

BUSBARS & ISOLATIONS



BUSBARS

MATERIAL

Copper/aluminum and aluminum alloys

SURFACE

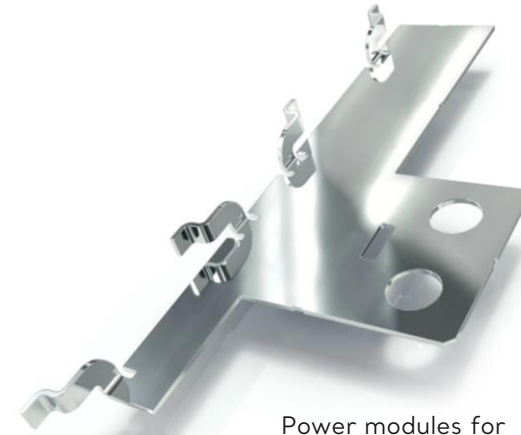
- Coatings selective/all sides Ni; Sn; Ag
- Coating thickness <math>< 10 \mu\text{m}</math>
- Strip electroplating up to 2mm thickness and 180mm width
- Rack electroplating up to 400mm busbar length

TECHNOLOGIE

- Thicknesses up to 5mm
- Belt width up to 320mm

ADVANTAGES

- Copper alloys for the best current conductivity
- Individual insulation for space-saving insulation possible for almost any application



Power modules for renewable energies such as wind power and solar energy.



E-booster for Porsche Taycan



BUSBARS WITH FOIL INSULATION

INTERLAYER FILM NOT ADHESIVE

The insulation between the conductive busbars is achieved by inserting a stable interlayer foil.

- + Simple application
- + Non-adhesive film
- + Very scalable
- + Compact/slim design

FOIL-BONDED SINGLE-/DOUBLE-SIDED ADHESIVE

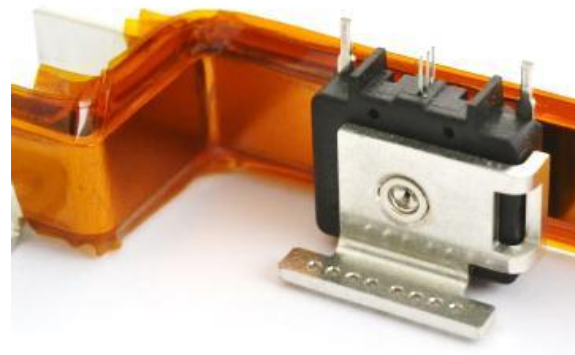
Sheathed laminated busbars - butt-glued, connected with adhesive film on both sides to form a uniform structure/assembly.

- + All-round insulation protection provided
- + Compact/slim design

FILM BONDED ON ONE/TWO SIDES HEAT-ACTIVATED ADHESIVE

Sheathed laminated busbars - impact-bonded under pressure and temperature, bonded with adhesive film on both sides to form a uniform structure/assembly.

- + All-round insulation protection provided
- + Compact/slim design
- + scalable





INSULATED BUSBARS WITH 3D-CLIP

USE

Insulated busbars with 3D-printed clips are used in various industries.

These include electronics, the automotive industry, new energy such as e-mobility, photovoltaics and many more.

AREA OF APPLICATION

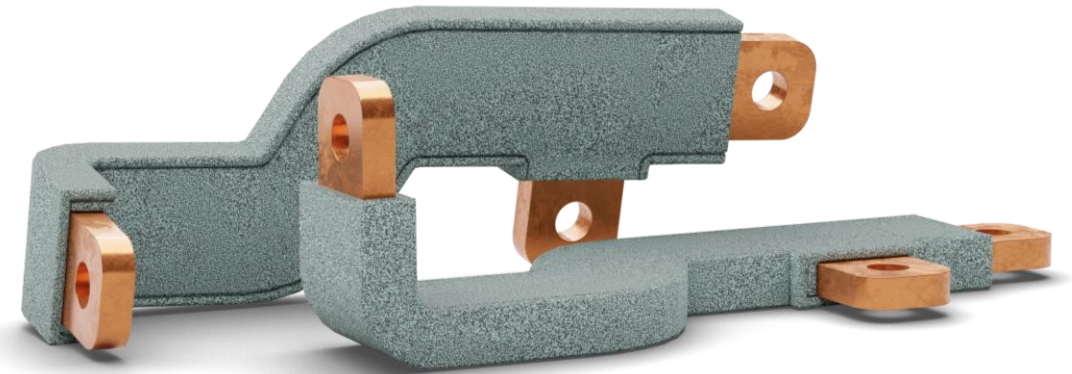
- Can be used well for initial functional samples or small series due to fast prototype development
- Suitable for complex geometries

MATERIAL

- 3D printing material: PA12
- Temperature resistance: 130 °C
- Materials with flame protection can be used

ADVANTAGES

- Fully automatic placement of insulation clips possible
- High degree of flexibility
- Consistent insulation thickness in structures with multiple components
- Additional support/holding structure can be implemented



FURTHER INSULATION OPTIONS



POWDER COATING

The insulation/powder coating is applied to the conductor rails in the frame using an electrostatic spraying process and annealed.

- + All-round insulation protection provided
- + Approval for electrical insulation of the epoxy powder in accordance with UL746 B; UL 1446 or E35075
- + Can be used up to 130°C

IMMERSION INSULATION

The PVC molecules dissolved in the PVC dipping paste are gradually deposited on the hot surface of the parts to be coated.

- + All-round insulation protection provided
- + Suitable for complex geometries
- + Well scalable



Coated busbars in blister packaging



FLEXIBLE BUSBARS

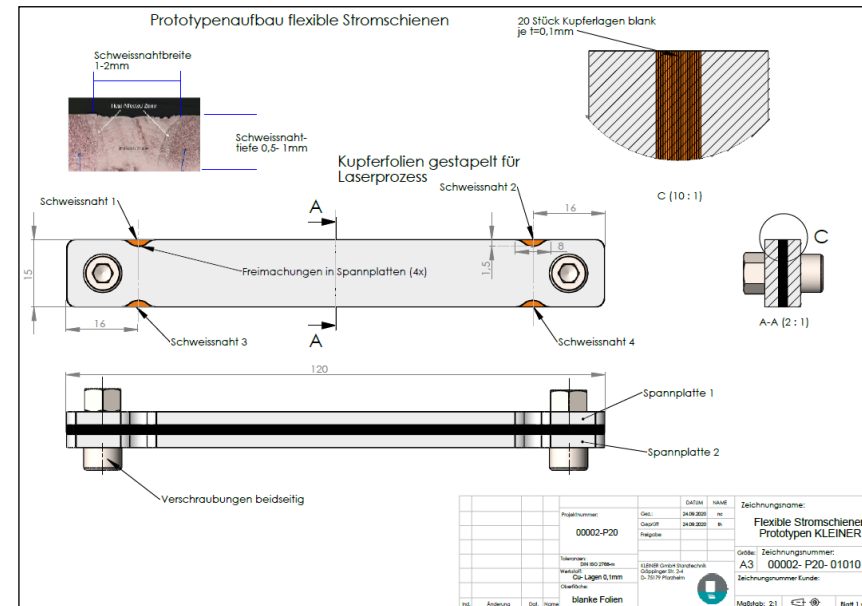
If there is a lot of vibration during the transmission of electrical current, as is the case in electromobility, a high degree of mechanical flexibility is required. This is where the use of highly flexible busbars pays off. These consist of several individually stacked copper laminations with a thickness of 0.1 to 0.5 mm.

KLEINER supports you in product development and offers you customized solutions for optimum power transmission.



WE IMPLEMENT YOUR REQUIREMENTS IN ALL PROCESS STEPS OF DEVELOPMENT AND PRODUCTION:

- ▶ Prototype development
- ▶ Punching of copper foils
- ▶ Stacking the copper foils
- ▶ One-sided fastening
- ▶ Moving the bends
- ▶ Pruning
- ▶ Fasten the remaining side





ASSEMBLY PRODUCTION

Cleaning, mechanical assembly and fully automatic film bonding of stamped parts are firmly established series processes for us. Plastic or silicone parts are integrated and delivered as fully tested assemblies.

MATERIAL

- CU-materials
- Aluminum

COATING

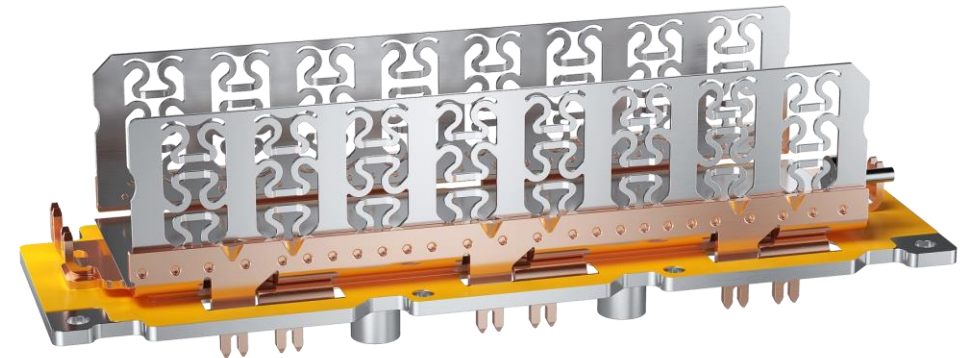
- Various foils
- Tinned

USE

Inverter module for holding the DC link capacitor

ADVANTAGES

- Foil insulation with thermal conduction
- Stacks for connection to condenser
- Semi-automatic assembly of the complete module with foil laminate and electrical testing, HV and PD testing



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