Connecting element
MC-SEALconTACT
MULTILAMTechnology | MULTILAM
Stäubli Electrical Connectors is a leading international manufacturer of high-quality electrical connector systems. We are part of the Stäubli Group which offers mechatronics solutions for electrical connectors, liquid and gas couplings, robots and textile machinery.

Stäubli develops, produces, sells and maintains products for markets with high productivity standards. As recognized specialists, our focus is always on solutions and customers. Many new developments got their start here and have begun to make their way around the world.

Businesses and customers count on our commitment and our active support when dealing with unusual problems. With us, you are entering into a long-term partnership built on reliability, dynamism, and exceptional quality in both products and services.
MULTILAM are specially formed and resilient contact elements. All Stäubli Electrical Connectors products benefit from the unique and outstanding performance of the MULTILAM Technology. Thanks to their constant spring pressure, MULTILAM louvers ensure continuous contact with the contact surface, resulting in a constantly low contact resistance. MULTILAM Technology allows to find solutions for connectors within the severest constraints and in certain products for up to 1 million mating cycles.

This makes the MULTILAM Technology the best choice for applications with demanding requirements:

- Reliable and longlife operation due to constantly high performance
- Safe operation under highest environmental demands on temperature, vibration and shock
- Suitable for data and signal contacts as well as high-current connectors
- Automated solutions with a high number of mating cycles

UNLIMITED POSSIBILITIES FOR CONTACT SOLUTIONS
MULTILAM Technology
MC-SEALconTACT

Sealed contact for high current connection of uncleaned busbars.

**KM SN**  
Contact module

**AM-L SN**  
Support module, long

**AM-K SN**  
Support module, short

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<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Description</th>
<th>Dimensions</th>
<th>Weight</th>
<th>MULTILAM</th>
<th>Compression force, min.</th>
<th>Continuous temperature</th>
<th>Rated current</th>
<th>Short-circuit current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>mm</td>
<td>g</td>
<td>kN</td>
<td>C°</td>
<td>A</td>
<td>kA</td>
<td>1s</td>
</tr>
<tr>
<td>71.1006</td>
<td>KM SN</td>
<td>Contact module ¹ ²</td>
<td>40 x 13.33 x 1.4</td>
<td>1.26</td>
<td>14 louvres</td>
<td>6</td>
<td>100</td>
<td>800</td>
<td>20</td>
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<tr>
<td>71.1007</td>
<td>AM-L SN</td>
<td>Support module, long ¹ ²</td>
<td>40 x 13.33 x 1.4</td>
<td>3.05</td>
<td>–</td>
<td>28</td>
<td>100</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>71.1008</td>
<td>AM-K SN</td>
<td>Support module, short ¹ ³</td>
<td>13.33 x 13.33 x 1.4</td>
<td>0.8</td>
<td>–</td>
<td>8</td>
<td>100</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

¹ tin plated  
² contact spacing  
³ plastic frame: polyamide

Assembly instructions MA015  
www.staubli.com/electrical
Applications
- For high current transmission with busbars and plates
- Contacting of unplated, unmachined busbars and plates
- Copper/copper, copper/aluminium (alloy), aluminium (alloy)/aluminium (alloy)
- Indoor and outdoor-installations
- In corrosive atmospheres (e.g. sulphur dioxide (SO2), salt laden air (NaCl))
- Suitable for bolted joints in busbars according to DIN
- Contact element is a modular design
- Static connection only

Features
- Energy-saving and maintenance free
- High-current transmission in hermetically sealed chambers
- No oxidation or corrosion in the chambers. Low loss over long-time use
- The contact will not worsen in an avalanche effect due to heating
- Bars do not need cleaning
- Plating not required
- The torsion spring louver of the MULTILAM permits the contact force as well as the electrical performance of the busbar joint to remain constant even when the compression force drops to 50% of its initial value
- Economics of the installation: low resistance factor over a long period of time (stable long-term behaviour), minimum energy loses
- Busbar joints do not need any servicing
- High operating reliability
- Substantially prolonged service life
- Easy do-it-yourself assembly

Notice:
In a corrosive atmosphere and with combinations of different materials, in order to prevent corrosion potential differences should not exceed 350 mV. Silver-tin and silver-aluminium combinations should be avoided in a corrosive atmosphere. Also see Technical Report IEC 60943:1998-01.
MC-SEALconTACT are suitable for unplated or plated connections Cu/Cu, Cu/Al alloys or Al alloys/Al alloys (e.g. AlMgSi0.5, EN-AW6060).
The busbar material and application should be stated in any inquiries or orders for MC-SEALconTACT.

Attention:
MC-SEALconTACT must not be used in connections with Cu/pure aluminium or pure aluminium/pure aluminium (e.g. with E-Al99.5, EN-AW1350) with or without electroplating. The contact resistance of a connection with MC-SEALconTACT can rise rapidly, resulting in marked heat generation.
Fundamental principles

Flat contact surfaces e.g. two overlapping busbar connections do not ensure a reliable current transmission due to the fact that there are very few defined contact points over the surface. These few points heat up at high current. The higher temperature accelerates the oxidation, which in turn impairs the contact points until a contact failure occurs. Both the electrical and mechanical requirements have to be considered when making busbar connections.

MC-SEALconTACT guarantees an optimal current transmission with low, and stable contact resistance.

MC-SEALconTACT and the Resistance factor

Bolted busbar joints with MC-SEALconTACT provide economical power transmission. A resistance factor \( k_u = 1 \), means that the power loss in the joint is no higher than in an equally long section of busbar (see illustration).

\[
\text{Resistance factor } \quad k_u = \frac{R_v}{R_{sch}}
\]

\( k_u = 1 \) is an excellent joint technically, and therefore economically as well. Joints without MC-SEALconTACT suffer an increasing resistance factor after only a few months. Those made up with MC-SEALconTACT display a constant resistance factor for many years (depending on the application). See diagram page 7.

The grooved supporting modules bring the MULTILAM to the optimum deflection height and protect them from destruction. At least 2 supporting modules must be used. The exact number of supporting modules depends on the application. In the event of space problems an appropriate slot can be used.
Long-term resistance factor $k_u(t)$

Application examples

<table>
<thead>
<tr>
<th>Standard MC-SEALconTACT 40 mm × 40 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque with lubricated bolts</td>
</tr>
<tr>
<td>Thread diameter</td>
</tr>
<tr>
<td>Maximum clamping length for screws of property class 8.8 or more</td>
</tr>
</tbody>
</table>

Busbars DIN 43673-6-160-13,5

If possible design the busbars and plates to suit the standard MC-SEALconTACT elements.
**Notice 1**
With existing configurations not initially designed for the standard MC-SEALconTACT, the

- Tightening torque
- Thread diameter
- Bolt length
- Bolt spacings

are to be defined according to the compression force of the contact and support

**Notice 2**
1. The relevant DIN or other national standards should be referred to, in particular the current loading of the busbars.
2. The assembly instructions are to be observed.

**Customer:**
ABB, Semiconductors, Switzerland

**Application:**
Outdoor permanent contact (AlCu) to a reactance coil.

**Fundamental principles**
Technical Papers on MC-SEALconTACT, 1995:

Long-term Behaviour of Bare, Bolted Busbar Joints with and without the Contact Element, MC-SEALconTACT. Use of the contact element, MC-SEALconTACT, reduces electrical losses, prolongs service life and enhances the reliability of the entire installation.

Test arrangement
- AlCu connections, uncleaned, cleaned
- Al, 40 mm × 10 mm
- E Al Mg Si 041, bare, DIN 1725
- Cu, 40 mm × 10 mm, Cu ETP, bare, DIN 1787

Tests
- Long-term testing
  - indoors
  - outdoors
- Ageing tests (Accelerated time tests)
  - Relaxation of bolt force
  - Temperature shock
  - Salt mist

Conduct of tests
- Technical University Dresden
  - Department of High Voltage and High Current Engineering
- Fachhochschule für Technik und Wirtschaft Berlin
  - Department of Electrical Engineering / Cable and Connection Technology

Test results

Long-term testing
- Indoors
  - $I = 800 \, A$, $T_v = 90 \, ^{\circ}C$
  - Duration $t = 19,787$ hours (approx. 27 months)

![Graph showing resistance factor $k_u$ over time $t$.](image)
Outdoors

$I = 535 \, A; \Delta T_v = 10 \, K$

Duration $t = 21,530$ hours (approx. 29 months)

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**Ageing tests (Accelerated time tests)**

**Relaxation of bolt force**

Duration $t = 1,000$ hours

Ambient temperature; Average value from 4 test samples
**Temperature shock**

Temperature range +180 °C...–40 °C, 200 cycles
1 cycle: 30 min. +180 °C, 30 min. –40 °C
Average value from 10 test samples

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**Salt mist**

IEC 68, Part 2 – 52
Degree of corrosiveness 2, 30 cycles
1 cycle: 24 hours
Average value from 10 test samples
Global presence of the Stäubli Group

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