



RAST 5 Positive Lock* MKIII, 6.3 Series Receptacles and Housings

1. SCOPE

1.1. Contents

This specification covers performance, tests, and quality requirements for the TE Connectivity RAST 5 Positive Lock* MKIII, 6.3 Series Receptacles and Housings. The Positive Lock* receptacle can be used as a stand-alone part, but in the context of RAST systems it is commonly paired with a connector housing. In the context of RAST, a housing will be used for product testing.

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. All contacts must be crimped to comply with the Application Specification listed below using the appropriate TE Applicator or Hand Tool as specified in that document.

1.3. Revision Summary

Revisions to this specification include:

- Updated Contact Retention Force in Plastic Housing requirement in Figure 1

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. TE Connectivity Specifications

502-134238 Qualification Test Report

2.2. Commercial Standards and Specifications

EIA-364	Electrical Connector Test Procedures Including Environmental Classifications
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 Standard – Component Connectors for Use in Data, Signal, Control, and Power Applications

2.3. Reference Document

109-197	Test Specification (TE Test Specifications vs. EIA and IEC Test Methods)
109-1	General Requirements for Testing
102-950	Qualification of Separable Interface Connectors
102-951	Qualification of Crimp Terminations

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

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

A. Housings (Connectors): Thermoplastic

B. Contacts, Receptacle: Copper Alloy; Plating: Tin overall.

3.3. Ratings

A. Voltage Rating: 500 VAC

B. Current Rating: To be less than 30°C temperature rise from ambient ($25 \pm 5^\circ\text{C}$). See current rating table.

C. Temperature Rating (includes ambient temperature plus thermal increase due to current flow): -40°C to $+105^\circ\text{C}$

3.4. 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 per Test Specification 109-1 unless otherwise specified.

3.5. Test Requirements and Procedure Summary

Test Description	Requirement	Procedure
Visual and Dimensional Inspection	Parts show no signs of damage or physical change.	EIA-364-18 Visually inspected per applicable inspection plan. Precondition parts for 24 hours prior to testing.
Electrical		
Low Level Contact Resistance	Initial: 2mΩ (milliohms) maximum Final: 4mΩ (milliohms) maximum	EIA-364-23 Measure between mating tab and at wire 50 mm from end of contact. (Protect wire from corrosion during testing.) Test on mated connectors. Subtract bulk wire resistance from measurement. See Figure 2. Test current: 100mA (maximum) Voltage: 20mV (maximum)
Insulation Resistance	Initial: 5000 MΩ (megaohms) minimum Final: 5000 MΩ (megaohms) minimum	EIA-364-21 Apply 500 VDC between adjacent contacts. Test on unmated connectors.
Dielectric Withstanding Voltage	No breakdown or flashover. Leakage current: 0.5 mA maximum	EIA-364-20 Apply 3000 VAC to adjacent contacts and hold at specified voltage for 1 minute. Test on unmated connectors.
Temperature Rise vs. Current	30°C maximum temperature rise	EIA-364-70, Method 2 Wires must be 500 mm (minimum) in length. Test on mated connectors.

Figure 1 (continued)

Mechanical		
Random Vibration	No damage which could impair normal usage. All components must remain assembled. No contact interruptions greater than 1 μ s.	EIA-364-28, Condition VII, Level D Subject mated connectors to 0.02 g ² /Hz between 20 and 500 Hz. Apply 15 minutes in each axis. Test to be performed at the 18°C temperature rise current level. Header to be clamped horizontal to test base. Wires to be clamped 125 mm from exit of connector housing.
Mechanical Shock	No damage which could impair normal usage. All components must remain assembled.	EIA-364-27, Condition H Subject mated connectors to 30 g's half-sine shock pulse of 11ms duration per axis. Wires must have 200 mm (minimum) in length unsupported between contact and first clamp.
Durability	No damage which could impair normal usage. All components must remain assembled.	EIA-364-09 Mate and unmate connector 10 times at a rate of 25 mm/min. Mating header must be clamped. Disengage locking feature during test. Test on mated connectors.
Mating Force	LIF & XLIF: 15 N maximum Standard: 31 N maximum	EIA-364-13 Operation Speed: 25 mm/min Peak force to be recorded between the point at which the tab and receptacle first engage until the point when the latch is fully engaged.
Unmating Force (Unlocked)	2 N minimum	EIA-364-13 Operation Speed: 25 mm/min Locking dimple must be disengaged.
Unmating Force (Locked)	XLIF: 20 N minimum LIF & Standard: 67 N minimum	EIA-364-13 Operation Speed: 25 mm/min Locking dimple must be engaged.
Contact Insertion Force into Plastic Housing	13.35 N (maximum)	EIA-364-05 Operation Speed: 25 mm/min
Contact Retention Force in Plastic Housing	60 N (minimum)	EIA-364-05 Operation Speed: 25 mm/min

Figure 1 (continued)

Environmental																																			
Thermal Shock	No damage which could impair normal usage.	EIA-364-32, Method A, Condition VIII, Duration A-1 Subject mated connectors to: Thermal Shock Duration = 25 cycles Dwell time = 30 minutes Min Temp = -40°C Max Temp = 105°C Rate of change: < 5 minutes																																	
Humidity-Temperature Cycling	No damage which could impair normal usage.	EIA-364-31, Method IV Subject mated specimens for 10 cycles for 10 hours per cycle (100 hours total) between a temperature of 25°C and 55°C. Each cycle consists of 7 steps. Final measurement shall be made after completing Step 6 of the final cycle. <table border="1"> <thead> <tr> <th>Step Number</th><th>Duration [hour]</th><th>Start Temp. [°C]</th><th>End Temp. [°C]</th></tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>25</td><td>55</td></tr> <tr><td>2</td><td>1.25</td><td>55</td><td>55</td></tr> <tr><td>3</td><td>1</td><td>55</td><td>25</td></tr> <tr><td>4</td><td>1</td><td>25</td><td>55</td></tr> <tr><td>5</td><td>1.25</td><td>55</td><td>55</td></tr> <tr><td>6</td><td>1</td><td>55</td><td>25</td></tr> <tr><td>7</td><td>3.5</td><td>25</td><td>25</td></tr> </tbody> </table>		Step Number	Duration [hour]	Start Temp. [°C]	End Temp. [°C]	1	1	25	55	2	1.25	55	55	3	1	55	25	4	1	25	55	5	1.25	55	55	6	1	55	25	7	3.5	25	25
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4	1	25	55																																
5	1.25	55	55																																
6	1	55	25																																
7	3.5	25	25																																
Temperature Life	No damage which could impair normal usage.	EIA-364-17, Method A, Test Condition 4c Subject connectors to 105°C for 500 hours. Test on mated connectors.																																	
Glow Wire	Flame duration ≤ 30 seconds (Test at 850°C). Flame duration ≤ 2 seconds (Test at 750°C).	IEC 60695-2-11, IEC 60335-1 Test performed on unmated connectors at 850°C and 750°C.																																	

Figure 1 (end)


NOTE

Product must be free of rust, corrosion transformation, crack and discoloration. Product 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.

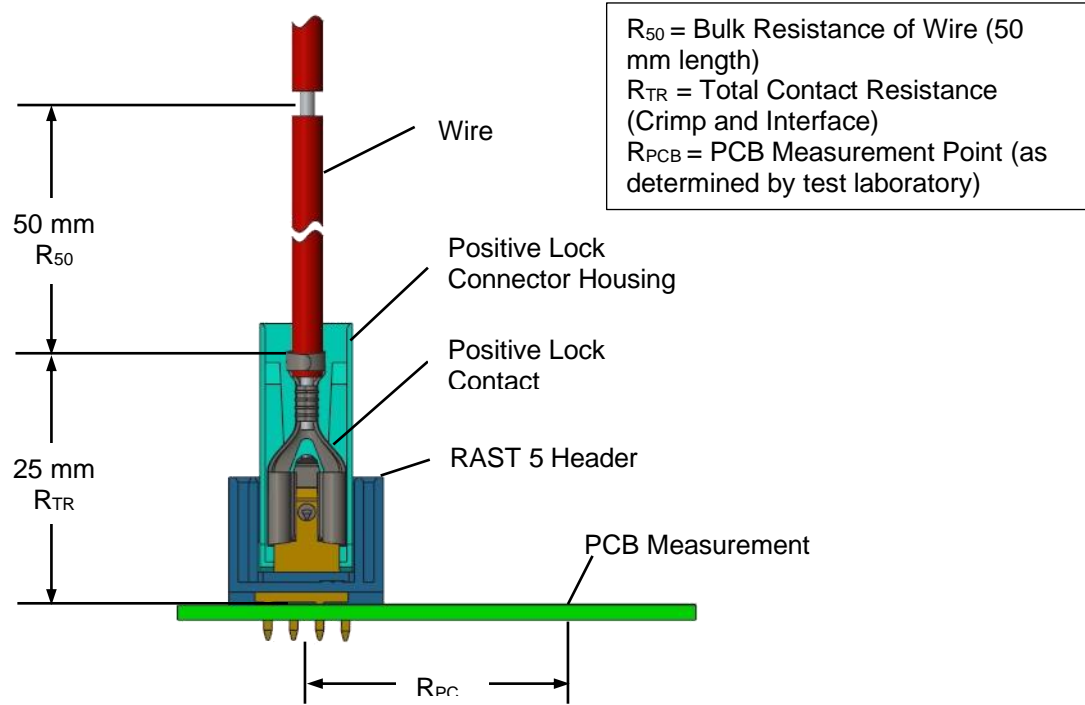


Figure 2

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)				
	1 Mechanical	2 Current Rating	3 Housing Electricals	4 Contact Retention	5 Glow Wire
	TEST SEQUENCE (b)				
Visual and Dimensional Inspection	1(e), 12	1(e), 11	1(e), 8	1(e), 4	1(e), 3
Low Level Contact Resistance	3, 7, 10(d)	2, 5, 7, 9			
Insulation Resistance			2, 6		
Dielectric Withstanding Voltage			3, 7		
Temperature Rise vs. Current		3, 10			
Vibration	5	8			
Mechanical Shock	6				
Durability	4				
Mating Force	2, 9(d)				
Unmating Force (Unlocked)	8(d)				
Unmating Force (Locked)	11(d)				
Contact Insertion Force into Plastic Housing				2	
Contact Retention Force in Plastic Housing				3	
Crimp Tensile Strength					
Thermal Shock			4		
Humidity-Temperature Cycling		4(c)	5		
Temperature Life		6			
Glow Wire					2

Figure 3



NOTE

- See paragraph 4.2.
- Numbers indicate the sequence in which tests are performed.
- Connectors for these tests shall be preconditioned by mating and unmating for 5 preconditioning cycles.
- Mate and unmate the connector for a total of 10 cycles. Alternate between the Mating Force test procedure and the Unmating Force (Unlocked) test procedure for the first 9 cycles. On the 10th cycle, follow the Mating Force test procedure to mate the connector and record the contact resistance on the mated specimen. Unmate the specimen on the 10th cycle following the Unmating Force (Locked) procedure and then perform the final Visual and Dimensional Inspection of the product.
- Precondition parts for 24 hours at ambient environmental conditions as stated in Figure 4.

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.

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

Figure 4

4.2. Test Specimens

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. A minimum of 5 connectors shall be used for each test group except for Test Group 2, which may use a minimum of 3 connectors and 30 contacts. If contacts per connector is less than or equal to 6, then all the contacts shall be measured. If contacts per connector is greater than 6, then a minimum of 30 randomly selected contacts distributed between the 5 connectors shall be measured. Test Group 4 must include a minimum of 30 contact data points.

For qualification testing of a product family, testing shall be performed on the minimum and maximum sizes under production.

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 of Figure 1. Requirements exist as either the upper or lower statistical tolerance limit based on a 2 sigma range (approximately 95% confidence, 90% reliability). All samples tested in accordance with this specification shall meet the stated tolerance limit.

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 resubmitted.

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.