Qualification Test Of PDL New Receptacle Contact

1. INTRODUCTION

1.1 Purpose

Testing was performed on the new PDL receptacle contact for the new part qualification.
Contact P/N: 2232901-1, wire size: 20~16 AWG.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of the PDL connector. Test was performed at TE Shanghai Electrical Test Laboratory per Product Specification 108-5410. The associated test number is TP-15-02869.

1.3 Conclusion

The PDL contact listed in paragraph 1.4 met all the listed requirements in Section 3 Summary of Testing.
The contact can meet all the electrical, mechanical and environmental performance requirements of Product Specification 108-5410, Revision H.

1.4 Test Specimens

Specimens with the following part numbers were used for test:

Description	P/N	Part Revision
PDL Receptacle Contact	2232901-1	3
PDL Plug Housing	177898-1	S
PDL TAB Contact	177917-1	K
PDL Cap Housing	179463-1	U

1.5 Test Sequence

Test Item	Test Group[a)]											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence[b)]											
Examination of Product	1,3	1	1	1,7	1,7	1,5	1,4	1,4	1,4	1,4	1,4	1,4
Low Level Contact Resistance				2,4,6	3,6	2,4	2,5	2,5	2,5	2,5	2,5	2,5
Insulation Resistance							6					
Withstanding Voltage							7					
Mechanical Shock				3								
Vibration				5								
Connector Mating Force					2							
Connector Unmating Force					4							
Crimp Tensile Strength	2											
Durability					5							
Contact Insertion Force		2										
Contact Retention Force			2									
Humidity-Temperature Cycling							3					
H2S Gas											3	
Ammonia												3
Thermal Shock						3						
Salt Spray								3				
Resistance to Cold										3		
Heat Aging									3			

Note: a). Test group defined per 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°C to 35°C
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 10 milliamperes maximum.
Requirements: 10 milliohms maximum initial, 10 milliohms maximum final.
Test Method: EIA 364-23C

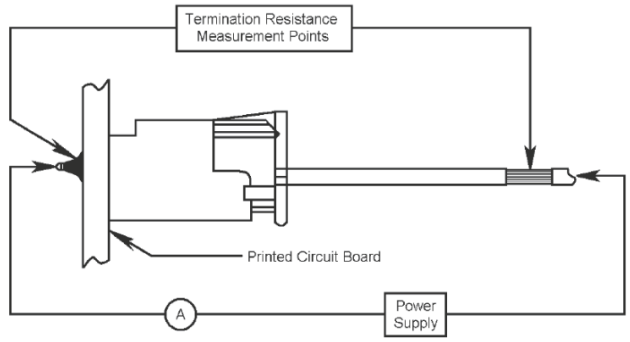

Fig.1 LLCR Measurement Points (Subtract Wire Bulk)

2.3 Crimp Tensile Strength

Apply an axial pull-off load to crimped wire of contact secured on the tester.
Operation Speed: 100 mm/min. Subject take insulation barrel away.
Requirements: 78.4N min. for 16AWG, 68.6N min. for 18AWG, 58.8N min. for 20AWG.

2.4 Mating force & un-mating force

Measure force necessary to mate & un-mate connector assembly with locking latches disengaged. Mount connector in fixtures and perform test at 100 mm per minute.
Requirements: Mating force: 6.86N maximum per contact, total 13.72N Max.
Un-mating force: 1.47 minimum per contact, total 2.94N Min.
Test Method: EIA 364-13B

2.5 Contact retention force

Apply an axial pull-off load to crimped wire.
Requirements: 41.16N min.

2.6 Contact insertion force

Measure the force required to insert contact into housing.
Requirements: 6.86N max.

2.7 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

2.8 Dielectric Withstanding Voltage

Test between adjacent contacts of mated connector assemblies. 2.2 kilovolts AC dielectric withstanding voltage, 1 minute hold.
Requirements: No breakdown, no flashover
Test Method: EIA-364-20 D

2.9 Mechanical Shock
Mated Conn. (50 G), Halfsign Curve, durations: 11 m sec, 3 drops each to normal and reversed directions of X,Y,Z axes, totally 18 drops.
Requirements: No electrical discontinuity greater than 1 μ sec. shall occur.

2.10 Vibration
Subjected mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes. 100 mA applied.
Requirements: No electrical discontinuity greater than 1 μ sec. shall occur.

2.11 Durability
25 cycles repeated mate/unmating.
Requirements: No physical damage.

2.12 Humidity-Temperature Cycling
Mated connectors,25~65° C,80~98% R.H. 10 cycles.
Requirements: No physical damage.

2.13 H2S Gas
Mated connectors,3±1 ppm,40±2° C 96 hours.
Requirements: No physical damage, no corrosion influence performance.

2.14 Ammonia
Mated connectors, put into atmosphere that rated 25 ml/l of 3% NH3 for 7 hours.
Requirements: No physical damage, no corrosion influence performance.

2.15 Thermal Shock
Mated connectors, -55° C /30min., 85° C /30min. repeat 25 cycles.
Requirements: No physical damage.

2.16 Salt Spray
Mated connectors, 5±1 % salt concentration for 48 hours.
Requirements: No physical damage, no corrosion influence performance.

2.17 Resistance to Cold
Mated connectors, -30° C±2° C , 96 hours.
Requirements: No physical damage.

2.18 Heat Aging
Mated connectors, 105° C±2° C , 96 hours.
Requirements: No physical damage.

3. SUMMARY OF TESTING

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
1	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Crimp Tensile Strength(16AWG)	3	initial	218.18	189.28	206.68	N	78.4N Min.	Meet Spec
	Crimp Tensile Strength(18AWG)	3	initial	161.93	157.53	159.67	N	68.6N Min.	Meet Spec
	Crimp Tensile Strength(20AWG)	3	initial	127.21	110.45	117.72	N	58.8N Min.	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
2	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Contact Insertion Force	3	initial	5.45	2.66	4.36	N	6.86N Max.	Meet Spec
3	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Contact Retention Force	3	initial	71.81	41.71	62.66	N	41.16N Min.	Meet Spec
4	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.68	2.31	2.5	mΩ	10mΩ Max.	Meet Spec
	Mechanical Shock	3	initial	No physical damage occurred, No electrical discontiniuity greater than 1μs.			mΩ	No abnormalities	Meet Spec
	LLCR	3	initial	2.83	2.4	2.61	mΩ	10mΩ Max.	Meet Spec
	Vibration	3	initial	No physical damage occurred, No electrical discontiniuity greater than 1μs.			mΩ	No abnormalities	Meet Spec
	LLCR	3	final	3.63	1.47	2.86	mΩ	20mΩ Max.	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
5	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	Mating Force	3	initial	8.24	5.35	7.07	N	13.72N Max.	Meet Spec
	LLCR	3	initial	3.66	3.38	3.48	mΩ	No abnormalities	Meet Spec
	Un-mating Force	3	initial	5.66	5.27	5.45	N	2.94N Min.	Meet Spec
	Durability	3	initial	No physical damage occurred.			mΩ	No abnormalities	Meet Spec
	LLCR	3	final	4	3.39	3.79	mΩ	20mΩ Max.	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
6	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.83	2.22	2.51	mΩ	10mΩ Max.	Meet Spec
	Thermal Shock	3	initial	No physical damage occurred.			mΩ	No abnormalities	Meet Spec
	LLCR	3	final	2.42	2.03	2.31	mΩ	20mΩ Max.	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
7	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.88	2.32	2.59	mΩ	10mΩ Max.	Meet Spec
	Humidity and Temperature Cycling	3	initial	No physical damage occurred			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	3.14	2.25	2.62	mΩ	20mΩ Max.	Meet Spec
	Insulation Resistance	3	initial	1.54	0.74	1.16	10^{11}Ω	500MΩ Min.	Meet Spec
	Withstanding Voltage	3	initial	No flashover or breakdown of voltage			/	No abnormalities	Meet Spec
8	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.99	2.62	2.74	mΩ	10mΩ Max.	Meet Spec
	Salt Spray	3	initial	No physical damage, no corrosion influence performance.			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	4.02	2.68	2.99	mΩ	20mΩ Max.	Meet Spec
9	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.59	2.44	2.54	mΩ	10mΩ Max.	Meet Spec
	Heat Aging	3	initial	No physical damage occurred.			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	3.42	2.83	3.08	mΩ	20mΩ Max.	Meet Spec

Group	Test Item	N	Condition	Test Result				Requirement	Conclusion
				Max	Min	Ave	Unit		
10	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.41	2.19	2.31	mΩ	10mΩ Max.	Meet Spec
	Resistance To Cold	3	initial	No physical damage occurred.			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	2.37	2.19	2.28	mΩ	20mΩ Max.	Meet Spec
11	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.45	2.28	2.37	mΩ	10mΩ Max.	Meet Spec
	H2S Gas	3	initial	No physical damage, no corrosion influence performance.			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	2.67	2.43	2.52	mΩ	20mΩ Max.	Meet Spec
12	Examination of Product	3	initial	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	initial	2.48	2.12	2.33	mΩ	10mΩ Max.	Meet Spec
	Ammonia	3	initial	No physical damage, no corrosion influence performance.			mΩ	No abnormalities	Meet Spec
	Examination of Product	3	final	No physical damage occurred.			/	No abnormalities	Meet Spec
	LLCR	3	final	2.76	2.36	2.54	mΩ	20mΩ Max.	Meet Spec

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

The contact can meet all the electrical, mechanical and environmental performance requirements.