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ARINC 600 Connector

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP* ARINC 600 non and semi-environment, low insertion force, rack and panel connector.

1.2. Intended Use

This connector is intended for use in a controlled environment similar to the electrical/electronic bay area of commercial subsonic jet aircraft. The connector shall provide the electrical interface between the ARINC-type equipment and the airplane equipment rack.

A. Class

- (1) Class A: Unsealed connector for continuous operation.
- (2) Class B: Semi-environment resisting connector for continuous operation.
- (3) Class C: Same as Class B except sealing O-rings for plug connector not required.

B. Series

- (1) Series 1: Rear release and rear removal crimp contacts.
- (2) Series 2: Front release and front removable contacts with wire wrap posts or solder tails.

C. Shell Size

- (1) Size 1
- (2) Size 2
- (3) Size 3

1.4. 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
- 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. Commercial Standards

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

- A. Contacts: Copper alloy, gold over nickel
- B. Shell: Aluminum alloy, clear cadmium plated
- C. Insert: Epoxy material
- D. Retainer plates: Aluminum alloy, clear cadmium plated
- E. Retainer plate hardware: Stainless steel
- F. Polarizing keys:
 - (1) Male: Stainless steel
 - (2) Female: Zinc alloy

3.3. Ratings

A. Voltage/Current: 115 volts at

Wire Size, AWG	Maximum Current Amperes
22 signal	5.0
20	7.5
16	13.0
12	23.0

B. Operating Temperature: -65° to 125°C

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.																								
ELECTRICAL																										
Termination Resistance, Rated Current	<table border="1"> <thead> <tr> <th>Wire Size, AWG</th> <th>Test Current, ampere</th> <th>Resistance, milliohms maximum initial</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>23</td> <td>2.60</td> </tr> <tr> <td>16</td> <td>13</td> <td>5.00</td> </tr> <tr> <td>20</td> <td>7.5</td> <td>8.60</td> </tr> <tr> <td>22</td> <td>5</td> <td>11.00</td> </tr> <tr> <td>24</td> <td>3</td> <td>15.00</td> </tr> <tr> <td>26</td> <td>2</td> <td>20.00</td> </tr> <tr> <td>28</td> <td>1.5</td> <td>23.30</td> </tr> </tbody> </table>	Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial	12	23	2.60	16	13	5.00	20	7.5	8.60	22	5	11.00	24	3	15.00	26	2	20.00	28	1.5	23.30	Measure potential drop of mated contacts assembled in housing, see Figure 3; AMP Spec 109-25, calculate resistance.
Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial																								
12	23	2.60																								
16	13	5.00																								
20	7.5	8.60																								
22	5	11.00																								
24	3	15.00																								
26	2	20.00																								
28	1.5	23.30																								
Termination Resistance, Dry Circuit (low level)	Initial resistance shall be the same as rated current.	Subject mated contacts assembled in housing to 20 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6-6.																								

Figure 1 (cont)

Test Description	Requirement	Procedure								
Dielectric Withstanding Voltage	<table border="0"> <tr> <td>Test Voltage</td> <td>Altitude</td> </tr> <tr> <td>AC (RMS)</td> <td>Feet</td> </tr> <tr> <td>1500</td> <td>Sea Level</td> </tr> <tr> <td>500</td> <td>50,000</td> </tr> </table> <p>1 milliampere maximum leakage current, no flashover.</p>	Test Voltage	Altitude	AC (RMS)	Feet	1500	Sea Level	500	50,000	Test between adjacent contacts of mated and unmated connector assemblies and between contacts and shell; AMP Spec 109-29-1.
Test Voltage	Altitude									
AC (RMS)	Feet									
1500	Sea Level									
500	50,000									
Insulation Resistance	5000 megohms minimum at ambient; 1000 megohms minimum at elevated temperature, 125°C.	Test between adjacent contacts of unmated connector and between shell and contacts adjacent to shell; AMP Spec 109-28-4.								
Contact Current Switching	No physical damage or welding of contacts. Termination resistance shall not increase more than 150% of initial value.	Contacts shall break an inductive load, a maximum of 10 times, at 5 amperes, 115 volts, 400 Hz and $.7 \pm .05$ lagging power factor; AMP Spec 109-10004.								
Contact/Circuit Breaker Compatibility	No physical damage or welding of contacts. Resistance shall not exceed 150% of initial values.	Subject mated contacts in series with a circuit breaker to 1 cycle of short circuit current; AMP Spec 109-10005.								
MECHANICAL										
Vibration (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors to random vibration with 100 ma current applied; 8 hours in each of 3 mutually perpendicular planes; AMP Spec 109-21-5, test letter E.								
Physical Shock (a)	No discontinuities greater than 1 microsecond.	Subject mated connector to 50 G's half-sine in 11 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-1.								

Figure 1 (cont)

Test Description	Requirement		Procedure
Mating and Unmating Force	<u>Size</u> 1 2 3	<u>Pounds, maximum</u> 32 67 120	Measure force necessary to mate and unmate connector assembly incorporating fixtures at a rate of 0.5 inch/minute AMP Spec 109-42, cond A.
Maintenance Aging	No physical damage.		Remove and insert all contacts 1 time; mate and unmate fully loaded connector 10 times; repeat procedure 10 times. The forces are measured on the first and final cycles; AMP Spec 109-17.
Insert Retention	35 pounds maximum for signal contact inserts; 75 pounds maximum for power.		Apply an axial load, as specified, to both faces of each insert size; AMP Spec 109-62.
Contact Retention	<u>Contact Size</u> Signal Contacts(22) 20 16 12	<u>Axial Load, pounds, minimum</u> 12 20 25 30	Apply axial load as specified in a direction tending to displace contacts from the rear of the insert; AMP Spec 109-30.
Durability	No physical damage; termination resistance, dry circuit.		Mate and unmate connectors for 500 cycles at a maximum rate of 250 cycles per hour; AMP Spec 109-27.
Contact Walk-Out	Contacts shall not dislodge from normal position.		Subject unmated connector to 100 cycles at a rate of 10-20 cycles per minute; AMP Spec 109-10007.
ENVIRONMENTAL			
Thermal Shock (a)	No physical damage.		Subject mated connectors to 5 cycles between -65° and 125°C; AMP Spec 109-22.

Figure 1 (cont)

Test Description	Requirement	Procedure
Humidity-Temperature Cycling	1 megohm 1 to 2 hours after removal from humidity. 5000 megohms I.R. after 24 hours of conditioning at room ambient.	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, method III, cond B, 5 cold shocks at -10°C, less Step 7.b.
Corrosion, Salt Spray	No exposure of basis metal that will adversely affect the connectors.	Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.
Temperature Life (a)	Meet termination resistance, dry circuit and rated current; insulation resistance and dielectric withstanding voltage.	Subject mated connectors to temperature life; AMP Spec 109-43, test level 4, test duration D.
Seal Leakage (b)	100 megohms minimum insulation resistance; dielectric withstanding voltage at sea level.	Subject mated connectors to seal leakage test using 5% salt solution containing 1% liquid detergent for 1 hour; AMP Spec 109-10008.
Fluid Immersion, Seals	No physical damage. Contacts shall be removed and inserted into connector.	Subject one unmated connector pair in each of the specified fluids; AMP Spec 109-33, test conditions A, D and H.

- (a) Shall remain mated and show no evidence of damage, cracking or chipping.
 (b) Grommet frames required to compress grommets.

Figure 1 (end)

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	1,19	1,23	1,16	1,10
Termination Resistance, Rated Current	4,14	4,15,17	9	5
Termination Resistance, Dry Circuit	3	3,13	3,5	
Dielectric Withstanding Voltage (Sea Level)	7,10	7,9,19	8,11	
Dielectric Withstanding Voltage (Altitude)	8			
Insulation Resistance (Ambient)	5	5,11,14	7	
Insulation Resistance (Elevated Temp)	6	6		
Contact Current Switching	17			
Contact/Circuit Breaker Compatibility	18			
Vibration, Random	11	12		4
Physical Shock	12			
Mating/Unmating Force	2,15	2,18	2,10	6
Maintenance Aging				2
Insert Retention		22	15	9
Contact Retention		21	14	8
Durability	13		4	
Contact Walk-Out			12	
Thermal Shock	9	8		3
Humidity-Temperature Cycling		10		
Corrosion, Salt Spray		16		
Temperature Life			6	
Seal Leakage (c)	16			
Fluid Immersion, Seal (c)		20	13	7

(a) See Para 4.1.A.

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

(c) Class B connectors only.

Figure 2 (end)

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. Test groups 1, 2, 3 & 4 shall consist of 1 mated pair of connectors of each class and size with half of the contacts crimped to the minimum wire size and the other half to the maximum wire size. Ten percent of contacts of the minimum and ten percent of the maximum shall be selected at random and identified and used for all testing.

B. Test Sequence

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

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. 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.

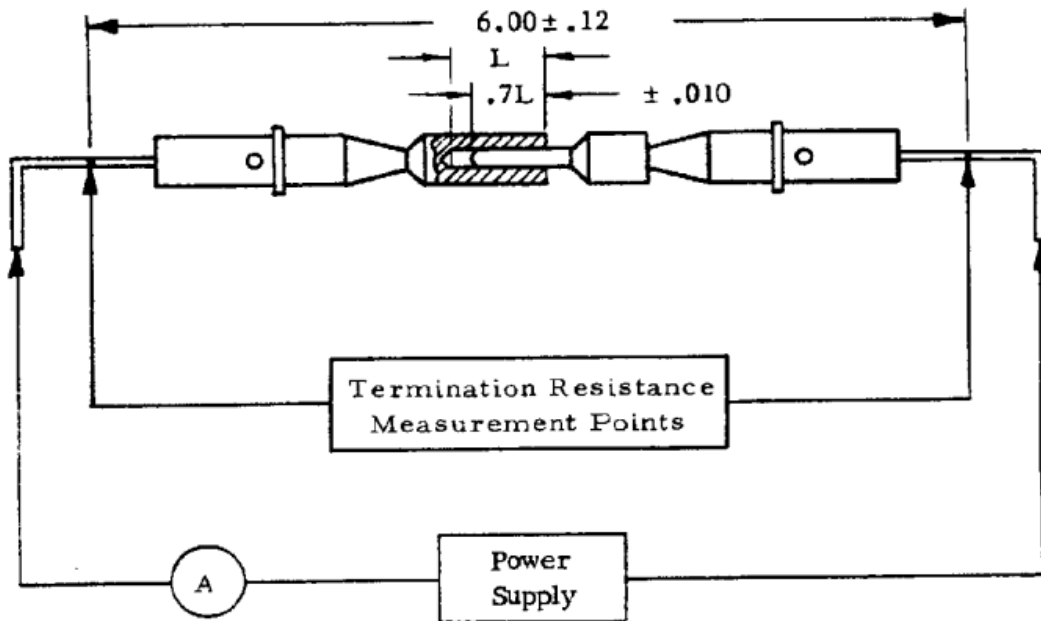


Figure 4

Resistance and Temperature Measurement Points