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**VAL-U-LOK\* High Current Series**

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**1. SCOPE**

1.1. Content

This specification covers performance, tests and quality requirements for VAL-U-LOK\* High Current Series.

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 in Feb. 2017. The Qualification Test Report number for this testing is 501-106427.

**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 Connectivity Specifications

- 114-13172: Application Specification (VAL-U-LOK\* Series Headers and Connectors)
- 501-106427: Qualification Test Report

2.2. Commercial Standards and Specifications

- IEC 61984 International Standard – Safety Requirements and Tests
- IEC 60335 International Standard – Safety of Household and Similar Appliance
- IEC 60512 International Standard – Connectors for Electronic Equipment – Tests and Measurements
- IEC 60695 International Standard – Fire Hazard Testing
- UL 1977 Safety Standards – Component Connectors for Use in Data, Signal, Control, and Power Applications
- EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Documents

- 109-1 General Requirements for Testing
- 102-950 Qualification of Separable Interface Connectors

**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

- A. Voltage: 600 V AC
- B. Current: 13 amperes maximum, 2 position application
- C. Temperature: -40 to 105°C

3.3. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests shall be performed at ambient environmental conditions otherwise specified.

3.4. Test Requirements and Procedure 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 <a href="#">114-13172</a> .	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 (LLCR).	10 milliohms maximum.	EIA-364-23. Subject specimens to 100 mA maximum and 20 mV maximum open circuit voltage.
Insulation resistance.	1000 megohms minimum.	EIA-364-21. 500 V DC, 2 minutes hold. Test between adjacent contacts.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1500 V AC at sea level. Test between adjacent contacts.
Temperature rise vs current.	30°C maximum temperature rises at specified current.  #16 AWG lead wire, #18 AWG lead wire w/o TPA, #18 AWG lead wire with TPA.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C  See as the current rating table in page 4.
<b>MECHANICAL</b>		
Sinusoidal vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10 to 55 to 10 Hz traversed in 1 minute with 1.5 mm maximum total excursion. Two hours in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.

Test Description	Requirement	Procedure
Durability.	See Note.	EIA-364-9. Mate and unmate specimens with H-04 hardness for 50 cycles, and specimens with H-06 hardness for 30 cycles at a maximum rate of 10 cycles per minute.
Crimp pull-out force.	89 N minimum for 16 AWG wire; 89 N minimum for 18 AWG wire; 58 N minimum for 20 AWG wire; 36 N minimum for 22 AWG wire.	EIA-364-29. Measure force necessary to remove the wire from the crimp at a maximum rate of 12.7 mm per minute.
Mating force.	41.2 N maximum for 6 position.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm per minute.
Unmating force.	2.4 N minimum for 6 position.	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm per minute.
Terminal insertion.	15 N maximum.	EIA-364-5. Measure force necessary to properly seat the terminal into the housing at a maximum rate of 12.7 mm per minute.
Terminal retention.	30 N minimum.	EIA-364-5. Measure force necessary to remove the terminal from the housing at a maximum rate of 12.7 mm per minute.

## ENVIRONMENTAL

Thermal shock.	See Note.	EIA-364-32. Subject mated specimens to 5 cycles between -55 and 105°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity, steady state.	See Note.	EIA-364-31. Subject specimens to 40°C and 90 to 95% RH for 96 hours.
Heat resistance.	See Note.	EIA-364-17. Subject mated specimens to 105°C for 96 hours.
Cold resistance.	See Note.	EIA-364-59, Condition 3, Duration D. Subject mated specimens to -40°C for 96 hours.
Salt spray.	See Note.	EIA-364-26, Condition B. Subject mated specimens to a 5% salt spray at 35°C for 48 hours.

Test Description	Requirement	Procedure
SO <sub>2</sub> gas.	See Note.	Subject mated specimens to 50 ppm of SO <sub>2</sub> gas to 40°C for 24 hours.

Figure 1



**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.

3.5. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Initial examination of product	1	1	1	1	1	1	1
LLCR		2,4	2,4		2,5	2,4,6,8,10	2,4
Insulation resistance				2,5			
Withstanding voltage				3,6			
Temperature rise vs current							5
Sinusoidal vibration					3		3
Mechanical shock					4		
Durability						3	
Crimp pull-out force	6						
Mating force	3						
Unmating force	4						
Terminal insertion	2						
Terminal retention	5						
Thermal shock						7	
Humidity, steady state				4			
Heat resistance						5	
Cold resistance						9	
Salt spray		3					
SO <sub>2</sub> gas			3				
Final examination of product	7	5	5	7	6	11	6

Figure 2



**NOTE**

(a) See paragraph 4.2.  
 (b) Numbers indicate sequence in which tests are performed.

3.6. Current Rating table

Now, only finished 2P, 12P and 24P test, update other position current rating when finished the test.

Wire size	Wire to Wire		
	2P	12P	24P
16AWG	13A	8A	8A
Wire size	Wire to Board		
	2P	12P	24P
16AWG	12.5A	7A	7A

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 3.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 3

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

B. Test Sequence

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

4.3. 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.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in 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.

4.5. 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.