MHF® 7S Connector

Part No. Plug: 20980-001R-13 Receptacle: 20981-001E-02

Test Report

Product Specification no. PRS-2676

Rev.	ECN	Date	Prepared by	Checked by	Approved by
4	T22072	May 20, 2022	T. Takuno	K. Yufu	Y. Hashimoto
3	T22063	April 15, 2022	H.Lu	Y.Shimizu	M.Takemoto
2	T21114	October 27, 2021	Y. Imaji	H. Nakamura	Hiro Takahashi
1	T20104	December 15, 2020	Y. Imaji	H. Nakamura	Hiro Takahashi

1. Purpose

To evaluate the performance of MHF 7S Connector in accordance with PRS-2676.

2. Specimen

(1) MHF 7S PLUG （Part No. 20980-001R-13）
(2) MHF 7S RECEPTACLE （Part No. 20981-001E-02）
(3) Applicable cable1 (Refer to PRS-2676 for specifications.)

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 10. For the details of the testing conditions and requirements, see PRS-2676.
The “n” in the tables show the number of measurement points.
Test results for applicable cable 1 are shown as representative.

5. Conclusion

All the specimens met the requirements of PRS-2676.

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
Contact Resistance						1,3		1,3	1,3	1,5	1,3	1,5	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												
Cabel retention force at 0 degree					1											
Durability						2										
Shearing strength							1									
Vibration								2								
Shock									2							
Thermal shock										4						
High temperature life											2					
Humidity steady state												4				
Salt Water Spray													2			
H_2S Gas														2		
Solderability															1	
Soldering Heat Resistance																1
Sample Quantity (pcs.)	Plug	10	10	10	10	10	—	10	10	10	10	10	10	10	—	—
	Receptacle	10	10	10	10	10	20	10	10	10	10	10	10	10	10	10
Test board (pcs.)		10	10	10	10	10	20	10	10	10	10	10	10	10	10	10

*Numbers indicate test sequences

Table 2-1 Test Result

	Test items	Measurements		Spec.	n	Unit	AVE.	MAX.	MIN.	S	Judge
A	Dielectric withstanding voltage	Initial		Spec : No abnormalities such as creeping discharge, flashover, insulator breakdown occur.							-
				-	10	-	Results : No abnormality				OK
B	VSWR (Mating condition)	0.1～3GHz		1.30 MAX.	10	-	1.076	1.09	1.07	0.005	OK
		3 ~ 6 GHz		1.35 MAX.	10	-	1.082	1.09	1.07	0.008	OK
		6 ~ 9 GHz		1.40 MAX.	10	-	1.087	1.11	1.07	0.011	OK
		9~12 GHz		1.45 MAX.	10	-	1.095	1.13	1.05	0.018	OK
		12~15 GHz		1.50 MAX.	10	-	1.083	1.12	1.05	0.017	OK
C	Mating force	Initial		30 N MAX.	10	N	17.52	19.5	15.9	1.18	OK
		30 cycles		30 N MAX.	10	N	8.74	9.9	7.6	0.82	OK
	Unmating force	Initial		20 N MAX. 5 N MIN.	10	N	8.19	9.3	7.4	0.54	OK
		30 cycles		20 N MAX. 3 N MIN.	10	N	5.08	5.8	4.5	0.40	OK
D	Cable retention force at 0 degree	Electrical discontinuity		Spec. : No electrical discontinuity greater than 1μsec.							-
				-	10	-	Results : No discontinity				OK
		Appearance	Initial	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
E	Durability										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.21	7.9	6.7	0.47	OK
			After testing	-	10	mΩ	10.06	12.7	8.0	1.53	-
			⊿R	20 MAX.	10	mΩ	2.85	5.1	0.8	1.49	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.96	6.3	5.8	0.17	OK
			After testing	-	10	mΩ	6.27	6.6	6.0	0.17	-
			⊿R	20 MAX.	10	mΩ	0.31	0.6	0.0	0.19	OK
		Appearance	Initial	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
F	Receptacle shearing strength	After testing	Direction 1	20N MIN.	5	N	30.36	36.9	25.7	-	OK
			Direction 2	20N MIN.	5	N	30.96	32.0	30.1	-	OK
			Direction 3	20N MIN.	5	N	34.00	37.4	30.0	-	OK
			Direction 4	20N MIN.	5	N	31.64	35.9	27.4	-	OK

*1: No abnormality adversely affecting the performance shall occur.

Table 2-2 Test Result

	Test items	Measurements		Spec.	n	Unit	AVE.	MAX.	MIN.	S	Judge
G	Vibration										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.38	9.0	6.8	0.64	OK
			After testing	-	10	mΩ	7.12	8.9	6.6	0.67	-
			⊿R	20 MAX.	10	mΩ	-0.26	-0.1	-1.0	0.27	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.93	6.1	5.4	0.21	OK
			After testing	-	10	mΩ	6.06	6.3	5.6	0.22	-
			⊿R	20 MAX.	10	mΩ	0.13	0.4	0.0	0.13	OK
		Electrical discontinuity		Spec. : No electrical discontinuity greater than 1μsec. shall occur.							-
				-	10	-	Results : No discontinity				OK
		Appearance	Initial	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
H	Shock										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.16	7.4	6.8	0.24	OK
			After testing	-	10	mΩ	7.01	7.5	6.6	0.27	-
			⊿R	20 MAX.	10	mΩ	-0.15	0.2	-0.7	0.25	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	6.20	6.6	6.0	0.19	OK
			After testing	-	10	mΩ	6.61	7.0	6.1	0.27	-
			⊿R	20 MAX.	10	mΩ	0.41	0.7	0.1	0.17	OK
		Electrical discontinuity		Spec. : No electrical discontinuity greater than 1μsec. shall occur.							-
				-	10	-	Results : No discontinity				OK
		Appearance	Initial	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK

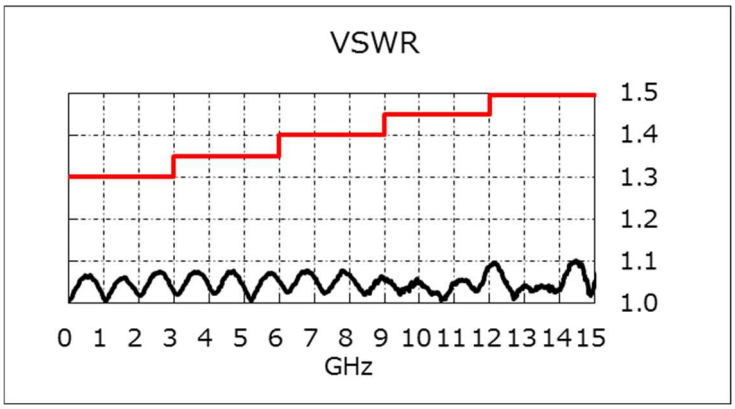
Table 2-3 Test Result

	Test items	Measurements		Spec.	n	Unit	AVE.	MAX.	MIN.	S	Judge
J	Thermal shock										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.03	7.5	6.6	0.31	OK
			After testing	-	10	mΩ	7.07	8.1	6.7	0.48	-
			⊿R	20 MAX.	10	mΩ	0.04	0.7	-0.4	0.29	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	6.25	6.6	6.0	0.16	OK
			After testing	-	10	mΩ	7.15	7.8	6.7	0.31	-
			⊿R	20 MAX.	10	mΩ	0.90	1.2	0.3	0.28	OK
		Insulation resistance	Initial	500 MIN.	10	MΩ	10,000 (minimum value)				OK
			After testing	100 MIN.	10	MΩ	10,000 (minimum value)				OK
		Dielectric withstanding voltage	Initial	*2	10	----------	No abnormality				OK
			After testing	*2	10	----------	No abnormality				OK
		Appearance	Initial	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
K	High temperature life										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.16	8.2	6.6	0.44	OK
			After testing	-	10	mΩ	6.86	7.4	6.4	0.34	-
			⊿R	20 MAX.	10	mΩ	-0.31	-0.1	-0.8	0.22	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.84	6.0	5.6	0.13	OK
			After testing	-	10	mΩ	6.75	7.0	6.5	0.16	-
			⊿R	20 MAX.	10	mΩ	0.91	1.1	0.7	0.11	OK
		Appearance	Initial	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
L	Humidity(Steady State)										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.22	7.5	6.9	0.19	OK
			After testing	-	10	mΩ	7.26	7.5	7.0	0.17	-
			⊿R	20 MAX.	10	mΩ	0.04	0.3	-0.1	0.12	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.73	6.0	5.5	0.18	OK
			After testing	-	10	mΩ	6.04	6.3	5.8	0.18	-
			⊿R	20 MAX.	10	mΩ	0.31	0.4	0.2	0.06	OK
		Insulation resistance	Initial	500 MIN.	10	MΩ	10,000 (minimum value)				OK
			After testing	100 MIN.	10	MΩ	10,000 (minimum value)				OK
		Dielectric withstanding voltage	Initial	*2	10	----------	No abnormality				OK
			After testing	*2	10	----------	No abnormality				OK
		Appearance	Initial	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	*1	10	----------	No abnormality adversely affecting the performance occurred.				OK

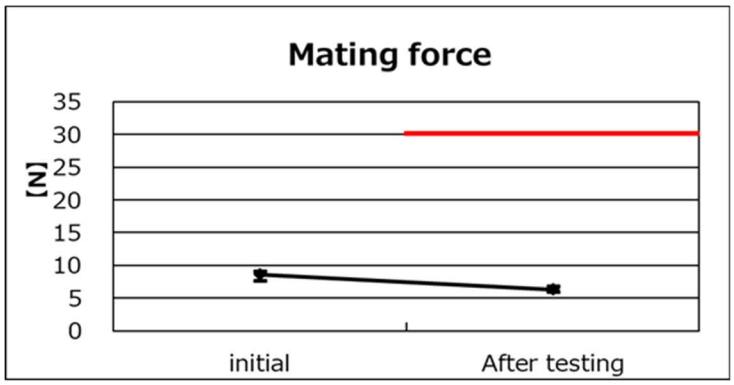
*2: No abnormalities such as creeping discharge, flashover, and insulator breakdown

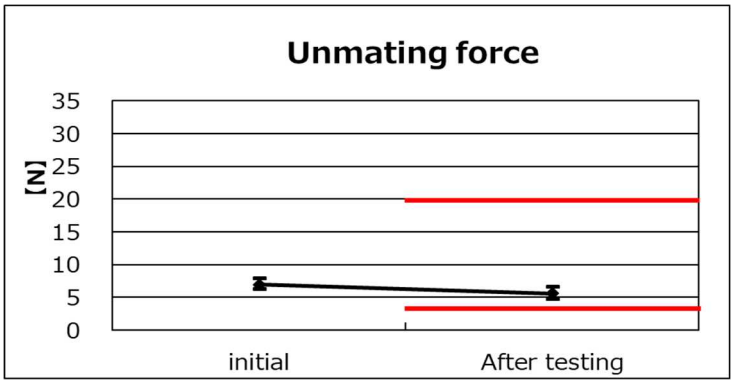
Table 2-4 Test Result

	Test items	Measurements		Spec.	n	Unit	AVE.	MAX.	MIN.	S	Judge
M	Salt water spray										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.17	8.1	6.7	0.41	OK
			After testing	-	10	mΩ	7.27	8.0	6.6	0.44	-
			⊿R	20 MAX.	10	mΩ	0.10	0.8	-1.1	0.55	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.80	6.6	5.5	0.33	OK
			After testing	-	10	mΩ	6.40	7.3	5.8	0.44	-
			⊿R	20 MAX.	10	mΩ	0.59	1.1	0.2	0.25	OK
		Appearance	Initial	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
N	H_2S Gas										
		Contact resistance of contact									
			Initial	20 MAX.	10	mΩ	7.25	8.4	6.3	0.57	OK
			After testing	-	10	mΩ	6.90	7.9	6.3	0.44	-
			⊿R	20 MAX.	10	mΩ	-0.35	0.4	-1.3	0.43	OK
		Contact resistance of ground contact									
			Initial	20 MAX.	10	mΩ	5.82	6.0	5.7	0.12	OK
			After testing	-	10	mΩ	6.14	6.5	5.9	0.21	-
			⊿R	100 MAX.	10	mΩ	0.32	0.5	0.2	0.11	OK
		Appearance	Initial	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
			After testing	∗1	10	----------	No abnormality adversely affecting the performance occurred.				OK
	Test items	Measurements		Spec.	n	Unit	AVE.	MAX.	MIN.	S	Judge
P	Solderability			Spec.:More than 95% of the dipped surface shall be evenly wet.							
				-	10	-	No abnormality				OK
Q	Soldering heat resistance			Spec.: No deformation nor defect adversely affecting the performance occur.							
				-	10	-	No abnormality adversely affecting the performance occurred.				OK

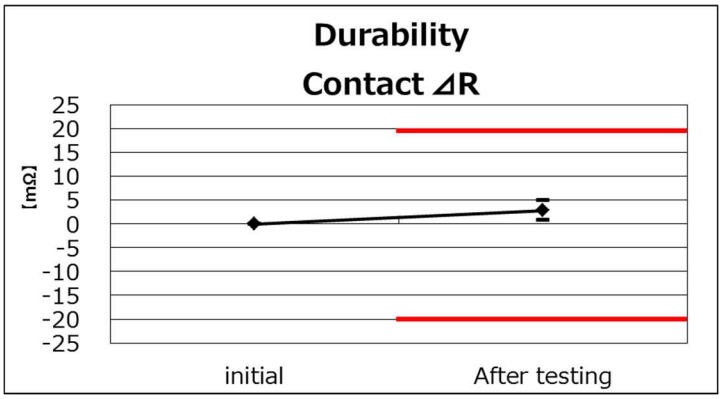


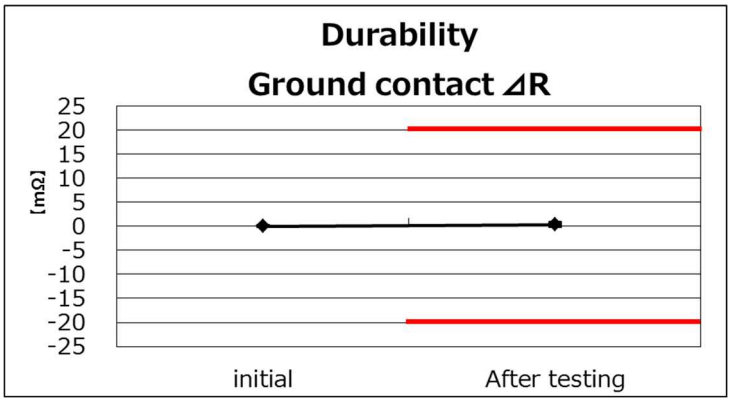
Graph 1. Group B VSWR



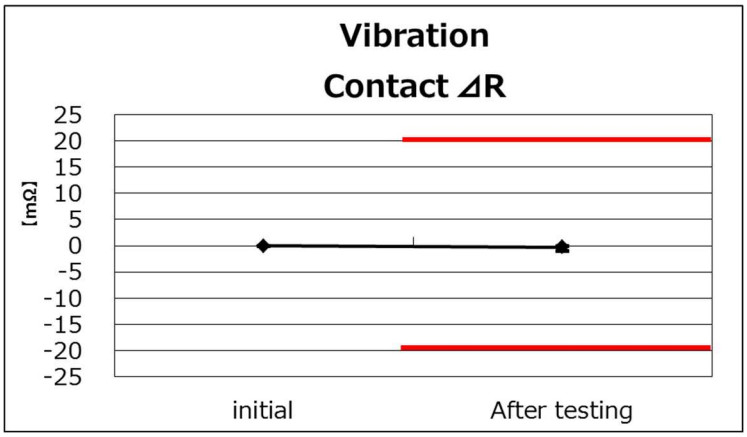


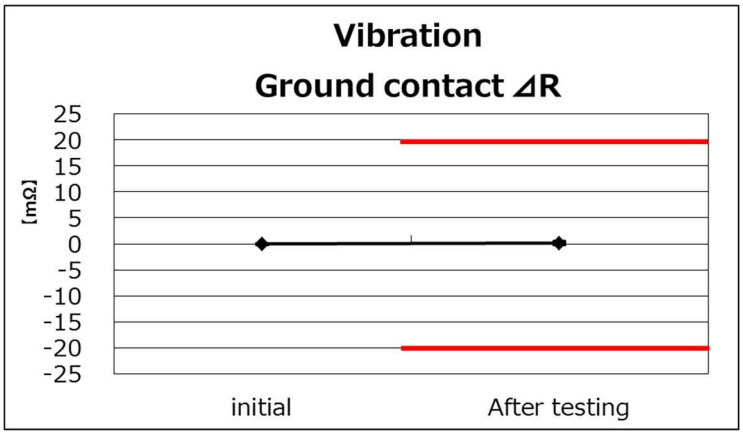
Graph 2. Group C Mating & Unmating force



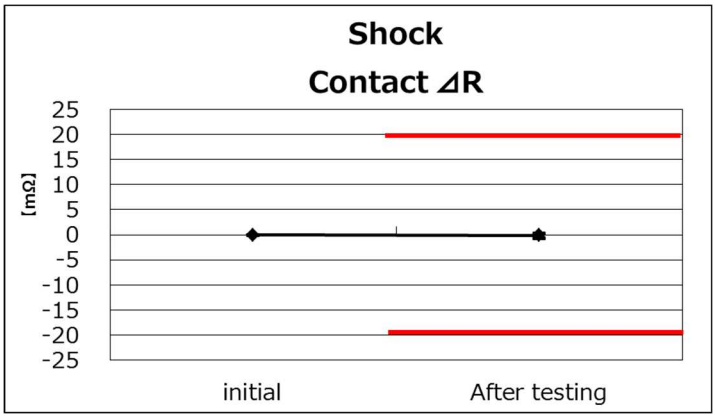


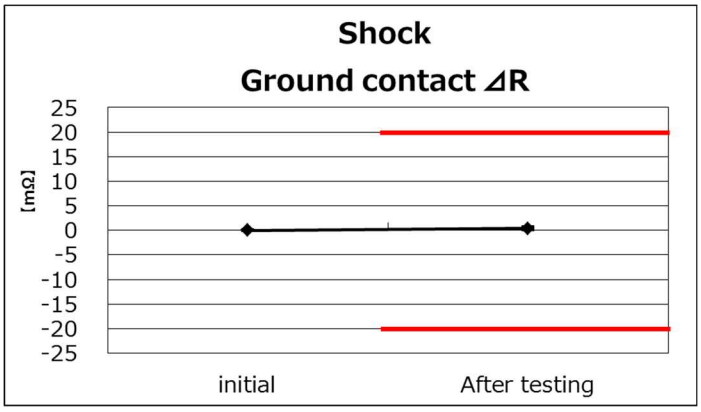
Graph 3. Group E Durability



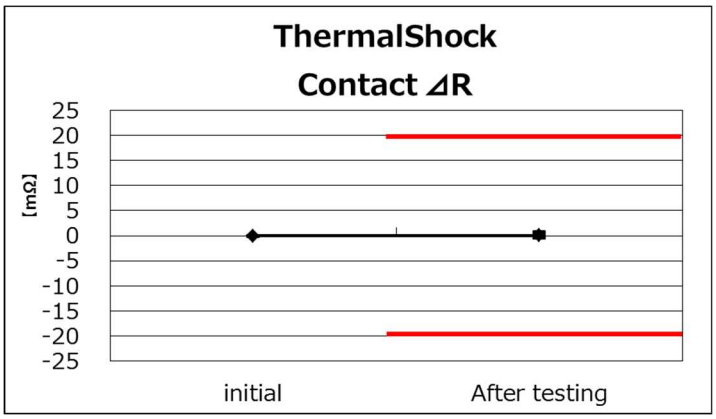


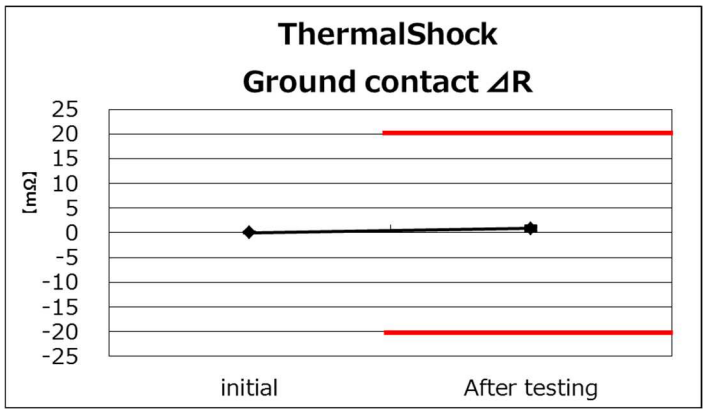
Graph 4. Group G Vibration



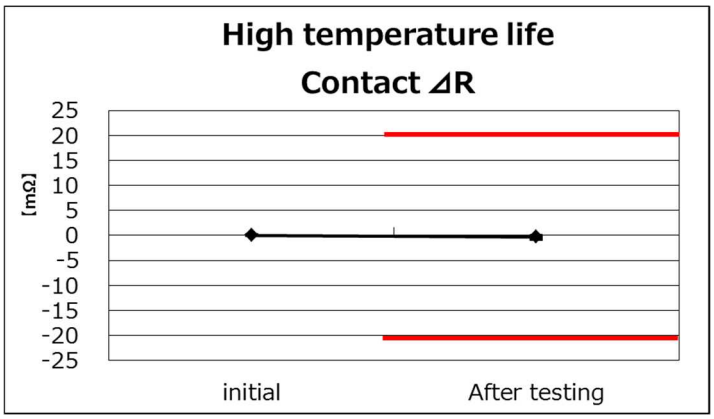


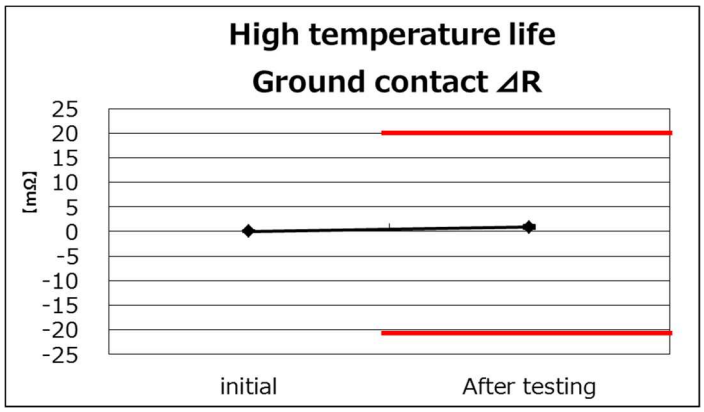
Graph 5. Group H Shock



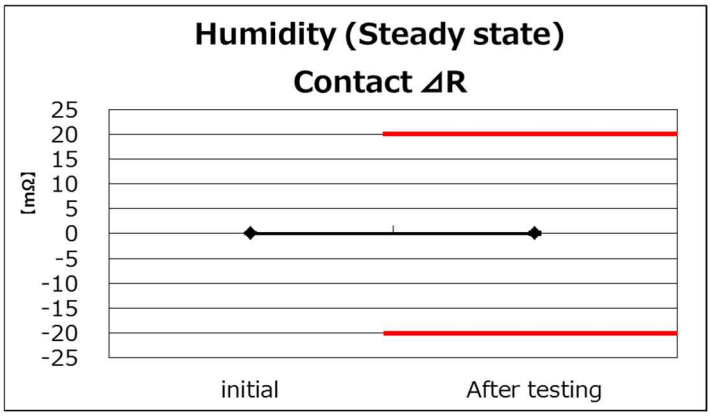


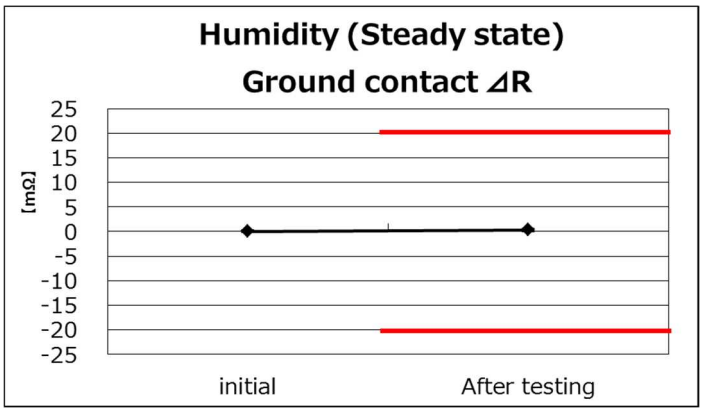
Graph 6. Group J Thermal shock



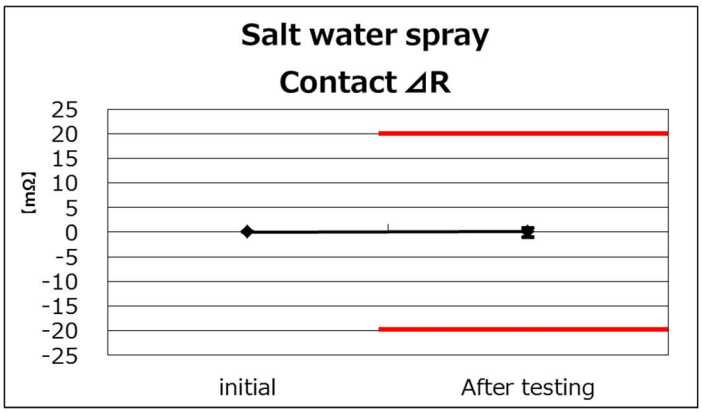


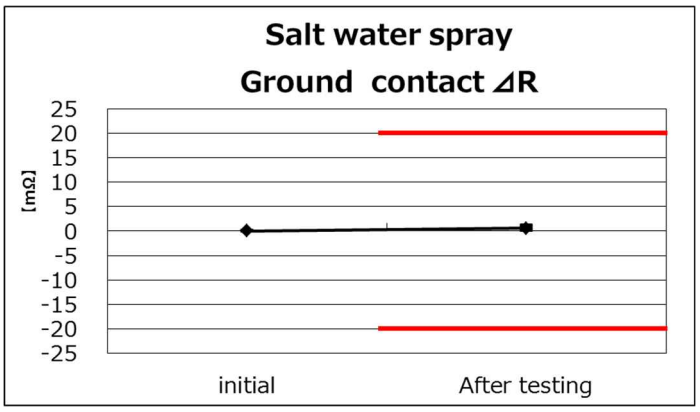
Graph 7. Group K High temperature life



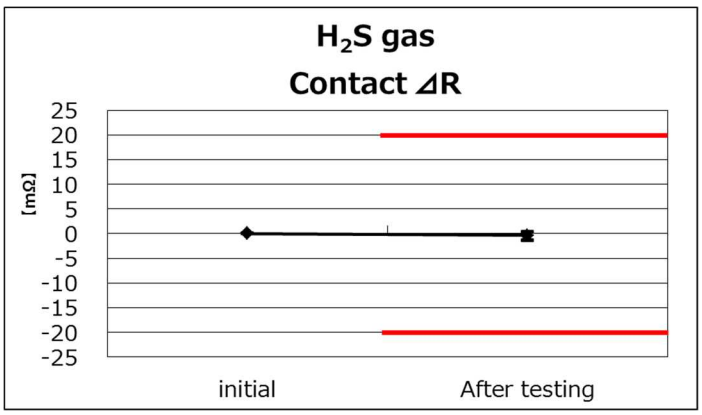


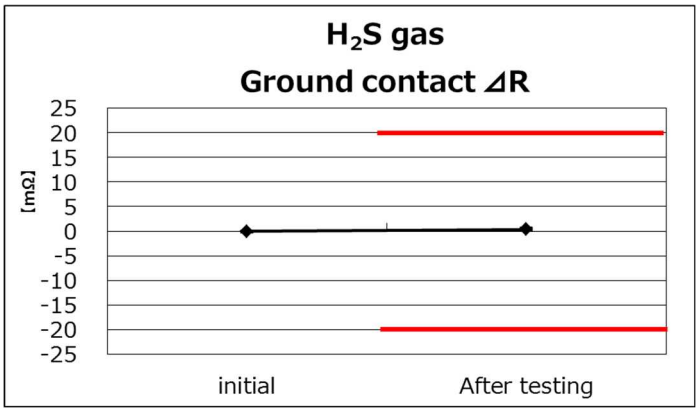
Graph 8. Group L Humidity steady state





Graph 9. Group M Salt water spray





Graph 10. Group N H_2S gas