

**Connector System, AMP-DUAC/PL\*****1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the AMP-DUAC/PL\* power connector system. This 2 to 12 position receptacle connector system with mating right angle or vertical header is designed for power applications and uses female contacts in the receptacle connector half. Headers contain 1.07mm [0.042 inch] square posts with mate-first, break-last option. Housings are polarized to prevent smaller position sizes from being inserted into larger position sizes.

## 1.2. Qualification

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

## 1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 30Apr97. The test file number for this testing is CGL 8150-5, 6, 7, 19, 20. This documentation is on file at and available from the Americas Regional Laboratory.

**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 requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

## 2.1. AMP Documents

- 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 401-76: Cross-reference between AMP Test Specifications and Military or Commercial Documents
- D. 114-6067: Application Specification
- E. 501-394: Qualification Test Report

## 2.2. Commercial Standard

UL 1863: Communications Circuit Accessories

**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

- A. Contact: Brass and/or phosphor bronze, Gold or palladium nickel plating in contact area, tin-lead plating in crimp or solder area, all over nickel plating
- B. Housing: Thermoplastic, UL94V-0

3.3. Ratings

- A. Voltage:
  - (1) 250 vdc, see Figure 4
  - (2) 600 vdc, see Figure 5
- B. Current: See Figure 6 for applicable current carrying capability
- C. Material temperature: -55 to 105°C

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 per AMP Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and AMP Spec 114-6067.	Visual, dimensional and functional per applicable quality inspection plan.
<b>ELECTRICAL</b>		
Termination resistance.	10 milliohms maximum.	AMP Spec 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Insulation resistance.	1 megohm minimum.	AMP Spec 109-28-4. Test between adjacent contacts of mated samples.
Dielectric withstanding voltage.	750 vdc at sea level. 1 minute hold with no breakdown or flashover.	AMP Spec 109-29-1. Test between adjacent contacts of mated samples. See Figure 4.
	1800 vdc at sea level. 1 minute hold with no breakdown or flashover.	AMP Spec 109-29-1. Test between adjacent contacts of mated samples. See Figure 5.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	AMP Spec 109-45-1. Measure temperature rise vs current. See Figure 6.

Figure 1 (cont)

Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-21-7. Subject mated samples to 3.14 G's rms between 10-500 Hz. 1 hour in each of 3 mutually perpendicular planes. See Figure 7.
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-26-1. Subject mated samples to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 7.
Durability.	See Note.	AMP Spec 109-27. Mate and unmate samples for 25 cycles at a maximum rate of 600 cycles per hour.
Contact retention.	Contacts shall not dislodge from normal position.	AMP Spec 109-30. Apply axial force of 66.7 Newtons to contacts with PL installed.
Mating force.	3.25 Newtons per contact maximum.	AMP Spec 109-42, Condition A. Measure force necessary to mate samples at a maximum rate of 12.7mm per minute.
Unmating force.	0.2 Newton per contact minimum.	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples with latch disengaged at a maximum rate of 12.7mm per minute.
Latch retention.	Samples shall remain latched and maintain continuity.	AMP Spec 109-50. Apply axial force of 60 Newtons to 4 to 10 position mated samples and 97 Newtons to 12 and larger position mated samples. Apply force at 45° angle in worst case direction.
Drop.	See Note.	UL 1863, Test 33. Fully assembled unmated sample shall withstand a 1 meter drop onto a hardwood surface.
<b>ENVIRONMENTAL</b>		
Thermal shock.	See Note.	AMP Spec 109-22. Subject mated samples to 5 cycles between -55 and 105°C.

Figure 1 (cont)

Test Description	Requirement	Procedure
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	AMP Spec 109-43. Subject mated samples to temperature life at 105°C for 1000 hours.
Mixed flowing gas.	See Note.	AMP Spec 109-85-2. Subject mated samples to environmental class II for 14 days.

**NOTE**

*Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence 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
	Test Sequence (b)				
Examination of product	1,9	1,11	1,8	1,4	1,4
Termination resistance	3,7	2,5,7,9			
Insulation resistance			2,6		
Dielectric withstanding voltage			3,7		3
Temperature rise vs current		3,10			
Vibration	5	8(c)			
Physical shock	6				
Durability	4				
Contact retention				3	
Mating force	2				
Unmating force	8				
Latch retention				2	
Drop					2(e)
Thermal shock			4		
Humidity-temperature cycling			5		
Temperature life		6			
Mixed flowing gas		4(d)			

**NOTE**

- (a) See Para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per AMP Specification 109-151.
- (d) Precondition samples with 25 cycles durability.
- (e) Cable applied, connector and cable only.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, 3, and 4 shall each consist of a minimum of 5 mated pair samples. Test group 5 shall consist of 3 unmated cable applied samples with 0.35 meter of wire crimped to the contacts.

B. Test Sequence

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

#### 4.2. Requalification Testing

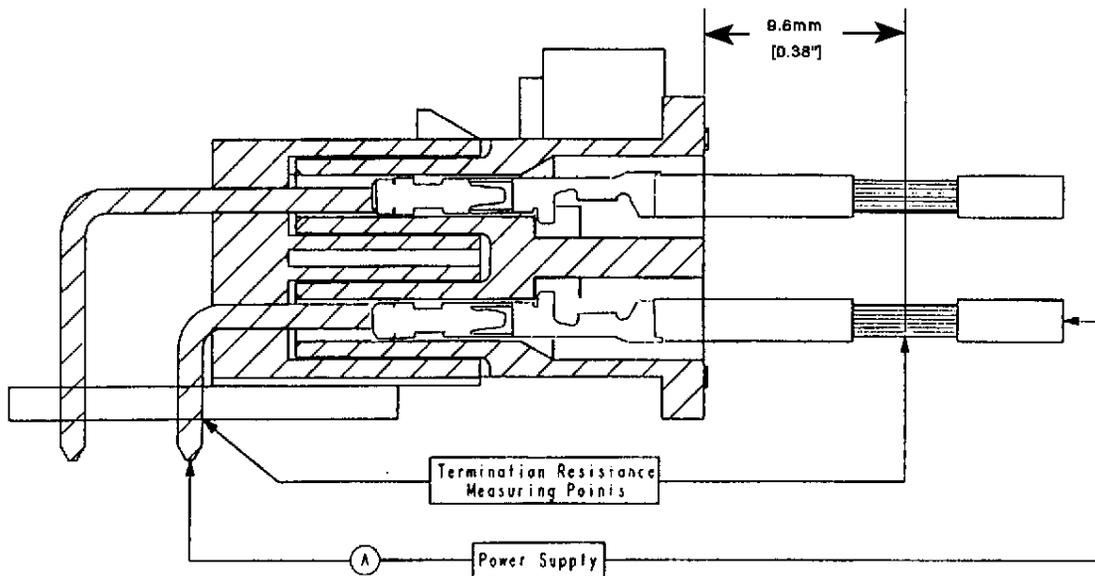
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

#### 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. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

#### 4.4. Quality Conformance Inspection

Applicable AMP quality 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 measured voltage divided by test current, less resistance of 9.6mm of wire.*

Figure 3  
Termination Resistance Measurement Points

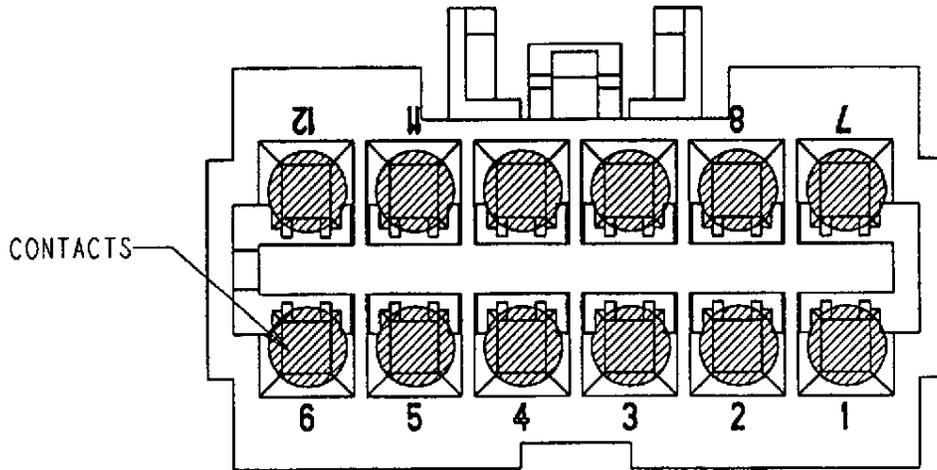


Figure 4  
250 vdc Connector Loading

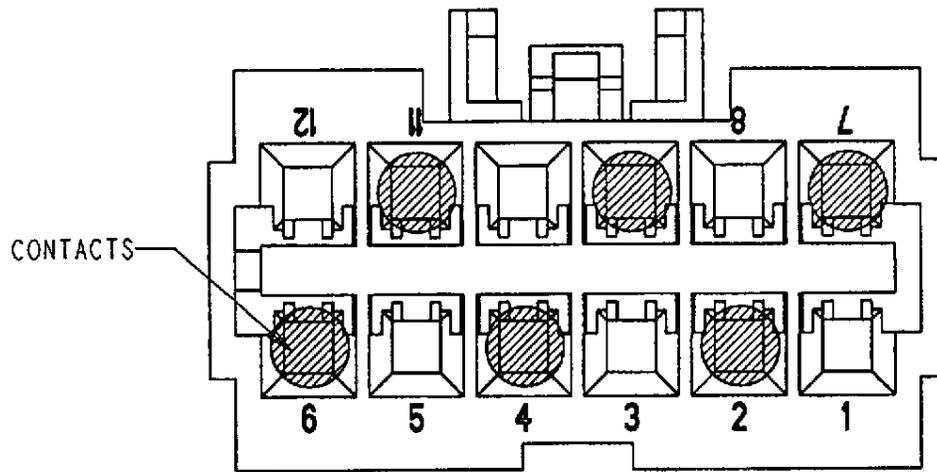


Figure 5  
600 vdc Connector Loading

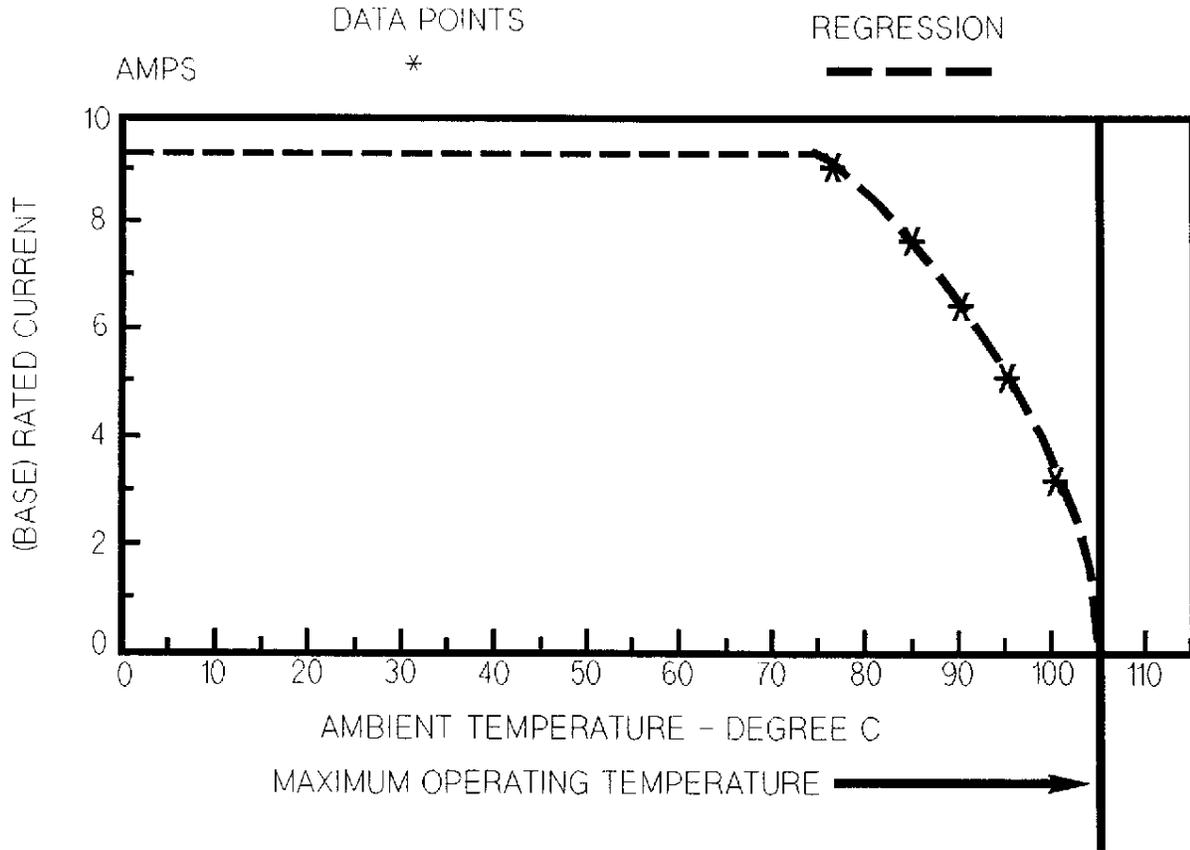


Figure 6A  
Current Carrying Capability

Percent Connector Loading	Wire Size AWG		
	26	20	18
Single Contact	.711	.907	1.0
25	.625	.797	.878
50	.565	.720	.794
75	.490	.625	.689
100	.465	.593	.654

**NOTE**

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base Rated Current for a single circuit at the maximum ambient operating temperature shown in Figure 6A.

Figure 6B  
Current Rating for 12 Circuit Assembly

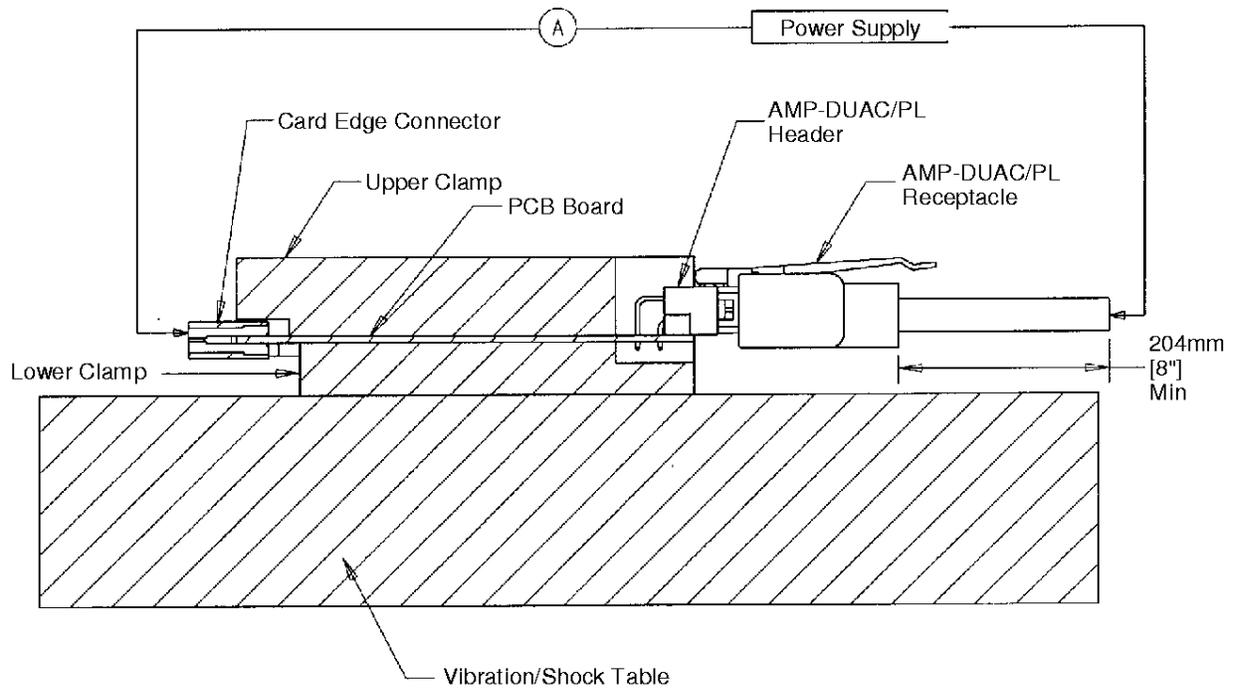


Figure 7  
Vibration & Physical Shock Mounting Fixture