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**AMPLIMITE\* HD-22 Front Metal Shell, PCB Mounted Connector**

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**1. SCOPE****1.1. Content**

This specification covers performance, tests and quality requirements for AMPLIMITE\* HD-22 right angle and vertical printed circuit board mounted connectors.

**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 applicable inspection plan and product drawing.

**1.3. Qualification Test Results**

Successful qualification testing on the subject product line was completed on 14Dec89. The Qualification Test Report number for this testing is 501-104. Additional testing was completed on 09Jan02, the Engineering Report number for this testing 502-1125. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following TE Connectivity (TE) 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.

- 109-1: Test Specification (General Requirements for Test Specifications)
- 109 Series: Test Specifications as indicated in Figure 1
- 114-40021: Application Specification (AMPLIMITE\* HD-22 Right Angle Front Metal Shell Connectors)
- 114-40022: Application Specification (AMPLIMITE\* HD-22 Straight Front Metal Shell PC Board Connector)
- 501-104: Qualification Test Report (AMPLIMITE\* HD-22 Front Metal Shell, PCB Mounted Connector)
- 502-1125: Engineering Report (AMPLIMITE\* HD-22 Front Metal Shell, PCB Mounted Connector)

**3. REQUIREMENTS****3.1. Design and Construction**

Product shall be of design, construction and physical dimensions specified on 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

- Voltage:
  - UL: 250 volts Ac
  - CSA: 125 volts AC
- Current:
  - Right angle: 2 amperes maximum per contact
  - Straight posted: 1.5 amperes maximum per contact
- Temperature:
  - Regular housing: -55 to 105°C
  - High temperature housing: -55 to 130°C

### 3.4. Performance and Test Description

Product is designed to meet electrical, mechanical and environmental performance requirements specified in Figure 1. All tests are performed at ambient environmental conditions per AMP Specification 109-1 unless otherwise specified.

### 3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and Application Specifications 114-40021 and 114-40022.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance, dry circuit.	25 milliohms maximum final for 30 $\mu$ in gold. 30 milliohms maximum final for 15 $\mu$ in and gold flash. $\Delta$ R 10 milliohms.	TE Spec 109-6-1. Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum. See Figure 3.
Dielectric withstanding voltage.	1000 volts AC at sea level.	TE Spec 109-29-1. Test between adjacent contacts and between contacts and metal shell of unmated connector assemblies.
Insulation resistance.	5000 megohms minimum initial. 1000 megohms minimum final.	TE Spec 109-28-4. Test between adjacent contacts of unmated connector assemblies.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	TE Spec 109-45-1. Measure temperature rise vs current.
MECHANICAL		
Vibration, random.	No discontinuities greater than 1 microsecond. See Note.	TE Spec 109-21-5, Test level G, Duration 20 minutes. Subject mated connectors to 23 G's rms with 100 ma current applied. See Figure 4.

Figure 1 (continued)

Test Description	Requirement	Procedure																												
Physical shock.	No discontinuities greater than 1 microsecond. See Note.	TE Spec 109-26-1. Subject mated connectors 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 4.																												
Mating force.	Force in pounds maximum. <table><thead><tr><th></th><th></th><th colspan="2">Grounding Indents</th></tr><tr><th>Size</th><th>Positions</th><th>W/O</th><th>With</th></tr></thead><tbody><tr><td>1</td><td>15</td><td>5.6</td><td>33</td></tr><tr><td>2</td><td>26</td><td>9.8</td><td>38</td></tr><tr><td>3</td><td>44</td><td>16.5</td><td>46</td></tr><tr><td>4</td><td>62</td><td>23.3</td><td>52</td></tr><tr><td>5</td><td>78</td><td>29.3</td><td>58</td></tr></tbody></table>			Grounding Indents		Size	Positions	W/O	With	1	15	5.6	33	2	26	9.8	38	3	44	16.5	46	4	62	23.3	52	5	78	29.3	58	TE Spec 109-42, Condition A. Measure force necessary to mate connector assemblies at rate of 1 inch per minute.
		Grounding Indents																												
Size	Positions	W/O	With																											
1	15	5.6	33																											
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Unmating force.	Force in pounds maximum. <table><thead><tr><th></th><th></th><th colspan="2">Grounding Indents</th></tr><tr><th>Size</th><th>Positions</th><th>W/O</th><th>With</th></tr></thead><tbody><tr><td>1</td><td>15</td><td>5.6</td><td>33</td></tr><tr><td>2</td><td>26</td><td>9.8</td><td>38</td></tr><tr><td>3</td><td>44</td><td>16.5</td><td>46</td></tr><tr><td>4</td><td>62</td><td>23.3</td><td>52</td></tr><tr><td>5</td><td>78</td><td>29.3</td><td>58</td></tr></tbody></table>			Grounding Indents		Size	Positions	W/O	With	1	15	5.6	33	2	26	9.8	38	3	44	16.5	46	4	62	23.3	52	5	78	29.3	58	TE Spec 109-42, Condition A. Measure force necessary to unmate connector assemblies at rate of 1 inch per minute.
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3	44	16.5	46																											
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Durability.	See Note.	TE Spec 109-27. Mate and unmate connector assemblies for 100 cycles for gold flash and 500 cycles for 30 μin gold plating at maximum rate of 200 cycles per hour.																												
Solderability.	Solderable area shall have minimum of 95% solder coverage.	TE Spec 109-11-1. Subject contacts to solderability for connectors with tin-lead plated solder tails.  TE Spec 109-11-11. Subject contacts to solderability for connectors with lead-free tin plated soldertails.																												
ENVIRONMENTAL																														
Thermal shock.	See Note.	TE Spec 109-22. Subject mated connectors to 100 cycles between -55 and 105°C for regular housings and -55 and 130°C for high temperature housings.																												

Figure 1 (continued)

Test Description	Requirement	Procedure
Humidity-temperature cycling.	See Note.	TE Spec 109-23-3, Condition B. Subject mated connectors to 10 humidity-temperature cycles between 25 and 65°C at 95% RH.
Mixed flowing gas.	See Note.	TE Spec 109-85-3. Subject mated connectors to environmental class III for 20 days.
Temperature life.	See Note.	TE Spec 109-43. Subject mated connectors to temperature life at 105°C for 500 hours.

**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	6	7	8
	Test Sequence (b)							
Examination of product	1,9	1,6	1,6	1,4	1,5	1,8	1,3	1,5
Termination resistance	3,7	2,5	2,5	2	2,4			
Dielectric withstanding voltage						3,7		
Insulation resistance						2,6		
Temperature rise vs current				3				
Vibration	5							
Physical shock	6							
Mating force	2							2
Unmating force	8							4
Durability	4	3	3					3
Solderability							2	
Thermal shock						4		
Humidity-temperature cycling			4			5		
Mixed flowing gas					3(c)			
Temperature life		4						

**NOTE**

- (a) See paragraph 4.1.A.  
(b) Numbers indicate sequence in which tests are performed.  
(c) Precondition samples with 10 cycles durability.

Figure 2

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1. Qualification Testing

#### A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

Test groups 1 and 3 shall consist of 5 samples each of 30  $\mu$ m gold plating and gold flash of a right angle receptacle connector. Mating crimp snap plug connectors without grounding indents shall be loaded with 30  $\mu$ m gold plating and gold flash pin contacts as required per Note (a). Crimp snap contacts shall be double crimped with 2, 12 inch 105°C rated PVC 26 AWG wires per Note (b). Cable clamps shall be used on crimp snap connectors. Hardware shall be used to hold mating connectors together and to secure posted connectors onto printed circuit boards.

Test group 2 shall consist of 5 samples each of 30  $\mu$ m gold plated right angle receptacle connector and gold flash straight posted receptacle connector. Mating crimp snap plug connectors shall be loaded with 30  $\mu$ m gold plating and gold flash pin contacts as required per Note (a). Crimp snap contacts shall be double crimped with 12 inch 105°C rated PVC 26 AWG wires per Note (b). Hardware shall be used to hold mating connectors together and to secure posted connectors onto printed circuit boards.

Test group 4 shall consist of 5 samples each of right angle receptacle connector and straight posted receptacle connector with gold flash contacts. Mating crimp snap plug connectors shall be loaded with gold flash pin contacts. Crimp snap contacts shall be double crimped with 2, 12 inch 105°C rated PVC 26 AWG wires per Note (b). Cable clamps shall be used on crimp snap connectors. Hardware shall be used to hold mating connectors together and to secure posted connectors onto printed circuit boards.

Test group 5 shall consist of 5 samples each of gold flash right angle receptacle connector and straight posted receptacle connector. Mating crimp snap plug connectors shall be loaded with gold flash pin contacts. Crimp snap contacts shall be double crimped with 2, 12 inch 105°C rated PVC 26 AWG wires per Note (b). Cable clamps shall be used on crimp snap connectors. Hardware shall be used to hold mating connectors together and to secure posted connectors onto printed circuit boards.

Test groups 6 and 7 shall each consist of 5 samples of right angle receptacle connector with gold flash contacts.

Test group 8 shall consist of 5 samples each of size 1 (15 position), size 2 (26 position), size 3 (44 position), size 4 (62 position), and size 5 (78 position) receptacle connectors with gold flash contacts. Mating crimp snap plug connectors with grounding indents shall be loaded with crimped contacts with no wires required.

**NOTE**

- (a) Gold flash socket contacts shall be mated with gold flash pin contacts. 30  $\mu$ m gold socket contacts shall be mated to 30  $\mu$ m gold pin contacts.
- (b) Strip wires to .250 inch beyond insulation barrel for double crimp to prevent broken wires. Second wire shall be used to provide voltage drop readings.

#### B. Test Sequence

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

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#### 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 quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.

#### 4.5. Certification

Product has been recognized under the Component Recognition Program of Underwriters' Laboratories Inc., Electrical File Number E-28476 and certified by Canadian Standards Association Number LR-16455.

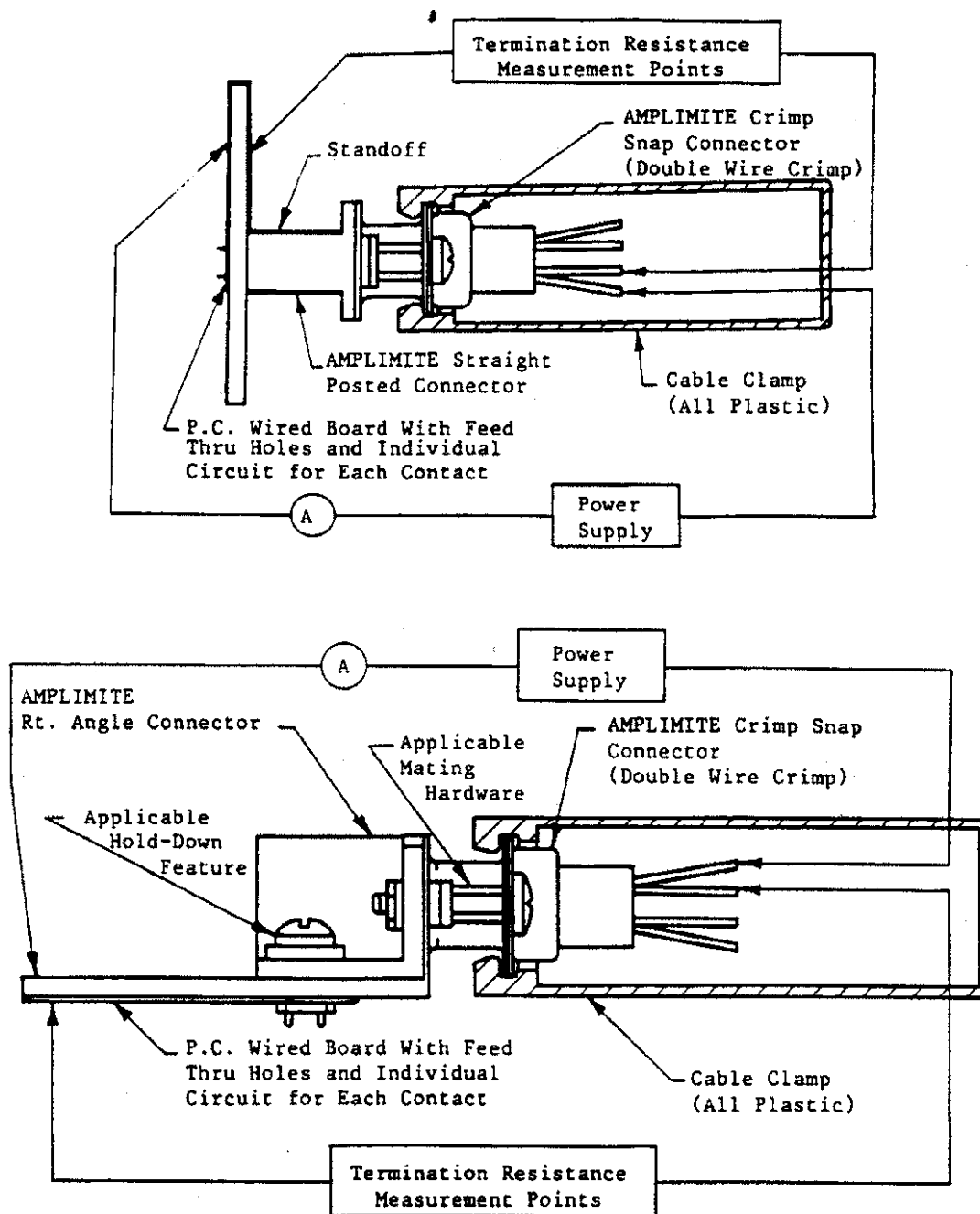


Figure 3  
Termination Resistance Measurement Points

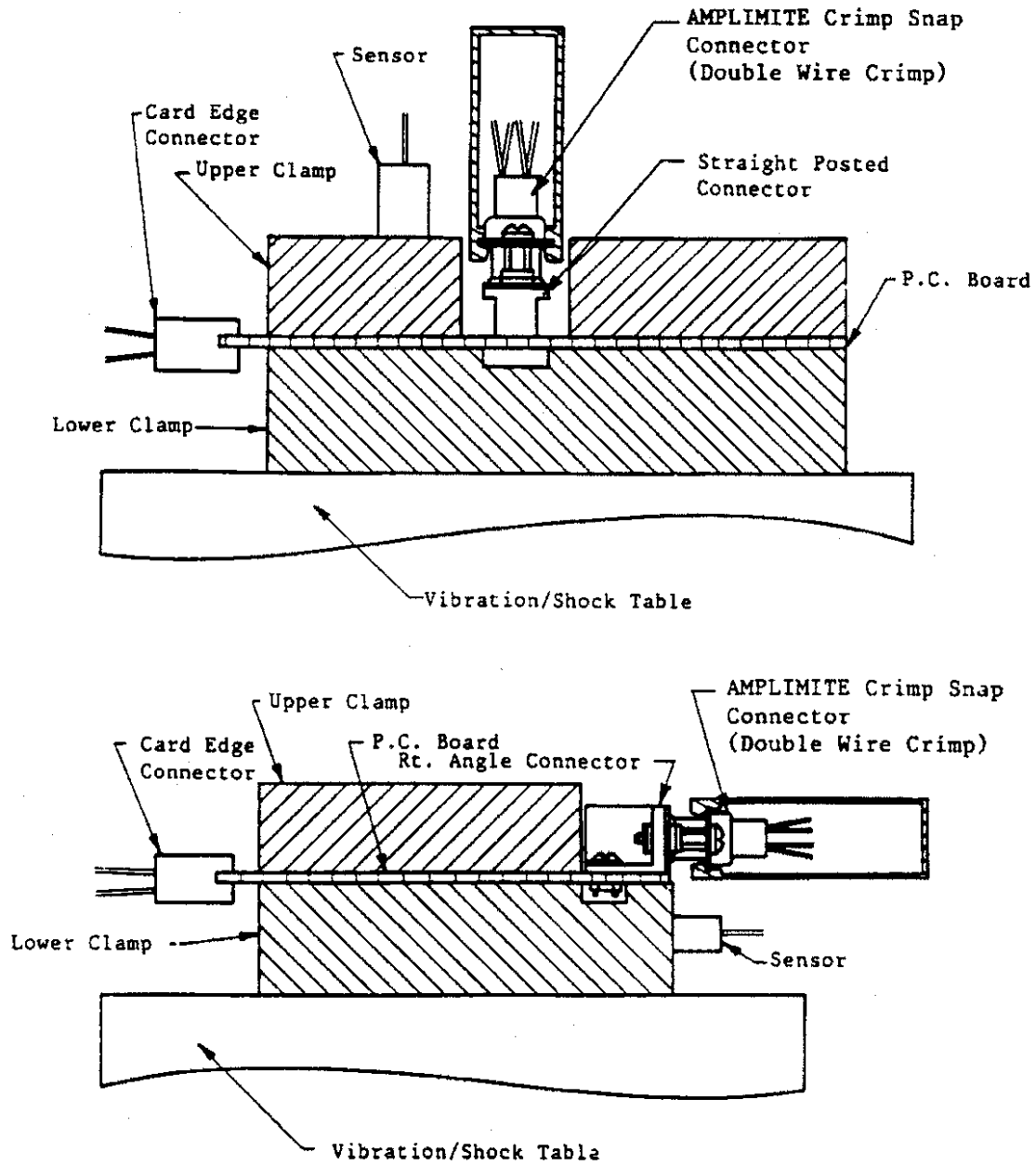


Figure 4  
Vibration & Physical Shock Mounting Fixture