
Connector, PCB Mounted, HD-20, AMPLIMITE* III

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the AMPLIMITE* III printed circuit board mounted connector with non-removeable contacts.

1.2. Qualification

- I When tests are performed on subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

I 1.3. Qualification Test Results

- I Successful qualification testing on the subject product line was completed on 26Oct90. Additional
I testing on Size 5, 50 position connectors was completed on 10Jul01. The Qualification Test Report
I number for this testing is 501-136. This documentation is on file at and available from Engineering
I Practices and Standards (EPS).

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.

I 2.1. Tyco Electronics Documents

- 109-1: General Requirements for Test Specifications
- I ● 109 Series: Test Specifications as indicated in Figure 1
- I ● 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- 114-40027: Application Specification, All Plastic
- 114-40028: Application Specification, Metal Shell
- 501-136: Qualification Test Report

I 2.2. Commercial Standard

- I EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

- Contact: Brass or phosphor bronze, gold plating on mating end, tin-lead plating on solder end
- Housing: Thermoplastic, UL94V-0
- Shell: Steel, tin plating

3.3. Ratings

- Voltage: 125 volts AC rms or DC per CSA; 250 volts AC rms or DC per UL
- Current: See Figure 4 for applicable current carrying capabilities
- Temperature: -55 to 105°C, see Application Specification 114-40028 for high temperature solder application temperatures for .318 front metal shell product line only.

3.4. Performance and Test Description

Product is designed to meet electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per Test Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and Application Specifications 114-40027 for all plastic and 114-40028 for metal shell.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	15 milliohms maximum initial. 20 milliohms maximum final.	AMP 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Insulation resistance.	5000 megohms minimum initial. 1000 megohms minimum final.	AMP Spec 109-28-4. Test between adjacent contacts of unmated specimens.
Dielectric withstanding voltage.	1000 volts AC at sea level.	AMP Spec 109-29-1. Test between adjacent contacts and between contacts and metal shell of unmated specimens.
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 109-11-2. Subject contacts to solderability.

Figure 1 (cont)

Test Description	Requirement	Procedure																												
Vibration, random (connector sizes 1 to 4).	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-21-5. Subject mated specimens to 23 G's rms. 20 minutes in each of 3 mutually perpendicular planes. See Figure 5.																												
Vibration, random (connector size 5).	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition D. Subject mated specimens to 3.10 G's rms between 20-500 Hz. 20 minutes in each of 3 mutually perpendicular planes. See Figure 5.																												
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-26-1. Subject mated specimens to 50 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 5.																												
Durability.	See Note.	AMP Spec 109-27. Mate and unmate specimens for 100 cycles for gold flash and 500 cycles for 30 μ in gold plating at a maximum rate of 200 cycles per hour.																												
Mating force.	Pounds maximum. <table><tr><th></th><th>Contact</th><th colspan="2">Grounding</th></tr><tr><th>Size</th><th>Position</th><th>W/O</th><th>With</th></tr><tr><td>1</td><td>9</td><td>2.8</td><td>30</td></tr><tr><td>2</td><td>15</td><td>4.7</td><td>33</td></tr><tr><td>3</td><td>25</td><td>7.8</td><td>37</td></tr><tr><td>4</td><td>37</td><td>11.6</td><td>40</td></tr><tr><td>5</td><td>50</td><td>25.0</td><td>44</td></tr></table>		Contact	Grounding		Size	Position	W/O	With	1	9	2.8	30	2	15	4.7	33	3	25	7.8	37	4	37	11.6	40	5	50	25.0	44	AMP Spec 109-42, Condition A. Measure force necessary to mate specimens at a maximum rate of 1 inch per minute.
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1	9	2.8	30																											
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5	50	25.0	44																											
Unmating force.	Pounds maximum. <table><tr><th></th><th>Contact</th><th colspan="2">Grounding</th></tr><tr><th>Size</th><th>Position</th><th>W/O</th><th>With</th></tr><tr><td>1</td><td>9</td><td>2.8</td><td>30</td></tr><tr><td>2</td><td>15</td><td>4.7</td><td>33</td></tr><tr><td>3</td><td>25</td><td>7.8</td><td>37</td></tr><tr><td>4</td><td>37</td><td>11.6</td><td>40</td></tr><tr><td>5</td><td>50</td><td>25.0</td><td>44</td></tr></table>		Contact	Grounding		Size	Position	W/O	With	1	9	2.8	30	2	15	4.7	33	3	25	7.8	37	4	37	11.6	40	5	50	25.0	44	AMP Spec 109-42, Condition A. Measure force necessary to unmate specimens at a maximum rate of 1 inch per minute.
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ENVIRONMENTAL																														
Thermal shock.	See Note.	AMP Spec 109-22. Subject mated specimens to 100 cycles between -55 and 105°C.																												

Figure 1 (cont)

Test Description	Requirement	Procedure
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-4, Condition B. Subject mated specimens to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	AMP Spec 109-43. Subject mated specimens to temperature life at 105°C for 500 hours.
Mixed flowing gas.	See Note.	AMP Spec 109-85-3. Subject mated specimens to environmental class III for 20 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(b)(d)	5	6	7	8
	Test Sequence (c)							
Examination of product	1,9	1,6	1,6	1,10	1,5	1,8	1,3	1,5
Termination resistance	3,7	2,5	2,5	2,8	2,4			
Insulation resistance						2,6		
Dielectric withstanding voltage						3,7		
Temperature rise vs current				3,9				
Solderability							2	
Vibration	5			7				
Physical shock	6							
Durability	4	3	3	4				3
Mating force	2							2
Unmating force	8							4
Thermal shock						4		
Humidity-temperature cycling			4			5		
Temperature life		4		6				
Mixed flowing gas				5	3			

NOTE

- (a) See paragraph 4.1.A.
(b) Discontinuities shall not be measured for this test group
(c) Numbers indicate sequence in which tests are performed.
(d) 30 μ in gold plating.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production and mounted on printed circuit boards. Mating pins shall be loaded with 2, 12 inch standard 26 AWG PVC wires.

Test groups 1, 2 and 3 shall each consist of 10 mated connector pairs, consisting of right angle board mounted AMPLIMITE III mated with cable mounted AMPLIMITE connectors with cable clamps. 5 of the pairs in each test group shall contain gold flash plated contacts and 5 pairs shall contain 30 μ in gold plated contacts. Plug connectors shall not have ground indents.

Test group 4 shall consist of 5 mated connector pairs of right angle board mounted AMPLIMITE III mated with cable mounted AMPLIMITE connectors with cable clamps. Contacts shall be plated with 30 μ in gold.

Test groups 5 and 6 shall each consist of 5 mated pairs of connectors with gold flash plated contacts. Plug connectors shall not have ground indents. Test group 6 specimens shall not be mounted on printed circuit boards.

Test group 7 shall consist of 5 right angle board mounted AMPLIMITE III connectors. Specimens shall not be mounted on printed circuit boards.

Test group 8 shall consist of 20 mated connector pairs consisting of right angle board mounted AMPLIMITE III mated with AMPLIMITE connectors with cable clamps. 20 mated pairs shall consist of 5 pairs each of 9, 15, 25, and 37 positions. Plug contacts shall have ground indents. No wires are required, but contacts shall be crimped.

B. Test Sequence

- I Qualification inspection shall be verified by testing specimens 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 specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

- I The applicable 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.

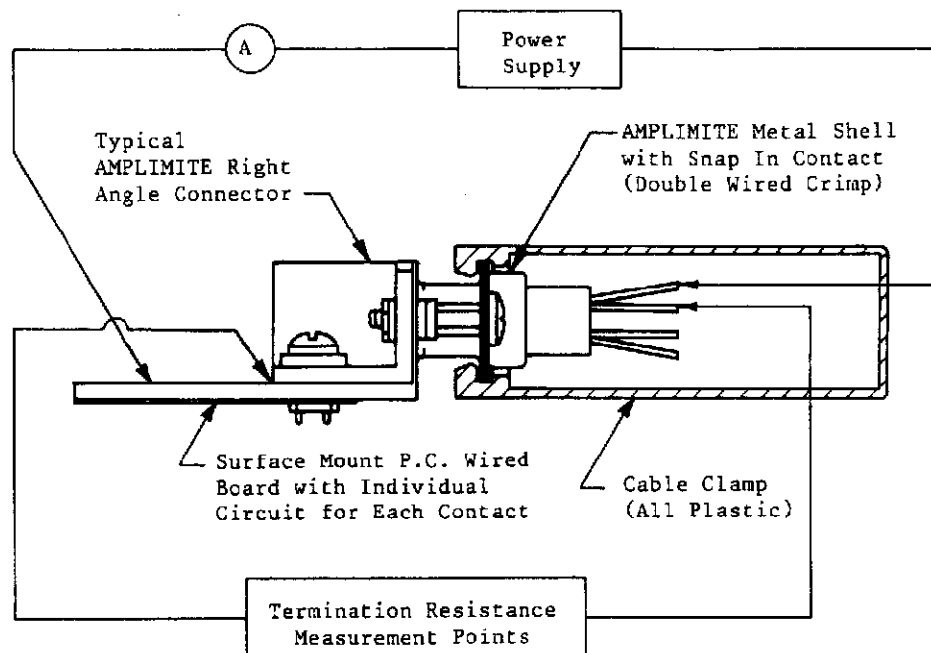


Figure 3
Termination Resistance & Temperature Measurement Points

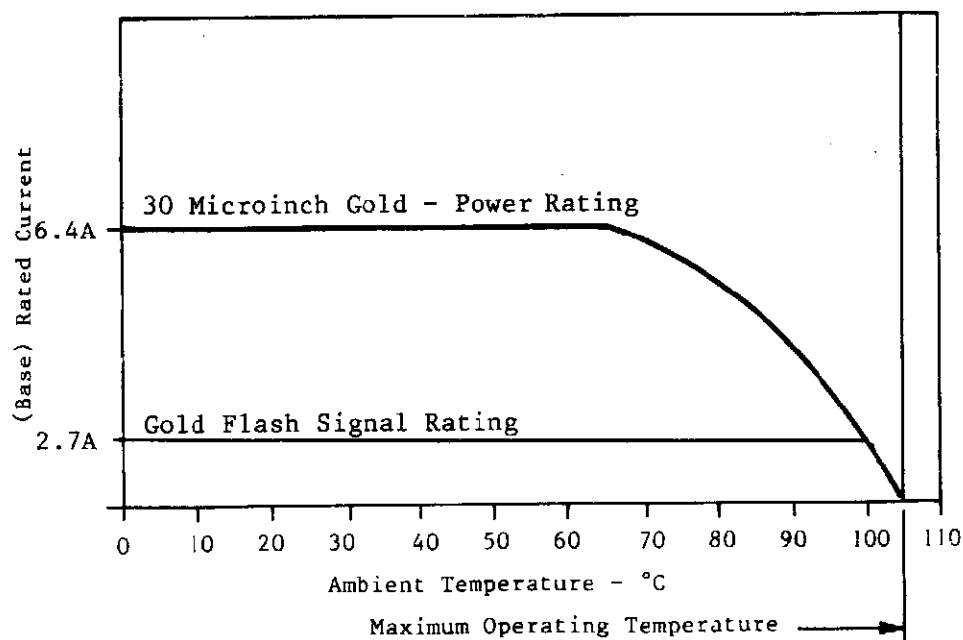


Figure 4A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG					
	18	20	22	24	26	28
Single Contact	1.0	.881	.786	.708	.643	.588
27 10/37 C=2.5068	.669	.589	.525	.473	.430	.393
49 18/37 C=4.9594	.496	.437	.390	.351	.319	.292
76 28/37 C=9.0189	.382	.336	.300	.270	.245	.225
100 37/37 C=12.3841	.332	.293	.261	.235	.213	.195

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 Base rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B
Current Rating

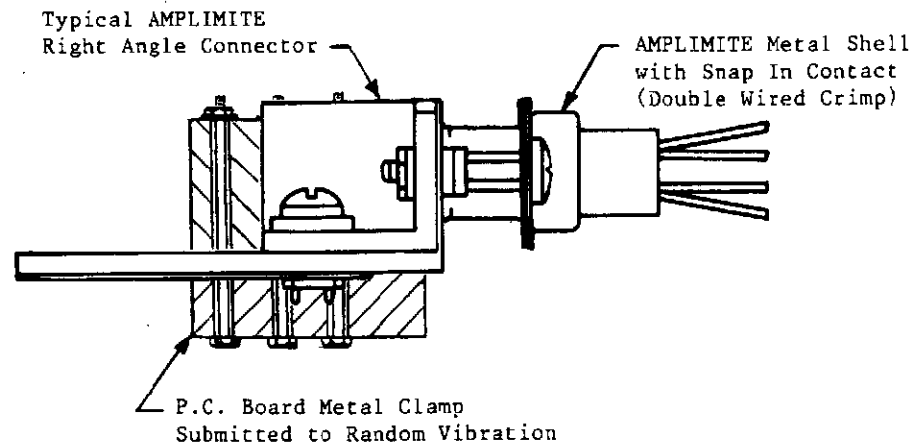


Figure 5
Vibration & Physical Shock Mounting Fixture