

(Only for ADAM OPEL AG and their harness makers)

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We declare our consent herewith.

(Customer's Signature)

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1 SCOPE

1.1 CONTENT

This specification describes the performance, tests and quality requirements of the 12pos. AMPMODU II pin header in its reflow solder version, pitch 2.54 mm.

The header was developed customer specific for automotive industry. It is used there preferably as interface between printed circuit boards and the external harness.

For fixation on the PCB the 12pos header has two boardlocks which also guide the contact pins to their corresponding holes.

It also contains a gear rack that can be used to reduce mating and unmating forces by a lever with tooth segments at the receptacle housing.

At the counterpart MQS contacts can be used with conductor cross-sections from 0.35 mm² to 0.75 mm².

The described header is constructed to fit with the following AMP connectors:

- 967671 Cover with Lever
- 968473 12pos. Receptacle Housing

1.2 QUALIFICATION

When tests are performed the following specified specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the events of conflict between the requirements of this specification and the product drawing or of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP DOCUMENTS

A. Customer Drawings:

- 1719039 12pos. AMPMODU II pin header 180°, Assembly
- 967671 Cover with lever for MQS receptacle housing, 12pos.
- 968473 MQS receptacle housing

B. AMP Product Specifications:

- 108-18030 Micro Quadlock System
- 108-18546 MQS receptacle housing, 12pos.

C. AMP Application Specifications:

- 114-18173 Application Specification for 12pos. MQS receptacle housing
- 114-18021 Application Specification for MQS
- 114-18022 General guidelines for application of contacts with open crimp barrel

2.2 GENERAL DOCUMENTS

- A. DIN /IEC 512 Electric-mechanical components for electrical equipment;
 (04/94) measuring and test procedures
- B. DIN/IEC 68-2-20 Fundamental environmental test process (soldering)
 (06/87)
- C. DIN / IEC 68-2-52 Fundamental environmental test process (salt fog, cyclic)
 Part 2-52
 (Output 07/85)

3 REQUIREMENTS

3.1 Design and Construction

This product shall be equivalent to the design, construction and physical dimensions specified on the applicable production drawing.

3.2 Materials

Descriptions for material see in production drawings.
Materials are free of Cadmium (max. 75ppm tolerated)
Materials are free of asbestos.
Materials are free of lead and hex equivalent chromium.

3.3 Technical data

- A. Voltage rating: 14 V direct current
- B. Current carrying capacity (MQS): single contact see Tyco specification 108-18030
contact in cavity see Tyco specification 108-18030
- C. Temperature range: -40 until +85°C (ambient temperature)
- D. Temperature limit for contacts: MQS, tinned version -40°C until 120°C
MQS, gold plated version -40°C until 140°C
- E. Max. number of mating cycles: 100 (MQS in gold version)
10 (MQS tinned version)

3.4 Characteristics and test description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in paragraph 3.5.

All tests are performed at ambient environmental conditions per IEC 512 unless otherwise specified.

3.5 Test Requirements and Procedures

| GENERAL TESTINGS | | |
|---|--|---|
| TEST DESCRIPTION | REQUIREMENT | PROCEDURE |
| 1. General | Cavity marking existing, marked clear and durable, existing manufacturers logo | Visual examination DIN/IEC 512-2, Test 1a |
| 2. Visual examination and dimensional control | Parts without mistakes or damages; dimensions according to product drawing | Visual examination and PSW (= Product-Sample-Warranty) DIN/IEC 512-2 Test 1a and 1b |

| GENERAL TESTINGS | | |
|-------------------------|---|---|
| TEST DESCRIPTION | REQUIREMENT | PROCEDURE |
| 3. Pin retention force | $F_{\text{Retention}} \geq 30\text{N}$ | Testing temperature: T = 23°C ± 5K Test velocity: v=75mm/min ±25mm/min axial pushed on each pin |
| 4. Solderability | After ageing simulation the pins must be solderable, pin retention force ≥ 30N, boardlocks may not be damaged | DIN / IEC 68 part 2-20 Test method 1 16h / 155°C v=75mm/min ±25mm/min |
| 5. Varnish density | Contact area is free of varnish | Varnish type: SL 1331N Fa. Peters Dilution 5:1 Dip time: 1min Drying: 20min / 80°C |

| ELECTRICAL TESTS | | |
|--------------------------|--|---|
| TEST DESCRIPTION | REQUIREMENT | PROCEDURE |
| 6. Insulation resistance | $R_{\text{insulation}} \geq 1 \text{ M}\Omega$ | GMW 3172 (4.3.2.5.1) Voltage 500V DC, Durance 60s, T=70°C a) Measurement between all connected pins and a metal foil surrounding the housing (grounding) b) Measurement between every adjacent pin, housing not mated |
| 7. Voltage proof | No disruptive discharge | GMW 3172 (4.3.2.5.2) Voltage 500V _{eff} AC 50 Hz, Durance 2s a) Measurement between all connected pins and a metal foil surrounding the housing (grounding) b) Measurement between every adjacent pin, housing not mated |

| THERMAL TESTS | | |
|-----------------------------|---------------------------------------|--|
| TEST DESCRIPTION | REQUIREMENT | PROCEDURE |
| 8. Temperature test | Pin retention force $\geq 30\text{N}$ | IEC 60068-2-1 / -2 Method B Passenger compartment: $T_{\min} = -40^{\circ}\text{C}$ $T_{\max} = +70^{\circ}\text{C}$ $v = 75\text{mm/min} \pm 25$ mm/min |
| 9. Temperature cycling test | Pin retention force $\geq 30\text{N}$ | IEC 60068-2-14 Nb Test cycle according pic. 1 $T_{\min.} = -40^{\circ}\text{C}$ $T_{\max.} = +70^{\circ}\text{C}$ Test time per cycle: 31min (100 cycle min) $v = 75\text{mm/min} \pm 25$ mm/min |

| ENVIRONMENTAL TESTS AND OTHER TESTS | | |
|---|---|---|
| TEST DESCRIPTION | REQUIREMENT | PROCEDURE |
| 10. Stress in condensed water climatic Chamber (constant) | <p>After this test all requirements with regard to pin retention in header and over all resistance must be fulfilled.</p> <p>No deformation, crack or breaking shall be visible at the header.</p> | <p>IEC 60068-2-38 Z/AD Test voltage: 11V Test temperature : T = -10°C bis +65°C</p> <p>Time : 10 days</p> |
| <p>11. Vibration test</p> <p>Parts without motor connection</p> <p>(Random vibration wide band with temperature superposition)</p> | <p>No exceed of overall resistance of 7Ω for a duration of $> 1\mu s$</p> <p>No contact disconnections during the test allowed.</p> <p>No fretting of contact finishes allowed.</p> <p>No deformation, crack or breaking shall be visible at the housing.</p> <p>All requirements concerning locking in housing and overall contact resistance must be fulfilled after this test.</p> | <p>IEC 60068-2-64 Test unit according pic. 2</p> <p>Superordinated temperature-cycle (one for each of the three mutually perpendicular directions): see pic. 3</p> <p>T min = -40°C T max = +70°C</p> <p>Vibr. parameters:</p> <p>Power spectral density:</p> <p>7.0 m²/s³ to 10 Hz 3.5 m²/s³ to 50 Hz 1.75m²/s³ to 60 Hz 0.06m²/s³ to 1 kHz</p> <p>Total acceleration (RMS): 20.9 m/s²</p> <p>Testing time for each of the three mutually perpendicular directions : 8h</p> <p>Rate of reproducibility: medium</p> <p>Current load Test current I = 100mA</p> |

3.6 Qualification- and Requalification Testings

| TEST | TEST GROUP | | | | | | | | | |
|---|-------------------------|-------------------------|-------------------------------------|----------|------------------------|--|--|--|--|--|
| | D | E | J | K | L | | | | | |
| | TEST SEQUENCE | | | | | | | | | |
| (01) General | 1 | 1 | 1 | 1 | 1 | | | | | |
| (02) Visual examination and dimensional control | 2 | 2 | 2 | 2 | 2 | | | | | |
| (03) Pin retention force | 5 | 5 | 5 | 4 | | | | | | |
| (04) Solderability | | | | 3 | | | | | | |
| (05) Varnish density | | | | | 3 | | | | | |
| (06) Insulation resistance | 4 | | | | | | | | | |
| (07) Voltage proof | | 4 | | | | | | | | |
| (08) Temperature test | 3 | | | | | | | | | |
| (09) Temperature cycling test | | | 4 | | | | | | | |
| (10) Stress in condensed water climatic Chamber | | 3 | | | | | | | | |
| (11) Vibration test | | | 3 | | | | | | | |
| Tyco Test Reports | 98-A-023 (Ref. Test) | 98-A-008 (Ref. Test) | 97-A-573 01-A-433 (Ref. Test) | 05-A-721 | 01-A-433 (Ref Test) | | | | | |

Number of tested parts see section 4.1
The numbers give the order the tests occur.

4 QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

A. Selection of the tested parts

The selected parts must be according to the drawing documents and have to be picked randomly out of the running production process.

The number of tested parts are composed as follows:

| | | |
|-----|---------------|----------|
| For | Test group D: | 10 parts |
| | Test group E: | 6 parts |
| | Test group J: | 10 parts |
| | Test group K: | 10 parts |
| | Test group L: | 10 parts |

B. Test groups

The tests must be performed acc. to the test groups listed in section 3.6.

4.2 Requalification Testing

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality, and reliability engineering.

4.3 Acceptance

Acceptance is based on verification that the product meets the requirements of paragraph 3.5. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4 Quality Conformance Inspection

The applicable AMP quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

5 APPENDIX

Fig. 1 : Test cycle for Temperature Cycling Test

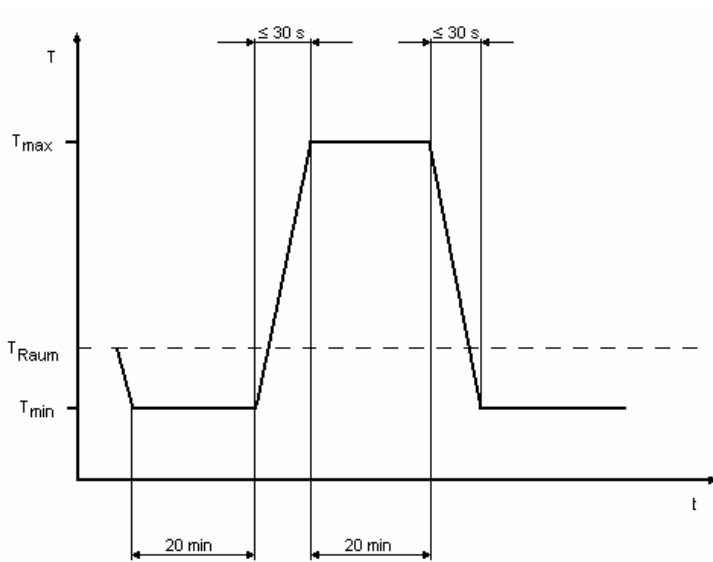


Fig. 2 : Test unit for Vibration Test

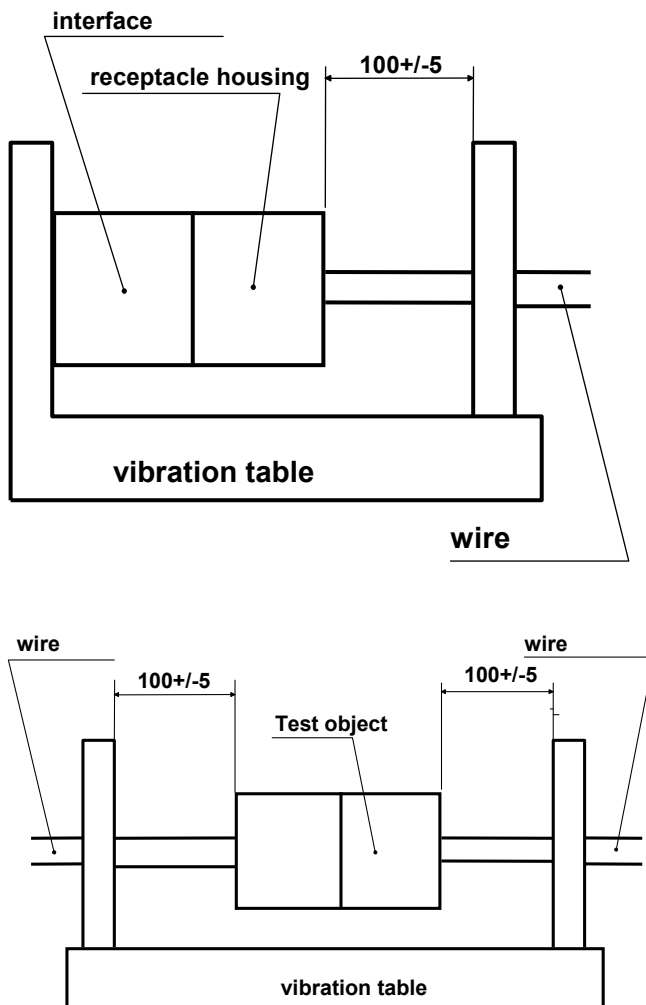


Fig. 3 : Temperature cycle during Vibration Test

