CABLINE® V Connector (Red Phosphorus Free)

Part No. Plug: 20345-#**T-##R Receptacle: 20347-#**T-##R

Test Report

Product Specification no. PRS-1461

Rev.	ECN	Date	Prepared by	Checked by	Approved by
5	T22037	March 9, 2022	R.Hatano	T.Tanigawa	H.Ikari
4	T18021	March 7, 2018	K.Ikeshita		T.Matsumoto
3	T17099	June 16, 2017	M.Kawasaki	M.Ishimaru	H.Ikari
2	T15188	November 19, 2015	H.Mashima		J.Tateishi

1. Purpose

To evaluate the performance of CABLINE V CONN. in accordance with PRS-1461.

2. Specimen

(1) CABLINE V PLUG FOR CABLE ASS'Y (Parts No. 20345-#**T-##R)

(2) CABLINE V RECEPTACLE ASS'Y (Parts No. 20347-#**E-##R)

3. Test Sequence

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

4. Result

See Table 2-1 to 2-6, Graph 1 to 20. For the details of the testing conditions and requirements, see PRS-1461.
The "n" in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-1461.

Table1 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	1,3	1,3	1,5	1,5,7	1,3	1,3			
Insulation Resistance						2,6	2,8					
D. W. Voltage						3,7	3,9					
Temperature Rising												1
Mating Force	1,5											
Unmating Force	3,7											
Durability	4						4 (10cycles)					
Contact Retention Force		1,3										
Cable Retention Force	8											
Vibration			2									
Shock			4									
Thermal Shock				2								
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 pos.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.

※The number of group is test sequence.

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#42 650mΩ MAX.	5	200	614.681	627.04	603.04	6.762	634.967	OK
			After 30th Cycle	AWG#42 ΔR=40mΩMAX.			0.716	2.68	-1.65	1.153	4.175	OK
	GND Resistance (mΩ) Stainless steel		Initial	50mΩ MAX.	5	—	27.927	28.29	27.31	0.537	29.538	OK
			After 30th Cycle	ΔR=40mΩMAX			1.203	1.26	1.15	0.055	1.368	OK
	GND Resistance (mΩ) Phosphor Bronze		Initial	50mΩ MAX.	5	—	18.753	19.15	18.07	0.594	20.535	OK
			After 30th Cycle	ΔR=40mΩMAX			0.867	1.24	0.13	0.638	2.781	OK
	10P Without Lock	Mating Force (N)	Initial	20.0N MAX.	5	—	7.658	8.51	6.75	0.638	9.572	OK
			After 30th Cycle	20.0N MAX.			4.334	4.89	3.60	0.476	5.762	OK
		Un-mating Force (N)	Initial	2.5N MIN.	5	—	4.320	4.74	3.95	0.294	3.438	OK
			After 30th Cycle	2.5N MIN.			3.330	3.63	3.15	0.204	2.718	OK
		Cable Retention Force(N)		4.9N MIN.	5	—	63.008	71.52	52.35	7.516	40.460	OK
	10P With Lock	Mating Force (N)	Initial	20.0N MAX.	5	—	7.686	8.50	6.88	0.591	9.459	OK
			After 30th Cycle	20.0N MAX.			6.396	6.68	6.11	0.205	7.011	OK
		Un-mating Force (N)	Initial	4.0N MIN.	5	—	7.154	7.56	6.85	0.266	6.356	OK
			After 30th Cycle	4.0N MIN.			6.580	7.01	6.23	0.311	5.647	OK
	15P Without Lock	Mating Force (N)	Initial	22.5N MAX.	5	—	8.803	9.20	8.31	0.323	9.772	OK
			After 30th Cycle	22.5N MAX.			5.530	5.78	5.21	0.216	6.178	OK
		Un-mating Force (N)	Initial	5.0N MIN.	5	—	5.190	5.50	4.91	0.214	4.548	OK
			After 30th Cycle	5.0N MIN.			4.596	4.78	4.21	0.257	3.825	OK
		Cable Retention Force(N)		7.35N MIN.	5	—	63.498	69.58	57.56	4.980	48.558	OK
	15P With Lock	Mating Force (N)	Initial	22.5N MAX.	5	—	8.284	8.49	8.01	0.210	8.914	OK
			After 30th Cycle	22.5N MAX.			6.770	7.23	6.43	0.320	7.730	OK
		Un-mating Force (N)	Initial	5.0N MIN.	5	—	8.120	8.45	7.89	0.207	7.499	OK
			After 30th Cycle	5.0N MIN.			7.298	7.56	7.10	0.198	6.704	OK

Table.2-2 Test result

Test Item	Measurements			Spec.	Set	n	DATA					Judge
							AVE.	MAX.	MIN.	s	X±3s	
A Group Durability Cable Retention Force	20P Without Lock	Mating Force (N)	Initial	25.0N MAX.	5	—	9.932	10.21	9.92	0.377	11.063	OK
			After 30th Cycle	25.0N MAX.			6.755	7.10	6.52	0.216	7.403	OK
		Un-mating Force (N)	Initial	3.5N MIN.	5	—	5.632	6.10	5.12	0.426	4.354	OK
			After 30th Cycle	3.5N MIN.			5.141	5.65	4.82	0.343	4.112	OK
		Cable Retention Force(N)		9.8N MIN.	5	—	63.838	69.40	59.87	3.787	52.477	OK
	20P With Lock	Mating Force (N)	Initial	25.0N MAX.	5	—	9.368	9.78	9.02	0.279	10.205	OK
			After 30th Cycle	25.0N MAX.			7.312	7.78	7.02	0.306	8.230	OK
		Un-mating Force (N)	Initial	5.5N MIN.	5	—	8.610	8.89	8.36	0.221	7.947	OK
			After 30th Cycle	5.5N MIN.			7.950	8.23	7.56	0.274	7.128	OK
	25P Without Lock	Mating Force (N)	Initial	27.5N MAX.	5	—	10.494	11.30	10.02	0.624	12.366	OK
			After 30th Cycle	27.5N MAX.			7.936	8.25	7.11	0.467	9.337	OK
		Un-mating Force (N)	Initial	4.0N MIN.	5	—	6.196	6.30	6.00	0.117	5.845	OK
			After 30th Cycle	4.0N MIN.			6.078	6.28	5.62	0.267	5.277	OK
		Cable Retention Force(N)		12.25N MIN.	5	—	68.740	70.03	67.26	1.042	65.614	OK
	25P With Lock	Mating Force (N)	Initial	27.5N MAX.	5	—	10.748	11.21	10.14	0.507	12.269	OK
			After 30th Cycle	27.5N MAX.			7.770	8.23	7.06	0.600	9.570	OK
		Un-mating Force (N)	Initial	6.0N MIN.	5	—	9.136	9.27	9.01	0.114	8.794	OK
			After 30th Cycle	6.0N MIN.			8.194	8.27	8.11	0.078	7.960	OK
	30P Without Lock	Mating Force (N)	Initial	30.0N MAX.	5	—	14.110	14.99	12.37	1.062	17.296	OK
			After 30th Cycle	30.0N MAX.			9.206	10.21	8.60	0.616	11.054	OK
		Un-mating Force (N)	Initial	4.5N MIN.	5	—	7.680	8.37	7.33	0.405	6.465	OK
			After 30th Cycle	4.5N MIN.			6.180	6.51	5.64	0.357	5.109	OK
		Cable Retention Force(N)		14.7N MIN.	5	—	81.442	83.65	78.11	2.084	75.190	OK
	30P With Lock	Mating Force (N)	Initial	30.0N MAX.	5	—	13.972	14.45	12.98	0.635	15.877	OK
			After 30th Cycle	30.0N MAX.			9.968	10.40	9.38	0.468	11.372	OK
		Un-mating Force (N)	Initial	7.0N MIN.	5	—	9.988	10.47	9.18	0.511	8.455	OK
			After 30th Cycle	7.0N MIN.			8.748	9.13	8.14	0.368	7.644	OK

Table.2-3 Test result

Test Item	Measurements			Spec.	Set	n	DATA					Judge
							AVE.	MAX.	MIN.	s	X±3s	
A Group Durability Cable Retention Force	35P Without Lock	Mating Force (N)	Initial	32.5N MAX.	5	—	16.306	17.22	15.44	0.691	18.379	OK
			After 30th Cycle	32.5N MAX.			10.468	11.00	10.05	0.369	11.575	OK
		Un-mating Force (N)	Initial	5.0N MIN.	5	—	8.150	8.33	8.00	0.157	7.679	OK
			After 30th Cycle	5.0N MIN.			7.224	7.87	6.44	0.526	5.646	OK
		Cable Retention Force(N)		17.15N MIN.	5	—	89.484	92.55	83.59	3.545	78.849	OK
	35P With Lock	Mating Force (N)	Initial	32.5N MAX.	5	—	15.800	16.91	14.01	1.076	19.028	OK
			After 30th Cycle	32.5N MAX.			11.262	11.79	10.49	0.535	12.867	OK
		Un-mating Force (N)	Initial	8.0N MIN.	5	—	11.078	11.97	10.31	0.720	8.918	OK
			After 30th Cycle	8.0N MIN.			10.656	11.71	9.76	0.786	8.298	OK
	40P Without Lock	Mating Force (N)	Initial	35.0N MAX.	5	—	18.068	19.06	17.23	0.760	20.348	OK
			After 30th Cycle	35.0N MAX.			11.886	12.49	11.40	0.474	13.308	OK
		Un-mating Force (N)	Initial	5.5N MIN.	5	—	8.634	9.18	7.92	0.496	7.146	OK
			After 30th Cycle	5.5N MIN.			7.694	8.15	7.03	0.428	6.410	OK
		Cable Retention Force(N)		19.6N MIN.	5	—	94.972	101.48	85.50	6.756	74.704	OK
	40P With Lock	Mating Force (N)	Initial	35.0N MAX.	5	—	17.120	18.36	16.46	0.792	19.496	OK
			After 30th Cycle	35.0N MAX.			12.154	13.14	11.38	0.857	14.725	OK
		Un-mating Force (N)	Initial	8.5N MIN.	5	—	12.638	13.18	11.62	0.704	10.526	OK
			After 30th Cycle	8.5N MIN.			11.366	12.12	10.72	0.642	9.440	OK
B Group High Temp. Life	C/T Retention Force (PLUG) (N)		Initial	0.6N MIN.	—	20	1.554	1.99	1.03	0.244	0.822	OK
			After Testing	0.6N MIN.	—	20	1.534	2.05	0.99	0.271	0.721	OK
	C/T Retention Force (RECE.) (N)		Initial	0.6N MIN.	—	20	1.055	1.16	0.96	0.046	0.917	OK
			After Testing	0.6N MIN.	—	20	1.098	1.24	0.98	0.058	0.924	OK

Table.2-4 Test result

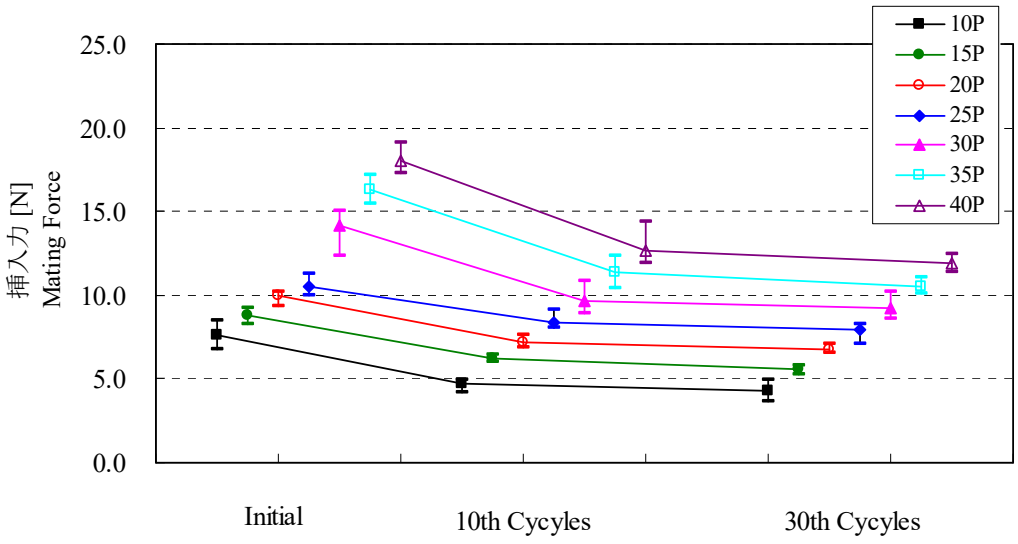
Test Item	Measurements		Spec.	Set	n	DATA					Judge
						AVE.	MAX.	MIN.	s	X±3s	
C Group Vibration Shock	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	613.012	625.33	602.13	8.327	637.993	OK
		After Vibration	AWG#42 ΔR=40mΩMAX.			0.962	2.15	-0.95	1.316	4.91	OK
		After Shock	AWG#42 ΔR=40mΩMAX.			0.912	3.01	-0.91	1.742	6.138	OK
	GND Resistance (mΩ) Stainless Steel	Initial	50mΩ MAX.	5	—	25.238	26.35	23.70	1.029	28.325	OK
		After Vibration	ΔR=40mΩMAX.			1.58	3.28	0.12	1.199	5.177	OK
		After Shock	ΔR=40mΩMAX.			1.742	3.24	0.27	1.135	5.147	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	19.266	19.76	18.67	0.467	20.667	OK
		After Vibration	ΔR=40mΩMAX.			1.826	2.66	0.20	0.947	4.667	OK
		After Shock	ΔR=40mΩMAX.			1.994	3.42	0.74	0.977	4.925	OK
	Electrical Discontinuity	During Vibration	1μsec. MAX.	5	—	No discontinuity					OK
		During Shock				No discontinuity					OK
	Appearance	After Vibration	No abnormality adversely affecting the performance shall occur.	5	—	No abnormality					OK
		After Shock				No abnormality					OK
D Group Thermal Shock	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	604.657	619.25	589.18	8.988	631.621	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			-1.325	1.33	-3.99	1.422	2.941	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	—	27.103	28.01	26.14	0.936	29.911	OK
		After Testing	ΔR=40mΩMAX.			0.840	2.21	-0.96	1.628	5.724	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	19.577	20.20	19.21	0.543	21.206	OK
		After Testing	ΔR=40mΩMAX.			1.443	3.11	0.12	1.524	6.015	OK
E Group High Temp. Life	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	616.121	628.10	605.01	7.007	637.142	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			1.127	3.99	-1.33	1.479	5.564	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	—	27.173	27.22	27.13	0.045	27.308	OK
		After Testing	ΔR=40mΩMAX.			0.540	1.29	0.10	0.653	2.499	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	20.603	21.28	19.30	1.129	23.990	OK
		After Testing	ΔR=40mΩMAX.			0.850	1.23	0.15	0.607	2.671	OK

Table.2-5 Test result

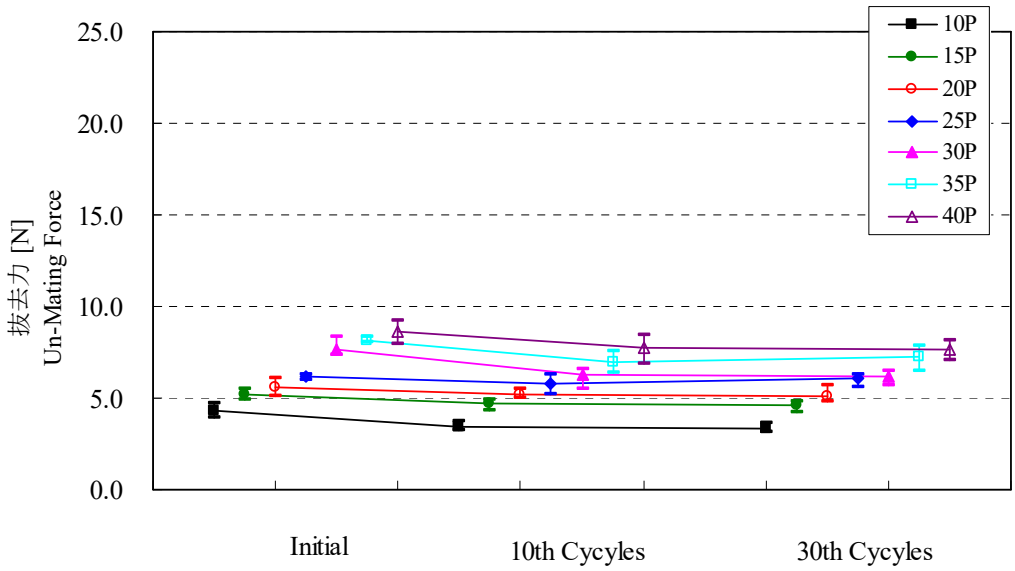
Test Item	Measurements		Spec.	Set	n	DATA					Judge
						AVE.	MAX.	MIN.	s	X±3s	
F Group Humidity (Steady State)	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	613.792	627.21	601.05	7.714	636.934	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			-2.150	1.33	-5.32	1.774	3.172	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	—	27.483	28.23	27.04	0.650	29.433	OK
		After Testing	ΔR=40mΩMAX.			0.853	2.09	-0.73	1.442	5.179	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	19.110	19.13	19.09	0.020	19.170	OK
		After Testing	ΔR=40mΩMAX.			1.197	1.29	1.14	0.081	1.440	OK
	Insulation Resistance (mΩ)	Initial	1000MΩ MIN.	5	100	7.0×103 MΩ MIN.					OK
		After Testing	500MΩ MIN.			2.0×103 MΩ MIN.					OK
	D.W.Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur.	5	100	No abnormality					OK
		After Testing				No abnormality					OK
G Group Humidity (Cycling)	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	613.014	627.26	599.04	8.498	638.508	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			-2.027	0.97	-4.83	1.557	2.644	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	—	27.570	28.27	27.20	0.607	29.391	OK
		After Testing	ΔR=40mΩMAX.			1.560	2.28	1.16	0.625	3.435	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	19.797	20.10	19.22	0.500	21.297	OK
		After Testing	ΔR=40mΩMAX.			0.813	2.26	0.02	1.255	4.578	OK
	Insulation Resistance (mΩ)	Initial	1000MΩ MIN.	5	100	7.5×103 MΩ MIN.					OK
		After Testing	500MΩ MIN.			3.5×103 MΩ MIN.					OK
	D.W.Voltage	Initial	No abnormalities such as creeping discharge, flashover, insulator breakdown occur	5	100	No abnormality					OK
		After Testing				No abnormality					OK
H Group Salt Water Spray	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	611.286	625.14	599.01	7.924	635.058	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			1.057	3.60	-1.64	1.444	5.389	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	—	26.517	27.04	26.22	0.455	27.882	OK
		After Testing	ΔR=40mΩMAX.			1.143	2.11	0.04	1.042	4.269	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	—	19.247	19.28	19.19	0.049	19.394	OK
		After Testing	ΔR=40mΩMAX.			1.797	3.09	0.13	1.515	6.342	OK

Table.2-6 Test result

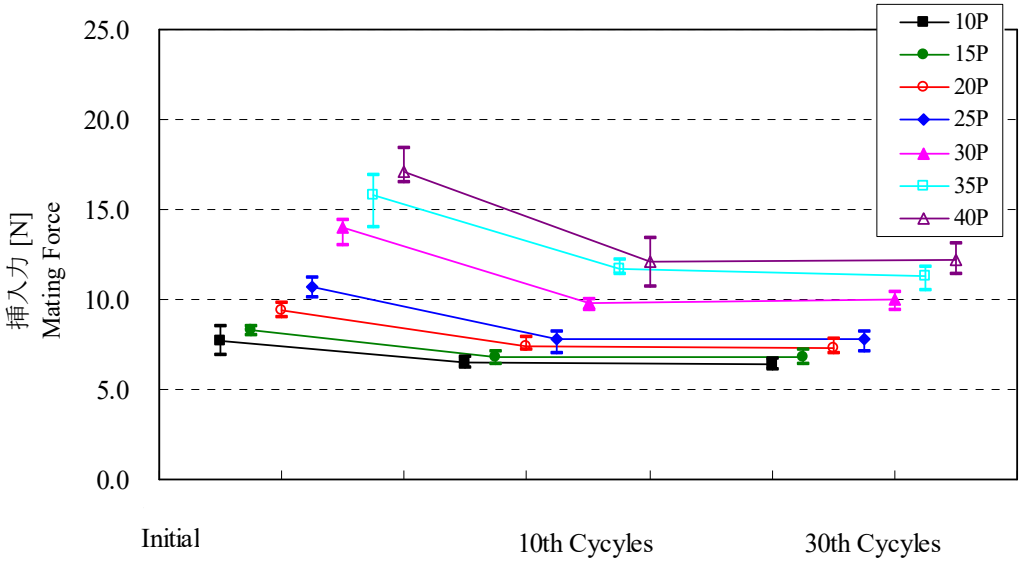
Test Item	Measurements		Spec.	Set	n	DATA					Judge
						AVE.	MAX.	MIN.	s	X±3s	
J Group Gas(H2S)	Contact Resistance (mΩ)	Initial	AWG#42 650mΩ MAX.	5	200	612.291	624.2	599.13	7.718	635.445	OK
		After Testing	AWG#42 ΔR=40mΩMAX.			-0.575	2.47	-3.74	1.648	4.369	OK
	GND Resistance (mΩ) Stainless steel	Initial	50mΩ MAX.	5	–	27.063	28.13	26.01	1.06	30.243	OK
		After Testing	ΔR=40mΩMAX.			0.817	2.23	0.07	1.225	4.492	OK
	GND Resistance (mΩ) Phosphor Bronze	Initial	50mΩ MAX.	5	–	19.133	20.21	18.12	1.046	22.271	OK
		After Testing	ΔR=40mΩMAX.			1.223	2.28	0.13	1.075	4.448	OK
K Group Solderability	Appearance		More than 95% wet	15	–	Wet 95% MIN.					OK
L Group Soldering Heat Resistance	Appearance		No deformation nor defect adversely affecting the performance occur.	15	–	No abnormality					OK
M Group Temperature Rise	AWG#42:0.24A(40P)		ΔT=30℃ MAX.	5	–	ΔT=19.4℃ MAX.					OK



A change of Mating Force Without Lock/ A Group : Mating Force



A change of Unmating Force Without Lock/ A Group : Unmating Force



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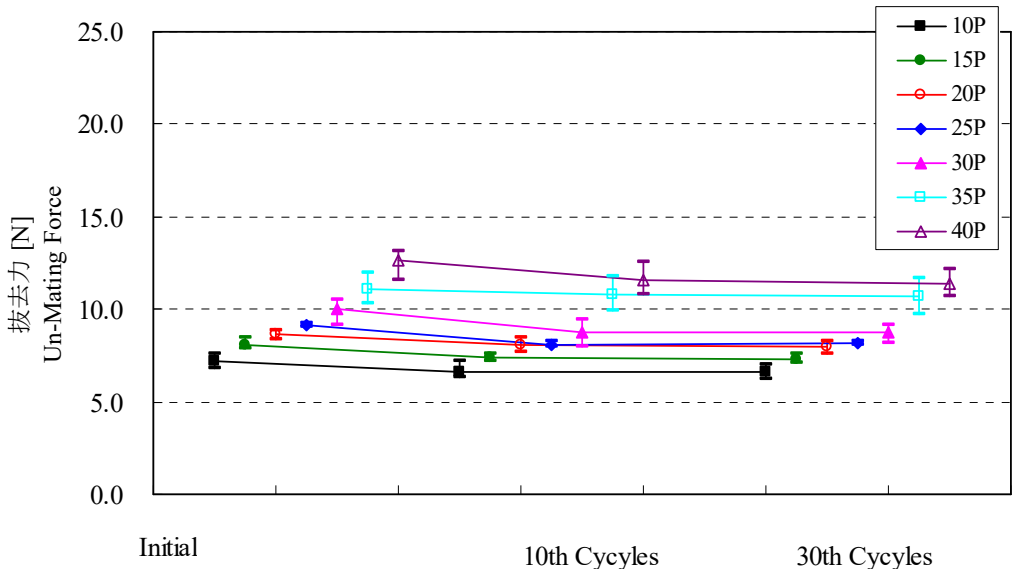

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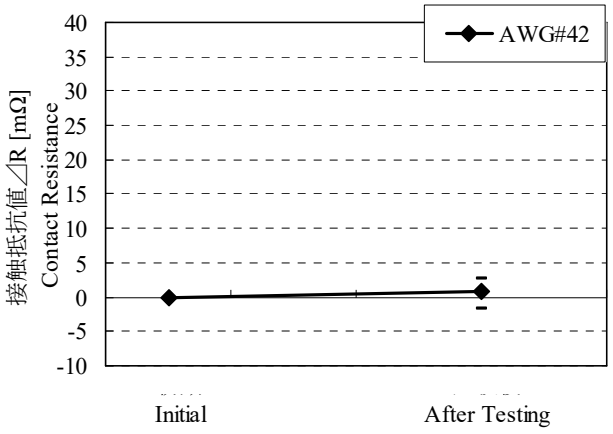
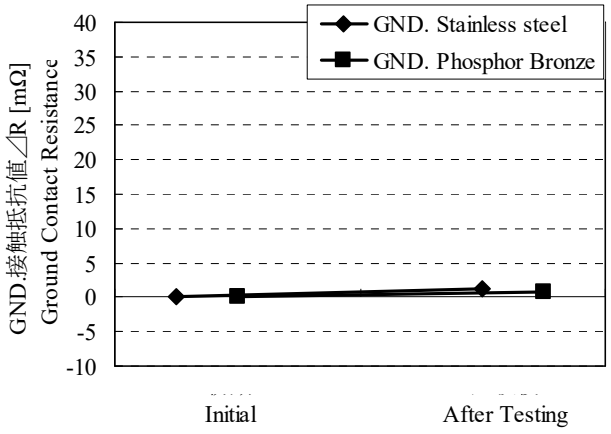
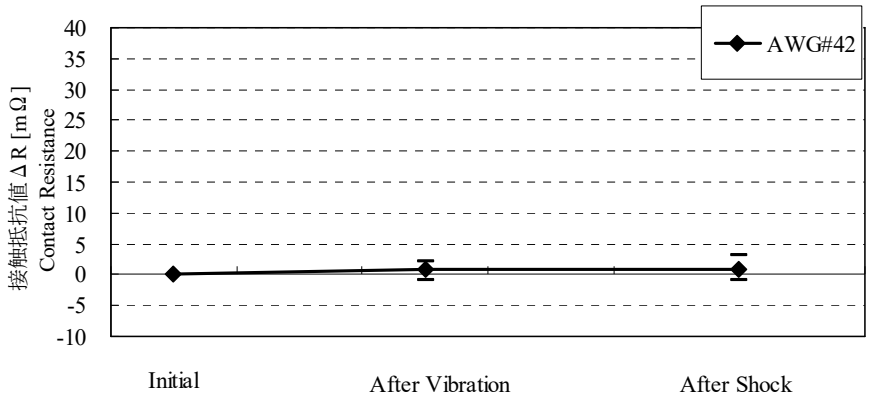


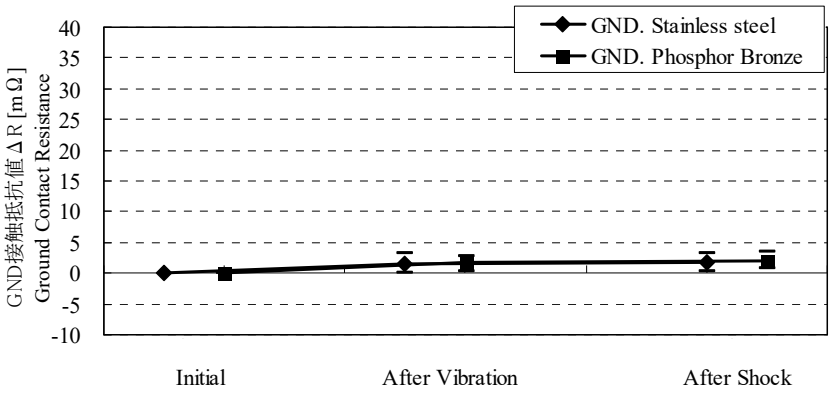
A change of contact resistance
A group : Durability



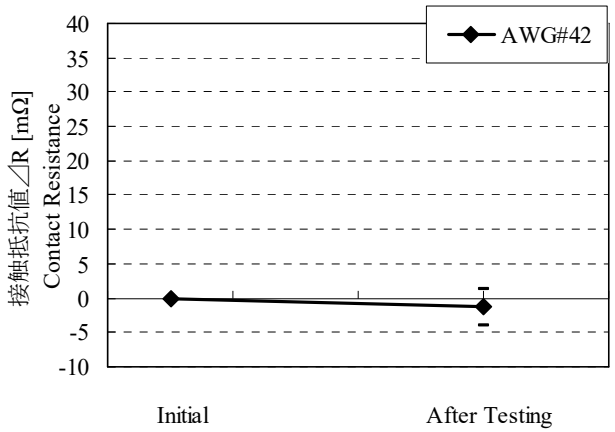
A change of ground contact resistance
A group : Durability



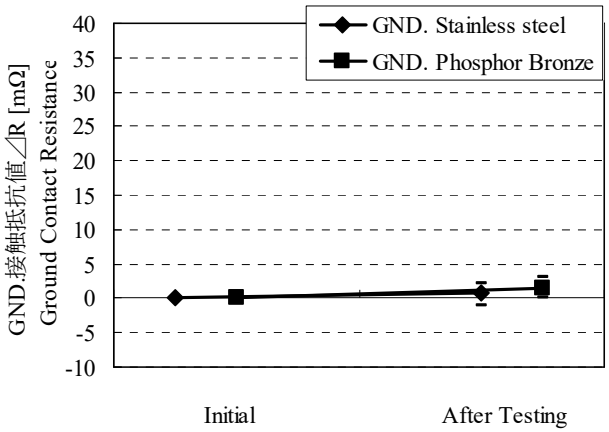
A change of contact resistance
C group : Vibration / Shock



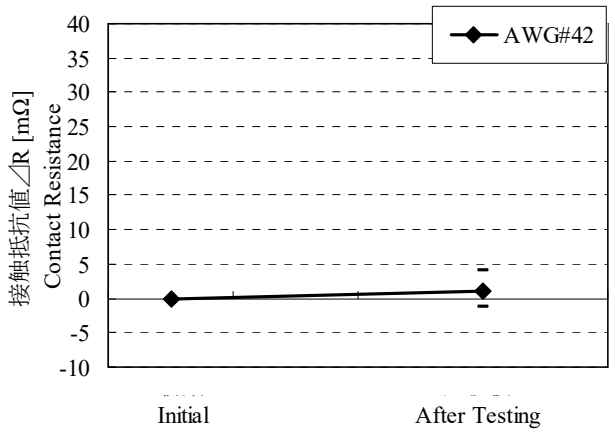
A change of ground contact resistance
C group : Vibration / Shock



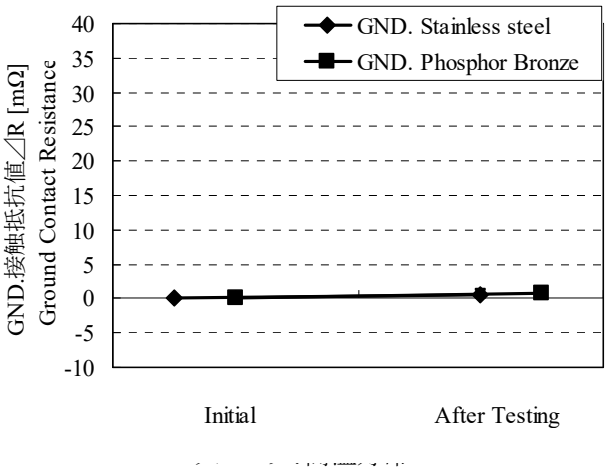
A change of contact resistance
D group : Thermal Shock



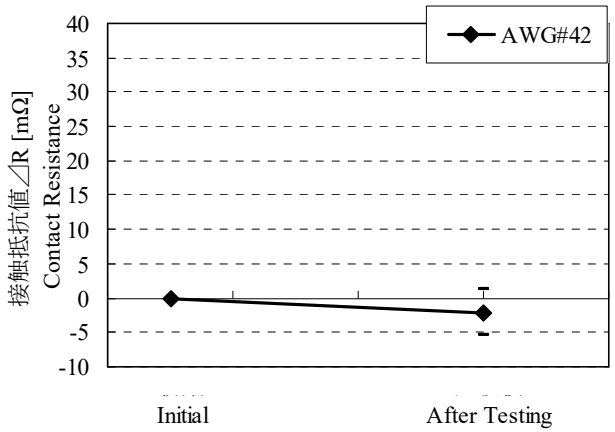
A change of ground contact resistance
D group : Thermal Shock



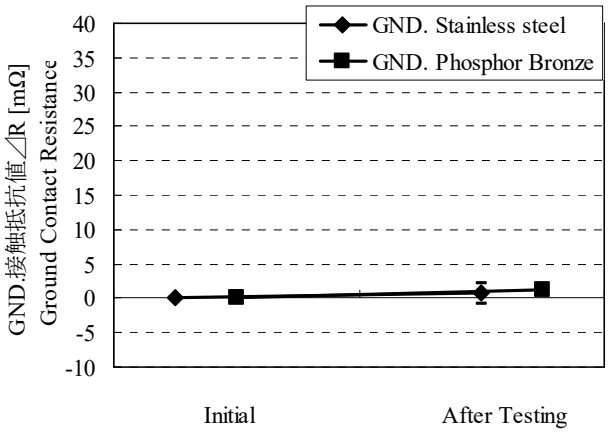
A change of contact resistance
E group : High Temp. Life



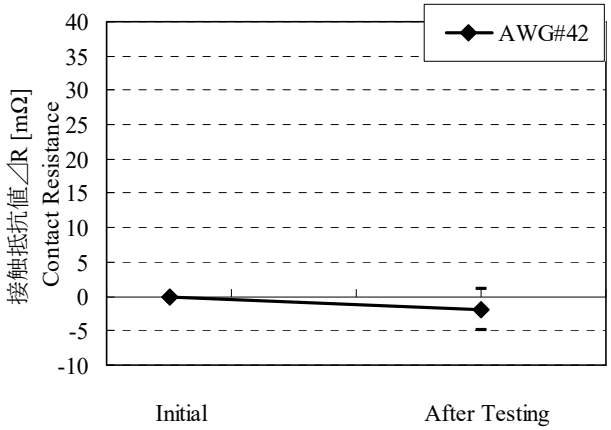
A change of ground contact resistance
E group : High Temp. Life



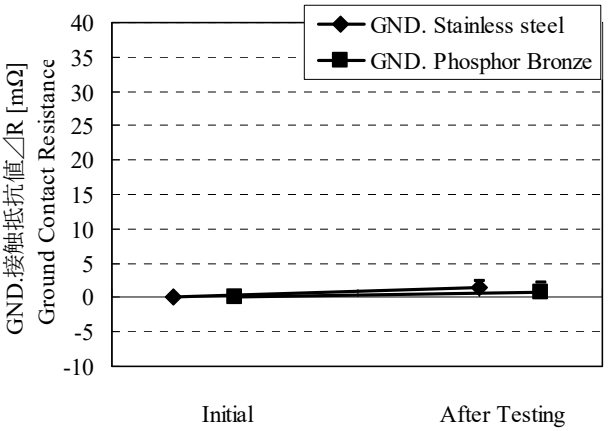
A change of contact resistance
F group : Humidity (Steady State)



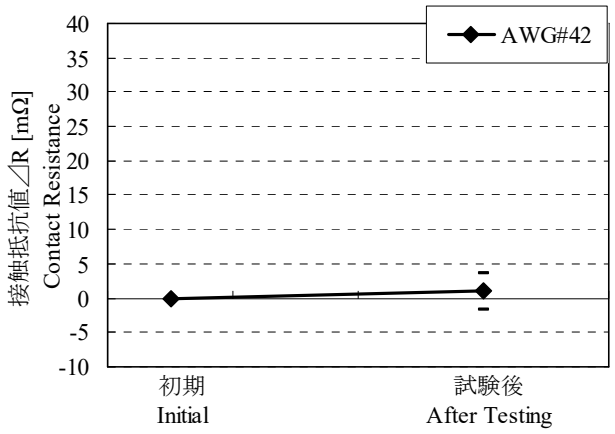
A change of ground contact resistance
F group : Humidity (Steady State)



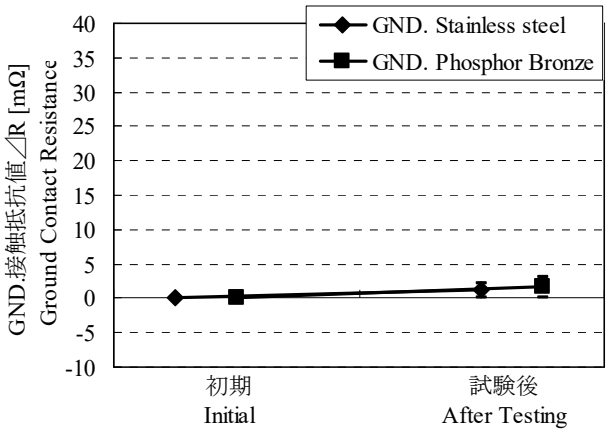
A change of contact resistance
G group : Humidity (Cycling)



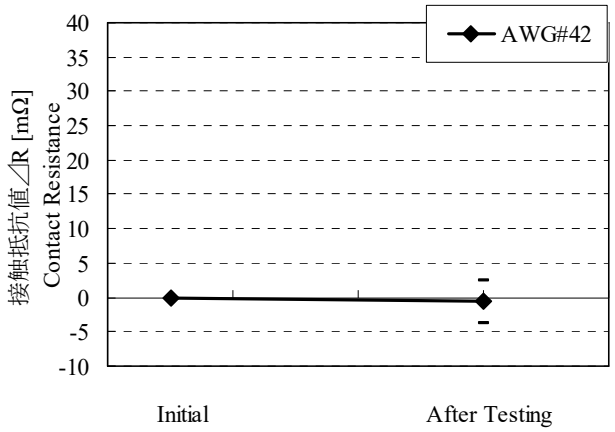
A change of ground contact resistance
G group : Humidity Cycle



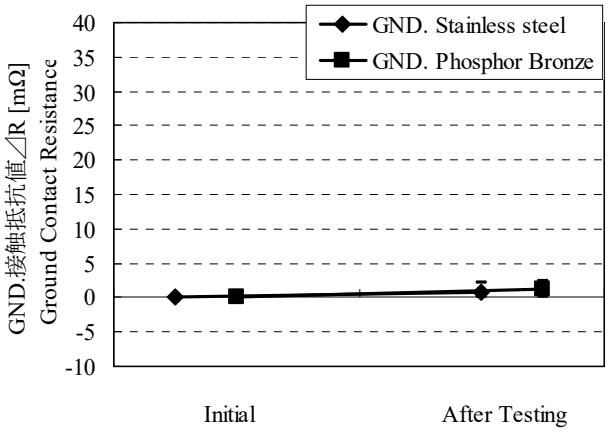
A change of contact resistance
H group : Salt Water Spray



A change of ground contact resistance
H group : Salt Water Spray



A change of contact resistance
J group : Gas (H_2S)



A change of ground contact resistance
J group : Gas (H_2S)