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**Universal MATE-N-LOK\* 6 Position Circular Connector**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the Universal MATE-N-LOK\* 6 position circular 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.

**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. Tyco Electronics Documents

- 109 Series: Test Specifications as indicated in Figure 1
- 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- 114-1010: Application Specification
- 501-531: Qualification Test Report

## 2.2. Commercial Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

**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

- Voltage: 600 volts AC
- Current: 20 amperes for 12 AWG wire; 22 amperes for 10 AWG wire
- Temperature: -55 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 EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	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.
<b>ELECTRICAL</b>		
Low level contact resistance.	3.5 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Insulation resistance.	1000 megohms minimum initial.	EIA-364-21. Test between adjacent contacts of mated specimens.
Withstanding voltage.	1 minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 5000 volts AC at sea level. Test between adjacent contacts of mated specimens.
Temperature rise vs current.	20 amperes AC for 12 AWG wire. 22 amperes AC for 10 AWG wire. See Current Rating Note in paragraph 3.3.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.
<b>MECHANICAL</b>		
Vibration, sinusoidal.	No discontinuities of 10 microseconds or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10-55-10 Hz traversed in 1 minute with 1.5 mm [.06 in] maximum total excursion. 2 hours in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 10 microseconds or longer duration. See Note.	EIA-364-27, Method A. Subject mated specimens 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.

Figure 1 (cont)

Test Description	Requirement	Procedure						
Durability.	See Note.	EIA-364-9. Manually mate and unmate specimens for 50 cycles.						
Mating force.	22.24 N [5 lb] maximum per contact for solid pins.	EIA-364-13. Measure force necessary to mate specimens with latches engaged to a depth of 19.05 mm [.750 in] from point of initial contact at a maximum rate of 127 mm [5 in] per minute.						
Unmating force.	3.11 N [.7 lb] minimum per contact for solid pins.	EIA-364-13. Measure force necessary to unmate specimens with latches engaged at a maximum rate of 12.7 mm [.5 in] per minute.						
Contact insertion force.	22.24 N [5 lb] maximum per contact.	AMP Spec 109-41. Measure force necessary to insert contact into housing at a maximum rate of 12.7 mm [.5 in] per minute.						
Contact retention.	66.72 N [15 lb] minimum.	EIA-364-29. Apply load at a maximum rate of 4.4 N [1 lb] per second and hold for 6 seconds.						
Crimp tensile.	<table border="1"> <thead> <tr> <th>Wire Size (AWG)</th> <th>Crimp Tensile (N [lbs] minimum)</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>311.4 [70]</td> </tr> <tr> <td>12</td> <td>266.9 [60]</td> </tr> </tbody> </table>	Wire Size (AWG)	Crimp Tensile (N [lbs] minimum)	10	311.4 [70]	12	266.9 [60]	EIA-364-8. Apply load at a maximum rate of 25 ± 6 mm [1 ± .25 in] per minute.
Wire Size (AWG)	Crimp Tensile (N [lbs] minimum)							
10	311.4 [70]							
12	266.9 [60]							
<b>ENVIRONMENTAL</b>								
Thermal shock.	See Note.	EIA-364-32. Subject mated specimens to 25 cycles between -55 and 125°C.						
Humidity-temperature cycling.	See Note.	EIA-364-31, Method V. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH and -10°C cold shock.						
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 5, Test Time Condition C. Subject mated specimens to 105°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	4
	Test Sequence (b)			
Initial examination of product	1	1	1	1
Low level contact resistance	3,7	2,7		
Insulation resistance			2,6	
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			
Contact insertion force				2
Contact retention				3
Crimp tensile				4
Thermal shock			4	
Humidity-temperature cycling		4(d)	5	
Temperature life		5		
Final examination of product	9	9	8	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 Specification 102-950.
  - (d) Precondition specimens with 10 durability cycles.

Figure 2

**4. QUALITY ASSURANCE PROVISIONS**

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, and 3 shall each consist of 10 connector assemblies of 10 AWG and 12 AWG wire size and 6 position housings. All contacts shall be crimped to tin plated test conductors in accordance with Application Specification 114-1010. Test group 4 shall consist of 5, 6 position housings with pin and socket contacts.

B. Test Sequence

Qualification inspection shall be verified by testing specimens 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 specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable 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.

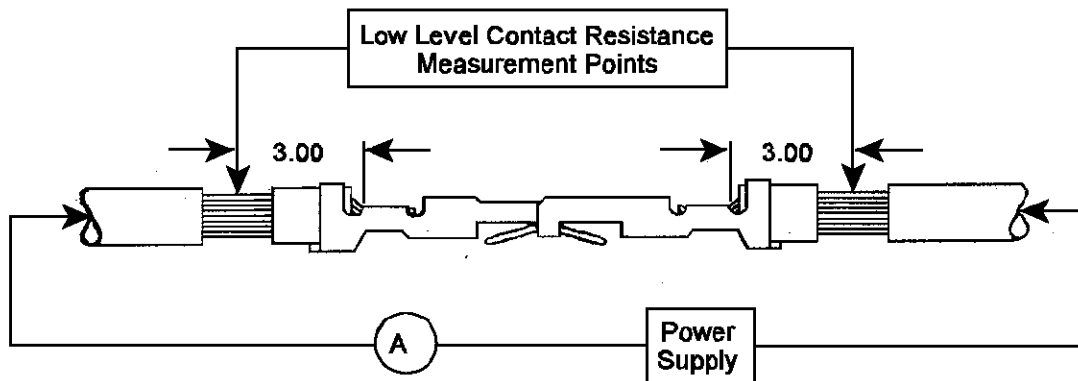


Figure 3  
Low Level Contact Resistance Measurement Points