

P R O D U C T S P E C I F I C A T I O N

AMP* Commercial N Series Dual Crimp Coaxial Plugs

1. SCOPE

1.1. Content

This specification covers the performance, tests, and quality requirements for AMP Commercial N Series Dual Crimp Coaxial plugs.

1.2 Definitions

For the purpose of this specification, the following definitions shall apply.

- A. Connector Assembly: A connector assembly consists of a mated plug and jack, terminated to their respective cable.
- B. Connector: A connector may be either a plug or a jack as described below.
 - 1. Plug: (Male) -- contains the male inner contact and a rotating; threaded collar for locking purposes.
 - 2. Jack: (Female) -- contains the female inner contact and may be either cable or panel mount type.

1.3. Qualification

When tests are performed on the subject product line, the procedures specified in AMP 109 series specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS

The following documents constitute a part of this specification to the extent specified herein. In the event of conflict between 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.

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				LOC	NO	108-12056	REV	
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DIST	A	ECN C82-359		SHEET	TITLE			
12	LTR	REVISION RECORD	APP	1 OF 11	AMP Commercial N Series Dual Crimp Coaxial Plugs			
			DATE					

2.1. AMP Specifications

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1.
(Comply with MIL-STD-202, MIL-STD-1344 and EIA RS-364, see Figure 5)

2.2. Military

- A. MIL-C-17: Cable, Coaxial, Radio Frequency
- B. MIL-I-17214: Indicator, Permeability, Low-Mu
- C. MIL-C-39012: Connectors, Coaxial, RF, General Specification For

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

The materials used in the construction of this product and the finish or plating shall be as specified on the AMP Product Drawing.

3.3. Ratings

- A. Nominal Impedance: 50 ohms
- B. Frequency Range: 0 - 11 GHz
- C. Operating Temperature: -65 to +85°C
- D. Operating Voltage @ Sea Level: 1000 VRMS

3.4. Performance and Test Description

Connectors shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of Product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan.


Figure 1 (Cont)

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Test Description	Requirement	Procedure									
Termination Resistance, Specified Current	<p style="text-align: center;">MILLIOHMS MAXIMUM</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;">Initial</th> <th style="text-align: center;">Test</th> </tr> </thead> <tbody> <tr> <td>Inner Contact</td> <td style="text-align: center;">1.0</td> <td style="text-align: center;">1.5</td> </tr> <tr> <td>Outer Contact</td> <td style="text-align: center;">1.0</td> <td style="text-align: center;">N/A</td> </tr> </tbody> </table>		Initial	Test	Inner Contact	1.0	1.5	Outer Contact	1.0	N/A	Measure potential drop of mated contacts at 1 ampere DC, see Figure 3; AMP Spec 109-25, calculate resistance.
	Initial	Test									
Inner Contact	1.0	1.5									
Outer Contact	1.0	N/A									
Dielectric Withstanding Voltage	2500 vac dielectric withstanding voltage, one minute hold. No breakdown or flash-over.	Test between center and outer contacts of unmated connector assemblies; AMP Spec 109-29-1.									
Insulation Resistance	5000 megohms minimum initial. 200 megohms minimum 5 minutes after Temperature - Humidity Cycling	Test between center and outer contact of unmated connector assembly, AMP Spec 109-28-4.									
Permeability	2 Mu maximum	Measure magnetic permeability with an indicator conforming to MIL-I-17214.									
Voltage Standing Wave Ratio	1.30 maximum	Measure VSWR between 0.5 and 11 GHz in accordance with MIL-C-39012, except discrete frequency network analyzer may be used.									
Altitude/Corona	500 volts rms minimum at 5 picocoulombs maximum discharge.	Test corona at 70,000 feet simulated altitude in accordance with AMP Spec 109-40.									
R.F. High Potential	1500 volts rms 5 MHz for 1 minute. No dielectric breakdown or flashover.	Test between center and outer contacts of unmated connectors; AMP Spec 109-29-1, except at 5 MHz AC.									

Figure 1 (cont)

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Test Description	Requirement	Procedure		
R.F. Leakage	Connector leakage cable to cable shall not exceed -90 dB minimum.	Measure RF Leakage in accordance with MIL-C-39012 between 2 and 3 GHz.		
R.F. Insertion Loss	.15 dB maximum at 10 GHz.	Measure RF Insertion Loss in accordance with MIL-C-39012 at 10 GHz.		
MECHANICAL				
Vibration	No discontinuities greater than 1 micro-second. (a)	Subject mated connectors to 15 G's, 10-2000 Hz with 100 ma current applied, see Figure 4; AMP Spec 109-21-3.		
Physical Shock	No discontinuities greater than 1 micro-second. (a)	Subject mated connector to 100 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; see Figure 4; AMP Spec 109-26-9.		
Force to Engage/ Disengage	6 inch pounds maximum	Connectors shall be fully engaged and disengaged with a standard mating part while measuring the force required. Connectors are fully engaged when referenced planes coincide.		
Figure 1 (Cont)				
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Test Description	Requirement	Procedure
Mating Characteristics	Mating of .316" ID ring 25 pounds maximum. .324" ID ring shall contact all slotted spring members within .031" of their tip ends.	Plugs Only: Measure force to insert into a .316" maximum ID test ring to .093" depth then measure depth from tip ends of spring members to contact a .324" ID minimum test ring.
Cable Retention	No loss of electrical continuity or evidence of physical damage. (a)	Apply a tensile load of 90 pounds between connector and cable for 30 seconds and check for electrical discontinuity. Then bend cable 90°, then reverse 180° at 10 cable diameters from the connector for 4 cycles, then recheck continuity.
Durability	No physical damage (a)	Mate and unmate connector assemblies for 500 cycles; AMP Spec 109-27.
Coupling Nut Retention	Coupling nut shall not loosen or dislodge from plug body.	Apply a tensile load of 100 pounds between coupling nut and plug body for 1 minute.

Figure 1 (Cont)

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Test Description	Requirement	Procedure
ENVIRONMENTAL		
Thermal Shock	No physical damage (a).	Subject mated connectors to 5 cycles between -65° and +85°C; AMP Spec 109-22.
Temperature-Humidity Cycling	No physical damage (a).	Subject mated connectors to 10 temperature-humidity cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, Method III, Cond B, with cold shock at -10°C; however no vibration. Measure Insulation Resistance within 5 minutes after removing from chamber.
Corrosion, Salt Spray	No base metal exposure on any mating or interface surface of the connectors.	Subject unmated uncabled connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, Cond B.

(a) Shall show no evidence of damage, cracking, or chipping.

Figure 1 (end)

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3.6. Connector Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1	1	1	1
Termination Resistance, Specified Current(c)			6-9-11-14	
Dielectric Withstanding Voltage			7-13-17	
Insulation Resistance (d)	5	5	5-16	
Permeability	4	4	4	
Voltage Standing Wave Ratio		6		
Altitude Corona			18	
R.F. High Potential			19	
R.F. Leakage				3
R.F. Insertion Loss				2
Vibration			8	
Physical Shock			10	
Force to Engage/Disengage	2-7	2	2-22	
Mating Characteristics	3	3-8	3	
Cable Retention			20	
Durability		7		
Coupling Nut Retention			21	
Center Contact Retention				
Thermal Shock			12	
Temperature - Humidity Cycling			15	
Corrosion, Salt Spray	6			

(a) See Paragraph 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

(c) Test Group 3 Sequence 6 measure inner contact, outer contact, and braid to body. Test Group 3 Sequences 9, 11, and 14 measure inner contact resistance only.

(d) Test Group 3 Sequence 16 measures Insulation Resistance within 5 minutes after Temperature Humidity Cycling.

Figure 2

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4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connectors shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test Group 1 shall consist of 3 unmated, uncabled connector pairs. Test Groups 2 and 4 consist of 3 connector pairs each, which shall be cabled during R.F. testing. Test Group 3 shall consist of 3 connector pairs with each connector crimped to a 12 inch length of cable. Cable used for testing shall be RG-214/U which shall conform to MIL-C-17.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 2.

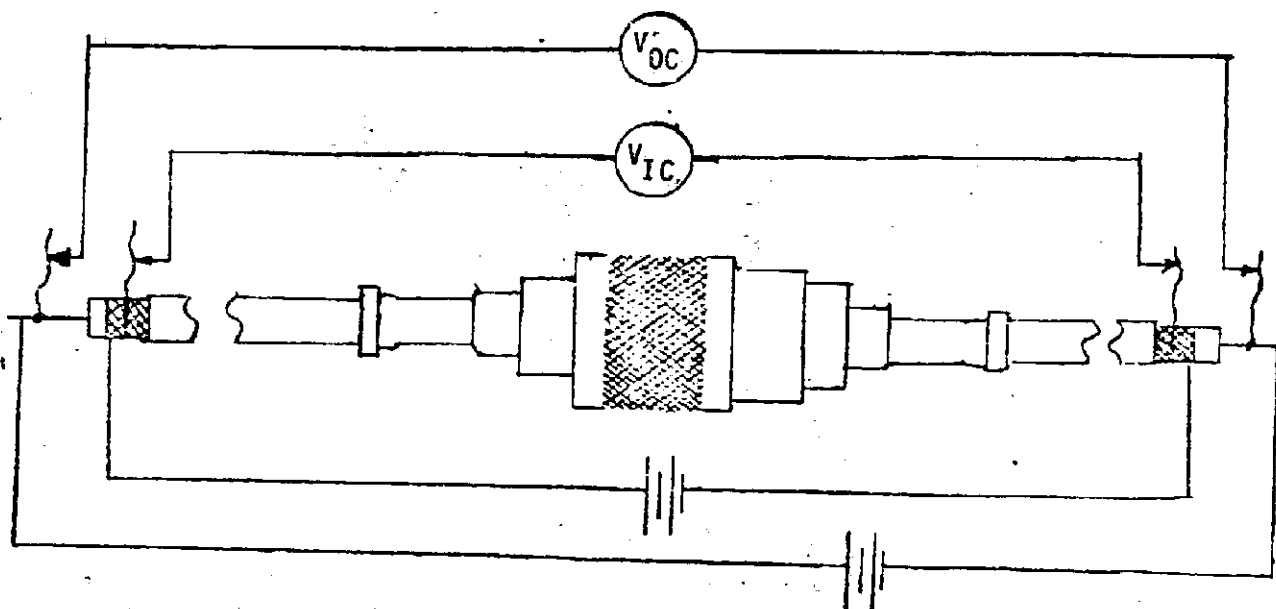
C. Acceptance

- (1) All samples tested in accordance with this specification shall meet the stated requirement.
- (2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken.

4.2. Quality Conformance Inspection

The applicable AMP inspection plan will 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.

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- NOTE: (a) V_{OC} is outer contact measurement.
 V_{IC} is inner contact measurement.
- (b) Measure at 1 ampere DC.
- (c) Also measure 3 feet of wire, calculate milliohms per inch. Measure distance between probes on specimens and subtract an equal distance of wire resistance to obtain actual contact resistance.

Figure 3

Resistance Measurement Points

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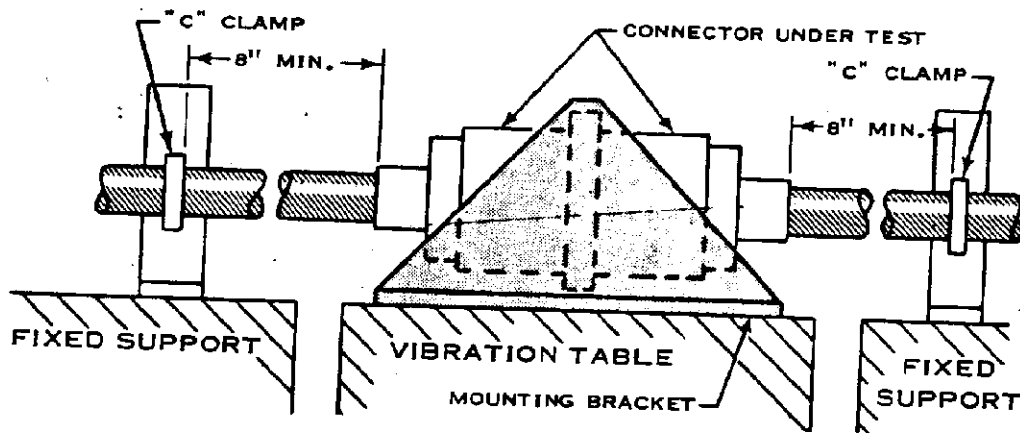


Figure 4
 Vibration and Physical Shock Mounting

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AMP Test Spec No	Title	Commercial Reference	Military Reference
109-21	Vibration Test Procedure for Electrical Connectors	EIA RS-364, TP-28	MIL-STD-1344, Method 2005 MIL-STD-202, Method 201 MIL-STD-202, Method 204
109-22	Thermal Shock Test Procedure for Electrical Connectors	EIA RS-364, TP-32	MIL-STD-1344, Method 1003 MIL-STD-1344, Method 1010 MIL-STD-202, Method 107
109-23	Humidity Test Procedure for Electrical Connectors	EIA RS-364, TP-31	MIL-STD-1344, Method 1002 MIL-STD-202, Method 103 MIL-STD-202, Method 106
109-24	Salt Spray Corrosion Test Procedure for Electrical Connectors	EIA RS-364, TP-26 ASTM B 117-64	MIL-STD-1344, Method 1001 MIL-STD-202, Method 101
109-25	Rated Current Termination Resistance Test Procedure for Electrical Connectors	EIA RS-364, TP-6 IPC-3.1	MIL-STD-1344, Method 3004
109-26	Mechanical Shock, Specified Pulse Test Procedure for Electrical Connectors	EIA RS-364, TP-27	MIL-STD-1344, Method 2004 MIL-STD-202, Method 213
109-27	Durability Test Procedure for Electrical Connectors	EIA RS-364, TP-9	MIL-STD-1344, Method 2016
109-28	Insulation Resistance Test Procedure for Electrical Connectors	EIA RS-364, TP-21	MIL-STD-1344, Method 3003 MIL-STD-202, Method 302
109-29	Withstanding Voltage Test Procedure for Electrical Connectors	EIA RS-364, TP-20	MIL-STD-1344, Method 3001 MIL-STD-202, Method 301
109-40	Corona, Test Procedure for	EIA RS-364, TP-44	

Figure 5

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