Rapid Lock Quick Connect/Disconnect Bus Bar Power Connector System

1. SCOPE

1.1. Content

This product specification covers performance, test and quality requirement for the TE Connectivity Power Distribution system - Rapid Lock Quick Connect/Disconnect Bus Bar Power Connector System.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in this specification 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

- 114-64005: Application Specification
- 109 Series: Test Specifications as indicated in Figure 3
- 109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)

2.2. Industry Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
EDCS-164608: Cisco Qualification of Electrical Connectors for Reliability Grades S and A

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
Insulator: Thermoplastic, flammability class UL94 V-0.
Rapid Lock Socket body: High conductivity Copper Alloy, Silver plating
Rapid Lock Pin body: High conductivity Copper Alloy, Silver plating

PRODUCT SPECIFICATION

3.3. Ratings

- Voltage: 48 Volts DC or AC (REF)
- Current: Refer to the T-Rise test.
- Application Temperature: -65 °C to 105°C
- Storage Temperature: -20 °C to 30°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 3. 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, applicable instructions on customer drawing, and application specification.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing. Document gold plating thickness at contact interfaces.
Final examination of product	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low level contact resistance	Refer to the figure 1.	EIA-364-23. Subject mated specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
Contact resistance at rated current	#8: 0.50 milliohms maximum #4: 0.30 milliohms maximum #2: 0.20 milliohms maximum #12mm: 0.10 milliohms maximum Detail please refer to figure 2	EIA-364-6. Current TBD at 30°C temperature rise result at rated current.
Insulation resistance.	5000 megohms minimum	EIA-364-21. 500 volts DC, 1 minute duration. Test between adjacent contacts of specimens.
Withstanding voltage.	No breakdown or flashover.	EIA-364-20, Condition I. 750 volts AC at sea level for power contacts. 1 minute duration. Test between adjacent contacts of specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current. #8: 50A; #4: 110A; #2: 150A; #12mm: 250A	EIA-364-70, Method II. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.

Test Description	Requirement	Procedure
	MECHANICAL	
Vibration	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition V, letter C. Duration 120 minutes in each of three mutually perpendicular planes.
Mechanical shock	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method A. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability (preconditioning)	See Note	EIA-364-09. Mate and unmate specimens with a bus bar conductor for 5 cycles at a maximum rate of 500 cycles per hour.
Durability	50 cycles	EIA-364-09. Mate and unmate specimens with a bus bar conductor for 50 cycles at a maximum rate of 500 cycles per hour.
Mating force	150 N maximum	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Unmating force	20 N minimum	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Reseating	See Note.	Manually mate/unmating samples for three cycles.
	ENVIRONMENTAL	
Thermal shock	See Note.	EIA-364-32, Method A, Condition II Subject mated specimens to 25 cycles between -65 and 105°C.
Humidity-temperature cycling.	See Note.	EIA-364-31, Method III, Condition B Subject mated specimens to 10 cycles (10 days) between 25 and 65°C.

Test Description	Requirement	Procedure
	ENVIRONMENTAL	
Temperature life (preconditioning)	See Note.	EIA-364-17, Method A (temperature and duration per EIA-364-1000, table 9, 60℃ for 10 years) Subject mated specimens to 105°C for 72 hours.
Temperature life	See Note.	EIA-364-17, Method A, Condition 4. Subject mated specimens to 105°C for 1000 hours.
Dust	See Note.	EIA-364-91. Subject specimens shall be unmated for one hour.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA. ½ Subject specimens mated for 336 hours(14 days); ½ Subject specimens unmated for 168 hours, and then mated for final 168 hours, (7 days unmated, 7 days mated)

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 paragraph 3.6.*

Conn. Size	Crimp Size	LLCR /milliohm Max.
#8	#12	0.5
	#8	0.5
	#6	0.5
#4	#8	0.3
	#6	0.3
	#4	0.3
#2	#4	0.2
	#2	0.2
	#0	0.2
	#1/0	0.2
12mm	95mm²	0.1

Figure 1: Rapid Lock LLCR specification.

Conn. Size	Crimp Size	Contact Resistance
#8	#12	0.5
	#8	0.5
	#6	0.5
#4	#8	0.3
	#6	0.3
	#4	0.3
#2	#4	0.2
	#2	0.2
	#0	0.2
	#1/0	0.2
12mm	95mm²	0.1

Figure 2: Rapid Lock CR specification.

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group			
	1	2	3	4
Initial examination of product	1	1	1	1
Low level contact resistance	2,5,7	4,7,9,13	3,6,8,10	2,6,8(c),12
Contact resistance at rated current				10
Insulation resistance		2,10		
Withstanding voltage		3,11		
Temperature rise vs. current test				4,9
Vibration, random			9	
Mechanical shock			7	
Durability	3(a)	5	4(a)	3(a)
Mating force			2	
Unmating force			11	
Thermal shock		6		
Humidity-temperature cycling		8		
Temperature life	4		5(b)	5(b)
Mixed flowing gas				7(d)
Reseating	6	12		11
Final examination of product	8	14	12	13

NOTE

(a) Durability (preconditioning)
(b) Temperature life (preconditioning)
(c) LLCR after MFG 7days, and LLCR after MFG 14 days
(d) MFG-Class IIA. ½ samples mated 14days; ½ samples unmated 7days, and then mated for final 7days.

PRODUCT SPECIFICATION

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.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in paragraph 3.6.

4.2. Requalification Testing

If changes significantly affecting form, fit or functions 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 paragraph 3.6. 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.