NOVASTACK® 35-HDP

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

Test Report

Product Specification no. PRS-2187

Rev.	ECN	Date	Prepared by	Checked by	Approved by
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
3	T18145	December 28, 2018	R.Shioya	Y.Baba	T.Hirakawa

1. Purpose

To evaluate the performance of NOVASTACK 35-HDPConnector 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 (10cydes)					
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_2S)									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.	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 AVE.	Data MAX.	Data MIN.	Data S	Data X±3s	Judge.
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	⊿R 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	⊿R 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	⊿R 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	⊿R 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	⊿R 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	⊿R 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 AVE.	Data MAX.	Data MIN.	Data S	Data X±3s	Judge.
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	⊿R 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	⊿R 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	⊿R 20 MAX.				-0.067	0.61	-0.84	0.413	1.172	OK
	Insulation resistance											
		Initial	1000 MIN.	MΩ	5	-	1.77×10^5 Min.					OK
		After test	500 MIN.				1.43×10^5 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	⊿R 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	⊿R 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	⊿R 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	⊿R 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	⊿R 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	⊿R 20 MAX.				-0.186	0.30	-0.91	0.420	1.074	OK
	Insulation resistance											
		Initial	1000 MIN.	MΩ	5	-	1.28×10^5 Min.					OK
		After test	500 MIN.				1.04×10^5 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

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	⊿R 40	MAX.				-0.719	1.60	-2.52	0.786	1.639	OK
		After test						0.493	2.51	-1.63	0.881	3.136	OK
	Power contact	Initial	20	MAX.			20	2.982	3.70	2.33	0.426	4.260	OK
		After 10cycle	⊿R 20	MAX.				-0.041	1.29	-1.08	0.643	1.888	OK
		After test						0.114	1.36	-1.18	0.626	1.992	OK
	GND	Initial	20	MAX.			10	8.164	8.86	7.40	0.399	9.361	OK
		After 10cycle	⊿R 20	MAX.				-0.070	1.04	-1.31	0.709	2.057	OK
		After test						0.134	1.33	-0.46	0.559	1.811	OK
	Insulation resistance											
		Initial	1000	MIN.	MΩ	5	-	1.15×10^5 Min.					OK
		After test	500	MIN.				1.04×10^5 Min.					OK
	Dielectric Withstanding Voltage											
		After test	**		-	5	-	No abnormality					OK
	Appearance											
		After test	*		-	5	-	No abnormality					OK

Group	Contents of measurement		Spec.		Unit	Q'ty	n	Data					Judge.
								AVE.	MAX.	MIN.	S	X±3s	
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	⊿R 40	MAX.				0.201	3.68	-3.49	1.670	5.211	OK
	Power contact	Initial	20	MAX.			20	2.952	3.36	2.46	0.255	3.717	OK
		After test	⊿R 20	MAX.				-0.037	0.98	-0.53	0.382	1.109	OK
	GND	Initial	20	MAX.			10	8.050	8.70	7.55	0.404	9.262	OK
		After test	⊿R 20	MAX.				0.036	0.77	-0.61	0.444	1.368	OK
	Appearance												
		After test	*		-	5	-	No abnormality					OK

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	⊿R 40	MAX.				0.599	3.41	-2.34	1.115	3.944	OK
	Power contact	Initial	20	MAX.			20	2.961	3.84	2.24	0.345	3.996	OK
		After test	⊿R 20	MAX.				-0.124	0.92	-1.06	0.550	1.526	OK
	GND	Initial	20	MAX.			10	8.001	8.52	7.50	0.335	9.006	OK
		After test	⊿R 20	MAX.				0.303	0.96	-0.28	0.418	1.557	OK
	Appearance												
		After test	*		-	5	-	No abnormality					OK

K	Solder ability							
	Solder wetting area							
		After test	95	MIN.	%	10	-	95 MIN.	OK

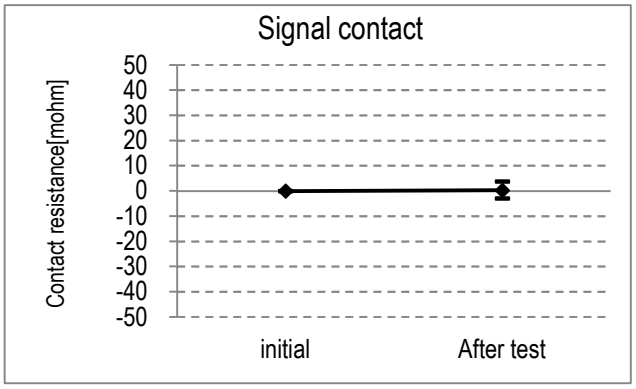
L	Resistance to reflow soldering heat							
	Appearance							
		After test	*		-	10	-	No abnormality	OK

M	Temperature rising							
	28P (Signal:0.30A,Power:2.20A)	⊿T 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

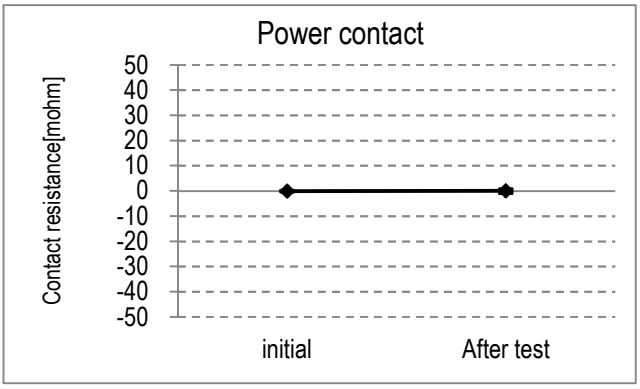
*Appearance Spec.: No abnormality adversely affecting the performance shall occur.

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

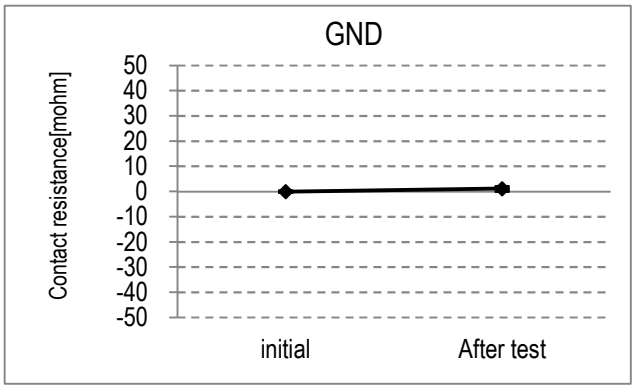
C Group / Durability



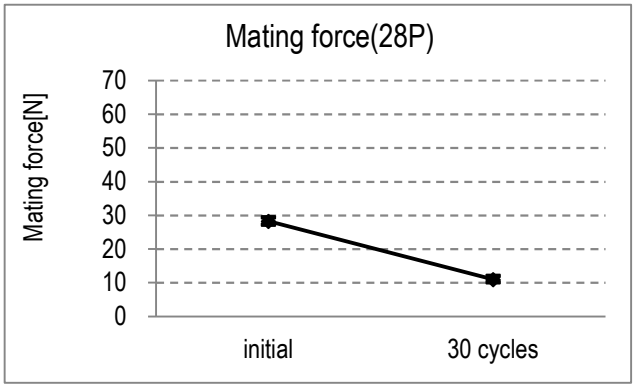
Graph-1. A change of signal contact resistance



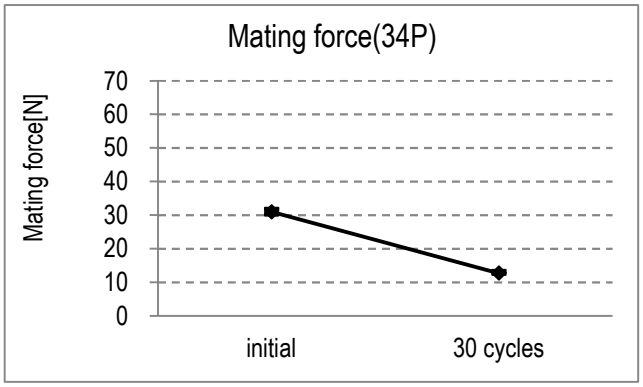
Graph-2. A change of power contact resistance



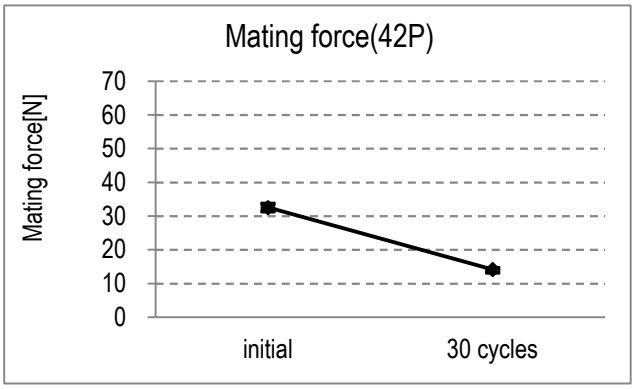
Graph-3. A change of GND contact resistance



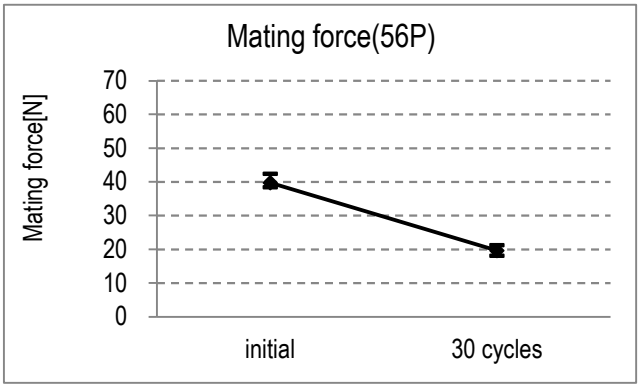
Graph-4-1. A change of mating force 28P



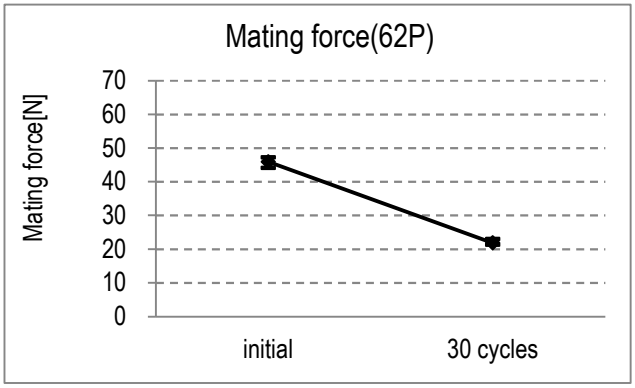
Graph-4-2. A change of mating force 34P



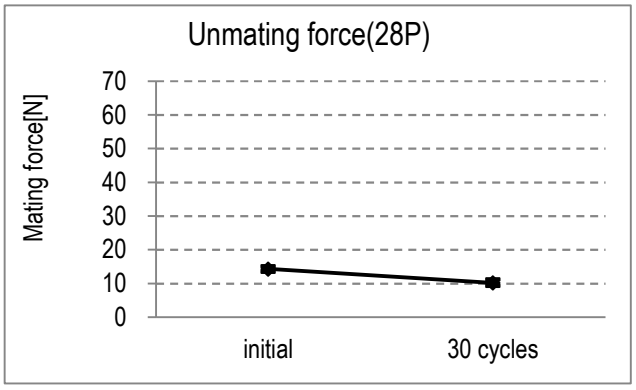
Graph-4-3. A change of mating force 42P



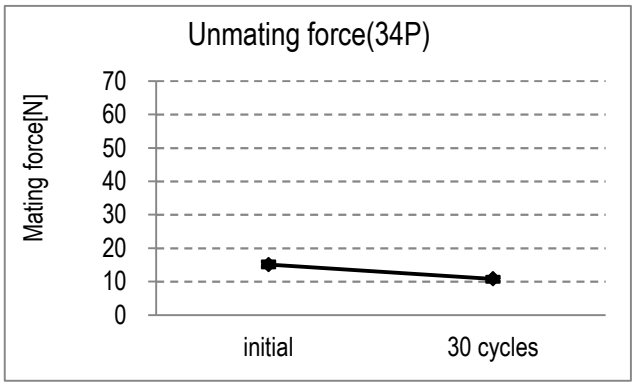
Graph-4-4. A change of mating force 56P



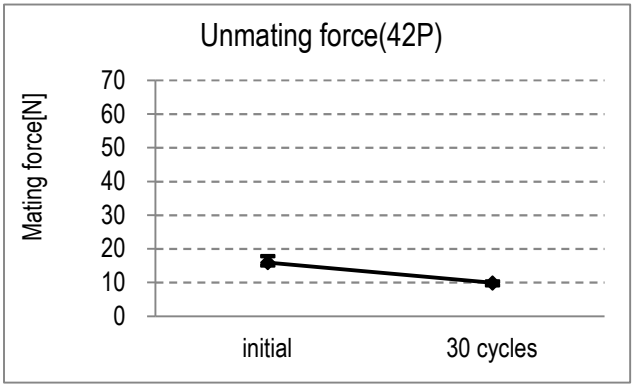
Graph-4-5. A change of mating force 62P



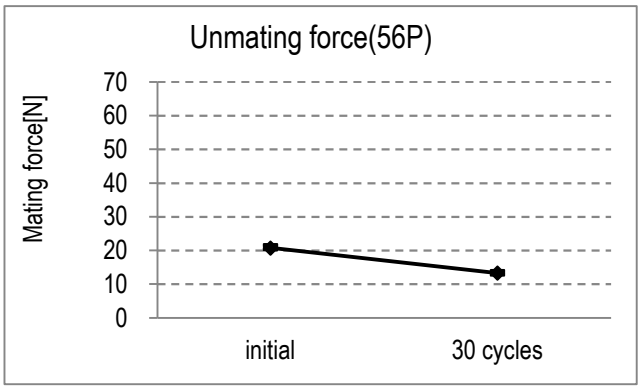
Graph-5-1. A change of unmating force 28P



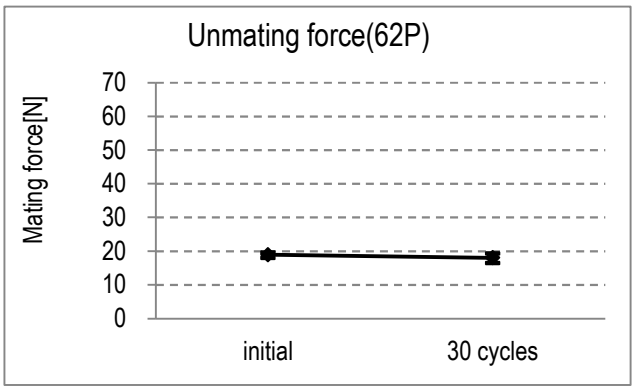
Graph-5-2. A change of unmating force 34P



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

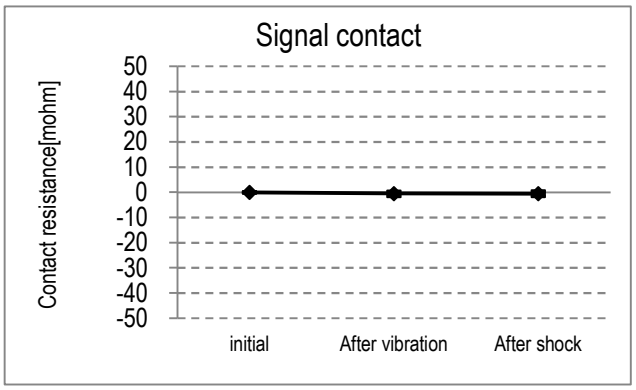


Graph-5-4. A change of unmating force 56P

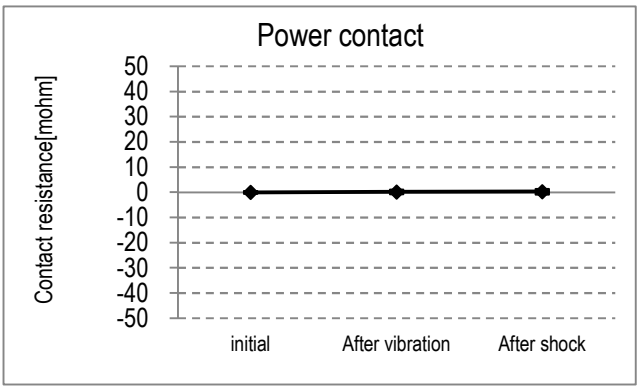


Graph-5-5. A change of unmating force 62P

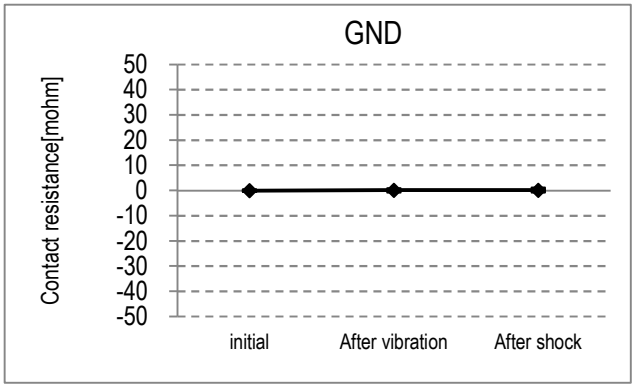
C Group / Vibration → Shock



Graph-6. A change of signal contact resistance

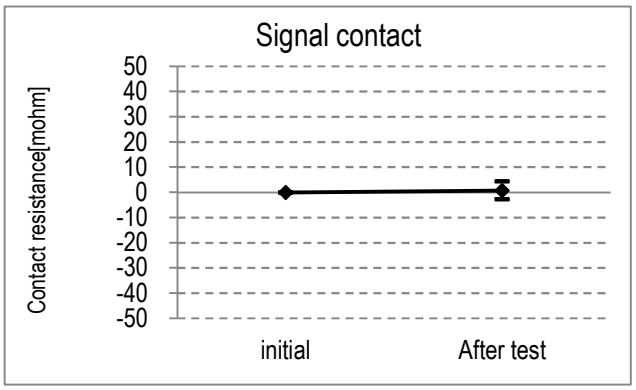


Graph-7. A change of power contact resistance

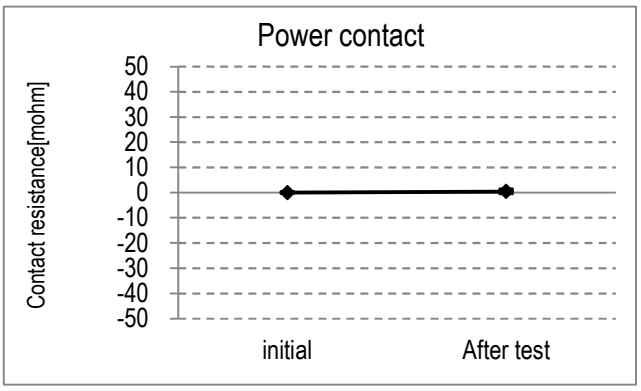


Graph-8. A change of GND contact resistance

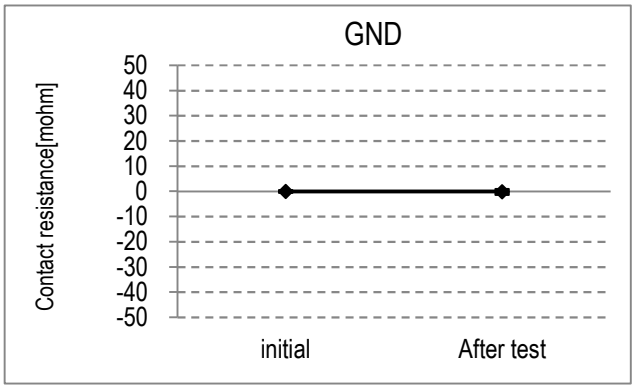
D Group / Thermal Shock



Graph-9. A change of signal contact resistance

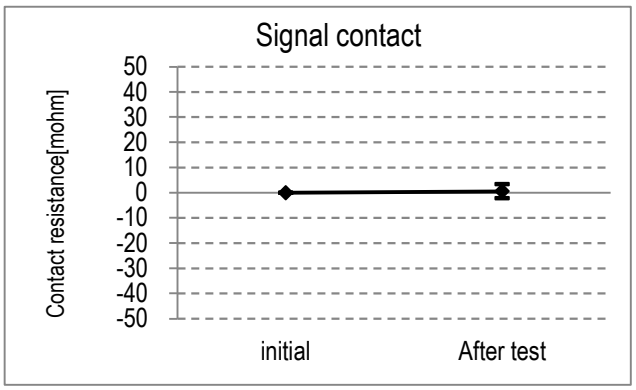


Graph-10. A change of power contact resistance

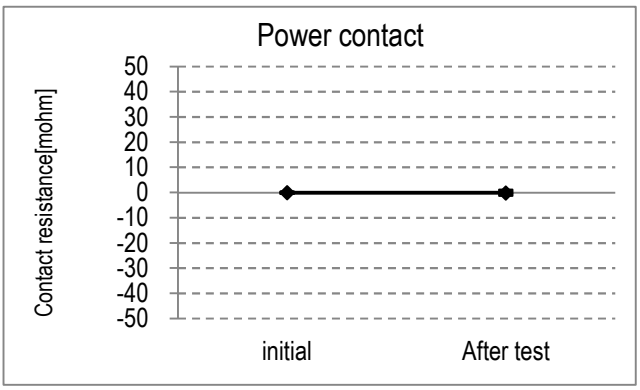


Graph-11. A change of GND contact resistance

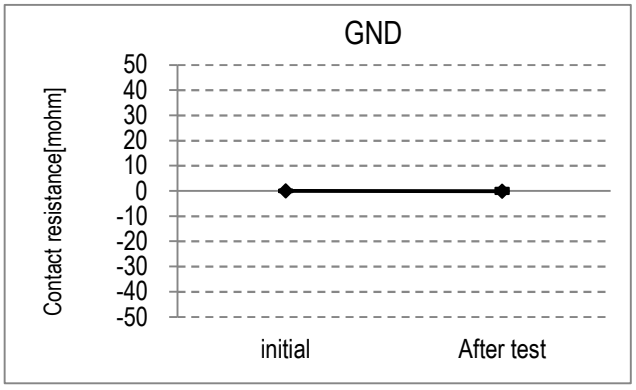
E Group / High Temperature Life



Graph-12. A change of signal contact resistance

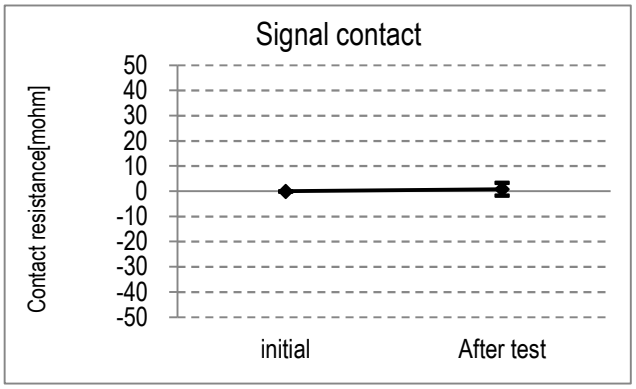


Graph-13. A change of power contact resistance

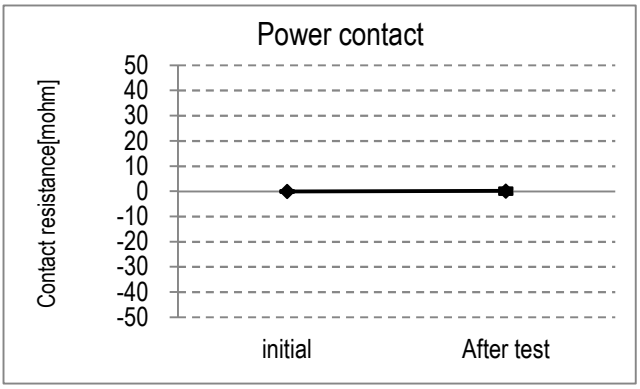


Graph-14. A change of GND contact resistance

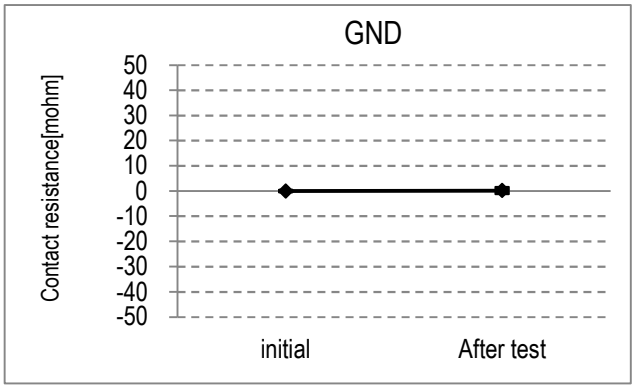
F Group / Humidity (Steady State)



Graph-15. A change of signal contact resistance

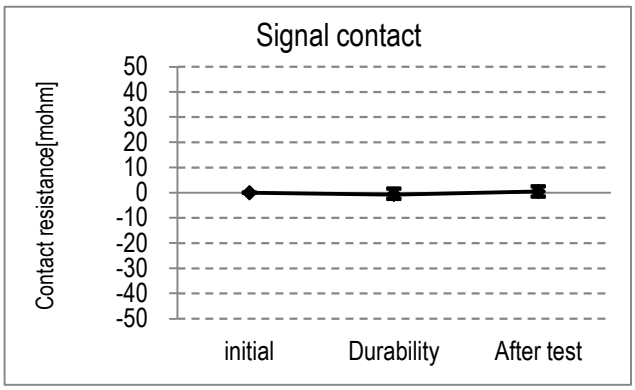


Graph-16. A change of power contact resistance

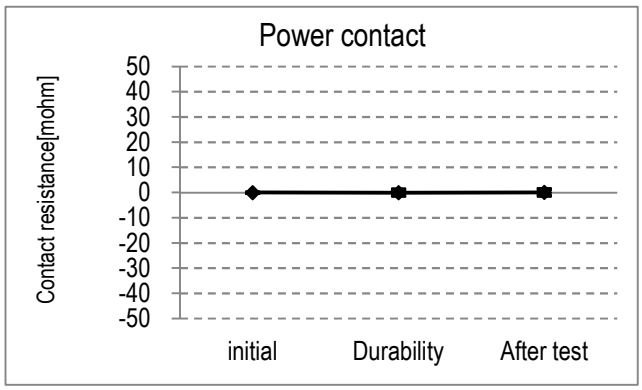


Graph-17. A change of GND contact resistance

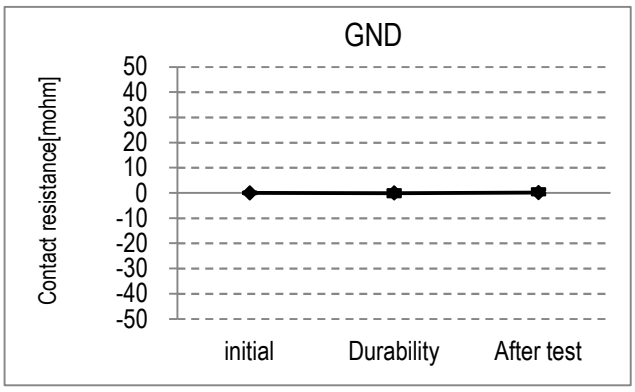
G Group / Humidity (Cycling)



Graph-18. A change of signal contact resistance

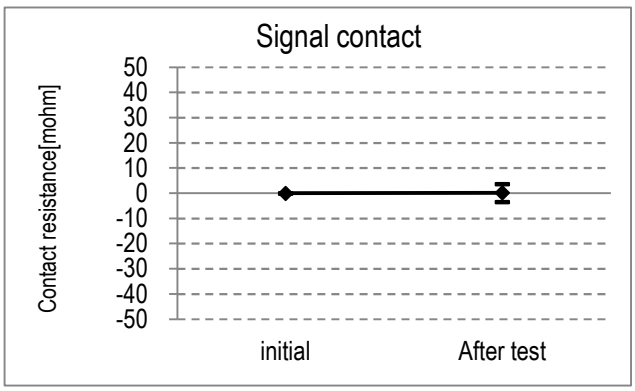


Graph-19. A change of power contact resistance

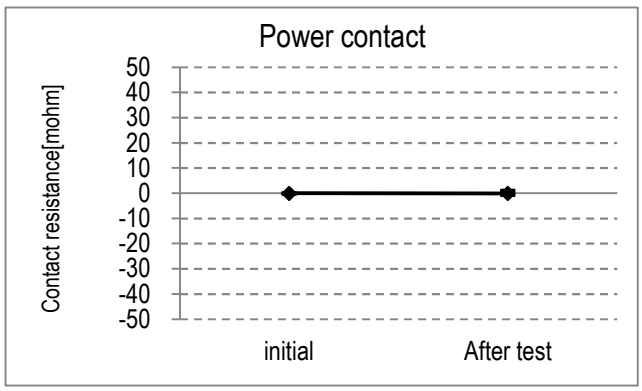


Graph-20. A change of GND contact resistance

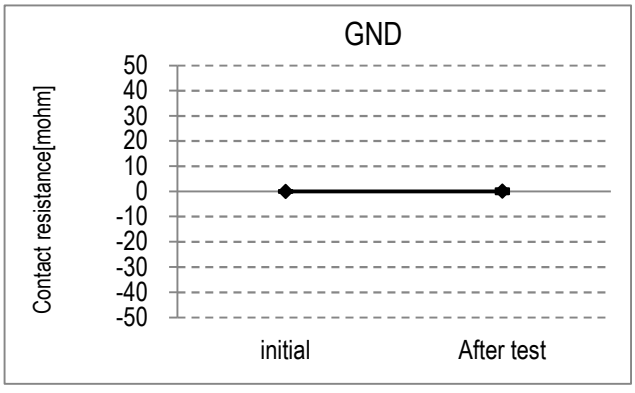
H Group / Salt Water Spray



Graph-21. A change of signal contact resistance

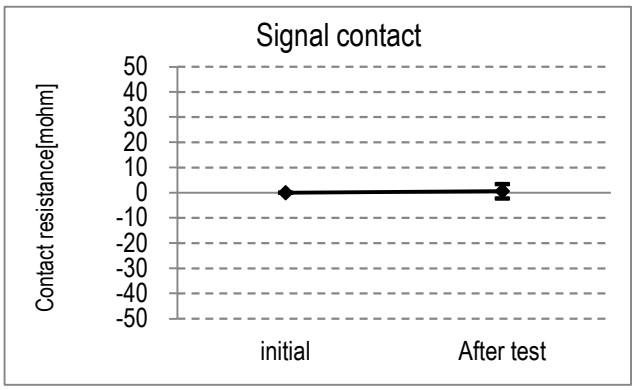


Graph-22. A change of power contact resistance

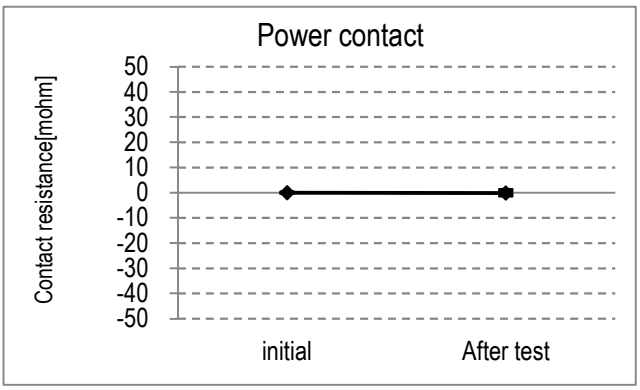


Graph-23. A change of GND contact resistance

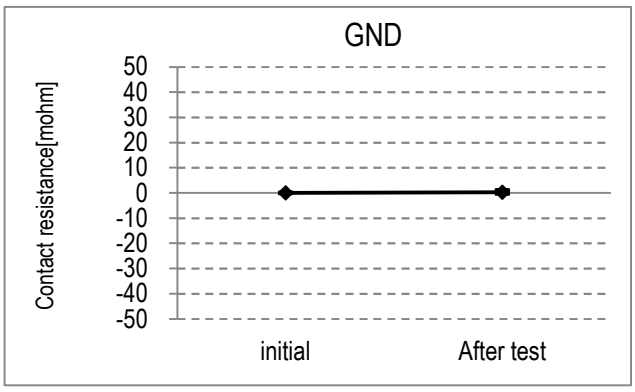
J Group / Gas



Graph-24. A change of signal contact resistance



Graph-25. A change of power contact resistance



Graph-26. A change of GND contact resistance