



Sintermetalle Prometheus GmbH & Co KG



MAGNETIC APPLICATIONS



SINTERMETALLE PROMETHEUS



Over 33 years in the service of progress

- Research and development
- Highest quality
- Highest technical, administrative security
- Documentation of all processes
- Fair price-performance ratio
- Competent and individual advice through our experience in materials and the know-how extension in electrical engineering
- High manufacturing depth for quality- and quantity protection

Our technical focus:

- 3D-isotrope magnetical and physical specifications
- Low-loss materials for improvement of the efficiency
- High control range of the materials
- Low noises
- Optimized EMC-performance
- Compact type of design
- Compliance of domestic and foreign standards

COMPACT, QUIET, MULTIFACETED

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OCEANLINERS

IT BEGINS WITH RESEARCH AND DEVELOPMENT

THE COMPANY



Graben-Neudorf in Germany (D)

SMP Sintermetalle Prometheus GmbH & Co KG was founded in 1982 by Dr.-Ing. Vasilios Gemenetzi.

In Graben-Neudorf (Baden) near Karlsruhe SMP produces inductive components, cores and molded parts on the basis of soft magnetic material. The components are used in different power electronic applications. SMP produces nearly 100 % of the products customized. The products are sold with an export rate of over 50 % worldwide.

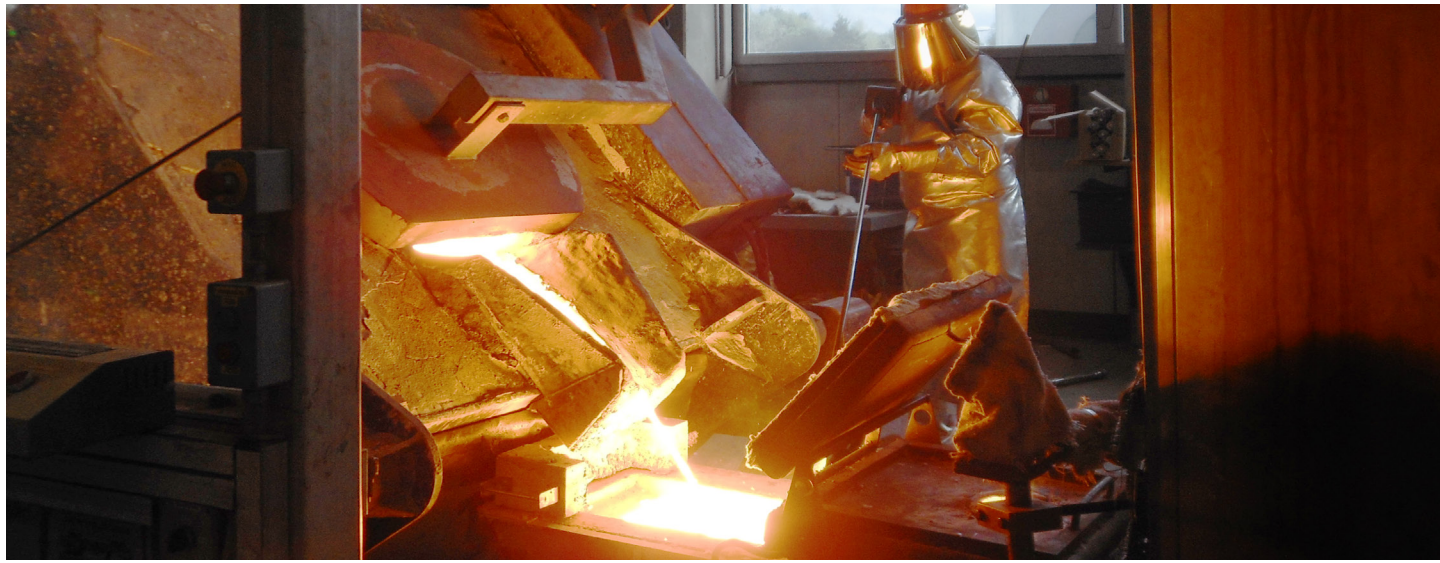


Kapfenberg in Austria (A)

Over the years SMP has become one of the most important suppliers for inductive components with soft magnetic materials in industrial application on the world market.

To ensure the future of SMP the two sons of the company's founder, who are already involved in the company, are studying electrical engineering and information technology at the Karlsruhe Institute of Technology (KIT).

The continuous development of the materials is based on the ability to control the powder metallurgical processes and the requirement for the appropriate application as producer of components in our own company at the same time.



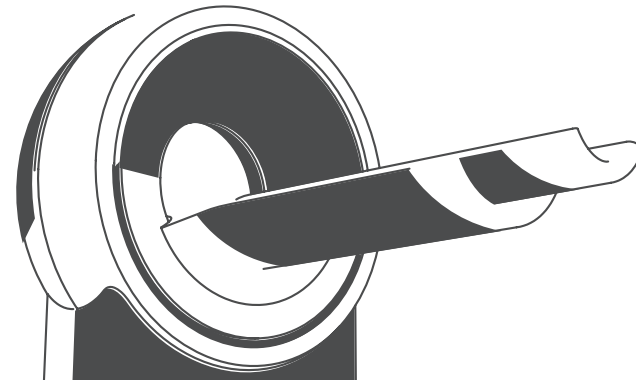
Our competence is your advantage:

- » Secure supply through high capacity (250t/month)
- » Selection of raw materials for highest quality
- » Change of production parameters to the application
- » Specific solutions (materials)

OWN POWDER PRODUCTION FOR THE RIGHT MATERIALS

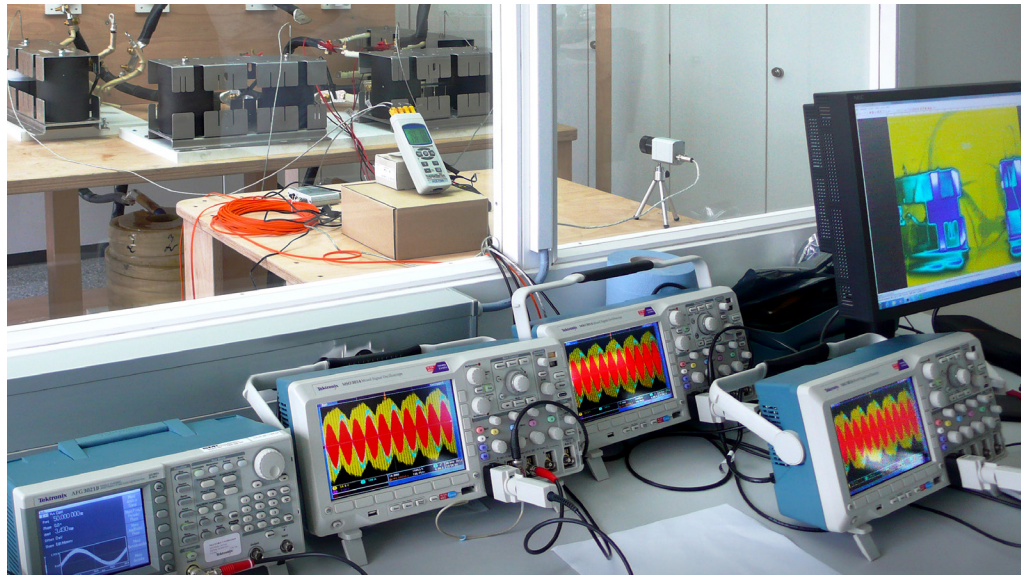
Since 2011 SMP has expanded its own production with a plastic injection molding unit to produce coil insulating frames and insulating materials for its components. SMP injectionmolded components are highly innovative products which are producible with a high limit of accuracy.

- » Secure supply of plastic components for SMP products (coil forms, isolation parts, covers,...)
- » Compliance to standards (flame resistance, UL, EN,...)
- » Realization of any forms
- » Ideal adaptation to the application
- » Plastic parts on customer request



MEDICAL MIRACLE

We see a continuity in our research and development as a natural contribution for your visions. Our team supports you with a customized project management from the design to the complete system assembling.



Measuring station for highest development

Our products are practical, electrical checked and optimized through modulation of any currency and frequency. This analyses may also serve as a pre-stage for a release.

COMPETENCE IN CONSTRUCTION AND PRODUCTION



RoHS
compliant



Member of
Top 100



IO Net
THE INTERNATIONAL CERTIFICATION NETWORK

DIN EN ISO 9001
DQS Reg-No: 1326

REACH
COMPLIANT

According to the varied requirements the components can be constructed to the application conditions.
All common standards are realizable:

- » ISO 9001 : 2008 certified (DQS)
- » EN / IEC
- » UL:
 - simple possibility of product certification through UL.
 - SMP has its own UL-accepted isolation system.
- » Fire protection certification according to DIN EN 45545
- » Protection class up to IP66
- » RoHS and REACH conformity

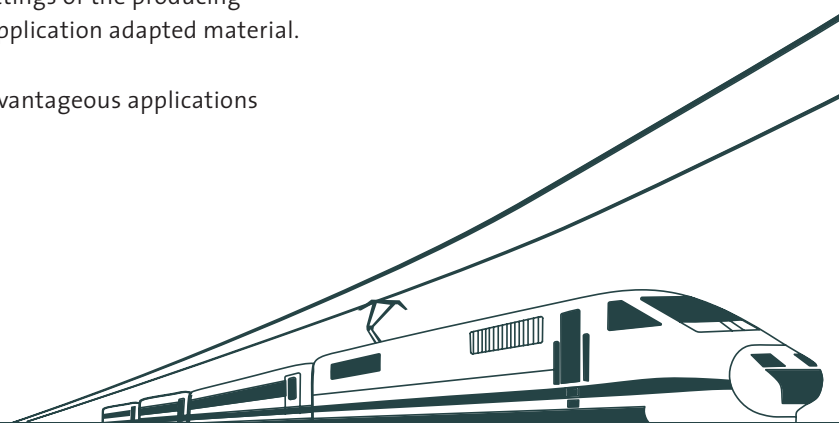


POWERTECHNOLOGY



Our technical solutions are based on predominant magnetic powder composite materials. To protect quality and quantity, we produce powder composite materials on our own. Specific high-end raw materials and free parameter settings of the producing machines transmit high quality and especially to the application adapted material.

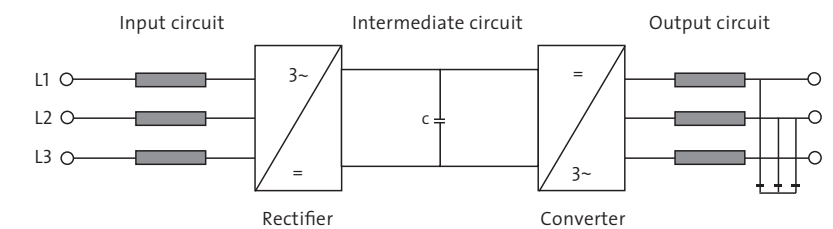
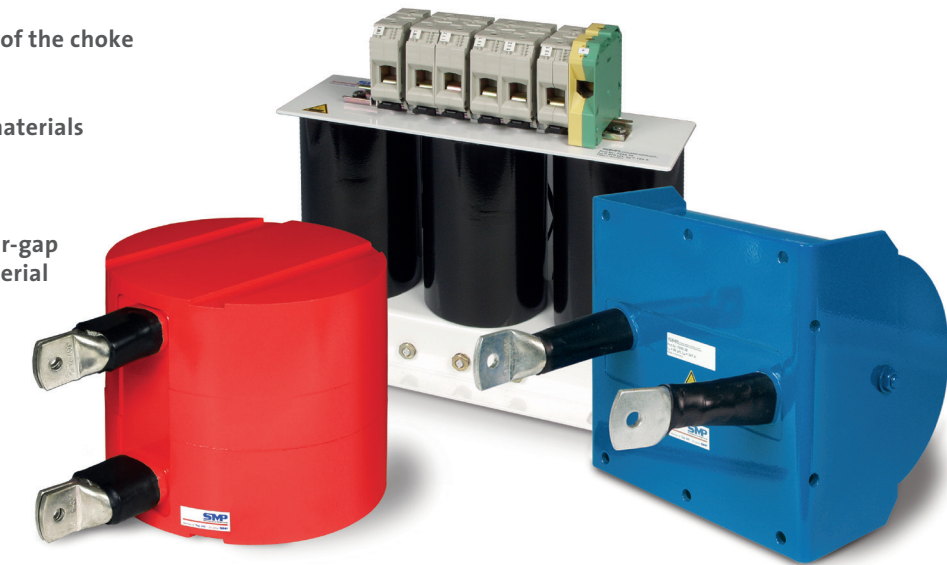
You can find the elementary characteristics and the advantageous applications in the detailed product groups.



RAILRUNNER

Technical specifications and world-leading advantages:

- » 3-dimensional isotropy of the materials
- » Low hysteresis and eddy-current losses
- » Setting of the oscillatory characteristic of the choke through the material
- » Silent through magnetostrictive-free materials
- » High control range of the materials
- » Adjustable permeability without any air-gap through distributed air-gaps in the material
- » **Closed magnetic circuit:**
 - best EMC-performance
 - low magnetical radiant emittance
 - low stray field
- » **Fair Price-Performance ratio**
- » **Maintenance-free and low losses**
- » **Compact and light construction:**
 - minimal length of core
 - minimal magnetic field strength
 - minimal use of winding material



YOUR PARTNER FOR INDUCTIVE COMPONENTS

ITEM NO.: 7200.01

Our inductive components are set up as:

- » Single-conductor choke (for high-current applications)
- » Single choke
- » Choke module
- » LC filters
- » Storage chokes
- » Three-phase chokes
- » Series chokes
- » Suppression chokes
- » Saturation chokes
- » PFC chokes
- » Input chokes
- » Output chokes
- » Commutating chokes
- » Smoothing chokes
- » Boost and buck converter chokes
- » Sinusoidal filter chokes
- » Chopper chokes
- » Absorption circuit chokes
- » Intermediate circuit chokes

For these applications SMP provides solutions in the range of:

- » Frequencies up to 500 kHz (special applications up to 2 MHz)
- » Currents up to 2000 A (special applications up to 3000 A)
- » Saturation induction up to 2 Tesla
- » Setting of the inductance through variation of the permeability without any air-gap, through distributed air-gaps in the material
- » Sizes from 36 mm to 300 mm
- » Weights from 50 g up to 130 kg
- » Temperature class H (180° Celsius)

From mini to maxi:

The ease of assembly of our components permits diverse set-ups that can be adjusted to the respective spatial conditions.

Smaller quantities, prototypes and test models, we can offer you a small selection of standard parts:

ITEMS-NO.	L	I _{EFF}	F _{SWITCH}	TU _{AMB}	WEIGHT	DIMENSIONS
	MH	A	KHZ	C	KG	MM
7200.01	1500	4	12	50	0,42	45 x 50
7300.01	1000	14	10	40	0,86	60 x 50
7400.01	1000	22	10	40	2,35	80 x 80
7500.01	1000	35	10	40	4,35	100 x 100

For further details, please refer to the datasheets on the next few pages.

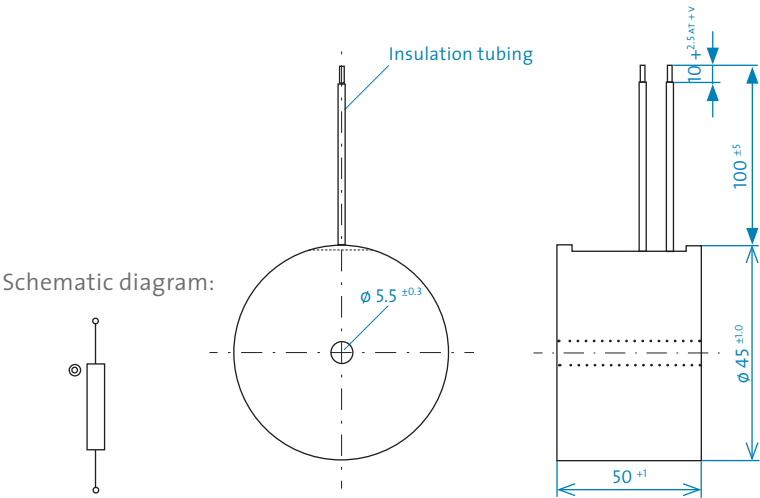
SMP designator: 45x50DRE720001

Dimensions in [mm]
General tolerances acc. to DIN ISO 2768-c
Rust protection coating Fix 102

Operating data/
Characteristic data (indicative values):

- L = 1500 μH
- I_{eff} = 4 A_{max}
- I_h = 10 A_{max}
- f_p = 12 kHz_{max}
- ΔI = 2,4 A_{max}
- Tu_{amb} = +50 °C_{max}

Weight approx. 0,420 Kg



Final inspection:

- 1.0 U_{p,eff} = 2,5 kV, 5 s, Winding to core
- 2.0 R_{Cu} < 110 mΩ
- 3.0 L = 1500 μH ± 10% I_{DC} = 4 A,
f = ±10 kHz, I_{AC,eff} = 10 mA

Test samples measured at room temperature after temperature equalization.



ITEM NO.: 7300.01

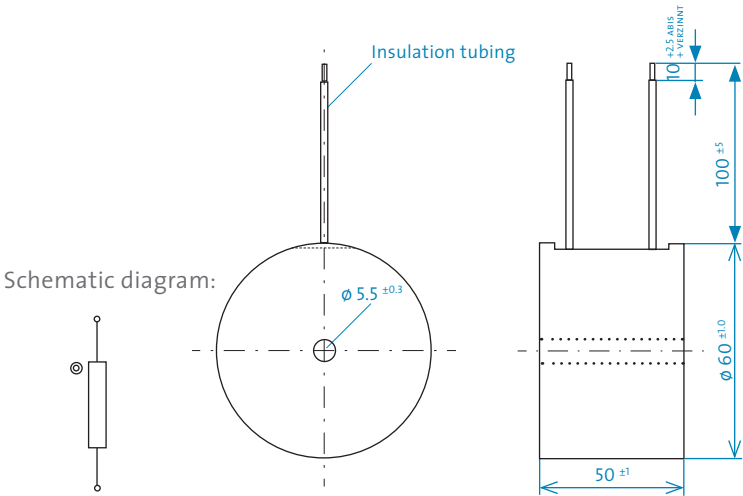
SMP designator: 60x50DRE730001

Dimensions in [mm]
General tolerances acc. to DIN ISO 2768-c
Rust protection coating Fix 102

Operating data/
Characteristic data (indicative values):

- $L = 1000 \mu H$
- $I_{eff} = 14 A_{max}$
- $\hat{I} = 22 A_{max}$
- $f_p = 10 kHz_{max}$
- $\Delta I = 4 A_{max}$
- $Tu_{amb} = +40 ^\circ C_{max}$

Weight approx. 0,86 Kg.



Final inspection:

- 1.0 $U_{p,eff} = 2,5 kV, 5 s, \text{Winding to core}$
- 2.0 $R_{Cu} < 35 m\Omega$
- 3.0 $L = 1000 \mu H \pm 10\% I_{DC} = 14 A$
- $f = \pm 10 kHz, I_{AC,eff} = 10 mA$

Test samples measured at room temperature
after temperature equalization.



ITEM NO.: 7400.01

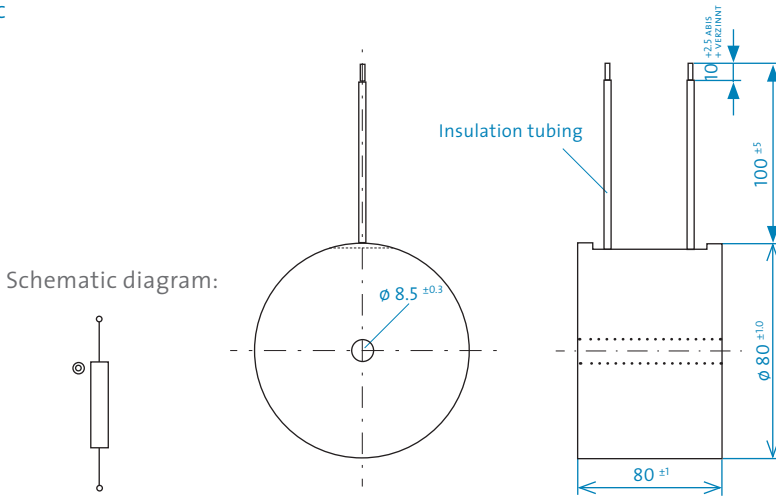
SMP designator: 80x80DRE740001

Dimensions in [mm]
General tolerances acc. to DIN ISO 2768-c
Rust protection coating Fix 102

Operating data/
Characteristic data (indicative values):

- $L = 1000 \mu H$
- $I_{eff} = 22 A_{max}$
- $\hat{I} = 35 A_{max}$
- $f_p = 10 kHz_{max}$
- $\Delta I = 4 A_{max}$
- $Tu_{amb} = +40 ^\circ C_{max}$

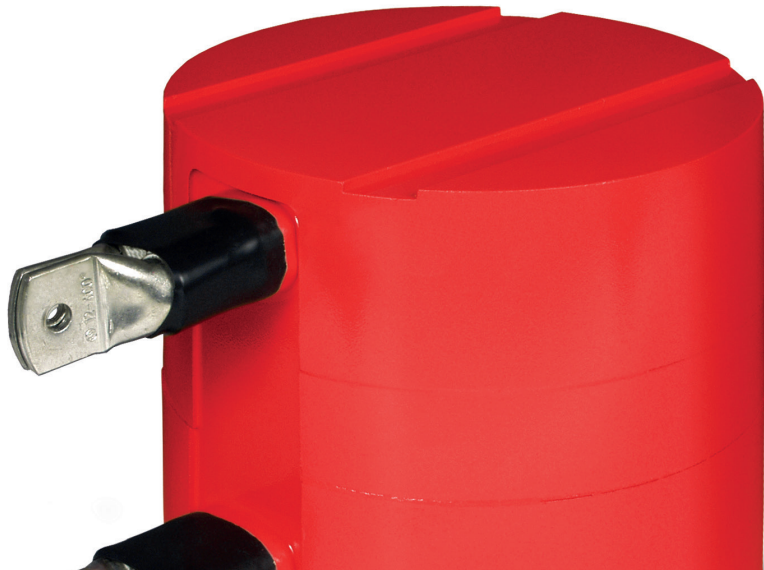
Weight approx. 2,35 Kg.



Final inspection:

- 1.0 $U_{p,eff} = 2,5 kV, 5 s, \text{Winding to core}$
- 2.0 $R_{Cu} < 24 m\Omega$
- 3.0 $L = 1000 \mu H \pm 10\% I_{DC} = 22 A,$
- $f = 10 kHz, I_{AC,eff} = 10 mA$

Test samples measured at room temperature
after temperature equalization.



ITEM NO.: 7500.01

SMP designator: 100x100DRE750001

Dimensions in [mm]
General tolerances acc. to DIN ISO 2768-c
Rust protection coating Fix 102

Operating data/
Characteristic data (indicative values):

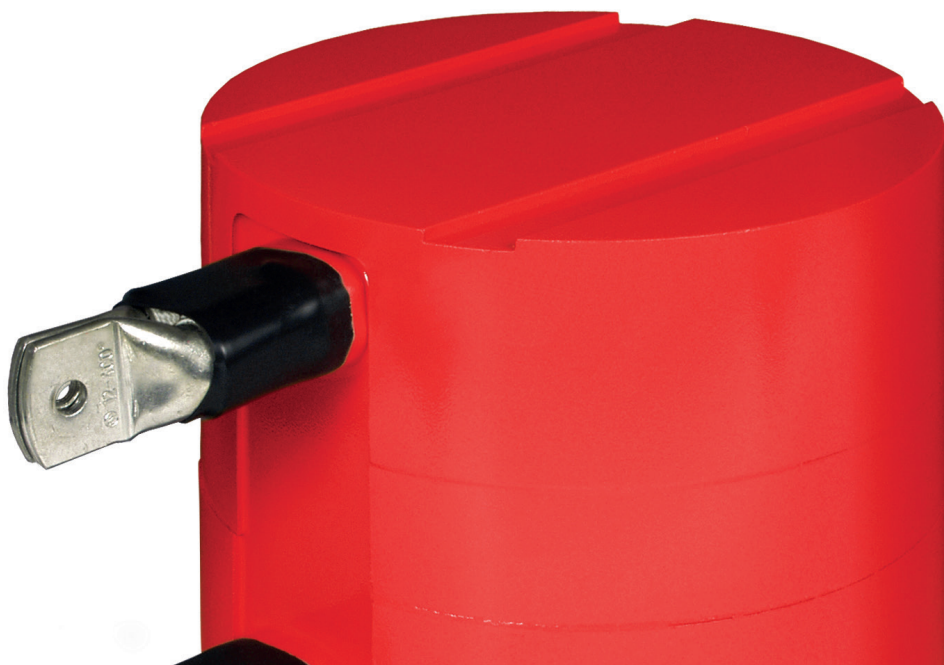
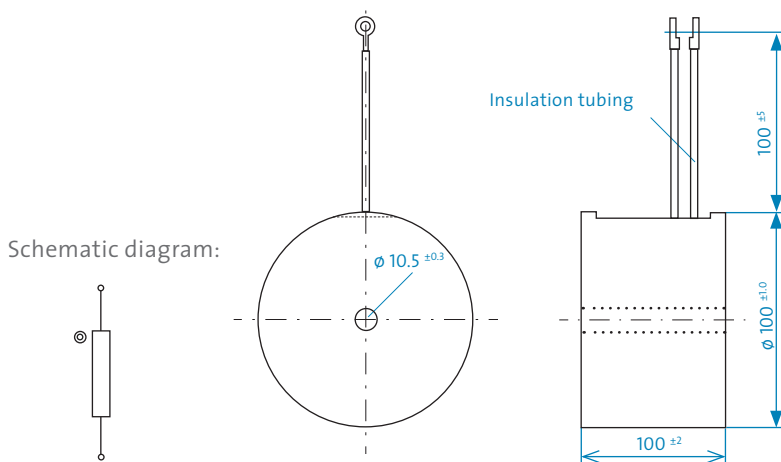
$L = 1000 \mu\text{H}$
 $I_{\text{eff}} = 25 A_{\text{max}}$
 $\hat{I} = 50 A_{\text{max}}$
 $f_p = 10 \text{ kHz}_{\text{max}}$
 $\Delta I = 7 A_{\text{max}}$
 $Tu_{\text{amb}} = +40^\circ\text{C}_{\text{max}}$

Weight approx. 4,35 Kg.

Final inspection:

$1.0 U_{p,\text{eff}} = 2,5 \text{ kV}, 5 \text{ s}, \text{Winding to core}$
 $2.0 R_{\text{Cu}} < 17 \text{ m}\Omega$
 $3.0 L = 1000 \mu\text{H} \pm 10\% I_{\text{DC}} = 35 \text{ A}$
 $f = 10 \text{ kHz}, I_{\text{AC,eff}} = 10 \text{ mA}$

Test samples measured at room temperature
after temperature equalization.



Technical specifications and world-leading advantages:

- » Less material usage
- » Less losses than non-magnetic coupled components (eco-design)
- » Higher frequencies possible
- » Setting of the magnetic quality factor of the choke, without any thermal load
- » Specific setting of the magnetizing and leakage inductance
- » Lower EMC-expenditure
- » More compact and lighter type of design
- » Reduction potential of the smoothing capacitors
- » More cost-effective

Our magnetic coupled components are set up as:

- » Transformer
- » Controlling choke through transformer utilization with an additional coil for:
 - Control signals
 - Monitoring of the saturation induction
 - Current measurement
 - Setting of the quality factor and thermal relief of the choke
 - Specific setting of the inductance factor through premagnetization of the magnetical material
- » Mid-frequency transformers
- » Flux-compensating choke

For these applications SMP provides solutions in the range of:

- Frequencies up to 500 kHz (special applications up to 2 MHz)
- » Currents up to 2000 A (special applications up to 3000 A)
- » Saturation induction up to 2 Tesla
- » Setting of the inductance through variation of the permeability without any air-gap, through distributed air-gaps in the material
- » Sizes from 36 mm to 300 mm
- » Weights from 50 g up to 130 kg
- » Temperature class H (180° Celsius)



Specific setting of the:

magnetizing and leakage inductance and thus of the magnetic coupling

Realizable through:

- » different types of windings
 - sepearate wound coil
 - bifilar wound coil
 - superimposed wound coil
- » different geometries of the moulded parts

YOUR DEVELOPMENT PARTNERSHIP FOR POWER ELECTRONICS

Technical specifications and world-leading advantages:

- » **3-dimensional isotropy of the materials:**
 - enables complicated magnetic circuits
- » **Low hysteresis and eddy-current losses**
- » **Silent through magnetostrictive-free materials**
- » **High control range of the materials**
- » **Adjustable permeability without any air-gap through distributed air-gaps in the material**
- » **Closed magnetic circuit**
- » **Maintenance-free**
- » **Fair Price-Performance ratio**
- » **Compact and light construction**

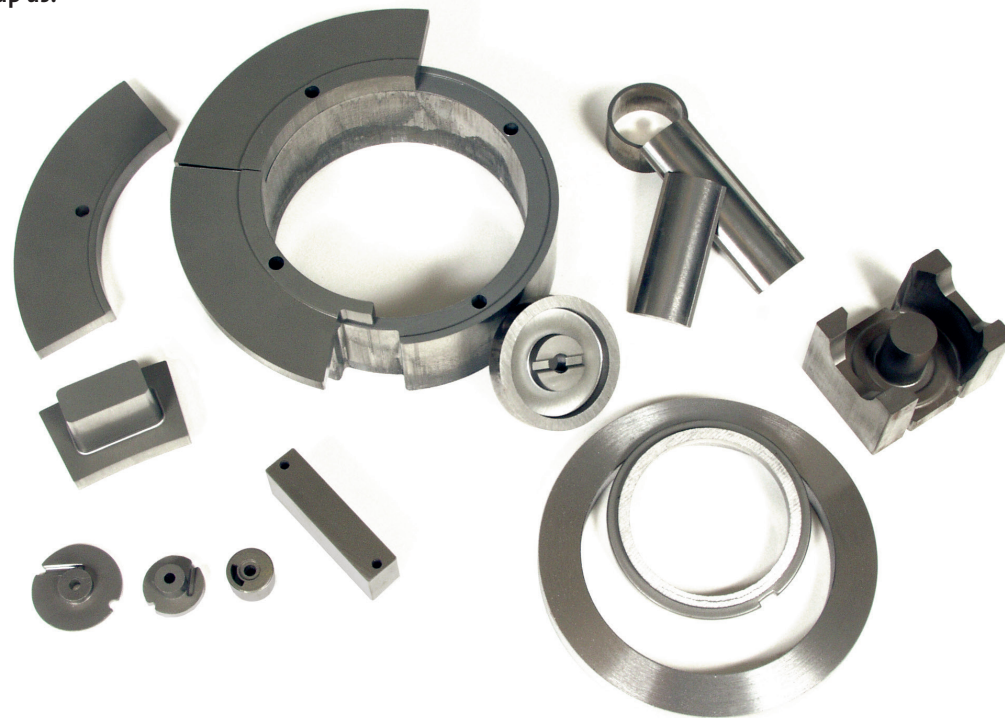
Our cores and molded parts are set up as:

Magnetic molded parts:

- » Stators
- » Rotors
- » Flux concentrating parts for motors and drive systems

Magnetic cores:

- » E-Cores
- » U-Cores
- » Half toroidal cores
- » Ring punching
- » Mushroom-Cores
- » Rectangle
- » Toroidal-Cores
- » Isostatic pressed blocks



For these applications SMP provides solutions in the range of:

- » Frequencies up to 500 kHz (special applications up to 2 MHz)
- » Saturation induction up to 2 Tesla
- » Adjustable permeability up to 300 without any air-gap
- » Weights from 50 g up to 130 kg
- » Temperature class H (180° Celsius)

WORLD-LEADING TECHNOLOGY FOR INDUCTIVE COMPONENTS

Required properties for:

- » Isolation
- » Creepage distance protection
- » Flame retardancy
- » Temperature resistance
- » Rational process engineering

This solves SMP with her own mold design and construction.

- » SMP's injection-molded parts are highly innovative products that are producible within very narrow tolerance limits.
- » SMP's injection-molded parts are producible from 0.1g to 1450g.



This materials are used:

ABS, PA, PE, PC, PES, PET, PBPT, POM, PP, PPO, PPS, SAN, TPE-S,

Blends, filled with CF, GF, GK, talcum, carbon black, bronze etc.

SMP

To use the qualities and benefits of our products to their full potential, we offer

CONSULTING FOR ACTIVE ELEMENTS IN power electronics | controlling | cooling techniques

DRIVE TECHNOLOGY

Rail – | Ship technology | Electromobility

SMP has developed a set of chokes for converters in rail technology. High demands are posed to these components: They must be shake and shock proof in all directions, withstand high temperatures, fit into limited installation spaces, be protected against dust, dirt and water penetrating as well as be silent when used in passenger trains.

Thanks to our specially developed magnetostriction-free materials we are able to produce very quiet chokes for these applications.



A high temperature resistance of the chokes is warranted by a UL listed, class H (180° C) insulation system.

MEDICAL TECHNOLOGY

X-ray | MRT | CT | Ultrasonic devices

The chokes that SMP developed for a renowned German manufacturer of MRT scanners are located in the so-called gradient pulse amplifier. The task of the filter and line chokes is to provide both a clean sine wave as well as a low-loss recovery of the energy which is not needed.

In doing so, the chokes are characterized by their magnetostriction-free powder composite materials specifically developed for this application. These materials enable the constructing of very low-noise chokes.

In order to keep the exposure to radiation low and the time in the cramped, unfamiliar situation short, the MRT device needs to be fast and efficient - chokes from SMP fulfill these high requirements.

AEROSPACE INDUSTRY

Satellite- | Aircraft- | Space technology

Utilizations of these applications are characterized by excellent compactness of SMP's components, especially by weight savings and low loss-products, which is extremely important in this industry.

CONVENTIONAL ENERGIES

Thermal- | Nuclear power plants | Oil exploration



SMP develops and delivers high-quality chokes in the field of oil exploration. In this context, protection against extreme environmental conditions is of key importance.

In the power plant section chokes with high performances are primarily in demand.

The abundance of IP66 allows the mounting of the chokes outside of the inverter. To simplify the mounting SMP offers chokes with particular mounting brackets.

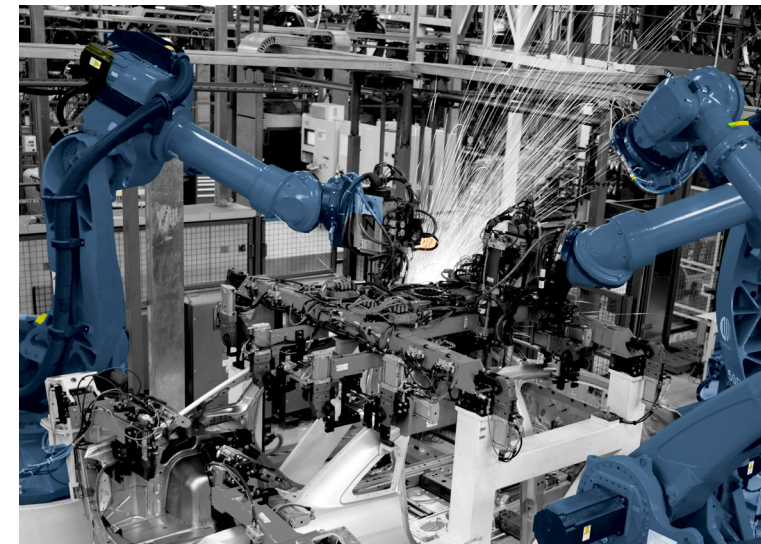
RENEWABLE ENERGIES

Bioconversion | Energy storage system
Solar | Wind | Water

SMP provides low-loss components for both wind turbines as well as photovoltaic inverters. The energy-efficient and high-performance chokes from SMP are very compact and space-saving. But they are also distinguished by being maintenance-free and their longevity which comes at an advantage with regard to the costly maintenance of offshore wind turbines.

INDUSTRIAL APPLICATIONS

Power electronics | Automation | Signal processing



The energy-efficient and high-performance chokes from SMP are very compact and space-saving. They are used in:

- Power converters
- Robotics
- Mechanical and plant engineering
- Circuit technology
- High-performance light sources
- Welding technology
- Induction heating
- Control engineering
- Manufacturing technology

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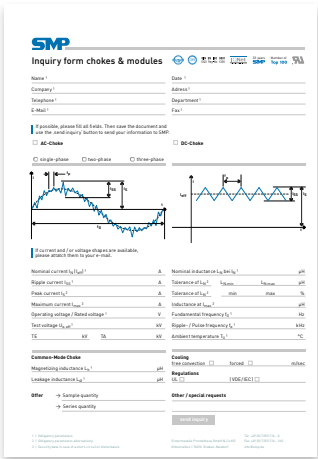
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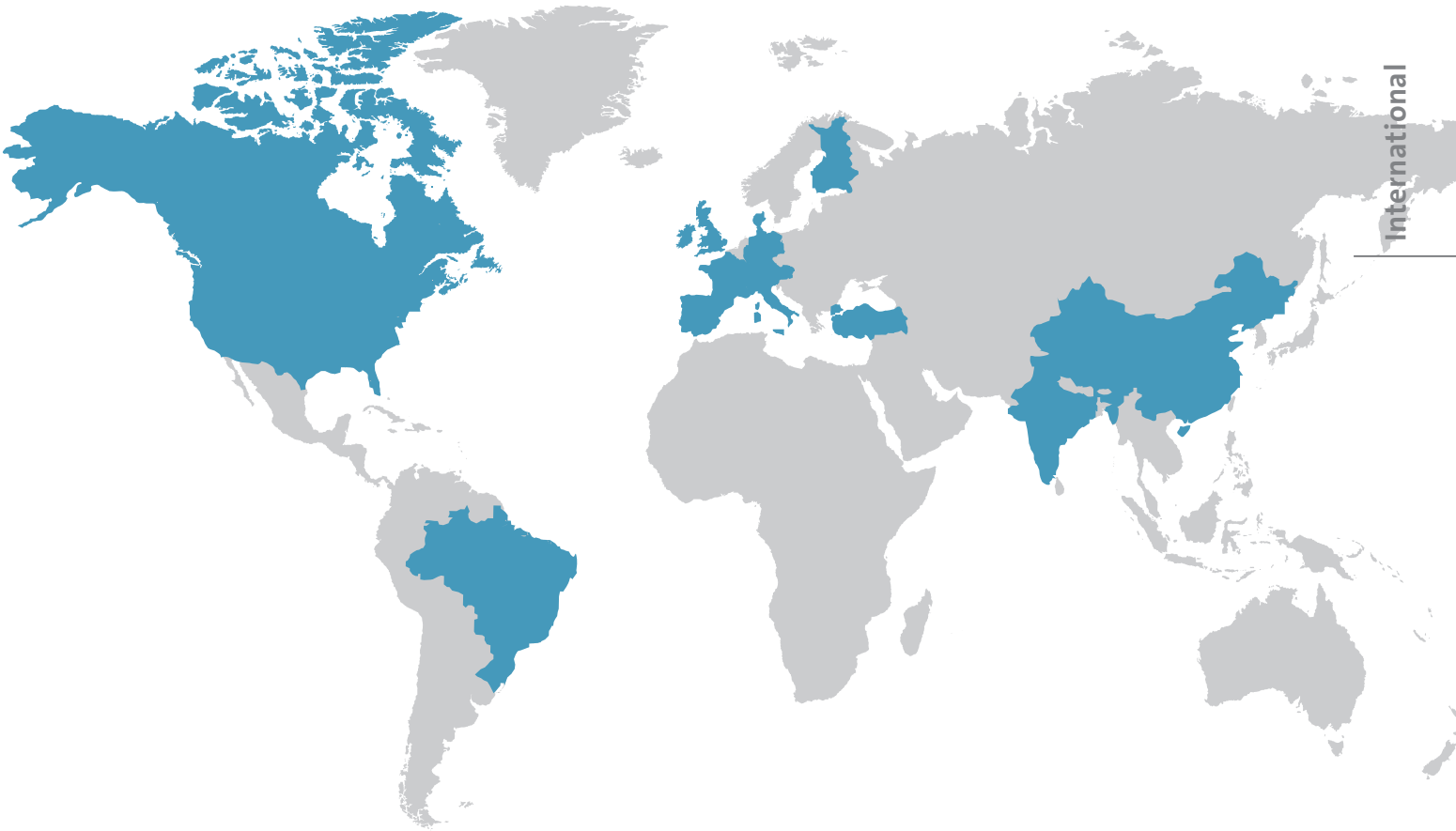
The enormous range of possibilities means that it is essential to consider the optimal shape of the components at the design stage. We will be glad to provide you with a suitably dimensioned component based on your data.

To find out what data is needed for design-appropriate dimensioning, please see our online enquiry forms on our website:



www.smp.de

These online forms are available for download in PDF format.



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33 Years
SMP



RoHS
compliant



Member of
Top 100



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REACH
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