



Product Standard for YMT 1.5 mm Contact System

Produktstandard für YMT 1.5 mm Kontaktteilsystem



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1 Revision list

1 Revisionsliste

0	Creation	M. Sprljan	19.10.2021.
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2 Scope

2.1 Content

This specification covers the performance, test and quality for the **YAZAKI 1.5 mm Contact System (YMT)**.

2.2 Qualification

To perform tests use following specified standards and specifications. All inspections shall be performed using the applicable Inspection Plan and Product Drawing.

If there are any differences between this document and the Product Drawing, the content of Product Drawing takes priority. In all other cases this document shall take priority.

3 Referenced Documents

3.1 YAZAKI Documents

- Product Drawings No:
7216-7860-02:R
7216-7862-02:R
- Design Objectives
- Handling Manual:
YPES-15-1609E

3.2 Other Documents

- Automotive Connector Test Specification LV214, Edition March 2010.
- DIN IEC 60512 Electromechanical components for electronic equipment; basic testing procedures and measuring methods.
- DIN EN 60068 Environmental testing procedures.
- DIN EN 60352-2 Solderless connections, Part 2: Solderless crimped connections

2 Anwendungsbereich

2.1 Inhalt

*Diese Spezifikation behandelt die Leistung, Prüfungen und Qualitätsanforderungen für das **YAZAKI 1.5mm Kontaktteilsystem (YMT)**.*

2.2 Qualifikation

Um Prüfungen durchzuführen, sind die nachfolgend aufgeführten Standards und Spezifikationen zu benutzen. Alle Prüfungen sollen unter Anwendung des entsprechenden Prüfungsplans und der Produktzeichnung durchgeführt werden.

Falls Abweichungen zwischen diesem Dokument und der Produktzeichnung auftreten, hat die Produktzeichnung Vorrang. In allen anderen Fällen hat dieses Dokument Vorrang.

3 Referenzdokumente

3.1 YAZAKI Dokumente

- Produktzeichnungen Nr.:
7216-7860-02:R
7216-7862-02:R
- Zielsetzungen für Leistungsdaten
- Verarbeitungsspezifikation:
YPES-15-1609E

3.2 Andere Dokumente

- *Kfz - Steckverbinder Prüfvorschrift LV214, Ausgabe März 2010.*
- *DIN IEC 60512 Elektrisch-mechanische Bauelemente für elektronische Einrichtungen; Meß- und Prüfverfahren.*
- *DIN EN 60068 Umweltprüfungen.*
- *DIN EN 60352-2 Lötfreie elektrische Verbindungen, Teil 2: Crimpverbindungen.*

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4 Product Overview

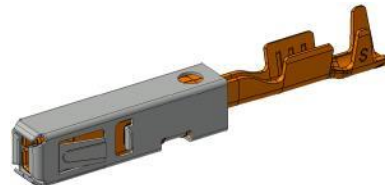
4 Produktübersicht

Terminal Version	Wire Range Drahtgrößenbe- reich [mm ²]	Female Terminal Part No. <i>Buchsenkontakt Teil Nr.</i>	Plating in Contact Area	Oberfläche im Kontaktbereich
UNSEALED/ FLR	0,35	7216-7862-02	Tin	<i>Verzinkt</i>
		7216-7862-06	Silver	<i>Versilbert</i>
		7216-7862-08	Gold	<i>Vergoldet</i>
	0,50 - 1,00	7216-7863-02	Tin	<i>Verzinkt</i>
		7216-7863-06	Silver	<i>Versilbert</i>
		7216-7863-08	Gold	<i>Vergoldet</i>
	1,50	7216-7861-02	Tin	<i>Verzinkt</i>
SWS/ELA	0,35	7216-7864-02	Tin	<i>Verzinkt</i>
		7216-7864-06	Silver	<i>Versilbert</i>
		7216-7864-08	Gold	<i>Vergoldet</i>
	0,50 - 1,00	7216-7865-02	Tin	<i>Verzinkt</i>
		7216-7865-06	Silver	<i>Versilbert</i>
		7216-7865-08	Gold	<i>Vergoldet</i>
CB	0,75 - 1,50	7216-7860-02	Tin	<i>Verzinkt</i>
		7216-7860-06	Silver	<i>Versilbert</i>
		7216-7860-08	Gold	<i>Vergoldet</i>

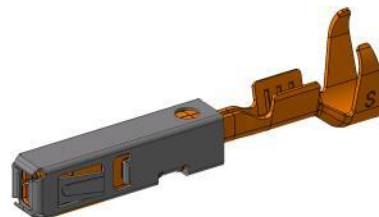
Table 1

Tabelle 1

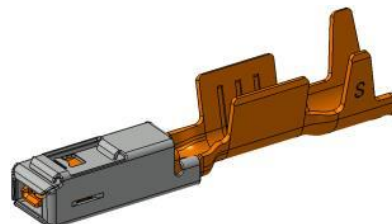
YMT 1.5 Contact system unsealed (FLR)



YMT 1.5 Contact system sealed (ELA)



YMT 1.5 Contact system Clean Body (CB)



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5 Performance Data of Terminal

5.1 Design

Shape and physical dimensions of the product are defined on the applicable product drawings.

5.2 Materials

All materials are defined in the applicable product drawings.

- Terminal Body: CuNiSi Alloy
- Terminal Spring: Stainless Steel

5.3 Technical Data

5.3.1 Nominal Voltage

Acc. To IEC 664/IEC 664A (DIN VDE 0110)

5.3.2 Current Carrying Capability

See applicable derating curves in chapter 7.

5.3.3 Temperature Range

Ambient temperature and heating up by current from

- 40°C to +130°C (tinned)
- 40°C to +150°C (silver plated)
- 40°C to +150°C (gold plated)

5.3.4 Durability

- ≤ 20 Cycles (tinned)
- ≤ 50 Cycles (silver plated)
- ≤ 100 Cycles (gold plated)

5.4 Quality and Performance

The product is designed to meet electrical, mechanical and environmental performance data specified in 5.4.1 Test Performance.

All tests are performed according to Automotive Connector Test Specification LV214, Edition March 2010.

5 Leistungsdaten von Kontakt

5.1 Konstruktion

Form und Abmessungen des Produktes sind in den entsprechenden Produktzeichnungen festgelegt.

5.2 Werkstoffe

Alle Werkstoffe sind in den entsprechenden Produktzeichnungen festgelegt.

- Kontaktkörper: CuNiSi Legierung
- Überfeder: Rostfreier Edelstahl

5.3 Technische Daten

5.3.1 Nennspannung

Nach IEC 664/IEC 664A (DIN VDE 0110)

5.3.2 Strombelastbarkeit

Siehe Deratingkurven Kapitel 7.

5.3.3 Temperaturbereich

Umgebungstemperatur und Stromerwärmung von

- 40°C bis +130°C (verzinnt)
- 40°C bis +150°C (versilbert)
- 40°C bis +150°C (vergoldet)

5.3.4 Stechkäufigkeit

- ≤ 20 Zyklen (verzinnt)
- ≤ 50 Zyklen (versilbert)
- ≤ 100 Zyklen (vergoldet)

5.4 Qualität und Leistung

Das Produkt ist so gestaltet, damit die in 5.4.1 Prüfleistung geforderten elektrischen, mechanischen und umgebungsabhängigen Leistungsdaten eingehalten werden. Alle Prüfungen werden nach Kfz - Steckverbinder Prüfvorschrift LV214, Ausgabe März 2010, durchgeführt.

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 0 - Receiving inspection / <i>Eingangsprüfung</i>		
Basic examination of all contact and housing parts in the unused condition, without prior loads. Determination of deviations from a given target state. Batch size: 44 terminal pairs for FLR 40 terminal pairs for ELA 24 terminal pairs for CB <i>Grundsätzliche Prüfung aller Kontakt- und Gehäuseteile im Neuzustand, ohne vorherige Belastungen. Anforderung: Feststellen von Abweichungen von einem gegebenen Sollzustand.</i> <i>Losgröße: 44 Terminalpaare für FLA</i> 40 Terminalpaare für ELA 24 Terminalpaare für CB		
E 0.1	Delivery condition without crack, rust, rattling, deformation, discoloration, etc. that affect the function/ <i>Anlieferzustand ohne Risse, Korrosion, Klappen, Verformungen, Verfärbungen usw. die Funktion beeinträchtigten könnten.</i>	DIN EN 60512-1-1
Visual inspection/ <i>Sichtprüfung</i>		
E 0.2	≤ 15mΩ ≤ 10mΩ for 1.5mm ² wire	DIN EN 60512-2-1
Contact resistance/ <i>Durchgangswiderstand</i>		
E 0.3	Riso > 100 MΩ at U = 500 V, t = 60 s Riso = insulation resistance / <i>Isolationswiderstand</i> U = DC test voltage / <i>Prüfspannung DC</i> T = read cycle time / <i>Ablesezeit</i>	DIN EN 60512-3-1
<i>Insulation resistance/ Isolationsswiderstand</i>		
PG 1 - Dimensions / <i>Maße</i>		
Dimensional inspection of all contact parts, housing parts, and single-wire seals Batch size: 10 pieces per wire size Contact parts: All crimped and non-crimped variants that occur for permissible double crimps Housings: All variants that occur Single-wire seals: All variants that occur <i>Maßliche Kontrolle aller Kontakteile, Gehäuseteile und Einzelleiterabdichtungen (ELA)</i> <i>Losgröße: 10 Stücke je Leiterquerschnitt</i> <i>Kontakteile: Alle vorkommenden, nicht angeschlagenen und angeschlagenen Varianten, zulässige Doppelcrimpungen siehe Anhang A</i> <i>Gehäuse: Alle vorkommenden Varianten</i> <i>ELA: Alle vorkommenden Varianten</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
E 1.1	The measured values correspond to the release drawing or product specifications. Indications must be provided in the measurement report./ <i>Die Messwerte müssen der Freigabezeichnung bzw. der Produktspezifikation entsprechen. Angaben müssen dem Messbericht entnehmbar sein.</i>	DIN EN 60512-1-2
Dimensions/ <i>Maße</i>		
E 1.2		
Dimensions (of processed components)/ <i>Maße (von verarbeiteten Bauteilen)</i>		
PG 2 - Material and surface analysis, contacts / <i>Material- und Oberflächenanalyse, Kontakte</i>		
Determination of all material parameters of metal parts Batch size: 5 pieces Test object: All materials and surfaces that occur <i>Erfassung aller Materialparameter der Metallteile</i> <i>Losgröße 5 Stück</i> <i>Prüfgegenstand: Alle vorkommenden Werkstoffe und Oberflächen</i>		
E 2.1	The material test are documented for all individual parts of the contact/ <i>Die Werkstoffprüfung muss für alle einzelnen Teile des Kontaktes nachgewiesen werden</i>	
Material test of contact parts/ <i>Werkstoffprüfung Kontaktteile</i>		
E 2.2	The contact labels are recognizable after processing. Not possible – tested samples not marked according product drawing/ <i>Die Kontaktteilbeschriftungen müssen nach der Verarbeitung erkennbar sein.</i>	
Markings on the visible surface/ <i>Kennzeichnungen auf der sichtbaren Oberfläche</i>		
PG 4 - Contact overlap / <i>Kontaktüberdeckung</i>		
Documentation of the minimum required contact engagement length under all worst conditions, including using theoretical studies (e.g., CAD) Batch size: 3 housings Up to 5-pin, fully equipped; for 6-pin and above, with 5 contacts Contact parts: All variants that occur, line cross-section and surface arbitrary Housings: All variants that occur, keying and color arbitrary <i>Nachweis der minimal geforderten Kontaktüberdeckung unter allen ungünstigsten Bedingungen auch anhand theoretischer Studien (z. B. CAD)</i> <i>Losgröße: 3 Gehäuse</i> <i>Bis 5-polig vollbestückt, ab 6-polig mit 5 Kontakten</i> <i>Kontaktteile: Alle vorkommenden Varianten, Leiterquerschnitt und Oberfläche beliebig</i> <i>Gehäuse: Alle vorkommenden Varianten, Kodierung und Farbe beliebig</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
E 4.1	Theoretical proof Contact engagement length: >1.00 mm Clearance: >0 (in the worst case) <i>Theoretische Nachweis</i> <i>Kontaktüberdeckung: > 1,00 mm</i> <i>Freiraum: > 0 (im ungünstigsten Fall)</i>	
<i>Contact engagement length / Kontaktüberdeckung</i>		
PG 5 - Mechanical and thermal relaxation behavior/ <i>Mechanisches u. thermisches Relaxationsverhalten</i>		
Functional evaluation of the upper limit temperature (= Tmax) of the contact system specified by the manufacturer and of the normal force. Batch size: 3 test batches of 25 contact parts each per sampling time Contact parts: All materials and design variants that occur in the contact area <i>Funktionelle Bewertung der vom Hersteller genannten oberen Grenztemperatur (= Tmax) des Kontaktsystems und der Normalkraft.</i> <i>Losgröße: 3 Prüflöse von 25 Kontaktteilen pro Entnahmezeitpunkt</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe und Designvarianten im Kontaktbereich</i>		
E 5.1	The contact opening dimensions are documented/ <i>Die Kontaktöffnungs müssen dokumentiert werden</i>	
Contact opening dimension in the unused condition (optical measurement) / <i>Kontaktöffnungsmaß im Neuzustand (optische Messung) – alle Prüflöse</i>		
B 5.1	Conditioning only/ <i>Nur Konditionierung</i>	
One half (5 pieces each) of all test batches is inserted and disconnected 5 times before further loading/ <i>Die eine Hälfte (je 5 Stück) aller Prüflöse wird vor der weiteren Beanspruchung 5-mal gesteckt und getrennt.</i>		
E 5.1	The contact opening dimensions are documented/ <i>Die Kontaktöffnungsmaße müssen dokumentiert werden</i>	
Contact opening dimension of the DUTs inserted 5 times (optical measurement) – all test batches/ <i>Kontaktöffnungsmaß der 5-mal gesteckten Prüflinge (optische Messung) – alle Prüflöse</i>		
E 5.2	The normal contact force is min. 1.5 N (CB), 2 N (FLR) / <i>Die Kontaktnormalekraft ist min. 1.5 N (CB), 2.0N (FLR)</i>	
Normal contact force Determination of the normal contact force – on test batch 1/ <i>Kontaktnormalkraft Ermittlung der Kontaktnormalkraft – an Prüflös 1</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 5.2	Conditioning only/ <i>Nur Konditionierung</i>	
All DUTs of test batches 1 – 5 are inserted. The DUTs must not be disconnected until measurement of the contact opening dimension and the normal contact force./ <i>Alle Prüflinge der Prüflöse 1- 5 werden gesteckt. Bis zur Messung des Kontakt- öffnungsmaßes und der Kontaktnormalkraft dürfen die Prüflinge nicht mehr getrennt werden.</i>		
B 5.3	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-2 Test B
Aging in dry heat, inserted Duration: 1 000 h Max. temperature Tmax limit temperature from derating curve (I = 0 A): 150°C Test batches 1 – 5 are aged and are successively removed at the respective times (1h, 100h, 200h, 500h, and 1000h), and the normal force is measured. <i>Lagerung bei trockener Wärme, gesteckt Dauer 1000 h Max. Temperatur Tmax Grenztemperatur aus Derating-Kurve (I = 0 A) Es werden die Prüflöse 1 - 5 eingelagert und zu den jeweiligen Zeitpunkten (1 h, 100 h, 200 h, 500 h und 1000 h.) nacheinander entnommen und die Normalkraft gemessen.</i>		
E 5.1	The contact opening dimensions are documented/ <i>Die Kontaktöffnungsmaße müssen dokumentiert werden</i>	
Contact opening dimension (optical measurement) – on test batches 1 – 5 <i>Kontaktöffnungsmaß (optische Messung) – an den Prüflösen 1 - 5</i>		
E 5.2		
Normal contact force Determination of the normal contact force on all test batches/ <i>Kontaktnormalkraft Ermittlung der Kontaktnormalkraft an allen Prüflösen</i>	The normal contact force is min. 1 N (CB), 1.5 N (FLR) / <i>Die Kontaktnormalkraft ist min. 1.0 N (CB), 1.5N (FLR)</i>	

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 6 - Interaction between contact and housing / Wechselwirkung zwischen Kontakt und Gehäuse		
Documentation of the function of the cavity and of the contact locks Batch size: FLR - 2 fully equipped 6P housings for E 6.2 and E 6.3 ELA - 2 fully equipped 6P housings for E 6.2 and E 6.3 CB - 2 fully equipped 56P housings for E 6.2 and E 6.3 Contact parts: Arbitrary Line cross-sections: Smallest and largest cross-section and, if applicable, permissible double-wire crimps Housings: All variants that occur, keying and color arbitrary <i>Nachweis der Funktion der Kammer und der Kontaktverriegelungen</i> <i>Losgröße: FLR - 2 vollbestückte 6P Gehäuse für E 6.2 und E 6.3</i> <i>ELA - 2 vollbestückte 6P Gehäuse für E 6.2 und E 6.3</i> <i>CB - 2 vollbestückte 56P Gehäuse für E 6.2 und E 6.3</i> <i>Kontaktteile: Beliebig</i> <i>Leistungsquerschnitte: kleinster und größter Querschnitt und ggf. zulässige Doppelanschlüsse, siehe Anhang A</i> <i>Gehäuse: Alle vorkommenden Varianten, Kodierung und Farbe beliebig</i>		
E 6.1	Deflection: Based on the cavity and pin drawings, it has documented that the pin and contact can be joined one in the other without any damage. The documentation provided graphically or computationally for the worst case./ <i>Taumelspiel: Auf Basis der Kammer und Kontaktteil Zeichnungen, es muss dokumentiert sein, daß der Stift und der Kontakt ohne Schaden verbunden werden können. Die Dokumentation muss graphisch oder rechnerisch für den ungünstigsten Fall zur Verfügung gestellt werden.</i>	
Deflection of contacts in the housing cavity (theoretical documentation according to manufacturer's specification)/ <i>Taumelspiel der Kontakte in der Gehäusekammer (theoretischer Nachweis nach Herstellervorgabe)</i>		
E 6.2		
Function of the primary lock/latch play (with new housings, see batch size)/ <i>Funktion der Primärverriegelung / Rastspiel (mit neuen Gehäusen, siehe Losgröße)</i>		
E 6.3	The secondary lock is closeable at the end stop. The secondary lock cannot be closed until all contacts are properly locked in the housing cavity in the correct position./ <i>Die Sekundärverriegelung muss am Ende verschließbar sein. Die Sekundärverriegelung soll nicht verschließbar sein so lange nicht alle Kontakte in der richtigen Position in der Kammer verriegelt sind.</i>	
Function of the secondary lock/latch play (with new housings, see batch size)/ <i>Funktion der Sekundärverriegelung / Rastspiel (mit neuen Gehäusen, siehe Losgröße)</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 8 - Insertion and retention forces of the contact parts in the housing / <i>Einsteck- und Haltekräfte der Kontaktteile im Gehäuse</i>		
Documentation of the cable manufacturability and of the contact locks Batch size: FLR - 10 contacts per wire size ELA - 10 contacts per wire size CB - 12 contacts per wire size Contact parts: All variants that occur Housings: All variants that occur (molds) <i>Nachweis der Konfektionierbarkeit und der Kontaktverriegelungen</i> <i>Losgröße: FLR - 10 Kontakte je Leiterquerschnitt</i> <i>ELA - 10 Kontakte je Leiterquerschnitt</i> <i>CB - 12 Kontakte je Leiterquerschnitt</i> <i>Kontaktteile: Alle vorkommenden Varianten</i> <i>Gehäuse: Alle vorkommenden Varianten (Formnester)</i>		
E 8.1	The insertion forces of the contacts into the cavity measured and documented./ <i>Die Kontakteinsteckkräfte der Kontakte in die Kammer müssen gemessen und dokumentiert werden</i>	
Determination of the contact insertion forces/ <i>Ermittlung der Kontakteinsteckkräfte</i>		
E 8.2.1.		
Contact removal force from the housing, primary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Primärverriegelung</i>		
E 8.2.2.		
Contact removal force from the housing, secondary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Sekundärverriegelung</i>	$F_{\text{prim}} \geq 80\text{N (FLR, ELA)}$ $F_{\text{prim}} \geq 60\text{N (CB)}$	
	$F_{\text{sek}} \geq 80\text{N}$	
PG 10 - Contacts: conductor pull-out strength/ <i>Kontakte: Leiterausreißkraft</i>		
Evaluation of the line connection at the contact Batch size: 10 contact parts Contact parts: All materials and surfaces that occur in the line area, crimp height at upper and lower tolerance in each case Line cross-section: All variants that occur <i>Beurteilung der Leitungsanbindung an den Kontakt</i> <i>Losgröße: 10 Kontaktteile</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe und Oberflächen im Leitungs- bereich, Crimphöhe jeweils obere und untere Toleranz</i> <i>Leitungsquerschnitt: Alle vorkommenden Varianten</i>		
E 10.1	0.35 mm ² : $\geq 50\text{N}$ 0.50 mm ² : $\geq 60\text{N}$ 0.75 mm ² : $\geq 85\text{N}$ 1.00 mm ² : $\geq 108\text{N}$ 1.50 mm ² : $\geq 150\text{N}$	DIN EN 60512-1-1
Conductor pull-out strength (only in connection with crimp)/ <i>Leiterausreißkraft (nur in Verbindung mit Crimp)</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 11 - Contacts: Insertion and removal forces, mating cycle frequency/ Kontakte: Steck- und Ziehkräfte, Stechkäufigkeit		
Evaluation of the contact surfaces through insertions and the forces that occur during these Batch size: 10 contact parts per plating Contact parts: All materials and surfaces that occur. Housings: With/without housing for contact retention (low friction, without seals, latching arms, etc.) <i>Beurteilung der Kontaktoberflächen durch Steckungen und dabei auftretende Kräfte</i> <i>Losgröße: 10 Kontaktteile pro Beschichtung</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe und Oberflächen.</i> <i>Gehäuse: Ohne / ggf. mit Gehäuse zur Kontakthalterung</i> <i>(reibungssarm, ohne Dichtungen, Rastarme etc.)</i>		
E 11.1	≤ 8.5N (FLR, ELA) ≤ 7N (CB)	
Plugging and removal force, without additional lubricants/ <i>Aufsteck- und Abzugskraft, ohne zusätzliche Schmiermittel</i>		
B 11.1	After conditioning the insertion force is changing by at most 25% compared to the initial value/ <i>Nach der Konditionierung darf sich die Kontakteinsteckkraft höchstens um 25% im Vergleich zum Anfangswert ändern</i>	
Mating cycle frequency Sn: 20 cycles Ag: 50 cycles Au: 100 cycles/ Stechkäufigkeit Oberfläche: Sn 20 Steckzyklen Ag 50 Steckzyklen Au 100 Steckzyklen		
PG 12 - Current heating, derating/ Stromerwärmung, Derating		
Documentation of the current carrying capacity of contacts Batch size: 10 contact pairs per wire size Contact parts: All surfaces are documented. (Note: It is permissible to measure a surface and to derive the values of the other surfaces from it.) Line cross-section: All variants that occur Line length: According to DIN EN 60512-5-2 Housings: Without <i>Nachweis der Stromtragfähigkeit von Kontakten</i> <i>Losgröße: 10 Kontaktpaare je Drahtgröße</i> <i>Kontaktteile: Alle Oberflächen werden dokumentiert. (Hinweis: Es ist zulässig, eine Oberfläche zu messen und die Werte der anderen Oberflächen davon abzuleiten)</i> <i>Leitungsquerschnitt: Alle vorkommenden Varianten</i> <i>Leitungslänge: Nach DIN EN 60512-5-2</i> <i>Gehäuse: Ohne</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
E 12.1	See applicable current capability in chapter 7/ Siehe Deratingkurven im Kapitel 7	DIN EN 60512-5-1
Current excess temperature/ <i>Stromübertemperatur</i>		
E 12.2		DIN EN 60512-5-2
Derating without housing/ <i>Derating ohne Gehäuse</i>		
PG 14 - Thermal time constant (current excess temperature at n times rated current)/ <i>Thermische Zeitkonstante (Stromübertemperatur bei n-fachem Nennstrom)</i>		
Evaluation of briefly exceeding the max. current capacity (peaks) Batch size: 10 contact parts Contact parts: All materials that occur Line cross-section: Maximum line cross-section Line length: According to DIN EN 60512-5-2 Housings: With or without housings equipped with 1 contact part/ <i>Beurteilung von kurzem Überschreiten der max. Stromkapazität (Spitzen)</i> <i>Losgröße: 10 Kontaktteile</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe.</i> <i>Leitungsquerschnitt: Maximaler Leitungsquerschnitt</i> <i>Leitungslänge: Nach DIN EN 60512-5-2</i> <i>Gehäuse: Ohne / ggf. mit Gehäuse mit 1 Kontaktteil ausgestattet</i>		
E 14.1	The rated current that was determined in PG 12 was used. For "current over time" graph see chapter 8/ <i>Der Nennstrom, der in PG 12 bestimmt wurde, muss verwendet werden. Für „Strom über Zeit“ Diagramme siehe Kapitel 8.</i>	
Thermal time constant/ <i>Thermische Zeitkonstante</i>		
E 14.2	Contacts are still fully functional after the test/ <i>Die Kontakte sind nach dem Test noch voll funktionsfähig</i>	
Determination of contact opening dimension, surface analysis/ <i>Bestimmung von Kontaktöffnungsmaß, Oberflächenanalyse</i>		
PG 15 - Electrical stress test/ <i>Elektrischer Stresstest</i>		
Functional evaluation of the upper limit temperature of the contact system specified by the manufacturer with current supply, temperature cycling, and humid heat. Batch size: 10 contact parts + 5 with USW treatment Contact parts: all materials and surfaces that occur Line cross-section: max. cross-section Line length: must be decided case-by-case Housings: must be decided case-by-case: Free contact or unsealed housing <i>Funktionelle Bewertung der vom Hersteller genannten oberen Grenztemperatur des Konakttelsystems mit Bestromung bei Temperaturwechsel und feuchter Wärme.</i> <i>Losgröße: 10 Kontaktteile + 5 mit USW Behandlung</i> <i>Kontaktteile: alle vorkommenden Werkstoffe und Oberflächen</i> <i>Leitungsquerschnitt: max. Querschnitt</i> <i>Leitungslänge: fallweise zu entscheiden</i> <i>Gehäuse: fallweise zu entscheiden: Freier Kontakt oder ungedichtetes Gehäuse</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 15.1	Conditioning only/ <i>Nur Konditionierung</i>	
The DUTs are inserted and disconnected 2 times/ <i>Die Prüflinge werden 2-mal gesteckt und getrennt</i>		
B 15.2	Conditioning only/ <i>Nur Konditionierung</i>	
Temperature cycle endurance test/current cycle endurance test Number of cycles: 60/ <i>Temperaturwechseldauertest/ Stromwechseldauertest Zyklenzahl: 60</i>		
B 15.3	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-30
Humid heat, cyclic Number of cycles: 21 (1 day = 1 cycle) relative humidity 95%, Tu = 25°C, To =55°C/ <i>Feuchte Wärme, zyklisch Zyklenzahl: 21 (1 Tag = 1 Zyklus) relative Feuchte 95 %, Tu = 25 °C, To = 55 °C</i>		
E 0.2	≤ 15mΩ ≤ 10mΩ for 1.5mm² wire	DIN EN 60512-2-1
Contact resistance/ <i>Durchgangswiderstand</i>		
E 12.2	≤ 20% change with regards to initial condition/ ≤ 20% Änderung in Bezug auf die Anfangsbedingung	DIN EN 60512-5-2
Derating with the DUTs from previous derating/ <i>Derating mit den Prüflingen aus vorausgegangenem Derating</i>		
E 5.1	The contact opening dimensions is documented at the start and end of PG15/ <i>Die Kontaktöffnungsmaße, müssen am Anfang und am Ende von PG15 dokumentiert werden.</i>	
Contact opening dimension in the unused condition (optical measurement)/ <i>Kontaktöffnungsmaß im Neuzustand (optische Messung) – alle Prüflose</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 17 - Dynamic load/ <i>Dynamische Beanspruchung</i>		
Batch size: 60 contact parts, distributed among 20 housings for FLR 90 contact parts, distributed among 15 housings for ELA 32 contact parts, distributed among 4 housings for CB Contact parts: All variants that occur Line cross-section: To be determined on a case-by-case basis Housings: Sealed/not sealed, to be specified individually Lines: The insulation must withstand the test temperature, Line type (from LV 112) must be documented in the test report. The contact resistance (E 0.2) is measured before and after each spatial axis in the clamped and firmly wired state (before it is converted to a new axis). In order to document the freedom from resonance of the clamping device, a resonance analysis must be performed in the designated frequency range before the start of the vibration <i>Losgröße: 60 Kontaktteile,verteilt auf 20 Gehäuse für FLR 90 Kontaktteile,verteilt auf 15 Gehäuse für ELA 32 Kontaktteile,verteilt auf 4 Gehäuse für CB</i> <i>Kontaktteile: Alle vorkommenden Varianten</i> <i>Leitungsquerschnitt: Fallweise festzulegen</i> <i>Gehäuse: Abgedichtet / nicht abgedichtet, im Einzelfall festzulegen</i> <i>Leitungen: Die Isolation muss der Prüftemperatur standhalten (siehe Abschnitt „allgemeine Regeln“),</i> <i>Leitungstyp (aus LV 112) muss im Prüfbericht dokumentiert werden.</i> <i>Der Durchgangswiderstand (E 0.2) wird vor und nach jeder Raumachse im aufgespannten und fest verkabelten Zustand gemessen (bevor auf neue Achse umgebaut wird).</i> <i>Um die Resonanzfreiheit der Aufspannvorrichtung nachzuweisen, ist vor Beginn der Vibrationsprüfung eine Resonanzanalyse durchzuführen</i>		
B 17.1	No interruptions ($R_c > 7 \Omega$ and $t < 1000 \text{ ns}$)/ Keine Störungen ($R_c > 7$ for $t > 1000 \text{ ns}$)	DIN EN 60068-2-6
Dynamic load, sinusoidal Severity: see Table 3, Appendix A, Sweep speed: 1 oct./min / <i>Dynamische Beanspruchung, sinusförmig</i> <i>Schärfegrad: siehe Tabelle 3, An- hang A</i> <i>Durchlaufgeschwindigkeit : 1 Okt/min</i>	For FLR: Not applicable – severity 1 For ELA (Sn) and CB (Sn): Not applicable – severity 2 Für FLR: Nicht anwendbar – Schärfegrad 1 Für ELA (Sn) und CB (Sn): Nicht anwendbar – Schärfegrad 2	
B 17.2	No interruptions ($R_c > 7$ and $t > 1000 \text{ ns}$) / Keine Störungen ($R_c > 7$ for $t > 1000 \text{ ns}$)	DIN EN 60068-2-64
Dynamic load, broad-band random vibration Severity: see Table 3 Ap- pendix A/ <i>Dynamische Beanspruchung, Breit- bandrauschen Schärfegrad: siehe Tabelle 3 Anhang A</i>		
NOTE B 17.1 and B 17.2 can also be performed simultaneously (SOR)./ ANMERKUNG B 17.1 und B 17.2 können auch gleichzeitig (SOR) durchgeführt werden		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 17.3	No interruptions ($R_c > 7$ for $t > 1000$ ns) / Keine Störungen ($R_c > 7$ for $t > 1000$ ns) For ELA (Au,Ag): Not applicable – severity 4 Für ELA (Au, Ag): Nicht anwendbar – Schärfegrad 4	DIN EN 60068-2-27
<i>Endurance shock test Severity: see Table 3 Appendix A / Dauerschoc- ken Schärfegrad: siehe Tabelle 3 Anhang A</i>		
E 0.2	≤ 15 m Ω throughout the entire test Measured at the start of the test and before E17.4/ <i>≤ 15 mΩ während des gesamten Test zu Beginn des Tests und vor E17.4 gemessen</i>	DIN EN 60512-2-1
Contact resistance/ Durchgangswiderstand		
B 17.4	Omitted – connector not object of testing./ <i>Ausgelassen - Stecker nicht Gegenstand der Prüfung</i>	DIN EN 60068-2-6
Resonance frequency of the contact assembly Dynamic load, sinusoidal Sweep speed: 1 oct./min $a = 10$ m/s ² $f = 5$ Hz – 2 000 Hz – 5 Hz / <i>Resonanzfrequenz der Kontaktierung Dynamische Beanspruchung, sinusförmig</i> <i>Durchlaufgeschwindigkeit: 1 Okt/min</i> <i>$a = 10$ m/s²</i> <i>$f = 5$ Hz – 2000 Hz – 5 Hz</i>		
PG 18A - Coastal climate load/ Küstenklimabeanspruchung		
Test for metal parts (test for sea transport or use near the coast) Batch size: 36 contact parts in unsealed housings for FLR Contact parts: All materials and surfaces that occur Housings: Open (not sealed), plugged in, average number of pins Line cross-sections: 0.5 mm ² <i>Test für Metallteile (Test auf Seetransport bzw. küstennaher Einsatz)</i> <i>Losgröße: 36 Kontaktteile in ungedichteten Gehäusen für FLR</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe und Oberflächen</i> <i>Gehäuse: Offen (nicht abgedichtet), gesteckt, mittlere Polzahl</i> <i>Leitungsquerschnitte: 0.5 mm²</i>		
B 18.1	Conditioning only/ Nur Konditionierung	
The DUTs are inserted 2 times/ <i>Die Prüflinge werden 2-mal gesteckt</i>		
B 18.2	Conditioning only/ Nur Konditionierung	DIN EN 60068-2-52
Salt spray, cyclic Severity: 3/ Salz- nebel, zyklisch Schärfegrad 3		
E 0.2	≤ 15 m Ω	DIN EN 60512-2-1
Contact resistance/ Durchgangswiderstand		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
PG 19 - Environmental simulation/ <i>Umweltsimulation</i>		
Test for plug contacts Batch size: 3 groups with 10 contact parts per group+ additional 5 USW treated contacts Contact parts: All materials and surfaces that occur Lines: Insulation must withstand the test temperature, i.e., PVC is not permissible Line cross-section: To be determined for the individual case Housings: Open (not sealed), to be determined in individual case, plugged in <i>Test für Steckkontakte</i> <i>Losgröße: 3 Gruppen mit 10 Kontaktteilen je Gruppe+ 5 mit USW Behandlung</i> <i>Kontaktteile: Alle vorkommenden Werkstoffe und Oberflächen</i> <i>Leitungen: Isolation muss der Prüftemperatur standhalten, d. h. kein PVC zulässig</i> <i>Leitungsquerschnitt: Im Einzelfall festzulegen</i> <i>Gehäuse: Offen (nicht abgedichtet), im Einzelfall festzulegen, gesteckt</i>		
E 0.2	≤15 mΩ ≤ 10mΩ for 1.5mm² wire	DIN EN 60512-2- 1
Contact resistance/ Durchgangswiderstand		
E 14.0	No requirement/ <i>Keine Anforderung</i>	
Contact resistance continuous during B 19.1,19.2,19.3 19.5,19.6,19.7/ <i>Kontaktwiderstand kontinuierlich während B 19.1,19.2,19.3, 19.5, 19.6,19.7</i>		
B 19.0	Conditioning only/ <i>Conditioning only/ Nur Konditionierung</i>	
Inserting and removing groups ac- cording to Table 4, Appendix B / <i>Gruppen Stecken und Ziehen gemäß Tabelle 4, Anhang B</i>		
B 19.1	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-14
Temperature shock Duration: 144 cycles Temperature: -40 °C/130 °C 15 min respectively Acclimatization period: max. 10 s/ <i>Temperaturschock (alle Gruppen)</i> <i>Dauer: 144 Zyklen</i> <i>Temperatur: -40 °C/ 130 °C je 15 min</i> <i>Umlagerungszeit: max. 10 s</i>		
B 19.2	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-14
Temperature cycle Duration: 20 cycles Temperature: -40 °C/130 °C 3 h re- spectively Time for temperature cycle: max.2 h/ <i>Temperaturwechsel</i> <i>Dauer: 20 Zyklen</i> <i>Temperatur: -40 °C / 130 °C je 3 h</i> <i>Zeit für Temperaturwechsel: max 2 h</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 19.3	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-2 Test B
Aging in dry heat Duration: 120 h Temperature: 130 °C/ <i>Lagerung bei trockener Wärme</i> <i>Dauer: 120 h</i> <i>Temperatur: 130 °C</i>		
B 19.4	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60512-11-14
Industrial climate (0,2 ppm SO ₂ , 0,01 ppm H ₂ S, 0,2 ppm NO ₂ , 0,01 ppm Cl ₂ /25 °C/75% relative humidity/21 d) Flow rate: 1 m ³ /h		
B 19.5	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-30 Variant 2
Humid heat, cyclic Relative humidity: 95% constant Duration: 10 cycles of 24 h each Temperatures: Tu = 25 °C, To = 55 °C Tu = lower cycle temperature To = upper cycle temperature/ <i>Feuchte Wärme, zyklisch</i> <i>Relative Feuchte: 95 % konstant</i> <i>Dauer: 10 Zyklen zu je 24 h</i> <i>Temperaturen: Tu = 25 °C, To = 55 °C</i> <i>Tu = untere Zyklustemperatur</i> <i>To = obere Zyklustemperatur</i>		
B 19.6	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-64
Dynamic load Broad-band random vibration (only groups 2+3) 6 h per axis RMS value of acceleration 13,9 m/s ² <i>Dynamische Beanspruchung</i> <i>Breitbandrauschen</i> <i>(Nur Gruppe 2 + 3) 6 h je Achse</i> <i>Effektivwert der Beschleunigung</i> <i>13,9 m/s²</i>		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 19.7	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-27
Mech. shocks (single shocks) Acceleration a = 30 g Individual shock duration t = 6 ms, sinusoidal half-wave No. of shocks: 50 per spatial axis/ <i>Mech. Schocken (Einzelschocks)</i> <i>Beschleunigung a = 30 g</i> <i>Einzelschockdauer t = 6 ms, Halbwelle sinusförmig</i> <i>Schockzahl: 50 je Raumachse</i>		
B 19.8	Conditioning only/ <i>Nur Konditionierung</i>	
One-time disconnection and insertion/ <i>Einmaliges Trennen und Stecken</i>		
E 0.2	≤15 mΩ ≤ 10mΩ for 1.5mm² wire	DIN EN 60512-2-1
Contact resistance/ Durchgangswiderstand		
PG 21 - Long-term temperature aging/ <i>Langzeittemperaturlagerung</i>		
Test of the long-term stability of the housings and the contact parts Batch size: 12 contact per plating distributed in 3 housings for FLR 36 contact per plating distributed in 6 housings for ELA 16 contact pairs distributed in 2 housing for CB Housings: Group 1 unequipped Group 2 per contact size: Up to 5-pin, fully equipped; for 6-pin and above, with 5 contacts Contact parts: As agreed upon, but at least 10 contact pairs for contact resistance measurements Single-wire seals: All variants that occur Lines: Insulation must withstand the test temperature Conductor cross-section: Lines with max. conductor cross-section Housings: All <i>Test der Langzeitstabilität der Gehäuse und der Kontaktteile</i> <i>Losgröße: 12 Kontakt pro Oberfläche verteilt in 3 Gehäuse für FLR</i> <i>36 Kontakt pro Oberfläche verteilt in 6 Gehäuse für ELA</i> <i>16 Kontaktpaare in 2 Gehäuse für CB</i> <i>Gehäuse: Gruppe 1 unbestückt, Gruppe 2 je Kontaktgröße: Bis 5-pol. Vollbestückt, ab 6-pol. mit 5 Kontakten</i> <i>Kontaktteile: Nach Vereinbarung jedoch mind. 10 Kontaktpaarungen für Durchgangswiderstandsmessungen</i> <i>ELA: Alle vorkommenden Varianten</i> <i>Leitungen: Isolation muss der Prüftemperatur standhalten</i> <i>Leiterquerschnitt: Leitungen mit max. Leiterquerschnitt</i> <i>Gehäuse: Alle</i>		
E 0.2	≤15 mΩ ≤15 mΩ	DIN EN 60512-2-1
Contact resistance/ Durchgangswiderstand		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 21.1	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-2 Test B
Long-term aging in dry heat Test B Duration: 1 000 h Temperature: 130 °C Subsequent aging 48 h at RT/ Langzeitlagerung bei trockener Wärme Prüfung B Dauer: 1 000 h Temperatur: 130 °C Anschließende Lagerung 48 h bei RT		
E 8.2	The value for secondary locks from PG 8 applies as the limit, even if the primary and secondary locks are closed here/ <i>Als Grenzwert gilt aus PG 8 der Wert für Sekundärverriegelungen, auch wenn hier Primär- und Sekundärverriegelung geschlossen sind.</i>	
Contact pull-out forces of all contacts of group 2/ <i>Kontaktauszugskräfte aller Kontakte der Gruppe 2</i>		
PG 23 – Water leak tightness/ Wasserdichtheit		
Test of the leak tightness of sealed connector housing, blind plugs and single wire seals Batch size: Group 1: n/a (connector housings with blind plugs) Group 2: 6 fully equipped housings Housings: all waterproof designs Contact parts: CB (sealed), Sn plating Line cross-section: 2 samples min./2 samples max./2 samples mixed cross section Lines: wire insulation temperature class: 150°C/ <i>Prüfung der Dichtigkeit von gedichteten Steckgehäusen, Blindstopfen und Einzelleiteabdichtung</i> <i>Losgröße: Gruppe 1: unbestückt, (Steckergehäuse mit Blindstopfen)</i> <i>Gruppe 2: 6 vollbestückte Gehäuse</i> <i>Gehäuse: alle wasserdichten Designs</i> <i>Kontaktteile: CB (gedichtet), Sn Oberfläche</i> <i>Leiterquerschnitt: 2 Proben min./2 Proben max./2 Proben gemischter Querschnitt</i> <i>Leitungen: Leitungen Temperaturklasse: 150 ° C</i>		
B 19.3	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-2 Test B
Aging in dry heat / Lagerung bei trockener Wärme		
B 19.1	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60068-2-14 Test Na
Temperature shock / Temperaturschock		

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Test Description <i>Beschreibung</i>	Performance <i>Leistung</i>	Procedure <i>Verfahren</i>
B 23.1	Conditioning only/ <i>Nur Konditionierung</i>	DIN EN 60512-14-5
Immersion with pressure difference / Tauchen mit Druckdifferenz		
B 23.2	Conditioning only/ <i>Nur Konditionierung</i>	
Line movement during immersion with pressure difference / Leitungsbe- wegung bei Tauchen mit Druckdifferenz		
B 23.3	Conditioning only/ <i>Nur Konditionierung</i>	
Thermal shock test / Thermoschockprüfung		
B 23.4	Conditioning only/ <i>Nur Konditionierung</i>	DIN 40050-9
Degree of protection test/pressure washer test / Schutzartprüfung / Dampfstrahlprüfung		
E 0.3	> 100 MΩ	DIN 60512-3-1
Insulation resistance/ Isolationswiderstand		
E 1.1	The dimensions of the housings must correspond to the release drawing before and after the tests / <i>Die Abmessungen der Gehäuse müssen vor und nach den Prüfungen dem Freigabeschema entsprechen</i>	DIN EN 60512-1-2
Dimensions / Maße		

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5.5 Qualification and Requalification Test Sequence

Qualifikations- und Requalifikations Prüfablauf

Test Prüfung		Test group / Prüfungsgruppe						
		PG0	PG1	PG2	PG4	PG5	PG6	PG8
		Test sequence / Prüfablauf						
Visual inspection/ <i>Sichtprüfung</i>	E 0.1	1	1	1	1	1, 8	1	1, 5, 8
Contact resistance/ <i>Durchgangswiderstand</i>	E 0.2	2						
Insulation resistance/ <i>Isolationsswiderstand</i>	E 0.3	3						
Dimensions/ <i>Maße</i>	E 1.1		2					
Dimensions (of processed components)/ <i>Maße (von verarbeiteten Bauteilen)</i>	E 1.2		3					
Material test of contact parts/ <i>Werkstoffprüfung Kontaktteile</i>	E 2.1			2				
Markings on the visible surface/ <i>Kennzeichnungen auf der sichtbaren Oberfläche</i>	E 2.2			3				
Contact engagement length / <i>Kontaktüberdeckung</i>	E 4.1				2			
Contact opening dimension/ <i>Kontaktöffnungsmaß</i>	E 5.1					2, 4, 9		
Inserted and disconnected 5 times/ <i>Gesteckt und getrennt 5-mal</i>	B 5.1					3		
Normal contact force/ <i>Kontaktnormalkraft</i>	E 5.2					5, 10		
Inserted batches 1 – 5/ <i>Gesteckt Prüflöse 1 - 5</i>	B 5.2					6		
Aging in dry heat, inserted/ <i>Lagerung bei trockener Wärme, gesteckt</i>	B 5.3					7		
Deflection of contacts in the housing cavity/ <i>Taumelspiel der Kontakte in der Gehäusenkammer</i>	E 6.1						2	
Function of the primary lock/latch play/ <i>Funktion der Primärverriegelung / Rastspiel</i>	E 6.2						3	
Function of the primary lock/latch play/ <i>Funktion der Sekundärverriegelung / Rastspiel</i>	E 6.3						4	
Determination of the contact insertion forces/ <i>Ermittlung der Kontakteinsteckkräfte</i>	E 8.1							2
Contact removal force from the housing, primary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Primärverriegelung</i>	E 8.2.1							3, 7
Contact removal force from the housing, secondary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Sekundärverriegelung</i>	E 8.2.2							4
Removal of the contacts three times with original release tools/ <i>Dreimalige Demontage der Kontakte mit Original-Entriegelungswerkzeugen</i>	B 8.1							6

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Test Prüfung		Test group / Prüfungsgruppe				
		PG10	PG11	PG12	PG14	PG15
		Test sequence / Prüfablauf				
Visual inspection/ <i>Sichtprüfung</i>	E 0.1	1, 3	1, 7	1, 4	1, 3	1, 14
Contact resistance/ <i>Durchgangswiderstand</i>	E 0.2					4, 11
Contact opening dimension/ <i>Kontaktöffnungsmaß</i>	E 5.1		2, 5			3, 13
Contact removal force from the housing, primary lock only/ Kontaktausreißkraft aus dem Gehäuse, nur Primärverriegelung	E 8.2.1					
Contact removal force from the housing, secondary lock only/ Kontaktausreißkraft aus dem Gehäuse, nur Sekundärverriegelung	E 8.2.2					
Conductor pull-out strength/ <i>Leiterausreißkraft</i>	E 10.1	2				
Contact opening dimensions/ <i>Kontaktöffnungsmaß</i>	E 11.1		3, 6			
Mating cycle frequency / <i>Oberfläche</i>	B 11.1		4			
Current excess temperature/ <i>Stromübertemperatur</i>	E 12.1			2		
Derating without housing/ <i>Derating ohne Gehäuse</i>	E 12.2			3		5, 12
Thermal time constant/ <i>Thermische Zeitkonstante</i>	E 14.1				2	
Determination of contact opening dimension/ <i>Bestimmung von Kontaktöffnungsmaß</i>	E 14.2				4	
Continuous contact resistance with test current/ <i>Durchgangswiderstand kontinuierlich bei Prüfstrom</i>	E 14.0					6, 9
The DUTs are inserted and disconnected 2 times/ <i>Die Prüflinge werden 2-mal gesteckt und getrennt</i>	B 15.1					2
Temperature/current cycle endurance test/ <i>Temperaturwechseldauertest/Stromwechseldauertest</i>	B 15.2					7, 10
Humid heat, cyclic/ <i>Feuchte Wärme, zyklisch</i>	B 15.3					8

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Test Prüfung		Test group / Prüfungsgruppe				
		PG17	PG18A	PG19	PG21	PG23
		Test sequence / Prüfablauf				
Visual inspection/ <i>Sichtprüfung</i>	E 0.1	1, 5, 8, 11	1, 6	1, 11, 15, 22	1, 6	1,4,7, 9,12
Contact resistance/ <i>Durchgangswiderstand</i>	E 0.2	2, 12	3, 5	2, 4, 21	2, 4	
Insulation resistance/ <i>Isolationsswiderstand</i>	E 0.3					11
Dimensions / Maße	E 1.1					13
Contact removal force from the housing, primary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Primärverriegelung</i>	E 8.2.1				5	
Contact removal force from the housing, secondary lock only/ <i>Kontaktausreißkraft aus dem Gehäuse, nur Sekundärverriegelung</i>	E 8.2.2				5	
Continuous contact resistance with test current/ <i>Durchgangswiderstand kontinuierlich bei Prüfstrom</i>	E 14.0	3, 6, 9		5, 7, 9, 13, 16, 18		
Dynamic load, sinusoidal/ <i>Dynamische Beanspruchung, sinusförmig</i>	B 17.1	4				
Dynamic load, broad-band random vibration/ <i>Dynamische Beanspruchung, Breitbandrauschen</i>	B 17.2	7				
Endurance shock test/ <i>Dauerschocken</i>	B 17.3	10				
Resonance frequency of the contact assembly/ <i>Resonanzfrequenz der Kontaktierung</i>	B 17.4	13				
The DUTs are inserted 2 times/ <i>Die Prüflinge werden 2-mal gesteckt</i>	B 18.1		2			
Salt spray, cyclic/ <i>Salznebel, zyklisch</i>	B 18.2		4			
Inserting and removing groups/ <i>Gruppen stecken und Ziehen</i>	B 19.0			3		
Temperature shock/ <i>Temperaturschock</i>	B 19.1			6		3
Temperature cycle/ <i>Temperaturwechsel</i>	B 19.2			8		
Aging in dry heat/ <i>Lagerung bei trockener Wärme</i>	B 19.3			10		2
Industrial climate/ <i>Industrieklima</i>	B 19.4			12		
Humid heat, cyclic/ <i>Feuchte Wärme, zyklisch</i>	B 19.5			14		
Dynamic load/ <i>Dynamische Beanspruchung</i>	B 19.6			17		
Mech. Shocks/ <i>Mech. Schocken</i>	B 19.7			19		
One-time disconnection and insertion/ <i>Einmaliges Trennen und Stecken</i>	B 19.8			20		
Long-term aging in dry heat/ <i>Langzeitlagerung bei trockener Wärme</i>	B 21.1				3	
Immersion with pressure difference/ <i>Tauchen mit Druckdifferenz</i>	B 23.1					5
Line movement during immersion with pressure difference/ <i>Leitungsbewegung bei Tauchen mit Druckdifferenz</i>	B 23.2					6
Thermal shock test/ <i>Thermoschockprüfung</i>	B 23.3					8
Degree of protection test/pressure washer test/ <i>Schutzartprüfung / Dampfstrahlprüfung</i>	B 23.4					10

Table 2

Tabelle 2

Title YMT 1.5 mm Contact System	Doc. No. YPES-11-04-297E	Rev. 0
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6 Quality Assurance Provisions

6.1 Qualification Testing

6.1.1 Sample Selection

The samples will be selected in random order from current production.

6.1.2 Test Sequence

Qualification inspection will be verified by testing samples as specified in Section 5.5.

6.2 Requalification Testing

If significant changes are made on the product or manufacturing process, which significantly affects form, fit or function, requalification testing has to be made. It will consist of whole or part of original testing sequence as determined by responsible engineering.

6.3 Acceptance

Acceptance is based on verification that the product meets requirements of Section 5.4. Failures attributed to the equipment, test setup or operator deficiencies will not disqualify the product.

6.4 Quality Conformance Inspection

The applicable YAZAKI Quality Inspection Plan will be the sampling acceptable quality level to be used. Dimensional and functional requirements will be in accordance with the applicable drawing and this specification.

6 Vereinbarungen zur Qualitätssicherung

6.1 Freigabeproofung

6.1.1 Musterauswahl

Die Muster werden in willkürlicher Reihenfolge aus der laufenden Fertigung ausgewählt.

6.1.2 Prüfablauf

Die Qualifizierungsprüfung wird durch die Prüfmuster bestätigt, wie in Absatz 5.5. spezifiziert.

6.2 Zweiter Qualifizierungstest

Wenn bedeutende Änderungen am Produkt oder Fertigungsprozess gemacht werden, die Form, Zusammenbau oder Funktion beeinträchtigen, müssen Requalifizierungsprüfungen durchgeführt werden. Diese können aus dem gesamten oder teilweisen Prüfablauf bestehen, welches durch die verantwortliche Entwicklungsabteilung veranlasst wird.

6.3 Abnahme

Die Abnahme beruht auf der Bestätigung, dass das Produkt die Leistungs-Anforderungen nach Abschnitt 5.4 erfüllt. Fehler, die auf Ausrüstung, Prüfaufbau oder Bedienermängel zurückzuführen sind, können das Produkt nicht disqualifizieren.

6.4 Qualitätssicherungsüberprüfung

Der geeignete YAZAKI Qualitätsprüfplan wird als die für die Prüfmuster akzeptierte Qualitätsstufe berücksichtigt. Anforderungen bezüglich Abmessungen und Funktion müssen mit der zugehörigen Zeichnung und dieser Spezifikation übereinstimmen.

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7 Deratin curves

7.1 Derating curves CB

7.1.1 Temperature rise diagram

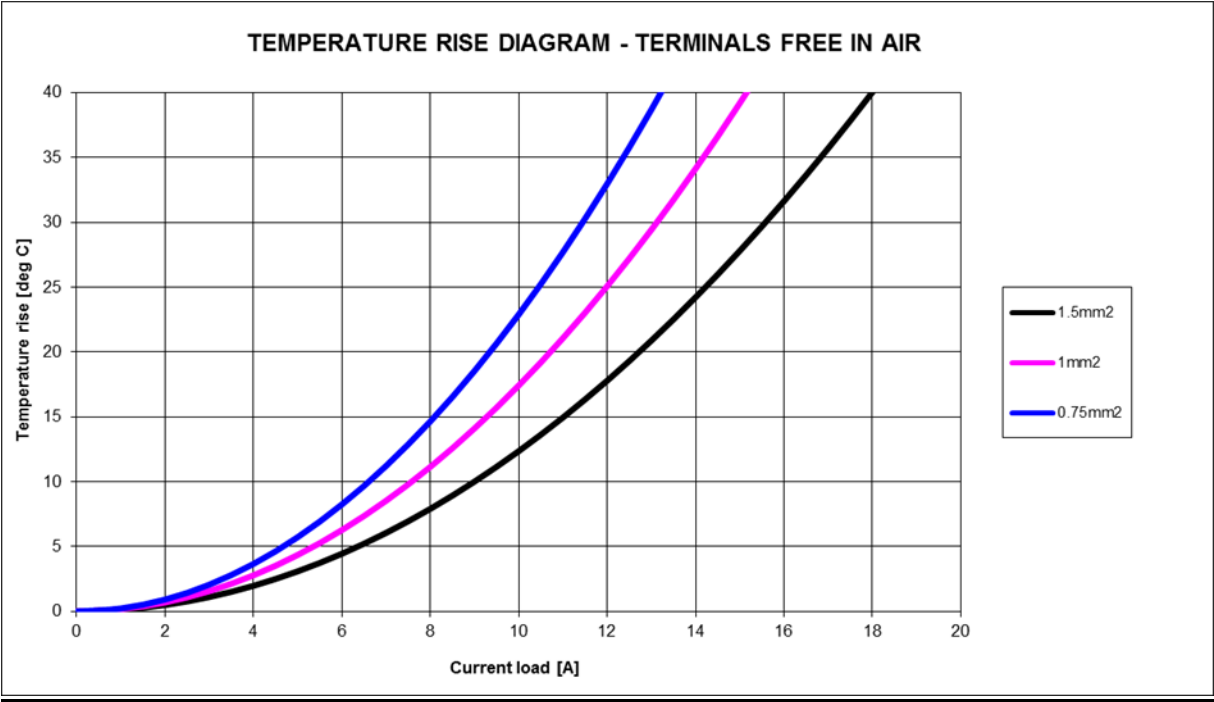
PN YMT 1.5: 7216-7860-02, 7216-7860-06,
7216-7860-08,
Surface: Sn, Ag and Au
Material of terminal: CuNiSi
Material of tab: CuFe2P (for Sn)
Measurement set up: Free in air

7 Derating-Kurven

7.1 Derating-Kurven CB

7.1.1 Temperaturanstieg Diagramm

PN YMT 1.5: 7216-7860-02, 7216-7860-06,
7216-7860-08,
Oberfläche: Sn, Ag und Au
Kontaktmaterial: CuNiSi
Tab Material: CuFe2P (für Sn)
Messaufbau: Frei in Luft



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7.1.2 Derating diagrams (Sn, Ag and Au)

PN YMT 1.5: 7216-7860-02, 7216-7860-06, 7216-7860-08,

Surface: Sn, Ag and Au (data for Ag and Au plated terminals derived from Sn)

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

Measurement set up: Free in air

7.1.2 Derating Diagramme (Sn, Ag und Au)

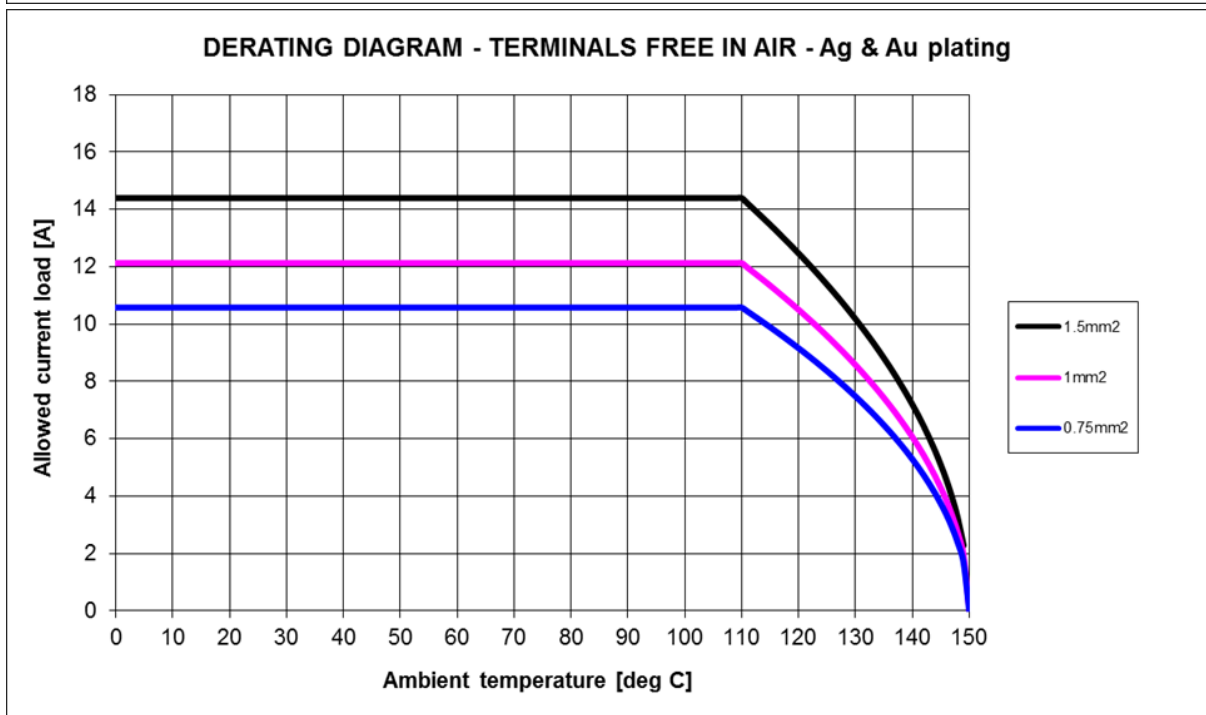
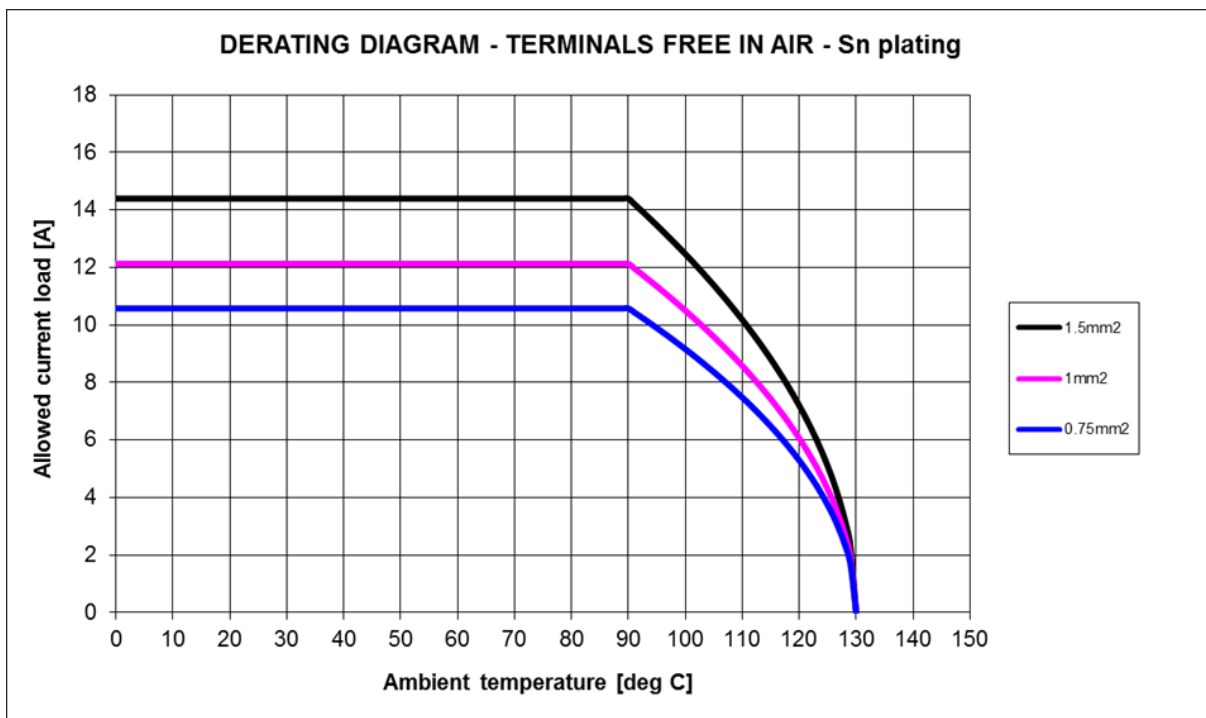
PN YMT 1.5: 7216-7860-02, 7216-7860-06, 7216-7860-08,

Surface: Sn, Ag und Au (Daten für Ag und Au überzogene Kontakte sind von Sn abgeleitet)

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (für Sn)

Messaufbau: Frei in Luft



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7.2 Derating curves FLR

7.2.1 Temperature rise diagram

PN YMT 1.5: 7216-7862-02, 7216-7862-06,
7216-7862-08, 7216-7863-02, 7216-7863-06,
7216-7863-08, 7216-7861-02,

Surface: Sn, Ag and Au

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

Measurement set up: Free in air

7.2 Derating-Kurven FLR

7.2.1 Temperaturanstieg Diagramm

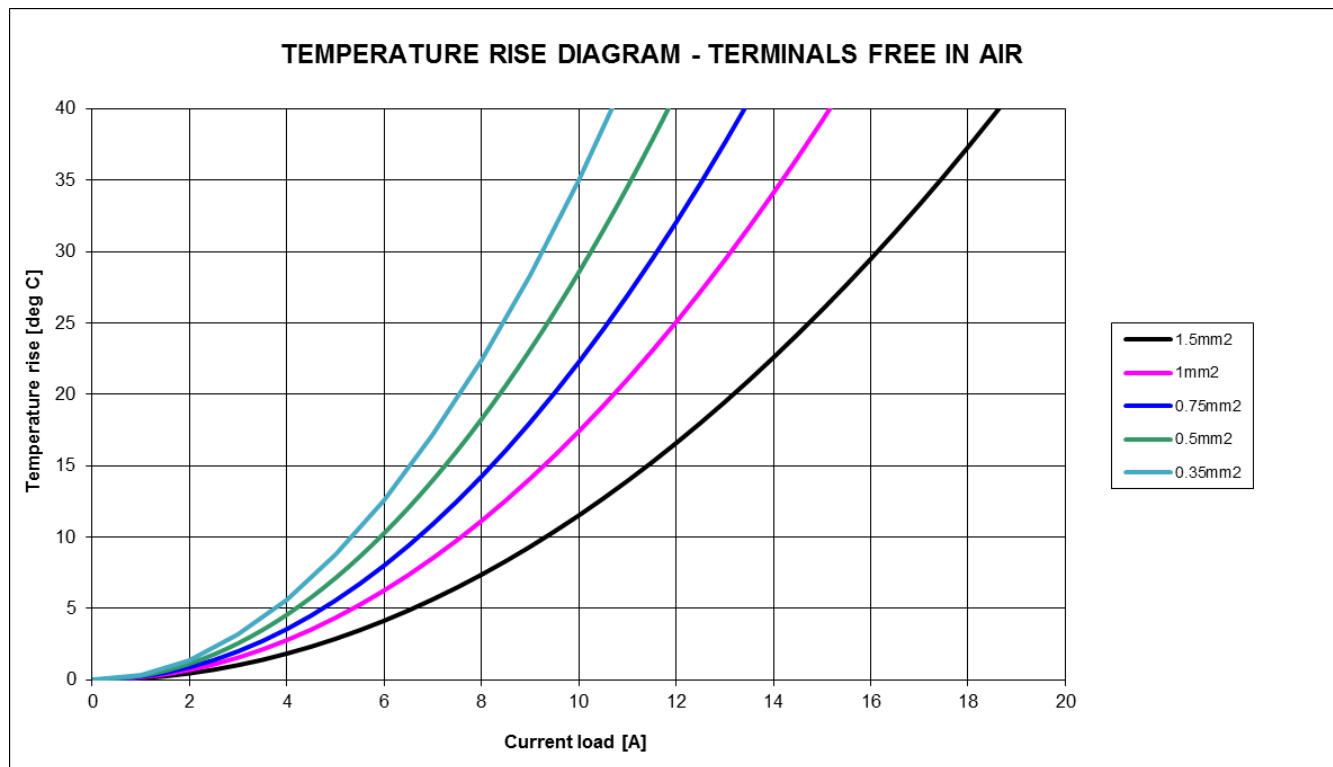
PN YMT 1.5: 7216-7862-02, 7216-7862-06,
7216-7862-08, 7216-7863-02, 7216-7863-06,
7216-7863-08, 7216-7861-02

Oberfläche: Sn, Ag und Au

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (für Sn)

Messaufbau: Frei in Luft



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7.2.2 Derating diagrams (Sn, Ag and Au)

PN YMT 1.5: 7216-7862-02, 7216-7862-06,
7216-7862-08, 7216-7863-02, 7216-7863-06,
7216-7863-08, 7216-7861-02

Surface: Sn, Ag and Au (data for Ag and Au
plated terminals derived from Sn)

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

Measurement set up: Free in air

7.2.2 Derating Diagramme (Sn, Ag und Au)

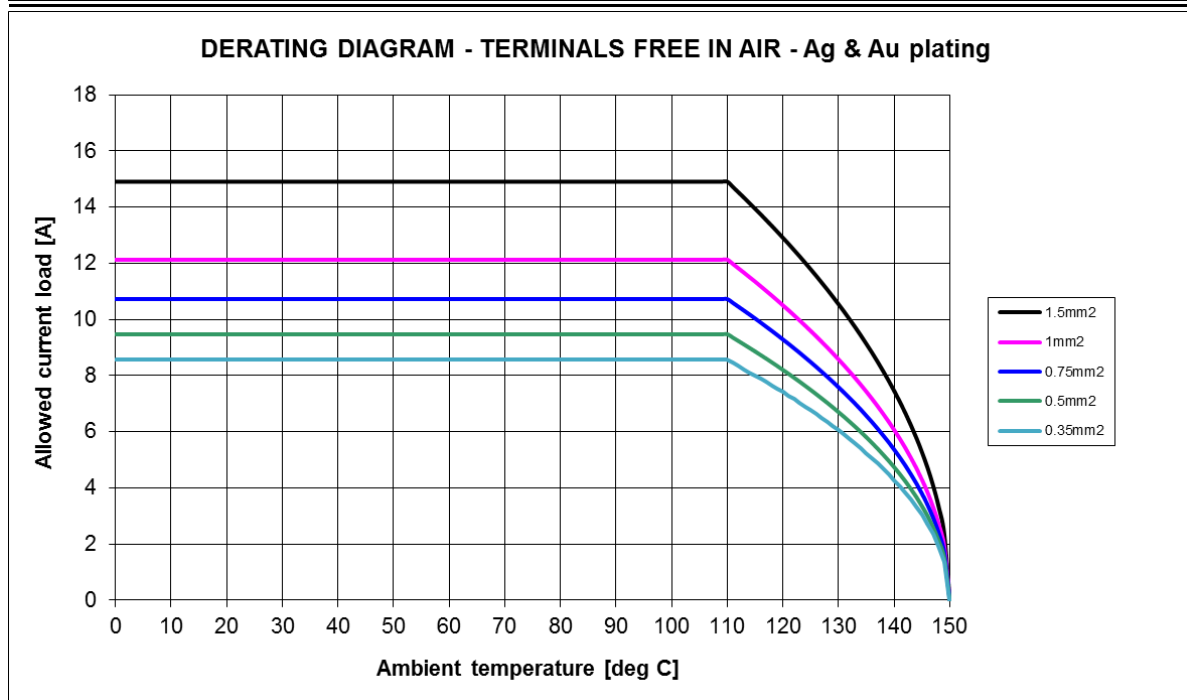
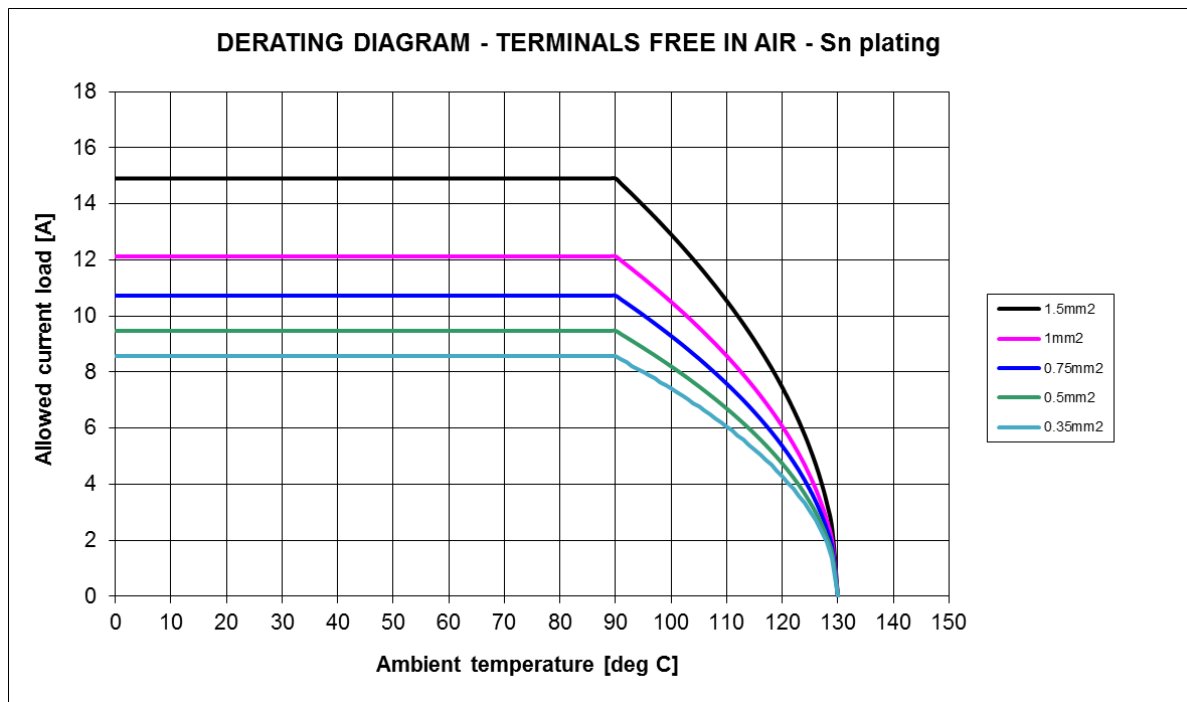
PN YMT 1.5: 7216-7862-02, 7216-7862-06,
7216-7862-08, 7216-7863-02, 7216-7863-06,
7216-7863-08, 7216-7861-02

Surface: Sn, Ag und Au (Daten für Ag und Au
überzogene Kontakte sind von Sn abgeleitet)

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (für Sn)

Messaufbau: Frei in Luft



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7.3 Derating curves ELA

7.3.1 Temperature rise diagram

PN YMT 1.5: 7216-7864-02, 7216-7864-06,
7216-7864-08, 7216-7865-02, 7216-7865-06,
7216-7865-08

Surface: Sn, Ag and Au

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

Measurement set up: Free in air

7.3 Derating-Kurven ELA

7.3.1 Temperaturanstieg Diagramm

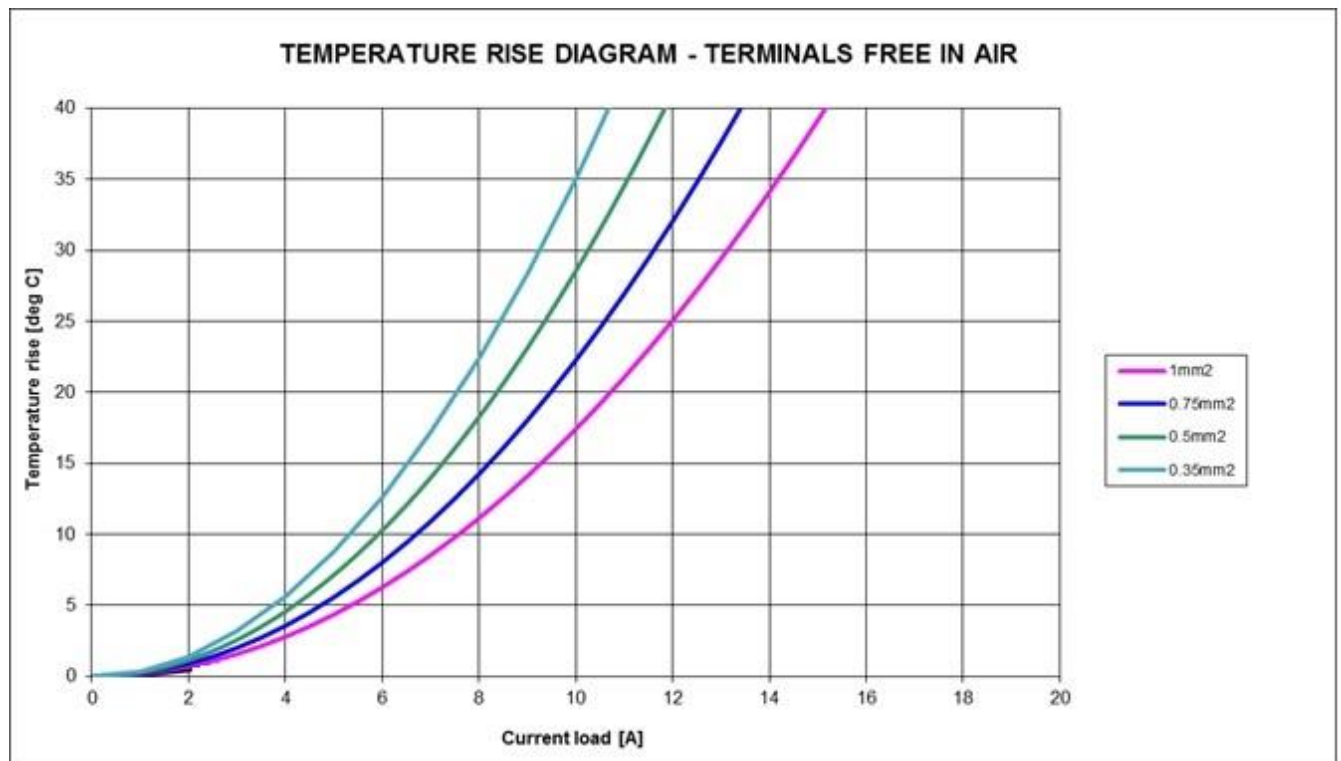
PN YMT 1.5: 7216-7864-02, 7216-7864-06,
7216-7864-08, 7216-7865-02, 7216-7865-06,
7216-7865-08

Oberfläche: Sn, Ag und Au

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (für Sn)

Messaufbau: Frei in Luft



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7.3.2 Derating diagrams (Sn, Ag and Au)

PN YMT 1.5: 7216-7864-02, 7216-7864-06,
7216-7864-08, 7216-7865-02, 7216-7865-06,
7216-7865-08

Surface: Sn, Ag and Au (data for Ag and Au
plated terminals derived from Sn)

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

Measurement set up: Free in air

7.3.2 Derating Diagramme (Sn, Ag und Au)

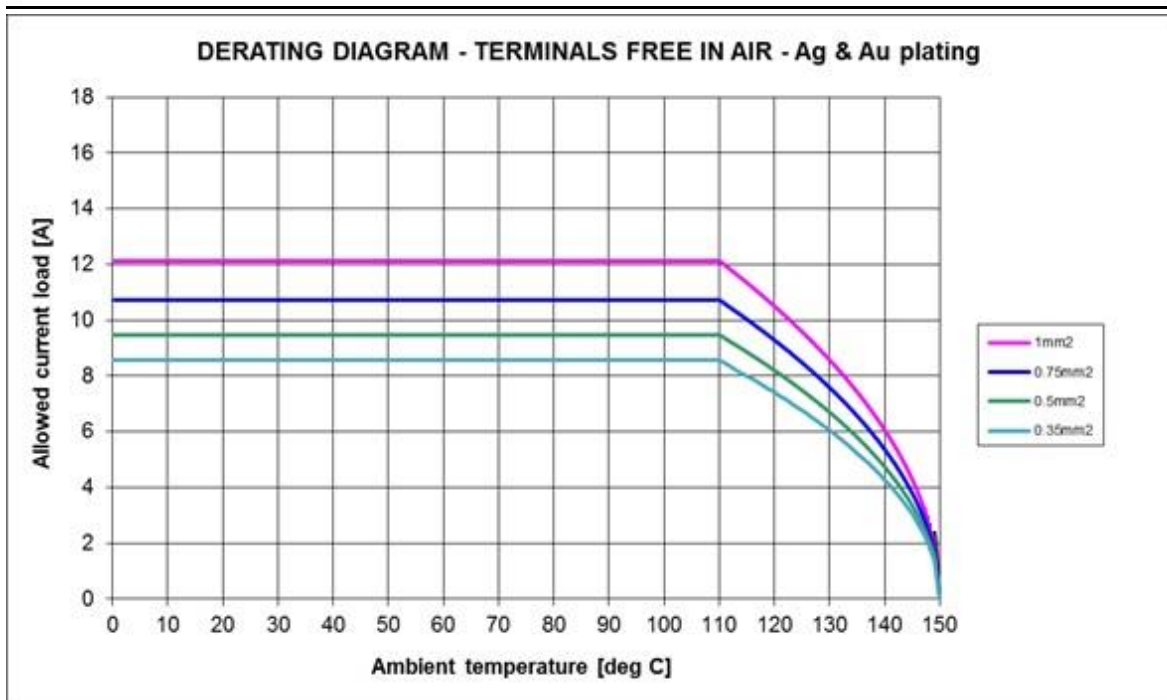
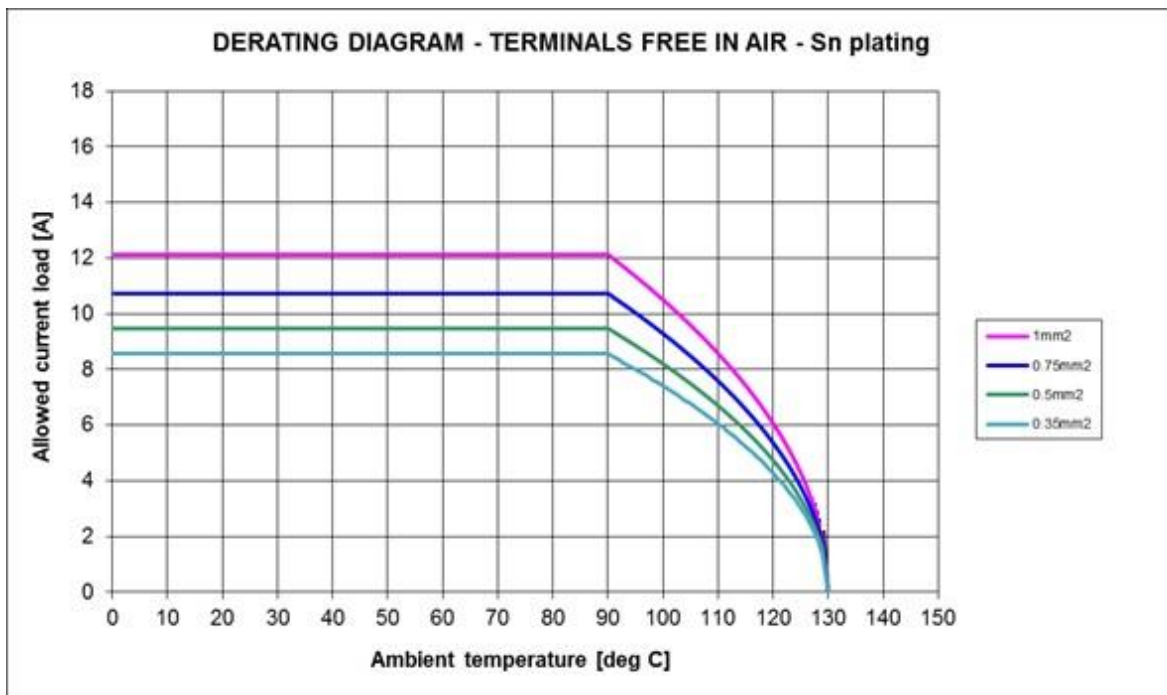
PN YMT 1.5: 7216-7864-02, 7216-7864-06,
7216-7864-08, 7216-7865-02, 7216-7865-06,
7216-7865-08

Surface: Sn, Ag und Au (Daten für Ag und Au
überzogene Kontakte sind von Sn abgeleitet)

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (für Sn)

Messaufbau: Frei in Luft



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8 Thermal time constant

8.1 Thermal time constant CB

8.1.1 Graph current over time

PN YMT 1.5: 7216-7860-02, 7216-7860-06, 7216-7860-08

Surface: Sn, Ag and Au

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

CuSn4 (for Ag and Au)

Wire cross section: 1.50 mm² for Sn

1.00 mm² for Ag and Au

Measurement set up: Free in air

8 Thermische Zeitkonstante

8.1 Thermische Zeitkonstante CB

8.1.1 Graph Stromstärke über Zeit

PN YMT 1.5: 7216-7860-02, 7216-7860-06, 7216-7860-08

Oberfläche: Sn, Ag und Au

Kontaktmaterial: CuNiSi

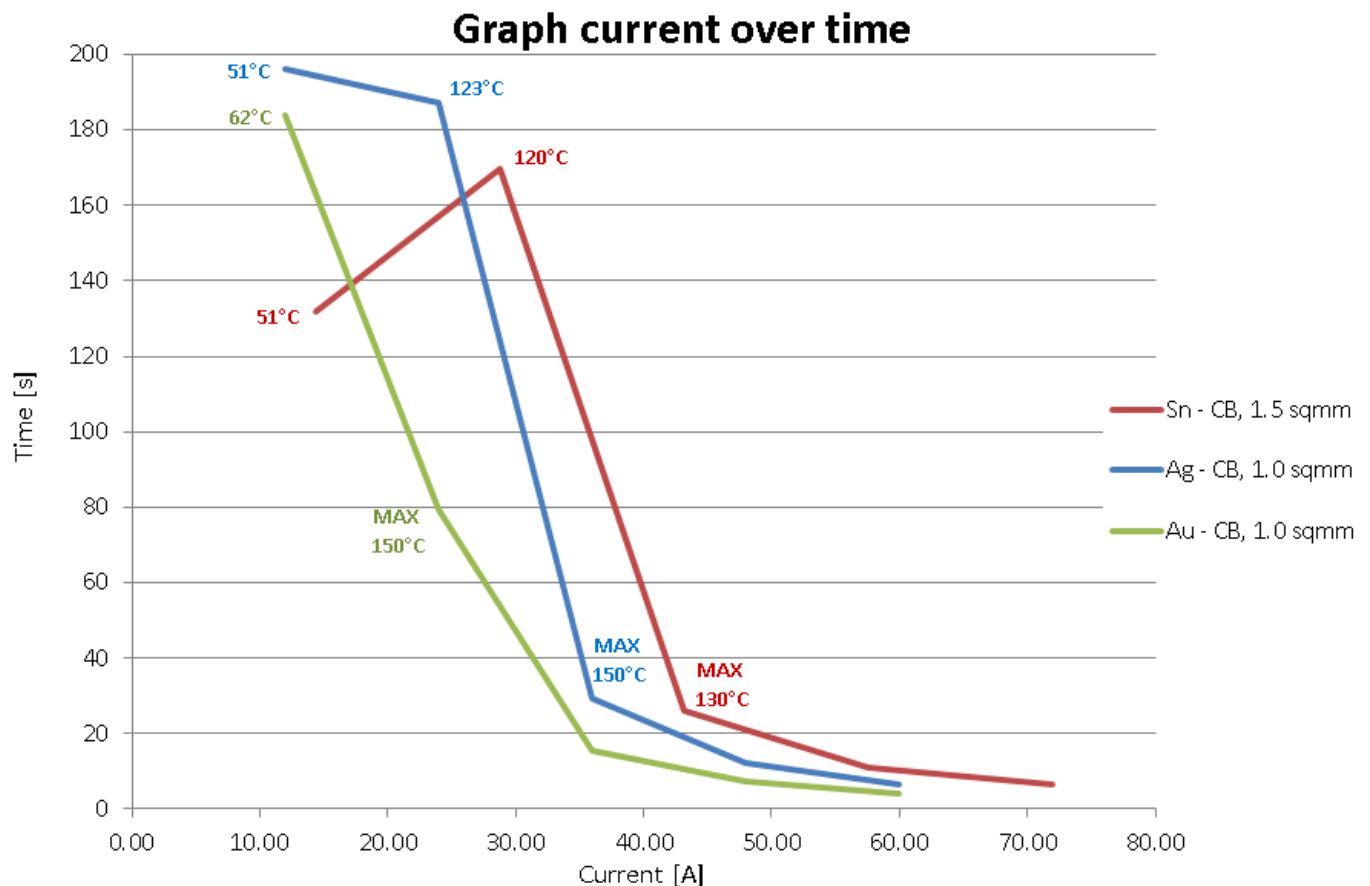
Tab Material: CuFe2P (for Sn)

CuSn4 (for Ag and Au)

Leiterquerschnitt: 1.50 mm² für Sn

1.00 mm² für Ag und Au

Messaufbau: Frei in Luft



8.2 Thermal time constant FLR

8.2.1 Graph current over time

PN YMT 1.5: 7216-7861-02, 7216-7863-06, 7216-7863-08

Surface: Sn, Ag and Au

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

CuSn4 (for Ag and Au)

Wire cross section: 1.50 mm² for Sn

1.00 mm² for Ag and Au

Measurement set up: Free in air

8.2 Thermische Zeitkonstante FLR

8.2.1 Graph Stromstärke über Zeit

PN YMT 1.5: 7216-7861-02, 7216-7863-06, 7216-7863-08

Oberfläche: Sn, Ag und Au

Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (for Sn)

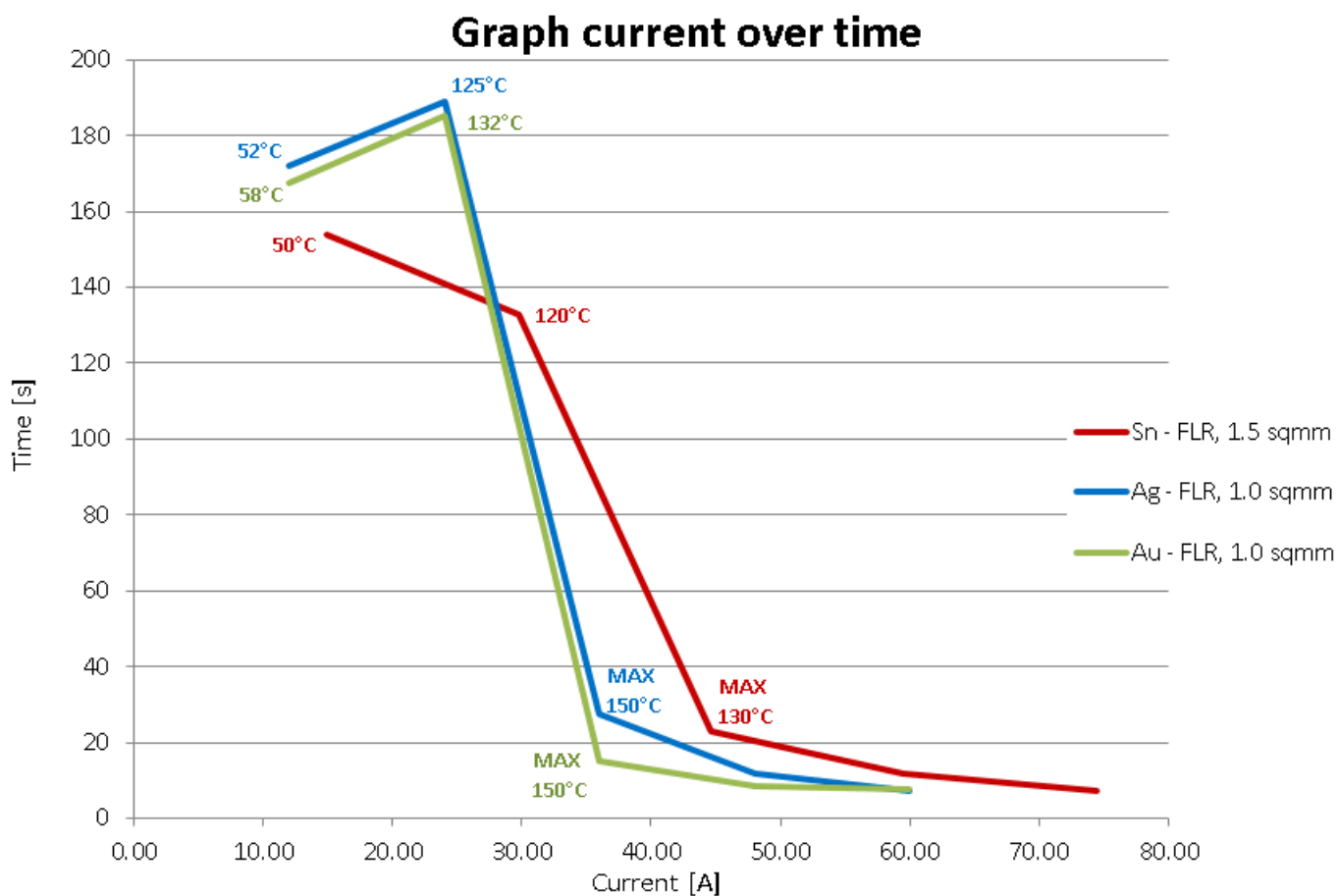
CuSn4 (for Ag and Au)

Leiterquerschnitt: 1.50 mm² für Sn

1.00 mm² für Ag und Au

Messaufbau: Frei in Luft

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8.3 Thermal time constant ELA

8.3.1 Graph current over time

PN YMT 1.5: 7216-7865-02, 7216-7865-06, 7216-7865-08

Surface: Sn, Ag and Au

Material of terminal: CuNiSi

Material of tab: CuFe2P (for Sn)

CuSn4 (for Ag and Au)

Wire cross section: 1.00 mm² for Sn, Ag and Au

Measurement set up: Free in air

8.3 Thermische Zeitkonstante ELA

8.3.1 Graph Stromstärke über Zeit

PN YMT 1.5: 7216-7865-02, 7216-7865-06, 7216-7865-08

Oberfläche: Sn, Ag und Au

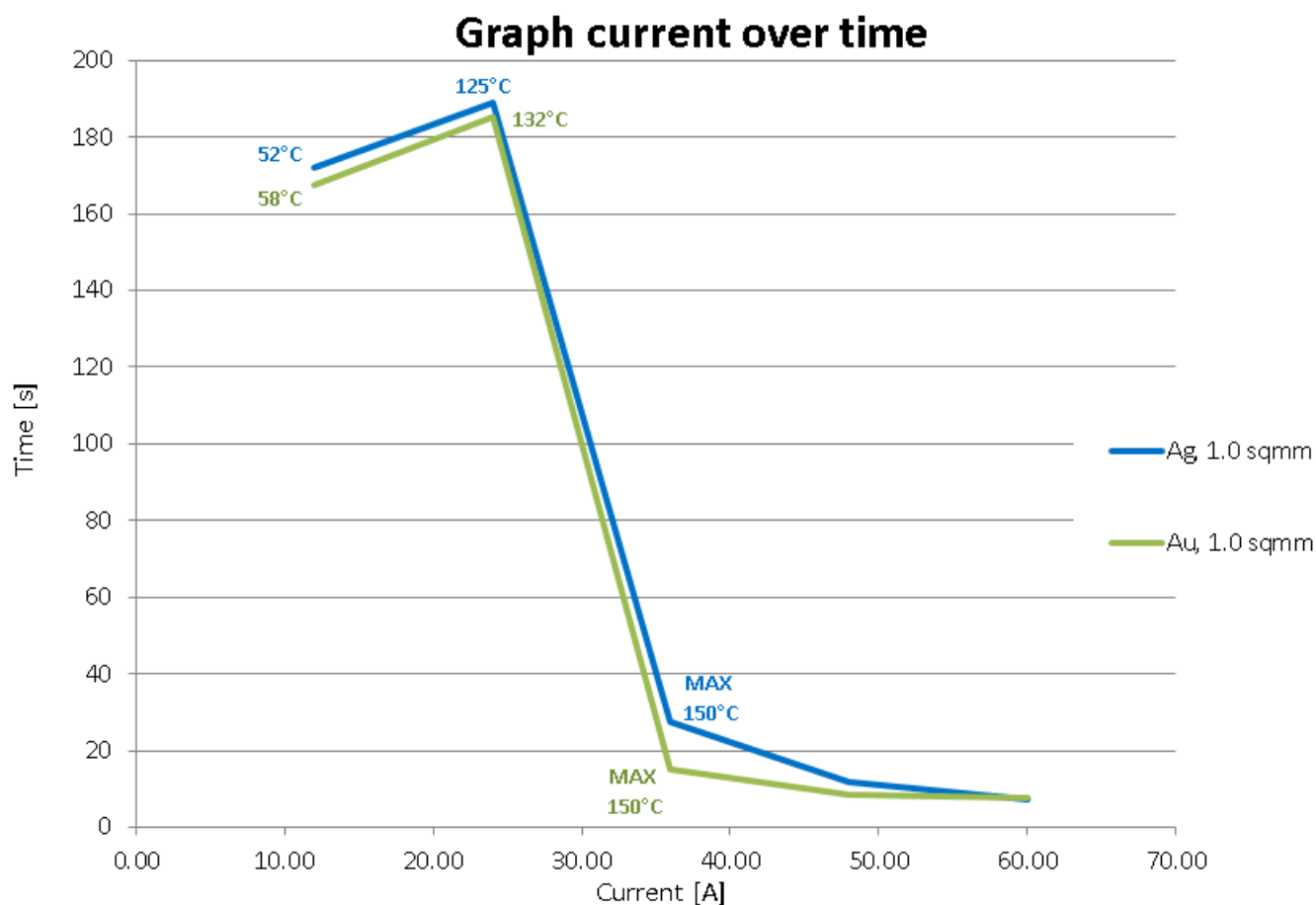
Kontaktmaterial: CuNiSi

Tab Material: CuFe2P (for Sn)

CuSn4 (for Ag and Au)

Leiterquerschnitt: 1.00 mm² für Sn, Ag und Au

Messaufbau: Frei in Luft



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PG 17 SEVERITY/ PG 17 SCHÄRFEGRAD					
Severity/ Schärfegrad	TC (temperature cycle)/ TW (Tempera tur- wechsel)	Random vibration with TC/ Rauschen mit TW		Sine wave with TC/ Sinus mit TW	No. of shocks/ Schockzahl
1) "Body" unsealed/ 1) „Karosserie“ ungedichtet	0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/105 °C 420 min/105 °C 480 min/20 °C	8 h per axis RMS value of acceleration 19,7 m/s²		No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6000
		Hz	(m/s²)²/Hz		
		10	10		
		55	3,25		
		180	0,125		
		300	0,125		
		360	0,07		
1 000	0,07				
2) "Body" sealed/ 2) „Karosserie“ gedichtet	0 min/20 °C 60 min/-40 °C 150 min/-40 °C 300 min/120 °C 420 min/120 °C 480 min/20 °C	20 h per axis RMS value of acceleration 27,8 m/s²		No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6000
		Hz	(m/s²)²/Hz		
		10	20		
		55	6,5		
		180	0,25		
		300	0,25		
		360	0,14		
1 000	0,14				
3) "Applications close to powertrain"/ 3) „Aggregate- nahe Anwendungen“	0 min/20 °C 60 min/-40 °C 90 min/-40 °C 240 min/120 °C 420 min/120 °C 480 min/20 °C	22 h per axis RMS value of acceleration 105,5 m/s²		22 h per axis	
		Hz	(m/s²)²/Hz	Hz	mm
		20	10	100	0,095
		95	10	Hz	m/s²
		110	0,01	200	150
		380	0,01		
		410	20		
800	10	221	100		
1 500	5	400	100		
4) "Engine mounted parts" Requirement B/ 4) „Motor- Anbauteile“ Anforderung B	0 min/20 °C 60 min/-40 °C 90 min/-40 °C 240 min/140 °C 420 min/140 °C 480 min/20 °C	22 h per axis RMS value of acceleration 181 m/s²		22 h per axis	
		Hz	(m/s²)²/Hz	Hz	m/s²
		10	10	100	100
		100	10	150	150
		300	0,51	200	200
		500	20	240	200
		2 000	20	255	150
		440	150		

	Group 1	Group 2	Group 3
Batch size	10	10	10
Insertions before the loads	1x	1x	Half the required number of insertion/ removal cycles
During load	Unplugged	Plugged	Plugged
Resistance measuring method	E 0.2	E 14.0	E 14.0

Table 4

Tabelle 4

11 Abbreviation

CB = Clean Body
ELA = "Einzeladerabdichtung" (English: Single wire seal)
FLR = "Fahrzeugleitung reduzierte Wanddicke" (English: Automotive thin wall wire)
FLU = "Fahrzeug Leitung mit ultra-reduzierte Wanddicke" (English: Automotiv Untra-thin wall wire)
SWS = Single Wire Seal
YMT = Yazaki Mechanical Lock Terminal

11 Abkürzung

CB = Clean Body, ist ein Kontakt ohne scharfe Kanten
ELA = Einzeladerabdichtung
FLR = Fahrzeugleitung Reduzierte Wanddicke
FLU = Fahrzeugleitung mit Ultra-reduzierte Wanddicke
SWS = Single Wire Seal (deutsch: Einzeladerabdichtung)
YMT = Yazaki Mechanical Lock Terminal

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