MINIFLEX® 2-BF LK TYPE Connector

Part No. 20817-120E-01

Test Report

Product Specification no. PRS-2422

2	T22032	February 3, 2022	M.Muro	-	H.Ikari
1	T19127	October 1, 2019	S.Shigekoshi	M.Muro	H.Ikari
0	T18098	September 5, 2018	Y.Miyazaki	T.Masunaga	H.Ikari
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose

To evaluate the performance of MINIFLEX 2-BF LK TYPE Connector in accordance with PRS-2422.

2. Specimen

(1) Connector：MINIFLEX 2-BF LK TYPE Connector (P/N：20817-120E-01)
(2) FPC：Made by Taiyo Industrial Co., Ltd.
Thickness：t=0.2±0.03 (Actual measurement：0.19～0.20mm)

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 14. For the details of the testing conditions and requirements, see PRS-2422.
The “n” in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-2422.

Table 1 Test Sequence and Sample Quantity

Test Item	Group															
	A	B	C	D	E	F	G	H	I	J	K	L	N	P	Q	R
Contact Resistance	2, 7			1, 3, 5	1, 3	1, 3	1, 3	1, 5	1, 5	1, 3	1, 3	1, 3	1, 3			
D. W. Voltage								2, 6	2, 6							
Insulation Resistance								3, 7	3, 7							
Temperature rising																1
Actuator Locking Force	1, 5															
Actuator Unlocking Force	3, 6															
FPC Retention Force		1, 3														
Durability	4	2														
Contact & Lock Retention Force			1													
Vibration				2												
Shock				4												
Fretting corrosion					2											
Thermal Shock						2										
High Temperature Life							2									
High Temperature & High Humidity energizing								2								
High Temperature & High Humidity Life									2							
Cold Temperature Life										2						
H_2S Gas											2					
SO_2 Gas												2				
Salt Water Spray													2			
Solder ability														1		
Soldering Heat Resistance															1	
Specimen Quantity.	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs	5 pcs

※Numbers indicate sequence in which tests are performed.

Table 2-1 Test Result

Test Item	Measurement			Spec.	Set	n	Data					Judgment
							AVG. (X)	MAX.	MIN.	s	X±3s	
A Group Durability	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.419	57.45	40.05	4.164	61.911	Pass
			After 20th	ΔR=40mΩ MAX.			-0.270	3.08	-3.36	1.709	4.857	Pass
		*B	Initial	100mΩ MAX.	5	600	41.238	55.21	30.21	6.649	61.185	Pass
			After 20th	ΔR=40mΩ MAX.			-0.160	1.86	-3.23	1.156	3.308	Pass
	Act Locking Force (N)	Initial		24.42N MAX.	5	5	12.638	12.95	12.41	0.187	13.199	Pass
		20th cycles					10.886	11.03	10.69	0.128	11.270	Pass
	Act Unlocking Force (N)	Initial		1.708N MIN.	5	5	5.126	5.31	4.99	0.115	4.781	Pass
		20th cycles					4.546	4.65	4.43	0.079	4.309	Pass
B Group FPC Retention Force (N)	Initial			25N MIN.	5	5	39.427	39.74	39.02	0.301	38.524	Pass
	After 20th						38.483	39.01	37.69	0.571	36.770	Pass
C Group Retention Force (N)	Contact-A			0.1N MIN.	5	25	0.194	0.21	0.18	0.011	0.161	Pass
	Contact-B				5	25	0.275	0.34	0.23	0.032	0.179	Pass
	Lock				5	10	0.298	0.31	0.28	0.009	0.271	Pass
D Group Vibration Shock	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.229	56.71	40.60	3.418	59.483	Pass
			After Vibration	ΔR=40mΩ MAX.			-0.164	3.05	-3.38	1.720	4.996	Pass
			After Shock	ΔR=40mΩ MAX.			-1.083	3.95	-7.11	2.372	6.033	Pass
		*B	Initial	100mΩ MAX.	5	600	40.227	53.87	29.04	6.686	60.285	Pass
			After Vibration	ΔR=40mΩ MAX.			-0.198	1.87	-3.23	1.179	3.339	Pass
			After Shock	ΔR=40mΩ MAX.			-0.325	3.02	-4.34	1.359	3.752	Pass
	Discontinuity	During Vibration		1μsec. MAX.	5	5	No Discontinuity					Pass
		During Shock					No Discontinuity					Pass
	Appearance	After Vibration		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
		After Shock					No Abnormality					Pass
E Group Fretting Corrosion	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.246	56.91	40.03	4.156	61.714	Pass
			After Test	ΔR=40mΩ MAX.			-1.702	4.84	-4.93	2.713	6.437	Pass
		*B	Initial	100mΩ MAX.	5	600	42.279	55.93	30.99	6.383	61.428	Pass
			After Test	ΔR=40mΩ MAX.			-0.343	3.42	-3.47	1.612	4.493	Pass
	Discontinuity	In Test		1μsec. MAX.	5	5	No Discontinuity					Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass

※T：Top Contact, B：Bottom Contact

Table 2-2 Test Result

Test Item	Measurement			Spec.	Set	n	Data					Judgment
							AVG. (X)	MAX.	MIN.	s	X±3s	
F Group Thermal Shock	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	50.614	58.82	40.35	4.121	62.977	Pass
			After Test	ΔR=40mΩ MAX.			-0.217	3.82	-4.50	2.206	6.401	Pass
		*B	Initial	100mΩ MAX.	5	600	41.680	54.57	30.56	6.372	60.796	Pass
			After Test	ΔR=40mΩ MAX.			-0.715	2.10	-3.66	1.447	3.626	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
G Group High Temp. Life	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.822	56.58	41.14	3.414	60.064	Pass
			After Test	ΔR=40mΩ MAX.			-0.391	2.98	-3.30	1.388	3.773	Pass
		*B	Initial	100mΩ MAX.	5	600	41.719	54.89	31.27	6.096	60.007	Pass
			After Test	ΔR=40mΩ MAX.			-0.470	2.23	-3.78	1.287	3.391	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
H Group High Temp. & High Hum. energizing	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.947	56.41	40.60	3.132	59.343	Pass
			After Test	ΔR=40mΩ MAX.			-0.330	2.97	-3.24	1.429	3.957	Pass
		*B	Initial	100mΩ MAX.	5	600	41.474	54.82	31.16	6.357	60.545	Pass
			After Test	ΔR=40mΩ MAX.			-0.457	2.22	-3.77	1.315	3.488	Pass
	D. W. Voltage	*T	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	300	No Abnormality					Pass
			After Test				No Abnormality					Pass
		*B	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	300	No Abnormality					Pass
			After Test				No Abnormality					Pass
	Insulation Resistance (MΩ)	*T	Initial	100MΩ MIN.	5	300	MIN. 3.5×10^4 MΩ					Pass
			After Test				MIN. 6.1×10^4 MΩ					Pass
		*B	Initial	100MΩ MIN.	5	300	MIN. 2.5×10^4 MΩ					Pass
			After Test				MIN. 4.3×10^3 MΩ					Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass

※T：Top Contact, B：Bottom Contact

Table 2-3 Test Result

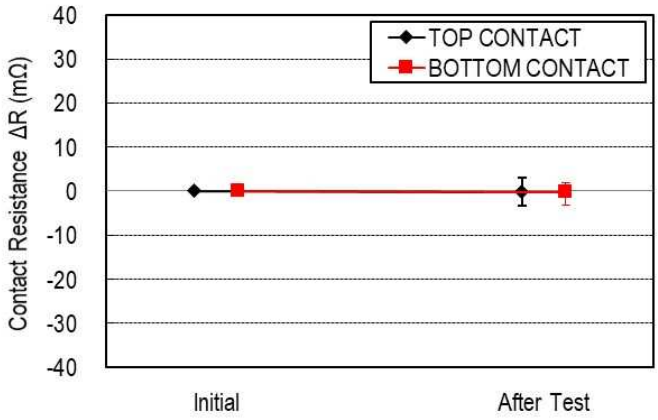
Test Item	Measurement			Spec.	Set	n	Data					Judgment
							AVG. (X)	MAX.	MIN.	s	X±3s	
J Group High Temp. & High Hum. Life	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.421	57.54	38.58	4.139	61.838	Pass
			After Test	ΔR=40mΩ MAX.			-0.331	3.63	-3.62	1.452	4.025	Pass
		*B	Initial	100mΩ MAX.			41.504	55.60	31.30	6.382	60.650	Pass
			After Test	ΔR=40mΩ MAX.			-0.127	2.13	-2.44	0.949	2.720	Pass
	D. W. Voltage	*T	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	300	No Abnormality					Pass
			After Test				No Abnormality					Pass
		*B	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	300	No Abnormality					Pass
			After Test				No Abnormality					Pass
	Insulation Resistance (MΩ)	*T	Initial	100MΩ MIN.	5	300	MIN. 6.4×10^4 MΩ					Pass
			After Test				MIN. 1.2×10^4 MΩ					Pass
		*B	Initial	100MΩ MIN.	5	300	MIN. 1.2×10^4 MΩ					Pass
			After Test				MIN. 3.5×10^3 MΩ					Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
K Group Cold Temp. Life	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.404	58.28	40.12	4.132	61.800	Pass
			After Test	ΔR=40mΩ MAX.			-0.367	2.64	-3.49	1.472	4.049	Pass
		*B	Initial	100mΩ MAX.			41.456	54.26	31.07	6.393	60.635	Pass
			After Test	ΔR=40mΩ MAX.			0.139	2.58	-1.94	1.032	3.235	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
L Group Gas (H_2S)	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.434	58.11	40.08	4.182	61.980	Pass
			After Test	ΔR=40mΩ MAX.			-0.523	2.28	-3.99	1.545	4.112	Pass
		*B	Initial	100mΩ MAX.			41.495	55.74	31.69	6.360	60.575	Pass
			After Test	ΔR=40mΩ MAX.			0.018	3.31	-2.79	1.144	3.450	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
M Group Gas (SO_2)	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.446	57.38	40.22	4.092	61.722	Pass
			After Test	ΔR=40mΩ MAX.			-0.421	2.66	-3.98	1.274	3.401	Pass
		*B	Initial	100mΩ MAX.			41.492	55.77	30.89	6.392	60.668	Pass
			After Test	ΔR=40mΩ MAX.			-0.233	2.43	-2.34	0.944	2.599	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass

※T：Top Contact, B：Bottom Contact

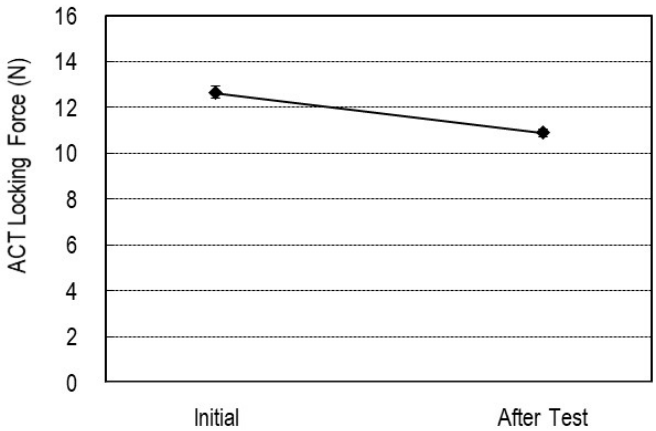
Table 2-4 Test Result

Test Item	Measurement			Spec.	Set	n	Data					Judgment
							AVG. (X)	MAX.	MIN.	s	X±3s	
N Group Salt Water Spray	Contact Resistance (mΩ)	*T	Initial	100mΩ MAX.	5	600	49.490	57.84	40.31	4.120	61.850	Pass
			After Test	ΔR=40mΩ MAX.			0.451	3.19	-2.30	1.132	3.847	Pass
		*B	Initial	100mΩ MAX.			41.524	54.32	31.25	6.412	60.760	Pass
			After Test	ΔR=40mΩ MAX.			0.192	1.45	-1.11	0.653	2.151	Pass
	Appearance	After Test		No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					Pass
P Group Solderability	Zerox Time (sec.)	Contact		3sec. MAX	5	5	MAX. 0.1sec.					Pass
	Appearance	Contact		Wetness 95% MIN.	5	5	95% MIN. was wet.					Pass
Q Group Soldering Heat Resistance	Reflow twice			No Abnormality	5	5	No Abnormality					Pass
	Soldering iron						No Abnormality					Pass
R Group Temp. rising	0.2A/Contact			ΔT=30℃ MAX.	5	5	MAX. 27.8℃					Pass

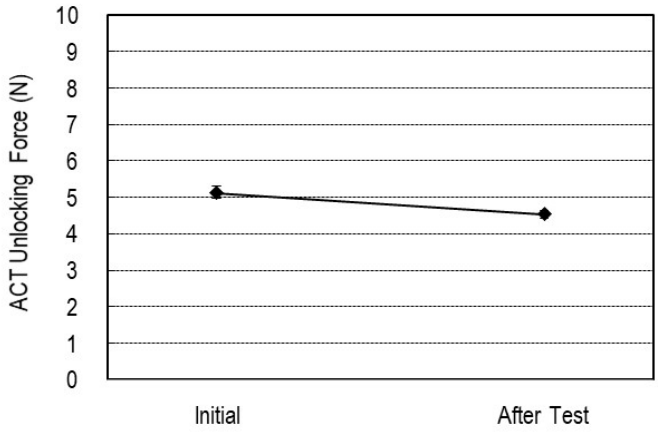
※T：Top Contact, B：Bottom Contact



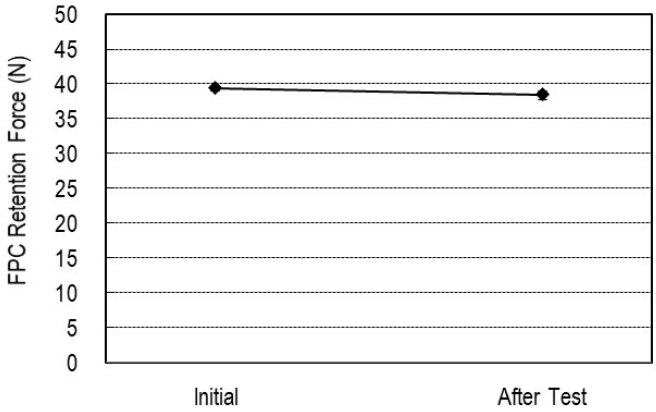
Graph. 1 A change of Contact Resistance
A group : Durability



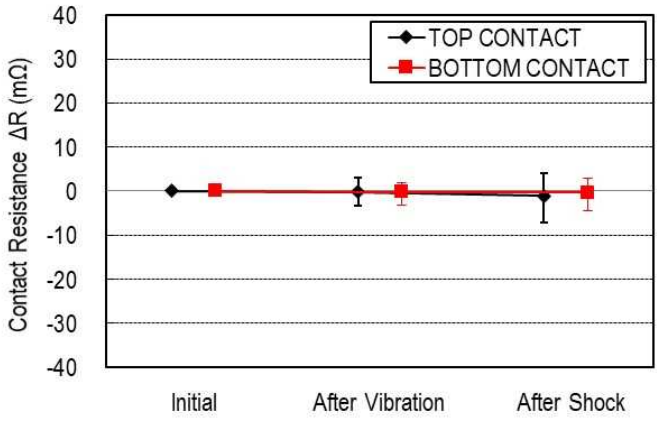
Graph. 2 A change of ACT Locking Force
A group : Durability



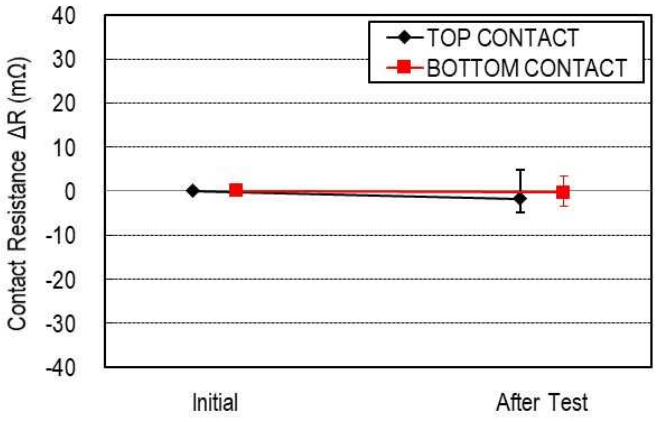
Graph. 3 A change of ACT Unlocking Force
A group : Durability



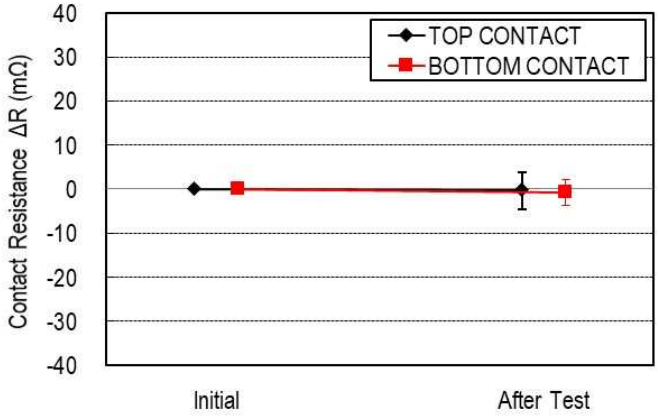
Graph. 4 A change of FPC Retention Force
B group : FPC Retention Force



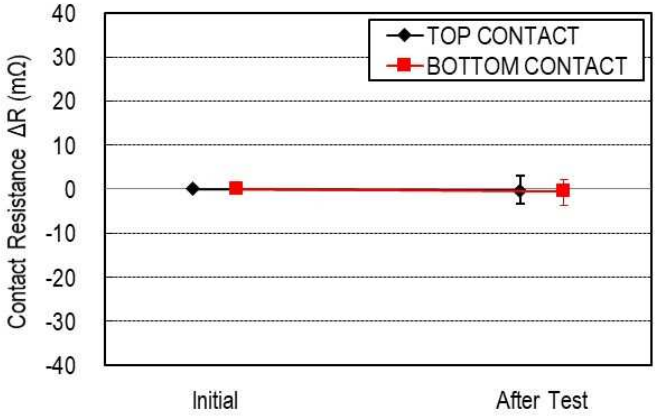
Graph. 5 A change of Contact Resistance
D group : Vibration / Shock



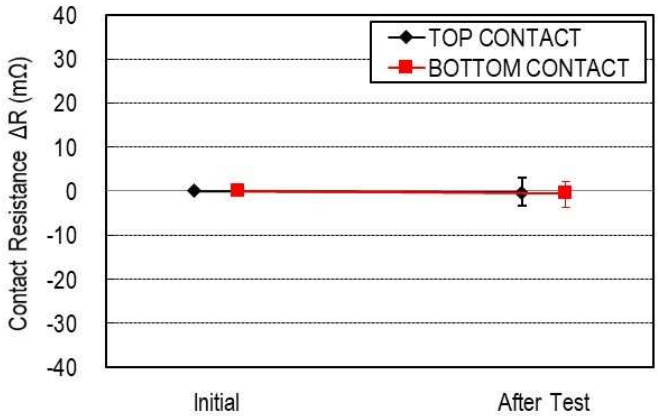
Graph. 6 A change of Contact Resistance
E group : Fretting Corrosion



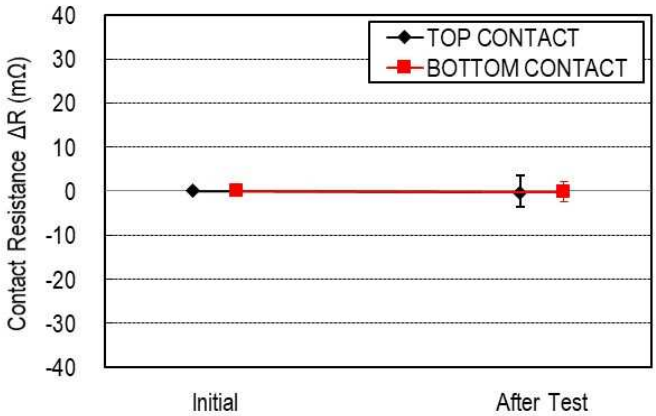
Graph. 7 A change of Contact Resistance
F group : Thermal Shock



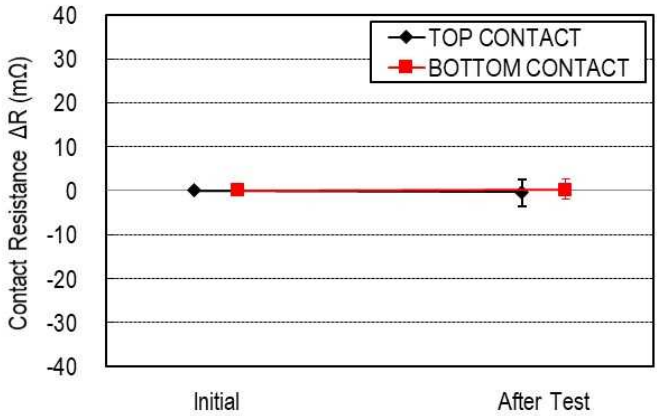
Graph. 8 A change of Contact Resistance
G group : High Temp. Life



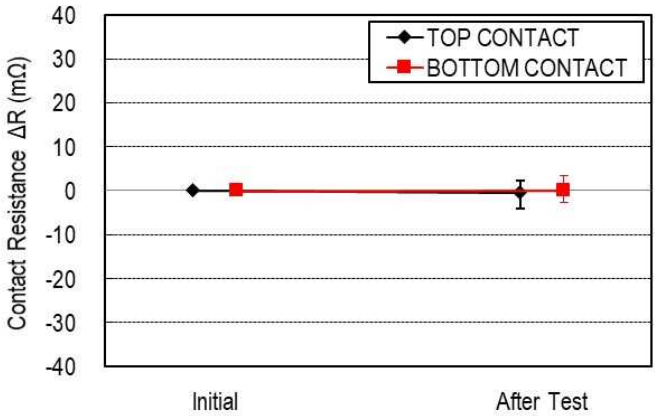
Graph. 9 A change of Contact Resistance
H group : High Temp. & High Hum. Energizing



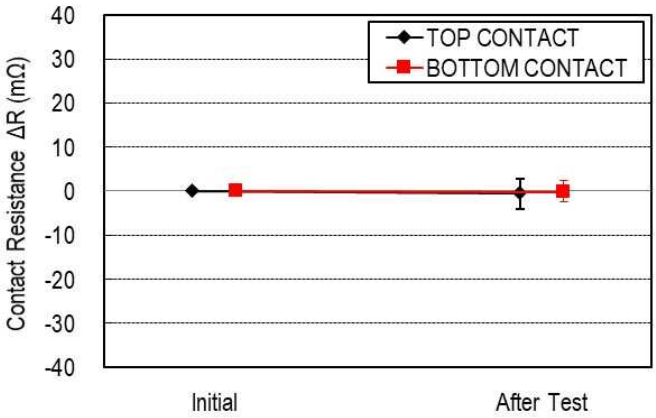
Graph. 10 A change of Contact Resistance
J group : High Temp. & High Hum. Life



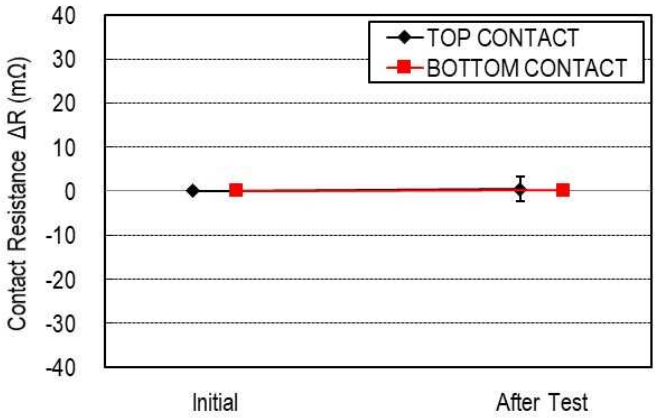
Graph. 11 A change of Contact Resistance
K group : Cold Temp. Life



Graph. 12 A change of Contact Resistance
L group : Gas (H_2S)



Graph. 13 A change of Contact Resistance
M group : Gas (SO_2)



Graph. 14 A change of Contact Resistance
N group : Salt Water Spray