Evaluation of compatibility between Economy Power 3.96 and XX

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity Economy Power 3.96 and XX connectors for compatibility

1.2 Scope

This specification covers performance, test and quality requirements for Economy Power 3.96 and XX connectors. Testing was performed at TE Connectivity Shanghai Electrical Test Laboratory between Oct 10, 2015 and Oct 27, 2015. The associated test number is TP-15-02403.

1.3 Conclusion

The Economy Power 3.96 and XX connectors listed in paragraph 1.4 met all the listed requirements in Section 3 Summary of Testing.

1.4 Test Specimens

Specimens with the following part numbers were used for test:

Type	Description	Qty
Type1	TE header+ XX plug&terminal	5 pairs for each test group
Type2	XX header +TE plug&terminal	5 pairs for each test group 1 and 2. 3 pairs for test group 3
Type3	TE header +TE plug&terminal	5 pairs for each test group
Type4	XX header + XX plug&terminal	5 pairs for each test group

Description	Part#
TE header	1-1123723-8
TE plug	2132781-8
TE terminal	1744144-1
XX header	n/a
XX plug	n/a
XX terminal	n/a

| Indicates Change

1.5 Test Sequence

Test Item	Test Group[a)]		
	1	2	3
	Test Sequence[b)]		
Initial Examination of Product	1	1	1
Low Level Contact Resistance	2		
Temperature Rise vs Current	3		
Mating & Unmating Force		2	
Contact Retention		3	
Insulation Resistance			2
Withstanding Voltage			3
Final Examination of Product	4	4	4

Note: a). Test group defined per customer requirement.
b). Numbers indicate sequence in which tests are performed

1.6 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15℃ to 35℃
Relative Humidity: 25% to 75%

2. TEST PROCEDUES

2.1 Examination of Product

Visual Inspection: appearance, and function of specimens pursuant to the applicable inspection plan.
Requirements: Meets requirements of product drawing and no physical damage.
Test Method: EIA-364-18B.

2.2 Low Level Contact Resistance

Subject mated contacts assembled in housing to 20 millivolt maximum open circuit at 100 milliamperes maximum.
Requirements: 10 milliohms maximum initial, 10 milliohms maximum final.
Test Method: EIA 364-23C

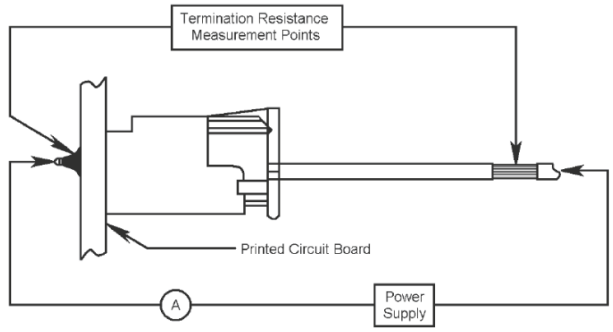

Fig.1 LLCR Measurement Points (Subtract Wire Bulk)

2.3 Temperature rise vs current
Wired all terminal poles and connected to DC power supply, each contact was energized at several current levels with the temperatures being recorded. Thermocouples were attached to the crimp area of each of the contacts to measure their temperatures. The ambient temperature was then subtracted from the contact temperatures to find the contact temperature rise. When three readings at five minute intervals were less than 1℃ different the readi ngs were considered stable and recorded. The current was then moved to the next current level until the contacts had reach a 30℃ Temperature rise.
Requirements: Measure the current when ΔT 10℃, 20℃ and 30℃.
Test Method: EIA-364-70C

2.4 Mating force & unmating force
Measure force necessary to mate & unmate connector assembly with locking latches disengaged. Mount connector in fixtures and perform test at 12.7 mm per minute.
Requirements: Mating force: 9.8N maximum per contact, total 78.4N Max.
Unmating force: 0.9 minimum per contact, total 7.2N Min.
Test Method: EIA 364-13B

2.5 Contact retention force
Apply axial load 29.4N hold for 6 seconds.
Requirements: Without damage or displacement
Test Method: EIA 364-29C

2.6 Insulation Resistance
Insulation resistance was measured separately between the closest adjacent contacts at 500Vdc for 1 minute.
Requirements: 1000M Ω Min. Initial, 500M Ω Min. Final.
Test Method: EIA-364-21 D

2.7 Dielectric Withstanding Voltage
Test between adjacent contacts of mated connector assemblies. 1.5 kilovolts AC dielectric withstanding voltage, 1 minute hold.
Requirements: No breakdown, no flashover
Test Method: EIA-364-20 D

3. SUMMARY OF TESTING

Type 1:

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	5	initial	3.97	2.40	3.19	mΩ	10mΩ Max.	Meet Spec
	Temperature rise vs current	5	initial	3.56A ΔT 10℃ 5.32A ΔT 20℃ 6.73A ΔT 30℃			/	Measure the current when ΔT at 10℃,20℃ and 30℃	Judged by applicant
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec
2	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Mating force	5	initial	48.5	39.9	44.9	N	78.4 Max.	Meet Spec
	Unmating force	5	initial	54.2	45.4	50.3	N	7.2 Min.	Meet Spec
	Contact retention force	5	final	Without damage, no displacement			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

3	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Insulation resistance	5	initial	7.86	1.09	4.24	$10^{11}\Omega$	1000MΩ Min.	Meet Spec
	Dielectric withstanding voltage	5	initial	No flashover or breakdown of voltage			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

Type 2:

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	5	initial	1.76	1.33	1.47	mΩ	10mΩ Max.	Meet Spec
	Temperature rise vs current	5	initial	4.89A ΔT 10℃			/	Measure the current when ΔT at 10℃,20℃ and 30℃	Judged by applicant
				7.15A ΔT 20℃					
				8.92A ΔT 30℃					
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

2	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Mating force	5	initial	38.4	26.8	32.9	N	78.4 Max.	Meet Spec
	Unmating force	5	initial	31.9	23.1	27.4	N	7.2 Min.	Meet Spec
	Contact retention force	5	final	Without damage, no displacement			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

3	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Insulation resistance	3	initial	6.29	1.27	3.15	$10^{11}\Omega$	1000MΩ Min.	Meet Spec
	Dielectric withstanding voltage	3	initial	No flashover or breakdown of voltage			/	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec

Type 3:

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	5	initial	1.88	1.36	1.55	mΩ	10mΩ Max.	Meet Spec
	Temperature rise vs current	5	initial	4.95A ΔT 10℃			/	Measure the current when ΔT at 10℃,20℃ and 30℃	Judged by applicant
				7.16A ΔT 20℃					
				8.89A ΔT 30℃					
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

2	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Mating force	5	initial	77.6	64.0	72.6	N	78.4 Max.	Meet Spec
	Unmating force	5	initial	68.2	53.1	60.4	N	7.2 Min.	Meet Spec
	Contact retention force	5	final	Without damage, no displacement			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

3	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Insulation resistance	5	initial	32.40	1.43	5.64	$10^{11}\Omega$	1000MΩ Min.	Meet Spec
	Dielectric withstanding voltage	5	initial	No flashover or breakdown of voltage			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

Type 4:

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	5	initial	4.60	2.44	3.28	mΩ	10mΩ Max.	Meet Spec
	Temperature rise vs current	5	initial	3.52A ΔT 10℃			/	Measure the current when ΔT at 10℃,20℃ and 30℃	Judged by applicant
				5.24A ΔT 20℃					
				6.60A ΔT 30℃					
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

2	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Mating force	5	initial	38.8	29.1	31.7	N	78.4 Max.	Meet Spec
	Unmating force	5	initial	38.3	28.8	34.5	N	7.2 Min.	Meet Spec
	Contact retention force	5	final	Without damage, no displacement			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

3	Examination of Product	5	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Insulation resistance	5	initial	8.34	1.37	4.73	$10^{11}\Omega$	1000MΩ Min.	Meet Spec
	Dielectric withstanding voltage	5	initial	No flashover or breakdown of voltage.			/	No abnormalities	Meet Spec
	Examination of Product	5	final	No physical damage occurred.			/	No abnormalities	Meet Spec

Note: $10^{11}\Omega$=100GΩ, 1GΩ =1000MΩ.

4. VALIDATION

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