

ISH® HYBRID
HORIZONTAL HC 20P

Part No. MALE ASSEMBLY: V0123-020E-02

FEMALE SUB ASSEMBLY: V0124-020B-02

Test Report

Product Specification no.PRS-3037

0	T26065	August 7, 2026	K.Tanaka	K.Tsusu	T.Takeda
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Purpose

To evaluate the performance of ISH® HYBRID HORIZONTAL HC 20P Connector in accordance with PRS-3037.

2. Specimen

MALE ASSEMBLY : V0123-020E-02

FEMALE SUB ASSEMBLY: V0124-020B-02

0.5mm FEMALE TERMINAL: VT009-02

1.5mm FEMALE TERMINAL: VT011-04

3. Test Sequence

All the evaluations were based on the PRS-3037

4. Result

See Table 1 to 4, Graph 1 to 8. For the details of the testing conditions and requirements, see PRS-3037.

The “n” in the tables show the number of measurement points.

5. Conclusion

All the specimens met the requirements of PRS-3037.

6-1. Initial characteristics

Table 1. Initial characteristics①

	Measurement		Specification	Set	n	Unit	Data				Judge.
							Avg.	Max.	Min.	s	
Initial characteristics	Terminal appearance		No detrimental deformation	5	5	-	No abnormalities				Pass
	Terminal outer dimension		Satisfy drawing dimension	5	5	-	No abnormalities				Pass
	Housing appearance		No detrimental deformation	5	5	-	No abnormalities				Pass
	Housing outer dimension		Satisfy drawing dimension	5	5	-	No abnormalities				Pass
	Feeling (insertion/removal)		No discomfort	5	5	-	No abnormalities				Pass
	Connector mating force		70N MAX.	5	5	N	49.22	49.8	48.6	1.21	Pass
	Connector unmating force		55N MAX.	5	5	N	46.88	48.4	45.9	0.92	Pass
	Connector retention force	Direction 1	100N MIN.	5	5	N	315.50	319.5	313.2	2.56	Pass
		Direction 2	100N MIN.	5	5	N	451.79	465.9	432.7	11.97	Pass
		Direction 3	100N MIN.	5	5	N	371.23	393.3	334.7	23.76	Pass
		Direction 4	100N MIN.	5	5	N	458.06	483.6	442.6	15.60	Pass
	Unlocking force		50N MAX.	5	5	N	10.22	10.3	10.1	0.08	Pass
	Insulation resistance	Between terminals	100MΩ MIN.	5	5	-	10,000MΩ以上				Pass
		Between terminal and housing	100MΩ MIN.	5	5	-	10,000MΩ以上				Pass
	Withstanding voltage	Between terminals	No insulation breakdown or erosion	5	5	-	No abnormalities				Pass
		Between terminal and housing	No insulation breakdown or erosion	5	5	-	No abnormalities				Pass
	Temperature rise	All pin	1.5mm	5	5	℃	28.51	29.6	27.1	1.03	Pass
	Leak current		1mA MAX.	5	5	-	1mA MAX.				Pass
	Coplanarity		0.1mm MAX.	5	5	mm	0.1mm MAX.				Pass
	Peg strength	Position 1	100N MIN.	5	5	N	209.51	215.7	204.1	9.27	Pass
		Position 2	100N MIN.	5	5	N	331.40	352.8	316.3	14.48	Pass
		Position 3	100N MIN.	5	5	N	927.90	948.7	903.8	16.06	Pass
	Audible click		60dB MIN.	5	5	dB	69.65	71.8	66.4	2.85	Pass
	Terminal crimp strength	0.5mm	70N MIN.	-	18	N	80.64	83.1	77.3	1.96	Pass
		1.5mm	130N MIN.	-	10	N	121.83	124.7	117.6	2.50	Pass
	Terminal insertion force	0.5mm	0.5N~3.0N	-	10	N	1.710	1.81	1.64	0.055	Pass
		1.5mm	3.5N~4.5N	-	10	N	4.094	4.17	4.01	0.059	Pass
	Terminal removal force	0.5mm	0.5N~3.0N	-	10	N	1.688	1.90	1.48	0.143	Pass
		1.5mm	3.5N~4.5N	-	10	N	4.138	4.25	3.99	0.118	Pass
	Terminal contact force	0.5mm	3N MIN.	-	10	N	2.722	2.86	2.50	0.137	Pass
		1.5mm	4N MIN.	-	10	N	8.532	8.59	8.48	0.041	Pass
	Terminal bend strength	a	0.5mm	-	10	-	Must not bend 1mm or over				Pass
			1.5mm	-	20	-	Must not bend 1mm or over				Pass
		b	0.5mm	-	10	N	2.404	5.230	0.260	1.570	Pass
			1.5mm	-	20	N	1.012	2.870	0.000	0.846	Pass

6-1. Initial characteristics

Table 2. Initial characteristics②

	Measurement		Specification	Set	n	Unit	Data				Judge.		
							Avg.	Max.	Min.	s			
Initial characteristics	Voltage drop		0.5mm	10mV/A MAX.	5	90	mV/A	2.504	3.66	1.97	0.274	Pass	
			1.5mm	10mV/A MAX.	5	10	mV/A	0.908	1.02	0.77	0.087	Pass	
	Dry circuit resistance		0.5mm	10mΩ MAX.	5	90	mΩ	2.448	3.63	2.08	0.276	Pass	
			1.5mm	10mΩ MAX.	5	10	mΩ	0.739	0.90	0.60	0.095	Pass	
	Microcut			1μsMIN.7ΩMAX.		-	-	-	1μsMIN.7ΩMAX.				Pass
	Terminal retention force	With secondary lock	0.5mm	49N MIN.	1	18	N	83.10	83.8	81.2	0.73	Pass	
			1.5mm	100N MIN.	3	6	N	131.67	133.8	128.4	2.01	Pass	
		Without secondary lock	0.5mm	20N MIN.	1	18	N	53.50	56.7	49.5	2.12	Pass	
			1.5mm	60N MIN.	3	6	N	70.03	71.1	69.4	0.67	Pass	
	Terminal to housing insertion force		0.5mm	10N MAX.	1	18	N	3.57	4.1	3.0	0.32	Pass	
			1.5mm	10N MAX.	5	10	N	5.60	7.2	4.5	0.83	Pass	
	Retainer insertion/removalforce		Insertion force	29.4N MAX.	5	5	N	19.95	20.5	19.5	0.33	Pass	
			Removal force	14.7N MIN.	5	5	N	41.61	44.3	39.0	2.25	Pass	
	Housing lock strength without terminals			49N MIN.	5	5	N	286.83	288.9	283.9	2.20	Pass	
	Sn whisker			125μm MAX.	5	5	-	125μm MAX.				Pass	

6-2. Environmental Performances

Table 3. Environmental Performances①

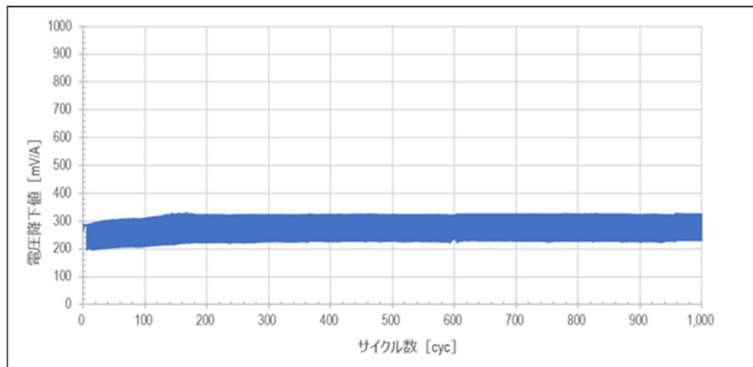
Item	Measurement			Requirements	Set	n	Unit	Data				Judge.
								Avg.	Max.	Min.	s	
Thermal a going	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Feeling (insertion/removal)			No discomfort	5	5	-	No abnormalities				Pass
	Connector retention force		Direction 1	100N MIN.	5	5	N	342.43	353.4	331.5	9.94	Pass
	Terminal crimp strength		0.5mm	70N MIN.	-	10	N	84.13	87.3	79.1	2.97	Pass
			1.5mm	130N MIN.	-	10	N	253.74	273.4	229.2	15.81	Pass
	Dry circuit resistance	Initial	0.5mm	10mΩ MAX.	5	90	mΩ	2.760	3.10	2.40	0.200	Pass
			1.5mm	10mΩ MAX.	5	10	mΩ	0.795	0.91	0.69	0.067	Pass
		After test	0.5mm	20mΩ MAX.	5	90	mΩ	3.940	4.90	3.00	0.410	Pass
			1.5mm	20mΩ MAX.	5	10	mΩ	1.100	1.30	1.00	0.100	Pass
	Terminal retention force	With secondary lock	0.5mm	49N MIN.	2	18	N	83.74	86.0	81.1	1.74	Pass
			1.5mm	100N MIN.	3	6	N	152.24	161.5	140.6	7.52	Pass
		Without secondary lock	0.5mm	20N MIN.	2	18	N	40.41	48.5	35.7	3.42	Pass
			1.5mm	60N MIN.	3	6	N	65.59	68.3	64.6	1.04	Pass
	Housing lock strength without terminals			49N MIN.	5	5	N	300.69	303.0	296.4	2.74	Pass
Low temperature a going	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Feeling (insertion/removal)			No discomfort	5	5	-	No abnormalities				Pass
	Dry circuit resistance	Initial	0.5mm	10mΩ MAX.	5	90	mΩ	2.57	2.90	2.30	0.120	Pass
			1.5mm	10mΩ MAX.	5	10	mΩ	0.647	0.79	0.52	0.095	Pass
		After test	0.5mm	20mΩ MAX.	5	90	mΩ	2.580	3.00	2.40	0.110	Pass
			1.5mm	20mΩ MAX.	5	10	mΩ	0.763	0.93	0.70	0.070	Pass
	Terminal retention force	With secondary lock	0.5mm	49N MIN.	2	18	N	83.44	86.3	75.9	2.68	Pass
			1.5mm	100N MIN.	3	6	N	147.44	156.8	138.2	5.77	Pass
		Without secondary lock	0.5mm	20N MIN.	2	18	N	38.80	42.5	35.1	1.92	Pass
			1.5mm	60N MIN.	3	6	N	65.71	67.6	64.1	1.24	Pass
	Housing lock strength without terminals			49N MIN.	5	5	N	301.88	303.8	297.5	2.69	Pass
Thermal shock	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Feeling (insertion/removal)			No discomfort	5	5	-	No abnormalities				Pass
	Connector retention force		Direction 1	100N MIN.	5	5	N	310.32	313.10	305.40	3.09	Pass
	Terminal crimp strength		0.5mm	70N MIN.	-	10	N	85.34	87.10	80.30	2.04	Pass
			1.5mm	130N MIN.	-	10	N	242.46	253.20	230.30	6.80	Pass
	Dry circuit resistance	Initial	0.5mm	10mΩ MAX.	5	90	mΩ	2.880	3.20	2.80	0.080	Pass
			1.5mm	10mΩ MAX.	5	10	mΩ	0.680	0.80	0.70	0.040	Pass
		After test	0.5mm	20mΩ MAX.	5	90	mΩ	3.980	7.20	1.90	0.790	Pass
			1.5mm	20mΩ MAX.	5	10	mΩ	1.160	2.40	0.90	0.420	Pass
	Terminal retention force	With secondary lock	0.5mm	49N MIN.	2	18	N	87.56	88.5	84.5	1.18	Pass
			1.5mm	100N MIN.	3	6	N	150.13	156.7	137.6	7.66	Pass
		Without secondary lock	0.5mm	20N MIN.	2	18	N	39.71	46.7	31.0	4.92	Pass
			1.5mm	60N MIN.	3	6	N	66.04	66.4	63.5	0.94	Pass

6-2. Environmental Performances

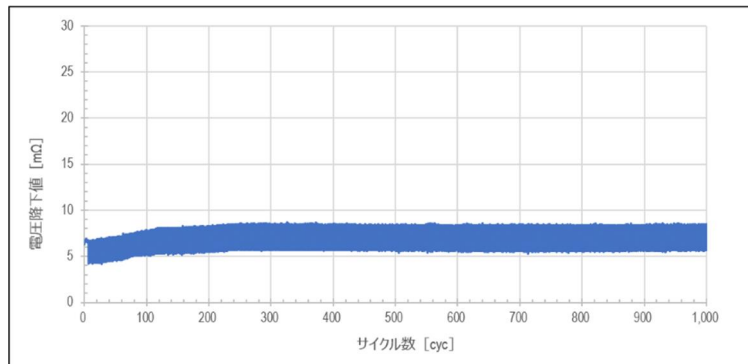
Table 4. Environmental Performances②

Item	Measurement			Requirements	Set	n	Unit	Data				Judge.
								Avg.	Max.	Min.	s	
Resistance to humidity	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Connector retention force		Direction 1	100N MIN.	5	5	N	326.79	334.20	318.20	5.79	Pass
	Insulation resistance	Between terminals		100MΩ MIN.	5	5	-	10,000MΩ Min.				Pass
		Between terminal and housing		100MΩ MIN.	5	5	-	10,000MΩ Min.				Pass
	Withstanding voltage	Between terminals		No insulation breakdown or erosion	5	5	-	No abnormalities				Pass
		Between terminal and housing		No insulation breakdown or erosion	5	5	-	No abnormalities				Pass
	Leak current			1mA MAX.	5	5	-	0.01mA Max.				Pass
	Dry circuit resistance	Initial	0.5mm	10mΩ MAX.	5	90	mΩ	2.650	3.00	2.30	0.130	Pass
			1.5mm	10mΩ MAX.	5	10	mΩ	0.722	0.88	0.61	0.083	Pass
		After test	0.5mm	20mΩ MAX.	5	90	mΩ	3.040	4.30	2.40	0.500	Pass
			1.5mm	20mΩ MAX.	5	10	mΩ	1.170	1.40	0.87	0.180	Pass
	Terminal retention force	With secondary lock	0.5mm	49N MIN.	2	18	N	83.74	86.0	81.1	1.74	Pass
			1.5mm	100N MIN.	3	6	N	152.24	161.5	140.6	7.52	Pass
		Without secondary lock	0.5mm	20N MIN.	2	18	N	40.41	48.5	35.7	3.42	Pass
			1.5mm	60N MIN.	3	6	N	65.59	68.3	64.6	1.04	Pass
Corrosion gas	Terminal appearance		0.5mm	No detrimental deformation	5	5	-	No abnormalities				Pass
			1.5mm	No detrimental deformation	5	5	-	No abnormalities				Pass
	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Terminal crimp strength		0.5mm	70N MIN.	-	10	N	84.74	85.5	84.0	0.47	Pass
			1.5mm	130N MIN.	-	10	N	255.08	274.0	237.0	12.67	Pass
	Voltage drop	Initial	0.5mm	10mV/A MAX.	5	90	V/A	3.290	3.76	3.12	0.130	Pass
			1.5mm	10mV/A MAX.	5	10	V/A	24.570	251.30	9.23	47.630	Pass
		After test	0.5mm	20mV/A MAX.	5	90	V/A	0.796	0.84	0.73	0.034	Pass
			1.5mm	20mV/A MAX.	5	10	V/A	7.100	19.61	3.41	5.220	Pass
Vibration with temperature change	Terminal appearance		0.5mm	No detrimental deformation	5	5	-	No abnormalities				Pass
			1.5mm	No detrimental deformation	5	5	-	No abnormalities				Pass
	Housing appearance			No detrimental deformation	5	5	-	No abnormalities				Pass
	Voltage drop	Initial	0.5mm	10mV/A MAX.	5	90	V/A	3.180	3.50	2.80	0.140	Pass
			1.5mm	10mV/A MAX.	5	10	V/A	0.706	1.10	0.53	0.120	Pass
		After test	0.5mm	20mV/A MAX.	5	90	V/A	3.950	7.30	3.20	0.490	Pass
			1.5mm	20mV/A MAX.	5	10	V/A	0.826	2.10	0.45	0.399	Pass
	Dry circuit resistance	Initial	0.5mm	10mΩ MAX.	5	90	mΩ	3.160	3.50	2.40	0.160	Pass
			1.5mm	10mΩ MAX.	5	10	mΩ	0.762	0.92	0.51	0.108	Pass
		After test	0.5mm	20mΩ MAX.	5	90	mΩ	4.280	8.90	2.60	0.770	Pass
			1.5mm	20mΩ MAX.	5	10	mΩ	1.320	16.30	0.50	2.840	Pass
	Microcut			1μsMIN.7ΩMAX.	5	5	-	No resistance above 7Ω persisted for 1μs or longer during the test.				Pass

6-2. Environmental Performances

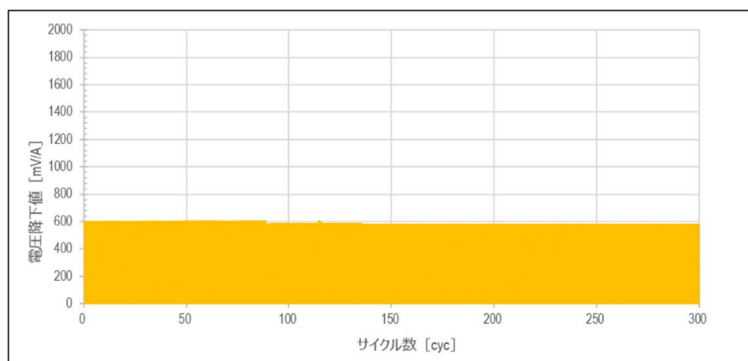
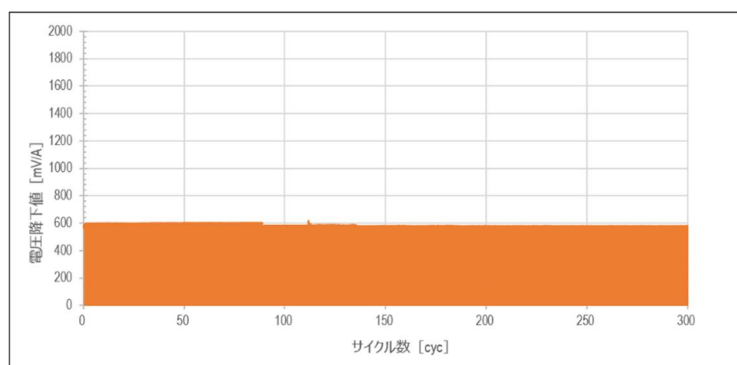
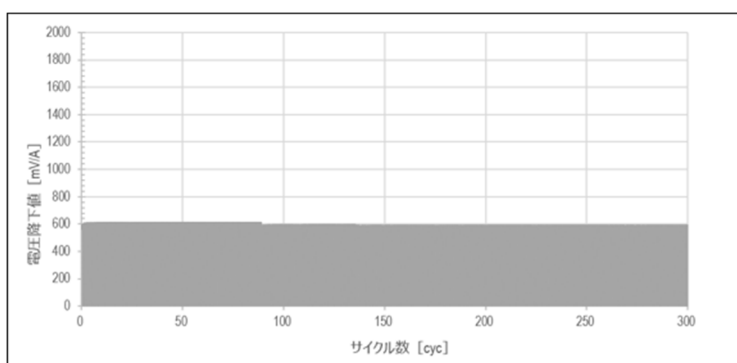


Graph 1. 0.5 mm Terminal Resistance Variation Monitor(Thermal shock)

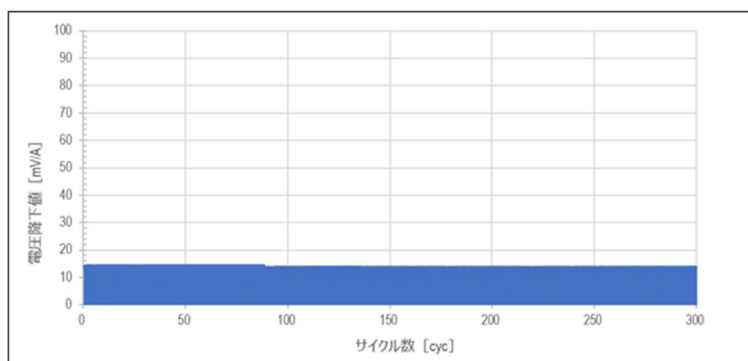


Graph 2. 1.5 mm Terminal Resistance Variation Monitor(Thermal shock)

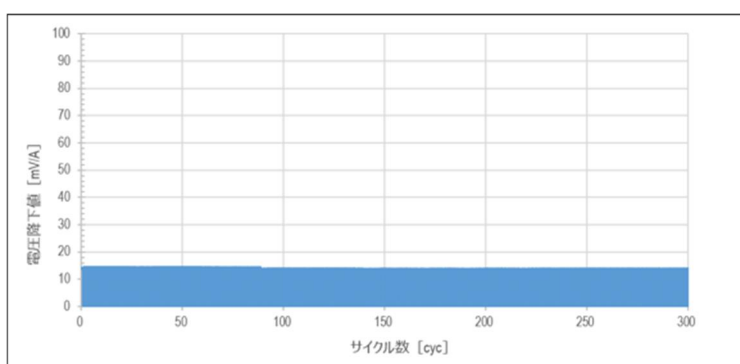
6-2. Environmental Performances

**Graph3. 0.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Front and Back)****Graph4. 0.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Up and Down)****Graph5. 0.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Left and Right)**

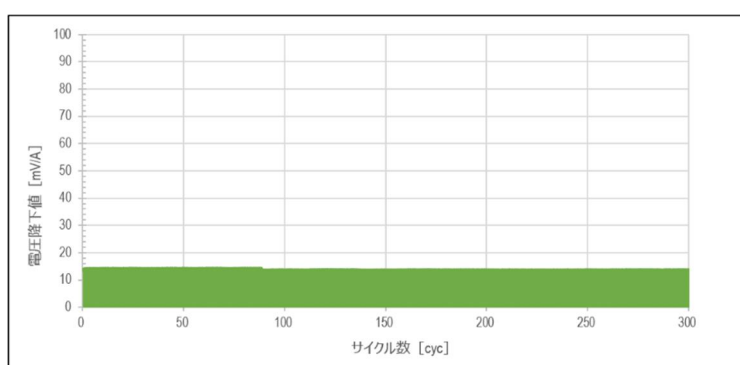
6-2. Environmental Performances



Graph6. 1.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Front and Back)



Graph7. 1.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Up and Down)



Graph8. 1.5 mm Terminal Resistance Variation Monitor(Vibration with temperature change * Left and Right)