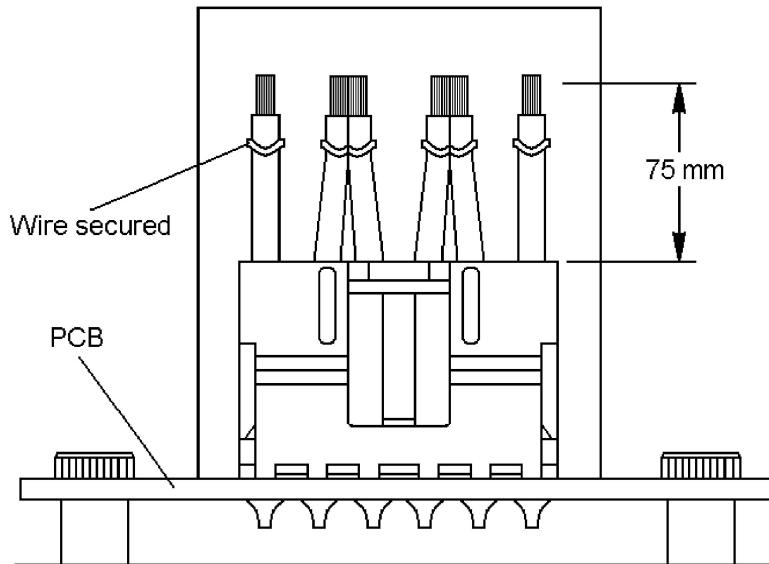


Figure 5
Vibration & Mechanical Shock Mounting Fixture