BARTH
GMBH E-MOTOREN & TRAFOS

On board worldwide

Resistors for transportation systems

GINO ESE

History

In **1977**, after the founding of **Gielen + Nothnagel GmbH** by acquisition of the electro-technical plant **Wiemann GmbH** exclusively active in the manufacture of cast steel resistors and crane cabins, the portfolio was soon extended to applications in other areas of industry. The mid-80s saw the beginning of a cooperation with former state-owned East German **Elektroschaltgeräte Eisenach ESE**.

Gino took over the sales activities for the steel grid resistors produced by ESE. It was therefore a natural move to acquire ESE from Treuhandgesellschaft after the German reunification.

Already back in the 80s, the company manufactured resistors for transportation systems. Major projects followed from the mid-90s. When Siemens AG decided to sell off its business unit PU IB (Industry and Railroad) in 1999, GINO GmbH took over the manufacture and sales of all resistor products: cast iron resistors, oil-cooled starters, motor starters, neutral point grounding resistors and, last but not least, resistors for transportation systems.

Resistors for transportation systems

The 6GN1 technology used by GINO so far is based on individual embossed and gilled strip elements connected in series by spot welding and mounted with ceramic insulators on support brackets. The support brackets are in addition also insulated. This technology allows for a high performance density and is particularly advantageous for fan-cooled resistors.

With the acquisition of the 3PQ4 technology developed and patented by Siemens, GINO added another high-performance insulating system to its product portfolio. This system in addition also affords an extension of the operating range to temperatures above 600 °C to the maximum thermal strength of the resistor material and the limits resulting from the geometric structure.

Even if this range is not fully utilized, it nevertheless offers additional overload protection.

The demands on resistors in transportation systems are becoming more stringent as the speeds increase together with the safety requirements for the vehicles. Vehicle manufacturers need competent partners already when designing their systems.

Braking resistors, general

Information on braking resistors:

Based on the requirements of the transportation system in question, the system designer will specify the parameters for the braking resistor. With these parameters, the manufacturer plans the unit and prepares a proposal. The proposal is always a compromise between price and performance.

Evaluation criteria:

Resistor material:

Nickel chromium alloys are corrosion-proof and characterized by high temperature strength. The iron concentration determines the change in resistance under the impact of heat. The higher the iron content, the higher the resistance change. Aluminum chromium iron alloys can be magnetized and cause serious noise emissions in chopper-type resistors.

Resistor mass:

The active mass determines the storage and overload capacities of a resistor.

Resistor surface:

The active surface is decisive for the heat transfer and thus for continuous operation under load.

Insulation:

Ceramic insulation in the heat zone is creepage-proof and non-aging.

Housing:

Stainless steel offers lifetime corrosion resistance and is preferable over galvanized or paint-coated sheet.

Underfloor resistors

Underfloor resistor with convection cooling for installation under a subway / underground train, 3PQ4 design, stainless steel housing, bolted and jointed

Underfloor resistor
with convection cooling
for installation under a subway / underground train in 3PQ4 design

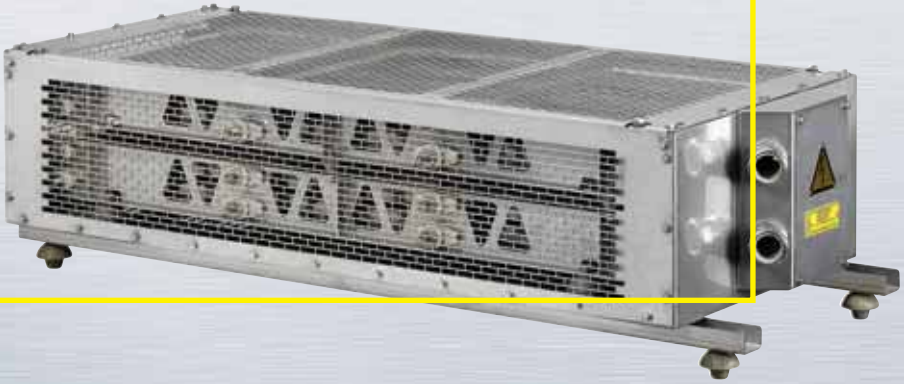
Underfloor resistor
with forced ventilation
by high-performance axial fan for mounting under a subway / underground train in 6GN1 design, stainless steel housing, bolted and jointed

Underfloor resistor
with forced ventilation
by high-performance axial fan for mounting under a subway / underground train in 6 GN1 design, stainless steel housing, bolted and jointed. Special feature: air inlet and outlet deflected by 90°.

Rooftop resistors

Rooftop resistor
Designed for direct mounting on the vehicle roof, in 3PQ4 design, stainless steel housing, bolted and jointed

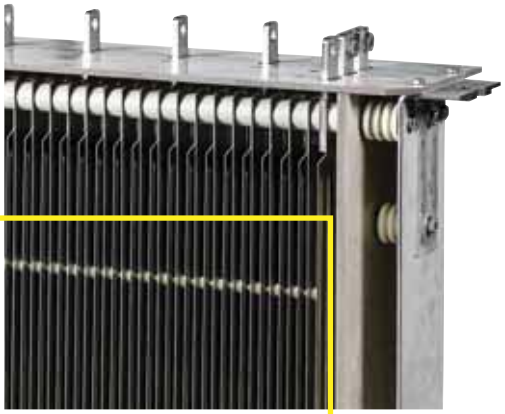
Rooftop resistor
Designed for mounting on the roof of a trolley bus in 3PQ4 design, stainless steel housing, bolted and jointed. Special feature: triple insulation

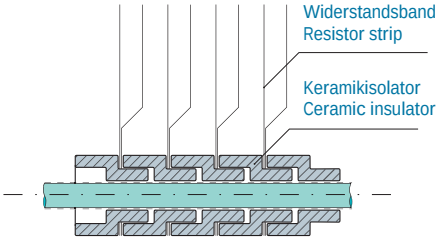


Systems

6GN1 technology:

Embossed and gilled strip elements connected in series by spot welding are mounted with ceramic insulators on support brackets provided with additional insulation. Admissible strip temperatures: up to 600°C.

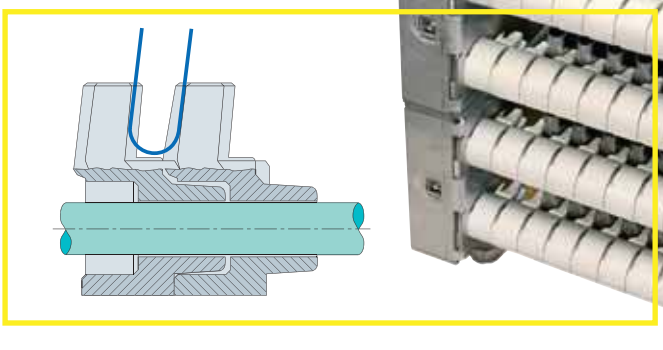




Patent application

3PQ4 technology:

Continuously folded strips mounted between ceramic insulators on support brackets. Due to the high air and creepage distance no additional insulation in the strip zone is required. Admissible strip temperatures: up to 850°C. Non-wear and low-maintenance.



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