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### 1.0 OBJECTIVE

This specification defines the **IEC** test requirements of the Millipacs (2 mm Hard-Metric) signal connector. These are required for Millipacs to comply with the IEC 1076-4-101 Hard Metric standards.


### 2.0 SCOPE

This specification is applicable to the termination characteristics of the Millipacs which provides a separable interconnect for printed circuit boards.

### 3.0 GENERAL

This document is composed of the following sections:

Paragraph	Title
1.0	OBJECTIVE
2.0	SCOPE
3.0	GENERAL
4.0	IEC REPORT

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#### 4.0 IEC REPORT

##### Group P - Preliminary

All specimens shall be subjected to the following tests:

Test phase	IEC 512			Measurement to be performed	IEC 512	Requirements		
	Title	Test No.	Severity or condition of test			Title	Test No.	PL
P1	General examination		Unmated connectors	Visual examination	1a	1	x	There shall be no defect that would impair normal operation
						2	x	
				Examination of dimensions and mass	1b	1	x	The dimensions shall comply with those specified in 3, including creepage and clearance distances as specified in 4.2.1, and first possible contact point as specified in 3.5.2.
						2	x	
						3	x	
P2	Polarizing method	13e	Polarizing method: see 4.3.8 Robustness of coding: see 4.3.9 Insertion force to be applied: Styles A, L and M: 100 N Styles C and N: 50 N Style B: not applicable	Visual examination	1a	1	x	There shall be no defect that would impair normal operation
						2	x	
						3	x	
P3			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1	x	20 mΩ max. See also 4.2.4
						2	x	
						3	x	
P4			Test voltage 100 V d.c. Method A Mated connectors Five contacts per specimen	Insulation resistance	3a	1	x	10 <sup>4</sup> MΩ min. See also 4.2.5
						2	x	
						3	x	
P5			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1	x	There shall be no breakdown or flashover
						2	x	
						3	x	



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**Group A - Dynamic / Climatic**

Test phase	IEC 512			Measurement to be performed Title	IEC 512		Requirements All connector styles			
	Title	Test No.	Severity or condition of test		Test No.	PL				
A1.1			Speed: 10 mm/s max.	Engaging and separating forces	13a	1 x 2 x 3 x	See also 4.3.2			
A2	Probe damage	16a	Not applicable	Gauge retention force	16e		Not applicable			
A3.1	Solderability	12a	Not applicable							
A3.2	Resistance to soldering heat	12d	Not applicable							
A4				Voltage proof	4a		Not applicable			
A5	Contact retention in insert	15a	Unmated connectors 10 contacts per specimen Force applied in two directions: see 4.3.3			1 x 2 x 3 x	Axial displacement 0,2 mm max. while force is applied 0,1 mm max. after removing force			
			Unmated connectors	Visual examination	1a	1 x 2 x 3 x	There shall be no damage that would impair normal operation			
A6	Bump	6b	Not applicable							
A7	Vibration	6d	Arrangement in fixture 5.1.2 Frequency 10 Hz to 2000 Hz Amplitude 1,5 mm or 200 m/s <sup>2</sup> Eight sweepings in each direction Full duration 3 x 2 h in three axes	Contact disturbance	2e	1 x	Duration of disturbance 1 μs max.			
			Frequency range 10 Hz to 500 Hz Amplitude 0.35 mm or 50 m/s <sup>2</sup> 10 sweepings in each direction Full duration 3 x 2 h in three axes			2 x				
			Unmated connectors			Visual examination		1a	1 x 2 x 3 x	There shall be no damage that would impair normal operation
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1 x 2 x	Rise in relation to initial values 5 mΩ max.			
A8	Shock	6c	Arrangement in fixture 5.1.2 Shock acceleration 500 m/s <sup>2</sup> Duration of impact 10 ms Five shocks in two directions of three axes	Contact disturbance	2e	1 x 2 x 3 x	Duration of disturbance 1 μs max.			
			Unmated connectors			Visual examination		1a	1 x 2 x	There shall be no damage that would impair normal operation
			Connecting points: see 5.1.1 10 contacts per specimen			Contact resistance		2a	1 x 2 x	Rise in relation to initial values 5 mΩ max.
A9	Acceleration steady state	6a	Not applicable							



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A10	Rapid change of temperature	11d	-55 °C to 125 °C Five cycles 30 min/temp Recovery time 2 h Mated connectors			1 2 3	x x x	
			Test voltage 100 V d.c. Method A Mated connectors Five contacts per specimen	Insulation resistance	3a	1 2 3	x x x	10 <sup>4</sup> MΩ min.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1 2 3	x x x	There shall be no breakdown or flashover
			Unmated connectors	Visual examination	1a	1 2	x x	There shall be no damage that would impair normal operation
A11	Climatic sequence	11a	Mated connectors					
A11.1	Dry heat	11i	Method A, 125 °C, unloaded Duration 16 h, recovery time 2 h Test voltage 100 V d.c. Five contacts per specimen	Insulation resistance at high temperature	3a	1 2 3	x x x	10 <sup>3</sup> MΩ min.
A11.2	Damp heat, cyclic first cycle	11m	55 °C, Variant 1			1	x	
			40 °C, Variant 1			2 3	x x	
			Unmated connectors	Visual examination	1a	1 2 3	x x x	There shall be no damage that would impair normal operation
A11.3	Cold	11j	-55 °C, duration 2 h Recovery time 2 h			1 2 3	x x x	
			Unmated connectors	Visual examination	1a	1 2 3	x x x	There shall be no damage that would impair normal operation
A11.4	Low air pressure	11k	30 kPa, test voltage 200 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1 2 3	x x x	There shall be no breakdown or flashover
A11.5	Damp heat cyclic, remaining cycles	11m	55 °C, Variant 1			1	x	
			40 °C, Variant 1			2 3	x x	
			Test voltage 100 V d.c. Method A, mated connectors Five contacts per specimen	Insulation resistance	3a	1 2 3	x x x	10 <sup>3</sup> MΩ min.
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1 2 3	x x x	Rise in relation to initial values 5 mΩ max.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1 2 3	x x x	There shall be no breakdown or flashover
A12.1			Speed: 10 mm/s max.	Engaging and separating forces	13a	1 2 3	x x x	See also 4.3.2
A13			Unmated	Visual examination	1a	1 2 3	x x x	There shall be no damage that would impair normal operation



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**Group B - Mechanical endurance**

Test phase	IEC 512			Measurement to be performed Title	IEC 512 Test No.	Requirements		
	Title	Test No.	Severity or condition of test			PL	All connector styles	
B1			Method A 10 contacts per specimen. Gauges: see 3.9.1	Gauge retention force	16e	1 2 3	x x x	The gauge shall be retained
B2	Mechanical operation	9a	Speed 10 mm/s max. Rest 30 s (unmated) Half of specified number of operations			1 2 3	x x x	
			Unmated	Visual examination	1a	1 2 3	x x x	There shall be no damage that would impair normal operation
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1 2 3	x x x	Rise in relation to initial values 5 mΩ max. 10 mΩ max.
			Test voltage 100 Vd.c. Method A Mated connectors Five contacts per specimen	Insulation resistance	3a	1 2 3	x x x	10 <sup>4</sup> MΩ min.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1 2 3	x x x	There shall be no breakdown or flashover
B3.2	Corrosion, industrial atmosphere	11g <small>(under consideration)</small>	See annex B Half number mated Half number unmated			1 2 3	x x x	10 days 4 days
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1 2 3	x x x	Rise in relation to initial values 5 mΩ max.
B4	Mechanical operation	9a	Speed 10 mm/s max. Rest 30 s (unmated) Remaining number of operations	Visual examination	1a	1 2 3	x x x	There shall be no damage that would impair normal operation
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1 2 3	x x x	Rise in relation to initial values 5 mΩ max. 10 mΩ max.
			Test voltage 100 Vd.c. Method A Mated connectors Five contacts per specimen	Insulation resistance	3a	1 2 3	x x x	10 <sup>4</sup> MΩ min.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1 2 3	x x x	There shall be no breakdown or flashover
			Method A 10 contacts per specimen Gauges: see 3.9.1	Gauge retention force	16e	1 2 3	x x x	The gauge shall be retained
B5	Probe damage	16a	Not applicable					
B6	Static load, transverse	8a	Arrangement and applicable forces according to 5.1.3	Visual examination	1a	1 2 3	x x x	No damage nor displacement likely to impair normal operation






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**Group C - Moisture**

Test phase	IEC 512			Measurement to be performed	IEC 512		Requirements			
	Title	Test No.	Severity or condition of test		Title	Test No.	PL	All connector styles		
C1	Damp heat, steady state	11c	Unloaded			1	x	56 days		
			Polarizing voltage 60 V d.c. Wiring according to 5.1.4			2	x	21 days		
			Test voltage 100 V d.c. Method A, mated connectors Five contacts per specimen	Insulation resistance	3a	1	x	2	x	10 <sup>3</sup> MΩ min.
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1	x	2	x	Rise in relation to initial values 5mΩ max.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1	x	2	x	There shall be no breakdown or flashover
			Speed: 10 mm/s max.	Engaging and separating forces	13a	1	x	2	x	See also 4.3.2
	Unmated		Visual examination	1a	1	x	2	x	There shall be no damage that would impair normal operation	

**Group D - Electrical load**

Test phase	IEC 512			Measurement to be performed	IEC 512		Requirements			
	Title	Test No.	Severity or condition of test		Title	Test No.	PL	All connector styles		
D1	Mechanical operation	9a	Speed 10 mm/s max. Rest 30 s (unmated) Half of specified number of operations			1	x			
						2	x			
D2	Electrical load and temperature	9b	Ambient temperature 70 °C Electrical load 1 A Wire gauge = 0,12 mm <sup>2</sup> All contacts loaded Duration 1000 h Recovery time 2 h			1	x	Temperature in centre of specimens shall not exceed the maximum operating temperature with more than 5 %		
			Connecting points: see 5.1.1 10 contacts per specimen	Contact resistance	2a	1	x	2	x	Rise in relation to initial values 5 mΩ max.
			Test voltage 100 V d.c. Method A, mated connectors Five contacts per specimen	Insulation resistance	3a	1	x	2	x	10 <sup>3</sup> MΩ min.
			Test voltage 750 V r.m.s. Method B, mated connectors 50 contacts per specimen Wiring according to 5.1.4	Voltage proof	4a	1	x	2	x	There shall be no breakdown or flashover
			Unmated	Visual examination	1a	1	x	2	x	There shall be no damage that would impair normal operation

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**REVISION RECORD**

REV	PAGE	DESCRIPTION	EC #	DATE
A	All	New Release	B20028	11feb2002
B	All	Design upgrade on Millipacs RA Receptacle & Shielding Accessory	I04-0112	30Dec2004
C	All	Logo Change	I06-0085	22 Jun2006