

NOVASTACK® 35-HDP

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

Test Report

Product Specification no. PRS-2187

7	T24034	June 19, 2024	Y.Fukumoto	-	S.Suzuki
6	T22065	April 25, 2022	H.Lu	Y.Shimizu	M.Takemoto
5	T21153	November 5, 2021	Y.Kuribayashi	S.Suzuki	Y.Hashimoto
4	T21002	February 4, 2021	M.Muro	-	H.Ikari
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 2-4, 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	Pass
		After 30 cycles	ΔR 40	MAX.				0.324	3.78	-2.91	1.568	5.028	Pass
	Power contact	Initial	20	MAX.			20	2.985	3.78	2.47	0.403	4.194	Pass
		After 30 cycles	ΔR 20	MAX.				0.115	0.61	-0.57	0.327	1.096	Pass
	GND	Initial	20	MAX.			10	9.095	10.17	8.50	0.468	10.499	Pass
		After 30 cycles	ΔR 20	MAX.				1.162	1.78	0.38	0.434	2.464	Pass
	Mating force												
	16P	Initial	32.0	MAX.	N	5	-	21.498	22.35	20.78	-	-	Pass
		After 30 cycles						9.630	10.36	9.04	-	-	Pass
	28P	Initial	32.0	MAX.			-	28.318	29.54	27.35	-	-	Pass
		After 30 cycles						11.012	12.12	10.24	-	-	Pass
	34P	Initial	38.0	MAX.			-	30.988	31.80	30.17	-	-	Pass
		After 30 cycles						12.738	13.33	12.54	-	-	Pass
	42P	Initial	46.0	MAX.			-	32.592	33.71	31.51	-	-	Pass
		After 30 cycles						14.194	14.66	13.42	-	-	Pass
	56P	Initial	60.0	MAX.			-	39.758	42.40	38.37	-	-	Pass
		After 30 cycles						19.596	21.23	18.08	-	-	Pass
	62P	Initial	66.0	MAX.			-	45.920	47.20	44.10	-	-	Pass
		After 30 cycles						21.840	23.00	21.30	-	-	Pass
	Unmating force												
	16P	Initial	3.2	MIN.	N	5	-	10.180	10.42	9.99	-	-	Pass
		After 30 cycles						6.456	6.81	5.89	-	-	Pass
	28P	Initial	3.2	MIN.			-	14.360	15.21	13.54	-	-	Pass
		After 30 cycles						10.226	11.32	9.43	-	-	Pass
	34P	Initial	3.8	MIN.			-	15.122	15.91	14.34	-	-	Pass
		After 30 cycles						10.824	11.39	9.99	-	-	Pass
	42P	Initial	4.6	MIN.			-	15.988	17.88	15.13	-	-	Pass
		After 30 cycles						9.942	10.40	9.30	-	-	Pass
	56P	Initial	6.0	MIN.			-	20.800	21.63	20.45	-	-	Pass
		After 30 cycles						13.340	13.93	12.94	-	-	Pass
	62P	Initial	6.6	MIN.			-	18.940	19.60	18.00	-	-	Pass
After 30 cycles		18.060						19.30	16.50	-	-	Pass	
B	Contact retention force												
	Plug												
	Signal contact	Initial	0.6	MIN.	N	-	20	2.52 MIN.					Pass
		After test						2.07 MIN.					Pass
	Power contact	Initial						3.80 MIN.					Pass
		After test						3.92 MIN.					Pass
	Receptacle												
	Signal contact	Initial	0.1	MIN.	N	-	20	0.42 MIN.					Pass
		After test						0.34 MIN.					Pass
	Power contact	Initial						0.53 MIN.					Pass
After test		0.48 MIN.						Pass					

*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					
C	Vibration → Shock														
	Contact resistance														
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.200	17.04	13.96	0.685	17.255	Pass		
		After vibration	ΔR 40	MAX.				-0.500	0.32	-1.31	0.474	0.922	Pass		
		After shock						-0.505	0.44	-1.39	0.393	0.674	Pass		
	Power contact	Initial	20	MAX.			20	2.783	3.31	2.18	0.362	3.869	Pass		
		After vibration	ΔR 20	MAX.				0.166	0.72	-0.20	0.268	0.970	Pass		
		After shock						0.324	0.87	-0.29	0.363	1.413	Pass		
	GND	Initial	20	MAX.			10	8.145	9.28	7.38	0.585	9.900	Pass		
		After vibration	ΔR 20	MAX.				0.149	0.55	-0.20	0.281	0.992	Pass		
		After shock						0.163	0.77	-0.27	0.288	1.027	Pass		
	Electrical discontinuity														
	During test	1	MAX.	μs			5	-	No discontinuity					Pass	
Appearance															
	After test	*		-	5	-	No abnormality					Pass			
D	Thermal shock														
	Contact resistance														
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.962	18.86	13.46	1.198	19.556	Pass		
		After test	ΔR 40	MAX.				0.769	4.46	-2.70	1.376	4.897	Pass		
	Power contact	Initial					20	MAX.	20	2.680	3.48	1.67	0.537	4.291	Pass
		After test	ΔR 20	MAX.			0.420	1.09		-0.15	0.308	1.344	Pass		
	GND	Initial					20	MAX.	10	8.865	9.38	8.45	0.356	9.933	Pass
		After test	ΔR 20	MAX.			-0.067	0.61		-0.84	0.413	1.172	Pass		
	Insulation resistance														
		Initial	1000	MIN.			MΩ	5	-	1.77 × 10 ⁵ Min.					Pass
		After test	500	MIN.						1.43 × 10 ⁵ Min.					Pass
	Dielectric Withstanding Voltage														
	After test	**		-			5	-	No abnormality					Pass	
Appearance															
	After test	*		-	5	-	No abnormality					Pass			
E	High temperature life														
	Contact resistance														
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.949	18.73	13.20	1.215	19.594	Pass		
		After test	ΔR 40	MAX.				0.529	3.44	-2.26	1.110	3.859	Pass		
	Power contact	Initial					20	MAX.	20	2.718	3.33	2.21	0.363	3.807	Pass
		After test	ΔR 20	MAX.			-0.095	0.76		-0.80	0.437	1.216	Pass		
	GND	Initial					20	MAX.	10	8.208	8.67	7.46	0.441	9.531	Pass
		After test	ΔR 20	MAX.			-0.098	0.75		-0.75	0.465	1.297	Pass		
	Appearance														
		After test	*				-	5	-	No abnormality					Pass

*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			
F	Humidity(steady state)												
	Contact resistance												
	Signal contact	Initial	40	MAX.	mΩ	5	210	16.158	18.74	13.94	1.143	19.587	Pass
		After test	ΔR 40	MAX.				0.865	3.37	-1.63	1.103	4.174	Pass
	Power contact	Initial	20	MAX.			20	2.786	3.62	2.18	0.393	3.965	Pass
		After test	ΔR 20	MAX.				0.190	1.13	-0.84	0.582	1.936	Pass
	GND	Initial	20	MAX.			10	8.295	8.78	7.56	0.378	9.429	Pass
		After test	ΔR 20	MAX.				-0.186	0.30	-0.91	0.420	1.074	Pass
	Insulation resistance												
		Initial	1000	MIN.	MΩ	5	-	1.28 × 10 ⁵ Min.					Pass
		After test	500	MIN.				1.04 × 10 ⁵ Min.					Pass
	Dielectric Withstanding Voltage												
		After test	**		-	5	-	No abnormality					Pass
	Appearance												
	After test	*		-	5	-	No abnormality					Pass	
G	Humidity(cycling)												
	Contact resistance												
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.793	17.74	13.74	0.842	18.319	Pass
		After 10cycle	ΔR 40	MAX.				-0.719	1.60	-2.52	0.786	1.639	Pass
		After test						0.493	2.51	-1.63	0.881	3.136	Pass
	Power contact	Initial	20	MAX.			20	2.982	3.70	2.33	0.426	4.260	Pass
		After 10cycle	ΔR 20	MAX.				-0.041	1.29	-1.08	0.643	1.888	Pass
		After test						0.114	1.36	-1.18	0.626	1.992	Pass
	GND	Initial	20	MAX.			10	8.164	8.86	7.40	0.399	9.361	Pass
		After 10cycle	ΔR 20	MAX.				-0.070	1.04	-1.31	0.709	2.057	Pass
		After test						0.134	1.33	-0.46	0.559	1.811	Pass
	Insulation resistance												
		Initial	1000	MIN.	MΩ	5	-	1.15 × 10 ⁵ Min.					Pass
		After test	500	MIN.				1.04 × 10 ⁵ Min.					Pass
Dielectric Withstanding Voltage													
	After test	**		-	5	-	No abnormality					Pass	
Appearance													
	After test	*		-	5	-	No abnormality					Pass	
H	Salt water spray												
	Contact resistance												
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.093	17.07	13.23	0.890	17.763	Pass
		After test	ΔR 40	MAX.				0.201	3.68	-3.49	1.670	5.211	Pass
	Power contact	Initial	20	MAX.			20	2.952	3.36	2.46	0.255	3.717	Pass
		After test	ΔR 20	MAX.				-0.037	0.98	-0.53	0.382	1.109	Pass
	GND	Initial	20	MAX.			10	8.050	8.70	7.55	0.404	9.262	Pass
		After test	ΔR 20	MAX.				0.036	0.77	-0.61	0.444	1.368	Pass
	Appearance												
		After test	*		-	5	-	No abnormality					Pass

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

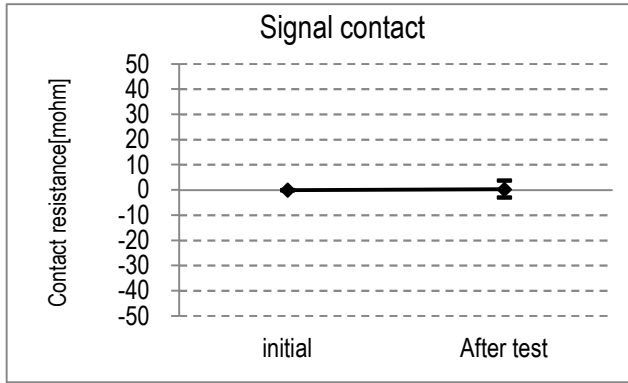
**Dielectric Withstanding Voltage Spec.: No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

Table 2-4. Test result

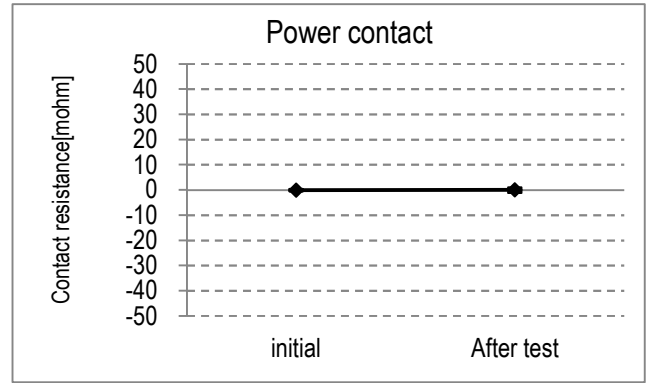
Group	Contents of measurement	Spec.	Unit	Q'ty	n	Data					Judge.			
						AVE.	MAX.	MIN.	S	X±3s				
J	Gas													
	Contact resistance													
	Signal contact	Initial	40	MAX.	mΩ	5	210	15.721	17.80	13.61	0.920	18.481	Pass	
		After test	ΔR 40	MAX.				0.599	3.41	-2.34	1.115	3.944	Pass	
	Power contact	Initial	20	MAX.			20	2.961	3.84	2.24	0.345	3.996	Pass	
		After test	ΔR 20	MAX.				-0.124	0.92	-1.06	0.550	1.526	Pass	
	GND	Initial	20	MAX.			10	8.001	8.52	7.50	0.335	9.006	Pass	
		After test	ΔR 20	MAX.				0.303	0.96	-0.28	0.418	1.557	Pass	
	Appearance													
		After test	*				-	5	-	No abnormality				
K	Solder ability													
	Solder wetting area													
	After test	95	MIN.	%	10	-	95 MIN.					Pass		
L	Resistance to reflow soldering heat													
	Appearance													
	After test	*		-	10	-	No abnormality					Pass		
M	Temperature rising													
	16P (Signal:0.30A,Power:2.20A)	ΔT 30	MAX.	℃	5	-	8.9 Max.					Pass		
	28P (Signal:0.30A,Power:2.20A)						8.7 Max.					Pass		
	34P (Signal:0.30A,Power:2.20A)						8.7 Max.					Pass		
	42P (Signal:0.29A,Power:2.20A)						8.5 Max.					Pass		
	56P (Signal:0.22A,Power:2.20A)						6.9 Max.					Pass		
62P (Signal:0.19A,Power:2.20A)	5.8 Max.						Pass							

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

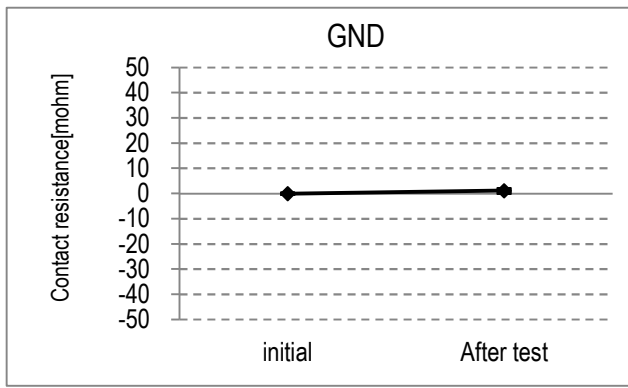
A Group / Durability



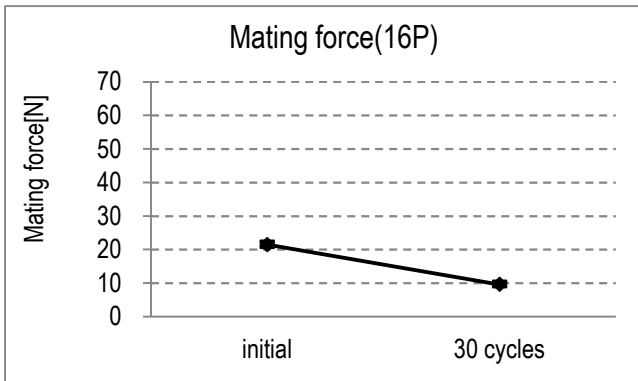
Graph-1. A change of signal contact resistance



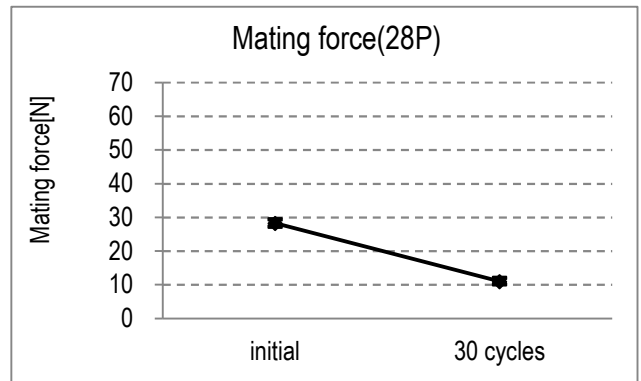
Graph-2. A change of power contact resistance



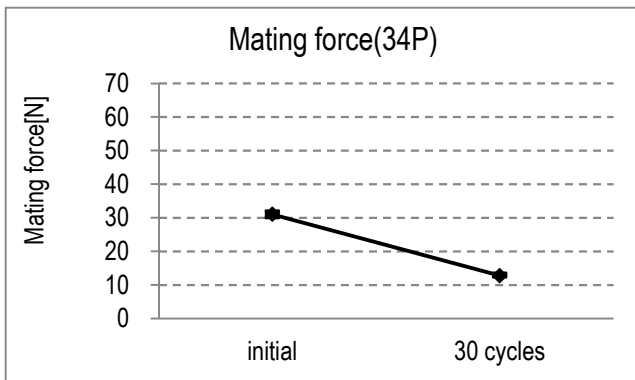
Graph-3. A change of GND contact resistance



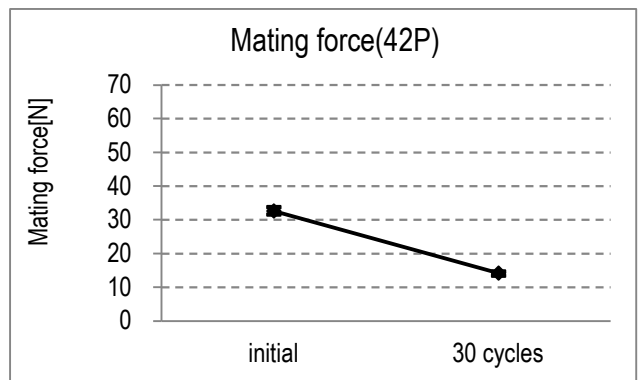
Graph-4-1. A change of mating force 16P



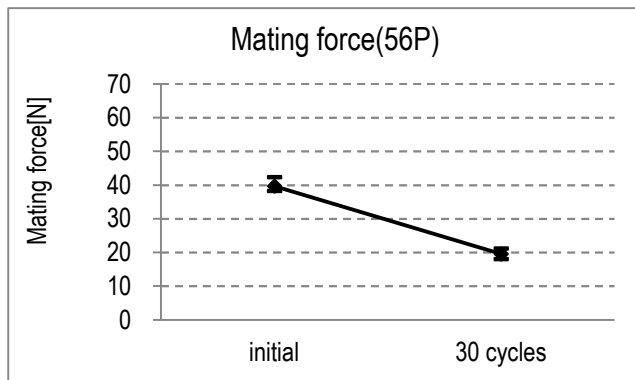
Graph-4-2. A change of mating force 28P



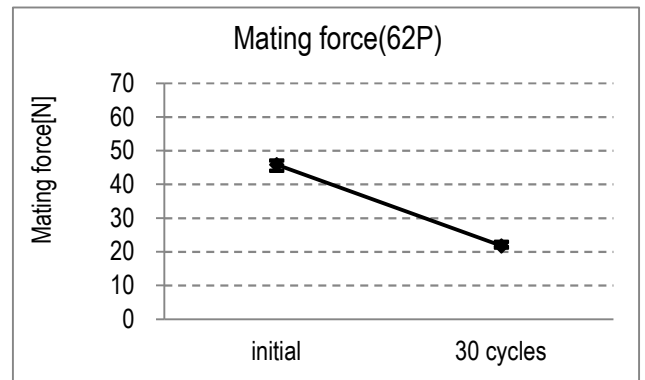
Graph-4-3. A change of mating force 34P



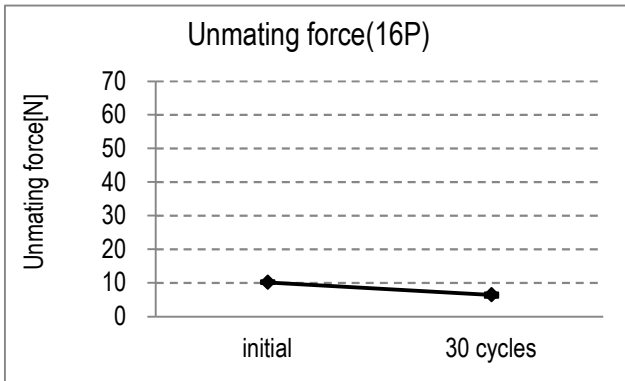
Graph-4-4. A change of mating force 42P



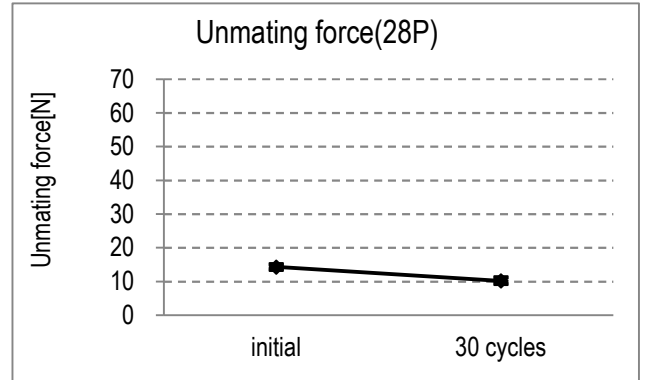
Graph-4-5. A change of mating force 56P



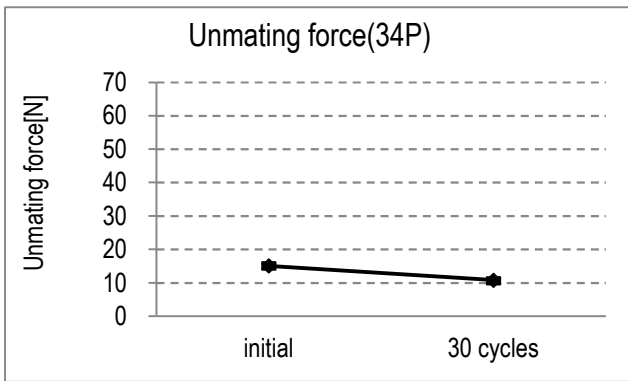
Graph-4-6. A change of mating force 62P



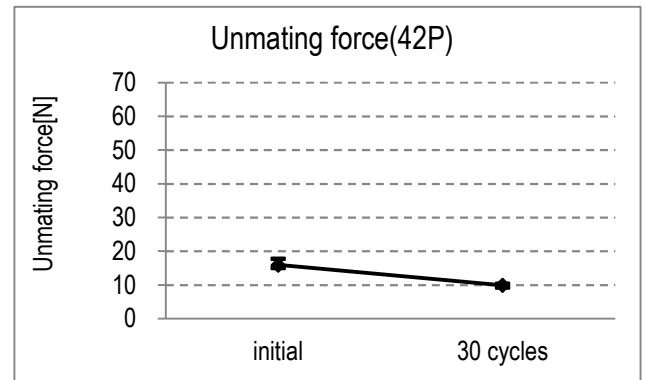
Graph-5-1. A change of unmating force 16P



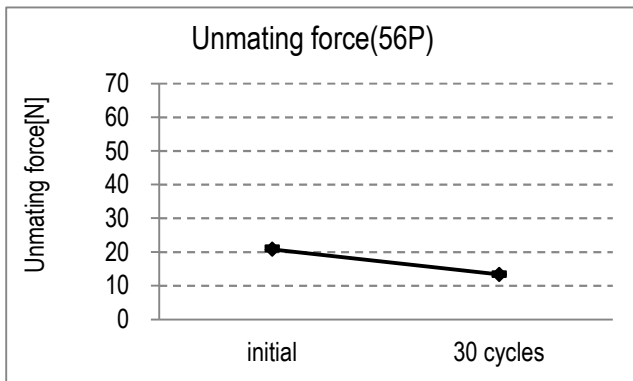
Graph-5-2. A change of unmating force 28P



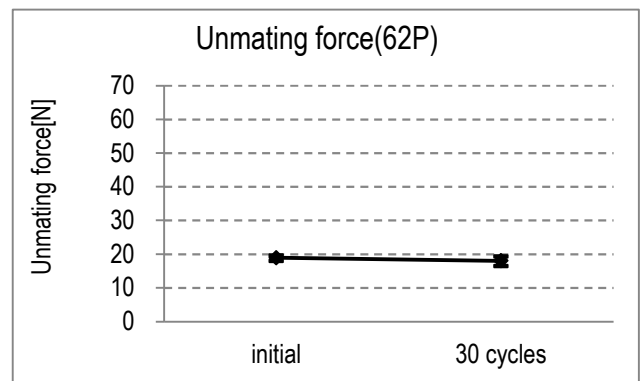
Graph-5-3. A change of unmating force 34P



Graph-5-4. A change of unmating force 42P

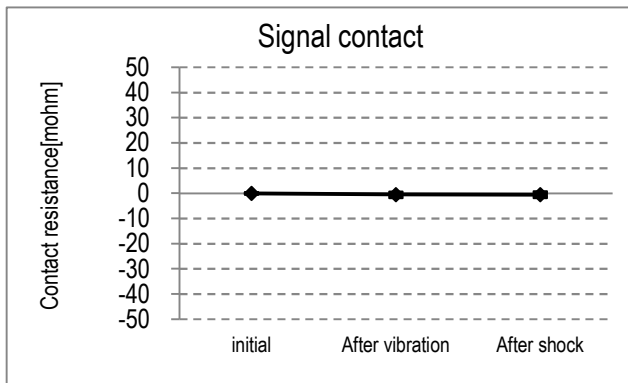


Graph-5-5. A change of unmating force 56P

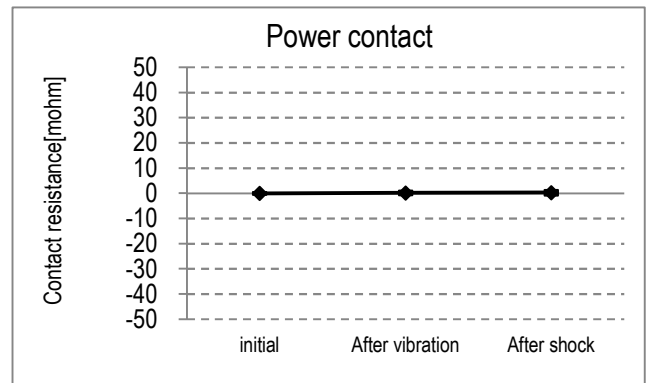


Graph-5-6. A change of unmating force 62P

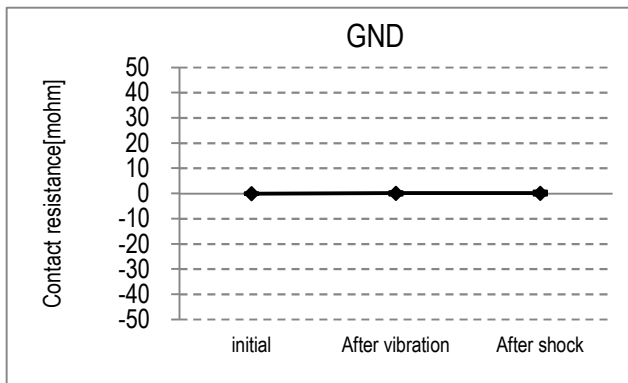
C Group / Vibration → Shock



Graph-6. A change of signal contact resistance

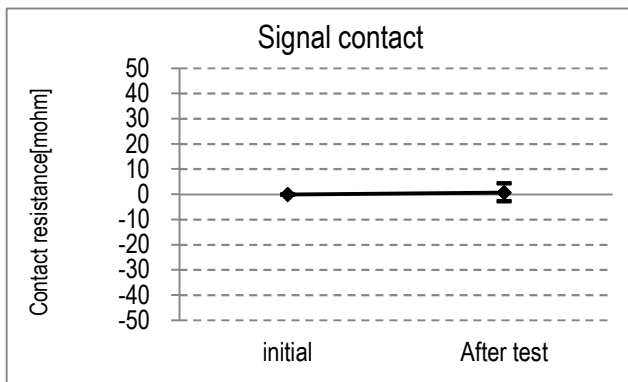


Graph-7. A change of power contact resistance

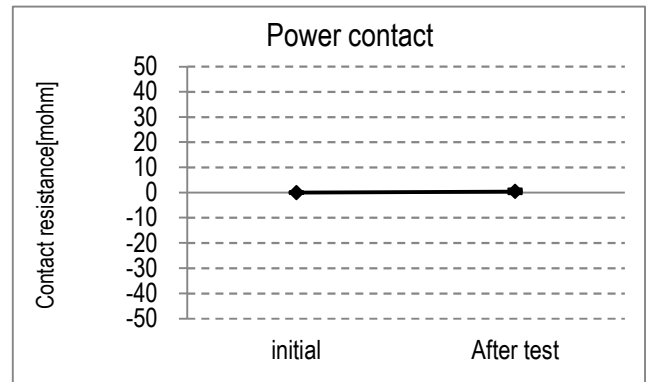


Graph-8. A change of GND contact resistance

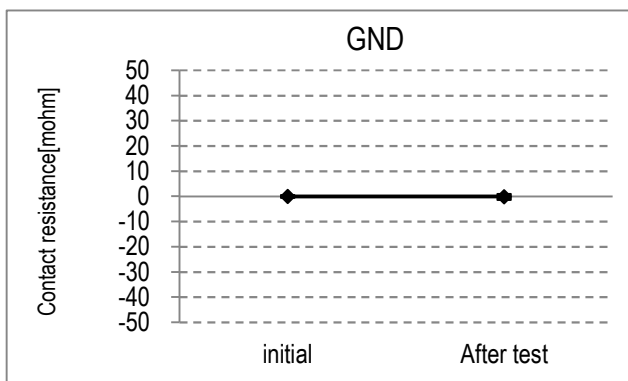
D Group / Thermal Shock



Graph-9. A change of signal contact resistance

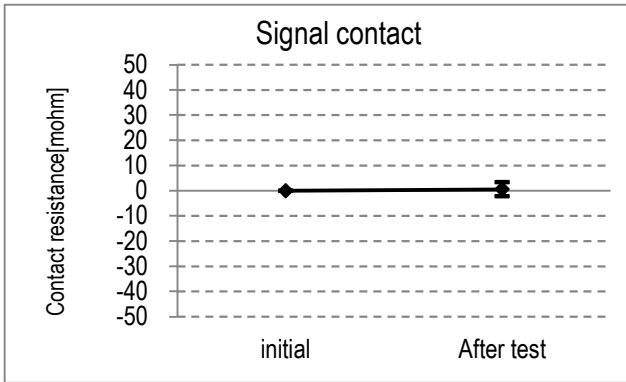


Graph-10. A change of power contact resistance

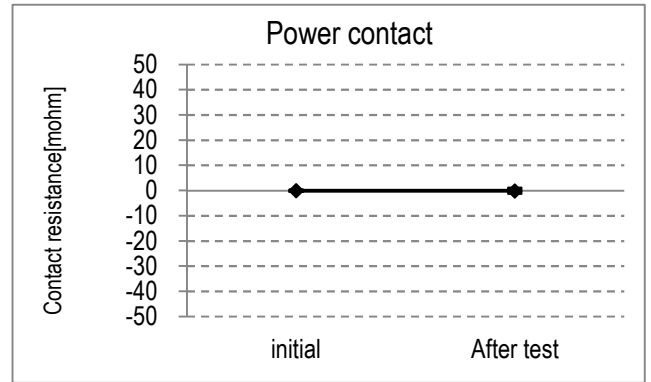


Graph-11. A change of GND contact resistance

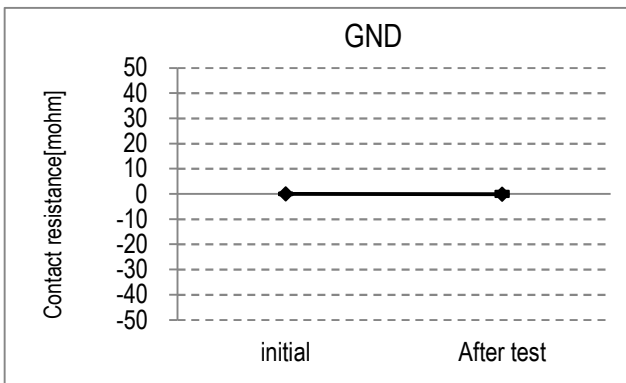
E Group / High Temperature Life



Graph-12. A change of signal contact resistance

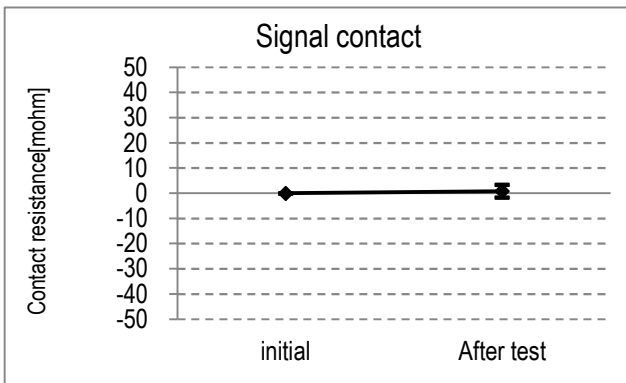


Graph-13. A change of power contact resistance

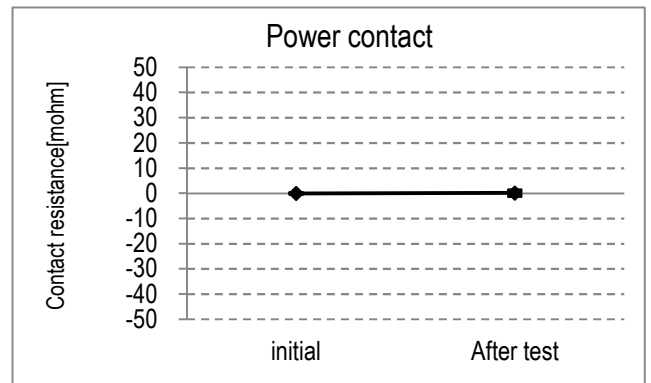


Graph-14. A change of GND contact resistance

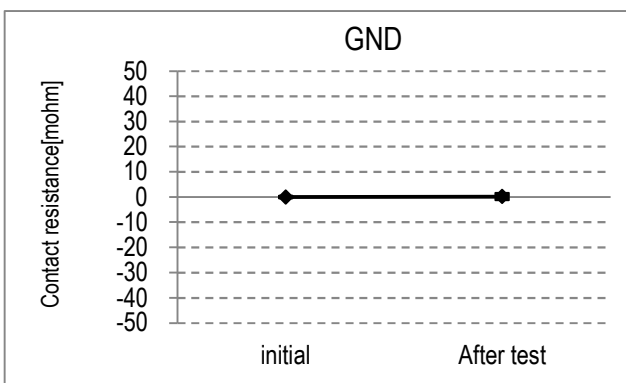
F Group / Humidity (Steady State)



Graph-15. A change of signal contact resistance

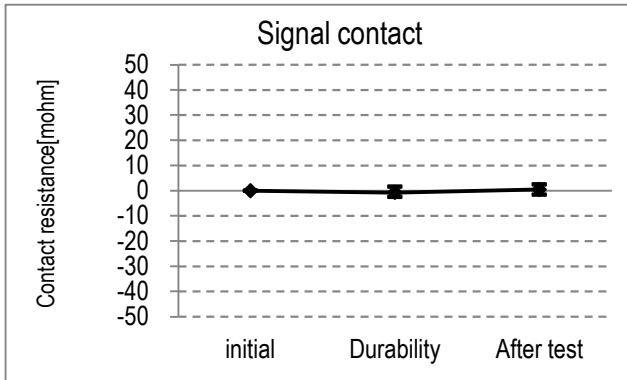


Graph-16. A change of power contact resistance

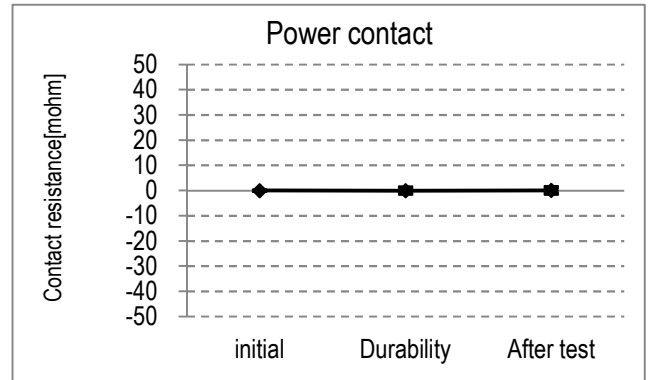


Graph-17. A change of GND contact resistance

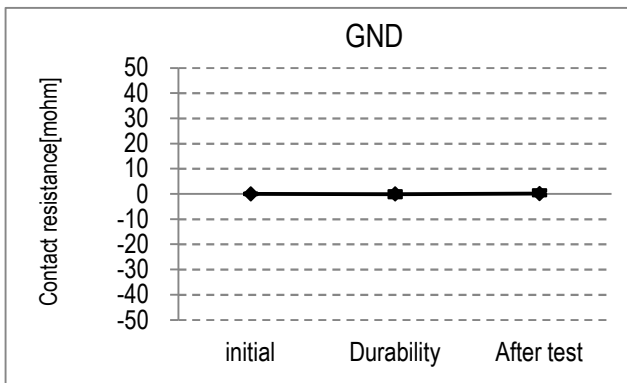
G Group / Humidity (Cycling)



Graph-18. A change of signal contact resistance

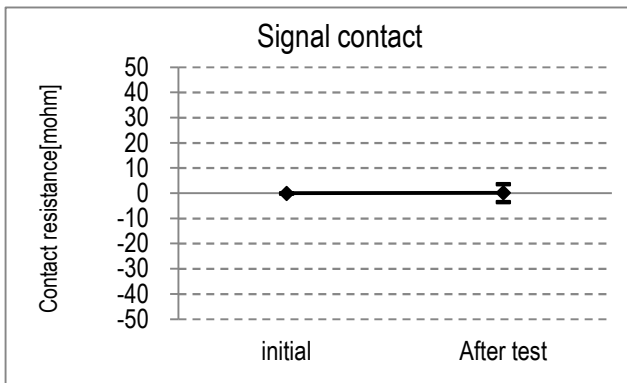


Graph-19. A change of power contact resistance

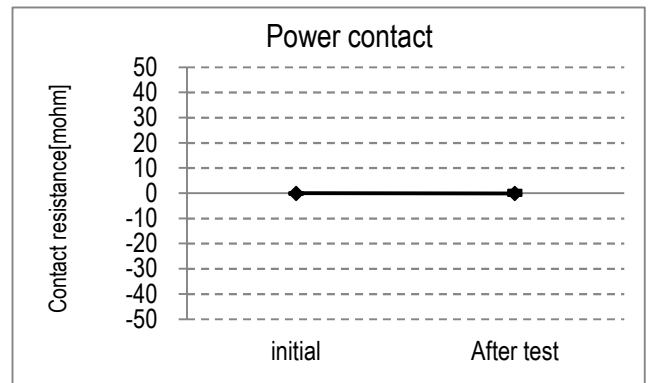


Graph-20. A change of GND contact resistance

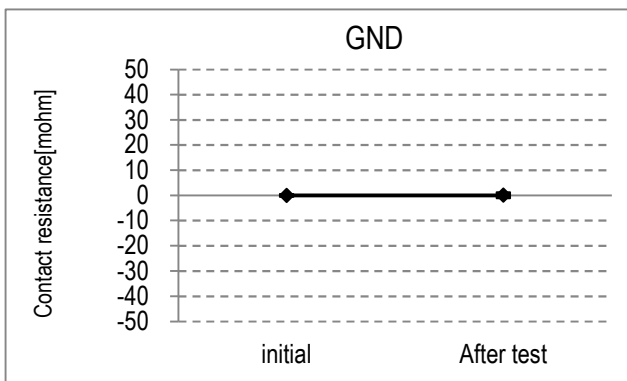
H Group / Salt Water Spray



Graph-21. A change of signal contact resistance

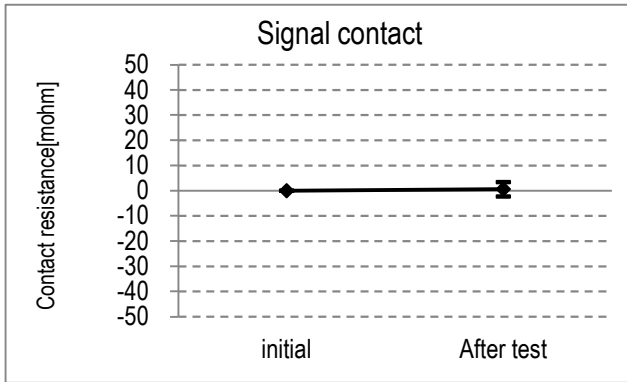


Graph-22. A change of power contact resistance

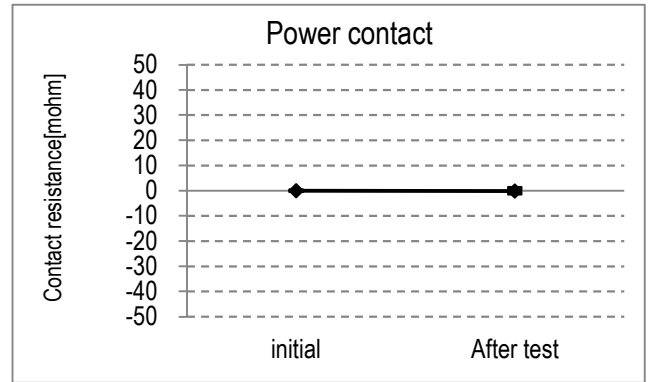


Graph-23. A change of GND contact resistance

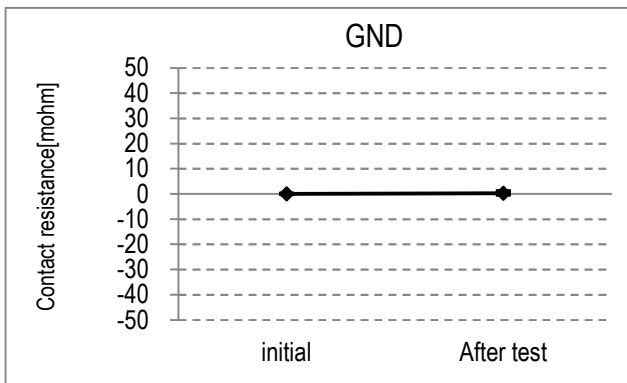
J Group / Gas



Graph-24. A change of signal contact resistance



Graph-25. A change of power contact resistance



Graph-26. A change of GND contact resistance