

MHF® 4 Connector

Part No. Plug: 20611-001R Receptacle: 20449-001E-**

Test Report

Product Specification no. PRS-2530

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2	T19170	December 13, 2019	S.Kamada	S.Suzuki	Y.Shimada
1	T19022	April 4, 2019	S.Kamada		T.Hirakawa
Rev.	ECN	Date	Prepared by	Checked by	Approved by
Confidentia	al C		I-PEX Inc.		QKE-DFFDE07-07 REV.10

1. Purpose

To evaluate the performance of MHF 4 connector in accordance with PRS-2530.

2. Specimen

(1) Plug: 20611-001R(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-2530. The "n" in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-2530.

T									Group							
lest	Item	А	В	С	D	Е	F	G	Н	J	K	L	М	Ν	Р	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	9)									4						
Thermal Shoo	ж ж										4					
High Temperat	ture Life											2				
H2S Gas													2			
Salt Water Spray														2		
Solder ability															1	
Soldering Heat Resistance																1
Sample Quantity	Plug	10	10	10	10	10	10	10	10	10	10	10	10	10	-	-
(pcs.)	Receptacle		5	.0	-	IU	10	10	.0	10	10	10	10	10	10	10

Table 1 Test Sequence and Sample Quantity

XNumbers indicate sequence in which tests are performed.

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Table 2-1 Test Result

0	Testite	ms	On a sife stars		11-3		MAY	MIN	6	hidaranat
Group		Measurements	Specification	n	Unit	AVE.	IVIAX.	WIIN.	5	Juagement
A	Dielectr	ic withstanding voltage				•				
		Spec : No creeping discharge,flashover,nor in:	sulator breakdown sł	nall occur						
		After testing	No abnormality	10	-	No abnorma	ality			Pass
В	VSWR									
	Plug									
	-	0.1~3GHz	1.30 MAX.		-	1.174	1.19	1.14	0.013	Pass
		3~6GHz	1.50 MAX.	10	-	1.340	1.36	1.32	0.014	Pass
		6~9GHz	2.00 MAX.		-	1.493	1.55	1.41	0.036	Pass
	Recept	acle								
		0.1~3GHz	1.30 MAX.		-	1.067	1.08	1.06	0.007	Pass
		3~6GHz	1.40 MAX.	5	-	1.176	1.19	1.16	0.010	Pass
		6~9GHz	1.55 MAX.		-	1.465	1.50	1.43	0.021	Pass
С	Unmatir	ng force								
		Initial	4N MIN.			13.11	13.8	12.6	0.44	Pass
		After testing	2N MIN.	10	N	8.48	9.3	7.7	0.59	Pass
D	Crimp s	strength				•				
_	onnp c	After testing	5N MIN.	10	N	7.04	7.60	6.35	0.37	Pass
	D 1 1									
E	Durabil	ity								
	Contact		20			0.50	0.1	7.0	0.20	Dees
				10		0.00	9.1	7.0	0.39	Pass
			-	10	mu2	0.07	10.3	1.2	0.00	- Dooo
	Contact					0.11	1.0	-1.0	0.95	Fass
	Comaci		20m0 MAX			5.86	69	5.2	0.50	Pass
		After testing	-	10	mΟ	7 31	0.0 Q 8	6.0	1.06	-
			- /100mO MAX	10	1162	0.03	9.0 2.0	-2.6	1.00	- Pass
	Annear	ance				0.00	2.0	2.0	1.42	1 435
	, ppour	Spec: No abnormality adversely affecting the p	erformance shall occ	ur.						
		Initial				No abnorma	ality			Pass
		After testing	No abnormality	10	-	No abnorma	ality			Pass
F	Cable r	retantion force								
'	Electric	al discontinuity								
		Spec: No electrical discontinuity grater than 1us shall occur								
		After testing	-	10	-	No discontin	ity			Pass
	Appear	ance		1		1				
		Spec: No abnormality adversely affecting the p	erformance shall occ	ur.						
		Initial	No sha Pi	40		No abnorma	ality			Pass
		After testing	ivo abnormality	10	-	No abnorma	ality			Pass

Group	Test ite	ms	Specification	n	Unit	AVE.	MAX.	MIN.	S	Judgement
		Measurements								
G	Vibratic	n								
	Contac	t resistance of main contact	-							
		Initial	20mΩ MAX.			7.73	8.7	6.4	0.76	Pass
		After testing	-	10	mΩ	7.68	8.7	6.1	0.85	-
		⊿R	⊿20mΩ MAX.			-0.05	0.7	-0.6	0.50	Pass
	Contac	t resistance of Ground contact	-							
		Initial	20mΩ MAX.			5.39	5.8	4.8	0.32	Pass
		After testing	-	10	mΩ	5.29	5.9	4.5	0.46	-
		⊿R	∠100mΩ MAX.			-0.10	0.8	-1.1	0.56	Pass
	Electric	al discontinuity								
		Spec: No electrical discontinuity grater than 1	is shall occur							
		After testing	-	10		No discontin	itv			Pass
	Annoar		_	10			ity			1 035
	Appear									
		Spec: No abnormality adversely allecting the p	Denormance shall occ	ur.		N				Deve
			 No abnormality 	10	-	No abnorma				Pass
		After testing				No abnorma	ality			Pass
Н	Shock									
	Contac	t resistance of main contact								
		Initial	20mΩ MAX.			8.06	9.1	7.5	0.57	Pass
		After testing	-	10	mΟ	8 59	11 1	7.5	1 02	-
			420m0 MAX	. 10	11122	0.53	20	0.2	0.74	Dass
	Cantas					0.55	2.0	-0.2	0.74	F 855
	Contac		00.0144	- 1		5.00	5.0	4.0	0.00	
		Initial	20mΩ MAX.		_	5.08	5.0	4.6	0.29	Pass
		After testing	-	10	mΩ	5.40	5.7	4.9	0.25	-
		⊿R	∠_100mΩ MAX.			0.32	0.7	0.0	0.22	Pass
	Electric	al discontinuity								
		Spec: No electrical discontinuity grater than 1µ	is shall occur.							
		After testing	-	10	-	No discontin	ity			Pass
	Appear	ance	-							
		Spec: No abnormality adversely affecting the p	performance shall occ	ur.						
		Initial								
			No abnormality			No abnorma	ality			Pass
		After testing	No abriorriality	10	-	No abnorma	ality ality		E 011-001-001-001-001-001-001-001-001-001	Pass Pass
		After testing	No abhormailty	10	-	No abnorma No abnorma	ality ality		*****************************	Pass Pass
J	Humidi	After testing y(Steady State)	No abriormality	10	-	No abnorma No abnorma	ality ality			Pass Pass
J	Humidii Contac	After testing y(Steady State) t resistance of main contact		10	-	No abnorma No abnorma	ality ality			Pass Pass
J	Humidi Contac	After testing y(Steady State) t resistance of main contact Initial	20mΩ MAX.	10	-	No abnorma No abnorma 8.69	ality ality 10.5	7.1	0.82	Pass Pass Pass
J	Humidit Contac	After testing ty(Steady State) t resistance of main contact Initial After testing	20mΩ MAX.	10	- mΩ	No abnorma No abnorma 8.69 9.89	ality ality 10.5 10.7	7.1 8.7	0.82	Pass Pass Pass -
J	Humidif Contac	After testing (Steady State) t resistance of main contact Initial After testing QR	20mΩ MAX. - 20mΩ MAX.	10	- mΩ	No abnorma No abnorma 8.69 9.89 1.21	lity 10.5 10.7 2.0	7.1 8.7 -0.3	0.82 0.75 0.75	Pass Pass Pass - Pass
J	Humidii Contac Contac	After testing (Steady State) t resistance of main contact Initial After testing △R t resistance of Ground contact	20mΩ MAX. - 20mΩ MAX.	10	- mΩ	No abnorma No abnorma 8.69 9.89 1.21	ality 10.5 10.7 2.0	7.1 8.7 -0.3	0.82 0.75 0.75	Pass Pass Pass - Pass
J	Humidii Contac Contac	After testing (Steady State) t resistance of main contact Initial After testing ∠R t resistance of Ground contact Initial	20mΩ MAX. - 20mΩ MAX. 20mΩ MAX.	10	- mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40	10.5 10.7 2.0 6.9	7.1 8.7 -0.3 5.3	0.82 0.75 0.75 0.50	Pass Pass Pass - Pass Pass
J	Humidii Contac Contac	After testing ty(Steady State) t resistance of main contact Initial After testing ☑R t resistance of Ground contact Initial After testing ☑R t resistance of Ground contact Initial After testing	20mΩ MAX. - 20mΩ MAX. 20mΩ MAX. 	10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51	ality 10.5 10.7 2.0 6.9 7.0	7.1 8.7 -0.3 5.3 5.4	0.82 0.75 0.75 0.50 0.56	Pass Pass Pass - Pass Pass -
J	Humidii Contac Contac	After testing ty(Steady State) tresistance of main contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R Initial After testing ☑R	20mΩ MAX. - _ _20mΩ MAX. 20mΩ MAX. - _ _ _ _ _ _ _ _ _ _ _ _ _	10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11	ality ality 10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass Pass - Pass Pass - Pass
J	Humidii Contac Contac	After testing tresistance of main contact Initial After testing ⊿R tresistance of Ground contact Initial After testing ∠R tresistance of Ground contact Initial After testing ∠R Initial After testing ∠R on residence	20mΩ MAX. - _20mΩ MAX. 20mΩ MAX. - _ _100mΩ MAX.	10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11	lity 10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass Pass - Pass Pass - Pass - Pass
J	Humidii Contac Contac	After testing ty (Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R Initial After testing ⊿R on residence Initial	20mΩ MAX. - _ 20mΩ MAX. 20mΩ MAX. - _ 100mΩ MAX. 500MΩ MIN	10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11	lity 10.5 10.7 2.0 6.9 7.0 1.2 AllN.	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass Pass - Pass Pass - Pass Pass
J	Humidii Contac Contac	After testing y(Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R Initial After testing ⊿R Initial After testing ⊿R Initial After testing △R Initial After testing △R On residence Initial After testing	20mΩ MAX. - _20mΩ MAX. 20mΩ MAX. - _100mΩ MAX. 500MΩ MIN. 100MΩ MIN.	10 10 10 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ M	10.5 10.7 2.0 6.9 7.0 1.2 MIN.	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass Pass - Pass Pass Pass Pass Pas
J	Humidii Contac Contac Insulatie	After testing tresistance of main contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R on residence Initial After testing ☑R on residence Initial After testing initial	20mΩ MAX. - _20mΩ MAX. 20mΩ MAX. - _100mΩ MAX. 500MΩ MIN. 100MΩ MIN.	10 10 10 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ №	Ality 10.5 10.7 2.0 6.9 7.0 1.2 MIN. MIN.	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass Pass - Pass Pass Pass P
J	Humidii Contac Contac Insulatie	After testing tresistance of main contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R on residence Initial After testing ☑R on residence Initial After testing ☑R Space No grouping dispersed for burge	20mΩ MAX. 20mΩ MAX. 20mΩ MAX. 100mΩ MAX.	10 10 10 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ Ν	10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass - Pass - Pass Pass Pass
J	Humidii Contac Contac Insulati	After testing y(Steady State) t resistance of main contact Initial After testing ☑R t resistance of Ground contact Initial After testing ☑R tresistance of Ground contact Initial After testing ☑R on residence Initial After testing ic withstanding voltage Spec: No creeping discharge, flashover, no in	20mΩ MAX. - _ _ 20mΩ MAX. _ _ 20mΩ MAX. _ _ _ _ 100mΩ MAX. _ _ _ 100MΩ MIN. 100MΩ MIN. _ sulator breakdown st	10 10 10 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ № 10,000ΜΩ №	10.5 10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass - Pass - Pass Pass Pass
J	Humidii Contac Contac Insulati	After testing y(Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R Initial After testing ⊿R on residence Initial After testing ic withstanding voltage Spec: No creeping discharge, flashover, no in After testing	20mΩ MAX. - _ _ 20mΩ MAX. _ _ _ 20mΩ MAX. _	10 10 10 10 10 nall occur 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ N 10,000ΜΩ N No abnorma	10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass - Pass - Pass Pass Pass
J	Humidii Contac Contac Insulati Dielectr	After testing y(Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R Initial After testing ⊿R on residence Initial After testing ic withstanding voltage Spec: No creeping discharge, flashover, no in After testing ance	20mΩ MAX. - _ 20mΩ MAX. _ _ 20mΩ MAX. _ _ _ 20mΩ MAX. _ _	10 10 10 10 10 nall occur 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000MΩ N 10,000MΩ N No abnorma	10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass - Pass - Pass Pass Pass
J	Humidii Contac Contac Insulati Dielectr	After testing y(Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R on residence Initial After testing ic withstanding voltage Spec: No creeping discharge, flashover, no in After testing :ance Spec: No abnormality adversely affecting the p	20mΩ MAX. - _ _ 20mΩ MAX. _ _ 20mΩ MAX. _	10 10 10 10 10 nall occur 10	- mΩ mΩ MΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000ΜΩ N Νο abnorma	10.5 10.7 2.0 6.9 7.0 1.2	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass Pass - Pass Pass Pass P
J	Humidii Contac Contac Insulatio Dielectr Appear	After testing y(Steady State) t resistance of main contact Initial After testing ⊿R t resistance of Ground contact Initial After testing ⊿R Initial After testing ⊿R Initial After testing △R on residence Initial After testing cic withstanding voltage Spec: No creeping discharge, flashover, no in After testing rance Spec: No abnormality adversely affecting the p Initial	20mΩ MAX. - _ _ 20mΩ MAX. _ _ _ 20mΩ MAX. _	10 10 10 10 10 nall occur 10 ur.	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000MΩ N 10,000MΩ N No abnorma No abnorma	lity lity 10.5 10.7 2.0 6.9 7.0 1.2 ИІЛ. ИІЛ.	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass Pass - Pass Pass Pass P
J	Humidii Contac Contac Insulati Dielectr	After testing y(Steady State) t resistance of main contact Initial After testing ☑R t resistance of Ground contact Initial After testing ☑R on residence Initial After testing ic withstanding voltage Spec: No creeping discharge, flashover, no in After testing ance Spec: No abnormality adversely affecting the p Initial After testing	20mΩ MAX. 20mΩ MAX. 20mΩ MAX. 20mΩ MAX. 20mΩ MAX. 500MΩ MIN. 100MΩ MIN. sulator breakdown sl - performance shall occ No abnormality	10 10 10 10 10 nall occur 10 ur. 10	- mΩ mΩ	No abnorma No abnorma 8.69 9.89 1.21 6.40 6.51 0.11 10,000MΩ N 10,000MΩ N No abnorma No abnorma No abnorma	10.5 10.7 2.0 6.9 7.0 1.2 AIN. AIN. slity	7.1 8.7 -0.3 5.3 5.4 -1.4	0.82 0.75 0.75 0.50 0.56 0.68	Pass Pass - Pass Pass - Pass Pass Pass P

Table 2-2 Test Result

						1	1		-	1
Group	Testite	ms	Specification	n	Unit	AVE.	MAX.	MIN.	S	Judgement
		Measurements								
К	Therma	al shock								
	Contact	t resistance of main contact								
		Initial	20mΩ MAX.			6.99	9.4	5.1	1.19	Pass
		After testing	-	10	mΩ	7.41	9.6	4.4	1.69	-
		⊿R	⊿20mΩ MAX.			0.42	2.7	-5.0	2.05	Pass
	Contact	t resistance of Ground contact	•				•			
		Initial	20mΩ MAX.			5.88	7.7	2.9	1.22	Pass
		After testing	-	10	mΩ	8.34	11.5	6.5	1.68	-
		⊿R	⊿100mΩ MAX.	1		2.46	5.5	1.1	1.38	Pass
	Insulatio	on residence	•							
		Initial	500MΩ MIN.			10,000MΩ I	MIN.			Pass
		After testing	100MΩ MIN.	10	MΩ	10,000MΩ I	MIN.			Pass
	Dielectr	ic withstanding voltage								
		Spec: No creeping discharge, flashover, no insulator breakdown shall occur.								
		After testing	-	10	-	No abnorma	alitv			Pass
	Appear	ance								
		Spec: No abnormality adversely affecting the p	erformance shall occ	ur						
		Initial				No abnorma	ality			Pass
			No abnormality	10	-	No abnorma	ality			Pass
							anty			1 400
L	High ter	mperature life								
	Contact	t resistance of main contact				-		_	-	-
		Initial	20mΩ MAX.			6.08	7.2	5.2	0.60	Pass
		After testing	-	10	mΩ	7.16	7.7	6.0	0.62	-
		⊿R	⊿20mΩ MAX.			1.08	1.9	0.5	0.43	Pass
	Contact	t resistance of Ground contact								
		Initial	20mΩ MAX.			5.24	6.8	4.3	0.93	Pass
		After testing	-	10	mΩ	11.03	24.9	5.8	5.66	-
		⊿R	⊿100mΩ MAX.			5.79	18.3	-0.4	5.56	Pass
	Appear	ance	•							
		Spec: No abnormality adversely affecting the p	erformance shall occ	ur.						
		Initial	NI 1 197			No abnorma	ality			Pass
		After testing	No abnormality	10	-	No abnorma	ality			Pass
	1100									
IVI	H25 ga									
	Contact		00O MAX			774	0.7	0.0	0.54	Deve
				40	•	1.14	8.7	6.9 0.5	0.51	Pass
			-	10	mΩ	10.88	18.4	8.5	2.82	-
	-	⊿R	∠20mΩ MAX.			3.14	10.6	0.9	2.79	Pass
	Contact	t resistance of Ground contact				1 _	-	_	—	-
		Initial	20mΩ MAX.			5.61	6.6	5.0	0.44	Pass
		After testing	-	10	mΩ	8.40	9.7	7.0	0.95	-
		⊿R	⊿100mΩ MAX.			2.79	4.2	1.4	0.75	Pass
	Appear	ance								
		Spec: No abnormality adversely affecting the p	erformance shall occ	ur.						-
		Initial	No abnormality	10	_	No abnorma	ality			Pass
		After testing	ite abriorritality			No abnorma	ality			Pass

Table 2-3 Test Result



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I-PEX



Graph 11 Group N Salt water spray