NOTE
The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, TE Connectivity (TE) makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

Connector, Universal MATE-N-LOK* II

1. SCOPE

1.1. Content

This specification defines performance, tests and quality requirements for universal MATE-N-LOK* II connectors. These connectors provide a highly reliable and economical means of grouping multi-lead connections in today's in home entertainment centers, appliances, vending machines, computers and other sophisticated commercial equipment.

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 has not been completed. The Qualification Test Report number for this testing is 501-TBD.

1.4. Revision Summary

Revisions to this specification include:

- Added mixed flowing gas test procedure and sequence to Figure 1 and Figure 3
- Updated EIA test procedure references, test requirements for random vibration and housing lock strength, and test procedure for durability, temperature rise vs. current, and dry circuit resistance testing in Figure 1
- Updated testing sample requirements for test groups 1-4 and sequence for test group 2 in Figure 3
- Added Figure 2
- Removed Figure 4

2. APPLICABLE DOCUMENTS AND FORMS

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 Documents

- 114-1043: Application Specification (Universal MATE-N-LOK II Connectors)
- 501-TBD: Qualification Test Report

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC 60512: Connectors for Electronic Equipment - Tests and Measurements

2.3. Reference Document

- 109-197 Test Specification (TE Test Specification vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Ratings

Voltage	Current	Temperature
600 Volts AC	See Figure 4(A,B,C,D) for applicable current carrying capability. Maximum rated current that can be carried by this product is limited by the maximum operating temperature of the housings (90°C) and temperature rise of the contacts (30°C). Variables which shall be considered for each application are wire size, connector size, contact material, and ambient temperature.	-55 to 120°C

3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Initial Examination of Product.	Meets requirements of product drawing and Application Specification	EIA-364-18 Visual and dimensional (C of C) inspection per product drawing.
Final Examination of Product.	Meets visual requirements.	EIA-364-18 Visual inspection.
Electrical		
Dry Circuit Resistance	3.5 milliohms maximum initial 10 milliohms maximum final	EIA 364-23 & IEC 60512-2-1 Subject mated contacts assembled in housing to 20 millivolt maximum open circuit at 100 milliamperes maximum. See Figure 2.
Insulation Resistance	1000 megohms minimum initial 100 megohms minimum final	EIA 364-21 & IEC 60512-3-1 Apply 500 VDC. Test between adjacent contacts of mated connector assemblies.
Dielectric Withstanding Voltage	No breakdown or flashover	EIA 364-20 & IEC 60512-4-1 5.0 kilovolts AC dielectric withstanding voltage. Hold at specified voltage for 1 minute. Test between adjacent contacts of mated connector assemblies.
Temperature Rise vs Current	30°C maximum temperature rise at specified current	EIA 364-70 & IEC 60512-5-1 Measure temperature rise vs current.
Mechanical		
Crimp Tensile	Wire Size (AWG) / Crimp Tensile (lb) (minimum) 24 / 8 22 / 14 20 / 14 18 / 30 16 / 45 14 / 50 12* / 60 10* / 70 * Crimp tensile of wire exceeds tensile strength of contact	EIA 364-8, IEC 60512-16-4 & IEC 60512-16-20 Determine crimp tensile at a maximum rate of 1 inch per minute

Figure 1 (continued)

Test Description	Requirement	Procedure
Sinusoidal Vibration	No discontinuities of 10 microsecond or longer duration. See note	EIA 364-28 & IEC 60512-6-4 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 direction.
Random Vibration	No discontinuities greater than 10 microseconds. See Note.	EIA 364-28 & IEC 60512-6-4 Subject mated samples to 3.13 G's rms between 5-500 Hz. 15 minutes in each of 3 mutually perpendicular directions
Mechanical Shock Specified Pulse	No discontinuities of 10 microseconds or longer duration. See note.	EIA 364-27 & IEC 60512-6-3 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 directions, 18 total shocks.
Durability	See note	EIA 364-9 & IEC 60512-9-1 Manually mate and unmate samples for 50 cycles at a maximum rate of 300 cycles per hour.
Contact Insertion Force	22.2 N [5 lbf] maximum per contact.	EIA-364-5 Measure force necessary to insert a contact straight into the rear of a pre-staged housing
Contact Retention Force	66.7 N [15 lbf] minimum. 111.2 N [25 lbf] minimum for high retention contacts.	EIA-364-29 and IEC 60512-15-1 Except grip wire. Apply axial load to contact at a maximum rate of 0.5 inch per minute
Mating Force	22.24 N [5 lbf] maximum per contact for solid pins. 6.67 N [1.5 lbf] maximum per contact for split pins.	EIA 364-13 & IEC 60512-13-1 Measure force necessary to mate connector assembly with locking latches disengaged. Mount connector in fixtures and perform test at 12.7 mm [.5 in] per minute incorporating free floating fixtures. Calculate force per contact.
Unmating Force	3.11 N [0.7 lbf] minimum per contact for solid pins. 2.22 N [0.5 lbf] minimum per contact for split pins.	EIA 364-13 & IEC 60512-13-1 Measure force necessary to unmate connector assembly with locking latches disengaged. Mount connector in fixtures and perform test at 12.7 mm [.5 in] per minute. Calculate force per contact.
Housing Panel Retention	333.6 N [75 lbf] minimum. 250N [56 lbf] minimum for 2 position	Measure panel retention force using nominal panel cut out dimensions specified in the customer drawing Rate 100 mm/min
Housing Lock Strength	133.4 N [30 lbf] minimum	EIA 364-98 Determine strength of housing locking mechanism
Housing Staging Latch Strength	50 pounds minimum	EIA 364-98 Determine strength of staging latch

Figure 1 (continued)

Environmental		
Thermal Shock	See note	EIA 364-32 & IEC 60512-11-4 Subject mated connector samples to 25 cycles between -55 and 85°C.
Humidity/Temperature Cycling	See note	EIA 364-31, IEC 60512-11-3 & IEC 60512-11-12 Subject mated connectors to humidity-temperature cycling between 25 and 65°C at 95% RH.
Temperature Life	See note	EIA 364-17 & IEC 60512-11-9 Subject mated connectors to temperature life at 120° for 500 hours.
Mixed Flowing Gas	See note	EIA 364-65, Class IIA & IEC 60512-11-7 Subject mated connectors to mixed flowing gas for 14 days.

Figure 1 (end)

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 3.

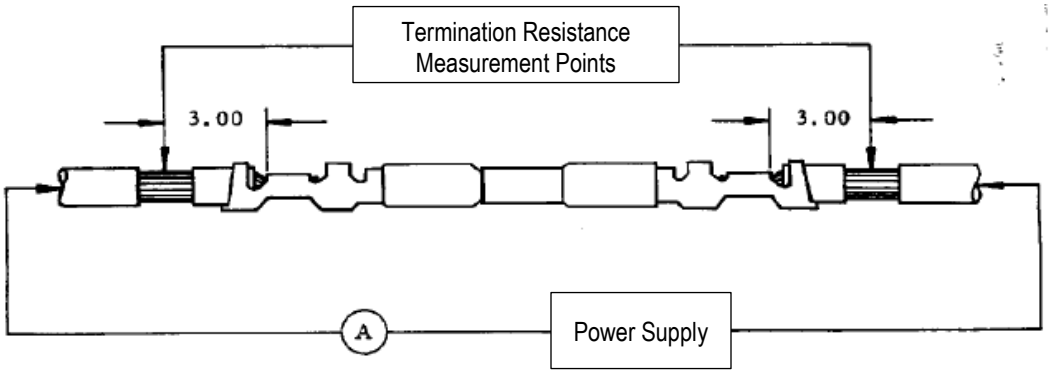

Figure 2: Termination Resistance Measurement Points

NOTE
1) A one foot minimum length of continuous lead for heat dissipation.
2) Termination resistance equals millivolts divided by test current less resistance of 6 inches of wire.

3.4. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial Examination of Product	1	1	1	1	1	1
Dry Circuit Resistance	3,7	2,5(e),7(e),9				
Insulation Resistance			2,6			
Dielectric Withstanding Voltage			3,7			
Temperature Rise vs Current		3,10				
Crimp Tensile				2		
Sinusoidal Vibration	5					
Random Vibration		8(c)				
Mechanical Shock	6					
Durability	4					
Contact Insertion Force					2	
Contact Retention Force					3	
Mating Force	2					
Unmating Force	8					
Housing Panel Retention						4
Housing Lock Strength						3
Staging Latch Strength						2
Thermal Shock			4			
Humidity-Temperature Cycling		4(d, f)	5			
Mixed Flowing Gas		4(d, f)				
Temperature Life		6				
Final Examination of Product	9	11	8	3	4	5

NOTE

(a) 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 through 4 shall consist of 3 or more housing and a minimum of 30 contacts per group. The housings and wire sizes shall be chosen randomly to cover the range of the product line. Test group 5 samples shall consist of 15 pin and socket contacts per wire size. Test group 6 samples shall consist of 15 random housings.

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

(c) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings.

(d) Precondition samples with 10 durability cycles.

(e) Optional measurement used for verification / failure identification

(f) Mixed flowing gas testing shall be performed on connectors with noble plated contacts. Humidity-temperature cycling shall be performed on connectors with non-noble plated contacts.

Figure 3