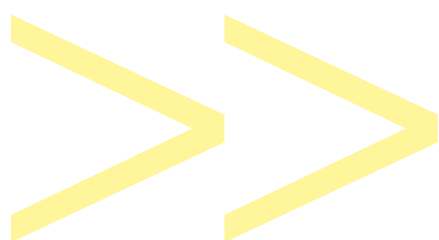
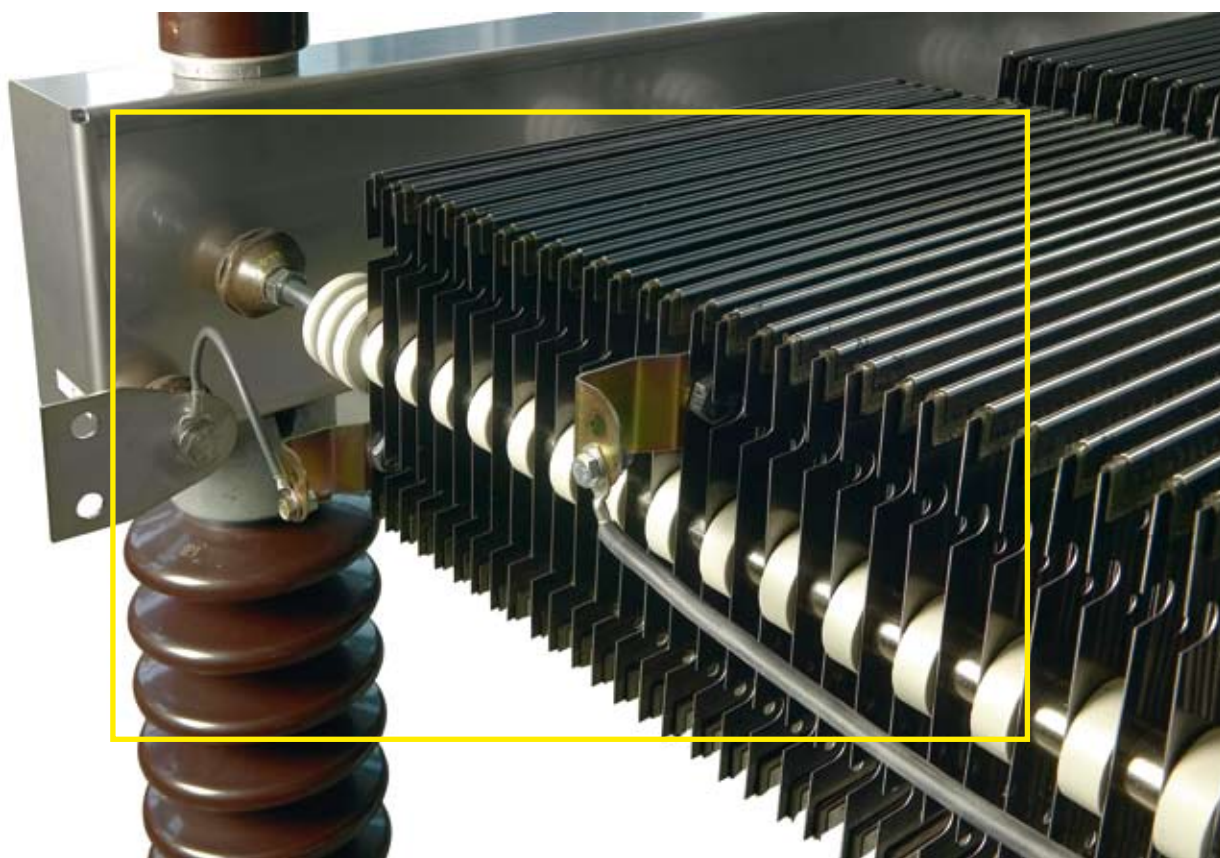


Damping Resistors for Harmonic Filters



System
DES / DDS



Steel Grid Resistors DES / DDS System

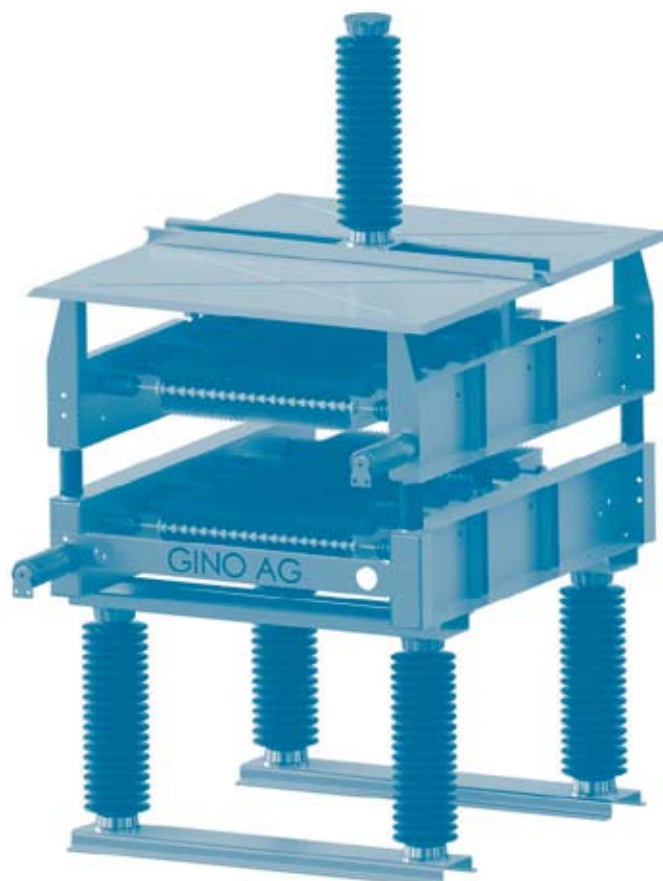
Power electronics, which undergo a rapid development, are used in all technical areas today. Besides their benefits of quick controllability and broad application range, some drawbacks are likewise involved.

Drives with a variable speed generate sinusoidal interferences. Harmonic waves affect the quality of the power system and compromise its safety. The cost factor due to the occurring reactive power should likewise not be neglected. The increased supply of renewable energy from wind turbines and solar power generators causes fluctuations in the active and reactive power of electrical systems that in turn affect the quality and reliability of the power system.

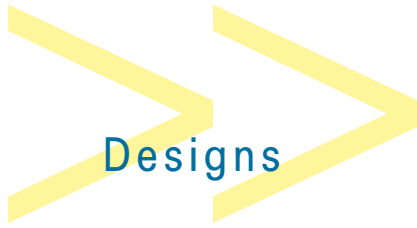
In order to keep the power supply system stable and ensure a high operating reliability, undesired interference factors are eliminated or reduced by taking measures such as medium-voltage filter circuits.

Filter circuits consist of inductivities, capacities and resistances to damp occurring voltage peaks. A precise adjustment of the filter circuit enables a specific intervention to counteract the undesired parasitic portions of the power supply system.

- > Voltage levels: 7.2 / 12 / 24 / 36 / 52kV
- > Single- and three-phase systems
- > High overload capacity
- > Low maintenance
- > High operating reliability
- > Many types of enclosures



Voltage level [kV]	Rated withstand voltage (50Hz, 60s) [kV]	Lightning impulse voltage (1,2/50 μ s) [kV]	Resistance [Ω]	Output [kW]
12	28	75	1 - 1000	5 - 200
24	50	125	1 - 1000	5 - 200
36	70	170	1 - 1000	5 - 200
52	95	250	1 - 1000	5 - 200



Steel Grid Resistors DES / DDS System

GINO damping resistors consist of resistor packages of steel grid resistor elements. The steel alloy 1.4724 is used as resistor material. Other resistor materials can likewise be employed. The resistor elements are mounted on insulated support brackets and are usually connected in series. Every resistor consists of one or

several resistor packages that are interconnected through thermally resistant lines. The resistor packages with insulators are mounted between side plates of stainless steel. Either a single-phase or a three-phase design is possible.



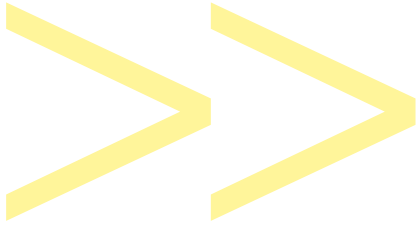
Resistors for indoor use are manufactured with an IP00 enclosure. For outdoor installation, an IP01 enclosure is required. For damping resistors in the medium-voltage range, the enclosures IP20 and IP23 are used only in specific cases.

The insulation is rated for system voltages of 7.2 / 12 / 24 / 36 / 52kV. Increased clearance and/or creepage distances may be required, depending on the prevailing climatic conditions, risk of contamination or altitude of

the place of installation. The insulators used are made of porcelain.

In general, all damping resistors are designed according to customer-specific requirements, employing our standards.

The design and manufacture is based on the following standards, for example: DIN EN 62271-1, DIN IEC 60815-1/2/3, DIN IEC 60529.

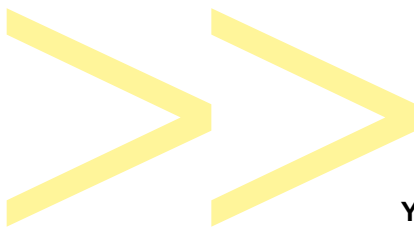


Steel Grid Resistors DES / DDS System

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