



# COMPONENTS FOR SUPERCONDUCTOR APPLICATIONS

YOUR WAY TO INNOVATIVE TECHNOLOGY

PIONEERS IN  
ELECTRIC POWER

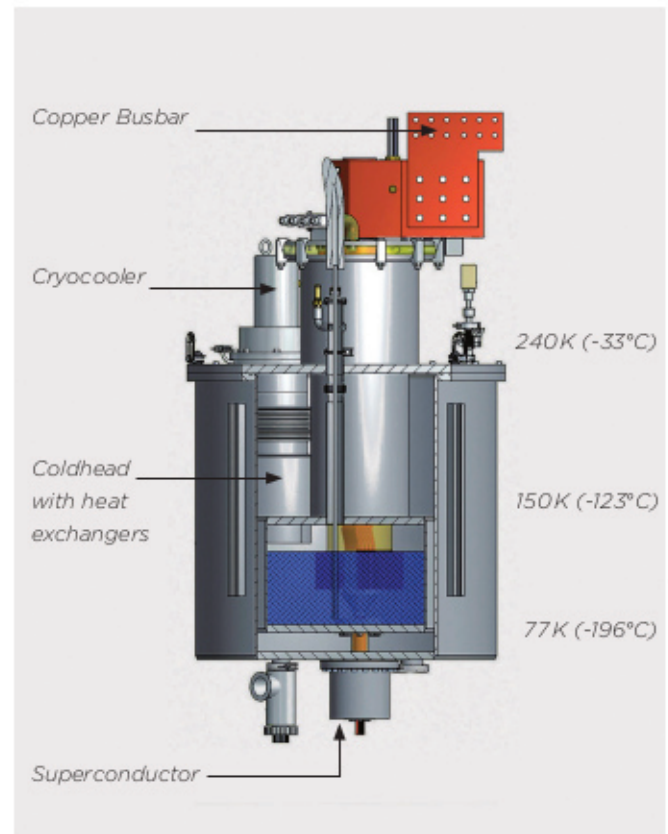
**VISION<sup>®</sup> ELECTRIC**  
Super Conductors



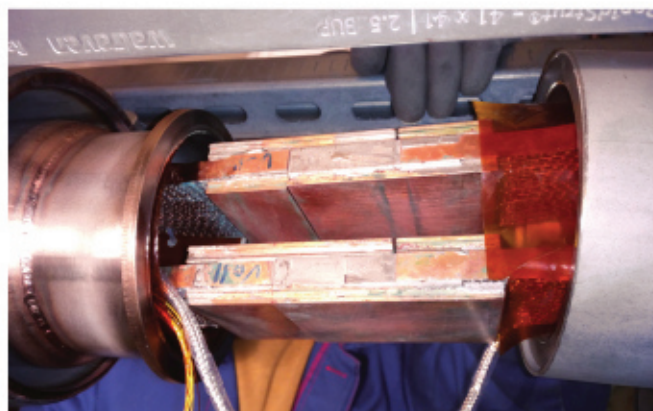
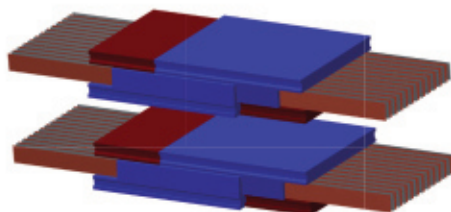
## ICE®LINK CURRENT LEAD

Current leads connect superconducting systems to the normal conducting power grid. They are an essential component of all superconductor applications. Current leads routinely bridge temperature gaps in the order of 300°C. Their design substantially affects both capital expenditure and operating cost of superconductor systems. Modular design, ready to connect SC-cables or SC-Busbars, with optimized adapted conductor cross section.

- More than 10 kA construction: 3-step cooling with cooling water (10°C), conventional refrigerant (-35°C) and cryocooler (approx - 200 C / 70-77 K)
- More than 20 kA construction: 3-step cooling with cooling water (10°C), conventional refrigerant (-35°C), special refrigerant (-140°C) and cryocooler (approx - 200 C / 70-77 K)
- Optimized for part load
- Minimizes the thermal input at part-load or zero-load
- Saves up to 45% of the electrical power demand for cooling
- Ideally suitable for recurring cases of part-load or zero load, e.g. photovoltaics or wind power applications.



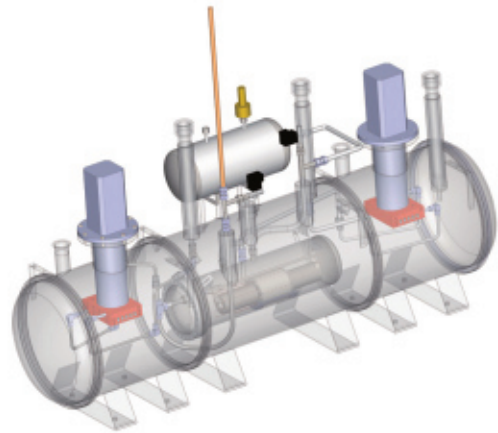
## SUPERCONDUCTOR TAPE CONNECTION



- Standard solution for almost zero resistance and smooth connection to SC-tapes
- Based on connecting parts made of highly conductive copper
- Optimizes power distribution among parallel single tapes
- Careful industrial manufacturing of connections under workshop conditions
- Robust handling during connection work onsite or in labs
- Fast and safe connection of multiple conductors, e.g. 20 kA in 2 hours
- Temperature controlled and automated demountable solder equipment

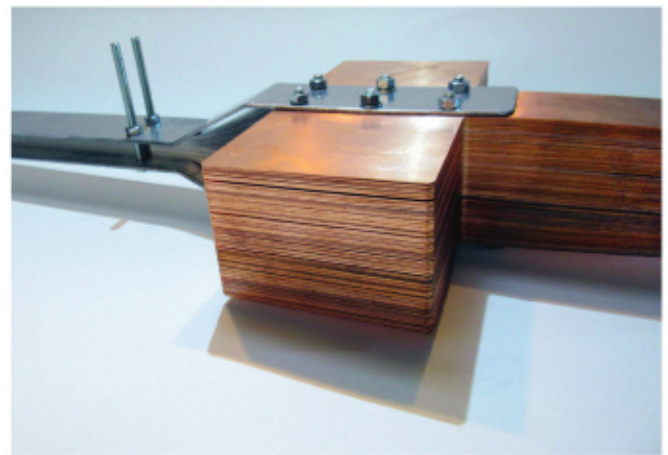
## COLDBOX

- Suitable for building a closed cryocooling circuit with subcooled liquid nitrogen
- Combines pump circuit with cryocooler subcooling
- Displacement pump integrated in cryogenic circuit
- Monitoring and control of temperature, pressure, etc.



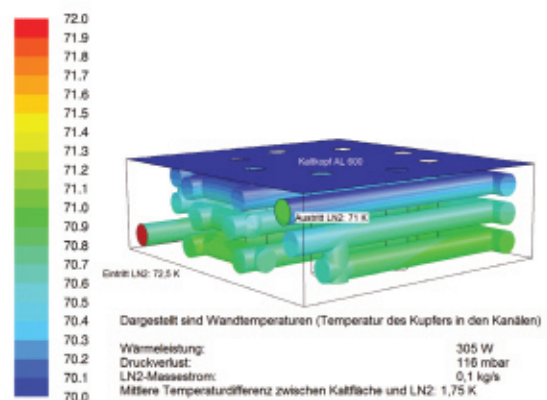
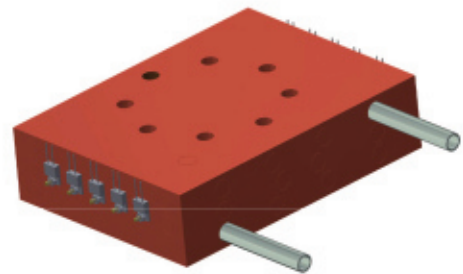
## INTERFACE SUPERCONDUCTOR TO COPPER

- Based on copper lamellas for defined current distribution
- Pressure welded massive connection to warm side
- Integrated contraction compensation during cooling
- Manufactured of high conductive copper
- Tin pest free solder connection between Superconductor and copper tape
- Lowest temperature differences at the transition point between copper and superconductor tape
- Large freedom in design of heat transfer to cryocooling



## HEAT EXCHANGER

- Manufactured of high conductive copper
- Adapted for closed cooling circuit
- For coldhead connection
- Connections with 12x1 mm VA-Pipe, hard soldered with cold resistive solder
- Manufacturing possible with 3D print or conventional method
- Integrated counter heaters and temperature monitoring
- Design optimization with 3D flow simulation technical data according to requirements, e.g.:
  - 300 Watt cooling power at < 2 Kelvin temperature difference
  - Pressure drop: 120 mbar at 0,125 l per second rate flow
- Design options available for:
  - Different cold heads
  - Higher or lower pressure losses
  - Higher or lower cooling power
  - Higher or lower temperature difference





## SERVICE – KNOW HOW FOR YOUR PROJECT

**We deliver the following services for all high current, high power and superconductor systems**

- Basic engineering and feasibility studies
- Design engineering and layout
- Detail engineering and mathematical models
- Thermodynamic and temperature models
- Cross section optimization and thermal load calculation
- Definition of materials and equipment
- Stress analysis and force calculation
- Installation and operation manuals creation
- Risk analysis, risk assessment and remedy measures
- Quality inspection
- Tender specifications
- Maintenance and operation supervision



## SUPERCONDUCTORS DON'T WASTE ENERGY

Below their critical temperature superconductors carry very high currents without electrical losses.

This property allows the design and construction of highly efficient, ultra compact and lightweight energy transmission systems.

Comparing an entire conventional busbar system with a superconductor system, up to 90 % of the energy can be saved.

## ABOUT VISION ELECTRIC SUPERCONDUCTORS

We are pioneers in the field of efficient power transmission. We are curious, brave and sustainable.

VISION ELECTRIC SUPER CONDUCTORS is the avantgarde in the development of industrial applications based on superconductor technology. Our core competence is the loss-free and safe transport of high currents.

We take care of your whole project: starting from the design and construction to the commissioning and maintenance, we deliver turnkey solutions.

We have decades of experience in the field of plant engineering. We deliver best quality – made in Germany.