
**Connector, AMPLIMITE* Series 109, Straight & Right Angle
Receptacles**

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the AMPLIMITE* Series 109 straight and right angle receptacle connectors with one piece insert design and size 20 posted socket contacts. The plug connectors are designed with a rear release pin contact retention system and are available in 9, 15, 25, 37, and 50 positions. Posted tail receptacles are to be placed on printed circuit boards.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 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 17Dec97. The test file number for this testing is CTL 4791-624-014. 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 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 Documents

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1
- C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Government or Commercial Documents
- D. 114-40051: Application Specification
- E. 501-410: Qualification Test Report

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

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- A. Voltage: 250 vac
- B. Current: See Figure 4 for applicable current carrying capability
- C. Temperature: -55 to 125°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 114-40051.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	7.3 milliohms maximum.	AMP Spec 109-25. Determine resistance. See Figure 3.
Insulation resistance.	1000 megohms minimum.	AMP Spec 109-28-4. Test between adjacent contacts of mated samples.
Dielectric withstanding voltage.	1000 vac at sea level. 1 minute hold with no breakdown or flashover.	AMP Spec 109-29-1. Test between adjacent contacts of mated samples.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	AMP Spec 109-45-1. Measure temperature rise vs current. See Figure 4.
MECHANICAL		
Solderability.	Solderable area shall have minimum of 95% solder coverage.	AMP Spec 109-11-5. Subject contacts to solderability.
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-21-5. Subject mated samples to 11.95 G's rms between 50-2000 Hz. 1 hour in each of 3 mutually perpendicular planes.
Mechanical shock, specified pulse.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-26-7. Subject mated samples to 50 G's sawtooth shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.

Figure 1 (cont)

Test Description	Requirement	Procedure												
Durability.	See Note.	AMP Spec 109-27. Mate and unmate samples for 500 cycles at a maximum rate of 200 cycles per hour.												
Mating force.	<table border="1"> <thead> <tr> <th>Connector Size</th> <th>Pounds Maximum</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10</td> </tr> <tr> <td>2</td> <td>17</td> </tr> <tr> <td>3</td> <td>28</td> </tr> <tr> <td>4</td> <td>39</td> </tr> <tr> <td>5</td> <td>49</td> </tr> </tbody> </table>	Connector Size	Pounds Maximum	1	10	2	17	3	28	4	39	5	49	AMP Spec 109-42, Condition A. Measure force necessary to mate samples at a maximum rate of .5 inch per minute.
Connector Size	Pounds Maximum													
1	10													
2	17													
3	28													
4	39													
5	49													
Unmating force.	<table border="1"> <thead> <tr> <th>Connector Size</th> <th>Pounds Minimum</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>.75</td> </tr> <tr> <td>2</td> <td>1.0</td> </tr> <tr> <td>3</td> <td>1.75</td> </tr> <tr> <td>4</td> <td>2.5</td> </tr> <tr> <td>5</td> <td>3.25</td> </tr> </tbody> </table>	Connector Size	Pounds Minimum	1	.75	2	1.0	3	1.75	4	2.5	5	3.25	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples at a maximum rate of .5 inch per minute.
Connector Size	Pounds Minimum													
1	.75													
2	1.0													
3	1.75													
4	2.5													
5	3.25													
ENVIRONMENTAL														
Thermal shock.	See Note.	AMP Spec 109-22. Subject mated samples to 5 cycles between -55 and 125°C.												
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 chamber temperature for 500 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 meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,9	1,9	1,8	1,3
Termination resistance	3,7	2,7		
Insulation resistance			2,6	
Dielectric withstanding voltage			3,7	
Temperature rise vs current		3,8		
Solderability				2
Vibration	5	6(c)		
Mechanical shock	6			
Durability	4			
Mating force	2			
Unmating force	8			
Thermal shock			4	
Humidity-temperature cycling			5	
Temperature life		5		
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 10 cycles durability.

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. All test groups shall each consist of a minimum of 5 samples.

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

The applicable AMP quality inspection plan shall 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.

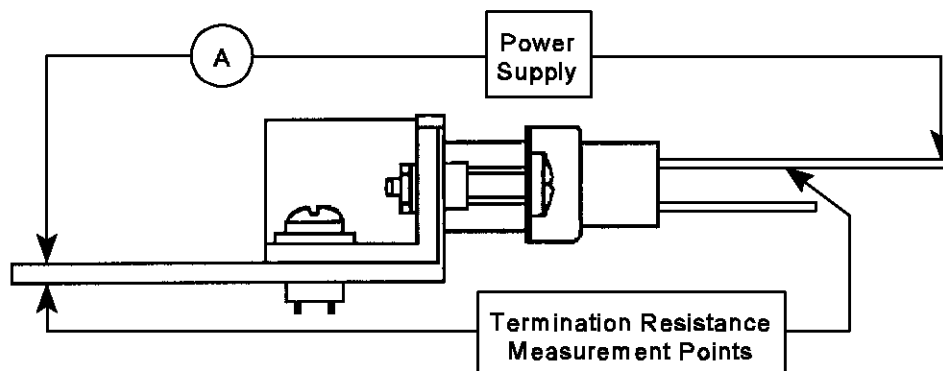


Figure 3
Termination Resistance Measurement Points

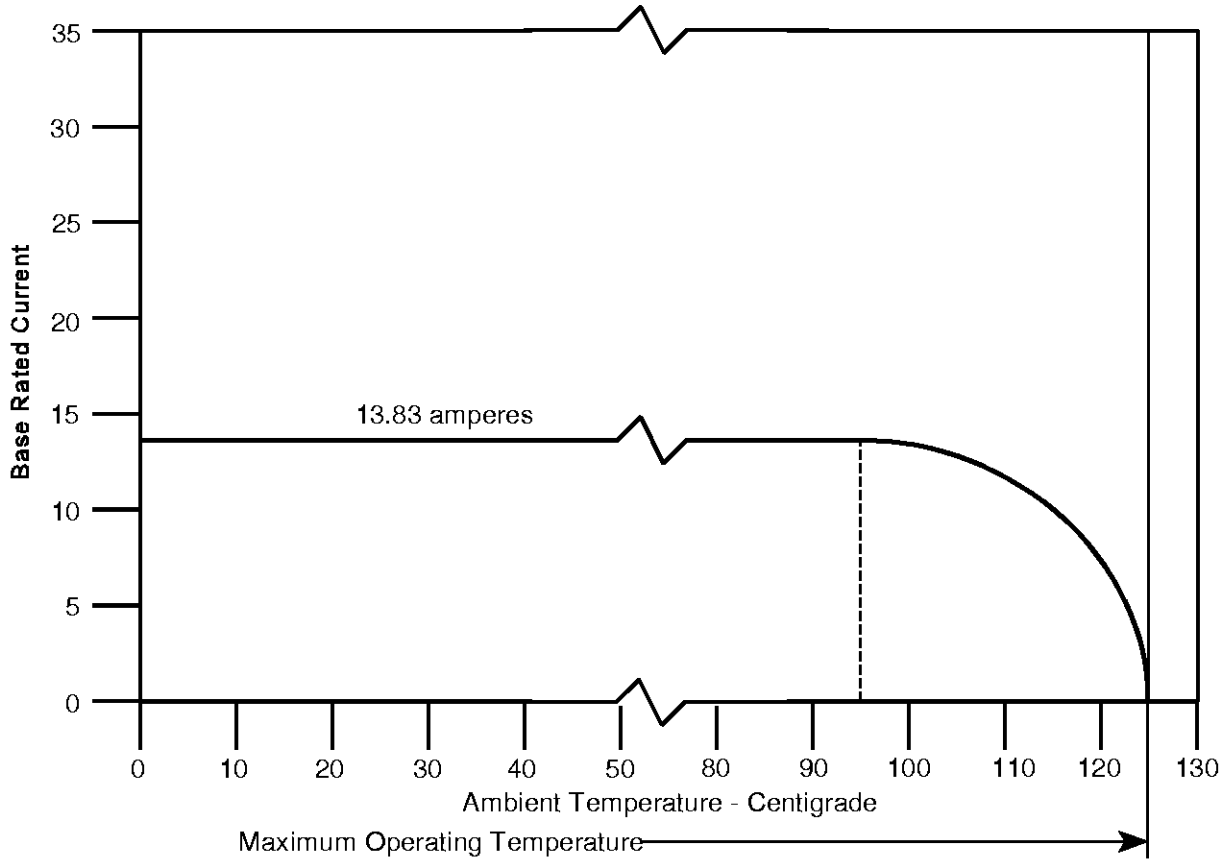


Figure 4A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG			
	26	24	22	20
Single Contact	.79	.86	.93	1
50	.43	.47	.50	.54
100	.29	.32	.34	.37

NOTE

To determine acceptable the 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 4A.

Figure 4B
Current Rating