REDUR // ISMET // TRAMAG // PM SMS

MAKE A CHANGE WHEREVER ELECTRICAL ENERGY FLOWS.

The reliable and high-precision products of **Phoenix Mecano's Measuring Technology Division** are used wherever electrical energy flows – regardless of whether it involves high, medium, or low voltage, alternating or direct current.

AT HOME IN THE WORLD'S MARKETS.

Phoenix Mecano is a global technology group and a leading manufacturer of enclosures and industrial components for a wide range of markets.

As part of the Phoenix Mecano Group, we benefit from a global network that combines innovation, precision, and engineering excellence across industries and continents. Close collaboration within our **Measurement Technology Division** creates powerful synergies – from shared research and development to combined engineering expertise, optimized sourcing, and efficient manufacturing.

These strengths enable us to deliver solutions that are more efficient, more reliable, and better prepared for the challenges of tomorrow. Together, we achieve what no single company could accomplish alone: developing technologies that create measurable value for our customers, our industries, and the world of tomorrow.

GET IN TOUCH

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CO_2 NEUTRAL

All our printed materials are produced on sustainable paper and printed CO_2-neutral.

FOLLOW THE CHANGE
@REDUR

Low V Medium V High V

UNITED TO MAKE A MEASURABLE CHANGE.

Driven by Precision our **Measurement Technology Division** unites four specialized brands under one mission: delivering high-performance measurement and transformer technology for a wide range of applications.

Each brand brings its own strengths, fields of expertise, and market focus – but all share the same commitment to precision, innovation, and quality.

Together, we offer more than products – we offer a global network of expertise, ready to meet your specific requirements.

Phoenix Mecano's Measurement Technology Division

REDUR is specialized in the development and manufacturing of Measurement transformers and analogue and digital Measurement transducers. The product portfolio ranges from clip-on and wound current transformers, cable transformers and combined AC/DC current transformers to high-frequency transformers and current transformers with integrated Measurement transducers. Thanks to decades of experience, REDUR produces the most compact current transformers on the market and is the technology leader in the industry with innovative products such as the 333 mV output signal.

ISMET is one of the leading European suppliers for the development and production of high-quality transformers, chokes and filters. Our products and solutions are used in the most demanding applications worldwide. Founded in 1902, the company serves market segments such as mechanical and plant engineering, wind and solar energy, marine equipment and energy supply. The product range includes both – standard products and customized solutions.

ISMET develops and produces low voltage transformers up to 5 tons and chokes and filters for air and liquid cooling.

Since 2022, ISMET has been an independent brand to REDUR.

TRAMAG Founded in Nuremberg in 1923, the product range was initially focussed on transformers for the toy industry. Over the following decades, TRAMAG was able to win many new and well-known customers with customized solutions for individual applications in the low-voltage range. This was achieved by expanding the product range to include choke and filter technology, which opened up new markets with increasing demand for power quality in drive technology, test field technology and renewable energies.

Over the years, TRAMAG also established itself as the leading European company for inductors in medical technology, including transformers for supplying power to MRI devices. In individual production or in series: always customized, reliable and of the highest quality.

Since 2024, TRAMAG has been an independent brand to REDUR.

PM SMS (Special Measurement Systems) is specialized in the development and manufacturing of zero-flux current Measurement systems for Measurement electrical currents from direct to high-frequency alternating current (0 - 400 kHz). The company was the first in the world to introduce fluxless current measurement systems in the early 1970s. Today, they are considered the ultimate solution for Measurement electrical currents and are found in scientific, industrial and healthcare applications around the world.

AC DC

CHANGING SOLUTIONS FOR YOUR INDUSTRIES.

Wherever electrical energy flows, our transformers and Measurement solutions help shape the future – with precision, safety, and innovation. As a solution provider, we offer a broad range of standard products as well as customized solutions tailored to your specific requirements.

From clean energy and automation to mobility and medical technology, we deliver solutions that make a lasting change across industries.

LET'S CREATE CHANGE. TOGETHER.

As your solution provider, we don't deliver products – we deliver solutions. Whether it's a custom transformer or expert advice, we're here to support you and your project.

Get in touch and discover how we can support your project – with solutions that truly make a difference.

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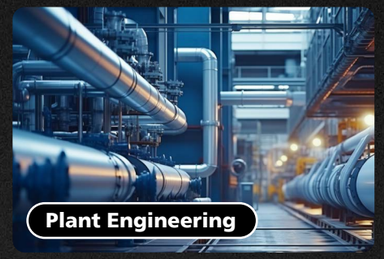
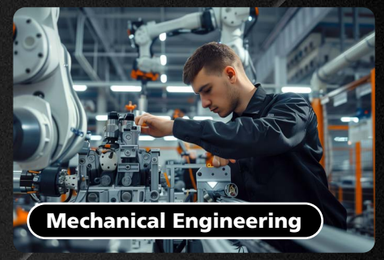
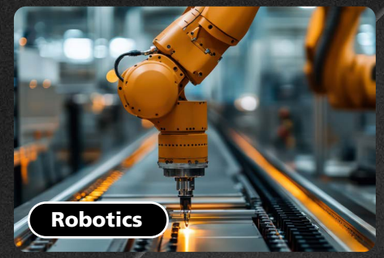






CERTIFIED BY STANDARDS.

Development through to series production
– customized and application-oriented

ISO 9001:2015

ISO 14001:2015

ISO 45001:2023

UL

RoHS 2|3 gemäß 2011/65/EU 2015/863/EU

CERTIFIED BY DNV·GL MARITIME

ENGINEERED IN GERMANY. MADE FOR THE WORLD.

Reliability through German engineering – Efficiency through global manufacturing. Thanks to our various production sites and our in-house development department, we are not only the market leader for standard products, but also offer customized solutions that are precisely tailored to your specific requirements.

MADE IN GERMANY / NL

Development, design and production at the highest technical level. Customized, precise and future-proof.

// **Production Current Transformer**
// **Production high-voltage Zero-Flux CT's**
// **Production conformity assessment CT's**
// **Development Current Transformer**
// **Development Transformers, Chokes and Filters**
// **Development Zero-Flux Current Transformer** (Netherlands)

GLOBAL MANUFACTURING

Flexible manufacturing capacities around the globe

// **European Production of Transformers, Chokes and Filters** - medium batch sizes with short delivery times - Czech Republic

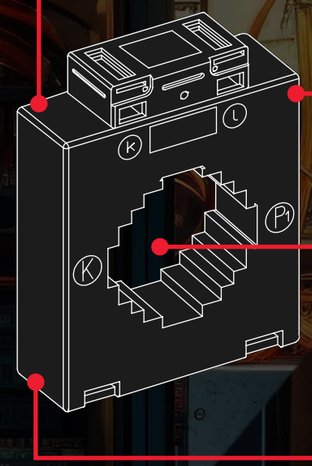
// **Indian Production of Transformers, Chokes and Filters** - high-volume series production - cost efficient with consistently high quality

MEASURING TECHNOLOGY THAT MAKES A CHANGE.

From switchgear and inverter systems to EV charging stations and renewable energy applications – our products enable smarter, more efficient power management across industries.

Our transducers precisely measure current, voltage, power, and turning complex data into clear control signals for intelligent system integration.

Whatever your application – you can rely on: Exceptional quality. Personalised support. Solutions that make a real difference.



SHATTERPROOF

plastic housing made of polyamide

FLAME-RETARDANT

according to UL 94

VERSATILE APERTURE

for various cable or busbar diameters

COMPACT DESIGN

30 mm depth

SERIES **REGULUS**

Low Voltage Current Transformers

Our low voltage current transformers are designed for compactness, versatility, and enhanced safety. All transformers in this range feature a uniform depth of 30 mm, with various designs offering different window sizes for cable or busbar diameters. Each model can be used as a clip-on or wound current transformer. For secure mounting on primary busbars, a form-fit primary clamp is available. If space is limited, the clamp can be easily removed for flexible installation.

// Input: Primary currents **from 1 to 7.000 A**
// Output: Current or voltage **1 A / 5 A / 333 mV**
// Accuracy class: **0,2S / 0,2 / 0,5S / 0,5 / 1 / 3**
// Also available with **conformity assessment**

SERIES **REGULUS FFP**

// **Minimizes electromagnetic interference effects**

AC DC

CLICK. CONNECT. CHANGE.

The **RSC-LC series** makes installation easier than ever – no tools, no hassle.

Its innovative hinge system, constant-pressure core, and intuitive lever clamps ensure precision and reliability with a single click. The removable click-off hinge allows effortless mounting even in tight spaces, while the self-extinguishing housing adds safety and durability. The advanced spring mechanism maintains perfect core alignment for long-term measurement stability.

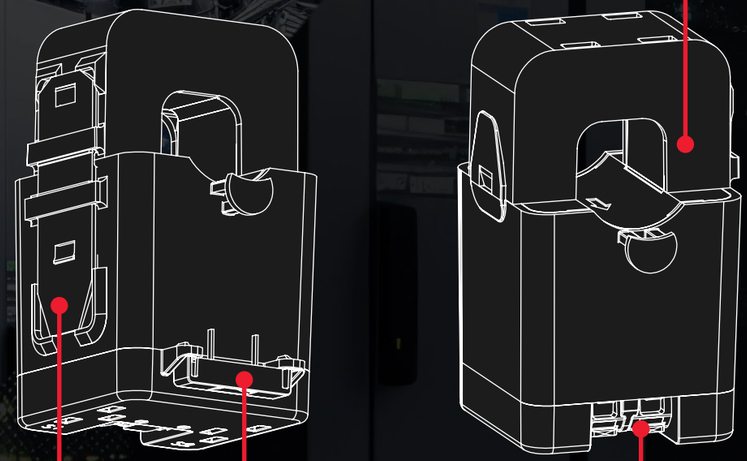
Compact, robust, and ready for the future – **the RSC-LC is a gamechanger in current measurement technology**.

// Input: Primary currents **from 50 to 500 A**
// Output: Current or voltage **1 A / 5 A / 333 mV**
// Accuracy class: **0,5 / 1 / 3**

RSC-LC

ROBUST & SELF-EXTINGUISHING

High-grade housing with UL 94-V0 flame rating for maximum safety.



PLUGGABLE SHORT-CIRCUIT BRIDGE

EASY INSTALLATION

Removable click-off hinge allows effortless mounting even in tight spaces.

TOOL-FREE CONNECTION

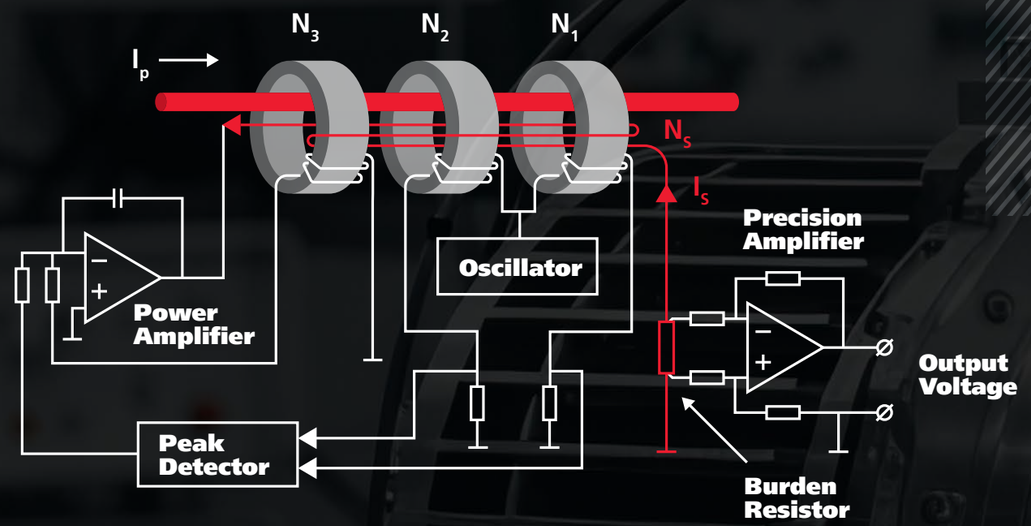
Thanks to the convenient lever technology, single-, fine-, and multi-stranded conductors from 0.2 to 4 mm² can be connected to the secondary terminals without the use of tools.

AC DC

ZERO-FLUX PRINCIPLE.

The Zero-Flux current transformer compensates the magnetic flux generated by the primary current via a controlled secondary current, maintaining zero residual flux in the core. Three sensing cores detect DC and AC components and regulate the zero-flux condition through active feedback.

With Measurement ranges **up to 30 kA** and bandwidths **up to 800 kHz**, the system delivers high-precision current measurement from DC to high frequencies – stable, distortion-free, and without temperature compensation.



AC DC

CHANGING THE POWER THAT CONNECTS THE WORLD.

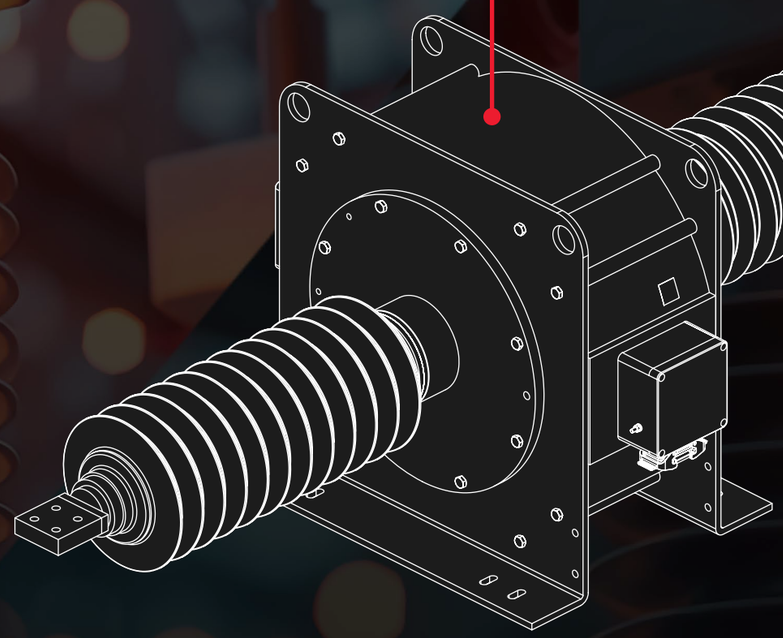
Electrical energy powers our world – from cities and transport to communication and innovation. As global demand rises, so does the need for technologies that ensure safe, stable, and efficient transmission.

With our Zero-Flux current Measurement systems, we take high-voltage measurement to a new level. Designed for the most demanding conditions – indoor, outdoor, onshore or offshore – they remain stable, accurate, and completely non-intrusive, even under extreme electrical stress.

Each system is engineered to ensure reliable control, monitoring, and safety across HVDC applications – enabling the energy infrastructure of tomorrow. Changing how we measure power means changing how the world stays connected.

FULLY ENCAPSULATED

for heavy-duty use and environmental conditions



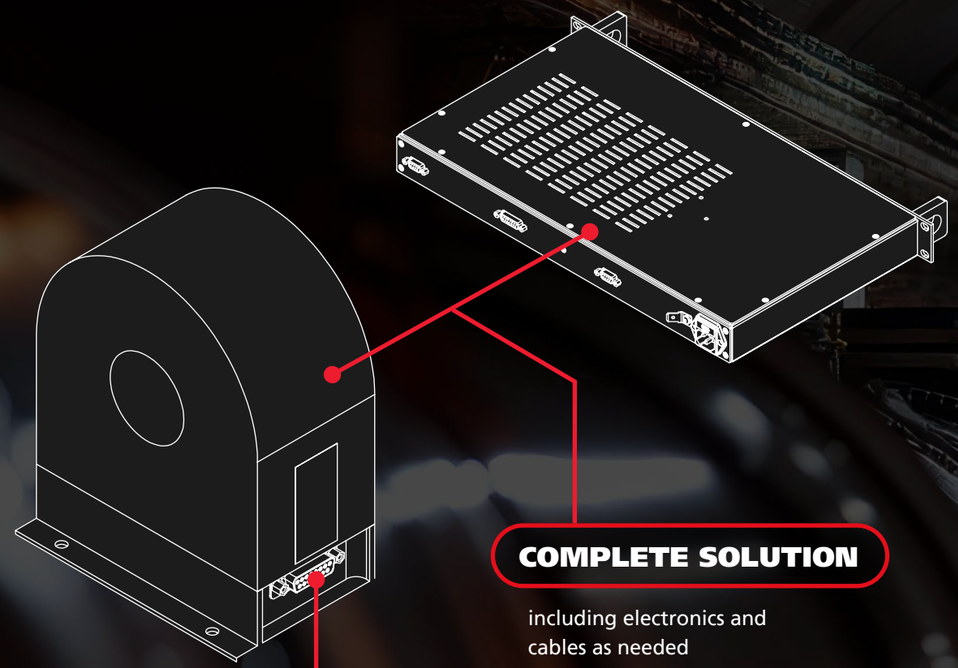
SERIES **H**

High Voltage Measurement

reliable solutions for harsh environments

- **// Up to 8.000 A**
- **// Accuracy in the ppm range**
- **// Available as redundant systems**
  1 - 3 Measurement units

AC DC



COMPLETE SOLUTION

including electronics and cables as needed

FLEXIBLE INTERFACES

SERIES **MH**

High Precision Zero-Flux Measurement

- **// Up to 30 kA**
- **// Up to 800 kHz**
- **// Accuracy in the sub-ppm range**
- **// indoor area**

CHANGING THE WAY WE MEASURE KNOWLEDGE.

Science drives change – and we empower it.
Every discovery begins with precise data, and every new world revealed depends on reliable measurement.

We've been shaping the science of measurement since the 1970s. Our Zero-Flux current Measurement systems deliver
unmatched accuracy, linearity, and long-term stability – making them the trusted choice for scientific institutions and research projects across the globe.

From particle accelerators to plasma physics, our custom-built solutions help scientists push the limits of what's measurable – and what's possible.

Where precision meets discovery, change begins.

CHANGING THE FUTURE OF PRECISION.

As industries evolve toward smarter, cleaner energy, precision becomes the key to progress. Every tenth of a percent in efficiency can redefine performance, reduce emissions, and make a measurable change. Our **DualFlux** Measurement systems bring laboratory precision to industrial environments for both – AC and DC current.

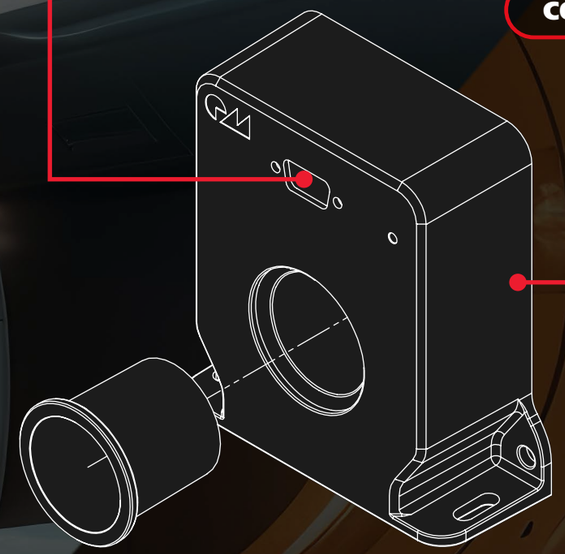
Built on decades of scientific experience, these systems deliver proven stability and repeatability that drive innovation in automation, power electronics, and high-efficiency design.

From science to industry – we turn precision into progress.

DUAL FLUX

FLEXIBLE INTERFACES

COMPACT DESIGN



SERIES **DFX**

Highest Measurement accuracy

In the **DualFlux** product family, the focus is on precision, user-friendliness, and seamless integration. For demanding measurement and testing tasks, our system is engineered for maximum reliability.
Designed for industrial applications, it adapts effortlessly to diverse energy systems and testing environments. Every detail is made for performance.

// Primary nominal current: **up to 1.500 A** $_{RMS}$
// Linearity error: **≤ 2 ppm**
// Output offset error: **≤ 5 ppm**
// Offset drift: **≤ 0,1 ppm/K**

AC DC

TRANSFORMING POWER INTO PERFORMANCE

As one of the leading winding component specialists, we deliver tailor-made transformer solutions trusted by customers around the world. From automation and drive systems to machine tools, test equipment, and control cabinets – our transformers, chokes, and filters ensure reliable power supply and consistent power quality.

With deep industry expertise and a strong focus on electrical safety, long-term quality, and application-specific requirements, we don't deliver components – **we deliver solutions.**

TRANSFORMERS

For the right power supply, every application requires a perfectly matched transformer. Our transformers are functional, reliable, energy efficient and safe for long-term operation. Single-phase and three-phase versions as dry-type transformers in accordance with EN61558 up to a core power of approx. 1,2 MVA, depending on needs and requirements wound with copper or aluminum conductors. In standard or customized design, We offer you, among other things: Mains-, matching-, medical-, converter-, high-current-, economy-, safety-, isolating and pre-magnetisation transformers.

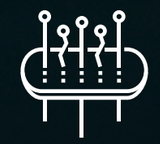
// up to 1.200 kVA - higher for autotransformers

CHOKES

To ensure the power quality for trouble-free operation in the drive systems, we provide single-phase or three-phase chokes in accordance with EN61558, in the frequency range up to 3 kHz and DC (direct current). We use core materials such as iron and ferrites. Operating voltages up to 7,2 kV and currents up to approx. 4.000 A can be realised technically and economically with copper or aluminum strip windings. In standard or customized design we offer you, among other things: Mains-, filter-, load-, motor-, output-, double-deck-, storage-, smoothing- and commutation-chokes.

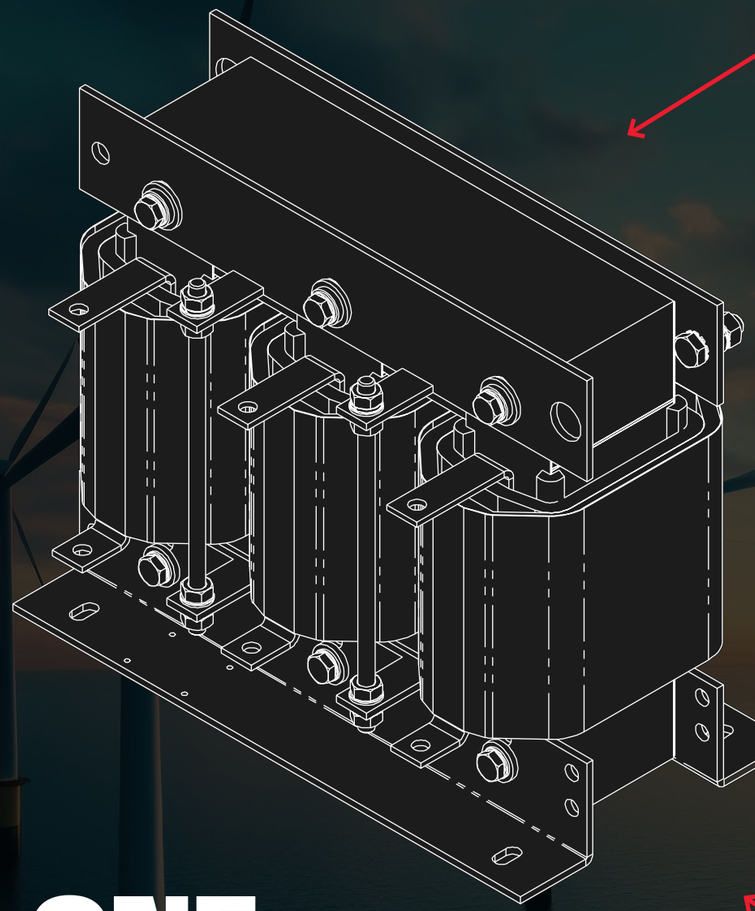
// up to 4.000 A

FILTERS



To ensure the maximum functionality and safety of electronically controlled drives, it is important to significantly reduce electromagnetic (EMC) interference and charging current peaks must be significantly reduced. We offer a broad portfolio of filters for this purpose - from input-side LCL filters for energy recovery through dU/dt and sine filters downstream to protect the motor. We also offer LHF filters, which are used upstream of the frequency inverter to reduce the harmonics in the input grid.

// solutions for demanding applications



ONE PRODUCT. THREE SOLUTIONS.

THREE PHASE CHOKE

3x 690 V	3x 0,51 mH	50/60 Hz Fundamental frequency	
3x 200 A	ta 50°C	2 kHz Switching frequency	

WINDING 100 x 0,5
with aluminum tape

13 26.982 **Al** Aluminium

WF Water Forced

70 kg Weight	W: 300 / D: 250 / H: 320 mm Dimensions	260 W Losses Air | 1.040 W Losses Liquid

THREE PHASE CHOKE

3x 690 V	3x 0,51 mH	50/60 Hz Fundamental frequency	
3x 200 A	ta 50°C	2 kHz Switching frequency	

WINDING 150 x 1,0
with aluminum tape

13 26.982 **Al** Aluminium

AN Air Natural

90 kg Weight	W: 420 / D: 260 / H: 350 mm Dimensions	600 W Losses

THREE PHASE CHOKE

3x 690 V	3x 0,51 mH	50/60 Hz Fundamental frequency	
3x 200 A	ta 50°C	2 kHz Switching frequency	

WINDING 100 x 1,0
with copper tape

29 63.546 **Cu** Copper

AN Air Natural

100 kg Weight	W: 420 / D: 260 / H: 300 mm Dimensions	500 W Losses

AC DC

INDUCTIVE COMPONENTS

We offer you customized special solutions, e.g. air coils, a choke type but without an iron core. They are mainly installed in test facilities and systems, where they are used as test loads, for example to test switching elements with high short-circuit strength requirements. Air-core coils are characterised by their compact design and high mechanical stability, which is mainly due to the cooling channels between the layers and the round winding shape. We can offer you a wide range of other inductive solutions on your request.

CUSTOMIZED SOLUTIONS

For maritime applications, for example: Ship generators generate the necessary energy, which is fed by a medium-voltage (MV) transformer into the onboard grid. In order to avoid overloading the generator during switch-on processes, the MV transformer is briefly pre-magnetised on the secondary side by a special transformer. This electrical process using a pre-magnetisation transformer dampens an uncontrolled increase in the inrush current in order to enable safe switch-on processes. We are also happy to provide you with solution-orientated assistance for your individual application requirements.

As your solution provider, we don't deliver products – we deliver solutions. Whether it's a custom transformer or expert advice, we're here to support you and your project.

Get in touch and discover how we can support your project – with solutions that truly make a difference.

+49 (0) 2428 905 370

WE DELIVER SOLUTIONS THAT MAKE A MEASURABLE CHANGE.

Shaping Change with Smart Transformer Solutions. We stand for reliable transformer technology in all shapes and sizes – from standard products available off the shelf to optimized series models and fully customized special designs.

Our transformers are developed to meet the highest technical standards and tailored to your specific requirements – whether for industrial automation, energy systems, or complex control environments.

By combining flexibility, precision, and proven quality, we deliver more than just components: **We deliver solutions that power real change**.

COOLING CONCEPTS AS NEEDED.

Where performance meets precision, cooling makes the difference. Whether air or water – natural or forced – we design cooling solutions that perfectly match your application and environment. From compact air-cooled units to high-performance water systems, every concept is engineered to ensure reliability, efficiency, and measurable change.

AN
Air Natural

AF
Air Forced

WF
Water Forced

LOSS REDUCTION

up to 65 %

Achieved through targeted material selection and optimized design

MORE EFFICIENCY. LESS EMISSIONS.

SUSTAINABILITY

Use of nanocrystalline, amorphous, and ferrite materials for maximum efficiency.

SHORT PAYBACK PERIOD

Higher investments often pay off after a short period of operation.

CONSULTING

We provide support in choosing between conventional and loss-reduced solutions.

// get in touch

IN THE NACELLE

TOWER INTERIOR

MAKE A CHANGE WHEREVER ELECTRICAL ENERGY FLOWS.

From Top to Bottom. Wherever power is generated, transformed, or controlled – our solutions make a measurable difference.

// CHOKES
For vibration damping and grid feedback reduction

// FILTERS & CHOKES
For grid stabilization

// SELF-SUPPLY TRANSFORMERS
Power supply for control and monitoring systems
Operation of sensors and Measurement devices
Power supply for pitch systems (blade adjustment)
Power supply for cooling systems and hydraulic pumps
Lighting and others

// CURRENT TRANSFORMERS
For Measurement generated current
For current monitoring. Optional intermediate measurements, e.g. for maintenance units

// MEASUREMENT TRANSDUCERS
For converting signals to control system formats

// CURRENT TRANSFORMERS AND MEASUREMENT TRANSDUCERS
For integration into the turbine control system
For grid monitoring and feed-in control

TOWER BASE

AC DC