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## Miniature Rectangular (MR) Headers

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### 1. SCOPE

#### 1.1. Content

This specification covers the performance, tests and quality requirements for the AMP\* Miniature Rectangular (MR) Headers. These headers offer a wide range of uses for interfacing with printed circuit boards in sophisticated commercial equipment.

#### 1.2. Qualification

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

### 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. 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 Specifications

- 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. 114-1000: Contact, Miniature Rectangular (MR) Pin and Socket, Application of
- D. 114-1014: Contact, Miniature Rectangular (MR) with Preformed Stabilizer, Application of
- E. 501-19: Test Report

### 3. REQUIREMENTS

#### 3.1. Design and Construction

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

3.2. Materials

- A. Pin: Phosphor bronze, pre-tin
- B. Housing: Nylon 6/6, UL 94V-2

3.3. Ratings

- A. Current/Voltage: 250 vac at 6 amperes maximum
- B. Operating Temperature: -55° to 105°C

3.4. Performance and Test Description

Headers shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.5. Test Requirements and Procedures Summary

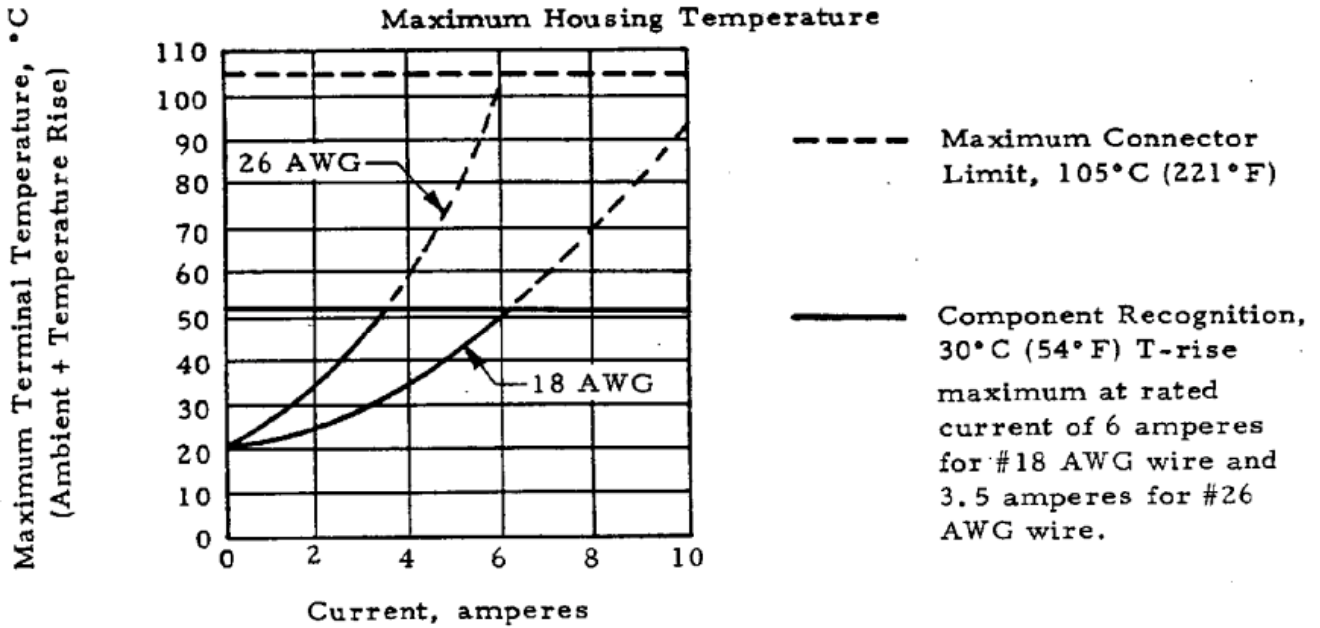
Test Description	Requirement	Procedure																		
Examination of Product	Meets requirements of product drawing and AMP Spec 114-1000 and 114-1014.	Visual, dimensional and functional per applicable inspection plan.																		
<b>ELECTRICAL</b>																				
Termination Resistance, Specified Current	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Wire Size, AWG</th> <th>Test Current, ampere</th> <th>Resistance, milliohms maximum initial</th> </tr> </thead> <tbody> <tr> <td>26</td> <td>1.0</td> <td>5.00</td> </tr> <tr> <td>24</td> <td>1.5</td> <td>5.00</td> </tr> <tr> <td>22</td> <td>3.0</td> <td>4.50</td> </tr> <tr> <td>20</td> <td>4.5</td> <td>4.00</td> </tr> <tr> <td>18</td> <td>6.0</td> <td>4.00</td> </tr> </tbody> </table>	Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial	26	1.0	5.00	24	1.5	5.00	22	3.0	4.50	20	4.5	4.00	18	6.0	4.00	Measure potential drop of mated contacts assembled in housing, see Figure 4; AMP Spec 109-25, calculate resistance.
Wire Size, AWG	Test Current, ampere	Resistance, milliohms maximum initial																		
26	1.0	5.00																		
24	1.5	5.00																		
22	3.0	4.50																		
20	4.5	4.00																		
18	6.0	4.00																		
Termination Resistance, Dry Circuit (Low Level)	5.5 milliohms maximum initial.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 4; AMP Spec 109-6-1.																		
Dielectric Withstanding Voltage	2.5 kvac dielectric withstanding voltage, one minute hold.	Test between adjacent contacts of mated connector assemblies; EIA-364-20, Method B.																		
Insulation Resistance	1500 megohms minimum initial.	Test between adjacent contacts of mated connector assembly; EIA-364-21, 500 VDC.																		

Figure 1 (cont)

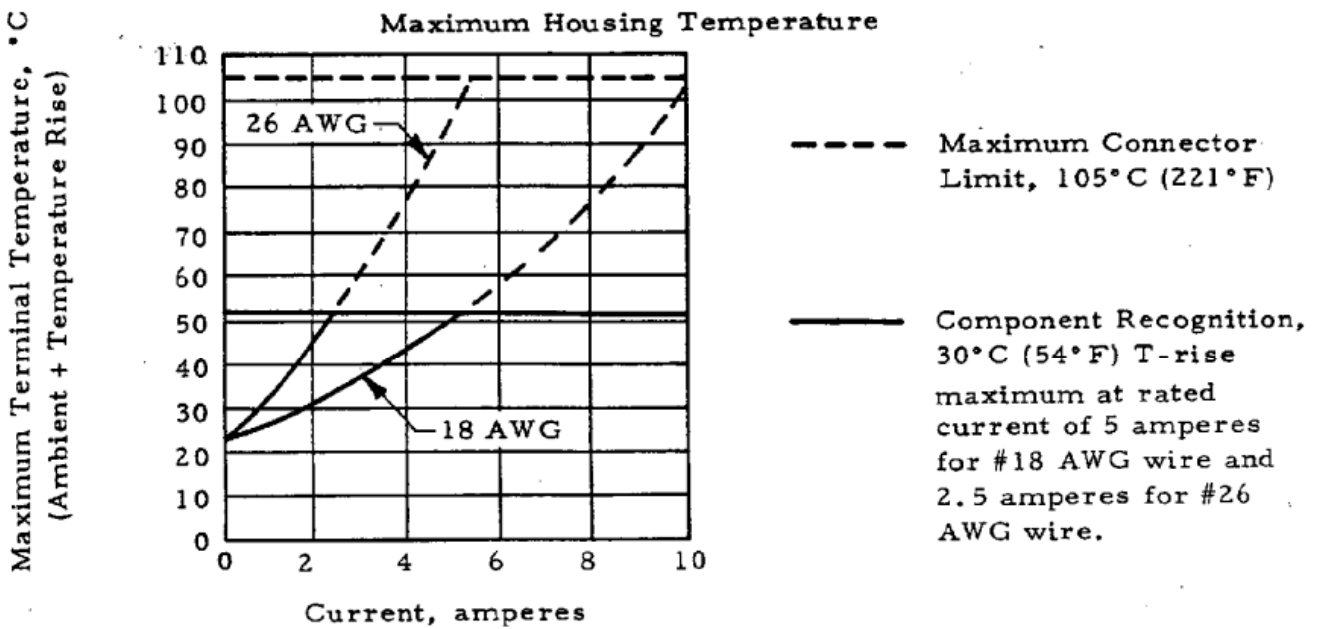
Test Description	Requirement	Procedure
Temperature Rise vs Current (a)	Temperature rise, see Figure 2; termination resistance, specified current.	T-rise at rated current specified in Figure 2; AMP Spec 109-45-1.
<b>MECHANICAL</b>		
Mating Force	1.0 pound maximum.	Measure force necessary to mate connector assembly with locking latches, a distance of .100 from point of initial contact, incorporating free floating fixtures at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Unmating Force	.25 pounds minimum.	Measure force necessary to unmate connector assembly with locking latches removed, at a rate of 0.5 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Durability	Mating-unmating; 6.0 milliohms maximum final termination resistance, dry circuit.	Mate and unmate connector assemblies for 25 cycles; AMP Spec 109-27.
Housing Lock Strength	20 pounds minimum for positive lock housing.	Determine strength of housing locking mechanism; AMP Spec 109-50.
<b>ENVIRONMENTAL</b>		
Thermal Shock (b)	Dielectric withstanding voltage; 6.75 milliohms maximum termination resistance, dry circuit; insulation resistance.	Subject mated connectors to 25 cycles between -55° and 105°C; AMP Spec 109-22.

- (a) Maximum rated current that can be carried by this product is limited by maximum operating temperature of housings, which is 105°C, and temperature rise of contacts, which is 30°C. Variables which shall be considered for each application are: wire size, connector size, contact material, and ambient temperature.
- (b) Shall remain mated and show no evidence of damage, cracking or chipping.

Figure 1 (end)



9 Position



36 Position

Figure 2

3.6. Header Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1	1	1	1
Termination Resistance, Specified Current	3			
Termination Resistance, Dry Circuit		3,5,8		
Dielectric Withstanding Voltage			3	
Insulation Resistance			2	
Temperature Rise vs Current	2			
Mating Force		2		
Unmating Force		6		
Durability		4		
Housing Lock Strength				2
Thermal Shock		7		

(a) See Para 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification and Retention of Qualification Testing

A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test group 1 shall consist of 2 connectors for each requirements of Figure 2. Test groups 2, 3 and 4 shall consist of 5 random connector assemblies. Group 2 shall be used for retention of qualification. All contacts shall be crimped to appropriate PN 103501 and 103502 tin plated test conductors in accordance with AMP Specification 114-1000 and 114-1014.

B. Test Sequence

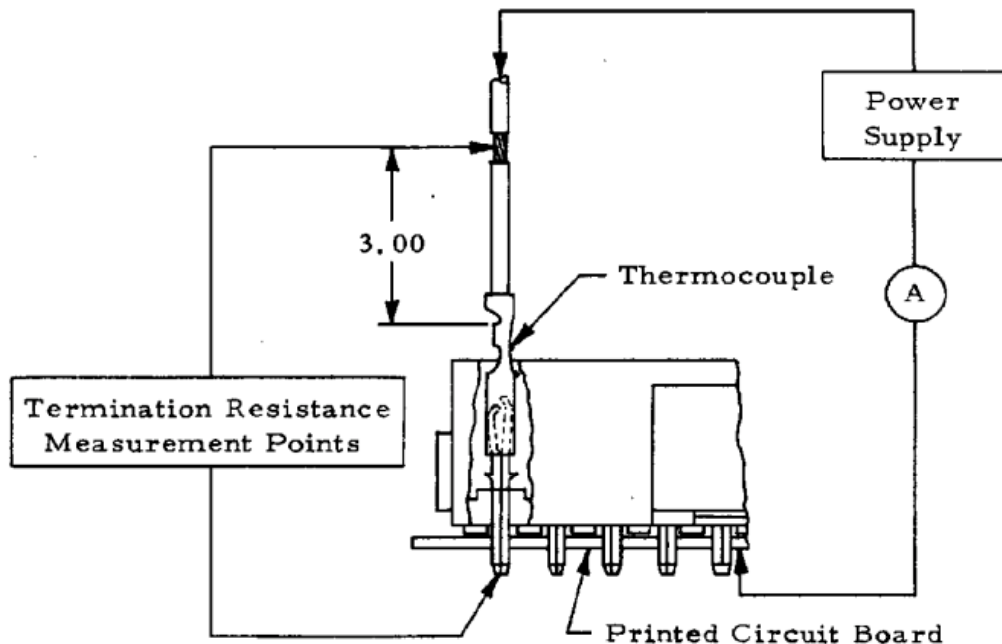
Qualification inspection shall be verified by test samples as specified in Figure 3.

### C. Acceptance

- (1) Requirements put on test samples, as indicated in the requirements portion of Figure 1, exist as either the upper or lower statistical tolerance limit (95% confidence, 99% reliability). All samples tested in accordance with this specification shall meet the stated tolerance limit.
- (2) 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.

#### 4.2. Quality Conformance Inspection

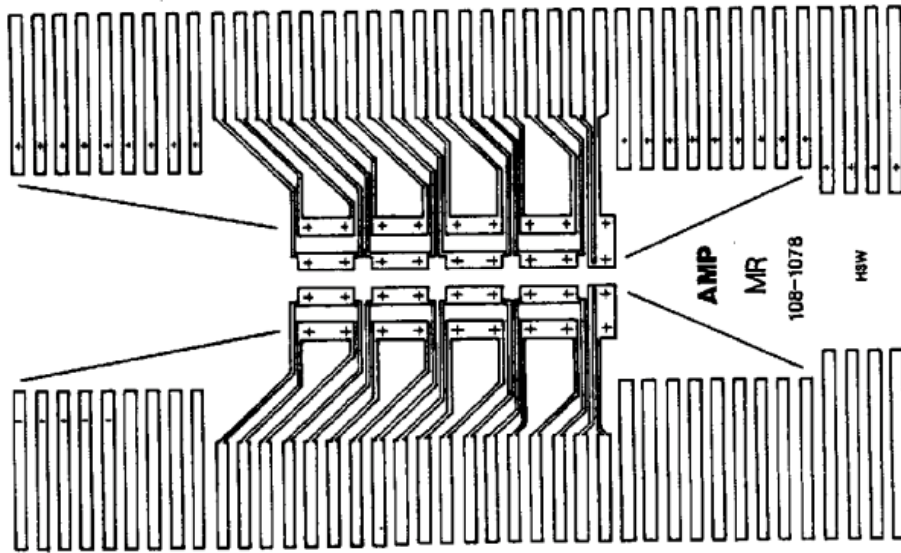
The applicable AMP inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.



- Notes:
1. A foot minimum length of continuous lead for heat dissipation.
  2. Termination resistance equals millivolts divided by test current less resistance of 3 inches of wire.
  3. Printed circuit board is 2 ounce copper single side.

Figure 4  
Resistance and Temperature Measurement Points





**Notes:**

- (a) This board shall be used for test groups 1 and 2.
- (b) Current trace width is .080 inch.

Figure 5

Printed Circuit Board