

MHF[®] 4 Connector

Part No. Plug: 20448-001R-081 Receptacle: 20449-001E-**

Test Report

Product Specification no. PRS-1745

5	T21092	October 22, 2021	K. Ikeshita		M. Takemoto
4	T20019	February 11, 2020	S.Kamada	S.Suzuki	Y.Shimada
3	T19167	December 12, 2019	S.Kamada	S.Suzuki	Y.Shimada
2	T15036	March 10, 2015	K.Hashiba		T.Takano
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose

To evaluate the performance of MHF 4 connector in accordance with PRS-1745.

2. Specimen

- (1) Plug: 20448-001R-081
- (2) Receptacle: 20449-001E-**

3. Test Sequence

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

4. Result

See Table 2, and from sheet 7. For the details of the testing conditions and requirements, see PRS-1745.

The "n" in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-1745.

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, 5	1, 3	1, 3	1, 3		
Insulation Resistance									2, 6	2, 6					
D. W. Voltage	1								3, 7	3, 7					
VSWR		1													
Unmating Force			1												
Crimp strength				1											
Durability					2										
Cable Retention Force						1									
Vibration							2								
Shock								2							
Humidity (Steady State)									4						
Thermal Shock										4					
High Temperature Life											2				
H2S Gas												2			
Salt Water Spray													2		
Solder ability														1	
Soldering Heat Resistance															1
Sample Quantity (pcs.)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

※Numbers indicate sequence in which tests are performed.

Table 2-1 Test Result

	Test items	Measurements	Spec.	n	Unit	Data				Judge	
						AVE.	MAX.	MIN.	S		
A	Dielectric withstanding voltage	Initial	Spec : No creeping discharge, flashover, nor insulator breakdown shall occur.							-----	
		-----	10	-----	Results : No abnormality				OK		
B	VSWR Plug	0.1~3GHz	1.3 MAX.	10	-----	1.222	1.23	1.21	0.001	OK	
		3~6GHz	1.5 MAX.	10	-----	1.415	1.43	1.39	0.018	OK	
	VSWR Receptacle	0.1~3GHz	1.3 MAX.	10	-----	1.149	1.15	1.14	0.005	OK	
		3~6GHz	1.4 MAX.	10	-----	1.131	1.15	1.11	0.022	OK	
C	Un mating force	Initial	4 MIN.	10	N	11.13	12.0	10.0	0.63	OK	
		30 cycles	2 MIN.	10	N	6.22	8.5	4.3	1.36	OK	
D	Crimp strength	Initial	5 MIN.	10	N	7.79	8.4	7.1	0.37	OK	
E	Durability	Contact resistance of inner contact									
		Initial	20 MAX.	10	milli-ohm	6.25	7.0	5.7	0.67	OK	
		After testing	-----	10	milli-ohm	6.55	7.6	5.7	0.97	-----	
		ΔR	20 MAX.	10	milli-ohm	0.30	1.9	-0.6	1.35	OK	
		Contact resistance of ground contact									
		Initial	20 MAX.	10	milli-ohm	3.19	4.1	2.1	1.01	OK	
		After testing	-----	10	milli-ohm	3.34	4.0	3.0	0.56	-----	
		ΔR	20 MAX.	10	milli-ohm	0.15	1.0	-1.1	1.10	OK	
		Appearance	Spec: No abnormality adversely affecting the performance shall occur.								
			Initial	No abnormality	10	-----	No abnormality				OK
After testing	No abnormality		10	-----	No abnormality				OK		
F	Cable retention force	Electrical discontinuity	Spec. : No electrical discontinuity grater than 1μsec. shall occur.							-----	
			-----	10	-----	Results : No discontinuity				OK	

Table 2-2 Test Result

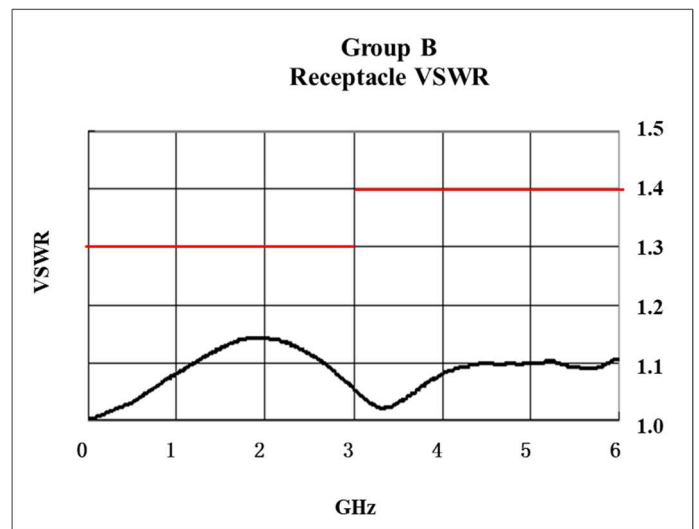
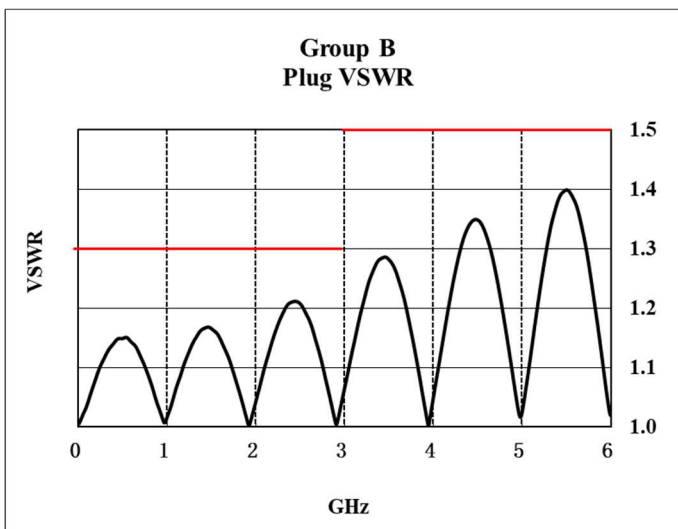
	Test items	Measurements	Spec.	n	Unit	Data				Judge		
						AVE.	MAX.	MIN.	S			
G	Vibration	Contact resistance of inner contact										
		Initial	20 MAX.	10	milli-ohm	5.25	6.3	4.1	0.46	OK		
		After testing	-----	10	milli-ohm	6.92	8.8	5.0	1.14	-----		
		∠R	20 MAX.	10	milli-ohm	1.68	2.5	0.9	0.69	OK		
		Contact resistance of ground contact										
		Initial	20 MAX.	10	milli-ohm	5.25	6.8	4.1	0.83	OK		
		After testing	-----	10	milli-ohm	5.77	7.8	4.8	0.91	-----		
		∠R	20 MAX.	10	milli-ohm	0.53	1.6	-0.7	0.68	OK		
		Electrical discontinuity		Spec. : No electrical discontinuity grater than 1μsec. shall occur.							-----	
				-----	10	-----	Results : No discontinuity			OK		
		Appearance		Spec.No abnormality adversely affecting the performance shall occur.								
		Initial		No abnormality	10	-----	No abnormality			OK		
		After testing		No abnormality	10	-----	No abnormality			OK		
		H	Shock	Contact resistance of inner contact								
				Initial	20 MAX.	10	milli-ohm	6.92	8.8	5.0	1.14	OK
After testing	-----			10	milli-ohm	7.13	8.6	5.6	1.05	-----		
∠R	20 MAX.			10	milli-ohm	0.21	1.1	-0.6	0.70	OK		
Contact resistance of ground contact												
Initial	20 MAX.			10	milli-ohm	6.97	8.8	4.4	1.21	OK		
After testing	-----			10	milli-ohm	6.95	8.5	3.7	1.42	-----		
∠R	20 MAX.			10	milli-ohm	-0.02	1.6	-1.4	0.87	OK		
Electrical discontinuity				Spec. : No electrical discontinuity grater than 1μsec. shall occur.							-----	
				-----	10	-----	Results : No discontinuity			OK		
Appearance				Spec.No abnormality adversely affecting the performance shall occur.								
Initial				No abnormality	10	-----	No abnormality			OK		
After testing				No abnormality	10	-----	No abnormality			OK		
J	Humidity (Syeady State)			Contact resistance of inner contact								
				Initial	20 MAX.	10	milli-ohm	5.86	7.4	4.8	0.78	OK
		After testing	-----	10	milli-ohm	7.11	8.0	5.1	0.84	-----		
		∠R	20 MAX.	10	milli-ohm	1.25	1.8	0.3	0.57	OK		
		Contact resistance of ground contact										
		Initial	20 MAX.	10	milli-ohm	5.94	6.6	4.8	0.57	OK		
		After testing	-----	10	milli-ohm	6.33	7.0	5.4	0.56	-----		
		∠R	20 MAX.	10	milli-ohm	0.39	0.8	0.0	0.31	OK		
		Insulation resistance										
		Initial	500 MIN.	10	Mega-ohm	10,000 (minimum vale)				OK		
		After testing	100 MIN.	10	Mega-ohm	10,000 (minimum vale)				OK		
		Appearance		Spec.No abnormality adversely affecting the performance shall occur.								
		Initial		No abnormality	10	-----	No abnormality			OK		
		After testing		No abnormality	10	-----	No abnormality			OK		
		Dielectric withstanding voltage										
Initial		No abnormality	10	-----	No abnormality			OK				
After testing		No abnormality	10	-----	No abnormality			OK				

Table 2-3 Test Result

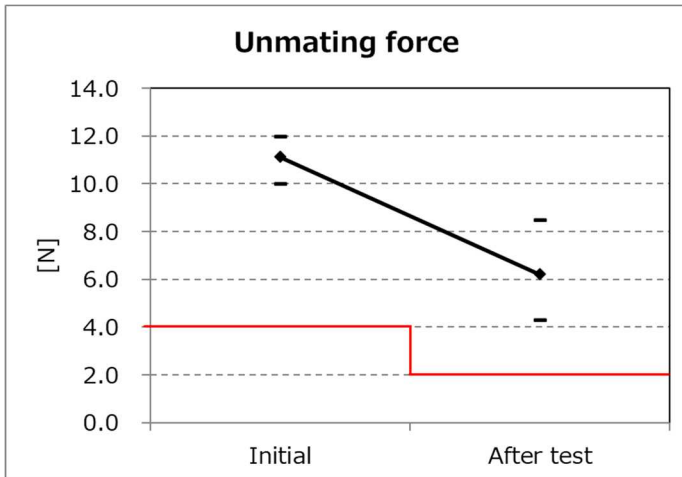
	Test items	Measurements	Spec.	n	Unit	Data				Judge		
						AVE.	MAX.	MIN.	S			
K	Thermal shock	Contact resistance of inner contact										
		Initial	20 MAX.	10	milli-ohm	5.73	7.5	4.3	0.83	OK		
		After testing	-----	10	milli-ohm	6.71	7.8	5.1	0.89	-----		
		ΔR	20 MAX.	10	milli-ohm	0.98	2.4	-1.1	1.06	OK		
		Contact resistance of ground contact										
		Initial	20 MAX.	10	milli-ohm	5.27	5.8	4.5	0.45	OK		
		After testing	-----	10	milli-ohm	6.67	7.3	6.2	0.34	-----		
		ΔR	20 MAX.	10	milli-ohm	1.40	2.2	0.8	0.53	OK		
		Insulation resistance										
		Initial	500 MIN.	10	Mega-ohm	10,000 (minimum vale)				OK		
		After testing	100 MIN.	10	Mega-ohm	10,000 (minimum vale)				OK		
		Appearance	Spec:No abnormality adversely affecting the performance shall occur.									
			Initial	No abnormality	10	-----	No abnormality				OK	
			After testing	No abnormality	10	-----	No abnormality				OK	
		Dielectric withstanding voltage										
Initial	No abnormality	10	-----	No abnormality				OK				
After testing	No abnormality	10	-----	No abnormality				OK				
L	High temperature life	Contact resistance of inner contact										
		Initial	20 MAX.	10	milli-ohm	6.57	7.7	5.8	0.68	OK		
		After testing	-----	10	milli-ohm	7.52	8.6	6.0	0.96	-----		
		ΔR	20 MAX.	10	milli-ohm	0.95	2.3	-0.9	1.05	OK		
		Contact resistance of ground contact										
		Initial	20 MAX.	10	milli-ohm	4.96	5.7	4.4	0.48	OK		
		After testing	-----	10	milli-ohm	5.67	6.1	4.8	0.43	-----		
		ΔR	20 MAX.	10	milli-ohm	0.71	1.5	-0.1	0.63	OK		
		Appearance	Spec:No abnormality adversely affecting the performance shall occur.									
			Initial	No abnormality	10	-----	No abnormality				OK	
			After testing	No abnormality	10	-----	No abnormality				OK	
		M	H ₂ S Gas	Contact resistance of inner contact								
				Initial	20 MAX.	10	milli-ohm	5.86	8.2	4.3	1.42	OK
				After testing	-----	10	milli-ohm	6.80	10.9	4.7	2.00	-----
				ΔR	20 MAX.	10	milli-ohm	0.94	2.7	-1.1	1.16	OK
Contact resistance of ground contact												
Initial	20 MAX.			10	milli-ohm	4.91	6.0	3.9	0.68	OK		
After testing	-----			10	milli-ohm	7.35	9.0	5.3	1.38	-----		
ΔR	20 MAX.			10	milli-ohm	2.45	3.9	0.6	1.23	OK		
Appearance	Spec:No abnormality adversely affecting the performance shall occur.											
	Initial			No abnormality	10	-----	No abnormality				OK	
	After testing			No abnormality	10	-----	No abnormality				OK	

Table 2-4 Test Result

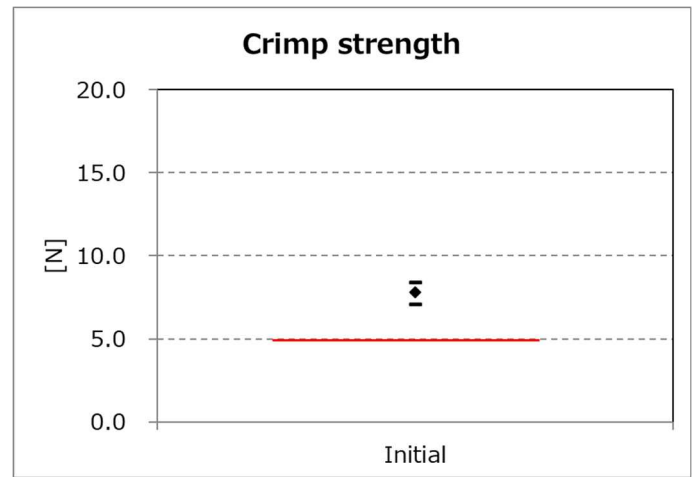
	Test items	Measurements	Spec.	n	Unit	Data				Judge
						AVE.	MAX.	MIN.	S	
N	Salt water spray	Contact resistance of inner contact								
		Initial	20 MAX.	10	milli-ohm	5.05	7.2	4.1	0.99	OK
		After testing	-----	10	milli-ohm	5.35	7.1	4.2	1.01	-----
		ΔR	20 MAX.	10	milli-ohm	0.30	1.6	-1.2	0.88	OK
		Contact resistance of ground contact								
		Initial	20 MAX.	10	milli-ohm	5.58	7.2	4.2	1.04	OK
		After testing	-----	10	milli-ohm	5.66	7.1	4.5	0.73	-----
		ΔR	20 MAX.	10	milli-ohm	0.08	1.4	-2.0	1.17	OK
		Appearance								
		Spec.:No abnormality adversely affecting the performance shall occur.								
		Initial	No abnormality	10	-----	No abnormality			OK	
		After testing	No abnormality	10	-----	No abnormality			OK	
P	Solderability	Spec.:More than 95% of the dipped surface becomes wet and the pinhole that should not gather at one point is less than 5%.								
		-----	10	-----	No abnormality			OK		
Q	Reflow soldering heat resistance	Spec.:Abnormality adversely affecting the performance should not occur.								
		-----	10	-----	No abnormality			OK		



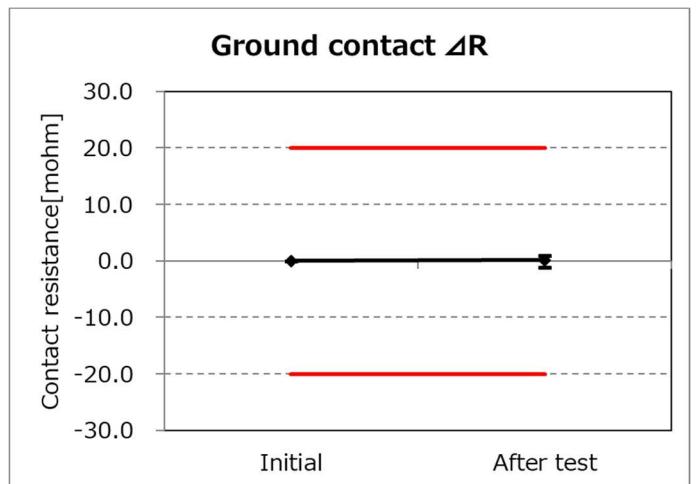
Graph 1 Group B VSWR



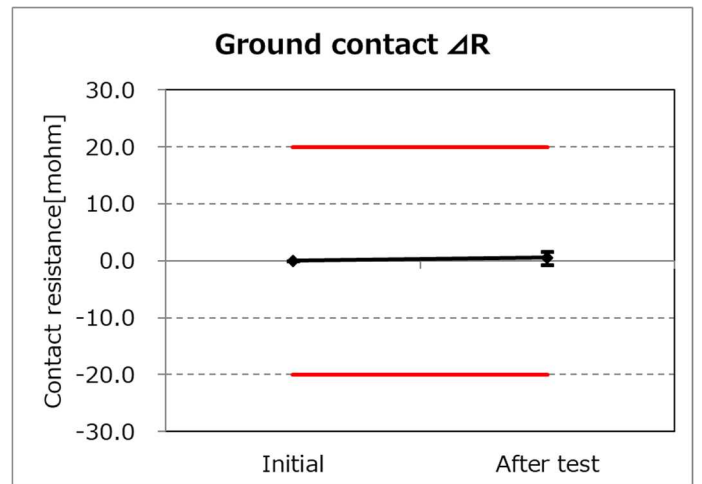
Graph 2 Group C Unmating force



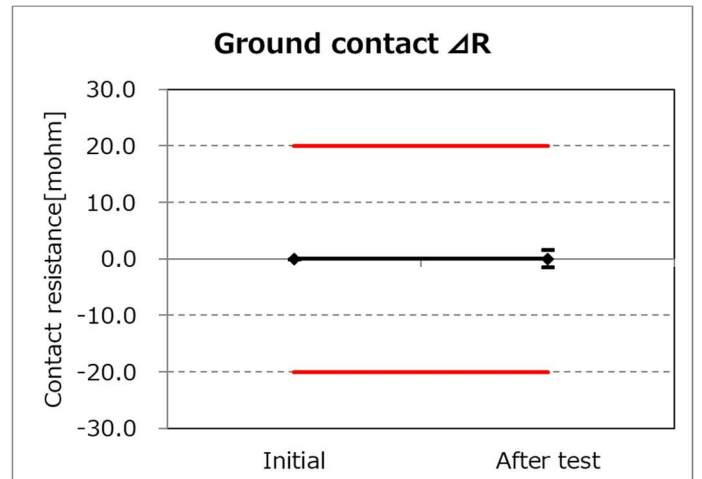
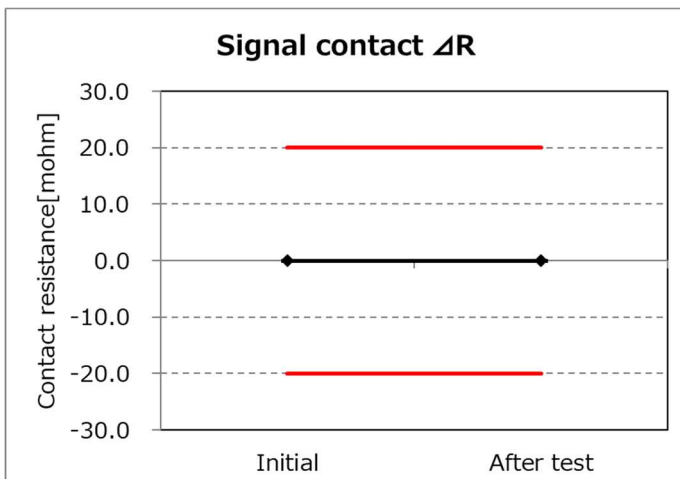
Graph 3 Group D Crimp strength



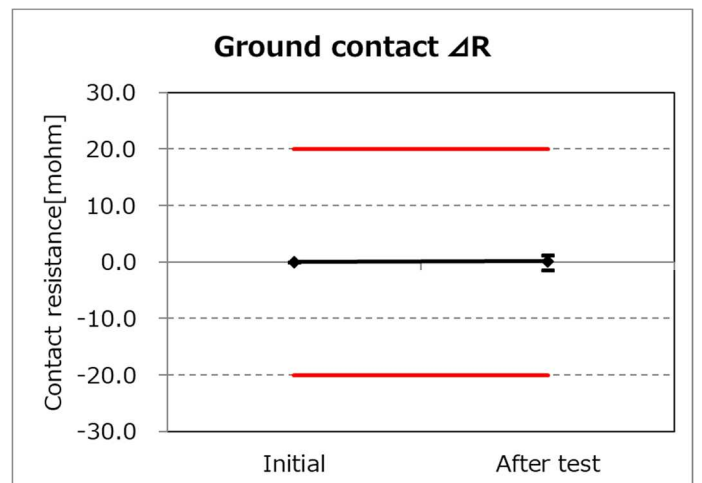
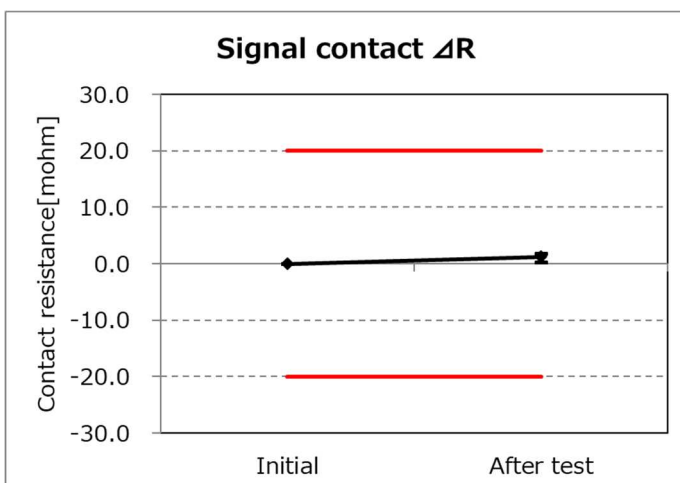
Graph 4 Group E Durability



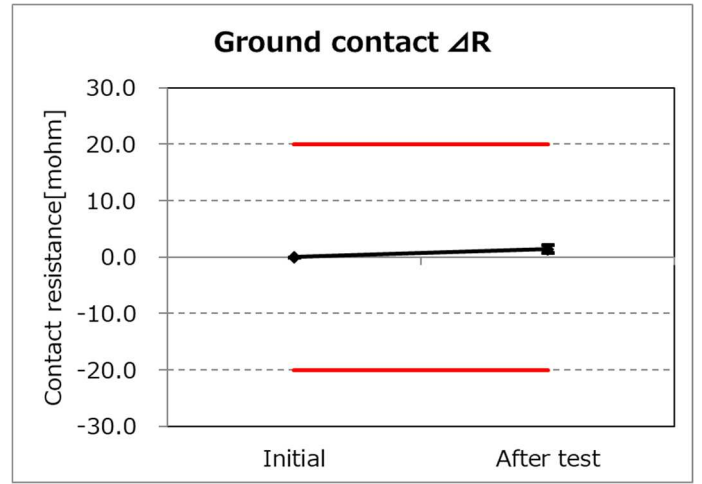
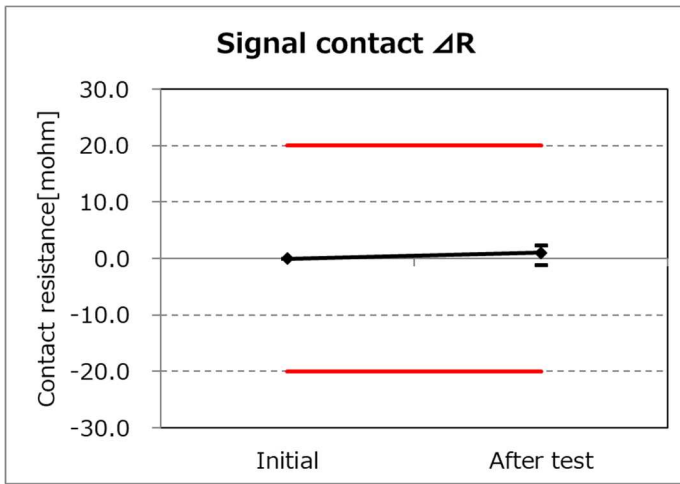
Graph 5 Group G Vibration



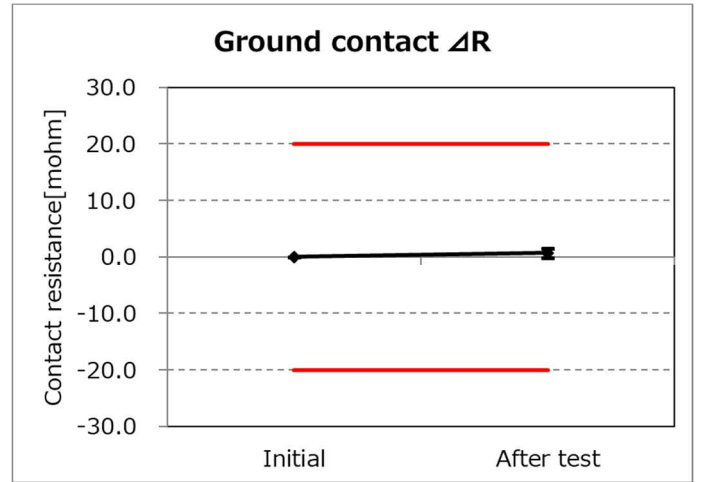
Graph 6 Group H Shock



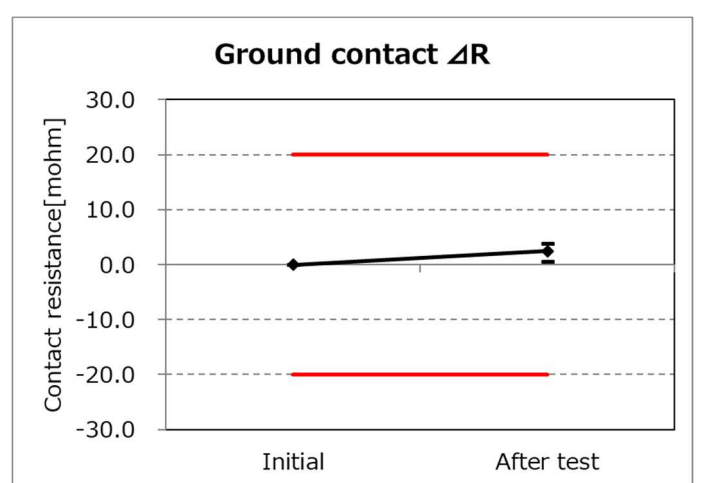
Graph 7 Group J Humidity (Steady state)



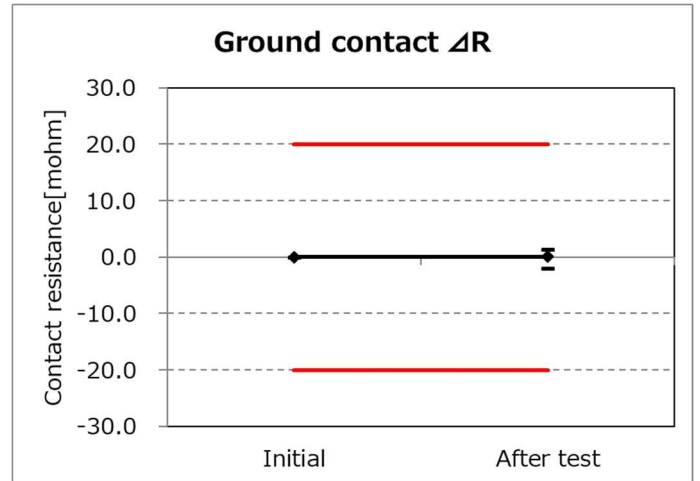
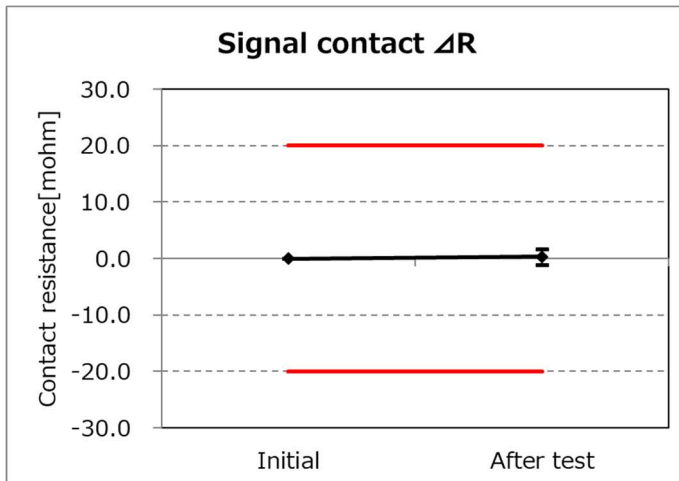
Graph 8 Group K Thermal shock



Graph 9 Group L High temperature life



Graph 10 Group M H₂S Gas



Graph 11 Group N Salt water spray