

# CABLINE®-CAL

Part No. Plug : 20728-0\*\*T-#1, Receptacle : 20729-0\*\*E-##

## Test Report

Product Specification no. PRS-2371

2	T22024	January 25, 2022	S.Yamaguchi	T.Tanigawa	H.Ikari
1	T20102	January 13, 2021	S.Yamaguchi	T.Tanigawa	H.Ikari
0	T19031	September 10, 2019	S.Yamaguchi	T.Kurachi	H.Ikari
Rev.	ECN	Date	Prepared by	Checked by	Approved by

## 1. Purpose

To evaluate the performance of CABLINE-CAL Connector in accordance with PRS-2371.

## 2. Specimen

- (1) CABLINE-CAL PLUG ASS'Y (Part No. 20728-0\*\*T-#1)
- (2) CABLINE-CAL RECEPTACLE ASS'Y (Part No. 20729-0\*\*E-##)

## 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 18. For the details of the testing conditions and requirements, see PRS-2371.  
The "n" in the tables show the number of measurement points.

## 5. Conclusion

All the specimens met the requirements of PRS-2371.

**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												
Un-mating Force	3,7												
Durability	4						4 (10cycles)						
Contact Retention Force		1,3											
Cable Retention Force	8												
Vibration			2										
Shock			4										
Thermal Shock				4									
High Temperature Life		2			2								
Humidity (Steady State)						4							
Humidity (Cycling)							6						
Salt Water Spray								2					
H2S Gas									2				
Solder ability										1			
Soldering Heat Resistance											1		
Specimen Quantity.	5 pcs.	20 pos.	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

Test Item	Measurements		Spec.	Set	n	DATA					Judge	
						AVE.	MAX.	MIN.	s	X±3s		
A Group Durability Cable Retention Force	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	559.946	567.02	553.11	2.811	568.379	OK	
		After 30th Cycle	AWG #40 ΔR=40mΩMAX.			0.958	5.54	-4.22	1.881	6.601	OK	
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	21.736	22.22	21.26	0.350	22.786	OK	
		After 30th Cycle	ΔR=40mΩMAX.			0.309	0.90	-0.18	0.304	1.221	OK	
	30P	Mating Force (N)	Initial	12.0N MAX.	5	5	7.932	8.44	7.56	0.330	8.922	OK
			After 30th Cycle	12.0N MAX.			5.586	5.97	4.98	0.370	6.696	OK
		Un-mating Force (N)	Initial	1.80N MIN.	5	5	6.084	6.81	5.49	0.492	4.608	OK
			After 30th Cycle	1.80N MIN.			4.358	5.11	3.58	0.567	2.657	OK
	(Cable retention force)		11.80N MIN.	5	5	122.640	125.78	116.48	3.604	111.828	OK	
	40P	Mating Force (N)	Initial	16.0N MAX.	5	5	9.574	10.07	9.29	0.315	10.519	OK
			After 30th Cycle	16.0N MAX.			6.836	7.31	6.34	0.474	8.258	OK
		Un-mating Force (N)	Initial	2.40N MIN.	5	5	7.862	8.14	7.47	0.276	7.034	OK
			After 30th Cycle	2.40N MIN.			4.790	5.10	4.53	0.259	4.013	OK
	(Cable retention force)		12.40N MIN.	5	5	126.312	129.20	123.65	2.420	119.052	OK	
B Group Contact Retention Force	RECE	Initial	0.20N MIN.	-	20	1.102	1.67	0.67	0.224	0.430	OK	
		After High Temperature Life	0.20N MIN.	-	20	1.068	1.60	0.62	0.218	0.414	OK	

Table.2-2 Test result

Test Item	Measurements		Spec.	Set	n	DATA					Judge	
						AVE.	MAX.	MIN.	s	X±3s		
C Group Vibration & Shock	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	555.443	564.16	547.43	3.613	566.282	OK	
		After Vibration	AWG #40 ΔR=40mΩMAX.			0.651	4.19	-3.56	1.617	5.502	OK	
		After Shock				-0.835	4.11	-5.25	1.721	4.328	OK	
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	22.763	23.71	21.65	0.640	24.683	OK	
		After Vibration	ΔR=40mΩMAX.			0.006	2.55	-0.99	1.004	3.018	OK	
		After Shock				-0.249	1.83	-1.94	1.465	4.146	OK	
	Electrical Discontinuity	During Vibration	1μsec. MAX.	5	5	No discontinuity					OK	
		During Shock				No discontinuity					OK	
	Appearance	After Vibration	No abnormality adversely affecting the performance shall occur.	5	5	No abnormality					OK	
		After Shock				No abnormality					OK	
	D Group Thermal Shock	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	550.844	567.40	537.26	5.679	567.881	OK
			After Testing	AWG #40 ΔR=40mΩMAX.			1.147	7.68	-4.40	2.491	8.620	OK
GND Resistance (mΩ)		Initial	50mΩ MAX.	5	200	22.556	23.61	21.28	0.705	24.671	OK	
		After Testing	ΔR=40mΩMAX.			-0.070	2.78	-1.17	1.265	3.725	OK	
Insulation Resistance (MΩ)		Initial	1000MΩ MIN. 500MΩ MIN.	5	150	1.49×10 <sup>5</sup> MΩ MIN.					OK	
		After Testing				1.03×10 <sup>5</sup> MΩ MIN.					OK	
D.W.Voltage		Initial	No creeping discharge, flashover, or insulator breakdown shall occur.	5	150	No abnormality					OK	
		After Testing				No abnormality					OK	

Table.2-3 Test result

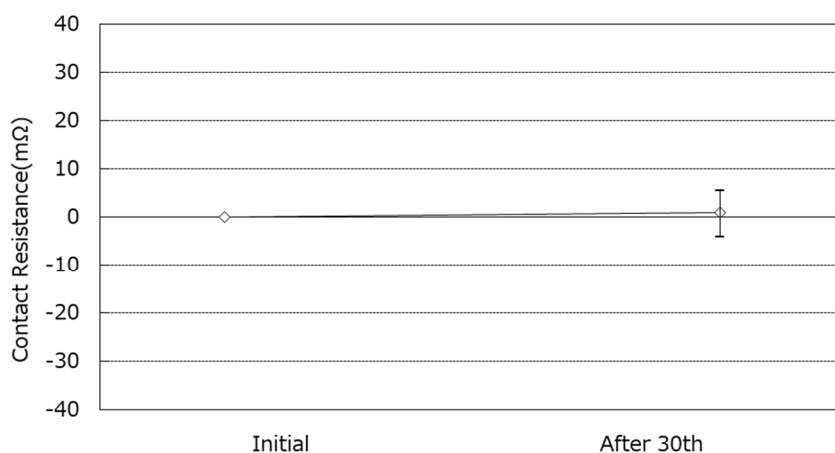
Test Item	Measurements		Spec.	Set	n	DATA					Judge
						AVE.	MAX.	MIN.	s	X±3s	
E Group High Temp. Life	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	555.917	563.44	546.76	3.311	565.850	OK
		After Testing	AWG #40 ΔR=40mΩMAX.			0.846	7.68	-5.90	2.485	8.301	OK
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	21.868	23.39	20.15	1.233	25.567	OK
		After Testing	ΔR=40mΩMAX.			0.383	2.86	-1.78	1.191	3.956	OK
F Group High Humidity Life	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	554.583	561.07	547.57	2.403	561.792	OK
		After Testing	AWG #40 ΔR=40mΩMAX.			0.597	6.40	-6.09	2.284	7.449	OK
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	20.939	21.93	19.79	0.639	22.856	OK
		After Testing	ΔR=40mΩMAX.			1.212	2.25	-0.32	1.132	4.608	OK
	Insulation Resistance (MΩ)	Initial	1000MΩ MIN.	5	150	1.08×10 <sup>5</sup> MΩ MIN.					OK
		After Testing	500MΩ MIN.			1.04×10 <sup>5</sup> MΩ MIN.					OK
D.W.Voltage	Initial	No creeping discharge, flashover, or insulator breakdown shall occur.	5	150	No abnormality					OK	
	After Testing				No abnormality					OK	
G Group High Humidity Life	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	558.869	564.74	552.28	2.347	565.910	OK
		After Testing	AWG #40 ΔR=40mΩMAX.			0.208	6.50	-6.90	2.623	8.077	OK
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	21.847	22.50	20.44	0.700	23.947	OK
		After Testing	ΔR=40mΩMAX.			1.360	2.93	0.19	0.845	3.895	OK
	Insulation Resistance (MΩ)	Initial	1000MΩ MIN.	5	150	1.59×10 <sup>5</sup> MΩ MIN.					OK
		After Testing	500MΩ MIN.			1.21×10 <sup>5</sup> MΩ MIN.					OK
D.W.Voltage	Initial	No creeping discharge, flashover, or insulator breakdown shall occur.	5	150	No abnormality					OK	
	After Testing				No abnormality					OK	

Table.2-4 Test result

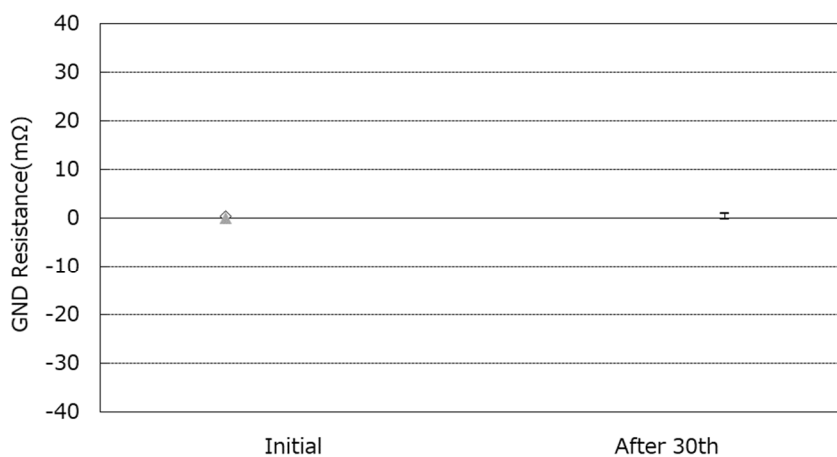
Test Item	Measurements		Spec.	Set	n	DATA					Judge
						AVE.	MAX.	MIN.	s	X±3s	
H Group Salt Water Spray	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	556.202	561.89	549.72	2.329	563.189	OK
		After Testing	AWG #40 ΔR=40mΩMAX.			0.376	5.16	-5.48	2.049	6.523	OK
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	22.326	23.56	20.65	0.922	25.092	OK
		After Testing	ΔR=40mΩMAX.			0.179	2.72	-3.31	1.773	5.498	OK
J Group GAS (H2S)	Contact Resistance (mΩ)	Initial	AWG #40 600mΩ MAX.	5	200	557.202	563.46	551.15	2.539	564.819	OK
		After Testing	AWG #40 ΔR=40mΩMAX.			0.558	5.86	-3.86	2.144	6.990	OK
	GND Resistance (mΩ)	Initial	50mΩ MAX.	5	200	21.714	22.59	19.85	0.853	24.273	OK
		After Testing	ΔR=40mΩMAX.			0.316	1.69	-1.23	0.873	2.935	OK
K Group Soldering Heat Resistance	Appearance		No deformation nor defect adversely affecting the performance occur.	10	10	No abnormality					OK
L Group Solderability	Appearance		Fillet is made (Fillet angle ≤ 90°)	10	10	No problem					OK
M Group Temperature Rise	AWG #40 0.30A/Pin (Total 7.80 A)		ΔT=30°C MAX.	5	5	ΔT= 27.4°C MAX.					OK

The Temperature Rising Test is a result when applied ratings current (0.3A/contact) between the neighboring contacts for 32pos.

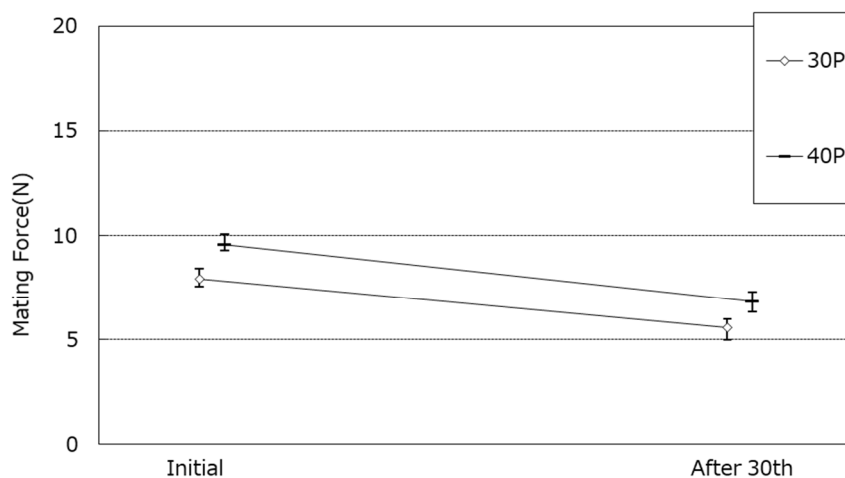
(With the whole connector 9.60A.)



Graph1. A change of contact resistance (A Group:Durability)

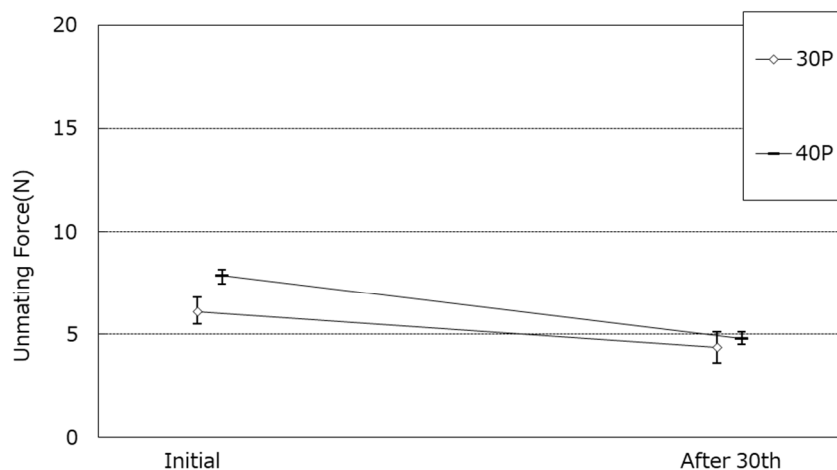


Graph2. A change of GND resistance (A Group:Durability)

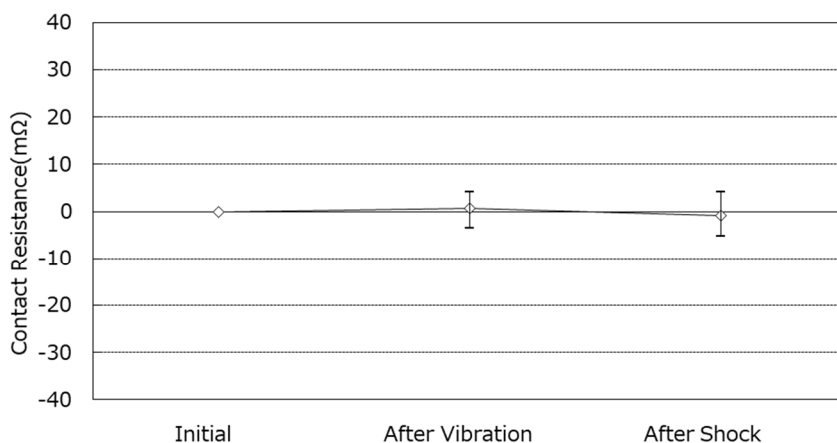


Graph3. A change of mating force (A Group:Durability)

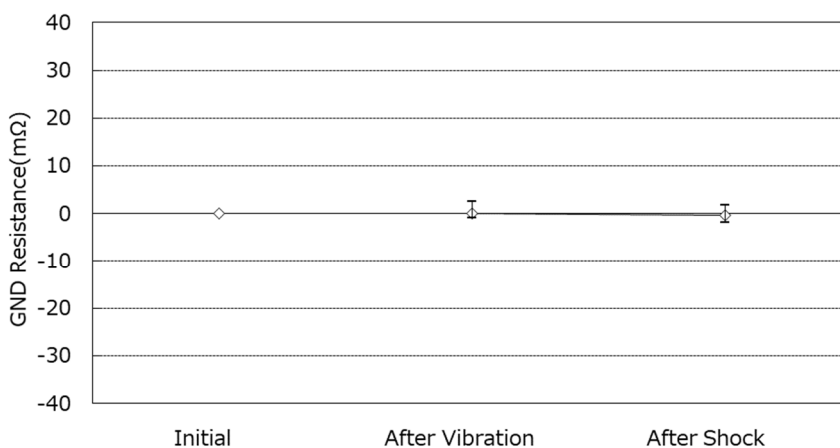




Graph4. A change of unmmating force (A Group:Durability)

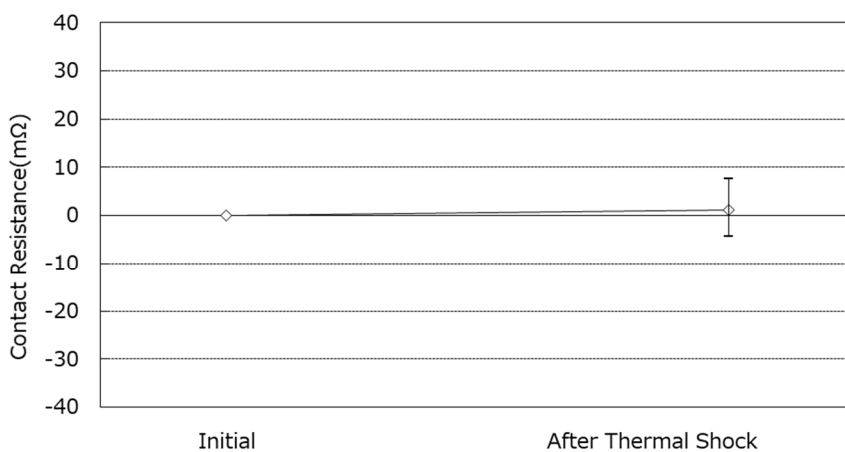


Graph5. A change of contact resistance (C Group:Vibration & Shock)

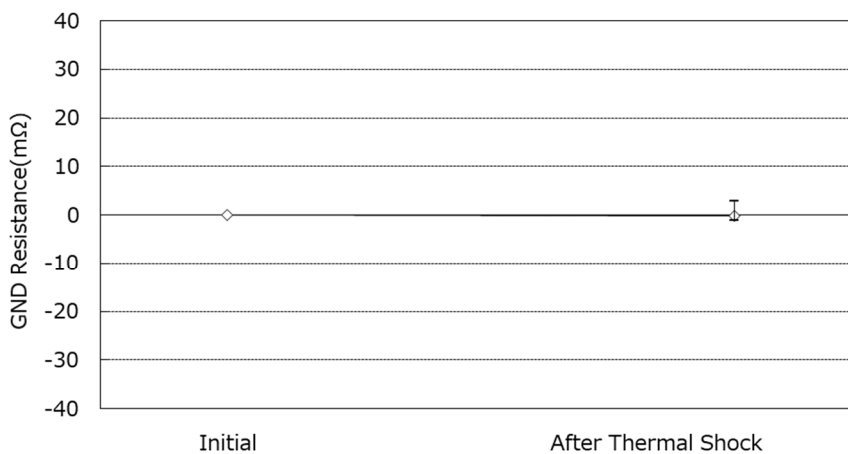


Graph6. GND抵抗値の変化 (C Group : 振動衝撃)

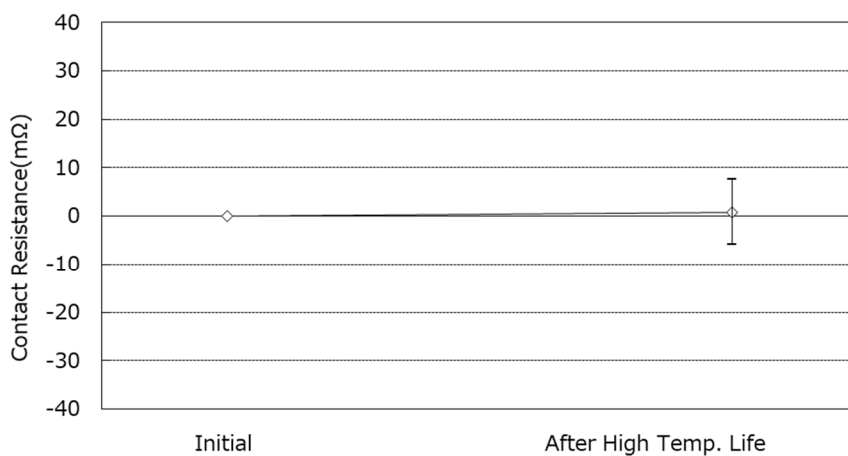
A change of GND resistance (C Group:Vibration & Shock)



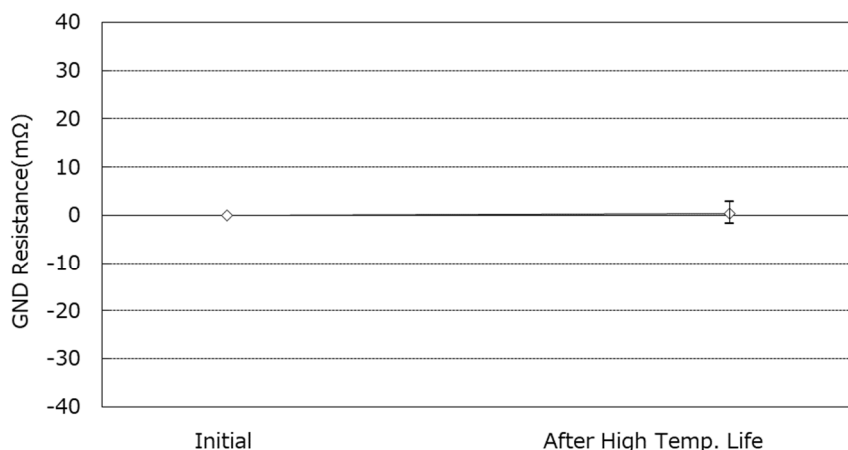
Graph7. A change of contact resistance (D Group:Thermal Shock)



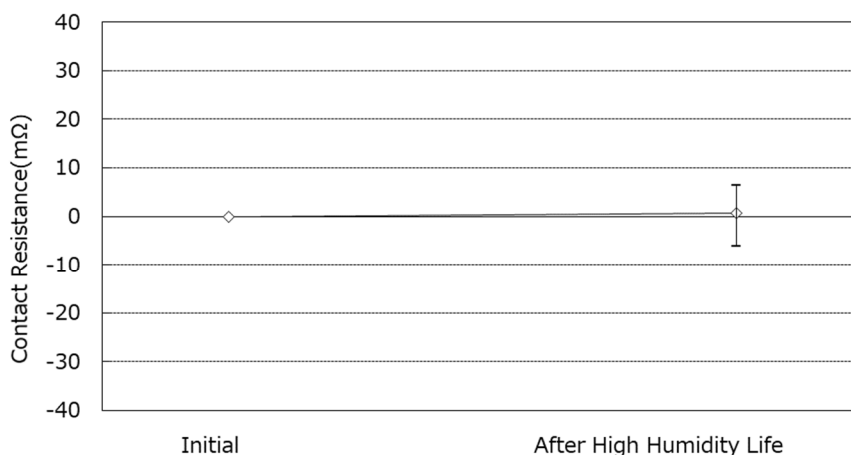
Graph8. A change of GND resistance (D Group:Thermal Shock)



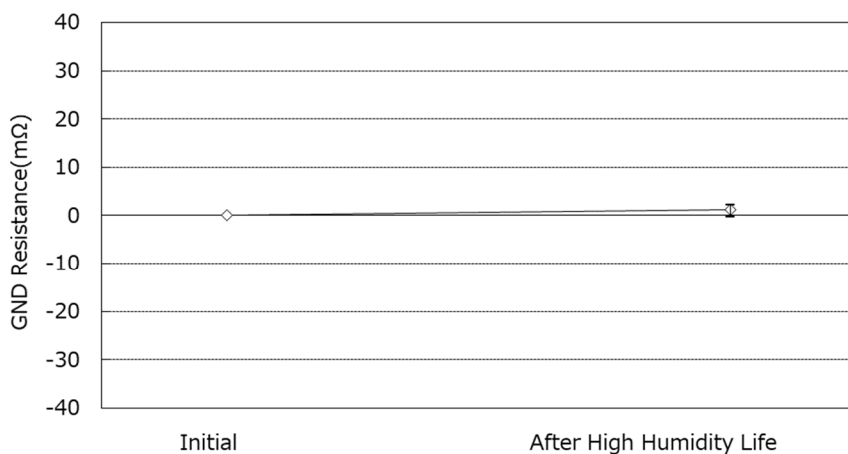
Graph9. A change of contact resistance (E Group:High Temp. Life)



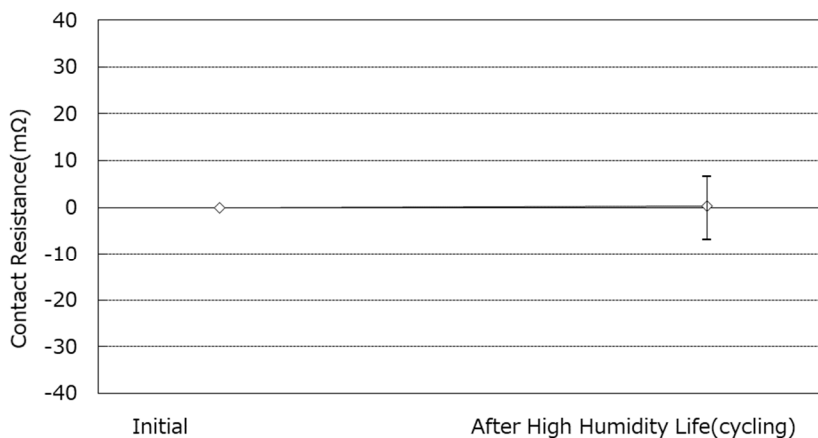
Graph10. A change of GND resistance (E Group:High Temp. Life)



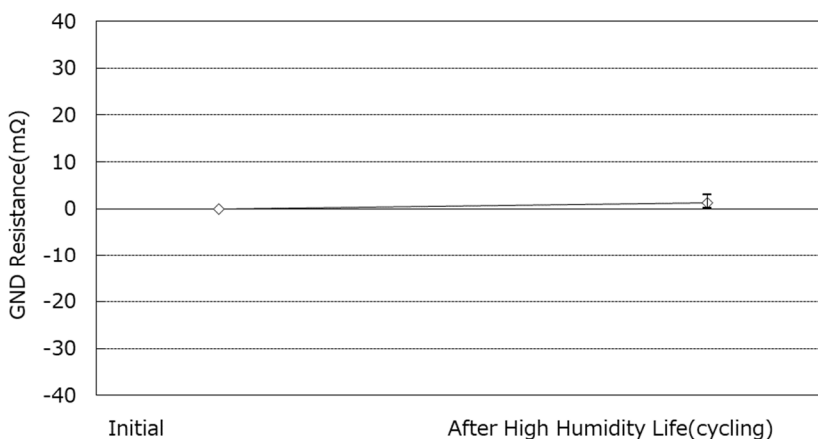
Graph11. A change of Contact resistance (F Group:High Humidity Life)



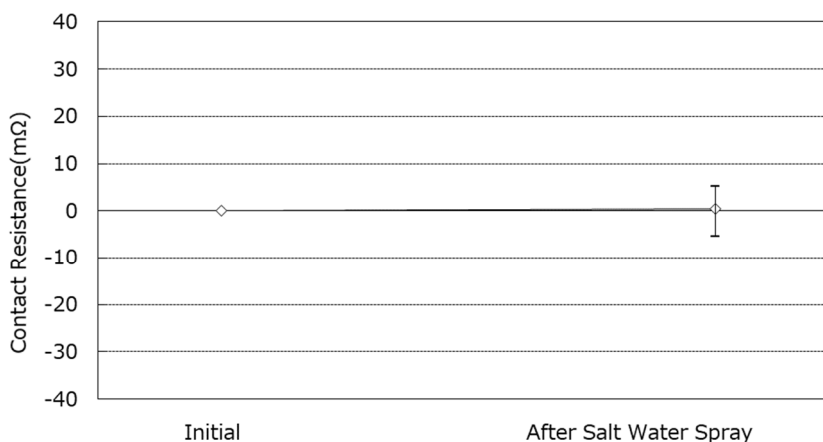
Graph12. A change of GND resistance (F Group:High Humidity Life)



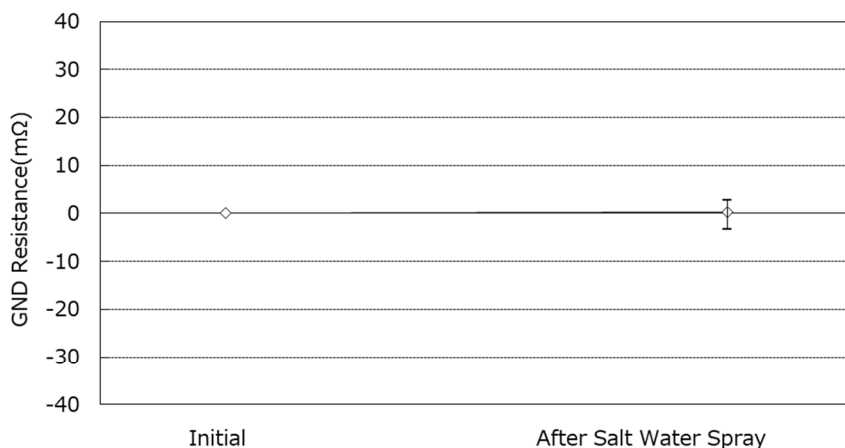
**Graph13.** A change of contact resistance  
(G Group:High Humidity Life(cycling))



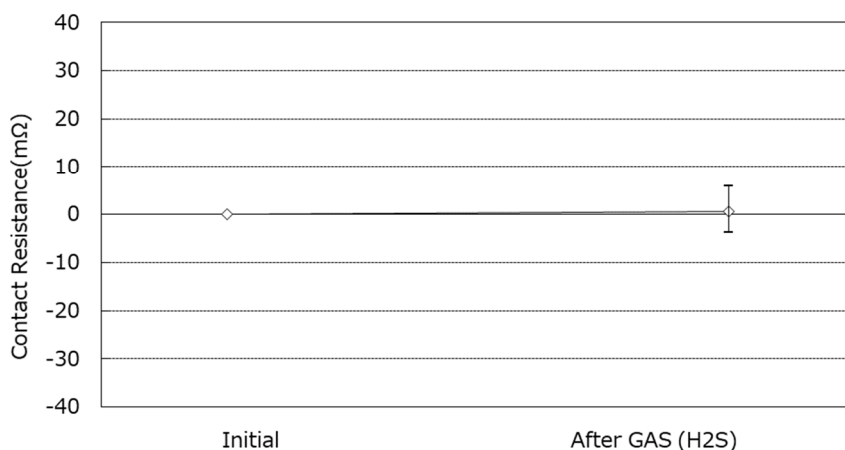
**Graph14.** A change of GND resistance  
(G Group:High Humidity Life(cycling))



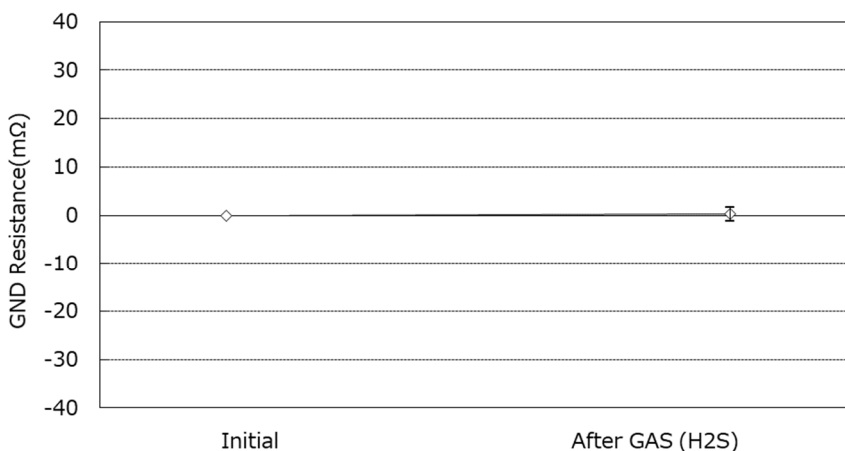
**Graph15.** A change of contact resistance (H Group:Salt Water Spray)



Graph16. A change of GND resistance (H Group:Salt Water Spray)



Graph17. A change of contact resistance (J Group:GAS (H2S))



Graph18. A change of GND resistance (J Group:GAS (H2S))