

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests, and quality requirements for the AMP* TNC Series Coaxial Connectors. These connectors are intended for use on RG-402/U semi-rigid coaxial cable, having an O.D. of .141 inch.

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 external threads designed for mating with a plug.

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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 RIGHTS RESERVED. AMP PRODUCTS MAY BE COVERED BY U.S. AND
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				DR <i>[Signature]</i> 8/4/86 CHK <i>[Signature]</i> 8-6-86 APP <i>[Signature]</i> 8/6/86	AMP AMP INCORPORATED Harrisburg, Pa. 17105	
				LOC B	NO 108-12032	REV 0
C				TITLE		
DIST	0	Release per	<i>PRC</i>	8/12	SHEET 1 OF 9	
12	LTR	ECN AJ-2176	APP	86	CONNECTOR, COAXIAL, TNC SERIES, SEMI-RIGID CABLE	
		REVISION RECORD	APP	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)
- C. Corporate Bulletin 76: Cross-Reference between AMP Test Specifications and Military or Commercial Documents

2.2. Military Specifications

- A. MIL-C-17: Cable, Coaxial, Radio Frequency
- B. 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 the 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: 0-15 GHz
- C. Operating Temperature: -65° to +105°C
- D. Operating Voltage @ Sea Level: 335 vrms (RG 402/U Cable)
- E. Operating Voltage @ 70,000 Feet: 85 vrms (RG 402/U Cable)

3.4. Performance and Test Description

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

AMP

AMP INCORPORATED
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LOC

B

SHEET

2 OF 9

NO

108-12032

REV

0

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.												
ELECTRICAL														
Termination Resistance, Specified Current	<table border="1"> <thead> <tr> <th></th> <th>Initial</th> <th>After Test</th> </tr> </thead> <tbody> <tr> <td>Inner Contact</td> <td>1.5</td> <td>4.0</td> </tr> <tr> <td>Outer Contact</td> <td>0.2</td> <td>N/A</td> </tr> <tr> <td>Shield to Body</td> <td>0.5</td> <td>N/A</td> </tr> </tbody> </table>		Initial	After Test	Inner Contact	1.5	4.0	Outer Contact	0.2	N/A	Shield to Body	0.5	N/A	Measure potential drop of mated contacts at 1 ampere DC, see Figure 3; AMP Spec 109-25, calculate resistance.
	Initial	After Test												
Inner Contact	1.5	4.0												
Outer Contact	0.2	N/A												
Shield to Body	0.5	N/A												
Dielectric Withstanding Voltage	1500 vac dielectric withstanding voltage one minute hold. No breakdown or flashover.	Test between center and outer contacts of unmated connector assemblies; AMP Spec 109-29-1.												
Insulation Resistance	5000 megohms minimum initial.	Test between center and outer contact of unmated connector assembly; AMP Spec 109-28-4.												
Permeability	2 Mu maximum.	Measure magnetic permeability; AMP Spec 109-88.												
Voltage Standing Wave Ratio	1.35 maximum.	Measure VSWR between 0.5 and 15 GHz in accordance with MIL-C-39012, except discrete frequency network analyzer may be used.												
Altitude/Corona	375 volts rms minimum at 5 picocoulombs maximum discharge.	Test corona at 70,000 feet simulated altitude; AMP Spec 109-40.												
R.F. High Potential	1000 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)

AMP	AMP INCORPORATED Harrisburg, Pa. 17105	LOC	SHEET	NO	108-12032	REV
		B	3 OF 9			0

Test Description	Requirement	Procedure		
R.F. Leakage	Connector leakage cable to cable shall not exceed -60 dB minimum.	Measure RF Leakage in accordance with MIL-C-39012 between 2 and 3 GHz.		
R.F. Insertion Loss	.06 F (GHz) maximum at 3 and 6 GHz.	Measure RF Insertion Loss in accordance with MIL-C-39012 at 3 and 6 GHz.		
MECHANICAL				
Vibration (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors to 20 G's, 10-2000 Hz with 100 ma current applied; AMP Spec 109-21-4.		
Physical Shock (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors to 100 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-9.		
Force to Engage/Disengage	2 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)				
AMP AMP INCORPORATED Harrisburg, Pa. 17105	LOC B	SHEET 4 OF 9	NO 108-12032	REV 0

Test Description	Requirement	Procedure
Mating Characteristics	<p>Mating of .319 inch ID ring 5 pounds maximum. .324 inch ID ring shall contact all slotted spring members within .031 inch of their tip ends.</p> <p>.054 inch gage 2 pounds maximum insertion force. .052 inch gage 2 ounces minimum withdrawal force.</p>	<p>Plugs Only: Measure force to insert into a .319 inch maximum ID test ring to .093 inch depth then measure from tip ends of spring members to contact a .324 inch ID minimum test ring.</p> <p>Jacks only: Precondition by inserting a .057 inch gage 1 time to a .125 inch minimum depth. Measure force to insert a .054 inch gage to .125 inch minimum depth. Insert a .052 inch gage to .125 inch minimum depth and measure force to withdraw.</p>
Cable Retention (a)	No loss of electrical continuity or evidence of physical damage.	Apply a tensile load of 60 pounds between connector and cable for 30 seconds and check for electrical discontinuity. Then apply a torque of 55 inch-ounces at 1 cable diameter from the connector in both directions then reapply 60 pound axial load and recheck continuity.
Durability (a)	No physical damage.	Mate and unmate connector assemblies for 500 cycles; AMP Spec 109-27.
Coupling Proof Torque	Coupling mechanism shall not dislodge from connector and connector interface dimensions shall stay within their specified tolerance.	The plug shall be coupled to its standard mating part, tightened to 15 inch pounds for 1 minute, then disengaged.

Figure 1 (cont)

	AMP INCORPORATED Harrisburg, Pa. 17105	LOC B	SHEET 5 OF 9	NO 108-12032	REV 0
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Test Description	Requirement	Procedure
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. During the minute, rotate nut 2 revolutions in each direction.
Center Contact Retention	The center contact shall not be displaced from the specified interface dimensions.	A 6-pound force shall be applied to the center contact for 5 seconds minimum in each direction.

ENVIRONMENTAL

Thermal Shock (a)	No physical damage.	Subject mated connectors to 5 cycles between -65° and 115°C; AMP Spec 109-22.
Humidity-Temperature Cycling (a)	No physical damage. 200 megohms minimum insulation resistance when measured within 5 minutes of removal from chamber.	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, Method III, Cond B, with cold shock at -10°C, less step 7b.
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)

AMP	AMP INCORPORATED Harrisburg, Pa. 17105	LOC B	SHEET 6 OF 9	NO 108-12032	REV 0
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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)			9,11,13,15	
Dielectric Withstanding Voltage			8,16,19	
Insulation Resistance (d)	7	7	7,18	7
Permeability	6	6	6	6
Voltage Standing Wave Ratio		8		
Altitude Corona			20	
R.F. High Potential			21	
R.F. Leakage				9
R.F. Insertion Loss				8
Vibration			10	
Physical Shock			12	
Force to Engage/Disengage	3,5,10	3,5,10	3,5,24	3,5
Mating Characteristics	2	2,11	2	2
Cable Retention			22	
Durability		9		
Coupling Proof Torque	4	4	4	4
Coupling Nut Retention			23	
Center Contact Retention	8			
Thermal Shock			14	
Humidity-Temperature Cycling			17	
Corrosion, Salt Spray	9			

- (a) See Para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Test Group 3 Sequence 8 measure inner contact, outer contact, and braid to body. Test Group 3 Sequences 11, 13, and 16 measure inner contact resistance only.
- (d) Test Group 3 Sequence 18 measures Insulation Resistance within 5 minutes after Temperature Humidity Cycling.

Figure 2

AMP	AMP INCORPORATED Harrisburg, Pa. 17105	LOC	SHEET	NO	108-12032	REV
		B	7 OF 9			0

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. 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-402/U which conforms 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. Requalification Testing

Requalification shall be established by the cognizant divisional engineering function and may consist of all or any part of the overall qualification program provided that it is conducted within the required time period.

4.3. 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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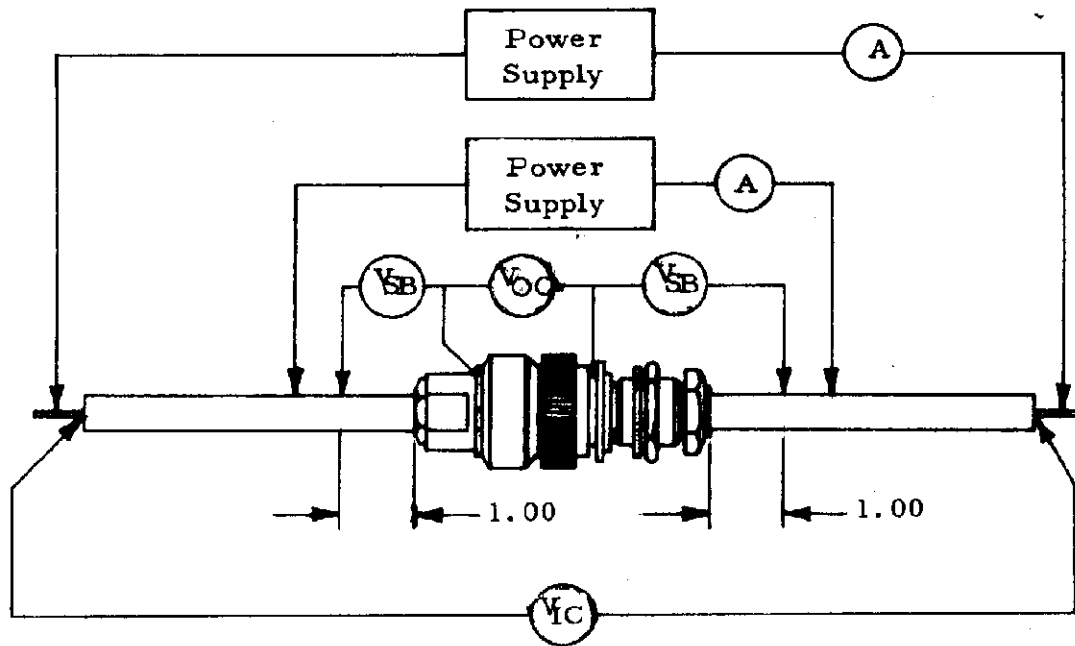
AMP INCORPORATED
Harrisburg, Pa. 17105

LOC
B

SHEET
8 OF 9

NO
108-12032

REV
0



- Note:
- (a) V_{SB} is shield to body measurement.
 - 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

AMP AMP INCORPORATED Harrisburg, Pa. 17105	LOC	SHEET	NO	REV
	B	9 OF 9	108-12032	0