
Non-Concentric Twinax Pin and Socket Assemblies

DESIGN OBJECTIVES

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

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Non-Concentric Twinax Pin and Socket assemblies which are used in connector systems such as rectangular Quadrax, ARINC* 600 and MIL-DTL-38999 style 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.

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 Documents

- 109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)
- 114-13188: Application Specification (Non-Concentric Twinax Pin and Socket Assemblies)
- 501-TBD: Qualification Test Report (Non-Concentric Twinax Pin and Socket Assemblies)

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- TIA/EIA-568-B.2: Commercial Building Telecommunications Cabling Standard Part 2 - Balanced Twisted-Pair Cabling Components

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: TBD
- Current: 1 ampere for signal contacts; 12 amperes for outer shell
- Temperature: -65 to 175°C
- Characteristic Impedance: TBD
- Frequency Range: TBD

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. 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).	6 milliohms maximum initial. 7.5 milliohms maximum final.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Contact resistance, rated current.	Center contact: 6 milliohms maximum initial. 7.5 milliohms maximum final. Outer shell: 2 milliohms maximum initial. 4 milliohms maximum final.	EIA-364-6. One ampere DC for center contact, 12 amperes DC for outer shell.
Insulation resistance, ambient temperature.	5000 megohms minimum.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent signal contacts and between signal contacts and outer shell.
Insulation resistance, elevated temperature.	1000 megohms minimum.	EIA-364-21. 500 volts DC, 2 minute hold, 125°C. Test between adjacent signal contacts and between signal contacts and outer shell.

Figure 1 (continued)

Test Description	Requirement	Procedure
Withstanding voltage.	One minute hold with no breakdown or flashover. One milliohm maximum leakage current.	EIA-364-20, Condition I. 1000 volts rms at seal level between adjacent signal contacts. 500 volts rms at sea level between signal contacts and outer shell.
RF insertion loss.	TBD	TIA/EIA-568-B.2.
RF return loss.	TBD	TIA/EIA-568-B.2.
Near End Crosstalk (NEXT).	TBD	TIA/EIA-568-B.2.
Far End Crosstalk (FEXT).	TBD	TIA/EIA-568-B.2.
Magnetic permeability.	Less than 2 M μ .	EIA-364-54.
MECHANICAL		
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VI, Condition Letter J. Subject specimens to 43.92 G's rms between 50 to 2000 Hz. Eight hours in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition D. Subject specimens to 300 G's half-sine shock pulses of 3 milliseconds duration. Two shocks in the longitudinal axis and 2 shocks in the perpendicular axis.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 500 cycles at a maximum rate of 500 cycles per hour.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition V. Subject specimens to 5 cycles between -65 and 175°C with 30 minute dwells at temperature extremes.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method IV. Subject specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH with -10°C cold shock.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 6, Test Time Condition D. Subject specimens to 175°C for 1000 hours.

Figure 1 (continued)

Test Description	Requirement	Procedure
Salt spray.	See Note.	EIA-364-26, Test Condition B. Subject specimens to 5% salt spray for 48 hours.
Fluid resistance.	See Note.	EIA-364-10. Subject specimens to fluid specified in Figure 3.
Mold growth.	No growth.	MIL-STD-810-508-5.

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 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	
	Test Sequence (b)						
Initial examination of product	1	1	1	1	1	1	1
LLCR	2,7	2,5	2,7				
Contact resistance, rated current	3,8	3,6	3,8				
Insulation resistance, ambient temperature			4,9	2,6	2,4		
Insulation resistance, elevated temperature			10	8			
Withstanding voltage			5,11	3,7			
RF insertion loss							3
RF return loss							4
NEXT							5
FEXT							6
Magnetic permeability							2
Random vibration	5						
Mechanical shock	6						
Durability	4						
Thermal shock				4			
Humidity/temperature cycling				5			
Temperature life			6				
Salt spray		4					
Fluid resistance					3		
Mold growth							2
Final examination of product	9	7	12	9	5	7	3

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

Figure 2

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 2.

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 1. 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.

Fluids			Immersion		Storage Temperature (°C)	Number of Cycles	
Category	Reference		Duration (minutes)	Temperature (°C)			
Fuel	JP5/MIL-DTL-5624	NATO F-44	5 +2/-0	40	85	7	
Mineral hydraulic fluid	MIL-PRF-5606	NATO F-515	15 +5/-0	85	100	5	
Synthetic Hydraulic fluid	SAE AS 1241	Skydrol 500 B4 Skydrol LD 4		120	125		
Mineral lubricant	MIL-PRF-7870	NATO O-142		150			
Synthetic lubricant	MIL-PRF-23699	NATO O-156		25	25		
Cleaning product	25% propanol + 75% white spirit (in weight)			50	100		25
	MIL-PRF-87937 (diluted)						
De-icing fluid	AMS1424	NATO S-742					
Cooling fluid	Coolanol 25R						

Figure 3