Connector, .156 MATE-N-LOK*

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the .156 MATE-N-LOK* connector.

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 the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 29Mar99. The Qualification Test Report number for this testing is 501-471. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following AMP 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.

A. 109-1: General Requirements for Test Specifications
B. 109 Series: Test Specifications as indicated in Figure 1
C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Government or Commercial Documents
D. 501-471: 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

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

A. Voltage: 600 Vac
B. Current: See Figure 4 for applicable current carrying capability
C. Temperature: -55 to 105°C

* Trademark
I Indicates change

LOC B

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 AMP Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Dry circuit resistance.	3.5 milliohms maximum initial. $\Delta R \pm 3.0$ milliohms maximum.	AMP Spec 109-6-6. Subject mated samples to 20 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.
Dielectric withstanding voltage.	5000 Vac (rms) at sea level. 1 minute hold with no breakdown or flashover.	AMP Spec 109-29-1. Test between adjacent contacts of mated samples.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	AMP Spec 109-45-2. Measure temperature rise vs current. See Figure 4.
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute with 0.06 inch maximum total excursion. 2 hours in each of 3 mutually perpendicular planes. See Figure 5.
Mechanical shock, specified pulse.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-26-1, except 30 G's. Subject mated samples to 30 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 samples for 50 cycles at a maximum rate of 600 cycles per hour.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mating force.	8.0 pounds maximum per contact.	AMP Spec 109-42, Condition A. Measure force necessary to mate samples at a maximum rate of 0.5 inch per minute.
Unmating force.	2.0 pounds minimum per contact.	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples with latches disengaged at a maximum rate of 0.5 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	AMP Spec 109-22. Subject mated samples to 5 cycles between -55 and 105°C.
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-3, Condition B. Subject mated samples to 10, 24 hour cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	AMP Spec 109-43. Subject mated samples to temperature life at 85°C for 500 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
Dry circuit 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. Vibration duration in each axis shall be 1 hour.
(d) Precondition samples with 10 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. Test groups 1 and 3 shall each consist of 10, 4 position connector assemblies terminated to 10 AWG wire. Test group 2 shall consist of 8, 4 position connector assemblies terminated to 20 AWG wire; and 8, 4 position connector assemblies terminated to 10 AWG wire.

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. If 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 AMP quality inspection plan shall 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.

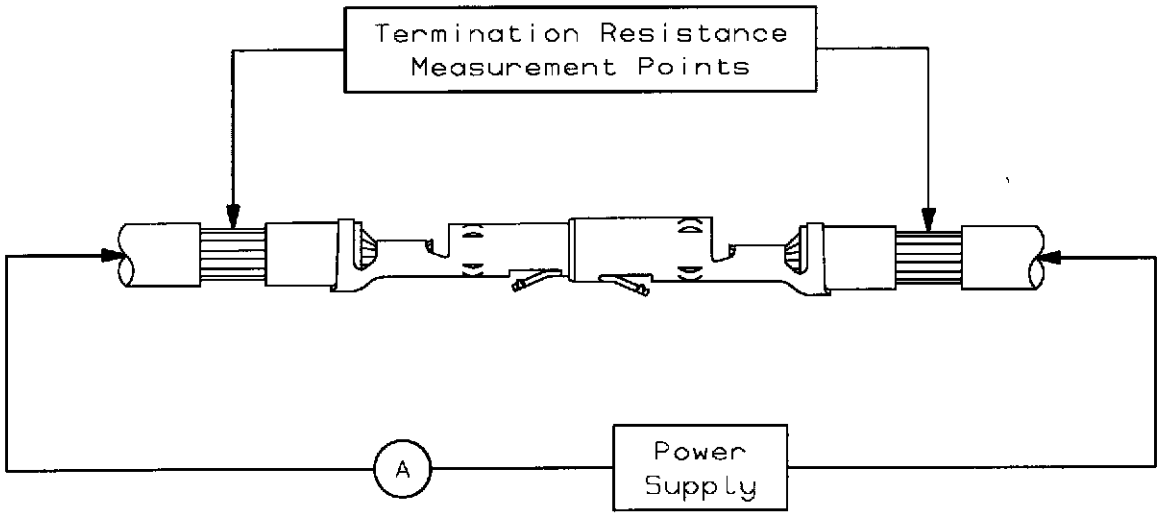

Figure 3
Dry Circuit Resistance Measurement Points

MATE-N-LOK 4 Position In-Line Connector
Final Single Circuit Current Rating With Maximum Wire 10 AWG

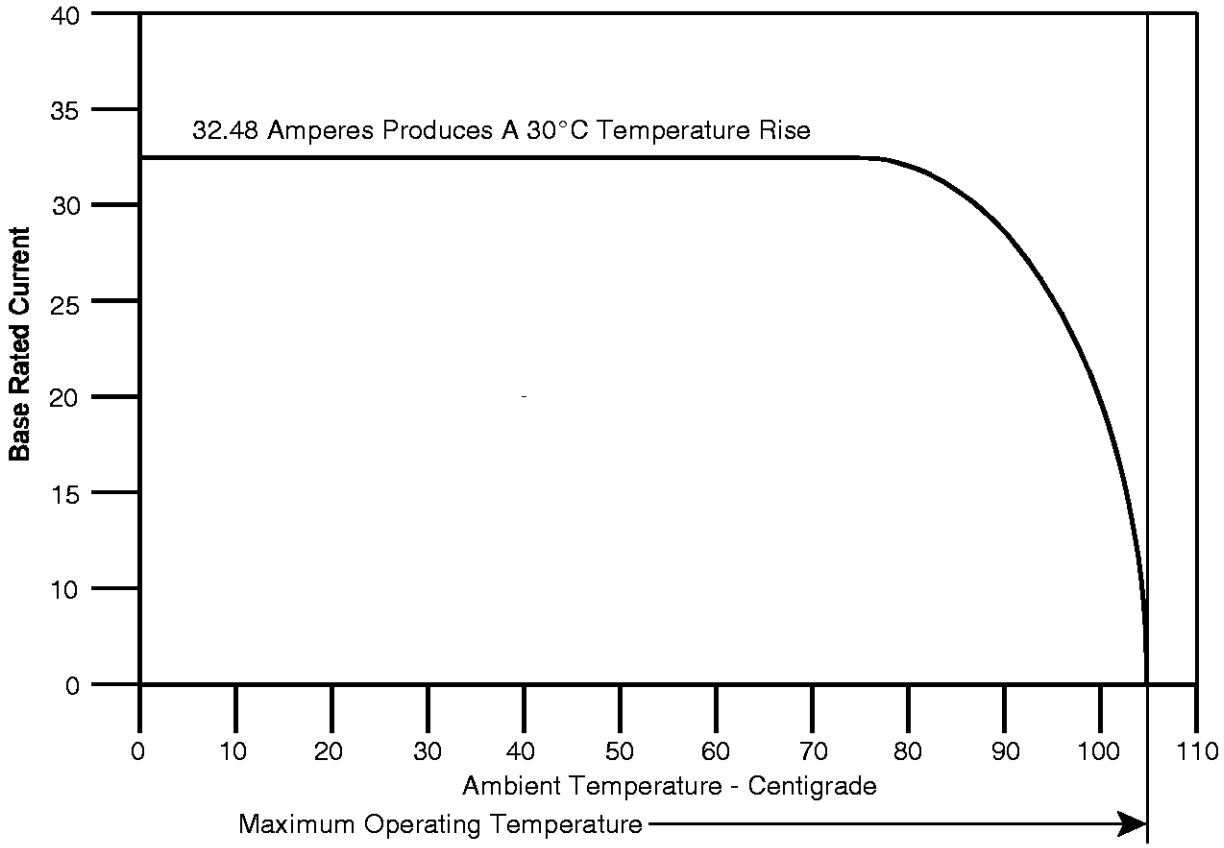

Figure 4A
Current Carrying Capability

Percent Connector Loading 4 Position Connector	Wire Size AWG			
	20	14	12	10
Single Contact	0.388	0.632	0.779	1.0
50	0.376	0.612	0.755	0.968
100	0.323	0.526	0.649	0.832

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

Figure 4B
Current Rating

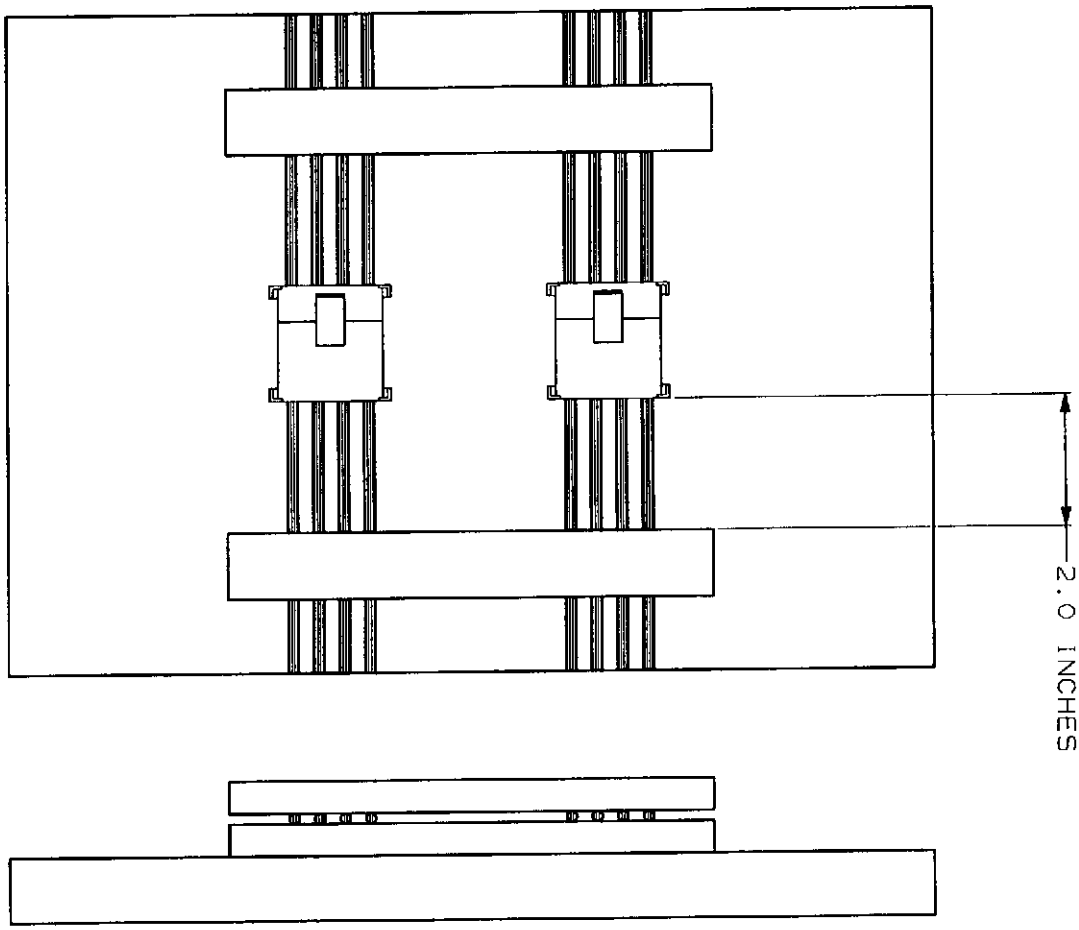

Figure 5
Vibration & Mechanical Shock Mounting Fixture