Connector, AMPINNERGY*, Wire To Wire

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for AMPINNERGY* Wire To Wire (WTW) hermaphroditic terminals, housing and mounting adapter.

1.2. Qualification

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

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the document applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence. In the event of conflict between requirements of this specification and 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. 114-6051: Application Specification
E. 501-312: Test Report

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

A. Housing: Polycarbonate, UL94V-0
B. Terminals: Copper, tin plated

3.3. Ratings

A. Voltage: 600 vac (rms) or 600 vdc
B. Current: See Figure 4 for applicable current carrying capability
C. Temperature: 0 to 105°C
D. Frequency Range: DC through 60 Hz. If power operating frequency is higher, ie. 400 Hz, consult appropriate product headquarters

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3.4. Reliability

A. On the basis of the test data, it can be said with 95% confidence that 99.999% of 1000000 contacts should exhibit a change in contact resistance less than 0.22 milliohm after 10 years at 105°C total operating temperature when the failure mode is stress relaxation.

B. On the basis of the test data, it can be said with 95% confidence that 99.999% of 1000000 contacts should exhibit a change in contact resistance less than 0.22 milliohm when exposed to 4 cycles of humidity-temperature cycling.

3.5. 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 AMP Specification 109-1.

3.6. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and AMP Spec 114-6051.	Visual, dimensional and functional per applicable quality inspection plan and Certificate of Conformance.
ELECTRICAL		
Termination resistance.	ΔR 0.22 milliohm maximum.	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.	1000 megohms minimum.	AMP Spec 109-28-4. Test between adjacent contacts of mated samples and between contacts and housing.
Dielectric withstanding voltage.	2500 vac at sea level.	AMP Spec 109-29-1. Test between adjacent contacts of mated samples and between contacts and housing.
Temperature rise vs current.	30°C maximum temperature rise at specified current of 38 amperes ac.	AMP Spec 109-45-1. Measure temperature rise vs current. See Figure 4.
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note (a).	AMP Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute at .06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes. See Figure 5.

Figure 1 (cont)

Test Description	Requirement	Procedure
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note (a).	AMP 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 5.
Durability.	See Note (a).	AMP Spec 109-27. Mate and unmate samples for 25 cycles at maximum rate of 400 cycles per hour.
Contact retention force.	Contacts shall not dislodge. See Note (a).	AMP Spec 109-30. Apply axial load of 40 pounds to each contact in parallel direction and hold for 1 minute.
Mating force.	10 pounds maximum per contact pair.	AMP Spec 109-42, Condition A. Measure force necessary to mate samples a distance of .5 inch from point of initial contact at maximum rate of .5 inch per minute.
Unmating force.	2 pounds minimum per contact pair.	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of .5 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note (a).	AMP Spec 109-22. Subject mated samples to 5 cycles between 0 and 105°C.
Humidity-temperature cycling.	See Note (a).	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 (a).	AMP Spec 109-43. Subject mated samples to temperature life at 105°C for 500 hours.

(a) 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)

3.7. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)		
	1	2	3
	Test Sequence (b)		
Examination of product	1,10	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)	
Physical shock	6		
Durability	4		
Contact retention force	9		
Mating force	2		
Unmating force	8		
Thermal shock			4
Humidity-temperature cycling		4(d)	5
Temperature life		5	

(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 5 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 20 samples of housings and terminals terminated to 10 AWG wire prepared with temperature and termination resistance measurement points per Figure 3.

B. Test Sequence

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

4.2. Requalification Testing

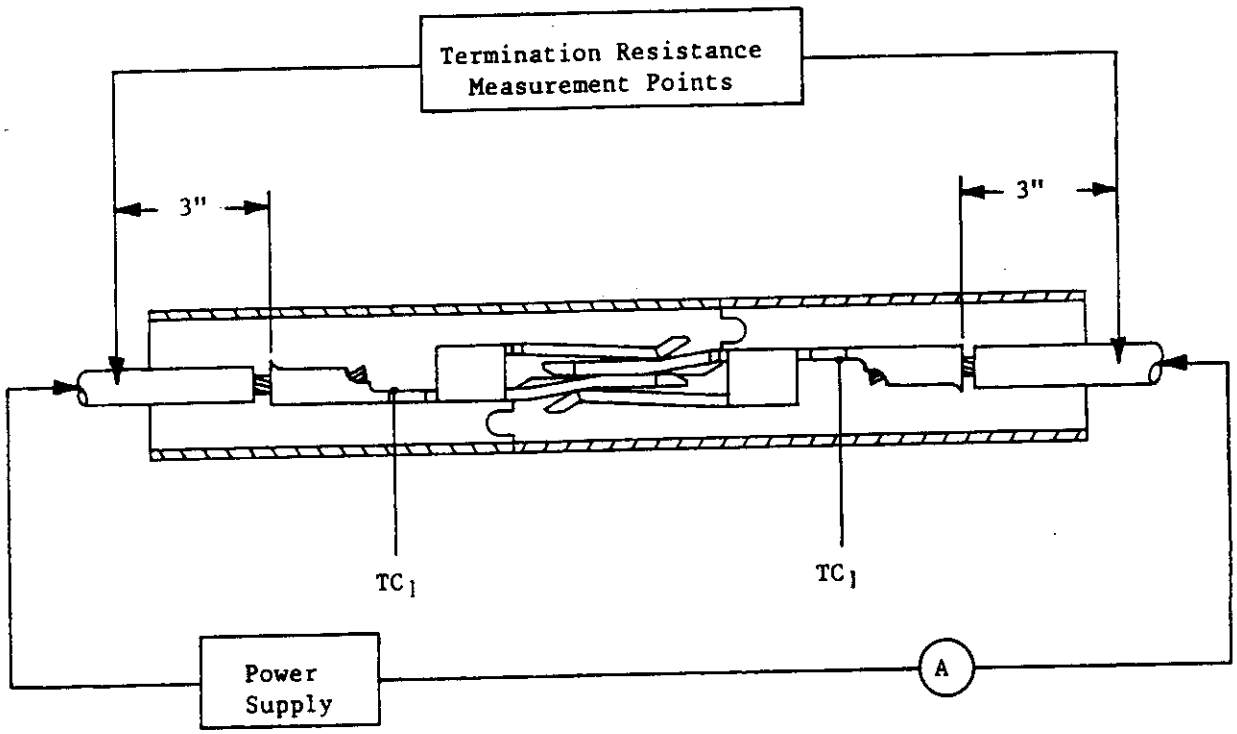
If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify 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 sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.



Note: Termination resistance equals millivolts divided by test current less resistance of 6 inches of wire.

Figure 3
Termination Resistance & Temperature Measurement Points

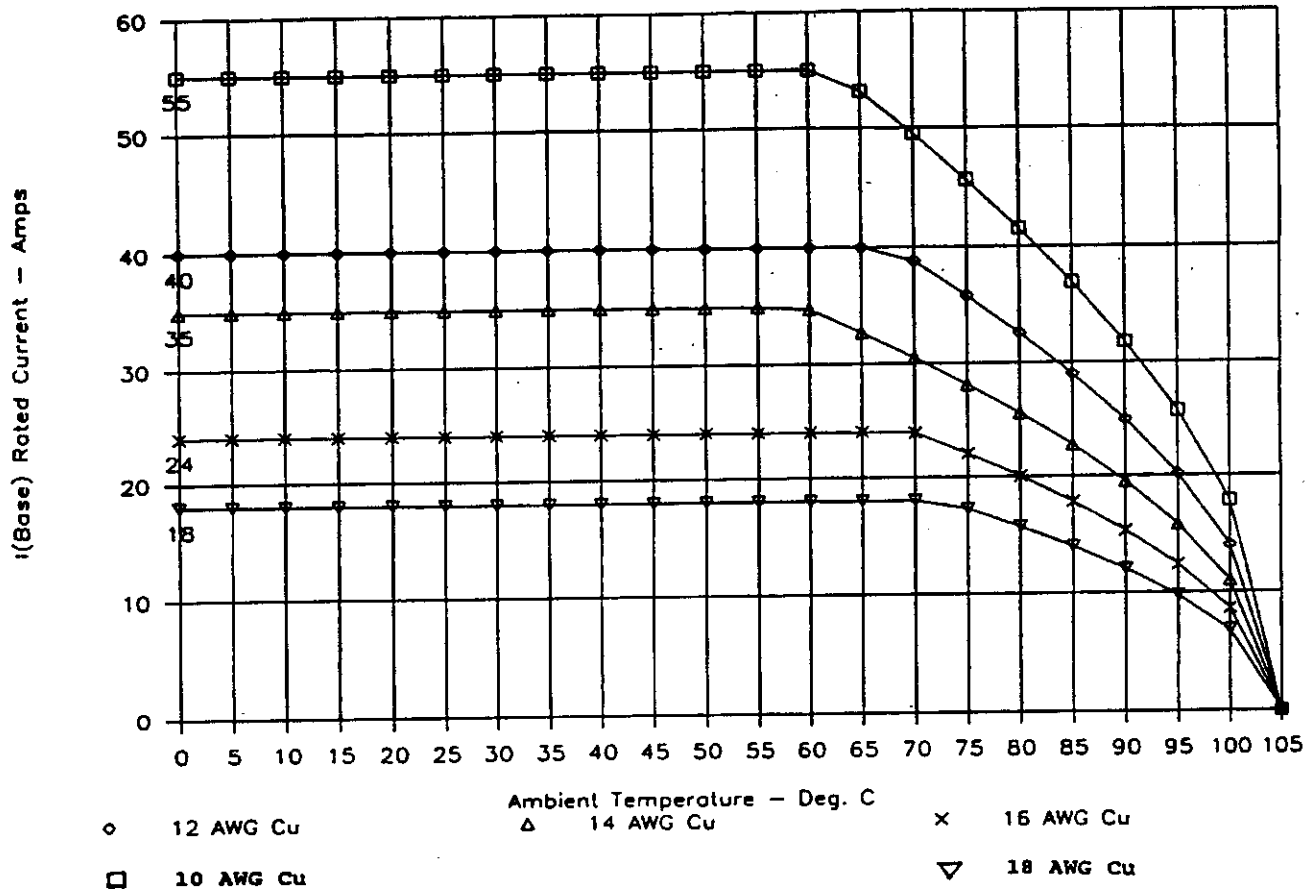


Figure 4A
Current Carrying Capability

Number of Positions	Wire Size AWG				
	18	16	14	12	10
1	.33	.44	.64	.73	1
2 to 3	.25	.33	.45	.55	.73
4 to 6	.20	.25	.36	.44	.56
7 to 9	.18	.24	.32	.38	.55

Note: (a) Multiplication factors (F) include effects of a load diversity of 50%.

(b) Unless specifically permitted within NEC, overcurrent protection for the following conductor types shall not be exceeded.

1. 7 amperes for 18 AWG copper wire
2. 10 amperes for 16 AWG copper wire
3. 15 amperes for 14 AWG copper wire
4. 20 amperes for 12 AWG copper wire

(c) To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use Multiplication Factor (F) from 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

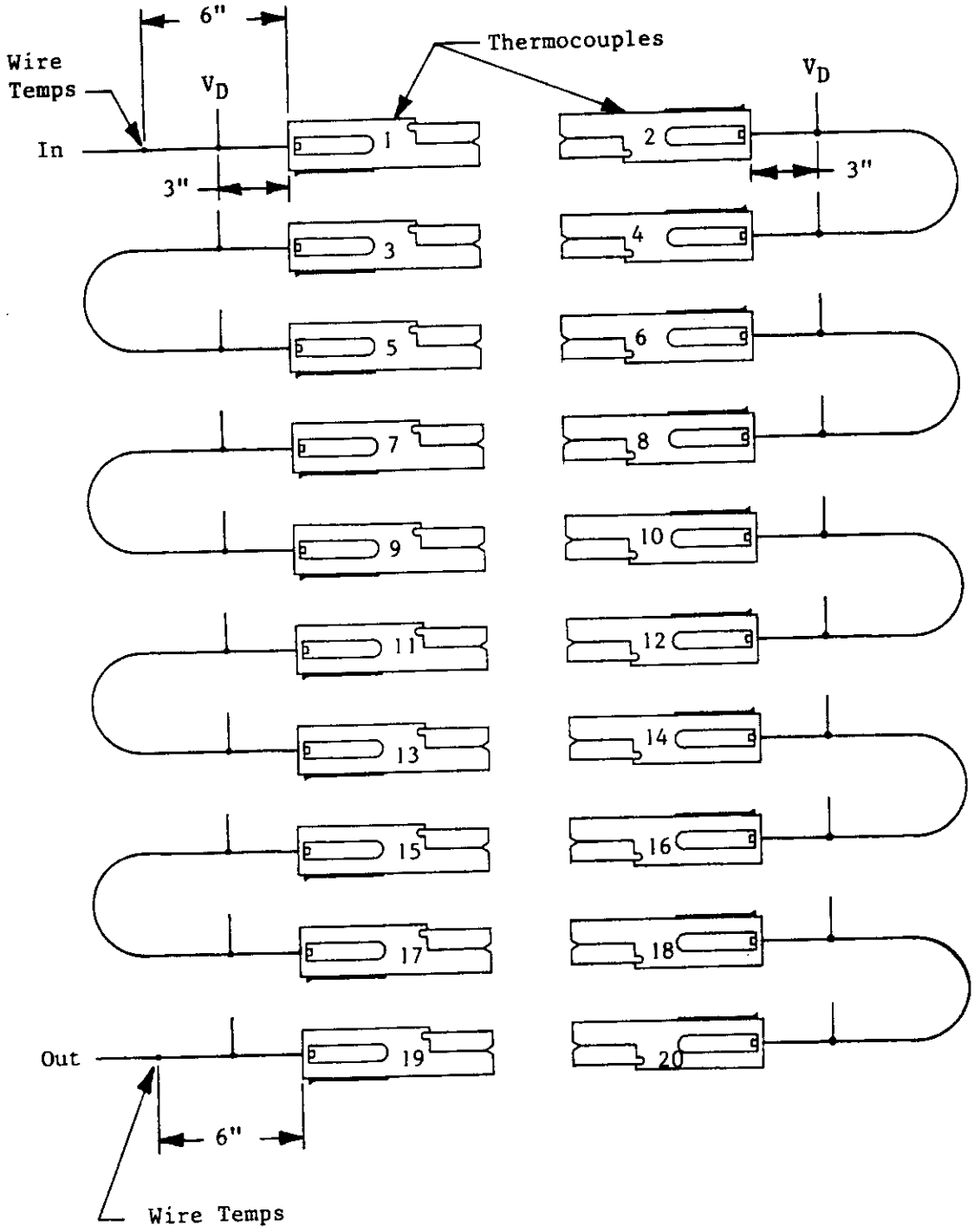


Figure 5
Mounting & Clamping Location For Vibration & Physical Shock