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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 61076-4-101** 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:

Group P – Preliminary testing sequence


| Test phase | IEC 60512 | | | Measurement to be performed | IEC 60512 | Requirements | | |
|------------|---------------------|----------|--|------------------------------------|-----------|--------------|----------------------|---|
| | Title | Test No. | Severity or condition of test | Title | Test No. | PL | All connector styles | |
| P1 | General examination | | Unmated connectors | Visual examination | 1a | 1 2 3 | x x x | There shall be no defect that would impair normal operation |
| | | | | Examination of dimensions and mass | 1b | 1 2 3 | x x x | The dimensions shall comply with those specified in clause 3, including creepage and clearance distances as specified in 4.2.1, and first possible contact point as specified in 3.5.2. |
| P2 | Polarizing method | 13a | Polarizing method: see 4.3.8 Robustness of coding: see 4.3.9 Insertion force to be applied: Styles A, D, G, L and M: 100 N Styles C, F and N: 50 N Style B and E: not applicable | Visual examination | 1a | 1 2 3 | x x x | There shall be no defect that would impair normal operation |
| P3 | | | Connecting points: see 5.1.1 10 contacts per specimen | Contact resistance | 2a | 1 2 3 | x x x | 20 mΩ max. See also 4.2.4 |
| P4 | | | Test voltage 100 V d.c. Method A Mated connectors Five contacts per specimen | Insulation resistance | 3a | 1 2 3 | x x x | 10 ⁴ MΩ min. See also 4.2.5 |
| P5 | | | Test voltage 750 V r.m.s. Method B, mated connectors Wiring according to 5.1.4 50 contacts per specimen | Voltage proof | 4a | 1 2 3 | x x x | There shall be no breakdown or flashover |

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Group A – Dynamic/Climatic

Group A – Dynamic/climatic testing sequence

| Test phase | IEC 60512 | | | Measure- ment to be performed | IEC 60512 Test No. | Requirements | |
|------------|------------------------------|----------|--|-------------------------------------|------------------------------|--------------|--|
| | Title | Test No. | Severity or condition of test | Title | | PL | All connector styles |
| A1.1 | | | Speed: 10 mm/s max. | Engaging and separating forces | 13a | 1 2 3 | x x 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 2 3 | x x x Axial displacement 0,2 mm max. while force is applied 0,1 mm max. after removing force |
| | | | Unmated connectors | Visual examination | 1a | 1 2 3 | x x 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 2 000 Hz Amplitude 1,5 mm or acceleration 200 m/s ² Eight sweepings in each direction Full duration 3 × 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 acceleration 50 m/s ² 10 sweepings in each direction Full duration 3 × 2 h in three axes | | | 2 3 | x |
| | | | Unmated connectors | 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 | x x Rise in relation to initial values 5 mΩ max. |
| A8 | Shock | 6c | Arrangement in fixture see 5.1.2 Shock acceleration 500 m/s ² Duration of impact 11 ms Five shocks in two directions of three axes | Contact disturbance | 2e | 1 2 3 | x x x Duration of disturbance 1 µs max. |
| | | | Unmated connectors | Visual examination | 1a | 1 2 | 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 | x 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 ⁴ 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 3 | x 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 ³ MΩ min. |
| A11.2 | Damp heat, cyclic first cycle | 11m | 55 °C, Variant 1 | | | 1 | x | |
| | | | 40 °C, Variant 1 | | | 2 3 | 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 | |
| | | | Test voltage 100 V d.c. Method A Mated connectors Five contacts per specimen | Insulation resistance | 3a | 1 2 3 | x x x | 10 ³ 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 connectors | 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

Group B – Mechanical endurance testing sequence

| Test phase | IEC 60512 | | | Measurement to be performed | IEC 60512 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 | 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 | |
| | | | Unmated connectors | Visual examination | 1a | 1 2 3 | 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 | 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 2 3 | 10 ⁴ 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 | There shall be no breakdown or flashover |
| | | | | | | | |
| B3 | Corrosion, industrial atmosphere | 11-7 | Method 1 Half number mated Half number unmated | | | 1 2 3 | 10 days 4 days Not applicable |
| | | | Connecting points: see 5.1.1 10 contacts per specimen | Contact resistance | 2a | 1 2 3 | 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 | 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 | 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 2 3 | 10 ⁴ 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 | 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 | The gauge shall be retained |
| B5 | Probe damage | 16a | Not applicable | Gauge retention force | | | Not applicable |
| B6 | Static load, transverse | 8a | Arrangement and applicable forces according to 5.1.3 | Visual examination | 1a | 1 2 3 | No damage nor displacement likely to impair normal operation |

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Group C – Moisture


Group C – Moisture testing sequence

| Test phase | IEC 60512 | | | Measure-ment to be performed Title | IEC 60512 Test No. | Requirements | |
|------------|-------------------------|----------|--|---------------------------------------|-----------------------|--------------|---|
| | Title | Test No. | Severity or condition of test | | | PL | All connector styles |
| C1 | Damp heat, steady state | 11c | Unloaded Polarizing voltage 60 V d.c. Wiring according to 5.1.4 | | | 1 2 | x x 56 days 21 days |
| | | | Test voltage 100 V d.c. Method A Mated connectors Five contacts per specimen | Insulation resistance | 3a | 1 2 | x x 10 ³ MΩ min. |
| | | | Connecting points: see 5.1.1 10 contacts per specimen | Contact resistance | 2a | 1 2 | 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 | x x There shall be no breakdown or flashover |
| | | | Speed: 10 mm/s max. | Engaging and separating forces | 13a | 1 2 | x x See also 4.3.2 |
| | | | Unmated connectors | Visual examination | 1a | 1 2 | x x There shall be no damage that would impair normal operation |

Group D – Electrical load

Group D – Electrical load testing sequence

| Test phase | IEC 60512 | | | Measure-ment to be performed Title | IEC 60512 Test No. | Requirements | |
|------------|---------------------------------|----------|---|---------------------------------------|-----------------------|--------------|---|
| | Title | Test No. | Severity or condition of test | | | PL | All connector styles |
| D1 | Mechanical operation | 9a | Speed 10 mm/s max. Rest 30 s (unmated) Half of specified number of operations | | | 1 2 | x x x |
| D2 | Electrical load and temperature | 9b | Ambient temperature 70 °C Electrical load 1 A Wire gauge = 0,12 mm ² All contacts loaded Duration 1 000 h Recovery time 2 h | | | 1 2 | x x x The temperature in the centre of the specimens shall not exceed the maximum operating temperature by more than 5 % |
| | | | Connecting points: see 5.1.1 10 contacts per specimen | Contact resistance | 2a | 1 2 | x 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 2 | x x 10 ³ 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 | 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 |

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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 |
| D | All | Correction in IEC specification number to 61076-4-101 from 1076-4-101 in page number 1 and change in logo. | ELX-I-33296 | 18Apr2019 |
| E | All | Correction in IEC number to 60512 from 512 in all testing sequence table. | ELX-I-36340-1 | 16Mar2020 |