

MHF® 4L Connector

Part No. Plug: 20565-001R-13, 20572-001R-08 / Receptacle: 20449-001E-**

Test Report

Product Specification no. PRS-1772

8	T21184	December 14, 2021	N. Miyashiro	K. Ikeshita	M. Takemoto
7	T21093	October 22, 2021	K. Ikeshita		M. Takemoto
6	T21032	May 19, 2021	N. Miyashiro	K. Ikeshita	M. Takemoto
5	T20085	October 23, 2020	J.Tonai		M. Takemoto
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose

To evaluate the performance of MHF 4L Connector in accordance with PRS-1772.

2. Specimen

- (1) MHF 4L PLUG (Part No: 20565-001R-13)
Cable : AWG#32 coaxial cable (Jacket diameter 1.13mm)
- (2) MHF 4L PLUG (Part No: 20572-001R-08)
Cable : AWG#36 coaxial cable (Jacket diameter 0.81mm)
- (3) MHF 4 RECEPTACLE (Part No. 20449-001E-**)

3. Test Sequence

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

4. Result

See Table 2, and graphs following Graph 1. For the details of the testing conditions and requirements, see PRS-1772. The "n" in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-1772.

Table 1 Test Sequence and Sample Quantity

Test Item	Group																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	
Contact resistance						1,3		1,3	1,3	1,5	1,3	1,3	1,3	1,3			
Insulation resistance										2,6		2,6					
Dielectric withstanding voltage	1									3,7		3,7					
VSWR		1															
Mating force / Unmating force			1														
Cable retention force at 30 degree				1													
.Cable retention force at 0 degree					1												
Durability						2											
Receptacle shearing strength							1										
Vibration								2									
Shock									2								
Thermal shock										4							
High temperature life											2						
Humidity(Steady state)												4					
Salt water spray													2				
H ₂ S gas														2			
Solder ability																1	
Soldering heat resistance																	1
試料数	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	12 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	10 pcs.	

※Numbers indicate sequence in which tests are performed.

Table 2-1 Test Result

Group	Test items		Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement
	Measurements									
A	Dielectric withstanding voltage		Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.							
	Plug Part No. 20565-001R-13									
	After testing		-	10	-	No abnormality				Pass
	Plug Part No. 20572-001R-08									
After testing		-	10	-	No abnormality				Pass	
B	VSWR									
	Plug Part No. 20565-001R-13									
	0.1~3.0GHz	1.3 MAX.	10	-	1.112	1.14	1.08	0.015	Pass	
	3.0~6.0GHz	1.45 MAX.		-	1.283	1.32	1.24	0.020	Pass	
	6.0~9.0GHz	1.6 MAX.		-	1.404	1.44	1.33	0.033	Pass	
	9.0~12.0GHz	1.9 MAX.		-	1.490	1.53	1.45	0.021	Pass	
	Plug Part No. 20572-001R-08									
	0.1~3.0GHz	1.3 MAX.	10	-	1.153	1.17	1.13	0.009	Pass	
	3.0~6.0GHz	1.45 MAX.		-	1.326	1.38	1.30	0.020	Pass	
	6.0~9.0GHz	1.6 MAX.		-	1.437	1.50	1.39	0.029	Pass	
	9.0~12.0GHz	1.9 MAX.		-	1.529	1.62	1.47	0.039	Pass	
	Receptacle									
	0.1~3.0GHz	1.3 MAX.	10	-	1.114	1.15	1.08	0.027	Pass	
	3.0~6.0GHz	1.4 MAX.		-	1.138	1.15	1.12	0.009	Pass	
	6.0~9.0GHz	1.5 MAX.		-	1.356	1.41	1.31	0.038	Pass	
	C	Mating force								
Plug Part No. 20565-001R-13										
Initial		30 N MAX.	10	N	19.97	21.9	19.3	0.93	Pass	
After 30 cycles		30 N MAX.			8.28	9.4	7.2	0.78	Pass	
Plug Part No. 20572-001R-08										
Initial		30 N MAX.	10	N	23.40	26.1	20.4	1.69	Pass	
After 30 cycles		30 N MAX.			9.30	10.3	8.4	0.61	Pass	
Unmating force										
Plug Part No. 20565-001R-13										
Initial		20 N MAX. 5 N MIN.	10	N	14.12	14.7	13.5	0.41	Pass	
After 30 cycles		20 N MAX. 3 N MIN.			8.95	9.3	8.0	0.40	Pass	
Plug Part No. 20572-001R-08										
Initial	20 N MAX. 5 N MIN.	10	N	15.10	16.1	14.3	0.60	Pass		
After 30 cycles	20 N MAX. 3 N MIN.			10.33	11.4	9.2	0.70	Pass		
D	Cable retention force at 30 degree									
	Plug Part No. 20565-001R-13									
	Electrical discontinuity									
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.									
	-	-	10	-	No discontinuity				Pass	
	Appearance									
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	Initial	No abnormality	10	-	No abnormality				Pass	
	After testing	No abnormality			No abnormality				Pass	
	Plug Part No. 20572-001R-08									
	Electrical discontinuity									
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.									
-	-	10	-	No discontinuity				Pass		
Appearance										
Initial	No abnormality	10	-	No abnormality				Pass		
After testing	No abnormality			No abnormality				Pass		

Table 2-2 Test Result

Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement
	Measurements								
E	Cable retention force at 0 degree								
	Plug Part No. 20565-001R-13								
	Electrical discontinuity								
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.								
		-	-	10	-	No discontinuity			Pass
	Appearance								
	Initial	No abnormality	10	-	No abnormality			Pass	
	After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08								
	Electrical discontinuity								
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.								
		-	-	10	-	No discontinuity			Pass
Appearance									
Pass criteria: No abnormality adversely affecting the performance shall occur									
Initial	No abnormality	10	-	No abnormality			Pass		
After testing	No abnormality			No abnormality			Pass		
F	Durability								
	Plug Part No. 20565-001R-13								
	Contact resistance of main contact								
	Initial	20mΩ MAX.	10	mΩ	9.46	10.0	8.7	0.48	Pass
	After testing	-			9.33	9.9	8.8	0.40	-
	ΔR	ΔR 20mΩ MAX.			-0.14	0.7	-0.8	0.54	Pass
	Contact resistance of ground contact								
	Initial	20mΩ MAX.	10	mΩ	6.82	7.2	6.4	0.26	Pass
	After testing	-			7.69	8.6	6.8	0.62	-
	ΔR	ΔR 20mΩ MAX.			0.88	2.0	-0.3	0.72	Pass
	Appearance								
	Pass criteria: No abnormality adversely affecting the performance shall occur								
	Initial	No abnormality	10	-	No abnormality			Pass	
	After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08								
	Contact resistance of main contact								
	Initial	20mΩ MAX.	10	mΩ	8.05	11.0	6.2	1.39	Pass
	After testing	-			9.07	12.1	6.2	1.90	-
	ΔR	ΔR 20mΩ MAX.			1.03	3.3	-0.8	1.26	Pass
	Contact resistance of ground contact								
	Initial	20mΩ MAX.	10	mΩ	5.87	6.1	5.6	0.18	Pass
	After testing	-			6.19	7.0	5.5	0.47	-
	ΔR	ΔR 20mΩ MAX.			0.32	0.9	-0.5	0.48	Pass
	Appearance								
Pass criteria: No abnormality adversely affecting the performance shall occur									
Initial	No abnormality	10	-	No abnormality			Pass		
After testing	No abnormality			No abnormality			Pass		
G	Shearing strength								
	Direction①	20 N MIN.	3	N	33.83	37.7	30.1	-	Pass
	Direction②	20 N MIN.			27.83	30.8	25.2	-	Pass
	Direction③	20 N MIN.			27.60	28.6	25.8	-	Pass
	Direction④	20 N MIN.			27.47	29.8	25.8	-	Pass

Table 2-3 Test Result

Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
H	Vibration									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	9.78	11.0	9.1	0.68	Pass
		After testing	-			11.14	12.3	9.3	0.96	-
		ΔR	ΔR 20mΩ MAX.			1.36	2.5	0.1	0.69	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.77	8.0	6.0	0.60	Pass
		After testing	-			7.14	7.7	6.6	0.31	-
		ΔR	ΔR 20mΩ MAX.			0.37	1.2	-1.0	0.61	Pass
	Electrical discontinuity									
		Pass criteria: No electrical discontinuity greater than 1μs shall occur.								
		After testing	-	10	-	No discontinuity			Pass	
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		Initial	No abnormality	10	-	No abnormality			Pass	
		After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.97	11.9	10.2	0.61	Pass
		After testing	-			10.32	12.3	9.4	0.90	-
		ΔR	ΔR 20mΩ MAX.			-0.65	0.4	-2.1	0.81	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.04	6.4	5.8	0.19	Pass
	After testing	-	6.00			7.4	5.0	0.66	-	
	ΔR	ΔR 20mΩ MAX.	-0.04			1.4	-1.2	0.74	Pass	
Electrical discontinuity										
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.									
	After testing	-	10	-	No discontinuity			Pass		
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	Initial	No abnormality	10	-	No abnormality			Pass		
	After testing	No abnormality			No abnormality			Pass		

Table 2-4 Test Result

Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
J	Shock									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.14	12.3	9.3	0.96	Pass
		After testing	-			10.55	12.7	9.2	1.11	-
		ΔR	ΔR 20mΩ MAX.			-0.59	0.8	-2.0	0.90	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	7.14	7.7	6.6	0.31	Pass
		After testing	-			7.13	8.2	6.5	0.57	-
		ΔR	ΔR 20mΩ MAX.			-0.01	0.9	-0.6	0.54	Pass
	Electrical discontinuity									
		Pass criteria: No electrical discontinuity greater than 1μs shall occur.								
		After testing	-	10	-	No discontinuity			Pass	
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		Initial	No abnormality	10	-	No abnormality			Pass	
		After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.32	12.3	9.4	0.90	Pass
		After testing	-			10.71	12.7	9.0	1.31	-
		ΔR	ΔR 20mΩ MAX.			0.38	2.9	-0.6	1.22	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.00	7.4	5.0	0.66	Pass
	After testing	-	5.90			8.5	5.2	0.96	-	
	ΔR	ΔR 20mΩ MAX.	-0.11			2.6	-2.0	1.21	Pass	
Electrical discontinuity										
	Pass criteria: No electrical discontinuity greater than 1μs shall occur.									
	After testing	-	10	-	No discontinuity			Pass		
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	Initial	No abnormality	10	-	No abnormality			Pass		
	After testing	No abnormality			No abnormality			Pass		

Table 2-5 Test Result

Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
K	Thermal shock									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.05	11.4	9.1	0.77	Pass
		After testing	-			11.63	12.9	9.8	0.95	-
		ΔR	ΔR 20mΩ MAX.			1.58	3.3	-0.1	1.09	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.89	7.7	6.5	0.43	Pass
		After testing	-			8.37	9.8	7.6	0.67	-
		ΔR	ΔR 20mΩ MAX.			1.49	3.3	0.4	0.87	Pass
	Insulation residence									
		Initial	500MΩ MIN.	10	MΩ	10,000MΩ MIN.			Pass	
		After testing	100MΩ MIN.			10,000MΩ MIN.			Pass	
	Dielectric withstanding voltage									
		Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.								
		After testing	-	10	-	No abnormality			Pass	
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		Initial	No abnormality	10	-	No abnormality			Pass	
		After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.03	12.3	9.8	0.84	Pass
		After testing	-			10.99	12.5	8.8	1.17	-
	ΔR	ΔR 20mΩ MAX.	-0.04			1.6	-1.2	0.82	Pass	
Contact resistance of ground contact										
	Initial	20mΩ MAX.	10	mΩ	6.30	6.6	6.0	0.23	Pass	
	After testing	-			5.79	6.4	5.4	0.38	-	
	ΔR	ΔR 20mΩ MAX.			-0.50	0.1	-1.2	0.35	Pass	
Insulation residence										
	Initial	500MΩ MIN.	10	MΩ	10,000MΩ MIN.			Pass		
	After testing	100MΩ MIN.			10,000MΩ MIN.			Pass		
Dielectric withstanding voltage										
	Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.									
	After testing	-	10	-	No abnormality			Pass		
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	Initial	No abnormality	10	-	No abnormality			Pass		
	After testing	No abnormality			No abnormality			Pass		

Table 2-6 Test Result

Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
L	High Temperature Life									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	9.74	11.8	8.5	1.17	Pass
		After testing	-			9.14	10.4	7.7	1.07	-
		ΔR	ΔR 20mΩ MAX.			-0.61	1.0	-2.9	1.08	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.90	7.4	6.5	0.23	Pass
		After testing	-			7.25	9.0	6.4	0.72	-
		ΔR	ΔR 20mΩ MAX.			0.35	2.2	-0.4	0.74	Pass
	Appearance									
	Pass criteria: No abnormality adversely affecting the performance shall occur									
		Initial	No abnormality	10	-	No abnormality			Pass	
		After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.57	12.7	9.5	0.93	Pass
		After testing	-			12.12	12.9	11.0	0.54	-
		ΔR	ΔR 20mΩ MAX.			0.55	1.6	0.0	0.53	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	5.57	6.1	5.3	0.23	Pass
		After testing	-			7.31	8.0	6.6	0.40	-
		ΔR	ΔR 20mΩ MAX.			1.73	2.4	1.0	0.42	Pass
	Appearance									
Pass criteria: No abnormality adversely affecting the performance shall occur										
	Initial	No abnormality	10	-	No abnormality			Pass		
	After testing	No abnormality			No abnormality			Pass		

Table 2-7 Test Result

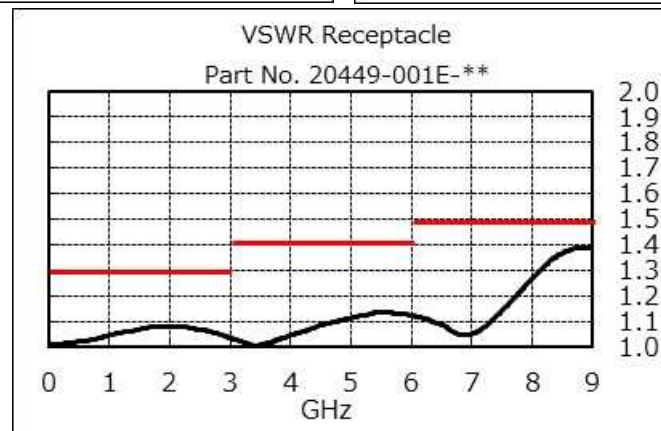
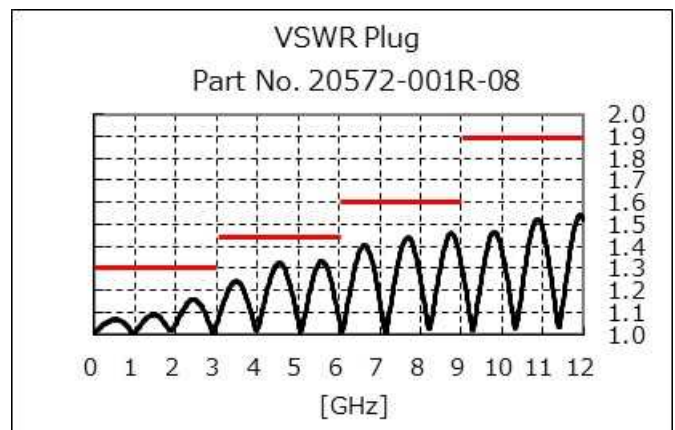
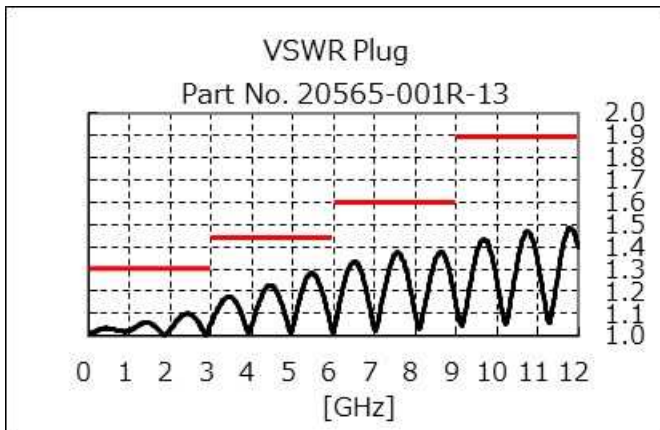
Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
M	Humidity (Steady State)									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.72	15.4	9.1	2.00	Pass
		After testing	-			10.42	13.0	9.5	0.94	-
		ΔR	ΔR 20mΩ MAX.			-0.30	1.1	-2.5	1.26	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.84	7.5	6.4	0.29	Pass
		After testing	-			6.77	8.5	6.1	0.73	-
		ΔR	ΔR 20mΩ MAX.			-0.06	1.7	-0.9	0.76	Pass
	Insulation residence									
		Initial	500MΩ MIN.	10	MΩ	10,000MΩ MIN.			Pass	
		After testing	100MΩ MIN.			10,000MΩ MIN.			Pass	
	Dielectric withstanding voltage									
		Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.								
		After testing	-	10	-	No abnormality			Pass	
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		Initial	No abnormality	10	-	No abnormality			Pass	
		After testing	No abnormality			No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.47	12.9	10.0	0.89	Pass
		After testing	-			11.34	12.8	9.6	1.23	-
	ΔR	ΔR 20mΩ MAX.	-0.13			1.4	-2.3	1.12	Pass	
Contact resistance of ground contact										
	Initial	20mΩ MAX.	10	mΩ	5.94	6.6	5.4	0.39	Pass	
	After testing	-			5.10	6.0	4.5	0.43	-	
	ΔR	ΔR 20mΩ MAX.			-0.84	-0.3	-1.6	0.42	Pass	
Insulation residence										
	Initial	500MΩ MIN.	10	MΩ	10,000MΩ MIN.			Pass		
	After testing	100MΩ MIN.			10,000MΩ MIN.			Pass		
Dielectric withstanding voltage										
	Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.									
	After testing	-	10	-	No abnormality			Pass		
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	Initial	No abnormality	10	-	No abnormality			Pass		
	After testing	No abnormality			No abnormality			Pass		

Table 2-8 Test Result

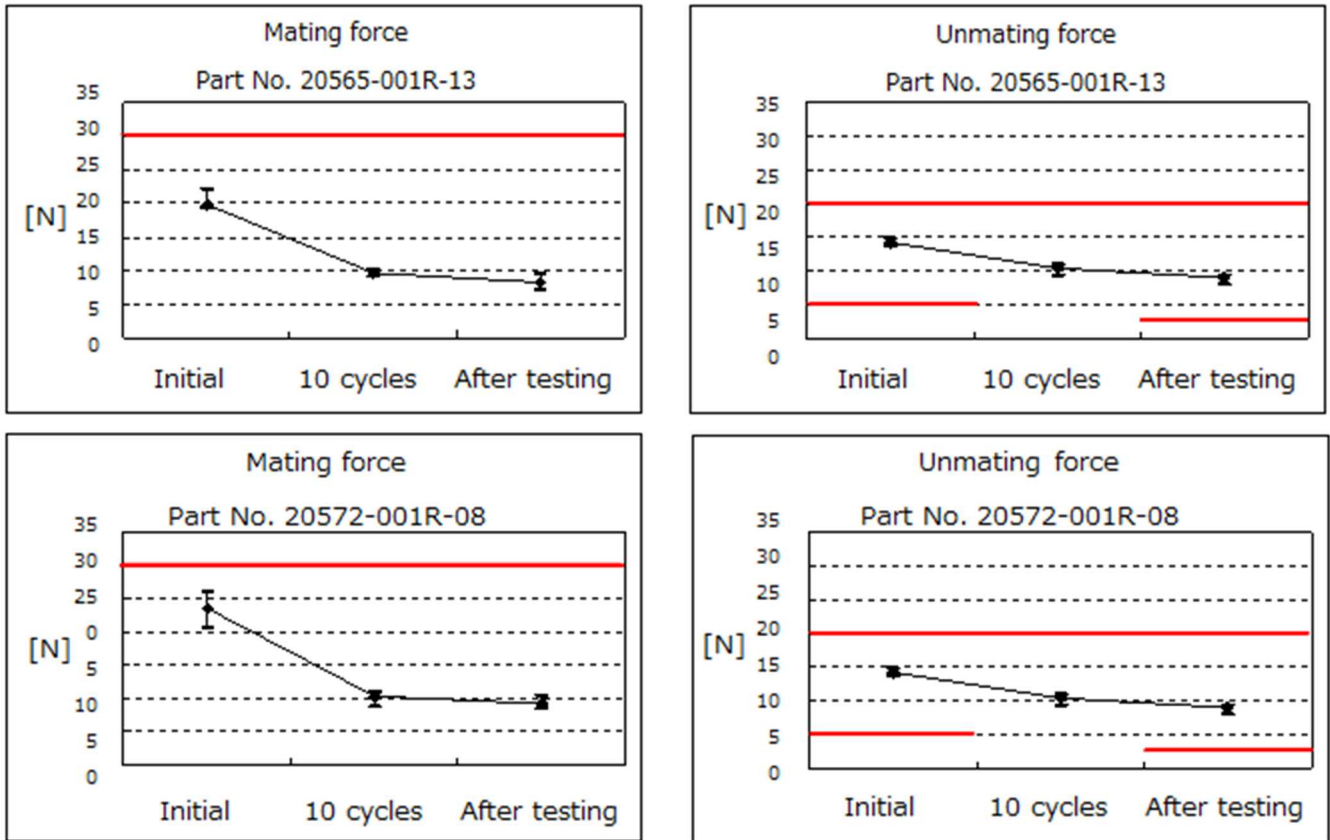
Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement	
	Measurements									
N	Salt water spray									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.37	11.6	8.5	1.04	Pass
		After testing	-			10.02	12.7	9.2	1.02	-
		ΔR	ΔR 20mΩ MAX.			-0.35	1.1	-2.0	1.01	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.75	7.3	5.9	0.42	Pass
		After testing	-			6.96	7.7	6.5	0.46	-
		ΔR	ΔR 20mΩ MAX.			0.22	1.3	-0.6	0.63	Pass
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		After testing	No abnormality	10	-	No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.37	12.3	10.3	0.65	Pass
		After testing	-			10.76	12.7	9.8	1.03	-
		ΔR	ΔR 20mΩ MAX.			-0.61	1.6	-1.9	1.27	Pass
Contact resistance of ground contact										
	Initial	20mΩ MAX.	10	mΩ	6.32	7.1	5.7	0.39	Pass	
	After testing	-			6.08	7.6	5.6	0.57	-	
	ΔR	ΔR 20mΩ MAX.			-0.23	1.2	-1.5	0.71	Pass	
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	After testing	No abnormality	10	-	No abnormality			Pass		
P	H ₂ S Gas									
	Plug Part No. 20565-001R-13									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	10.56	12.0	9.5	0.71	Pass
		After testing	-			11.60	12.4	10.8	0.52	-
		ΔR	ΔR 20mΩ MAX.			1.04	2.4	-0.3	0.79	Pass
	Contact resistance of ground contact									
		Initial	20mΩ MAX.	10	mΩ	6.56	8.0	6.1	0.56	Pass
		After testing	-			7.50	8.3	6.7	0.50	-
		ΔR	ΔR 20mΩ MAX.			0.94	2.0	-0.5	0.77	Pass
	Appearance									
		Pass criteria: No abnormality adversely affecting the performance shall occur								
		After testing	No abnormality	10	-	No abnormality			Pass	
	Plug Part No. 20572-001R-08									
	Contact resistance of main contact									
		Initial	20mΩ MAX.	10	mΩ	11.33	12.7	10.0	0.93	Pass
		After testing	-			11.72	13.0	9.7	0.95	-
		ΔR	ΔR 20mΩ MAX.			0.38	1.8	-1.0	0.82	Pass
Contact resistance of ground contact										
	Initial	20mΩ MAX.	10	mΩ	5.87	6.1	5.6	0.18	Pass	
	After testing	-			6.19	7.0	5.5	0.47	-	
	ΔR	ΔR 20mΩ MAX.			0.32	0.9	-0.5	0.48	Pass	
Appearance										
	Pass criteria: No abnormality adversely affecting the performance shall occur									
	After testing	No abnormality	10	-	No abnormality			Pass		

Table 2-9 Test Result

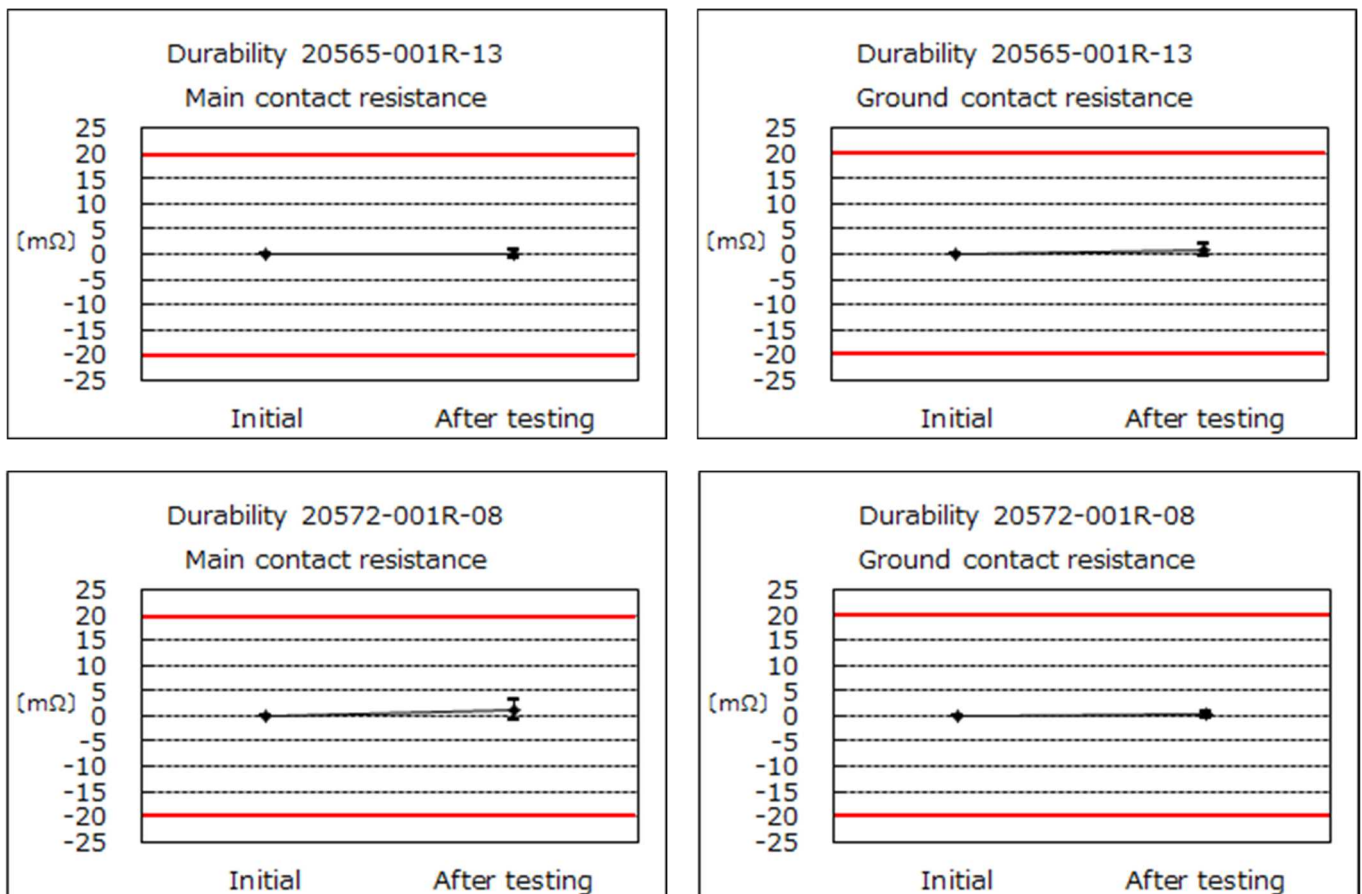
Group	Test items	Pass criteria	N	Unit	AVE.	MAX.	MIN.	S	Judgement
	Measurements								
Q	Solder ability	Pass criteria: More than 95% of the dipped surface becomes wet and the pinhole that should not gather at one point is less than 5%.							
	After testing	-	10	-	No abnormality				Pass
R	Reflow soldering heat resistance								
	Appearance	Pass criteria: No abnormality adversely affecting the performance shall occur.							
	After testing	-	10	-	No abnormality				Pass



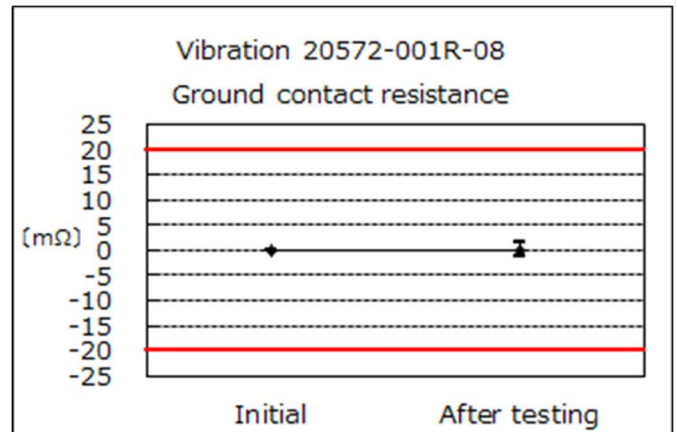
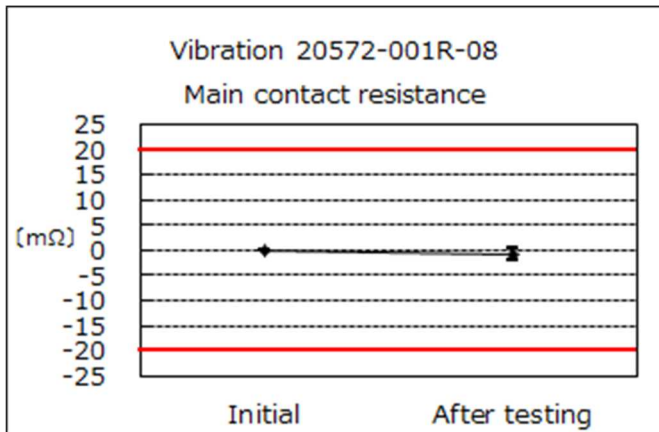
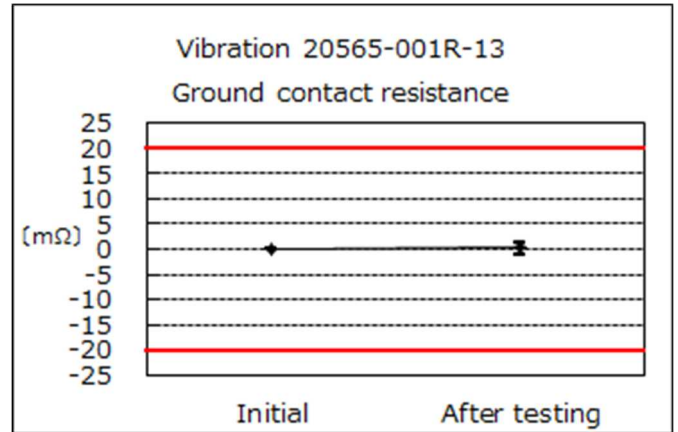
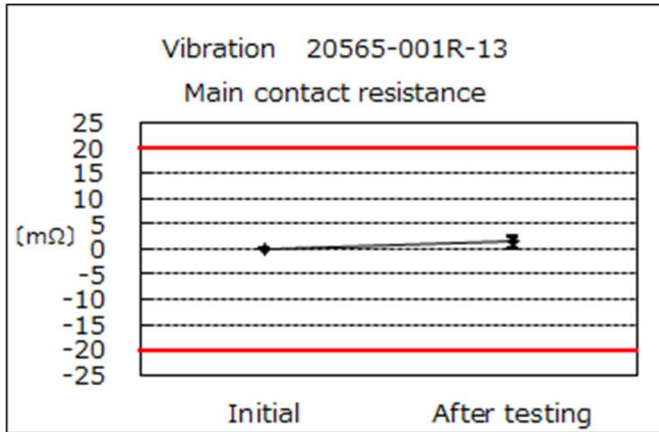
Graph 1 VSWR



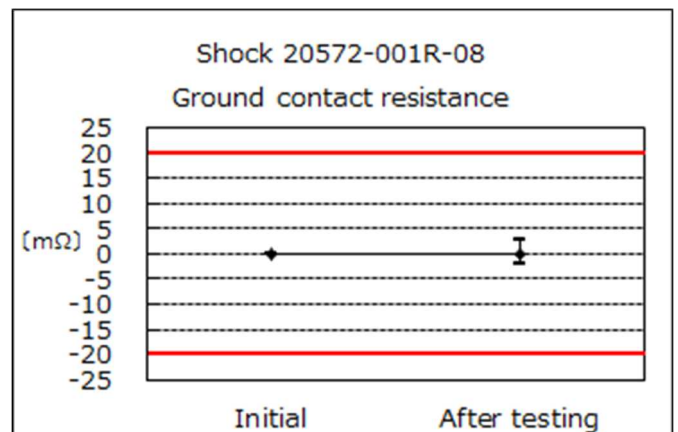
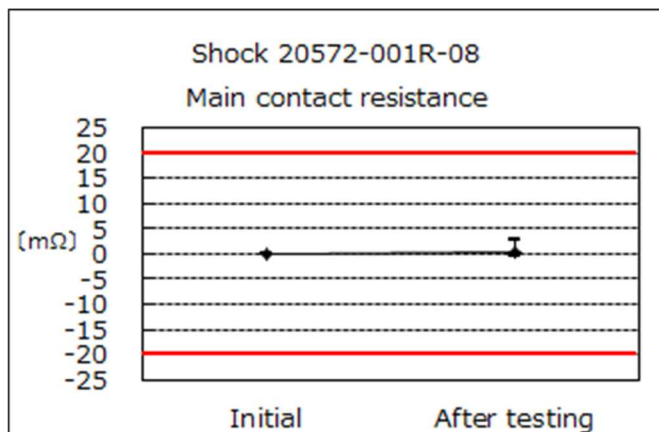
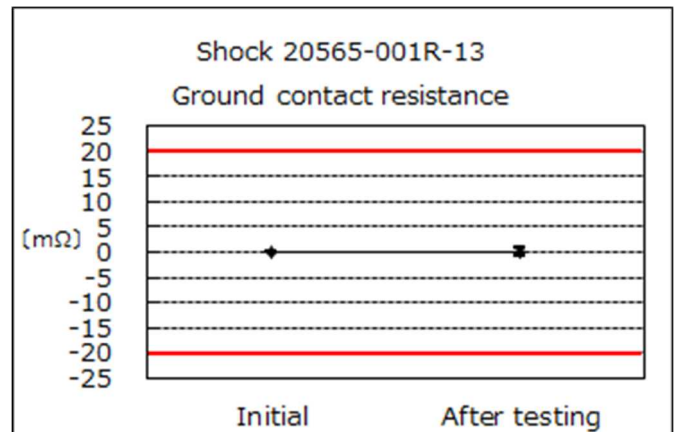
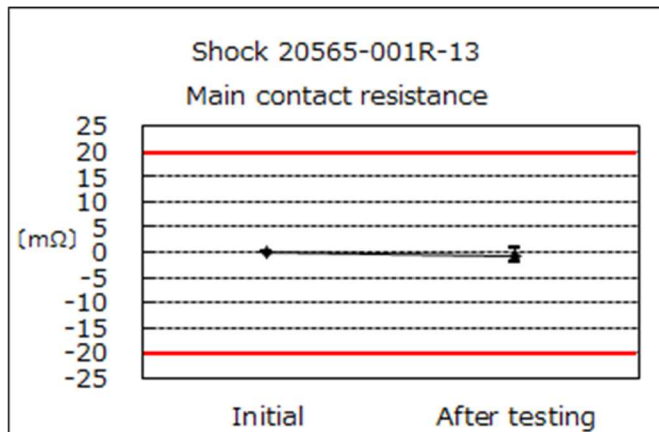
Graph 2 Mating Force and Unmating Force



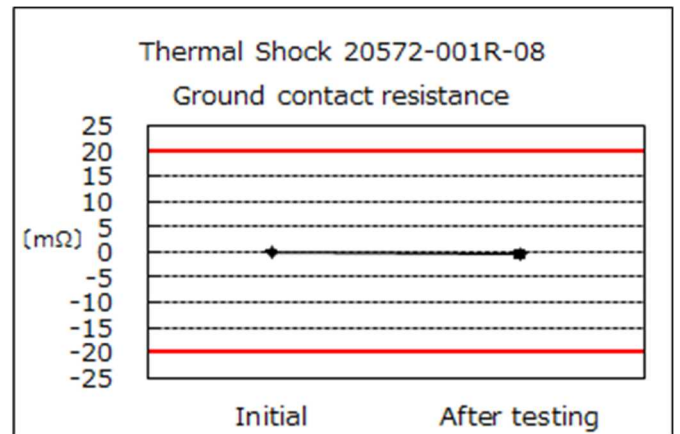
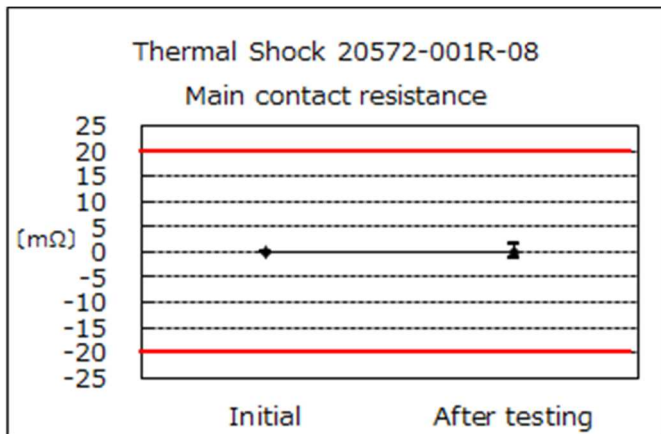
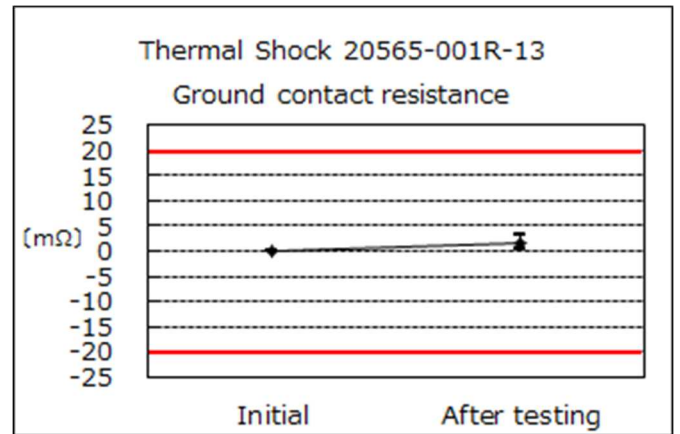
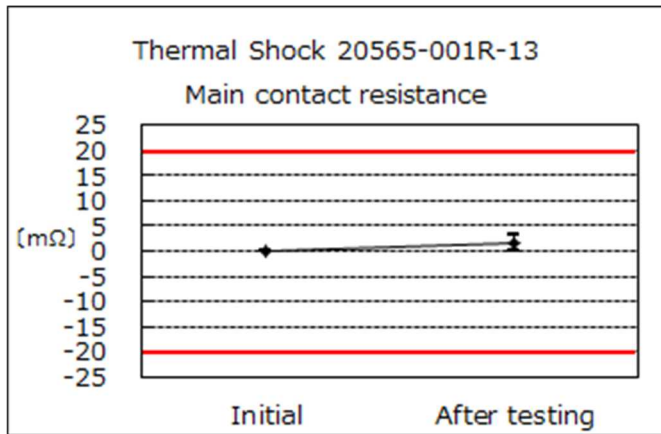
Graph 3 Durability



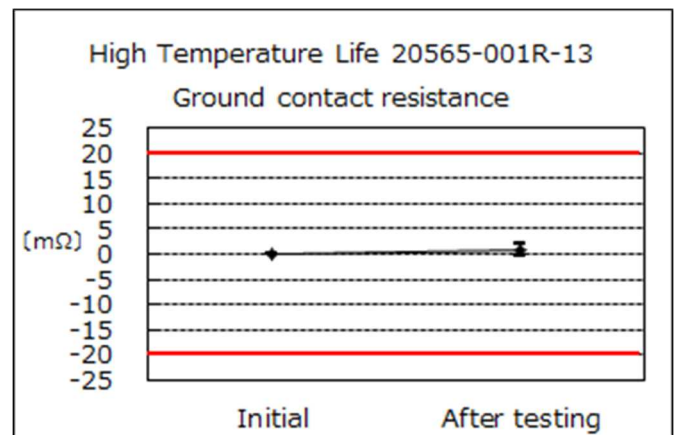
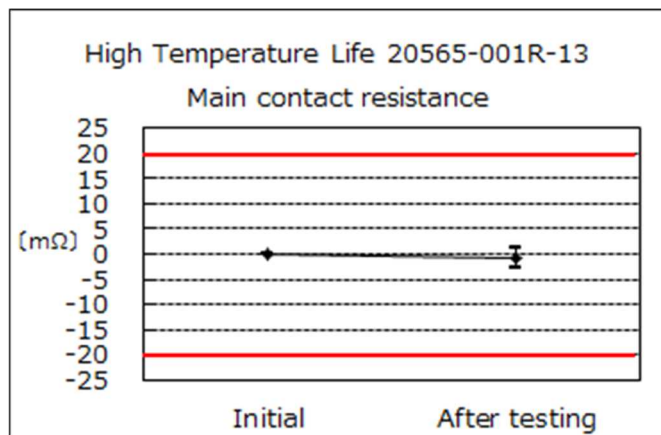
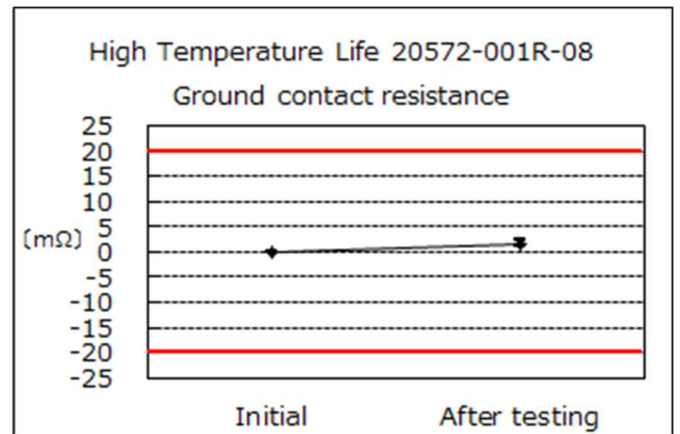
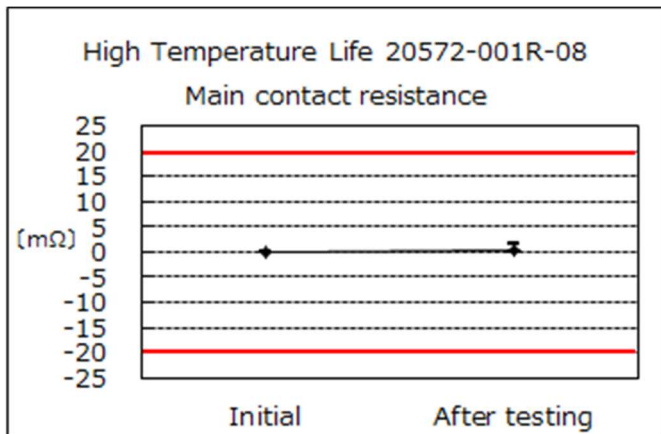
Graph 4 Vibration



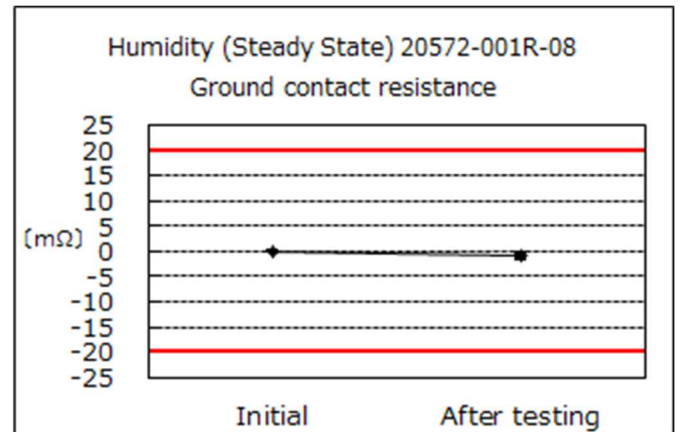
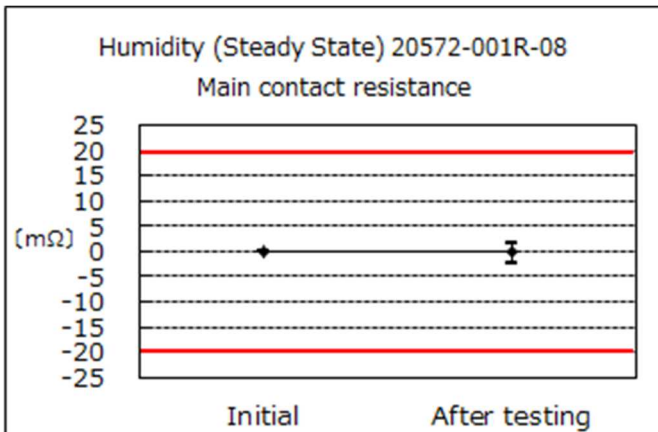
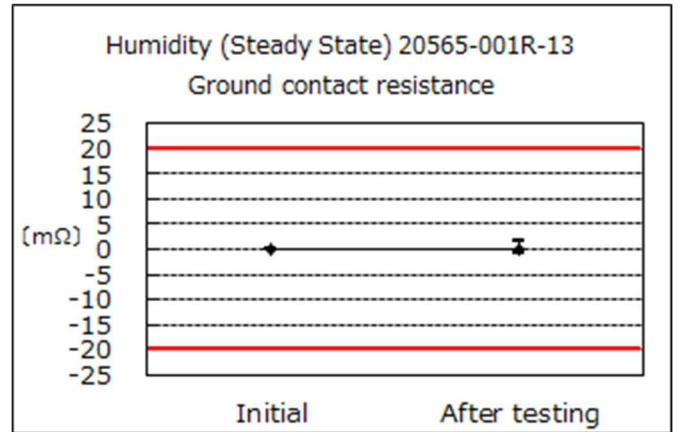
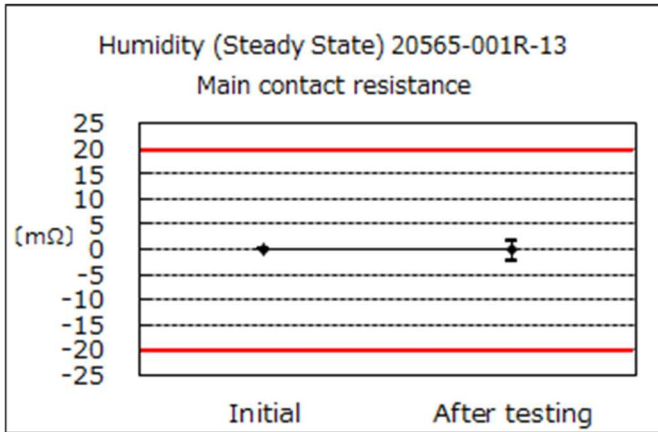
Graph 5 Shock



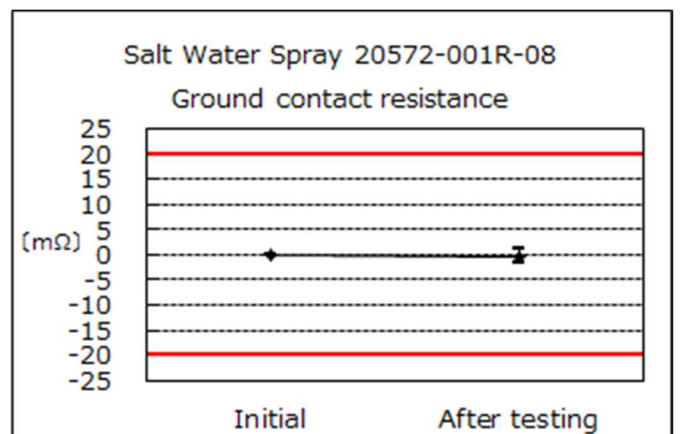
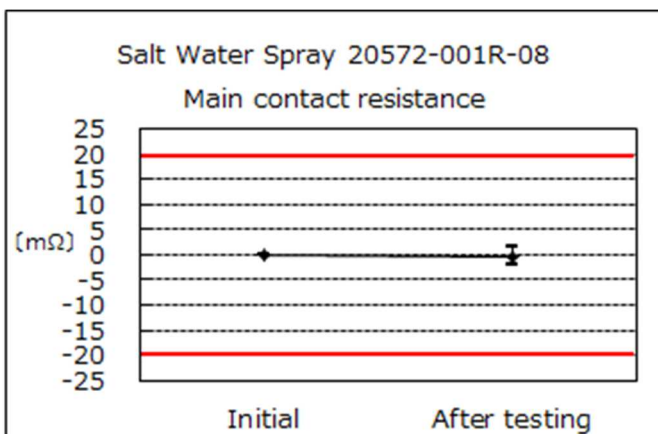
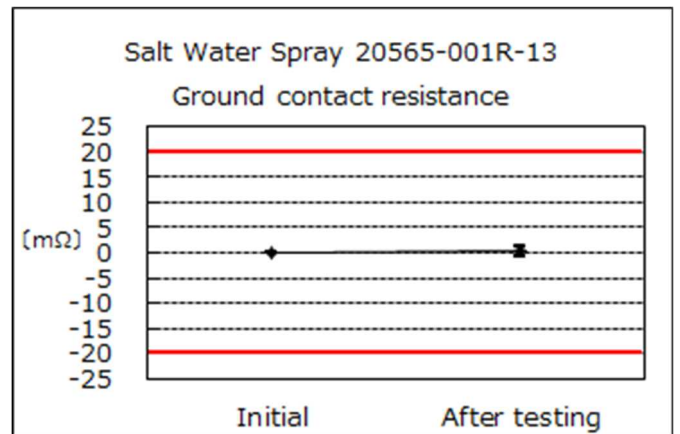
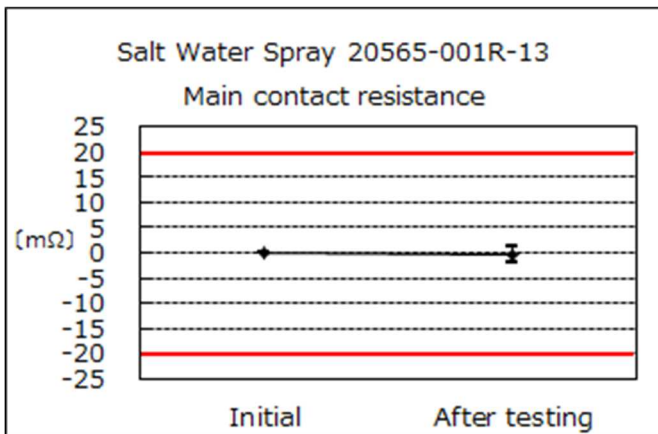
Graph 6 Thermal shock



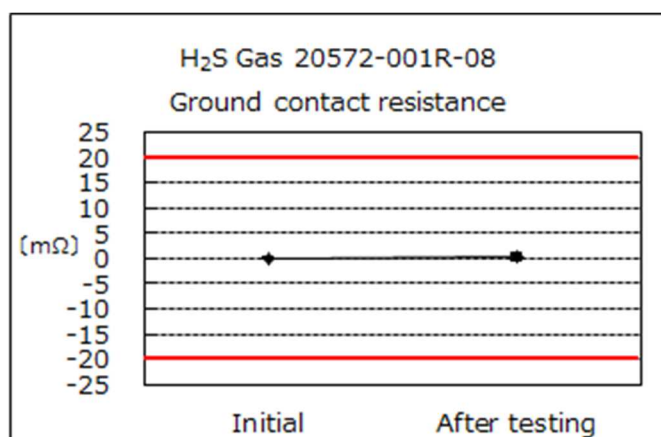
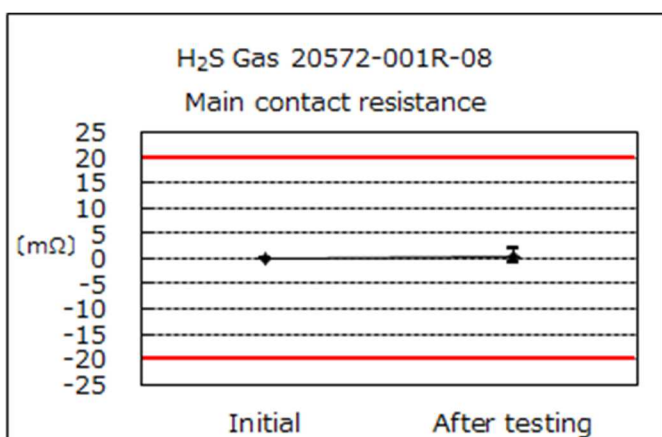
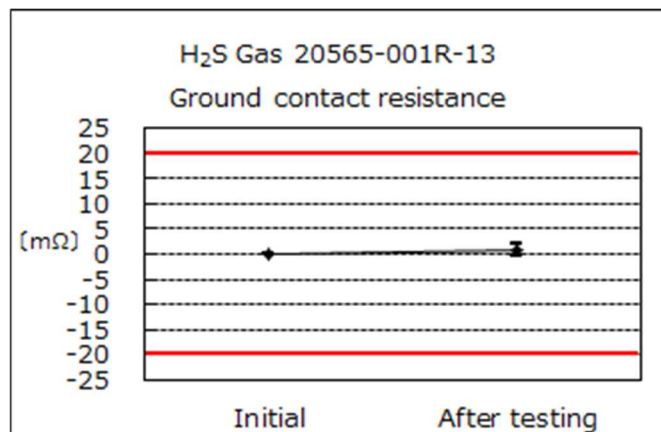
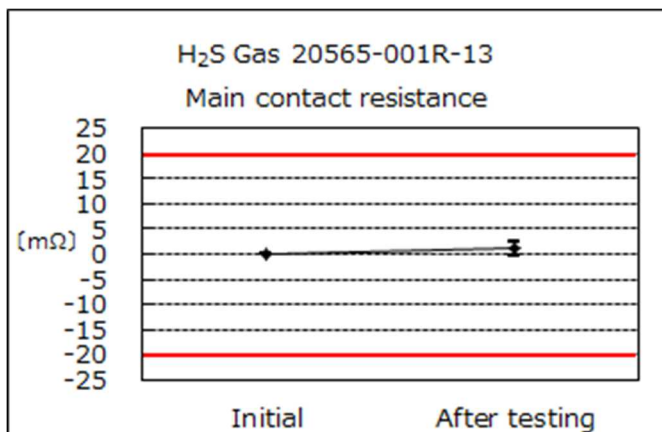
Graph 7 High temperature life



Graph 8 Humidity (Steady state)



Graph 9 Salt Water Spray



Graph 10 H₂S Gas