DYNAMIC D1000 Slim Connector

1. INTRODUCTION

1.1 Purpose

This document provides the qualification summery of Dynamic D1000 Slim Connector.

1.2 Scope

This specification covers the electrical, mechanical, and environmental performance of Dynamic D1000 Slim Connector.

1.3 Conclusion

Based on the test results, all meet the requirements according to Product Specification 108-140257 Rev.A.

1.4 Product Description

Name	Remarks
DYNAMIC D1000 Slim Connector Receptacle Housing	-
DYNAMIC D1000 Slim Connector Tab Housing	-
DYNAMIC D1000 Slim Connector Receptacle Contact	-
DYNAMIC D1000 Slim Connector Tab Contact	-

1.5 Test Samples

Samples were taken randomly from current production. The following samples were used

Product Part Number	Description
1-2366515-4	DYNAMIC D1000 SLIM REC HSG 4P X KEY
1-2366515-6	DYNAMIC D1000 SLIM REC HSG 6P X KEY
1-2366515-8	DYNAMIC D1000 SLIM REC HSG 8P X KEY
3-2366515-2	DYNAMIC D1000 SLIM REC HSG 12P X KEY
2-2366515-4	DYNAMIC D1000 SLIM REC HSG 4P Y KEY
2-2366515-6	DYNAMIC D1000 SLIM REC HSG 6P Y KEY
2-2366515-8	DYNAMIC D1000 SLIM REC HSG 8P Y KEY
4-2366515-2	DYNAMIC D1000 SLIM REC HSG 12P Y KEY
1-2366600-4	DYNAMIC D1000 SLIM TAB HSG 4P X KEY
1-2366600-6	DYNAMIC D1000 SLIM TAB HSG 6P X KEY
1-2366600-8	DYNAMIC D1000 SLIM TAB HSG 8P X KEY
3-2366600-2	DYNAMIC D1000 SLIM TAB HSG 12P X KEY
2-2366600-4	DYNAMIC D1000 SLIM TAB HSG 4P Y KEY
2-2366600-6	DYNAMIC D1000 SLIM TAB HSG 6P Y KEY
2-2366600-8	DYNAMIC D1000 SLIM TAB HSG 8P Y KEY
4-2366600-2	DYNAMIC D1000 SLIM TAB HSG 12P Y KEY
2367817-1	DYNAMIC D1000 SL REC CONTACT S Au0.2
2367819-1	DYNAMIC D1000 SL TAB CONTACT S AU0.2
2367817-2	DYNAMIC D1000 SL REC CONTACT M Au0.2
2367819-2	DYNAMIC D1000 SL TAB CONTACT M AU0.2

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| Indicates Change

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1.6 Qualification Test Sequence and Test result

Test Examination	Test Group											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence (a)											
Examination of Product	1,3	1,6	1,9	1	1	1	1,5	1,9	1,9	1,5	1,5	1,5
Termination Resistance (Low Level)		2,5	3,8				2,4	2,8	2,8	2,4	2,4	2,4
Dielectric withstanding Voltage								4,7	4,7			
Insulation Resistance								3,6	3,6			
Temperature Rising	2											
Vibration		3										
Physical Shock		4										
Connector Mating Force			2,7									
Connector Unmating Force			4,6									
Durability			5									
Contact Insertion Force				2								
Contact Retention Force				3								
Crimp Tensile Strength					2							
Housing Locking Strength						2						
Thermal Shock							3					
Humidity-Temperature Cycling								5				
Humidity (Steady State)									5			
Industrial SO_2 Gas										3		
Temperature Life											3	
Salt Spray												3

Figure 1

NOTE

(a) Numbers indicate sequence in which tests are performed.

2. TEST REQUIREMENTS AND PROCEDURES SUMMARY

Para	TEST DESCRIPTION	REQUIREMENT	PROCEDURE
2.1	Examination of Product	Meets requirements of product drawing and TE Specification 114-5377	Visual inspection No physical damage
		ELECTRICAL	
2.2	Termination Resistance (Low Level)	30 mΩ Max.	Subject mated contacts assembled in housing to 20 mV Max open circuit at 10 mA Max closed circuit. Figure. 5. IEC 60512-2-2 Test 2b
2.3	Dielectric withstanding Voltage	No flashover or breakdown of voltage Current leakage:0.5mA Max.	Test voltage 1500V AC Duration 1minute. Test between adjacent circuits of mated connectors. IEC60512-4-1 Test 4a
2.4	Insulation Resistance	1000 MΩ Min.（Initial） 100 MΩ Min.（Final）	Test voltage 500V DC Time: 1minute Test between adjacent circuits of mated connectors. IEC 60512-3-1 Test 3a Method B
2.5	Temperature Rising	Temperature rising: specified value Max. Under loaded specified current. Refer Figure 1 and 2	Measure temperature rising by energized current. Figure. 1, Figure. 2 and Figure.5 IEC 60512-5-1 Test 5a
		MECHANICAL	
2.6	Vibration Sinusoidal High Frequency	No electrical discontinuity greater than 1μs. Shall occur. Termination Resistance (Low Level)	Vibration Frequency:10～500Hz / 15 min. Amplitude : 1.52mm MAX Accelerated Velocity : 98 m/s^2 Vibration Direction : X,Y,Z Duration : 3 h each Fixed position of cable:100mm IEC60512-6-4 Test 6d EIA 364-28 Test Condition 2
2.7	Physical Shock	No electrical discontinuity greater than 1 μs. Shall occur. Termination Resistance (Low Level)	Accelerated Velocity :490 m/s^2 Waveform : Sin wave Duration : 11 m s Number of Drops : 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops. Fixed position of cable:100mm IEC60512-6-3 Test 6c
2.8	Connector Mating Force	(1.6×POSN) N Max.	Operation Speed : 20mm/min. Measure the force required to mate connectors. IEC 60512-13-1 Test 13a
2.9	Connector Unmating Force	(0.08N×POSN) Min.	Operation Speed : 20mm/min. Measure the force required to mate connectors. IEC 60512-13-1 Test 13a
2.10	Contact Insertion Force	9.8N Max. Per 1 contact	Measure the force required to insert contact into housing.

<table>
<tr><th>Para</th><th>TEST DESCRIPTION</th><th>REQUIREMENT</th><th>PROCEDURE</th></tr>
<tr><td>2.11</td><td>Contact Retention Force</td><td>14.7 N Min.</td><td>Apply an axial pull-off load to crimped wire.
Operation Speed : 20 mm/min.
Test 15a of IEC 60512-15-1</td></tr>
<tr><td>2.12</td><td>Crimp Tensile Strength</td><td><table><tr><th colspan="2">Wire Size</th><th>Crimp Tensile (min.)</th></tr><tr><th>mm²</th><th>(AWG)</th><th>N</th></tr><tr><td>0.05</td><td>#30</td><td>4.9</td></tr><tr><td>0.08</td><td>#28</td><td>9.8</td></tr><tr><td>0.12</td><td>#26</td><td>19.60</td></tr><tr><td>0.20</td><td>#24</td><td>29.40</td></tr><tr><td>0.30</td><td>#22</td><td>44.10</td></tr></table></td><td>Apply an axial pull-off load to crimped wire of contact secured on the tester,
Operation Speed : 50 mm/min.
IEC 60512-16-4. Test16d</td></tr>
<tr><td>2.13</td><td>Durability</td><td>Termination Resistance
(Low Level).</td><td>Repeat Insertion／Extraction of connector assembly following times at 100mm/min operation speed.
Number of cycles : 30 cycles
IEC 60512-9-1 Test 9a</td></tr>
<tr><td>2.14</td><td>Housing Locking Strength</td><td>24.5 N Min.</td><td>Measure connector locking strength.
Operation Speed : 100 mm/min.
EIA 364-98</td></tr>
<tr><td colspan="4">ENVIRONMENTAL</td></tr>
<tr><td>2.15</td><td>Thermal Shock</td><td>Termination Resistance
(Low Level)</td><td>Subject mated specimen to
Ta=-55±2°C to Tb=+125±2°C,
duration t1: 30min each extreme,
25 cycles
IEC 60512-11-4 Test 11d
(IEC 60068-2-14 Test Na)</td></tr>
<tr><td>2.16</td><td>Humidity-Temperature Cycling</td><td>Insulation resistance
Dielectric Strength
Termination resistance
(Low Level)</td><td>Mated connector, 25～65℃,
80～95 % R. H. 10 cycles
Cold shock －10℃(not) performed
The measurement is held after being left indoor for 3 hours.1cycle=24hours
EIA 364-31 Method 4 IEC60068-2-30</td></tr>
<tr><td>2.17</td><td>Humidity, Steady State</td><td>Termination Resistance
(Low Level)</td><td>Mated connector,
90-95 % R. H. 40 °C 96h
MIL-STD-202 Method 103 Condition B</td></tr>
<tr><td>2.18</td><td>Industrial Gas (SO_2)</td><td>Termination Resistance
(Low Level)</td><td>Mated connector
SO_2 Gas : 10±3 ppm, 95% R. H.
25°C, 96h</td></tr>
<tr><td>2.19</td><td>Temperature Life (Heat Aging)</td><td>Termination Resistance
(Low Level)</td><td>Subject mated specimen to +125°C Duration time:250h Test Bb
IEC 60512-11-9 Test 11i (IEC 60068-2-2)</td></tr>
<tr><td>2.20</td><td>Salt Spray</td><td>Termination Resistance
(Low Level)</td><td>Subject mated specimen to 5±1% salt spray
Temperature : 35±2°C
Duration time: 96h
IEC 60512-11-6</td></tr>
</table>

Figure 2

3. SUMMARY OF TEST RESULTS:

Test Group	Test Item			Set	N	Unit	Results			Requirement	Judgement
1	Initial examination of products			3	12	-	No physical damage			Meets requirements of product drawing	Passed
	Temperature Rising			3	12	–	Refer to Figure.4			Temperature rising: specified value Max. Under loaded specified current.	
	Final examination of products			3	12	-	No physical damage			No damage likely to impair function	
2	Initial examination of products			4	4	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance						MAX	MIN	AVE	30mΩ MAX	
			Initial	4	36	mΩ	3.12	2.31	2.71		
			Finish				3.13	2.44	2.73		
	Vibration			4	4	-	No electrical discontinuity greater than 1usec .			No damage likely to impair function No discontinuities greater than t>1μs	
	Physical Shock			4	4	-	No electrical discontinuity greater than 1usec .			No damage likely to impair function No discontinuities greater than t>1μs	
	Final examination of products			4	4	-	No physical damage			No damage likely to impair function	
3	Initial examination of products			12	12		No physical damage			Meets requirements of product drawing	Passed
	Mating force						MAX	MIN	AVE		
		4POSN	Initial	3	3	N	3.15	2.75	2.95	6.4 MAX	
			Finish				3.05	2.60	2.87		
		6POSN	Initial	3	3	N	4.60	4.45	4.52	9.6 MAX	
			Finish				4.85	4.50	4.70		
		8POSN	Initial	3	3	N	5.85	5.55	5.67	12.8 MAX	
			Finish				6.20	5.65	5.87		
		12POSN	Initial	3	3	N	8.70	8.40	8.55	19.2 MAX	
			Finish				8.40	8.25	8.30		

Figure.3（Continue）

Test Group	Test Item			Set	N	Unit	Results			Requirement	
3	Un- Mating force						MAX	MIN	AVE		Passed
		4POSN	Initial	3	3	N	2.45	2.35	2.42	0.32 MIN	
			Finish				2.70	2.45	2.57		
		6POSN	Initial	3	3	N	4.65	3.75	4.23	0.48 MIN	
			Finish				4.25	3.50	3.88		
		8POSN	Initial	3	3	N	4.90	4.50	4.73	0.64 MIN	
			Finish				5.05	4.80	4.95		
		12POSN	Initial	3	3	N	7.60	6.75	7.18	0.96 MIN	
			Finish				7.40	6.00	6.77		
	Termination Resistance						MAX	MIN	AVE		
		4POSN	Initial	3	12	mΩ	2.67	2.19	2.36	30mΩ MAX	
			Finish				2.87	2.16	2.50		
		6POSN	Initial	3	18	mΩ	2.57	2.09	2.34		
			Finish				3.06	2.37	2.64		
		8POSN	Initial	3	24	mΩ	2.68	2.04	2.36		
			Finish				3.03	2.12	2.52		
		12POSN	Initial	3	36	mΩ	2.80	2.14	2.43		
			Finish				2.97	2.15	2.52		
	Final examination of products			12	12	-	No physical damage			No damage likely to impair function	
4	Initial examination of products			16	16	-	No physical damage			Meets requirements of product drawing	Passed
	Contact Insertion Force						MAX	MIN	AVE		
		4POSN		8	32	N	0.97	0.40	0.73	9.8 Max	
		6POSN		8	48	N	1.48	0.48	0.83		
		8POSN		8	64	N	1.34	0.53	0.87		
		12POSN		8	96	N	1.41	0.41	0.69		
	Contact Retention Force						MAX	MIN	AVE		
		4POSN		8	32	N	31.3	24.6	27.4	14.7 Min.	
		6POSN		8	48	N	30.4	21.4	27.2		
		8POSN		8	64	N	33.0	21.1	27.7		
		12POSN		8	96	N	33.9	21.2	28.4		

Figure.3（Continue）

Test Group	Test Item			Set	N	Unit	Results			Requirement	Judgement
5	Initial examination of products			60	60	-	No physical damage			Meets requirements of product drawing	Passed
	Crimp tensile strength						MAX	MIN	AVE		
		S size	AWG30	10	10	N	15.9	13.0	14.1	4.9 MIN	
			AWG28	10	10	N	24.5	18.8	22.7	9.8 MIN	
		M size	AWG28	10	10	N	24.3	19.7	21.7	9.8 MIN	
			AWG26	10	10	N	39.8	33.7	36.6	19.6 MIN	
			AWG24	10	10	N	63.2	58.6	60.3	29.4 MIN	
			AWG22	10	10	N	83.3	71.0	79.4	44.1 MIN	
6	Initial examination of products			16	16	-	No physical damage			Meets requirements of product drawing	Passed
	Housing Locking Strength	4POSN		4	4	N	50.2	48.7	49.7	25.4 MIN	
		6POSN		4	4	N	57.5	54.2	56.5	25.4 MIN	
		8POSN		4	4	N	54.6	50.1	51.9	25.4 MIN	
		12POSN		4	4	N	52.7	49.6	50.6	25.4 MIN	
7	Initial examination of products			3	3	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance (Thermal Shock)						MAX	MIN	AVE		
		Initial		3	24	mΩ	2.99	2.22	2.54	30mΩ MAX	
		Finish					3.23	2.22	2.55		
	Final examination of products			3	3	-	No physical damage			No damage likely to impair function	

Figure.3（Continue）

Test Group	Test Item			Set	N	Unit				Requirement	
8	Initial examination of products			15	15	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance (Humidity-Temperature Cycling)						MAX	MIN	AVE		
			Initial	3	24	mΩ	3.02	1.79	2.01	30mΩ MAX	
			Finish				2.69	2.12	2.38	30mΩ MAX	
	Dielectric Withstand Voltage Test(Humidity-Temperature Cycling)	4POSN	Initial	3	3	-	No breakdown or flashover			No breakdown or flashover	
			Finish								
		6POSN	Initial	3	3		No breakdown or flashover				
			Finish								
		8POSN	Initial	3	3		No breakdown or flashover				
			Finish								
		12POSN	Initial	3	3		No breakdown or flashover				
			Finish								
	Insulation Resistance (Humidity-Temperature Cycling)						MAX	MIN	AVE		
		4POSN	Initial	3	3	MΩ	9.2×10^6	3.7×10^6	5.7×10^6	1000 MΩ MIN	
			Finish				2.1×10^6	9.2×10^6	1.6×10^6	100 MΩ MIN	
		6POSN	Initial	3	3	MΩ	4.5×10^6	2.3×10^6	3.7×10^6	1000 MΩ MIN	
			Finish				4.3×10^6	1.3×10^6	2.3×10^6	100 MΩ MIN	
		8POSN	Initial	3	3	MΩ	5.0×10^6	2.2×10^6	3.9×10^6	1000 MΩ MIN	
			Finish				3.5×10^6	1.0×10^6	2.0×10^6	100 MΩ MIN	
		12POSN	Initial	3	3	MΩ	1.5×10^6	1.3×10^6	1.4×10^6	1000 MΩ MIN	
			Finish				1.4×10^7	6.3×10^6	5.0×10^6	100 MΩ MIN	
	Final examination of products			15	15	-	No physical damage			No damage likely to impair function	

Figure.3（Continue）

Test Group	Test Item			Set	N	Unit	Results			Requirement	Judgement
9	Initial examination of products			15	15	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance ((Humidity State)						MAX	MIN	AVE		
			Initial	3	24	mΩ	2.22	1.93	2.05	30mΩ MAX	
			Finish				2.19	1.72	1.97	30mΩ MAX	
	Dielectric Withstand Voltage Test(Humidity-(Humidity State)	4POSN	Initial	3	3	-	No breakdown or flashover			No breakdown or flashover	
			Finish								
		6POSN	Initial	3	3	-	No breakdown or flashover				
			Finish								
		8POSN	Initial	3	3	-	No breakdown or flashover				
			Finish								
		12POSN	Initial	3	3	-	No breakdown or flashover				
			Finish								
	Insulation Resistance ((Humidity State)						MAX	MIN	AVE		
		4POSN	Initial	3	3	MΩ	9.8×10^6	3.6×10^6	5.7×10^6	1000 MΩ MIN	
			Finish				1.1×10^7	3.6×10^6	6.3×10^6	100 MΩ MIN	
		6POSN	Initial	3	3	MΩ	1.0×10^7	2.8×10^6	6.4×10^6	1000 MΩ MIN	
			Finish				2.8×10^6	2.2×10^6	2.4×10^6	100 MΩ MIN	
		8POSN	Initial	3	3	MΩ	7.0×10^6	1.6×10^6	4.2×10^6	1000 MΩ MIN	
			Finish				4.0×10^6	1.7×10^6	2.8×10^6	100 MΩ MIN	
		12POSN	Initial	3	3	MΩ	1.2×10^6	1.1×10^6	1.2×10^6	1000 MΩ MIN	
			Finish				1.2×10^6	8.2×10^5	1.1×10^6	100 MΩ MIN	
	Final examination of products			15	15	-	No physical damage			No damage likely to impair function	

Figure.3（Continue）

Test Group	Test Item		Set	N	Unit	Results			Requirement	Judgement
10	Initial examination of products		3	3	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance (Industry SO2 Gas)					MAX	MIN	AVE		
		Initial	3	24	mΩ	2.26	1.92	2.05	30mΩ MAX	
		Finish				2.56	1.93	2.19		
	Final examination of products		3	3	-	No physical damage			No damage likely to impair function	
11	Initial examination of products		3	3	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance (Temperature Life)					MAX	MIN	AVE		
		Initial	3	24	mΩ	2.20	1.86	2.06	30mΩ MAX	
		Finish				3.53	2.42	2.99		
	Final examination of products		3	3	-	No physical damage			No damage likely to impair function	
12	Initial examination of products		3	3	-	No physical damage			Meets requirements of product drawing	Passed
	Termination Resistance (Salt Spray)					MAX	MIN	AVE		
		Initial	3	24	mΩ	2.22	1.90	2.07	30mΩ MAX	
		Finish				2.43	1.88	2.15		
	Final examination of products		3	3	-	No physical damage			No damage likely to impair function	

Figure.3（End）

POSN	Set	N	Wire size	Temperature rise 30°C MAX at rated current.		Temperature rise 100°C MAX at rated current.	
				Current Rating [A]	Result [°C]	Current Rating [A]	Result [°C]
4POSN	3	12	AWG30	0.8	6.3	1.5	17.5
			AWG28	1	5	1.8	13.8
			AWG26	3.2	20	5.8	64.4
			AWG24	3.9	18.8	7.2	63.8
			AWG22	4.5	17.5	8.3	58.1
6POSN	3	12	AWG30	0.8	12.5	1.5	26.3
			AWG28	1	6.25	1.8	16.3
			AWG26	2.9	21.3	5.1	63.7
			AWG24	3.4	18.8	6.4	63.8
			AWG22	4.2	19.4	8	66.3
8POSN	3	12	AWG30	0.8	10	1.5	31.2
			AWG28	1	5	1.8	17.5
			AWG26	2.6	18.7	4.8	50.6
			AWG24	3.1	18.8	5.8	63.2
			AWG22	3.8	18.1	7	60
12POSN	3	12	AWG30	0.8	9.6	1.5	28.7
			AWG28	1	8.8	1.8	25
			AWG26	2.3	18.2	4.4	63.1
			AWG24	2.8	20	5.2	66.3
			AWG22	3.5	19.4	6.5	64.4

Figure.4