

MINIFLEX® 3-BFN L-HD TYPE

Part No. 20982-0**E-01

Test Report

Product Specification no. PRS-2650

0	T21027	April 19, 2021	M.Muro	-	H.Ikari
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose :

To evaluate the performance of MINIFLEX 3-BFN Connector L-HD TYPE in accordance PRS-2650.

2. Specimen :

(1) Connector : MINIFLEX 3-BFN Conn. L-HD TYPE・・・ P/N 20982-0**E-01

(2) FPC : Made by Taiyo Industrial Co.,Ltd.

FPC Thickness : $t=0.20\pm0.03$ (Actual measurement : 0.19～0.20 mm)

3. Test Sequence :

All the evaluation was performed in accordance with Table.1 Test Sequence.

4. Result :

See Table 2-1～2-5. Graph 1～14. For the detail of testing conditions and requirements, see PRS-2650.

5. Conclusion :

All the specimen met the requirements of PRS-2650.

Table1 Test Sequence

Test Items	Group															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
C/T 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							
Temp. rising																1
Act Locking Force	1,5															
Act Un-locking Force	3,6															
FPC Retention Force		1,3														
Durability	4	2														
C/T Retention Force			1													
H/D Retention Force			2													
Vibration				2												
Shock				4												
Fretting corrosion					2											
Thermal Shock						2										
High Temp. Life							2									
High Temp & High Hum energizing								4								
High Temp & High Hum Life									4							
Cold Temp. Life										2						
Gas (H ₂ S)											2					
Gas (SO ₂)												2				
Salt Water Spray													2			
Solderability														1		
Soldering Heat Resist.															1	

Table2-1 Test Result

Test Item	Measurement			Spec.	Sample q'ty	n	Data					Judge
							AVE.(X)	MAX.	MIN.	s	X±3s	
A Group Durability	Contact Resistance (mΩ)	※U	Initial	60m Ω MAX.	5	255	23.910	29.94	19.04	3.617	34.761	○
			After 20th	Δ R=40m Ω MAX.			0.490	4.73	-3.54	1.605	5.305	○
		※L	Initial	60m Ω MAX.	5	255	15.060	18.94	11.06	2.384	22.212	○
			After 20th	Δ R=40m Ω MAX.			1.126	4.56	-1.65	1.356	5.194	○
	Act Locking Force (N)	51P	Initial	10.71N MAX. (0.21N/Pos. ×51P)	5	5	5.172	5.47	5.02	0.184	5.724	○
			20th cycles				3.894	4.05	3.85	0.087	4.155	○
	Act Un-locking Force (N)	51P	Initial	0.714N MIN. (0.014N/Pos. ×51P)	5	5	3.268	3.46	3.16	0.124	2.896	○
			20th cycles				2.832	2.99	2.70	0.117	2.481	○
B Group	FPC Retention Force (N)	51P	Initial	6.63N MIN. (0.13N /Pos.×51P)	5	5	15.420	15.85	15.16	0.263	14.631	○
			20th cycles	5.10N MIN. (0.10N /Pos.×51P)			13.370	13.93	13.07	0.383	12.221	○
C Group	C/T			0.3N MIN.	5	30	1.213	1.33	1.06	0.079	0.976	○
Retention Force (N)	H/D			0.3N MIN.	5	10	0.514	0.60	0.44	0.055	0.349	○

※U : Upper Contact L : Lower Contact

Table2-2 Test Result

Test Item	Measurement			Spec.	Sample q'ty	n	Data					Judge
							AVE.(X)	MAX.	MIN.	s	X±3s	
D Group Vibration Shock	Contact Resistance (m Ω)	※U	Initial	60m Ω MAX.	5	255	23.765	29.90	19.05	3.354	33.827	○
			After Vibration	Δ R=40m Ω MAX.			0.653	4.55	-3.20	1.720	5.813	○
			After Shock				0.587	4.69	-3.32	1.812	6.023	○
		※L	Initial	60m Ω MAX.	5	255	14.984	18.83	11.13	2.245	21.719	○
			After Vibration	Δ R=40m Ω MAX.			1.141	3.89	-1.83	1.304	5.053	○
			After Shock				1.293	4.45	-1.61	1.410	5.523	○
	Discontinuity		In Vibration	1 μ sec. MAX.	10	10	No Discontinuity					○
			In Shock				No Discontinuity					○
	Appearance		After Vibration	No Abnormality	10	10	No Abnormality					○
			After Shock				No Abnormality					○
E Group Fretting corrosion	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.856	29.92	19.13	3.467	34.257	○
			After Test	Δ R=40m Ω MAX.			0.513	4.38	-3.45	1.722	5.679	○
		L	Initial	60m Ω MAX.	5	255	14.926	18.71	11.25	2.174	21.448	○
			After Test	Δ R=40m Ω MAX.			1.271	4.42	-1.81	1.357	5.342	○
	Discontinuity		In Test	1 μ sec. MAX.	10	10	No Discontinuity					○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○
F Group Thermal Shock	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.886	29.78	19.17	3.418	34.140	○
			After Test	Δ R=40m Ω MAX.			0.566	4.27	-3.38	1.647	5.507	○
		L	Initial	60m Ω MAX.	5	255	14.904	18.92	11.14	2.297	21.795	○
			After Test	Δ R=40m Ω MAX.			1.257	4.66	-1.73	1.383	5.406	○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○

※U : Upper Contact L : Lower Contact

Table2-3 Test Result

Test Item	Measurement			Spec.	Sample q'ty	n	Data					Judge
G Group High Temp. Life	Contact Resistance (m Ω)	※U	Initial	60m Ω MAX.	5	255	23.809	29.96	19.07	3.466	34.207	○
			After Test	Δ R=40m Ω MAX.			0.475	4.64	-3.13	1.732	5.671	○
		※L	Initial	60m Ω MAX.	5	255	14.903	18.90	11.11	2.341	21.926	○
			After Test	Δ R=40m Ω MAX.			1.334	4.65	-1.72	1.413	5.573	○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○
H Group High Temp. & High Hum. energizing	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.802	29.95	19.10	3.632	34.698	○
			After Test	Δ R=40m Ω MAX.			0.486	4.39	-2.92	1.614	5.328	○
		L	Initial	60m Ω MAX.	5	255	14.844	18.85	11.13	2.423	22.113	○
			After Test	Δ R=40m Ω MAX.			1.359	4.40	-1.84	1.450	5.709	○
	D.W. Voltage	U	Initial	No Abnormality	5	250	No Abnormality					○
			After Test				No Abnormality					○
		L	Initial		5	250	No Abnormality					○
			After Test				No Abnormality					○
	Insulation Resistance (M Ω)	U	Initial	100M Ω MIN	5	250	MIN. 5.0×10 ⁵ M Ω					○
			After Test				MIN. 1.0×10 ⁵ MΩ					○
		L	Initial		5	250	MIN. 4.0×10 ⁵ M Ω					○
			After Test				MIN. 2.5×10 ⁵ MΩ					○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○

※U : Upper Contact L : Lower Contact

Table2-4 Test Result

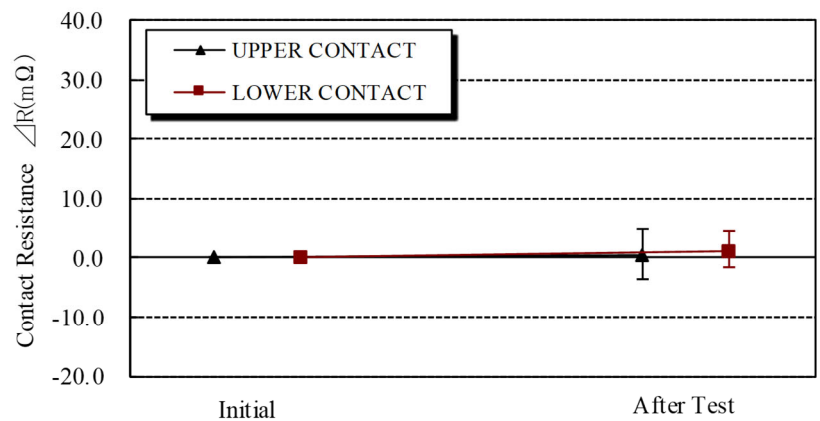
Test Item	Measurement			Spec.	Sample q'ty	n	Data					Judge
							AVE.(X)	MAX.	MIN.	s	X±3s	
J Group High Temp. & High Hum. Life	Contact Resistance (m Ω)	※U	Initial	60m Ω MAX.	5	255	23.722	29.95	19.00	3.419	33.979	○
			After Test	Δ R=40m Ω MAX.			0.606	4.00	-3.57	1.664	5.598	○
		※L	Initial	60m Ω MAX.	5	255	15.145	18.94	11.11	2.324	22.117	○
			After Test	Δ R=40m Ω MAX.			1.078	4.30	-1.78	1.338	5.092	○
	D.W. Voltage	U	Initial	No Abnormality	5	250	No Abnormality					○
			After Test				No Abnormality					○
		L	Initial		5	250	No Abnormality					○
			After Test				No Abnormality					○
	Insulation Resistance (M Ω)	U	Initial	100M Ω MIN	5	250	MIN. 5.0×10 ⁴ M Ω					○
			After Test				MIN. 1.5×10 ⁴ MΩ					○
		L	Initial		5	250	MIN. 5.0×10 ⁴ M Ω					○
			After Test				MIN. 1.0×10 ⁴ MΩ					○
	Appearance			After Test	No Abnormality	10	10	No Abnormality				
K Group Cold Temp. Life	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.741	29.86	19.01	3.611	34.574	○
			After Test	Δ R=40m Ω MAX.			0.614	3.89	-3.33	1.604	5.426	○
		L	Initial	60m Ω MAX.	5	255	15.005	18.83	11.13	2.217	21.656	○
			After Test	Δ R=40m Ω MAX.			1.193	4.53	-1.55	1.364	5.285	○
	Appearance			After Test	No Abnormality	5	5	No Abnormality				
L Group Gas(H ₂ S)	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.853	29.88	19.13	3.544	34.485	○
			After Test	Δ R=40m Ω MAX.			0.485	4.06	-3.08	1.642	5.411	○
		L	Initial	60m Ω MAX.	5	255	14.995	18.85	11.01	2.395	22.180	○
			After Test	Δ R=40m Ω MAX.			1.102	4.04	-1.82	1.386	5.260	○
	Appearance			After Test	No Abnormality	10	10	No Abnormality				

※U : Upper Contact L : Lower Contact

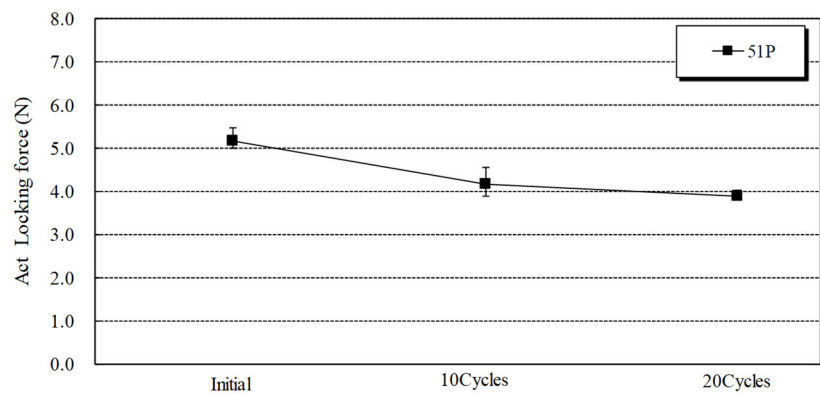
Table2-5 Test Result

Test Item	Measurement			Spec.	Sample q'ty	n	Data					Judge
							AVE.(X)	MAX.	MIN.	s	X±3s	
M Group Gas(SO ₂)	Contact Resistance (m Ω)	※U	Initial	60m Ω MAX.	5	255	23.721	29.75	19.00	3.535	34.326	○
			After Test	Δ R=40m Ω MAX.			0.576	3.97	-3.31	1.695	5.661	○
		※L	Initial	60m Ω MAX.	5	255	15.046	19.20	11.10	2.376	22.174	○
			After Test	Δ R=40m Ω MAX.			1.108	3.98	-1.94	1.335	5.113	○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○
N Group Salt Water Spray	Contact Resistance (m Ω)	U	Initial	60m Ω MAX.	5	255	23.677	29.89	19.11	3.538	34.291	○
			After Test	Δ R=40m Ω MAX.			0.634	3.98	-3.64	1.661	5.617	○
		L	Initial	60m Ω MAX.	5	255	15.013	18.89	11.11	2.386	22.171	○
			After Test	Δ R=40m Ω MAX.			1.281	4.17	-1.50	1.438	5.595	○
	Appearance		After Test	No Abnormality	10	10	No Abnormality					○
P Group Solderability	Zerox Time (sec.)		C/T	3sec. MAX	5	5	MAX. 0.1sec.					○
	Appearance		C/T	Wetness: 95% MIN.	5	5	95%MIN.was wet.					○
Q Group Soldering Heat Resistance	Reflow twice			No Abnormality	5	5	No Abnormality					○
	Soldering iron											
R Group Temp. rising	0.3A/Contact			Δ T=30K MAX.	5	5	MAX.ΔT=10.6K No Problem					○

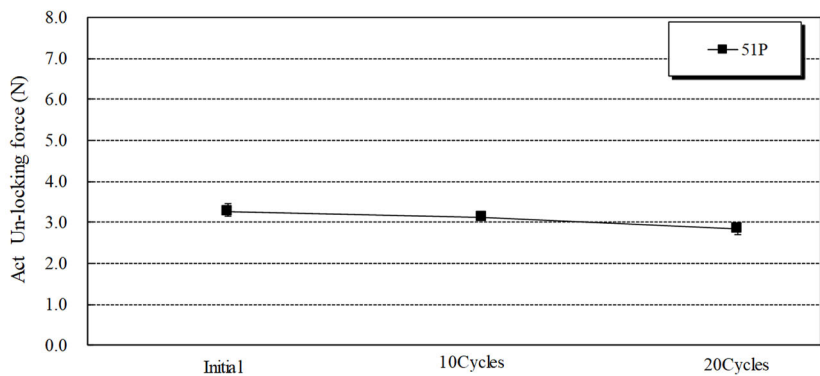
※U : Upper Contact L : Lower Contact



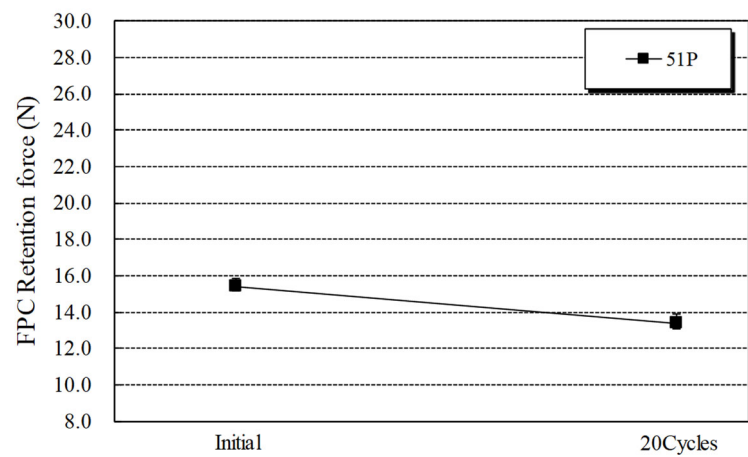
Graph.1 A change of contact resistance
A group : Durability



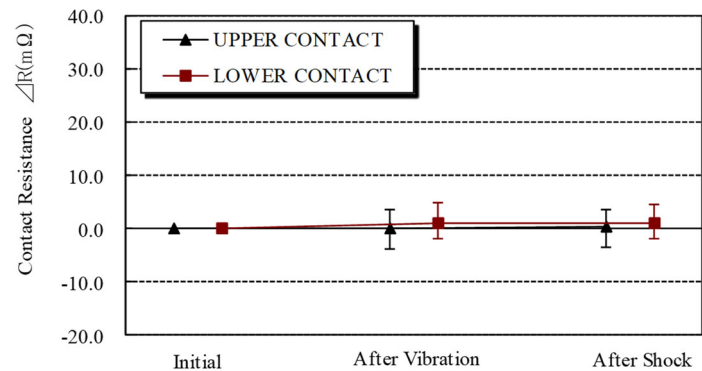
Graph.2 A change of Locking force
A group : Durability



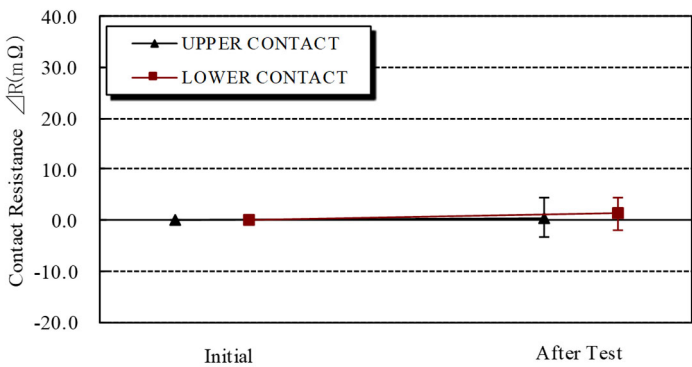
Graph.3 A change of Un-locking force
A group : Durability



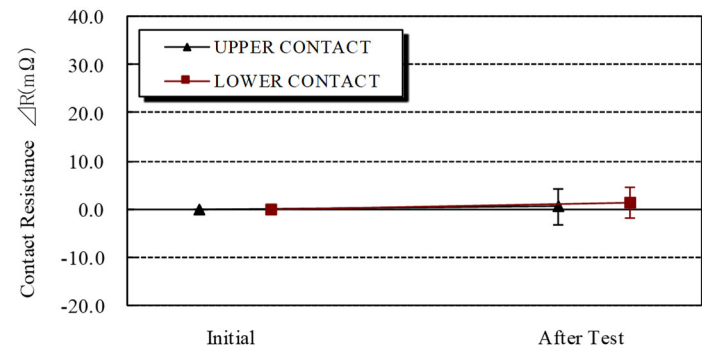
Graph.4 A change of FPC Retention Force
B group : FPC Retention Force



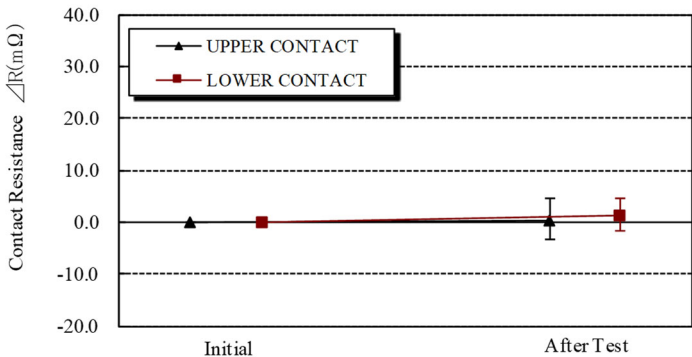
Graph.5 A change of contact resistance
D group : Vibration / Shock



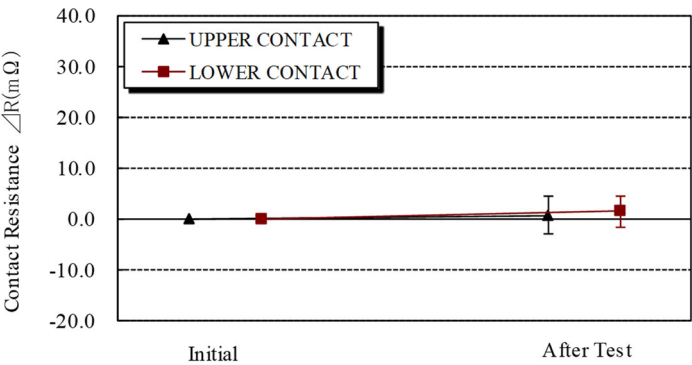
Graph.6 A change of contact resistance
E group : Fretting Corrosion



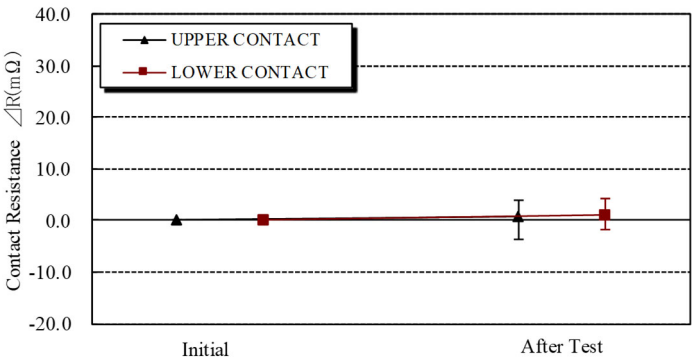
Graph.7 A change of contact resistance
F group : Thermal Shock



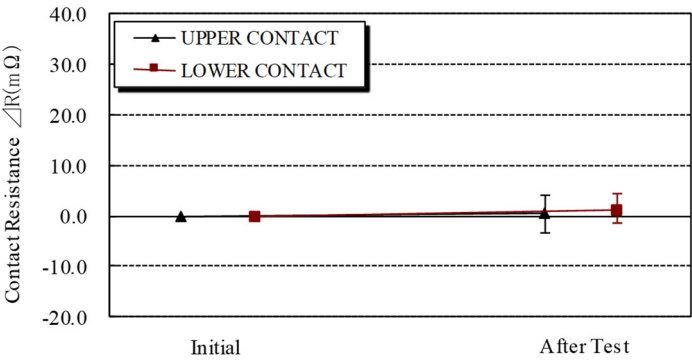
Graph.8 A change of contact resistance
G group : High Temp. Life



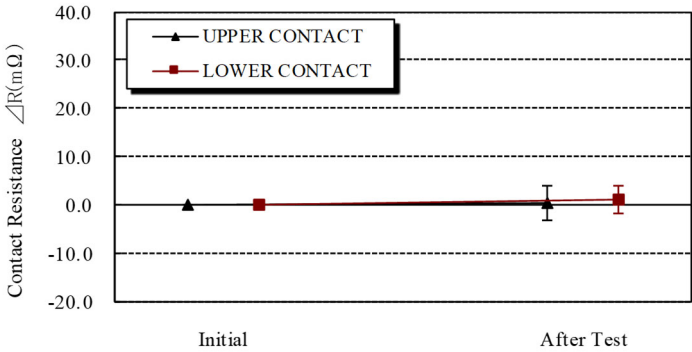
Graph.9 A change of contact resistance
H group : High Temp. & High Hum. energizing



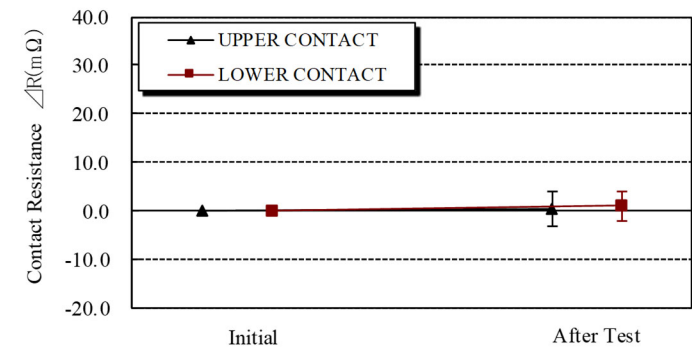
Graph.10 A change of contact resistance
J group : High Temp. & High Hum. Life



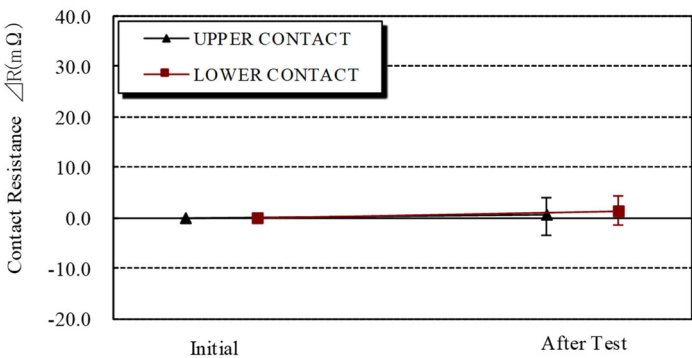
Graph.11 A change of contact resistance
K group : Cold Temp. Life



Graph.12 A change of contact resistance
L group : Gas(H₂S)



Graph.13 A change of contact resistance
M group : Gas(SO₂)



Graph.14 A change of contact resistance
N group : Salt Water Spray