

Press Release

High performance and compact design - power resistors on steel for intelligent drive systems

Korb, Germany 2007-08-29

Power resistors on steel in thick film technology – high performance and compact design – suited for intelligent drive and control systems

Since several years high quality power resistors of Metallux AG have been implemented into intelligent drive systems of Demag Cranes & Components GmbH. Solely "made in Germany" produced thick film power resistors have a high performance in spite of their compact design making them competitive compared to conventional power wire resistors. Flat design and a substrate thickness with a maximum of 1 mm, an optimized allocation as well as marginal thermal resistance mark these power resistors. They are specially designed for applications in drive and control systems. For Demag Cranes & Components those Metallux resistors are important components of Demag DCS continuously variable chain hoist with a loading up to 2.500 kg.

Assembly and operating mode of thick film power resistors on steel

By relating resistance value, voltage and electricity a defined electrical energy is being coined into the resistor material and altered into heat. In thick film power resistors we have a 20 to 25µm thick film composed of different metallic components such as binders and ceramics. On the substrate of the stainless steel the isolation layers, a contact film and the resistance film are being applied. In order to protect the resistor from environmental impact it is finally covered by a glass coat. Low heat transmission resistors allow ideal thermal conduction and disburden therefore the resistor film. The component system of different materials is based on consorting coefficients of expansion. The heat is primarily absorbed by the stainless steel substrate while at the surface already a heat change with the surrounding medium – normally air - is taking place. At a sole operation with air as surrounding medium the steady state of the system (input of electrical energy = output of emitted heat energy) is rapidly being achieved. The thermal budget is optimized for the benefit of the energy input if the substrate is applied on the heat sink.

Power resistors in thick film technology are advantageous compared to power wire resistors because of a low inductivity and a compact, space saving design. Using steel - an ideal heat conductor- as base substrate, a high mechanical stability is being ensured.

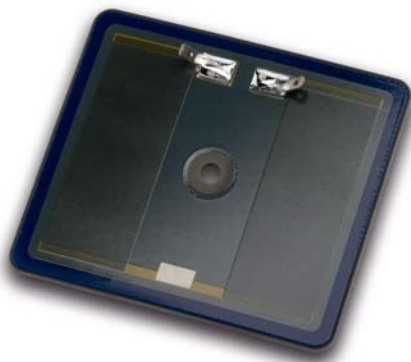
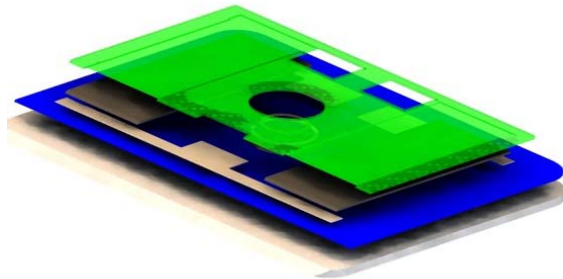


Photo 1: Metallux-PLR

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← Layout power layer resistor PLR

- glass coating
- resistor material
- isolation layer
- contact film
- steel substrate

Photo 2: Metallux PLR-layer composition

Demag Cranes & Components

In addition to chain hoists with two speed levels, generated as DC-Pro by a dual-speed hoist motor, Demag Cranes & Components also provides continuously variable DCS-Pro types. The mechanical assembly of both chain hoist series is nearly identical. Compared to the dual-speed type, which is equipped with a contractor control the continuously variable chain hoist DCS-Pro is run by an integrated frequency converter.

Special characteristics of DCS-Pro are:

- up to 2.500 kg load
- continuously variable speed control
- expanded speed range (load dependent)
- sensitive positioning and mounting of the load
- soft start and slowing
- low vibration operation
- rotating direction control via integrated rotation speed feedback
- frequency converter control integrated into the chain hoist
- temperature monitoring

For individual applications of the respective case of operation DCS-Pro offers in its standard configuration various parameters. Among these are e.G. the max. stroke velocity and acceleration which are user-friendly adjustable. Furthermore additional information such as operating hours of the chain hoist is being displayed.

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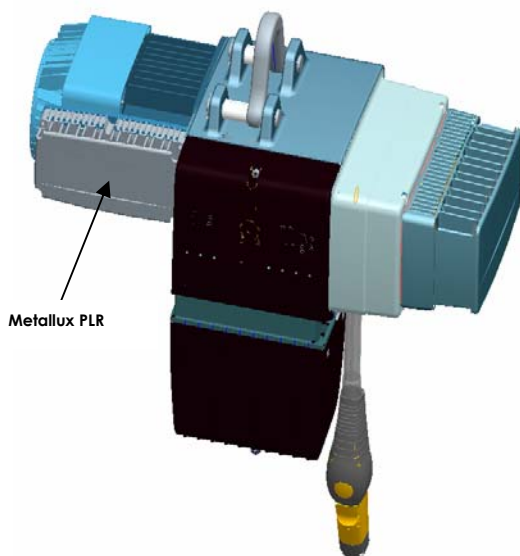


Photo 3: Demag - DCS Pro -



Photo 4: DCMS Pro

When lowering the load the asynchrony machine works as a generator supplying energy back into the converter intermediate circuit. While the energy surplus is being modified into heat by the integrated brake resistor of the chain hoist.



DCS Pro 10 incl. brake resistor

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Integration and operating mode of Metallux power resistor PLR into the system

By integrating the Metallux power resistors in thick film on steel in an aluminium heat sink the brake resistor is perfectly integrated into the chain hoist's construction. The enlargement of the cooling surface causes an increase of the capacity rating up to ca. 1kW. Furthermore the protection class of the brake resistor is raised up to the protection class of the chain hoist (IP55).

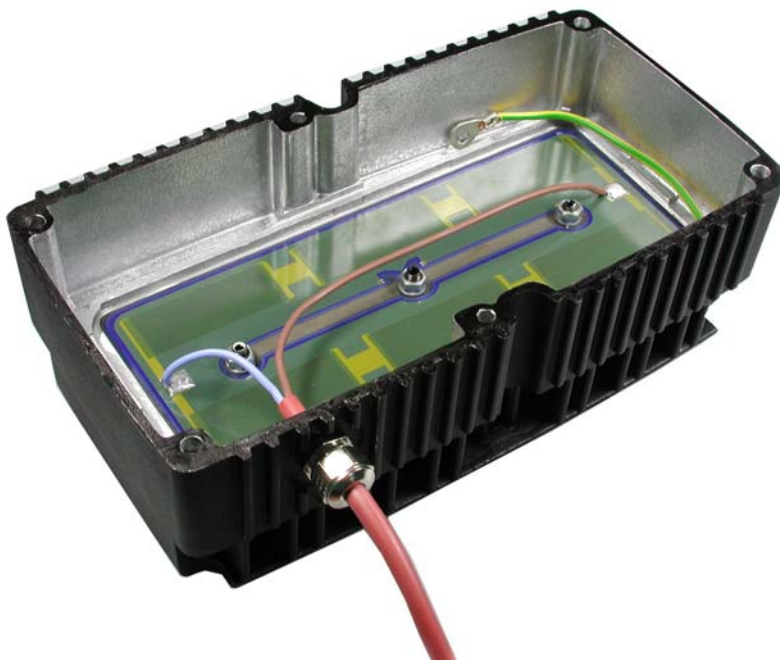


Photo 5: Metallux-PLR in aluminium body

Metallux AG

Metallux AG is a public limited company for electronic products based in Korb, near Stuttgart, Germany. The company focuses on research, development, production and sales of thick film products in cermet- and conductive plastic technology (sensors, resistive components). The company management starting with „father & son“ Oberascher is a union of about 30 years experience with new and innovative ideas for customers of automotive, industry, electro static, medical industry and industrial electronics as well as sensor requirements.

Demag Cranes & Components GmbH

Demag Cranes is one of the world's leading providers of industrial cranes, crane components, harbour cranes and port automation technology. Services, in particular maintenance and refurbishment services, are another key element of its business activities. The activities of Demag Cranes are divided up into three segments: Industrial Cranes, Port Technology and Services. Demag Cranes & Components GmbH in Wetter/Ruhr in Germany is a subsidiary of Demag Cranes world wide.

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