Circular DIN Connector

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP* circular DIN connectors.

1.2. Classification

A. Plugs

(1) Class A: 2 piece, shield and grounded receptacle
(2) Class B: 1 piece, shield and shielded receptacle

B. Receptacles

(1) Class A: Contains grounding clip
(2) Class B: Contains shielding clip

Class A plugs may be mated with Class B receptacles and vice versa.

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 form a part of this specification to the extent specified herein. 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. AMP Specifications

A. 109-1: General Requirements for Test Specifications

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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
D. 114
E. 501-15: Test Report

3. REQUIREMENTS

3.1. Design and Construction

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

3.2 Materials

A. Contacts: Brass, tin or gold over nickel plated
B. Shields: (1) Class A: Brass, nickel plated
(2) Class B: Brass, tin plated
C. Housing: Polycarbonate, UL 94V-0
D. Cord Guard: Polypropylene

3.3. Ratings

A. Current/Voltage: 250 vac at 7.5 amperes maximum, see Para 3.5.(a)
B. Operating Temperature: -55° to 105°C

3.4. Performance and Test Description

Connector 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	Requirements	Procedure
Examination of Product	Meets requirements of product drawing and AMP Spec 114	Visual, dimensional and functional per applicable inspection plan.

Figure 1 (cont)

Test Description	Requirement	Procedure
	ELECTRICAL	
Termination Resistance, Specified Current	Wire Size AWG / Test Current amperes / Resistance milliohm maximum 20 — 7.5 — 15 22 — 5.0 — 20 24 — 3.0 — 25 28 — 1.5 — 20	Measure potential drop of mated contacts after stabilizing, see Figure 4; AMP Spec 109-25, calculate resistance.
Dielectric Withstanding Voltage	750 vac dielectric withstanding voltage, one minute hold.	Test between adjacent contacts of mated connector assemblies; AMP Spec 109-29-1.
Insulation Resistance	5 x 10^3 megohms minimum.	Test between adjacent contacts of mated connector assembly; AMP Spec 109-28-4.
Temperature Rise Vs. Current (a)	30°C maximum T-rise, see Figure 2.	T-rise at rated current; AMP Spec 109-45-2.
	MECHANICAL	
Vibration (b)	No discontinuities greater than 1 microsecond	Subjected mated connectors to 10-55-10 Hz traversed in 1 minute at .06 inches total excursion; 2 hours in each of 3 mutually perpendicular planes; AMP Spec 109-21-1.
Physical Shock (b)	No discontinuities greater than 1 microseconds.	Subject mated connector to 50 G's half-size in 11 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-1.
Mating Force	3 pounds maximum per contact.	Measure force necessary to mate connector assembly from point of initial contact, incorporating free floating fixtures at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.

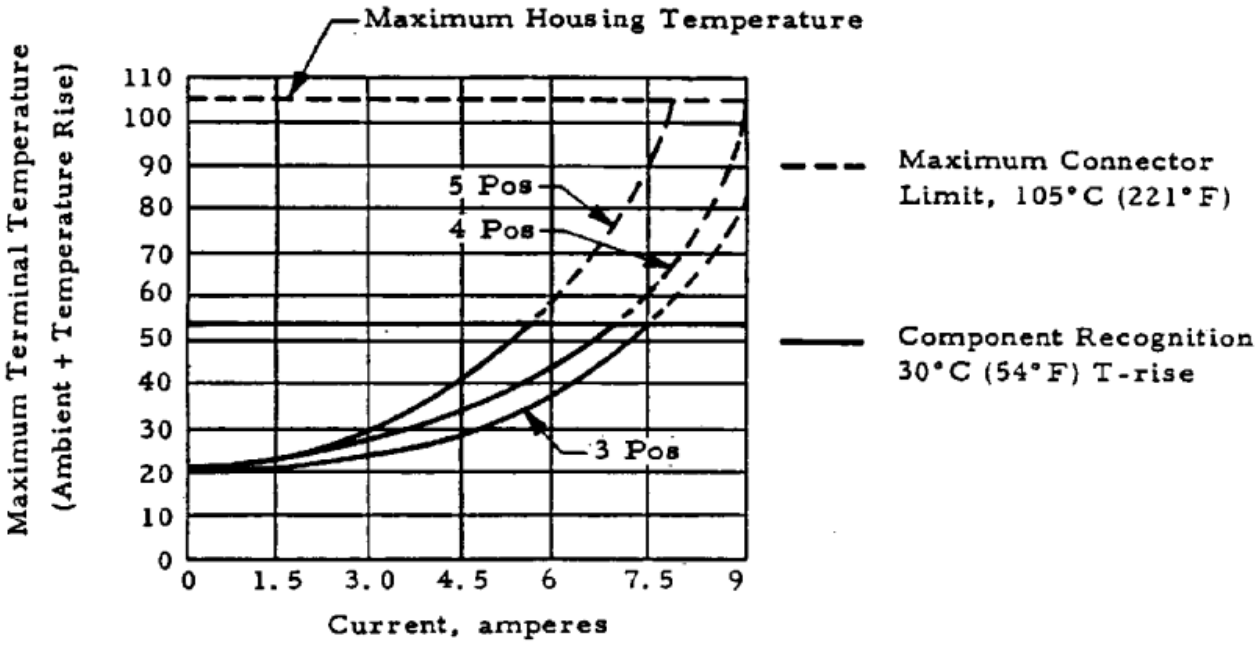
Figure 1 (cont)

Test Description	Requirement	Procedure
Unmating Force	1 pound minimum per contact	Measure force necessary to unmate connector assembly with locking latches removed, at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Contact Retention	6 pounds minimum.	Apply axial load of 6 pounds to crimped contacts; AMP Spec 109-30 except grip wire.
Durability	Maintain electrical continuity.	Mate and unmate connector assemblies for 100 cycles; AMP Spec 109-27.
ENVIRONMENTAL		
Thermal Shock (b)	Dielectric withstanding voltage.	Subject mated connectors to 10 cycles between -55° and 105°C; AMP Spec 109-22.
Humidity, Steady State	Insulation resistance.	Subject mated connectors to steady state humidity at 40°C and 90-95% RH; AMP Spec 109-23, method II, cond A.
Corrosion, Salt Spray	No base metal exposure.	Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.

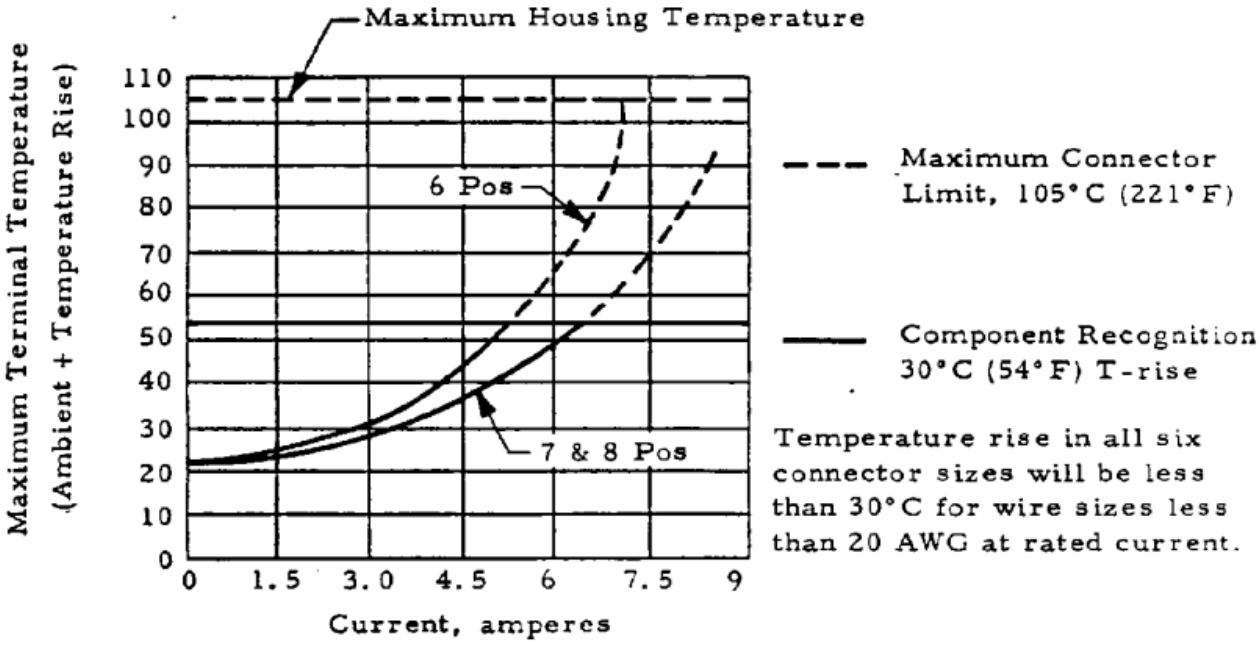
(a) Maximum rated current that can be carried by this product is limited by maximum operating temperature of housings, which is 105°C, and temperature rise of contacts, which is 30°C. Variables which shall be considered for each application are: wire size, connector size, contact material, and ambient temperature.

(b) Shall remain mated and show no evidence of damage, cracking or chipping.

Figure 1 (end)



3, 4 and 5 Position Connectors With 20 AWG Wire



6, 7 and 8 Position Connectors With 20 AWG Wire

Figure 2

3.6. Connector Qualification and Requalification Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1,8	1,7	1,6	1
Termination Resistance, Specified Current	7		5	
Dielectric Withstanding Voltage	2	5		
Insulation Resistance	3		3	
Temperature Rise Vs. Current				2
Vibration	4			
Physical Shock	5			
Mating Force		2		
Unmating Force		3		
Contact Retention		6		
Durability			4	
Thermal Shock		4		
Humidity, Steady State			2	
Corrosion, Salt Spray	6			

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

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. All groups shall consist of 2 mated pair of Class A and 2 mated pair of Class B connectors. One mated pair of each class and size shall be terminated with the minimum wire size and the other with the maximum wire size. In addition Test Group 2 requires 2 mated pair of each class and size for the mate and unmate test only. These connectors need not be wired.

B. Test Sequence

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

C. Acceptance

(1) Requirements put on test samples, as indicated in the requirements portion of Figure 1, exist as either the upper or lower statistical tolerance limit (95% confidence, 99% reliability). All samples tested in accordance with this specification shall meet the stated tolerance limit.

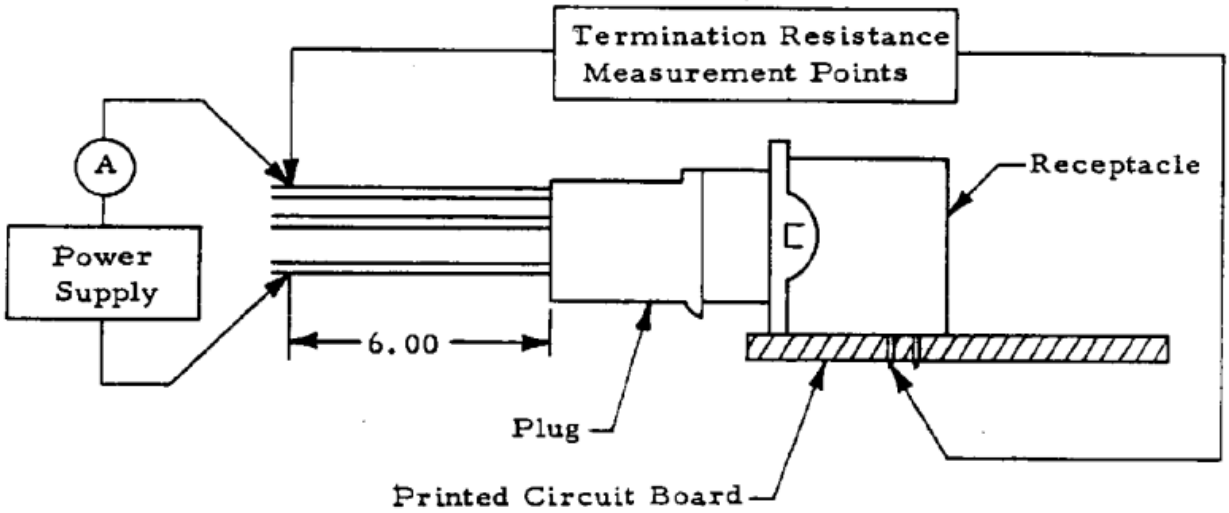
(2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

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.



Note: Termination resistance equals millivolts divided by test current less resistance of 6 inches of wire.

Figure 4

Termination Resistance Measurement Points