



Harwin Test Report Summary

HT00301

Environmental Testing for Datamate
(M80 Series) Trio-Tek Connectors

Datamate **Trio-Tek**

A decorative graphic at the bottom of the page consisting of numerous thin, red, wavy lines that flow from the left side towards the right, creating a sense of motion and depth.

1. Introduction.

1.1. Description and Purpose

The Harwin Datamate Trio-Tek connector has been designed to withstand 400 successive engagements and separations without impairing its mechanical or electrical performance. The following tests were carried out to confirm the connector's performance.

1.2. Conclusion.

The following information has been taken from Harwin test report 328. Testing showed that the Datamate Trio-Tek female crimp contacts met the 400 mating cycles criterion, and all other requirements of Test Specification BS9525 F0033 Iss 1 Group CD3(i)(D) and CD6(1)(D). Connectors therefore met the Harwin performance criteria for environmental, mechanical and electrical requirements.

2. Test Method, Requirements and Results.

2.1. List of Test Samples.

All tests were carried out on the following pairs of connectors, in a mated condition:

Sample number	Male connector (J-Tek)	Female Mould & Crimp (Trio-Tek)	No. of pre-conditioning mating cycles
1	M80-5101042	M80-4401098 & M80-2530045	400
2	M80-5101042	M80-4401098 & M80-2530045	400
3	M80-5101042	M80-4401098 & M80-2530045	400
4	M80-5101042	M80-4401098 & M80-2530045	400
5	M80-5101042	M80-4401098 & M80-2530045	500
6	M80-5101042	M80-4401098 & M80-2530045	500
7	M80-5101042	M80-4401098 & M80-2530045	500
8	M80-5101042	M80-4401098 & M80-2530045	500

2.2. Group CD3(i)(D) – 4 mating pairs.

Specification Parameters:

Test	BS9520	Parameters
Rapid Change of Temperature (Thermal Shock)	1.2.6.8	BS2011: Part 2.1 Na: 1977 -55°C to +125°C, 1 hour dwells, 5 cycles
Damp Heat (steady state)	1.2.6.15	BS2011: Part 2.1 Ca: 1977 40°C ±2°C 93%rh +2% -3%rh Duration 21 days with 60Vdc polarizing voltage and 120Vdc working voltage applied throughout the tests
	1.2.6.15.2	Full rated working voltage to be applied (120Vdc) immediately after conditioning
<u>Final measurements</u>	<u>1.2.6.15.3</u>	
Insulation Resistance	1.2.4.4	1.2.6.12.2(a) Method B (500±50V) 100MΩ minimum, mated
Voltage Proof	1.2.4.5	1.2.6.12.2(h) 360Vdc (Ref: BS9525 F0033 7.1.2(b))
Contact Resistance	1.2.4.2	1.2.6.12.2(c) 25mΩ maximum Measured as shown in Appendix D of BS9525 F0033
Engaging and Separating	1.2.5.3	1.2.6.12.2(d) By special tools (Ref: BS9525 F0033 Appendix A5)
Visual Examination	--	1.2.6.12.2(e) There shall be no corrosion or other deterioration such as would impair operation

Results:

Sample number		1	2	6	7
Insulation Resistance	Polarising Voltage: Pins	7,500MΩ	9,500MΩ	10,000MΩ	10,000MΩ
	Working Voltage: Pins	34,000MΩ	50,000MΩ	2,000MΩ	44,000MΩ
Voltage Proof, 5 seconds		OK ✓	OK ✓	OK ✓	OK ✓
Contact resistance		5.5mΩ	6.5mΩ	6.0mΩ	8.0mΩ
		5.0mΩ	6.5mΩ	7.0mΩ	6.0mΩ
		7.5mΩ	7.0mΩ	6.5mΩ	5.5mΩ
		6.5mΩ	6.5mΩ	6.5mΩ	6.0mΩ
		6.5mΩ	6.0mΩ	9.5mΩ	7.5mΩ
		(#)	8.5mΩ	7.5mΩ	7.0mΩ
		6.0mΩ	3.5mΩ	5.5mΩ	6.5mΩ
		7.5mΩ	7.0mΩ	6.0mΩ	6.0mΩ
		4.5mΩ	6.0mΩ	5.5mΩ	8.5mΩ
		7.5mΩ	7.5mΩ	8.0mΩ	8.5mΩ
Engaging & Separating		OK ✓	OK ✓	OK ✓	OK ✓
Visual Examination		OK ✓	OK ✓	OK ✓	OK ✓

(#) - Pin failed during post test checks.

Group CD6(i)(D) – 4 mating pairs.

Specification Parameters:

Test	BS9520	Parameters
Bump	1.2.6.2	BS2011: Part 2.1 Eb: 1977 390 m/s ² (40g) 6ms 4000 ±40 Bumps, both directions of three axis continuously monitoring of electrical continuity during the last 200 bumps
Vibration: General	1.2.6.3.1	BS2011: Part 2.1 Fc: 1977 10Hz to 2kHz 0.75mm peak/10g duration 6 hours total (2h/axis) Continuously monitoring of electrical continuity during initial resonance search and the last two frequency sweeps
Shock	1.2.6.4	BS2011: Part 2.1 Ea: 1977. 981 m/s ² (100g) 6ms Trapezoidal pulse, both directions of three axis, 18 shocks total, continuously monitoring of electrical continuity during application of shocks
Acceleration	1.2.6.5	BS2011: Part 2.1 Ga: 1977. 490 m/s ² >10 seconds Both directions of three axis continuously monitoring of electrical continuity during application of acceleration
Visual Examination	1.2.2 (d)	Mechanical damage, movement or displacement of parts such as would impair operation
Mechanical Operation	1.2.7.1	50 operations (at 15 operations per minute maximum)
Electrical Load and Temperature (short term)	1.2.7.2	250 hours at 125°C, no electrical load, during conditioning the following measurements shall be made:
Insulation Resistance	1.2.4.4	Method B (500 ±50V) mated at 125°C measured 8 times at intervals not less than 24hours, 100MΩ minimum. After 1.5 to 2 hours recovery specimens shall remain mated
Final Measurements		Final measurements to be carried out by Harwin Test Laboratory

Results:

Sample	3	4	5	8
Bump	OK ✓	OK ✓	OK ✓	OK ✓
Vibration	OK ✓	OK ✓	OK ✓	(##) ✓
Shock	OK ✓	OK ✓	OK ✓	OK ✓
Acceleration	OK ✓	OK ✓	OK ✓	OK ✓
Visual Examination	OK ✓	OK ✓	OK ✓	OK ✓
Mechanical Operation	OK ✓	OK ✓	OK ✓	OK ✓
Insulation resistance	7,500MΩ	7,000MΩ	5,800MΩ	9,000MΩ
	200MΩ	200MΩ	200MΩ	280MΩ
	300MΩ	250MΩ	200MΩ	300MΩ
	300MΩ	300MΩ	300MΩ	400MΩ
	300MΩ	300MΩ	300MΩ	300MΩ
	300MΩ	300MΩ	300MΩ	300MΩ
	400MΩ	300MΩ	400MΩ	300MΩ
	400MΩ	300MΩ	350MΩ	300MΩ
	400MΩ	300MΩ	300MΩ	300MΩ

Results (continued):

(##) = Only one open circuit was detected during the vibration test and this was observed at 63 minutes into the 3rd vibration run. The cause of the open circuit was found to be a broken solder tail on Connector Pair Sample 8 and was due to abnormal stress applied to the solder tail from the large wire loop used to link the contacts during the test. The broken solder tail was bridged out on the PCB and the test was successfully completed.

Resonance Search Results (part of the Vibration testing):

The connector vibration axes were identified as follows:

Axis A1: Through the open face of the connector.

Axis A2: Across the narrow dimension of the open connector face.

Axis A3: Across the broad dimension of the open connector face.

A strobe lamp was used to detect any vibration responses. The following response data was recorded during the vibration test.

Connector Sample	Vibration Axis	Vibration Frequency (Hz)
3	A2	170 to 400
3	A3	350 to 420
4	A2	200 to 560
4	A3	245 to 540
5	A2	210 to 425
5	A3	340 to 500
8	A2	220 to 500
8	A3	250 to 450 (before ##) 80 to 360 (after ##)

Final Measurements:

Voltage Proof 1.2.4.5. Method B Voltage as in 7.1.2(2) of BS9520: 1983 – Duration = 5 seconds – No breakdown or leakage detected.

Contact Resistance 1.2.4.1(a) of BS9520: 1983 – 25mΩ Maximum – see results in the table below:

Sample Pair	3	4	5	8
Contact 1	6.2mΩ	7.7mΩ	8.5mΩ	8.7mΩ
Contact 2	9.2mΩ	7.9mΩ	7.7mΩ	8.7mΩ
Contact 3	9.3mΩ	7.6mΩ	7.6mΩ	9.5mΩ
Contact 4	7.7mΩ	7.2mΩ	7.6mΩ	10.3mΩ
Contact 5	7.1mΩ	7.8mΩ	7.5mΩ	8.7mΩ
Contact 6	7.9mΩ	7.4mΩ	9.0mΩ	9.4mΩ
Contact 7	8.4mΩ	7.2mΩ	11.2mΩ	8.7mΩ
Contact 8	7.6mΩ	7.3mΩ	9.2mΩ	8.5mΩ
Contact 9	7.5mΩ	6.7mΩ	9.7mΩ	8.3mΩ
Contact 10	7.5mΩ	6.8mΩ	9.2mΩ	8.4mΩ