



AMP MCP 1.5K Contact System

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2. SCOPE

2.1. Content

This specification describes the performance, testing and quality requirements for the AMP MCP 1.5K contact system.

2.2. Qualification

When tests are performed for the AMP MCP 1.5K contact system, the specifications and standards defined in chapters below must be used. All inspections must be performed following the applicable inspection plan and product drawings.

3. REFERENCED DOCUMENTS

The below mentioned documents, if they are referred to, are part of this specification. In case of conflicts between the requirements of this specification and the referenced documents, this specification takes precedence.

3.1. TE Connectivity documents

- Customer drawing – **C-1241436**
- Application specification – **114-18386**

3.2. General documents

- DIN IEC 60512: Electromechanical components for electronic equipment, basic testing procedures and methods in engagement.
- DIN EN 60068: Environmental testing
- DIN EN 60352: Solderless connections – Part 2: Crimped connections - General requirements, test methods and practical guidance
- TE Test Standard 209-160012: Automotive Connectors (supersedes LV214: Motor vehicle connectors test specification 2010-03)
- [TE Test Standard 109-18079: Standard crimp validation \(supersedes LV214-2: Slow Motion Tests\)](#)

4. DESCRIPTION

Design and dimensions of the AMP MCP 1.5K contacts conform to the drawings and are checked according to the TE Connectivity quality guidelines.

The AMP MCP 1.5K contact is a flat contact with two independent tongues and a stainless steel cantilever spring. On one tongue two contact points and at the opposite side one contact point are coined. This increases the bonding with tabs. The spring has two locking lances for first lock in the contact cavity.

There are contacts available with insulation crimp seen on the Figure 1, contacts with crimp for single-wire-seals seen on the Figure 2 as well as contacts with crimp for double wire crimp seen on the Figure 3.

Suitable mating parts are tabs with the standard dimension 1.6x0.6 mm respectively tab headers between 1.6x0.6 mm and 1.6x0.8 mm. They have to be according to specification 114-94201 "Contact pins and tabs for shrouded connection".

The cavity pitch for contacts with insulation crimp and crimp for single wire seal is 4x4 mm. If the cavities of the contacts will be moved about half of the pitch from one row to the other, then it is possible to position the contacts in a pitch of 4x3.5 mm.

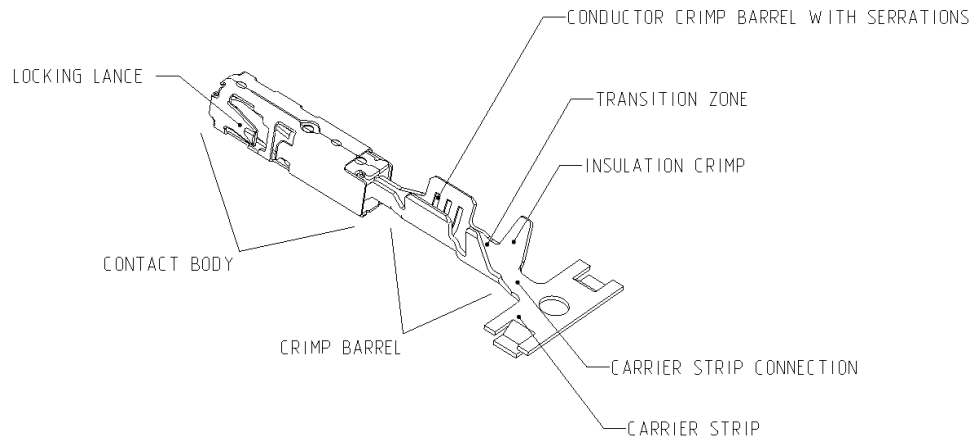


Figure 1: Contacts with insulation crimp

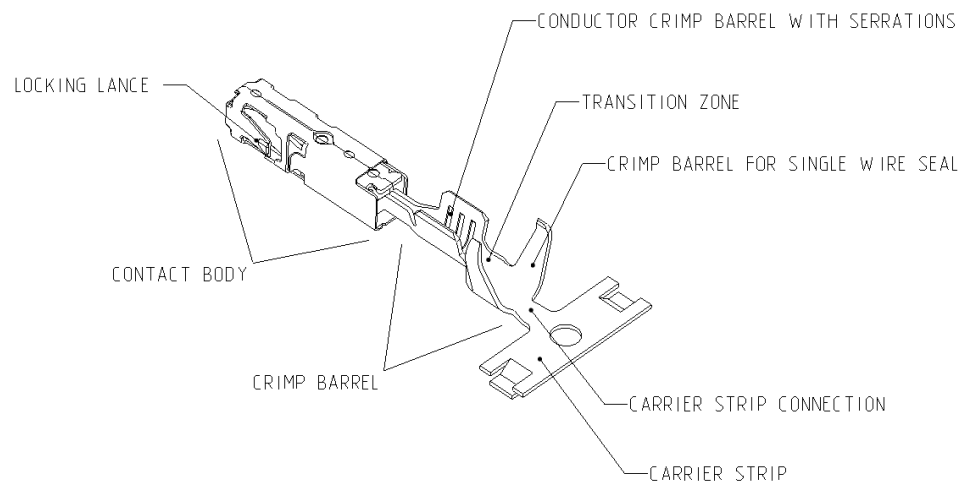


Figure 2: Contacts with crimp for single wire seals

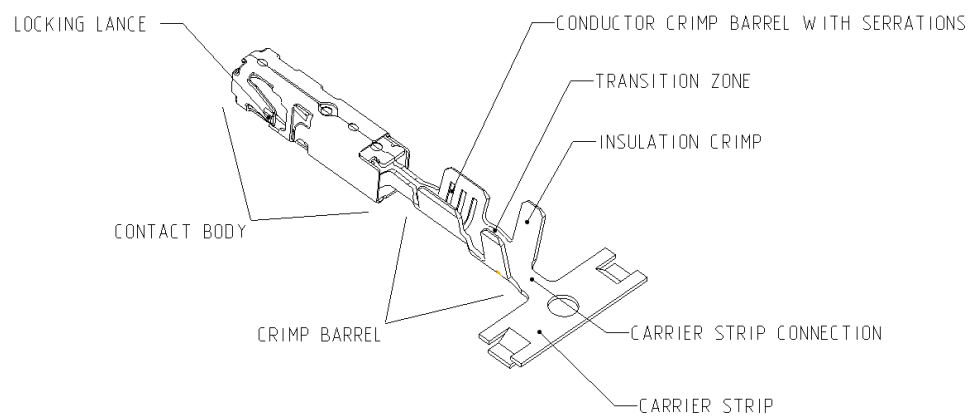


Figure 3: Contacts with crimp for double wire crimp

4.1. Materials

Information about this can be found on the customer drawing.

5. REQUIREMENTS

5.1. General requirements

- The crimp quality has to be according to the TE specifications.
- Specified TE applicators must be used.
- Housings according to TE specifications must be used.
- The contacts must comply with the current drawing.
- For testing only serial parts must be used.

5.2. Characteristic data

Voltage	Acc. to IEC 60 664 –1 (DIN VDE 0110)
Current carrying capability	see derating curves, Diagram 1-10
Temperature ¹	- 40 to 130°C (Sn variant) - 40 to 140°C (Ag variant) - 40 to 150°C (Au variant)

5.3. Test requirements and procedure

The test requirements and procedure have to be in conformity with TE Test Standard 209-160012 or its equivalent unless otherwise specified in below mentioned table.

Test group	Test description	Test requirement	Test procedure
PG0 Receiving inspection and testing	Contact resistance in contact area	$R_k \leq 2 \text{ m}\Omega$	DIN EN 60512-2-1 / 209-160012-E0.2.1 Measuring points – see Figure 4
	Crimp resistance	0,22 mm ² : $R_{\text{crimp}} \leq 3,51 \text{ m}\Omega$ 0,35 mm ² : $R_{\text{crimp}} \leq 2,33 \text{ m}\Omega$ 0,50 mm ² : $R_{\text{crimp}} \leq 1,70 \text{ m}\Omega$ 0,75 mm ² : $R_{\text{crimp}} \leq 1,19 \text{ m}\Omega$ 1,00 mm ² : $R_{\text{crimp}} \leq 0,92 \text{ m}\Omega$ 1,50 mm ² : $R_{\text{crimp}} \leq 0,64 \text{ m}\Omega$	DIN EN 60512-2-1 Measuring points – see Figure 4
PG5 Mechanical and thermal relaxation behavior	Contact normal force (unused)	4 – 10 N	
	Contact normal force (aging in dry heat)	2 – 8 N	DIN EN 60068-2-2 / 209-160012-B5.3

¹ Ambient temperature and heating up by current. Limit temperature of wire and housing (where applicable single-wire-seal) must be \geq limit temperature of application.

<p style="text-align: center;">PG8 Contact retention force out of cavity</p>		<p>1) Primary lock tested in plastic housing, where retention force out of housing have to be in conformity with product specification of the used plastic housing</p> <p>2) Primary lock in steel cavity, $F_{s \leq 1 \text{ mm}} \geq 80 \text{ N}$</p> <p>3) Secondary lock in steel cavity, $F_{\text{max}} \geq 80 \text{ N}$</p> <p>Wire break failure mode before reaching of the desired force is allowed. In this case the 2) and 3) needs to be repeated on uncrimped samples pulled out by carrier strip, force requirements mentioned in the 2), 3) applies.</p>	<p>209-160012-E8.2</p> <p>Testing speed = 50 mm/min</p>
<p style="text-align: center;">PG10 Conductor pull out strength</p>	<p>Conductor pull out strength (insulation crimp inactive)</p>	<p>$0,22 \text{ mm}^2 \geq 28 \text{ N}$</p> <p>$0,35 \text{ mm}^2 \geq 50 \text{ N}$</p> <p>$0,50 \text{ mm}^2 \geq 60 \text{ N}$</p> <p>$0,75 \text{ mm}^2 \geq 85 \text{ N}$</p> <p>$1,00 \text{ mm}^2 \geq 108 \text{ N}$</p> <p>$1,50 \text{ mm}^2 \geq 150 \text{ N}$</p>	<p>209-160012-E10.1</p>
<p style="text-align: center;">PG11 Insertion and removal forces, mating cycle frequency</p>	<p>Maximum mating and unmating forces (using reference tab, for part evaluation)</p>	<p>Mating = max. 6 N</p> <p>Unmating = max. 6 N</p>	<p>209-160012-E11.1</p> <p>With reference tab: PN 2497553-1 (Tab 0.6) PN 2497553-2 (Tab 0.8)</p> <p>Alternative reference tab: PN 965848-1 (Tab 0.6) PN 965852-1 (Tab 0.8)</p> <p>Alternative tab can be used only in assumption, that its surface roughness Ra in mating direction is max 0.02 μm</p> <p>Reference tab roughness in mating direction needs to be documented before test and mentioned in the test report</p>

	Average mating and unmating forces (using real tab, just for informational purposes, not for part evaluation)	95% confidence interval (Student's t-distribution): Sn-plated: Mating = $4,62 \pm 0,25$ N Unmating = $4,11 \pm 0,39$ N Ag-plated: Mating = $5,48 \pm 0,98$ N Unmating = $3,81 \pm 0,90$ N Au-plated: Mating = $5,20 \pm 0,21$ N Unmating = $3,62 \pm 0,22$ N	Just for informational purposes
	Mating cycles ²	Sn-plated = min. 10 Ag-plated = min. 50 Au-plated = min. 100 Mating force variation > 25 % is allowed	209-160012-B11.1
PG12 Current temperature rise, derating (without housing)		See derating curve - Diagram 1 - Diagram 10	DIN EN 60512-5-2 / 209-160012-E12.2
PG14 Thermal time constant		See Diagram 11	209-160012-E14.1
PG17 Dynamic stress	Dynamic load, sinusoidal	The dynamic stress severity depends on operational area and the housing used; the verification has to be done for each housing and each site of operation separately	DIN EN 60068-2-6 / 209-160012-B17.1
	Dynamic load, broadband random vibration		DIN EN 60068-2-64 / 209-160012-B17.2

² The maximum number of mating cycles is dependent on the tribological properties of the used surfaces in each case. Only by using the relevant / matching surfaces and contact geometries, receptacle and tab contacts produced and delivered by TE Connectivity, the maximum number of insertions can be achieved.

<p style="text-align: center;">Slow Motion Bending Test (SMBT)</p>		<p>109-18079</p>	<p>109-18079</p> <p>Following PN's meet the requirements of SMBT:</p> <p>1564980 (0.20mm²-0.35mm²) 1564324 (0.20mm²-0.35mm², SWS) 1241374 (0.50mm²-1.00mm²) 1241380 (0.50mm²-1.00mm², SWS) 1534334 (>1.00mm²-1.50mm²)</p> <p>Double crimp:</p> <p>1241376 (0.35mm²+0.35mm²) 1241376 (0.35mm²+0.50mm²) 1241376 (0.50mm²+0.50mm²)</p> <p>All mentioned PN's were tested with FLR wires according to DIN 72551</p>
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5.4. Test sequence

The test sequence has to be in conformity with TE Test Standard 209-160012 or its equivalent.

6. ATTACHMENTS

6.1. Derating curves

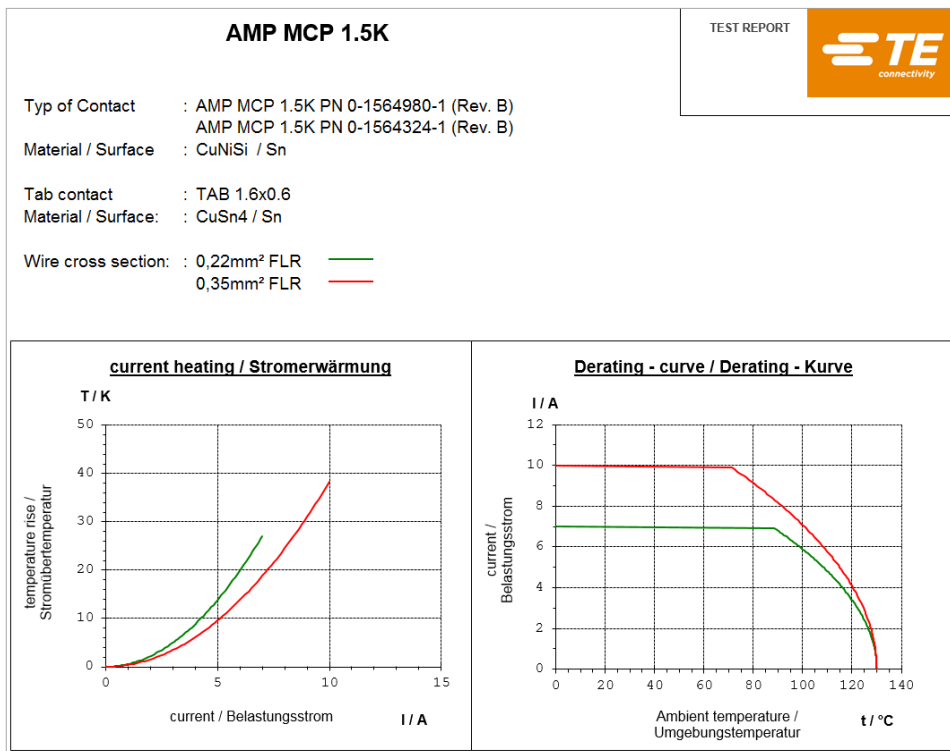


Diagram 1

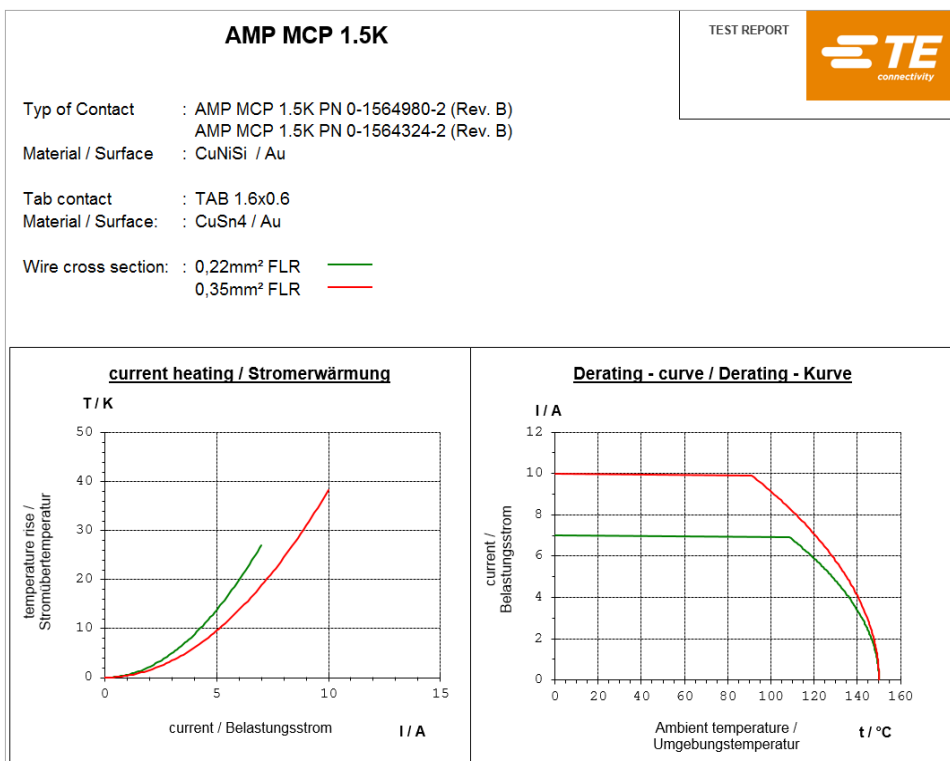


Diagram 2

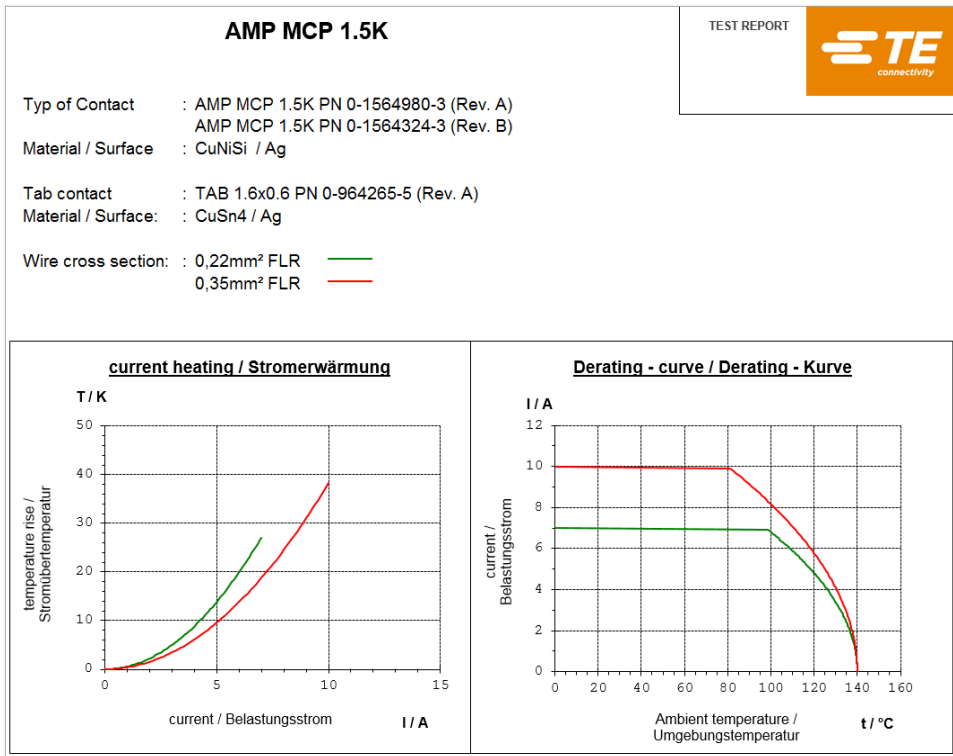


Diagram 3

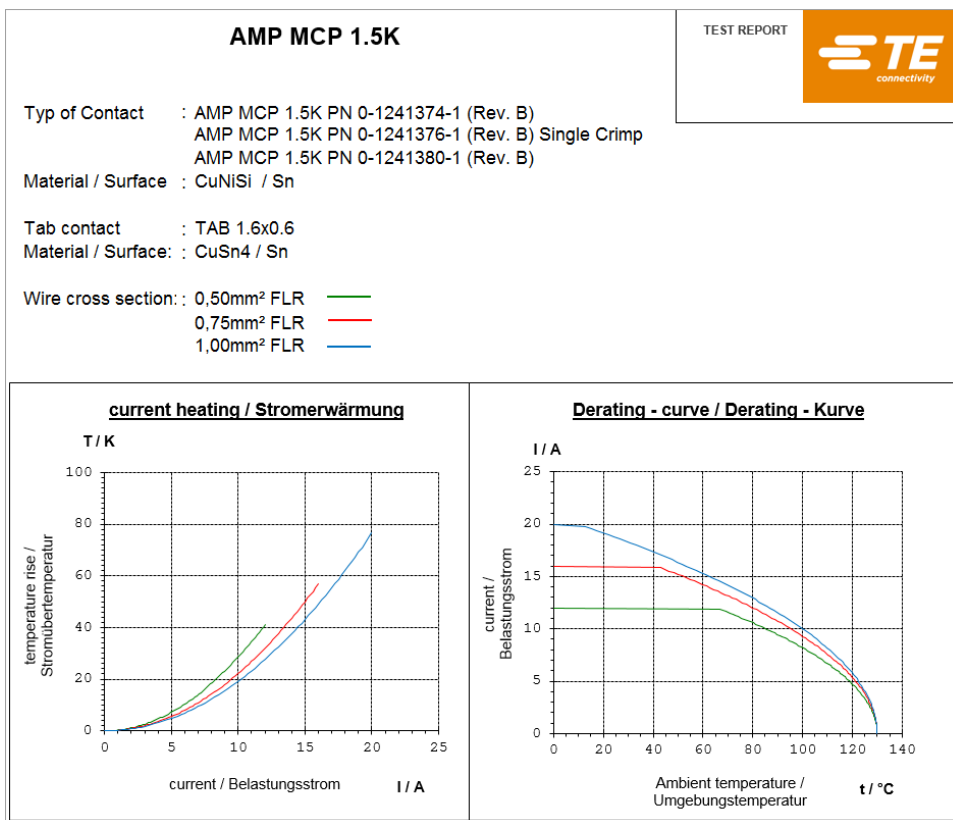


Diagram 4

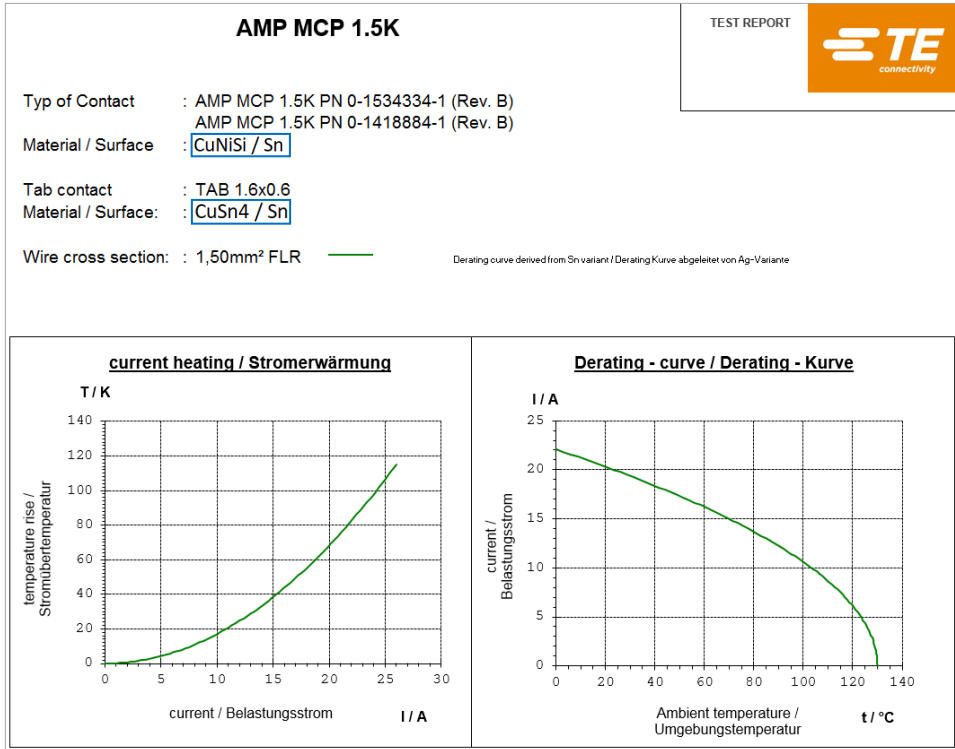


Diagram 9

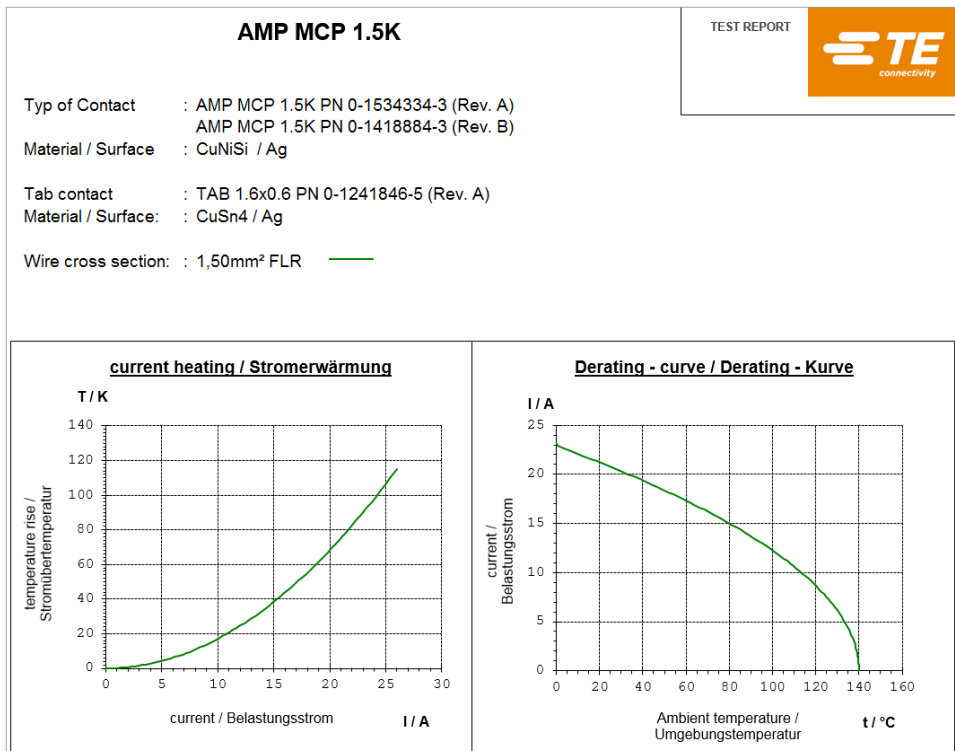


Diagram 10

6.2. Thermal time constant

AMP MCP 1.5K : 0-1241374-3 Rev.B
 Material : CuNiSi / Ag über Ni
 Leiter : 1,0mm², ACW0219



Tab 1.6x0.6 : 0-0964267-4 Rev.A
 Material : CuSn4 / Ag über Ni
 Leiter : 1,0mm², ACW0219

Testaufbau : 3 Kontakte frei in Luft

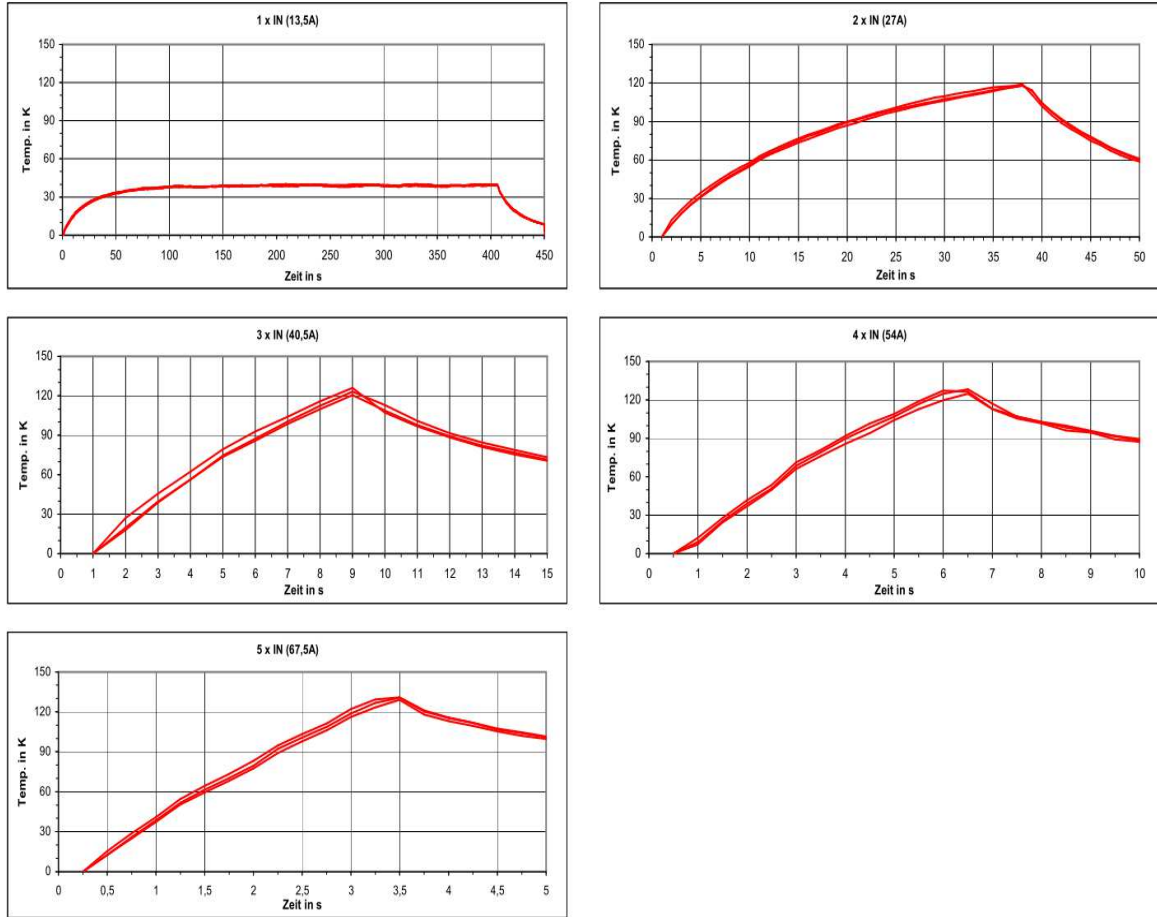
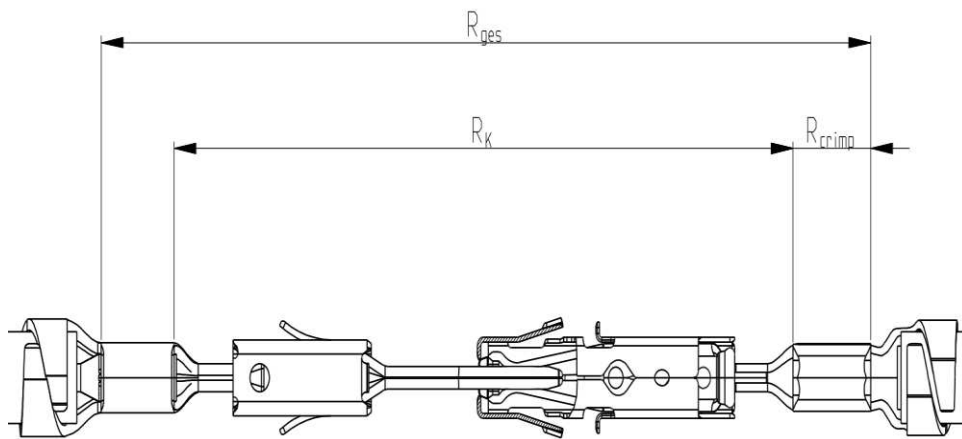


Diagram 11

6.3. Test default

**Figure 4 – Resistance measurements points**

LTR	REVISION RECORD	DWN	APP	DATE
H3	<p>PG11 test requirements have been updated – added new reference tabs and the old ones are now alternative tabs which can be used under specific conditions, added average mating/unmating forces with real tab.</p> <p>Corrected error in Diagram 9 - ... / Ag has been corrected to ... / Sn.</p> <p>LV214-2 standard has been superseded by TE Test Standard 109-18079</p>	J. SOLDÁN	M. PAVLÍČEK T. SVÁTEK	18-FEB-2024
H2	Correction of PG11 Test group name	J. SOLDÁN	M. PAVLÍČEK	28-FEB-2024
H1	Lower mating/unmating force limit has been removed.	J. SOLDÁN	M. PAVLÍČEK	31-OCT-2023
H	<p>The LV214 standard has been superseded by TE Testing standard 209-160012. Simplification of the spec. – removed test sequence table (redundant with 209-160012), redundant test requirements with 209-160012 have been removed, removed German language. Updated PG8 test requirements. Update of the spec. to be in conformity with the latest PE-AUT-AV-00017-03 template.</p>	J. SOLDÁN	M. PAVLÍČEK	09-OCT-2023