
Connector, AMPINNERGY*, Wire-To-Board

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMPINNERGY* wire-to-board connectors. This includes vertical and right angle receptacles assemblies, plug housings, crimp dual beam contacts for wire-to-board application.

1.2. Qualification

When tests are performed on the subject product line, the 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 on 02Dec97. The test file numbers for this testing are CTL 3451-010-002 and CTL 3451-000-003. 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. TE Connectivity (TE) Documents

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1
- 114-6044: Application Specification
- 501-406: 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

- Contacts:
 - Dual Beam: Copper alloy, tin plated
 - PCB: Copper, tin plated
- Housings:
 - Receptacle: Polyphthalamide, UL 94V-0
 - Plug: Polycarbonate, UL 94V-0

3.3. Ratings

- Voltage: 600 volts alternating current (rms)
- Current: See Figure 4 for applicable current carrying capability
- Temperature: 0 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 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 Specification 114-6044.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	ΔR 1 milliohm maximum.	TE Spec 109-6-1. Subject samples to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Insulation resistance.	5000 megohms minimum.	TE Spec 109-28-4. Test between adjacent contacts of mated samples.
Dielectric withstanding voltage.	2200 vac at sea level. 1 minute hold with no breakdown or flashover.	TE Spec 109-29-1. Test between adjacent contacts of mated samples.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	TE Spec 109-45-1. Measure temperature rise vs current. See Figures 4 and 5.
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute with .06 inch maximum excursion. 2 hours in each of 3 mutually perpendicular planes. See Figure 6.
Mechanical shock, specified pulse.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated samples 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 6.

Figure 1 (continued)

Test Description	Requirement	Procedure
Durability.	See Note.	TE Spec 109-27. Mate and unmate samples for 100 cycles at a maximum rate of 500 cycles per hour.
Mating force.	6 pounds maximum average per contact.	TE Spec 109-42, Condition A. Measure force necessary to mate samples at a maximum rate of 1 inch per minute.
Unmating force.	1 pound minimum average per contact. 6 pounds maximum average per contact.	TE Spec 109-42, Condition A. Measure force necessary to unmate samples at a maximum rate of 1 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	TE Spec 109-22. Subject mated samples to 10 cycles between 0 and 105°C.
Humidity-temperature cycling.	See Note.	TE Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	TE Spec 109-43. Subject mated samples to temperature life at 118°C for 792 hours.

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

- NOTE**
- (a) See paragraph 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 100 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 4, 8 position mated pairs of connectors (plug housings and vertical receptacle assembly). Samples for test groups 1 and 2 shall be mounted to printed circuit board PN 93-660341-000. Samples for test group 3 shall be unmounted.

B. Test Sequence

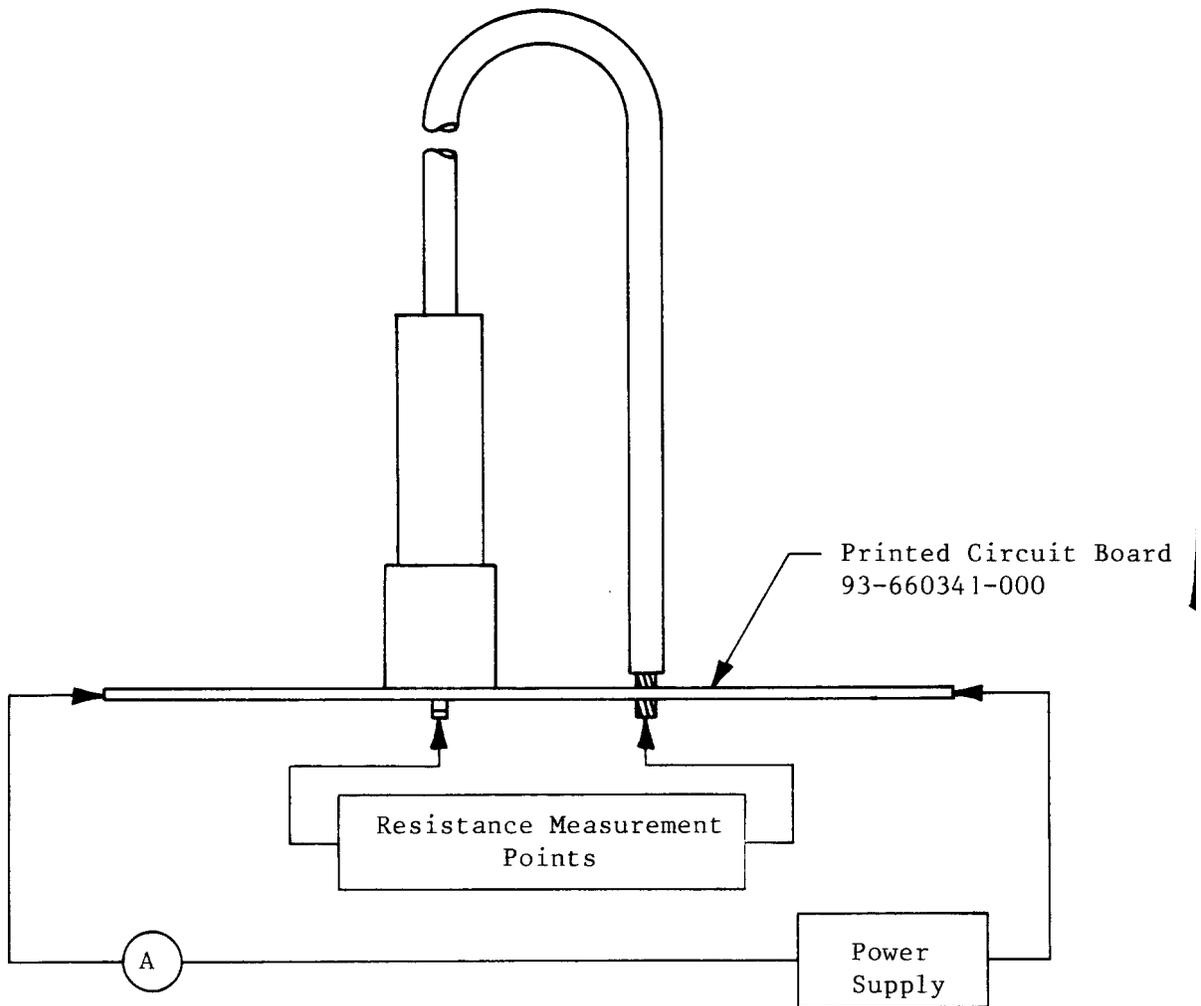
Qualification inspection shall be verified by testing samples as specified in Figure 2.

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

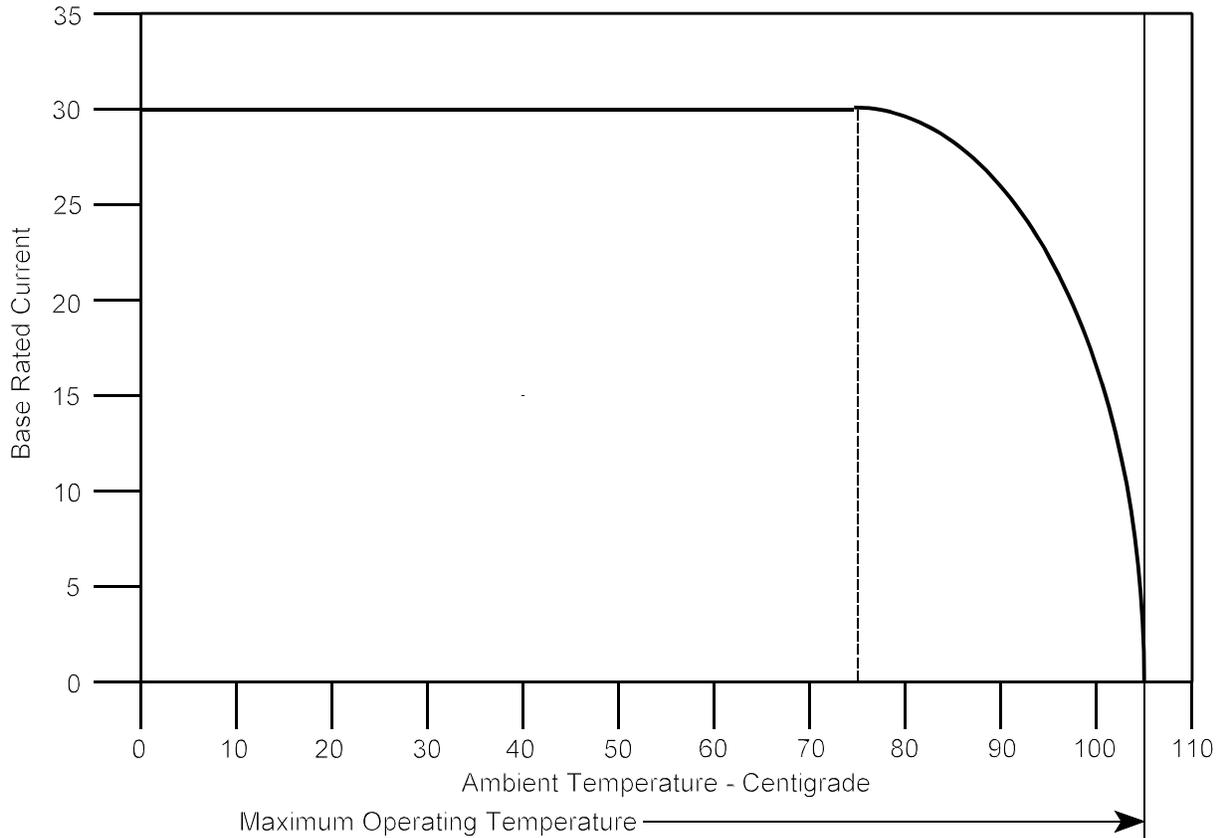
Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.



NOTE Resistance measurement points are actually at board level. Resistance of wire is subtracted out of measurements.

Figure 3
Termination Resistance Measurement Points

Rated Current vs Ambient Temperature Rating for
Single Circuit I_{rms} or I_{dc} , Maximum Wire Gage, Continuous Operating



NOTE .062 inch thick printed circuit board, 2 ounce copper trace, double sided, .360 inch wide trace.

Figure 4A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG				
	18	16	14	12	10
Single Contact	.50	.62	.75	.87	1
50	.46	.57	.69	.80	.92
100	.40	.50	.60	.70	.80

NOTE To determine acceptable current carrying capacity for the 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

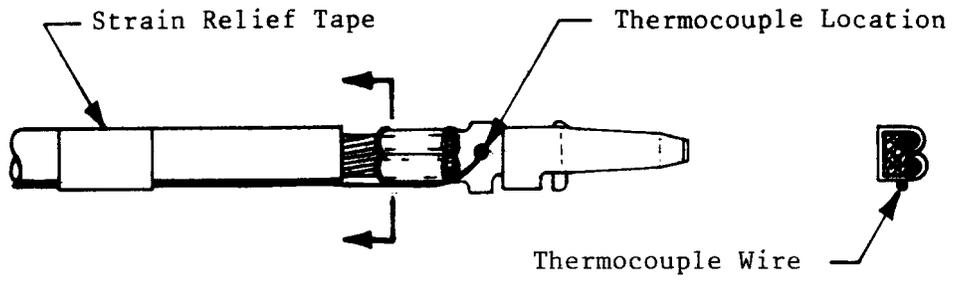


Figure 5
Temperature Rise Measurement Points

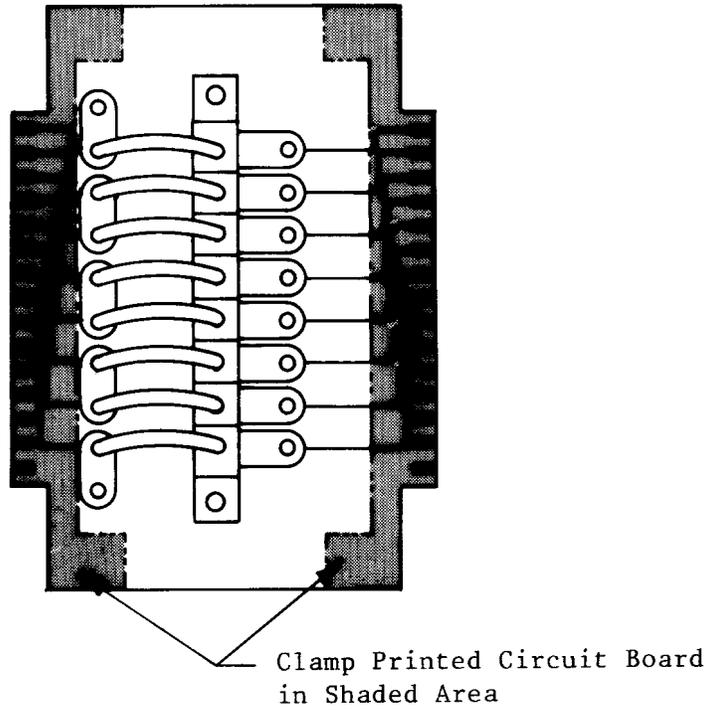


Figure 6
Vibration & Mechanical Shock Mounting Fixture
(Fixture 92-660368-000-1 through -004)