DW 5 Connector
(0.5mm pitch Discrete Cable & FPC)

Part No. PLUG:20598-0**T-0* RECEPTACLE:20597-0**E-0*

Test Report

Product Specification no. PRS-1880

Rev.	ECN	Date	Prepared by	Checked by	Approved by
4	T22012	January 14, 2022	S.Shigekoshi	M.Muro	H.Ikari
3	T17090	July 10, 2017	T.F		TAK
2	T15069	May 29, 2015	Y.F		Tom
1	T14131	October 10, 2014	Y.F		Tom

1. Purpose

To evaluate the performance of DW 5Connector in accordance with PRS-1880.

2. Specimen

(1) DW 5 PLUG ASS'Y （Part No. 20598-0**T-0*）
(2) DW 5 RECEPTACLE ASS'Y （Part No. 20597-0**E-0*）

3. Test Sequence

All the evaluations were performed in accordance with Table 1. Test Sequence.

4. Result

PLUG : See Table 2-1 to 2-4, Graph 1 to 13.
FPC : See Table 3-1 to 3-4, Graph 14 to 26.
For the details of the testing conditions and requirements, see PRS-1880.
The “n” in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-1880.

Table1 Test Sequence and Sample Quantity

Test Item	Group														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
Contact Resistance	2,6			1,3,5	1,3	1,3	1,3	1,5	1,5,	1,3	1,3	1,3			
Insulation Resistance								2,6	2,6						
D. W. Voltage								3,7	3,7						
Temp. Life															1
Act Locking Force	1,5														
Act Un-locking Force	3,7														
PLUG CONN/FPC Retention Force		1,3													
Durability	4	2													
Contact Retention Force			1												
H/D Retention Force			2												
Cable Retention Force	8														
Vibration				2											
Shock				4											
Fretting corrosion					2										
Thermal Shock						2									
High Temp. Life							2								
Humidity (Steady State)								4							
Humidity (Cycling)									4						
Salt Spray										2					
Gas (H_2S)											2				
Gas (SO_2)												2			
Solderability													1		
Soldering Heat Resistance														1	

The number of group is test sequence.

Table.2-1 Discrete Cable Test result

Test Item	Contents of Measurement			Specifications	Set	n	Data					Judge
							AVE.	MAX.	MIN.	s	X±3s	
A Group Durability	Contact Resistance (mΩ)		Initial	AWG#34 150mΩMAX.	5	50	132.949	139.26	127.70	3.379	143.086	OK
			After 20th	AWG#34 ΔR=40mΩMAX.			1.265	6.76	-6.38	3.109	10.592	OK
	Act Locking Force (N)	6P	Initial	4.8N MAX. (0.6N/Pos. ×(6P+2))	5	5	2.822	2.90	2.73	0.077	3.053	OK
			After 20th				1.808	1.83	1.75	0.033	1.907	OK
		8P	Initial	6.0N MAX. (0.6N/Pos. ×(8P+2))	5	5	3.630	3.73	3.48	0.132	4.027	OK
			After 20th				2.343	2.52	2.15	0.186	2.900	OK
		10P	Initial	7.2N MAX. (0.6N/Pos. ×(10P+2))	5	5	4.230	4.37	4.12	0.102	4.536	OK
			After 20th				2.788	2.93	2.65	0.129	3.175	OK
	Act Un-locking Force (N)	6P	Initial	0.4N MIN. (0.05N/Pos. ×(6P+2))	5	5	1.870	1.90	1.85	0.021	1.807	OK
			After 20th				1.566	1.62	1.52	0.042	1.440	OK
		8P	Initial	0.5N MIN. (0.05N/Pos. ×(8P+2))	5	5	2.235	2.34	2.12	0.112	1.898	OK
			After 20th				1.872	1.90	1.84	0.030	1.781	OK
		10P	Initial	0.6N MIN. (0.05N/Pos. ×(10P+2))	5	5	2.840	2.87	2.79	0.030	2.750	OK
			After 20th				2.364	2.43	2.27	0.068	2.160	OK
	Cable Retention Force (N)	6P		4.12N MIN.	5	5	7.414	8.27	6.49	0.701	5.311	OK
		8P		5.49N MIN.	5	5	10.690	11.99	9.34	1.092	7.414	OK
		10P		6.86N MIN.	5	5	13.164	14.62	11.89	1.042	11.494	OK
B Group PLUG Retention Force (N)		6P	Initial	2.9N MIN. (0.15N/Pos. ×6P+2)	5	5	12.680	13.32	11.62	0.713	10.541	OK
			After 20th				9.000	9.55	8.21	0.532	7.404	OK
		8P	Initial	3.2N MIN. (0.15N/Pos. ×8P+2)	5	5	14.130	14.94	13.21	0.870	11.519	OK
			After 20th				10.513	11.36	9.90	0.757	8.241	OK
		10P	Initial	3.5N MIN. (0.15N/Pos. ×10+2)	5	5	15.156	15.86	14.36	0.700	13.056	OK
			After 20th				11.802	13.03	11.05	0.785	9.447	OK

Table.2-2 Discrete Cable Test result

Test Item	Contents of Measurement		Specifications	Set	n	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
C Group Contact Retention Force	PLUG Contact Retention Force		0.6NMIN.	5	20	1.273	1.34	1.21	0.040	1.153	OK
	RECE. Contact Retention Force		0.5NMIN.	5	20	1.282	1.34	1.20	0.044	1.150	OK
	RECE.LOCK Retention Force			5	10	1.268	1.32	1.22	0.033	1.169	OK
	RECE. H/D Retention Force			5	10	0.882	0.94	0.80	0.046	0.744	OK
D Group Vibration Shock	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	130.096	137.70	124.26	3.674	141.118	OK
		After Vibration	AWG#34 ΔR=40mΩMAX.			-0.351	10.83	-10.41	4.014	11.691	OK
		After Shock	AWG#34 ΔR=40mΩMAX.			-0.234	8.69	-8.02	2.971	8.679	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
E Group Fretting Corrosion	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	130.984	137.66	124.37	4.103	143.293	OK
		After Test	AWG#34 ΔR=40mΩMAX.			0.883	9.92	-8.58	4.356	13.951	OK
	Discontinuity	In Test	1μsec. MAX.	5	5	No Discontinuity					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
F Group Thermal Shock	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	130.598	136.68	125.84	3.601	141.401	OK
		After Test	AWG#34 ΔR=40mΩMAX.			0.261	7.83	-6.92	3.343	10.290	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
G Group Temperature Life	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	129.602	139.65	119.14	4.888	144.266	OK
		After Test	AWG#34 ΔR=40mΩMAX.			0.232	6.98	-6.88	3.870	11.842	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK

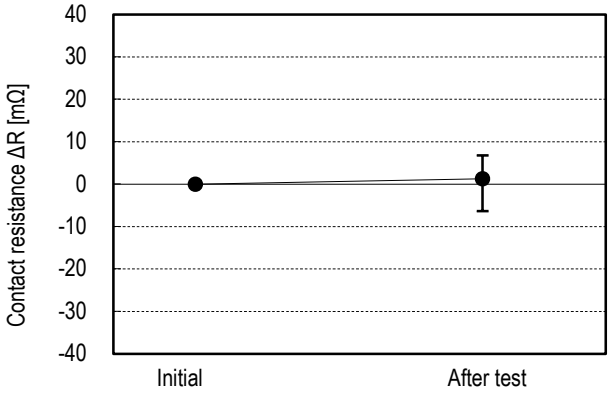
Table.2-3 Discrete Cable Test result

Test Item	Contents of Measurement		Specifications	Set	n	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
H Group Humidity (Steady State)	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	131.673	141.01	122.74	4.901	146.376	OK
		After Test	AWG#34 ΔR=40mΩMAX.			1.139	9.05	-7.83	4.176	13.667	OK
	Insulation Resistance (MΩ)	Initial	1000MΩMIN.	5	20	1.5×10^5 MΩMIN.					OK
		After Test	500MΩMIN.			1.0×10^4 MΩMIN.					OK
	D. W. Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	20	No Abnormality					OK
		After Test				No Abnormality					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
J Group Humidity (Cycling)	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	130.309	140.35	122.28	4.720	144.469	OK
		After 10th	AWG#34 ΔR=40mΩMAX.			1.145	7.83	-6.97	3.961	13.028	OK
		After Test	AWG#34 ΔR=40mΩMAX.			0.840	8.15	-8.69	4.205	13.455	OK
	Insulation Resistance (MΩ)	Initial	1000MΩMIN.	5	20	1.5×10^5 MΩMIN.					OK
		After Test	500MΩMIN.			0.5×10^5 MΩMIN.					OK
	D. W. Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	20	No Abnormality					OK
		After Test				No Abnormality					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK

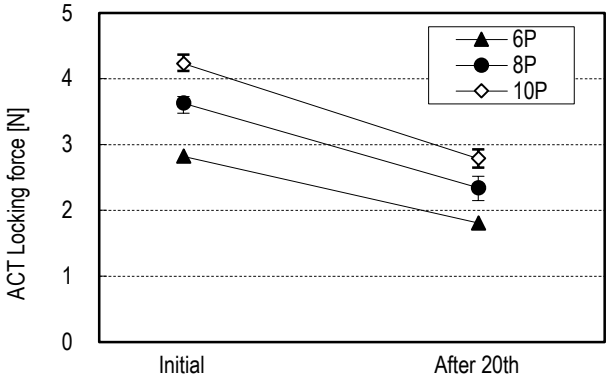
Table.2-4 Discrete Cable Test result

Test Item	Contents of Measurement		Specifications	Set	n	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
K Group Salt Water Spray	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	133.521	140.19	125.54	4.729	147.708	OK
		After Test	AWG#34 ΔR=40mΩMAX.			1.656	11.52	-7.86	4.911	16.389	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
L Group Gas(H_2S)	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	133.521	140.19	125.54	4.729	147.708	OK
		After Test	AWG#34 ΔR=40mΩMAX.			1.896	11.00	-5.27	3.848	13.440	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
M Group Gas(SO_2)	Contact Resistance (mΩ)	Initial	AWG#34 150mΩMAX.	5	50	137.027	144.27	129.69	4.031	149.120	OK
		After Test	AWG#34 ΔR=40mΩMAX.			1.800	9.12	-7.97	4.432	15.096	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
N Group PLUG Contact Solderability	Appearance		More than 95% of the dipped surface shall be evenly wet.	5	5	Wet 95% MIN.					OK
P Group PLUG Contact Soldering Heat Resistance	Reflow twice		No Abnormality	5	5	No Abnormality					OK
	Soldering iron										
Q Group Temperature Rising	AWG#34 0.7A/Contact 7.0A/Connector		ΔT=30℃MAX.	5	5	ΔT=26.3℃MAX.					OK

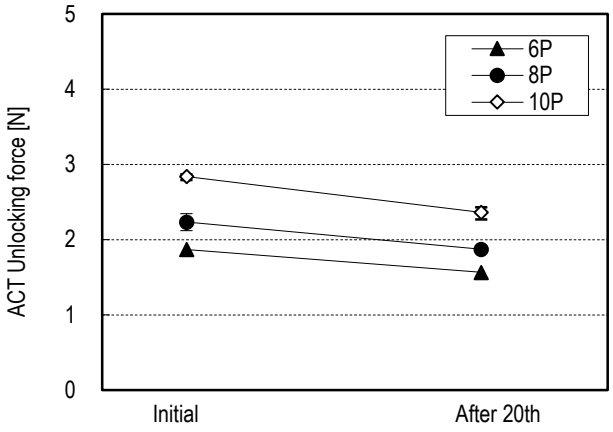
*The Temperature Rising Test is a result when applied ratings current (0.7A/contact) between the neighboring contacts for 30pos. (With the whole connector 7.0A.)



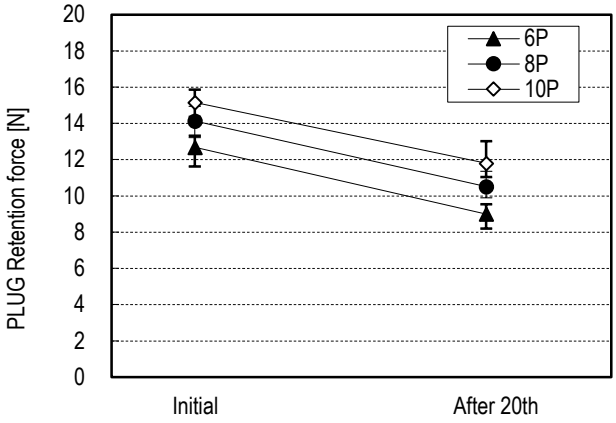
Graph 1. A change of Contact Resistance
A group : Durability



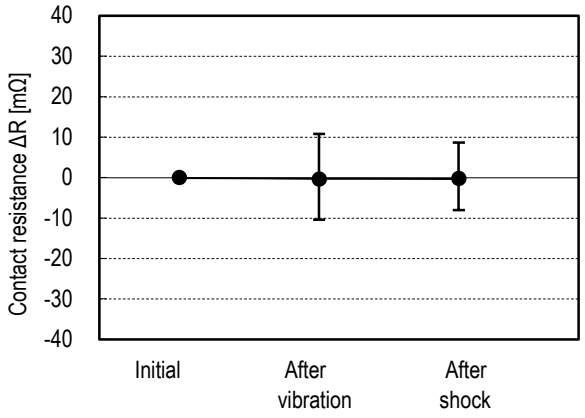
Graph 2. A change of ACT Locking Force
(6P, 8P, 10P)
A group : Durability



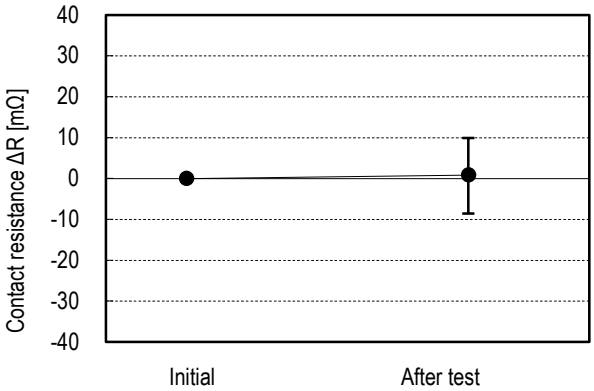
Graph 3. A change of ACT Un-locking Force
(6P, 8P, 10P)
A group : Durability



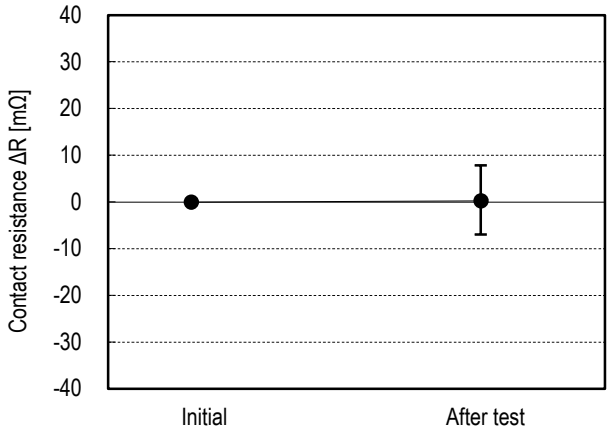
Graph 4. A change of PLUG Retention Force
(6P, 8P, 10P)
B group : PLUG Retention Force



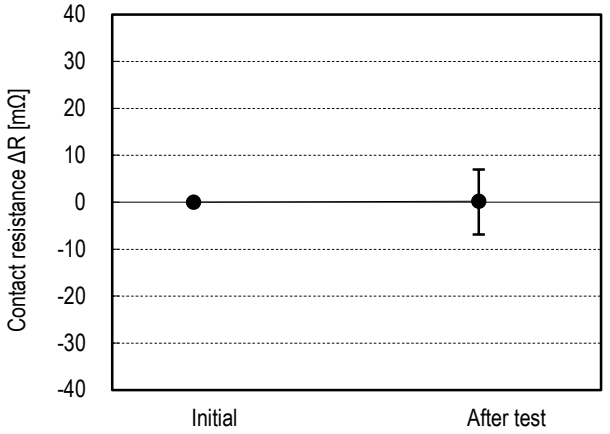
Graph 5. A change of Contact Resistance
D group : Vibration / Shock



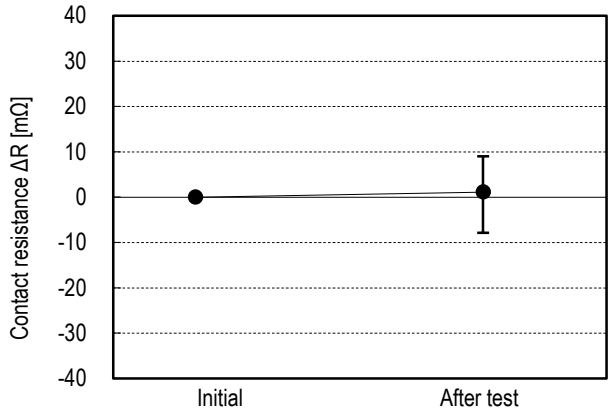
Graph 6. A change of Contact Resistance
E group : Fretting Corrosion



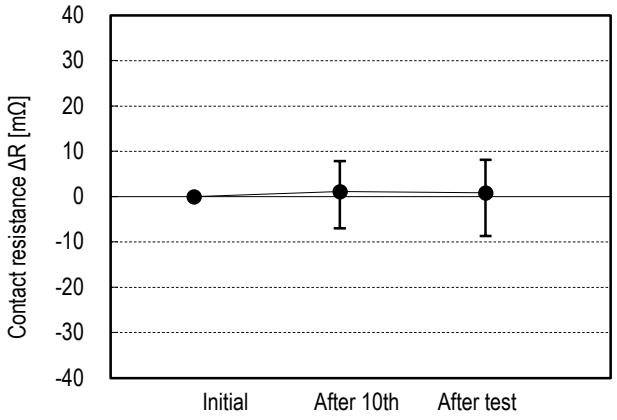
Graph 7. A change of Contact Resistance
F group : Thermal Shock



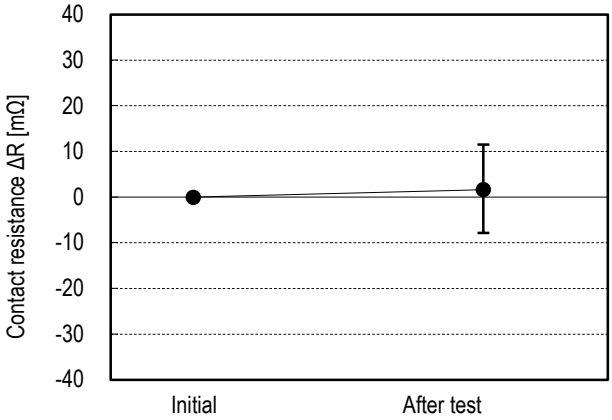
Graph 8. A change of Contact Resistance
G group : High Temp. Life



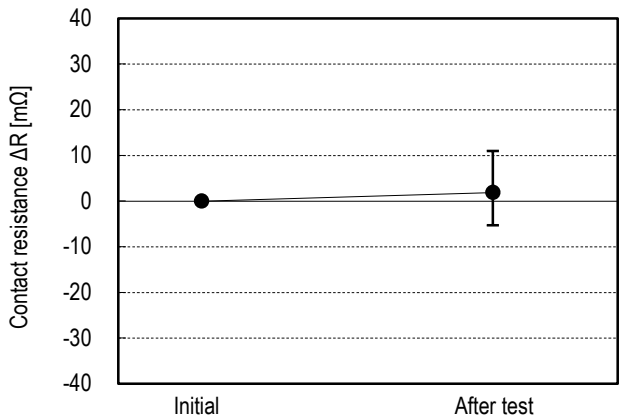
Graph 9. A change of Contact Resistance
H group : Humidity(Steady State)



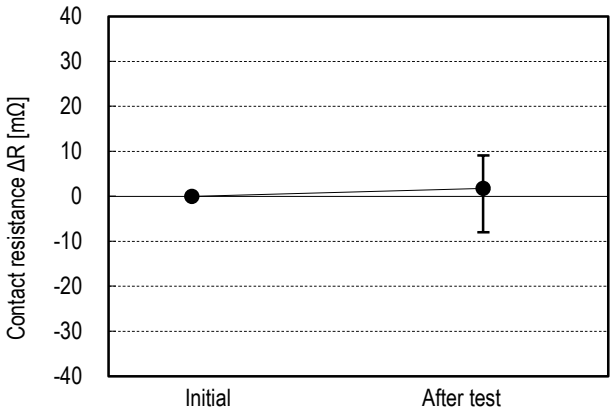
Graph 10. A change of Contact Resistance
J group : Humidity(Cycling)



Graph 11. A change of Contact Resistance
N group : Salt Water Spray



Graph 12. A change of Contact Resistance
L group : Gas (H2S)



Graph 13. A change of Contact Resistance
M group：Gas (SO2)

Table.3-1 FPC Test result

Test Item	Contents of Measurement			Specifications	Set	n	Data					Judge
							AVE.	MAX.	MIN.	s	X±3s	
A Group Durability	Contact Resistance (mΩ)	Initial		40mΩ MAX.	5	50	26.410	29.24	22.91	1.796	31.798	OK
		After 20th		ΔR=20mΩMAX.			-0.869	2.65	-3.71	1.790	4.501	OK
	Act Locking Force (N)	6P	Initial	4.8N MAX. (0.6N/Pos. ×(6P+2))	5	5	3.096	3.14	3.02	0.051	3.249	OK
			After 20th				2.036	2.06	2.01	0.019	2.093	OK
		8P	Initial	6.0N MAX. (0.6N/Pos. ×(8P+2))	5	5	3.287	3.45	3.12	0.128	3.673	OK
			After 20th				2.185	2.37	2.06	0.129	2.571	OK
		10P	Initial	7.2N MAX. (0.6N/Pos. ×10P+2))	5	5	3.558	3.64	3.50	0.054	3.720	OK
			After 20th				2.274	2.39	2.20	0.071	2.487	OK
	Act Un-locking Force (N)	6P	Initial	0.4N MIN. (0.05N/Pos. ×(6P+2))	5	5	1.748	1.82	1.67	0.060	1.568	OK
			After 20th				1.392	1.44	1.33	0.047	1.251	OK
		8P	Initial	0.5N MIN. (0.05N/Pos. ×(8P+2))	5	5	1.974	2.11	1.83	0.105	1.660	OK
			After 20th				1.671	1.72	1.61	0.052	1.514	OK
		10P	Initial	0.6N MIN. (0.05N/Pos. ×(10P+2))	5	5	2.340	2.35	2.32	0.012	2.304	OK
			After 20th				1.940	1.99	1.89	0.043	1.811	OK
B Group FPC Retention Force (N)		6P	Initial	2.9N MIN. (0.15N/Pos. ×6P+2)	5	5	9.046	9.19	8.94	0.108	8.722	OK
			After 20th				8.050	8.14	7.94	0.077	7.819	OK
		8P	Initial	3.2N MIN. (0.15N/Pos. ×8P+2)	5	5	10.874	11.39	10.48	0.350	9.822	OK
			After 20th				9.547	10.49	9.01	0.616	7.700	OK
		10P	Initial	3.5N MIN. (0.15N/Pos. ×10+2)	5	5	12.015	12.57	10.51	0.866	9.417	OK
			After 20th				10.431	11.24	9.23	0.764	8.139	OK

Table.3-2 FPC Test result

Test Item	Contents of Measurement		Specifications	Set	n	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
D Group Vibration Shock	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	26.191	29.31	22.97	1.651	31.144	OK
		After Vibration	ΔR=20mΩMAX.			-0.589	3.66	-4.37	1.380	3.551	OK
		After Shock				-0.897	4.23	-7.42	2.052	5.259	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
E Group Fretting Corrosion	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.801	28.92	22.61	1.844	31.333	OK
		After Test	ΔR=20mΩMAX.			-1.321	5.75	-7.74	2.924	7.451	OK
	Discontinuity	In Test	1μsec. MAX.	5	5	No Discontinuity					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
F Group Thermal Shock	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	27.061	30.59	24.01	1.816	32.509	OK
		After Test	ΔR=20mΩMAX.			-0.685	2.67	-4.10	1.751	4.568	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
G Group High Temperature Life	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.543	28.91	22.54	1.843	31.072	OK
		After Test	ΔR=20mΩMAX.			1.239	4.91	-1.94	1.910	6.969	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK

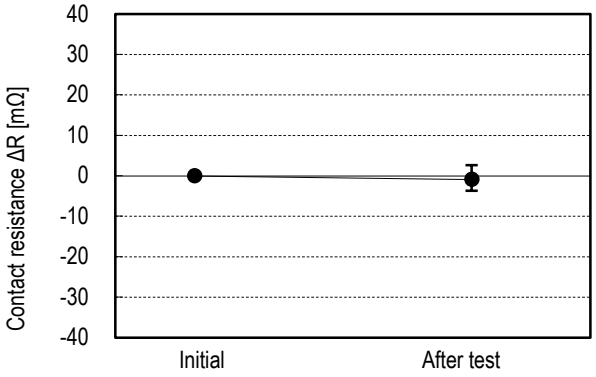
Table.3-3 FPC Test result

Test Item	Contents of Measurement		Specifications	Set	N	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
H Group Humidity (Steady State)	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.708	30.46	20.93	2.717	33.859	OK
		After Test	ΔR=20mΩMAX.			0.583	5.42	-4.38	2.758	8.857	OK
	Insulation Resistance (MΩ)	Initial	100MΩMIN.	5	20	2.0×10^5 MΩMIN.					OK
		After Test				3.0×10^4 MΩMIN.					OK
	D. W. Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	20	No Abnormality					OK
		After Test				No Abnormality					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
J Group Humidity (Cycling)	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.923	29.18	22.52	1.933	31.722	OK
		After 10th	ΔR=20mΩMAX.			-0.333	2.75	-3.73	1.952	5.523	OK
		After Test				0.450	3.86	-3.05	1.928	6.234	OK
	Insulation Resistance (MΩ)	Initial	100MΩMIN.	5	20	2.0×10^5 MΩMIN.					OK
		After Test				1.5×10^4 MΩMIN.					OK
	D. W. Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	20	No Abnormality					OK
		After Test				No Abnormality					OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK

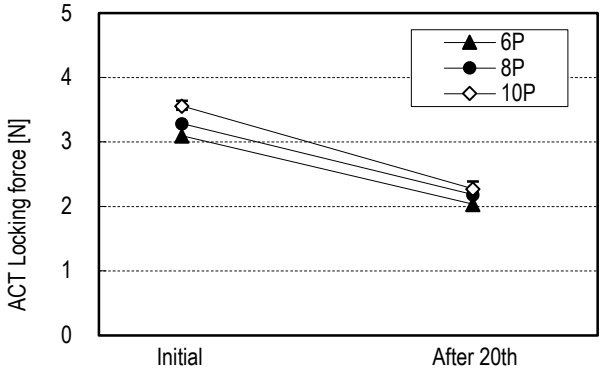
Table.3-4 FPC Test result

Test Item	Contents of Measurement		Specifications	Set	N	Data					Judge
						AVE.	MAX.	MIN.	s	X±3s	
K Group Salt Water Spray	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	26.405	29.43	23.10	1.828	31.889	OK
		After Test	ΔR=20mΩMAX.			1.041	4.81	-1.98	1.807	6.462	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
L Group Gas(H_2S)	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.356	29.12	22.27	1.807	30.777	OK
		After Test	ΔR=20mΩMAX.			1.551	6.79	-4.12	2.876	10.179	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
M Group Gas(SO_2)	Contact Resistance (mΩ)	Initial	40mΩ MAX.	5	50	25.151	28.46	21.46	2.215	31.796	OK
		After Test	ΔR=20mΩMAX.			1.098	7.22	-5.00	3.189	10.665	OK
	Appearance	After Test	No abnormality adversely affecting the performance shall occur	5	5	No Abnormality					OK
N Group Solderability	Appearance		More than 95% of the dipped surface shall be evenly wet.	5	5	Wet 95% MIN.					OK
P Group Soldering Heat Resistance	Reflow twice		No Abnormality	5	5	No Abnormality					OK
	Soldering iron										
Q Group Temperature Rising	0.5A/Contact 5.0A/Connector		ΔT=30℃MAX.	5	5	ΔT=28.1℃MAX.					OK

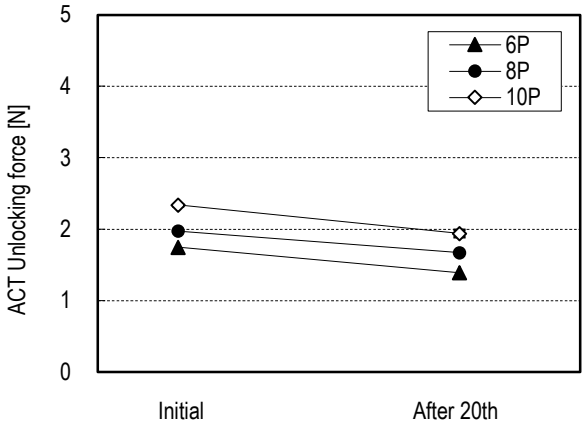
* To evaluate about Temp. Rising Test with FPC made by Taiyo Industrial Co.,Ltd (Thickness Lead : t=0.2mm, Length : L=100mm). It is a result of when applied ratings current (0.5A/Contact) between the neighboring contacts for 10pos. (With the whole connector 5.0A).



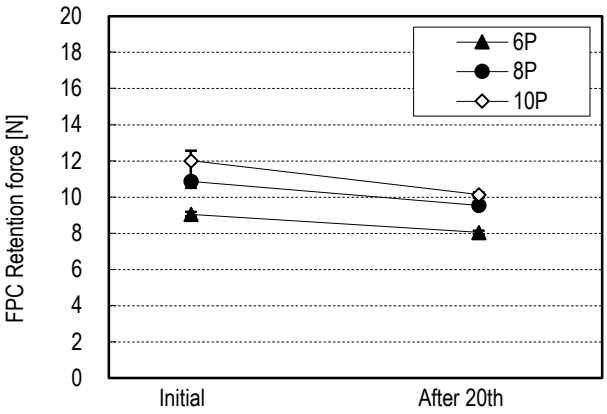
Graph 14. A change of Contact Resistance
A group : Durability



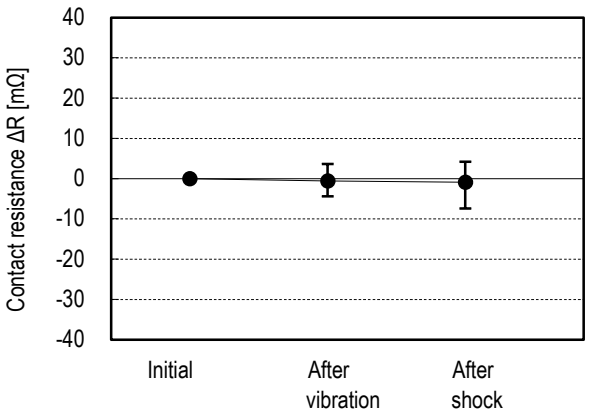
Graph 15. A change of ACT Locking Force (6P, 8P, 10P)
A group : Durability



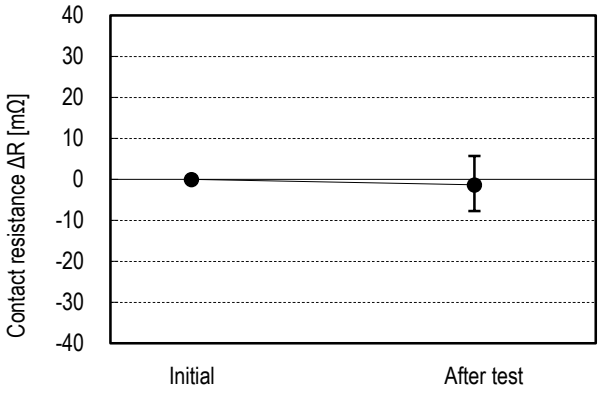
Graph 16. A change of ACT Un-locking Force (6P, 8P, 10P)
A group : Durability



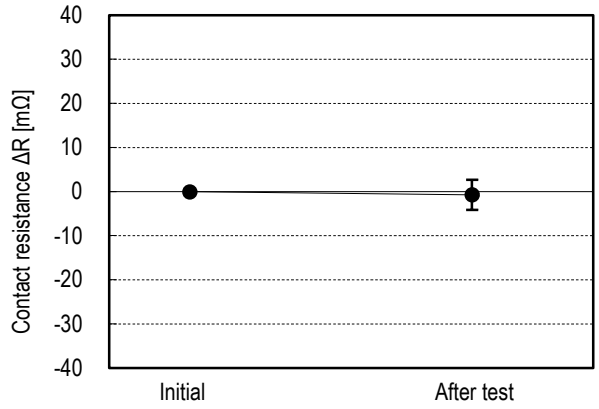
Graph 17. A change of FPC Retention Force (6P, 8P, 10P)
B group : FPC Retention Force



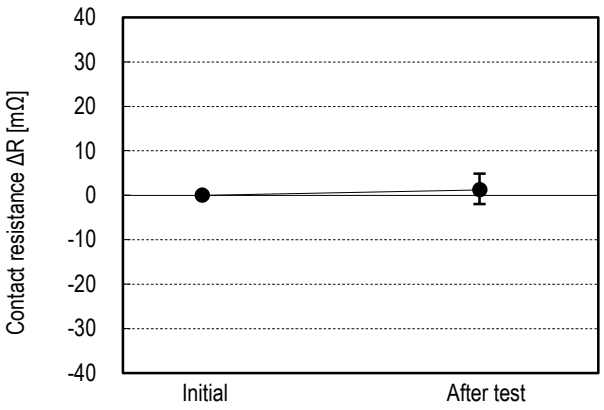
Graph 18. A change of Contact Resistance
D group : Vibration / Shock



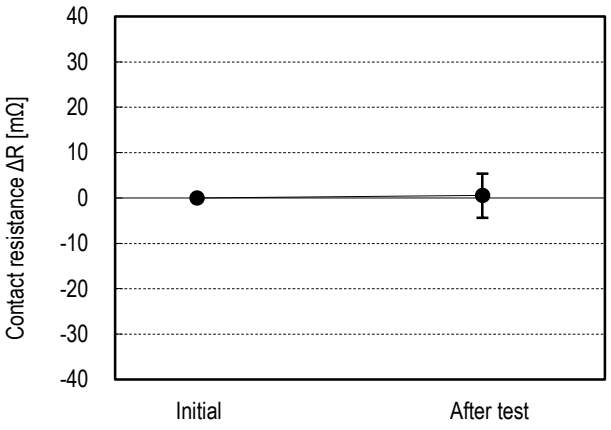
Graph 19. A change of Contact Resistance
E group : Fretting Corrosion



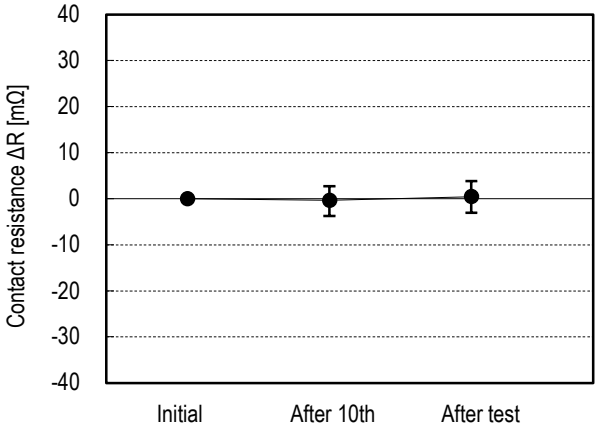
Graph 20. A change of Contact Resistance
F group : Thermal Shock



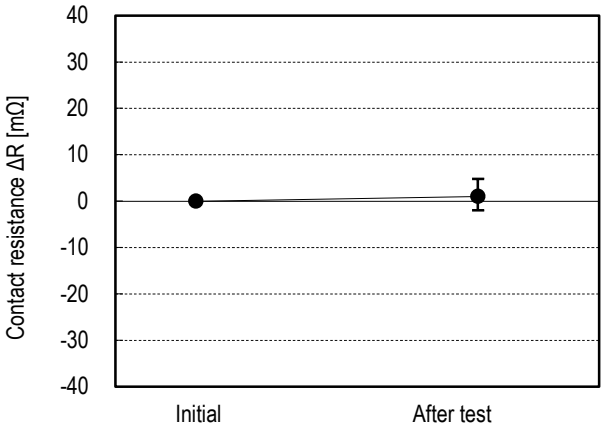
Graph 21. A change of Contact Resistance
G group : High Temp. Life



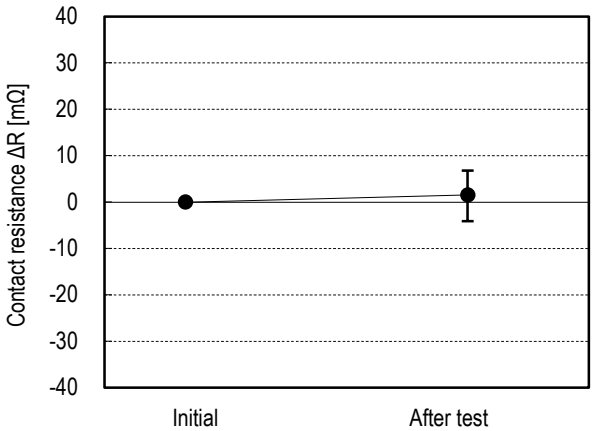
Graph 22. A change of Contact Resistance
H group : Humidity(Steady State)



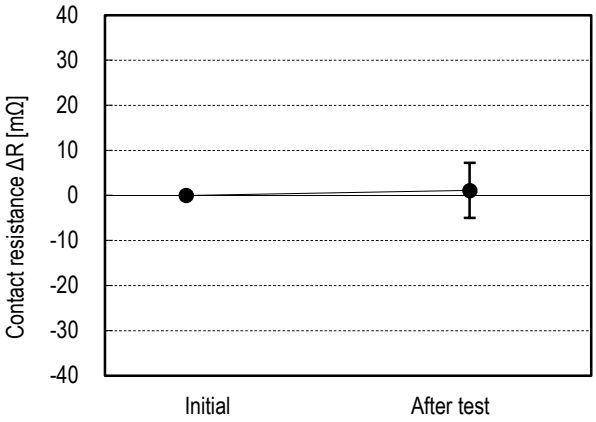
Graph 23. A change of Contact Resistance
J group : Humidity(Cycling)



Graph 24. A change of Contact Resistance
K group : Salt Water Spray



Graph 25. A change of Contact Resistance
L group : Gas (H2S)



Graph 26. A change of Contact Resistance
M group : Gas (SO2)