

NOVASTACK® 35-HDP

Part No. 20697-0**E-01#, 20698-0**E-01#

Test Report

Product Specification no. PRS-2187

5	T21153	November 5, 2021	Y.Kuribayashi	S.Suzuki	Y.Hashimoto
4	T21002	February 4, 2021	M.Muro	-	H.Ikari
3	T18145	December 28, 2018	R.Shioya	Y.Baba	T.Hirakawa
2	T16160	October 7, 2016	T.Kurachi	-	J.Tateishi
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose

To evaluate the performance of NOVASTACK 35-HDP Connector in accordance with PRS-2187.

2. Specimen

- (1) NOVASTACK 35-HDP PLUG ASS'Y (P/N: 20697-0**E-01#)
- (2) NOVASTACK 35-HDP RECEPTACLE ASS'Y (P/N: 20698-0**E-01#)

3. Test Sequence

All the evaluations were performed in accordance with Table 1. Test Sequence.

4. Result

See Table 2-1 to 2-3, Graph 1 to 26. For the details of the testing conditions and requirements, see PRS-2187.
The "n" in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-2187.

Table 1 Test Sequence and Sample Quantity

Test Item	Group												
	A	B	C	D	E	F	G	H	J	K	L	M	
Contact Resistance	2,6		1,3,5	1,5	1,3	1,5	1,5,7	1,3	1,3				
Insulation Resistance				2,6		2,6	2,8						
D. W. Voltage				3,7		3,7	3,9						
Temperature Rising												1	
Mating Force	1,5												
Unmating Force	3,7												
Durability	4						4 (10cycles)						
Contact Retention Force		1,3											
Vibration			2										
Shock			4										
Thermal Shock				4									
High Temperature Life		2			2								
Humidity (Steady State)						4							
Humidity (Cycling)							6						
Salt Water Spray								2					
Gas (H ₂ S)									2				
Solderability										1			
Soldering Heat Resistance											1		
Sample QTY.	5 pcs.	20 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.

※Numbers indicate sequence in which tests are performed.

Table 2-1. Test result

Group	Contents of measurement	Spec.	Unit	Q'ty	n	Data					Judge.				
						AVE.	MAX.	MIN.	S	X±3s					
A	Durability														
	Contact resistance														
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.223	17.22	14.15	0.690	17.293	OK		
		After 30 cycles	ΔR 40	MAX.				0.324	3.78	-2.91	1.568	5.028	OK		
	Power contact	Initial	20	MAX.			20	2.985	3.78	2.47	0.403	4.194	OK		
		After 30 cycles	ΔR 20	MAX.				0.115	0.61	-0.57	0.327	1.096	OK		
	GND	Initial	20	MAX.			10	9.095	10.17	8.50	0.468	10.499	OK		
		After 30 cycles	ΔR 20	MAX.				1.162	1.78	0.38	0.434	2.464	OK		
	Mating force														
	28P	Initial	32.0	MAX.	N	5	-	28.318	29.54	27.35	-	-	OK		
		After 30 cycles						11.012	12.12	10.24	-	-	OK		
	34P	Initial	38.0	MAX.			-	30.988	31.80	30.17	-	-	OK		
		After 30 cycles						12.738	13.33	12.54	-	-	OK		
	42P	Initial	46.0	MAX.			-	32.592	33.71	31.51	-	-	OK		
		After 30 cycles						14.194	14.66	13.42	-	-	OK		
	56P	Initial	60.0	MAX.			-	39.758	42.40	38.37	-	-	OK		
		After 30 cycles						19.596	21.23	18.08	-	-	OK		
	62P	Initial	66.0	MAX.			-	45.920	47.20	44.10	-	-	OK		
		After 30 cycles						21.840	23.00	21.30	-	-	OK		
	Unmating force														
	28P	Initial	3.2	MIN.			N	5	-	14.360	15.21	13.54	-	-	OK
		After 30 cycles			10.226	11.32				9.43	-	-	OK		
	34P	Initial	3.8	MIN.	-	15.122			15.91	14.34	-	-	OK		
After 30 cycles		10.824				11.39			9.99	-	-	OK			
42P	Initial	4.6	MIN.	-	15.988	17.88			15.13	-	-	OK			
	After 30 cycles				9.942	10.40			9.30	-	-	OK			
56P	Initial	6.0	MIN.	-	20.800	21.63			20.45	-	-	OK			
	After 30 cycles				13.340	13.93			12.94	-	-	OK			
62P	Initial	6.6	MIN.	-	18.940	19.60			18.00	-	-	OK			
	After 30 cycles				18.060	19.30			16.50	-	-	OK			
B	Contact retention force														
	Plug														
	Signal contact	Initial	0.6	MIN.	N	-	20	2.52 MIN.					-	-	OK
		After test						2.07 MIN.					-	-	OK
	Power contact	Initial						3.80 MIN.					-	-	OK
		After test						3.92 MIN.					-	-	OK
	Receptacle														
	Signal contact	Initial	0.1	MIN.	N	-	20	0.42 MIN.					-	-	OK
		After test						0.34 MIN.					-	-	OK
	Power contact	Initial						0.53 MIN.					-	-	OK
After test		0.48 MIN.						-	-	OK					
C	Vibration → Shock														
	Contact resistance														
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.200	17.04	13.96	0.685	17.255	OK		
		After vibration	ΔR 40	MAX.				-0.500	0.32	-1.31	0.474	0.922	OK		
		After shock						-0.505	0.44	-1.39	0.393	0.674	OK		
	Power contact	Initial	20	MAX.			20	2.783	3.31	2.18	0.362	3.869	OK		
		After vibration	ΔR 20	MAX.				0.166	0.72	-0.20	0.268	0.970	OK		
		After shock						0.324	0.87	-0.29	0.363	1.413	OK		
	GND	Initial	20	MAX.	10	8.145	9.28	7.38	0.585	9.900	OK				
		After vibration	ΔR 20	MAX.		0.149	0.55	-0.20	0.281	0.992	OK				
		After shock				0.163	0.77	-0.27	0.288	1.027	OK				
	Electrical discontinuity														
		During test	1	MAX.	μs	5	-	No discontinuity					OK		
	Appearance														
	After test	*		-	5	-	No abnormality					OK			

*Appearance Spec.: No abnormality adversely affecting the performance shall occur.

Table 2-2. Test result

Group	Contents of measurement	Spec.	Unit	Q'ty	n	Data					Judge.			
						AVE.	MAX.	MIN.	S	X±3s				
D	Thermal shock													
	Contact resistance													
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.962	18.86	13.46	1.198	19.556	OK	
		After test	ΔR 40	MAX.				0.769	4.46	-2.70	1.376	4.897	OK	
	Power contact	Initial	20	MAX.			20	2.680	3.48	1.67	0.537	4.291	OK	
		After test	ΔR 20	MAX.				0.420	1.09	-0.15	0.308	1.344	OK	
	GND	Initial	20	MAX.			10	8.865	9.38	8.45	0.356	9.933	OK	
		After test	ΔR 20	MAX.				-0.067	0.61	-0.84	0.413	1.172	OK	
	Insulation resistance													
		Initial	1000	MIN.	MΩ	5	-	1.77 x 10 ⁵ Min.					OK	
		After test	500	MIN.				1.43 x 10 ⁵ Min.					OK	
	Dielectric Withstanding Voltage													
		After test	**	-	5	-	No abnormality					OK		
	Appearance													
	After test	*	-	5	-	No abnormality					OK			
E	High temperature life													
	Contact resistance													
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.949	18.73	13.20	1.215	19.594	OK	
		After test	ΔR 40	MAX.				0.529	3.44	-2.26	1.110	3.859	OK	
	Power contact	Initial	20	MAX.			20	2.718	3.33	2.21	0.363	3.807	OK	
		After test	ΔR 20	MAX.				-0.095	0.76	-0.80	0.437	1.216	OK	
	GND	Initial	20	MAX.			10	8.208	8.67	7.46	0.441	9.531	OK	
		After test	ΔR 20	MAX.				-0.098	0.75	-0.75	0.465	1.297	OK	
	Appearance													
		After test	*	-	5	-	No abnormality					OK		
	F	Humidity(steady state)												
		Contact resistance												
		Signal contact	Initial	40	MAX.	mΩ	5	210	16.158	18.74	13.94	1.143	19.587	OK
			After test	ΔR 40	MAX.				0.865	3.37	-1.63	1.103	4.174	OK
Power contact		Initial	20	MAX.	20			2.786	3.62	2.18	0.393	3.965	OK	
		After test	ΔR 20	MAX.				0.190	1.13	-0.84	0.582	1.936	OK	
GND		Initial	20	MAX.	10			8.295	8.78	7.56	0.378	9.429	OK	
		After test	ΔR 20	MAX.				-0.186	0.30	-0.91	0.420	1.074	OK	
Insulation resistance														
		Initial	1000	MIN.	MΩ	5	-	1.28 x 10 ⁵ Min.					OK	
		After test	500	MIN.				1.04 x 10 ⁵ Min.					OK	
Dielectric Withstanding Voltage														
		After test	**	-	5	-	No abnormality					OK		
Appearance														
	After test	*	-	5	-	No abnormality					OK			

*Appearance Spec.: No abnormality adversely affecting the performance shall occur.

**Dielectric Withstanding Voltage Spec.: No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

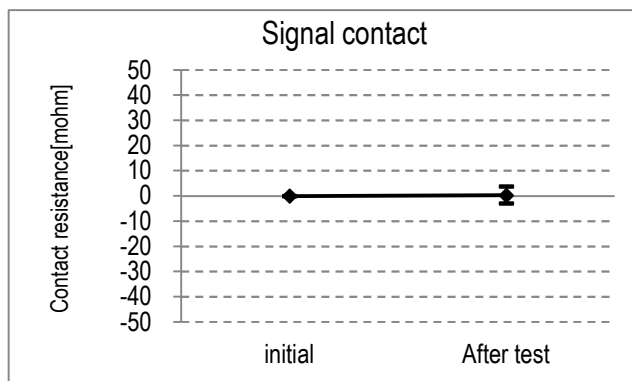
Table 2-3. Test result

Group	Contents of measurement	Spec.	Unit	Q'ty	n	Data					Judge.						
						AVE.	MAX.	MIN.	S	X±3s							
G	Humidity(cycling)																
	Contact resistance																
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.793	17.74	13.74	0.842	18.319	OK				
		After 10cycle						-0.719	1.60	-2.52	0.786	1.639	OK				
		After test	ΔR 40	MAX.				0.493	2.51	-1.63	0.881	3.136	OK				
	Power contact	Initial	20	MAX.			mΩ	5	20	2.982	3.70	2.33	0.426	4.260	OK		
		After 10cycle								-0.041	1.29	-1.08	0.643	1.888	OK		
		After test	ΔR 20	MAX.						0.114	1.36	-1.18	0.626	1.992	OK		
	GND	Initial	20	MAX.					mΩ	5	10	8.164	8.86	7.40	0.399	9.361	OK
		After 10cycle										-0.070	1.04	-1.31	0.709	2.057	OK
		After test	ΔR 20	MAX.								0.134	1.33	-0.46	0.559	1.811	OK
	Insulation resistance																
		Initial	1000	MIN.	MΩ	5					-	1.15 x 10 ⁵ Min.					OK
	After test	500	MIN.	1.04 x 10 ⁵ Min.								OK					
Dielectric Withstanding Voltage																	
	After test	**	-	5	-	No abnormality					OK						
Appearance																	
	After test	*	-	5	-	No abnormality					OK						
H	Salt water spray																
	Contact resistance																
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.093	17.07	13.23	0.890	17.763	OK				
		After test	ΔR 40	MAX.				0.201	3.68	-3.49	1.670	5.211	OK				
	Power contact	Initial	20	MAX.			mΩ	5	20	2.952	3.36	2.46	0.255	3.717	OK		
		After test	ΔR 20	MAX.						-0.037	0.98	-0.53	0.382	1.109	OK		
	GND	Initial	20	MAX.					mΩ	5	10	8.050	8.70	7.55	0.404	9.262	OK
		After test	ΔR 20	MAX.								0.036	0.77	-0.61	0.444	1.368	OK
	Appearance																
		After test	*	-							5	-	No abnormality				
J	Gas																
	Contact resistance																
	Signal contact	Initial	40	MAX.	mΩ	5					210	15.721	17.80	13.61	0.920	18.481	OK
		After test	ΔR 40	MAX.								0.599	3.41	-2.34	1.115	3.944	OK
	Power contact	Initial	20	MAX.			mΩ	5			20	2.961	3.84	2.24	0.345	3.996	OK
		After test	ΔR 20	MAX.								-0.124	0.92	-1.06	0.550	1.526	OK
	GND	Initial	20	MAX.					mΩ	5	10	8.001	8.52	7.50	0.335	9.006	OK
		After test	ΔR 20	MAX.								0.303	0.96	-0.28	0.418	1.557	OK
	Appearance																
		After test	*	-							5	-	No abnormality				
K	Solder ability																
	Solder wetting area																
	After test	95	MIN.	%	10	-					95 MIN.					OK	
L	Resistance to reflow soldering heat																
	Appearance																
	After test	*	-	10	-	No abnormality					OK						
M	Temperature rising																
	28P (Signal:0.30A,Power:2.20A)		ΔT 30	MAX.	℃	5	-	8.7 Max.					OK				
	34P (Signal:0.30A,Power:2.20A)							8.7 Max.					OK				
	42P (Signal:0.29A,Power:2.20A)							8.5 Max.					OK				
	56P (Signal:0.22A,Power:2.20A)							6.9 Max.					OK				
	62P (Signal:0.19A,Power:2.20A)							5.8 Max.					OK				

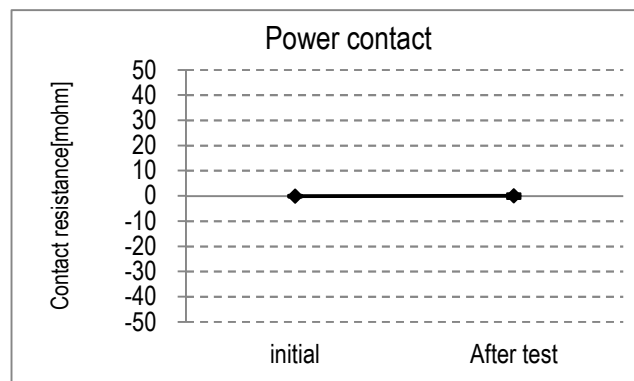
*Appearance Spec.: No abnormality adversely affecting the performance shall occur.

**Dielectric Withstanding Voltage Spec.: No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

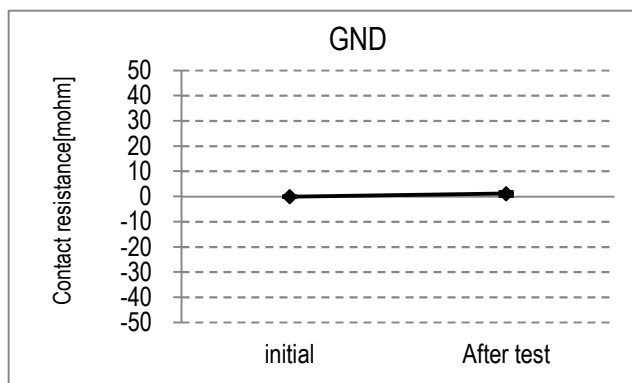
C Group / Durability



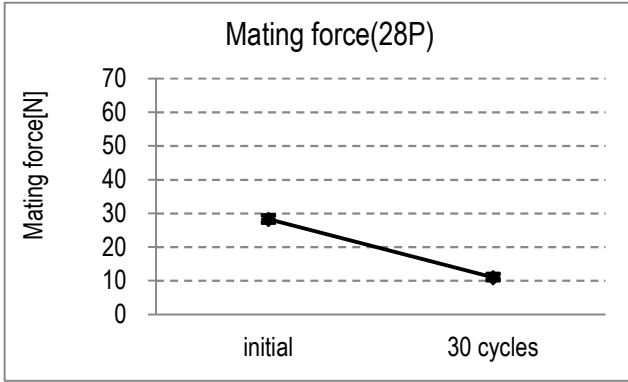
Graph-1. A change of signal contact resistance



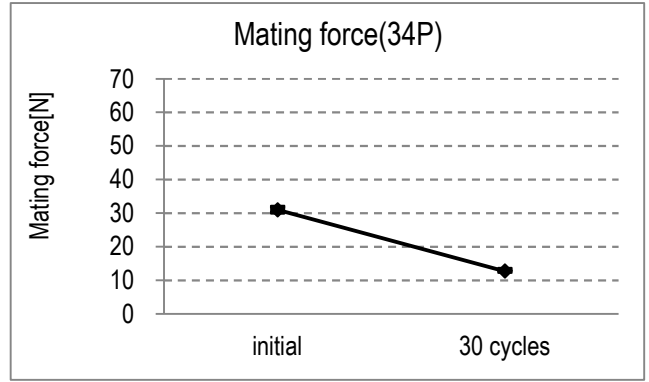
Graph-2. A change of power contact resistance



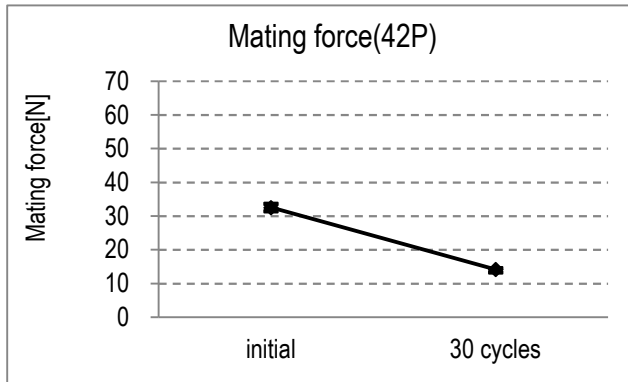
Graph-3. A change of GND contact resistance



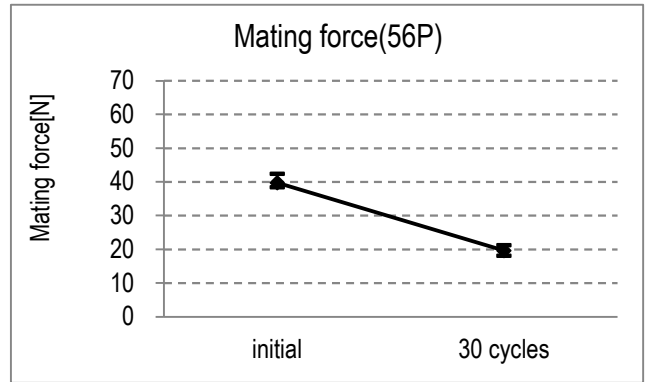
Graph-4-1. A change of mating force 28P



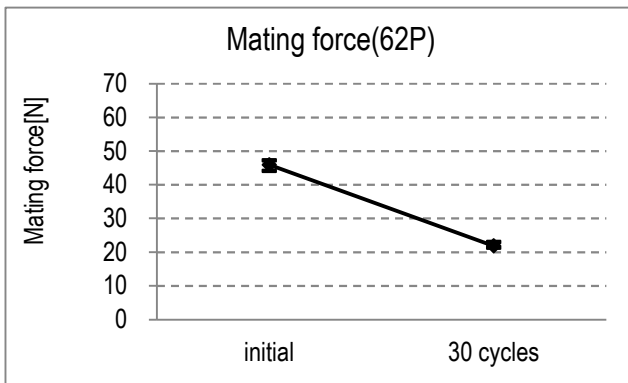
Graph-4-2. A change of mating force 34P



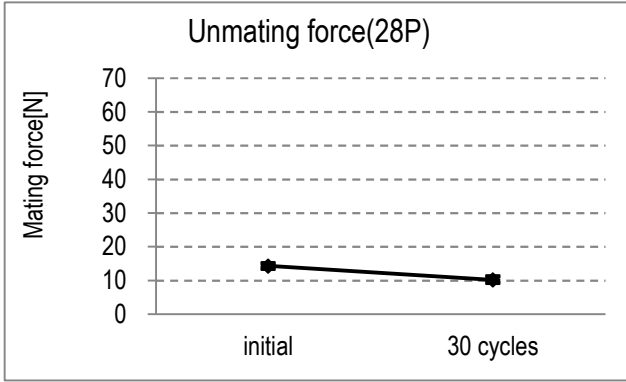
Graph-4-3. A change of mating force 42P



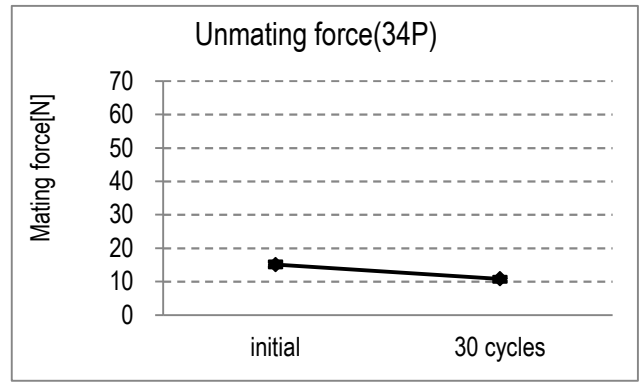
Graph-4-4. A change of mating force 56P



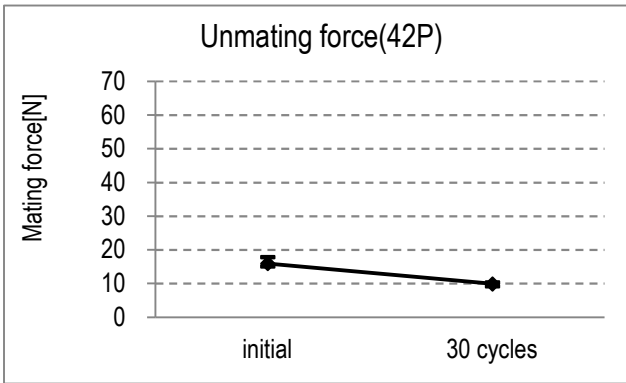
Graph-4-5. A change of mating force 62P



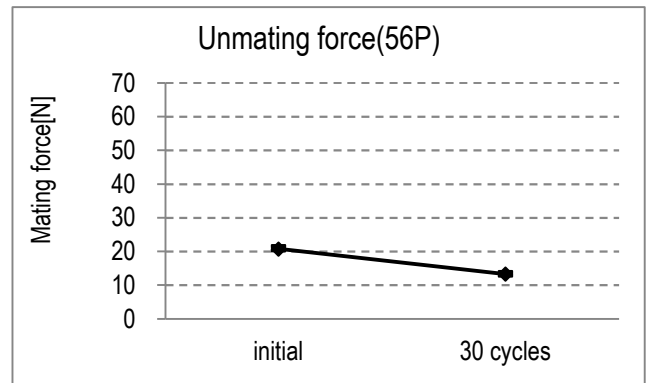
Graph-5-1. A change of unmating force 28P



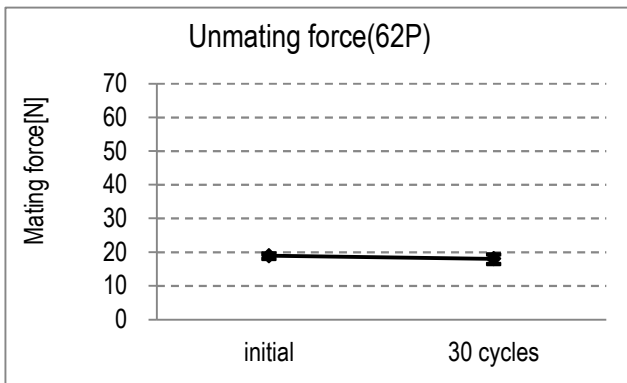
Graph-5-2. A change of unmating force 34P



Graph-5-3. A change of unmating force 42P

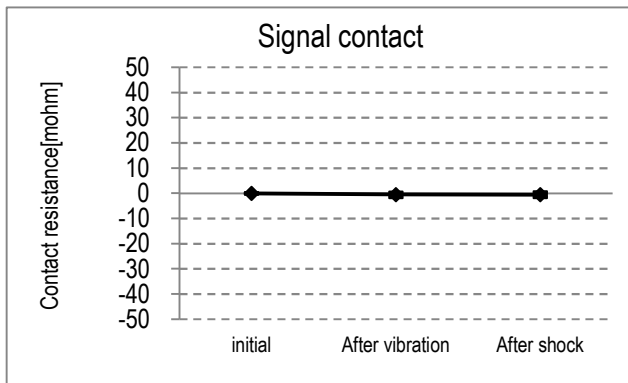


Graph-5-4. A change of unmating force 56P

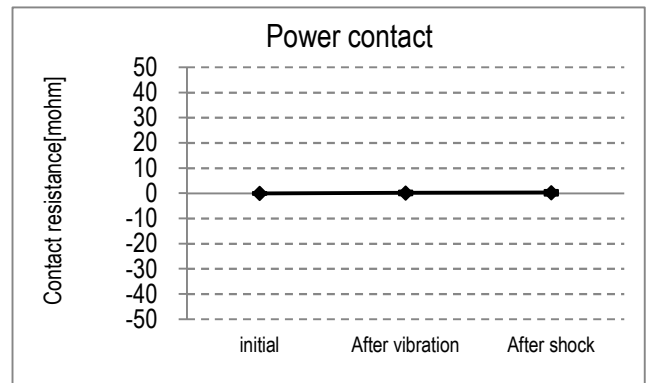


Graph-5-5. A change of unmating force 62P

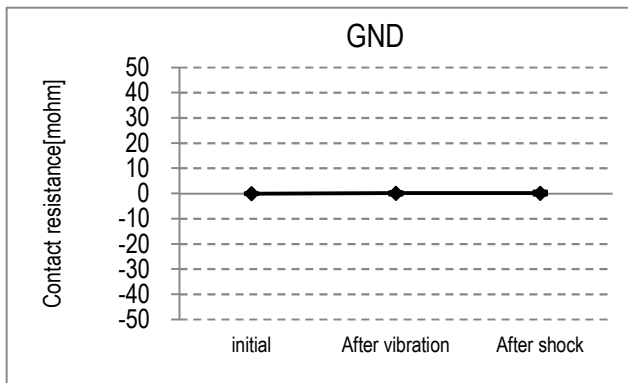
C Group / Vibration → Shock



Graph-6. A change of signal contact resistance

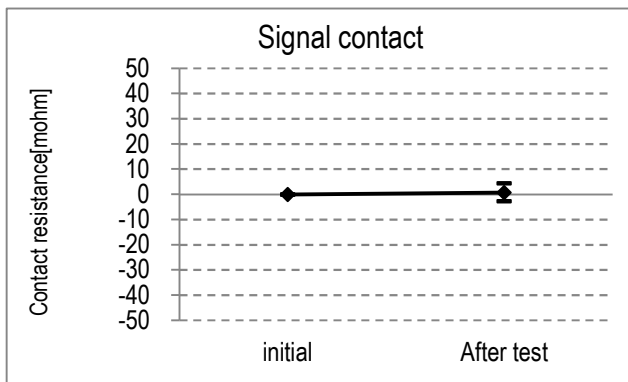


Graph-7. A change of power contact resistance

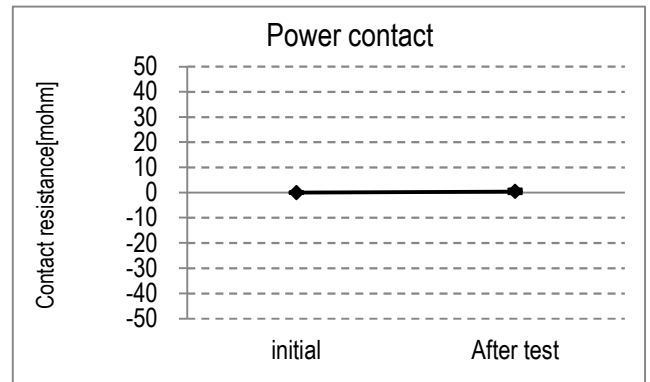


Graph-8. A change of GND contact resistance

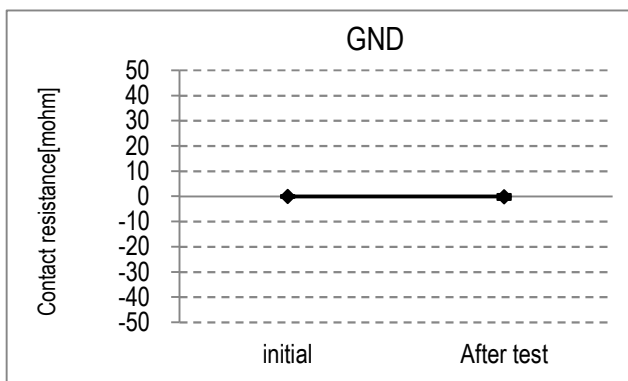
D Group / Thermal Shock



Graph-9. A change of signal contact resistance

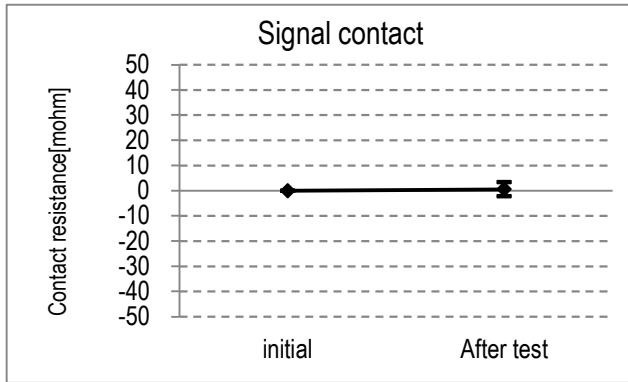


Graph-10. A change of power contact resistance

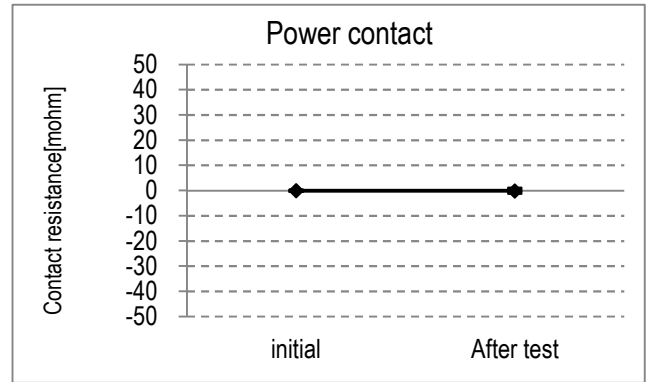


Graph-11. A change of GND contact resistance

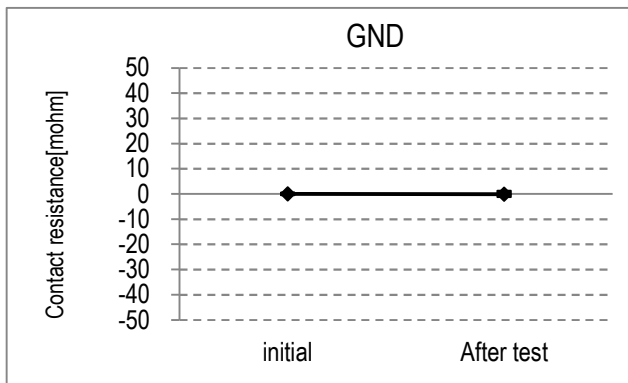
E Group / High Temperature Life



Graph-12. A change of signal contact resistance

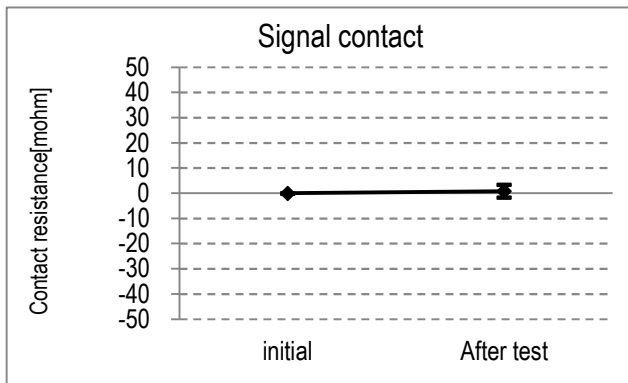


Graph-13. A change of power contact resistance

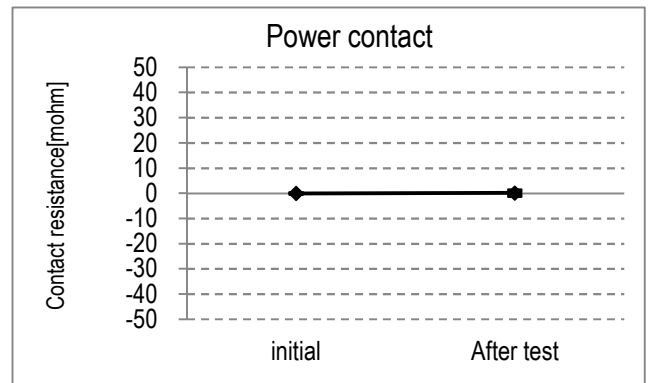


Graph-14. A change of GND contact resistance

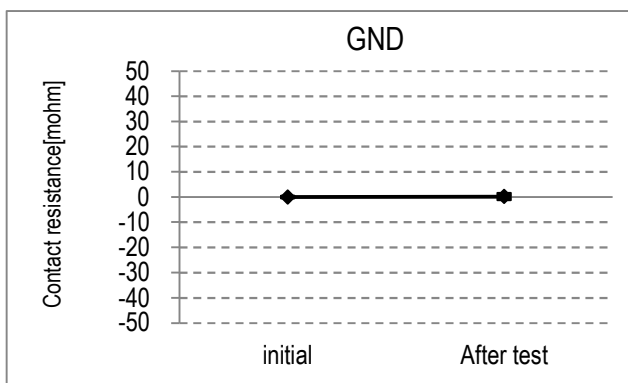
F Group / Humidity (Steady State)



Graph-15. A change of signal contact resistance

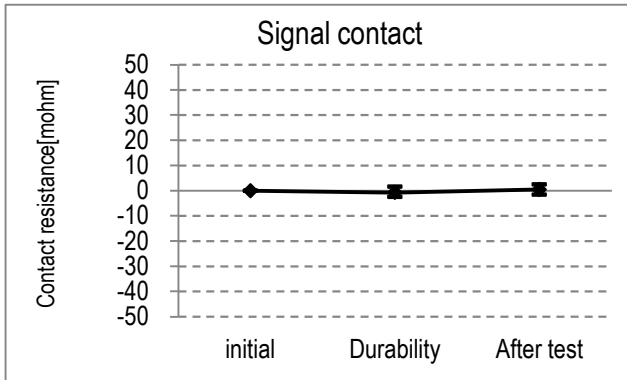


Graph-16. A change of power contact resistance

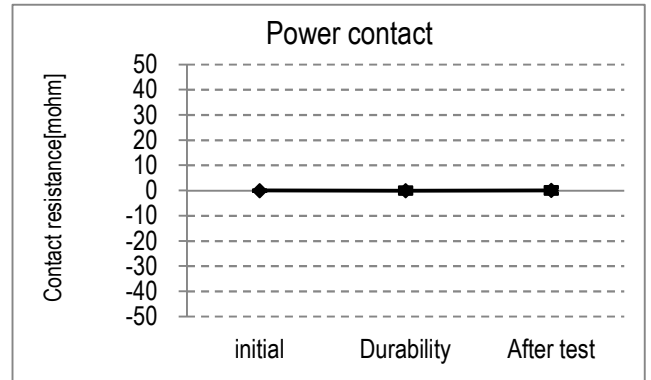


Graph-17. A change of GND contact resistance

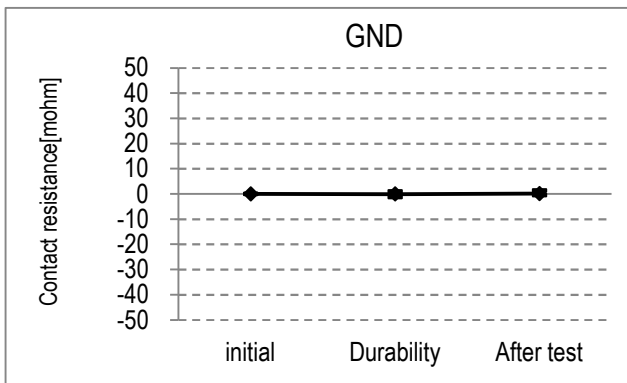
G Group / Humidity (Cycling)



Graph-18. A change of signal contact resistance

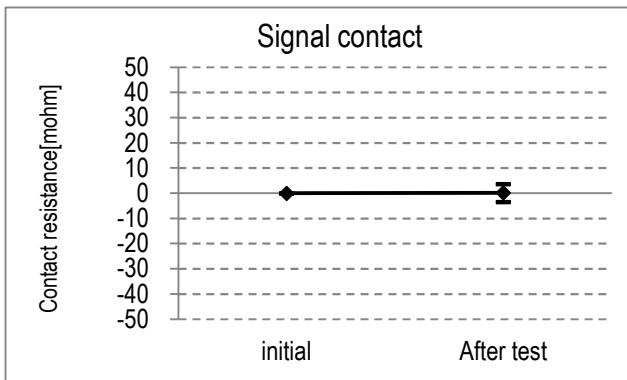


Graph-19. A change of power contact resistance

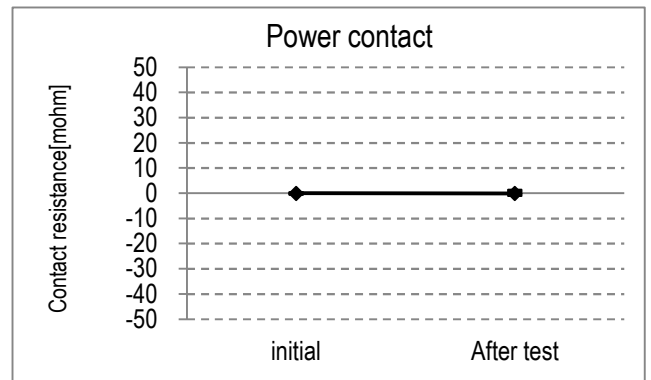


Graph-20. A change of GND contact resistance

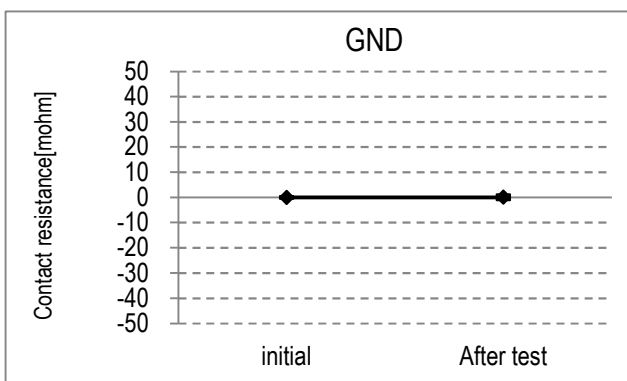
H Group / Salt Water Spray



Graph-21. A change of signal contact resistance

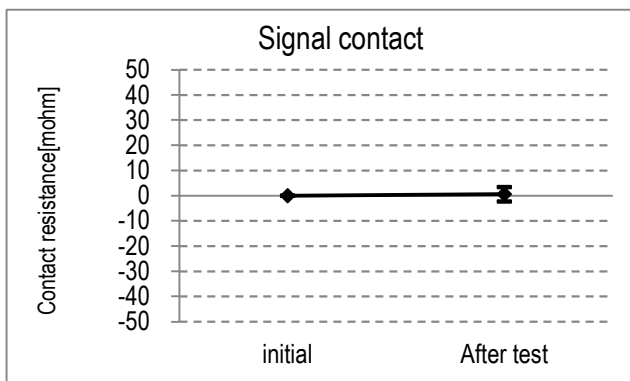


Graph-22. A change of power contact resistance

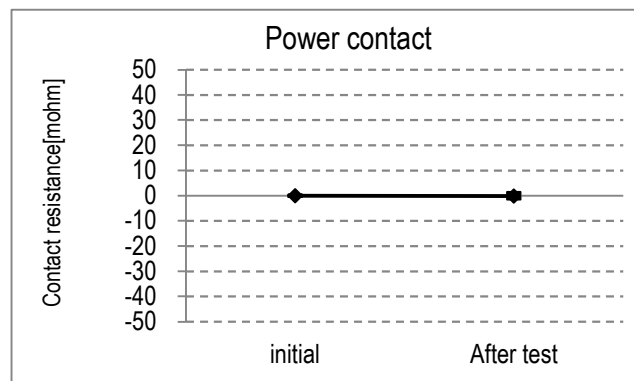


Graph-23. A change of GND contact resistance

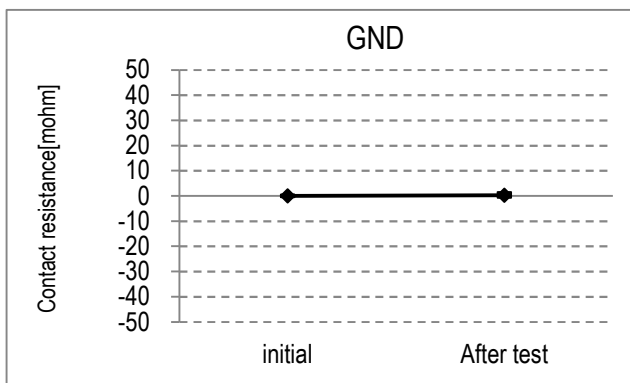
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Graph-24. A change of signal contact resistance



Graph-25. A change of power contact resistance



Graph-26. A change of GND contact resistance