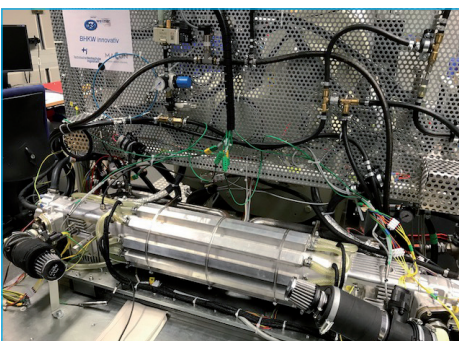
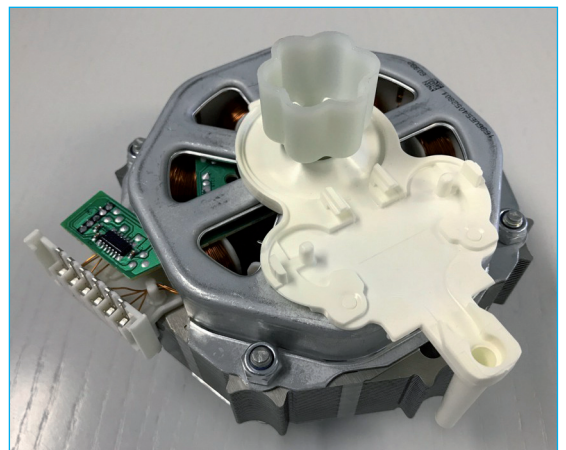
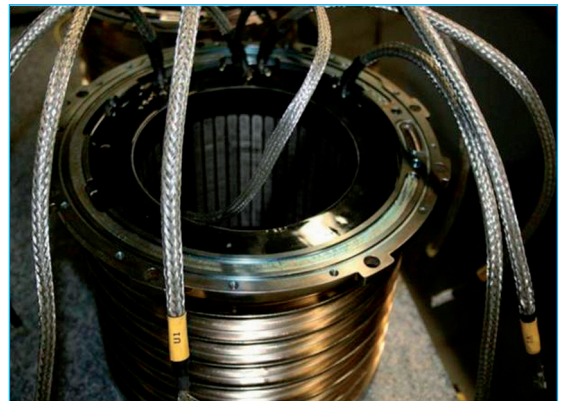
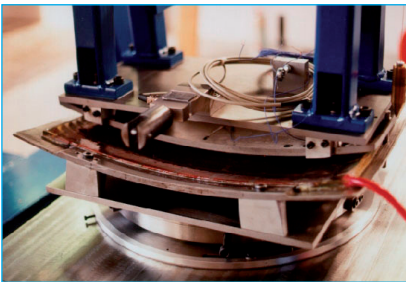


Torque, Linear and Custom Motors
Stepper, Servo and Traction Motors
Drive Electronics and Controllers
Actuators and Sensors
CAE Tools and Engineering
Motion Control Systems

MOTOR DESIGN & CAE SOFTWARE

Optimizing Motors & Motion Control Systems



MACCON
The Mechatronics Company

MACCON – OPTIMIZING MOTORS & MOTION CONTROL SYSTEMS

MOTOR DESIGN & CAE SOFTWARE

Designing and Optimizing Electric Motors

Front page

“Examples of the many frameless and housed bespoke motors that MACCON has designed and manufactured. The applications shown range from Science, through E-mobility, white goods to power generation”

System Design & Simulation Services

MACCON is a technical leader in the design and prototype production of electric motors in the power range up to 250 kW. In addition to the CAE tools presented in this brochure we also offer technology and manufacturer independent development services to our customers.

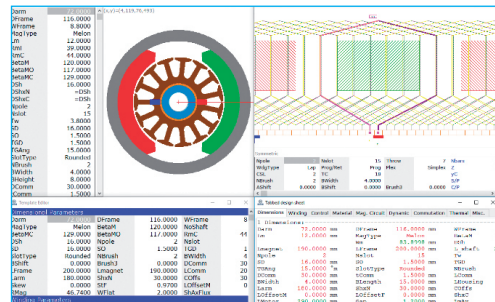
Research & Training

MACCON participates in many research programs around the electric motor, together with other companies and Universities. Examples are ADEPT and MATE, which target the optimisation of electric motors in drive trains, especially in regard to efficiency, vibration and noise.



We also hold regular motor design seminars – see our webpage for the next events.

MACCON is a leading supplier of electric motors, EM-actuators, drive and control electronics in the power range up to 250 kW as well as Motion Control accessories.

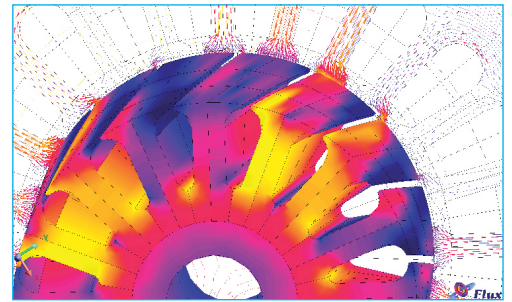


We master not only the configuration and application of drive systems but also the design of the motors themselves, we provide the CAE design tools needed.

The main tools that we use and support:

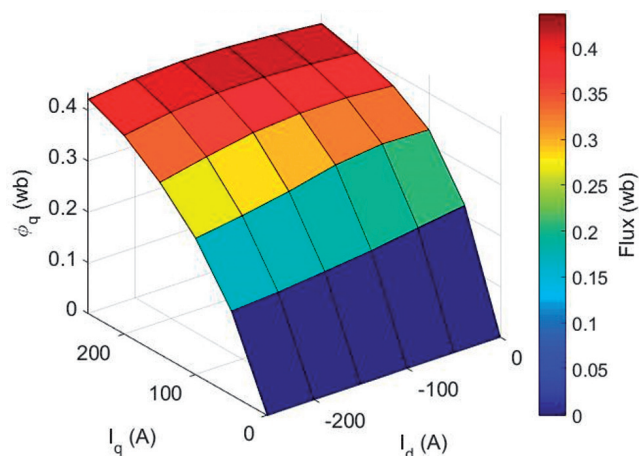
- SPEED® for the quick analytical design of all types of electric motors
- FLUX® for 2D and 3D simulation of all electromagnetic systems
- MotorCAD® for the thermal and electromagnetic verification of electric motors

We also apply these tools intensively in our own motor design and consultancy activities. This way we help other motor manufacturers and ourselves stay at the forefront of electric motor design technology.



Further we provide many more related programs and services, which are needed for the efficient and safe simulation and optimization of electric motors and any electromagnetic devices, as well as the drive and control systems, in which they are embedded.

Direct Axis Flux



MACCON – OPTIMIZING MOTORS

ELECTRIC MOTOR DESIGN WITH CAE

Design and Simulation of Electric Motors

SPEED

For fast simulation results, when designing electric motors, we apply and recommend SPEED.

Siemens PLM

Siemens PLM Software helps companies transform their business and develop innovative products and services. Its customers are better equipped to respond successfully to the challenges of digitalization. Its solutions optimize their processes from planning and development through manufacturing and lifecycle support to realize innovation.

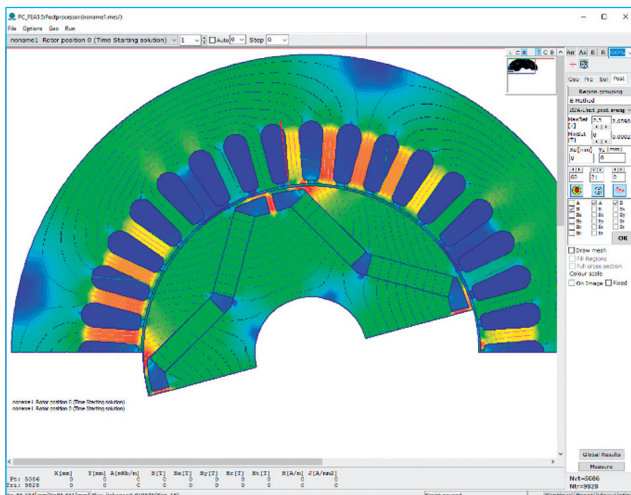
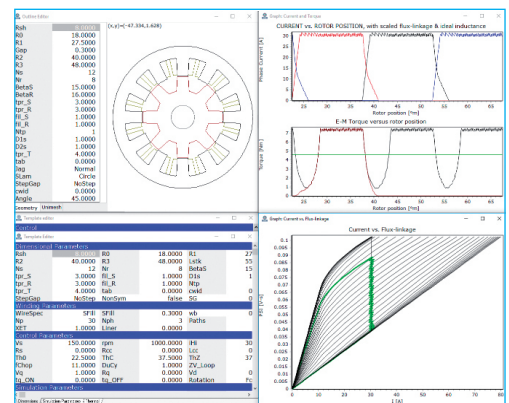
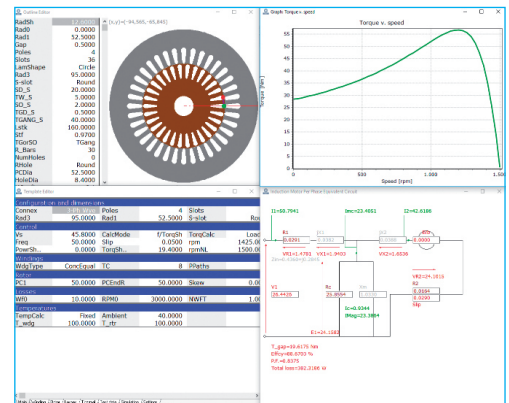
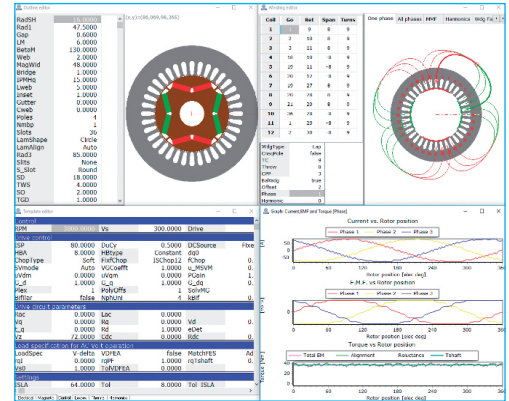
MACCON is the specialized partner of Siemens PLM for electric motor design related software.

SPEED Main Features

- Template based geometry editor
- Intuitive winding editor
- User specific materials database
- Fast analytic simulation
- Graph, table and phasor diagram output
- Parameter ranging
- Optimisation using generic and stochastic algorithms
- Embedded FEM calibration

Motor Types

- DC commutator and universal motors
- Permanent magnet motors
- Induction motors
- Switched reluctance motors
- Synchronous reluctance motors
- Linear motors



MACCON – OPTIMIZING ELECTROMAGNETIC SYSTEMS

ELECTROMAGNETIC FEM DESIGN

FLUX 2D/3D – Simulation of electromagnetic and thermal performance

FLUX General Features

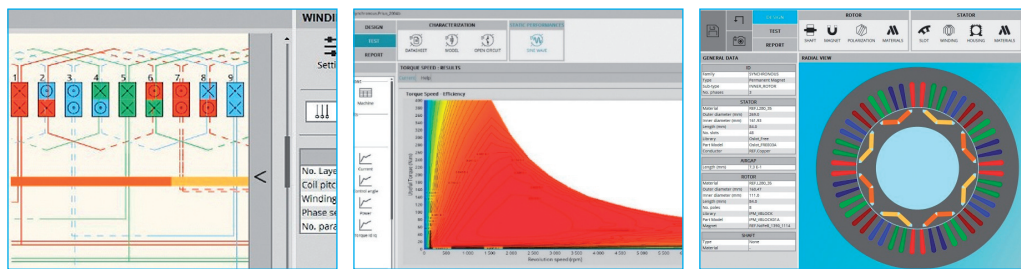
- Full 2D/3D FEM analysis (also 2½D)
- Magnetic, electrical and thermal solver
- Dedicated 2D/3D templates for electrical machines
- Full parametric analysis
- Integrated circuit editor
- Circuit and kinematic coupling
- Distributed computation

Applications

- Electric motors of all types
- Actuators
- Transformers
- Inductive charging
- Inductive, capacitive and eddy-current sensors
- Inductive heating
- Insulation equipment
- Etc.

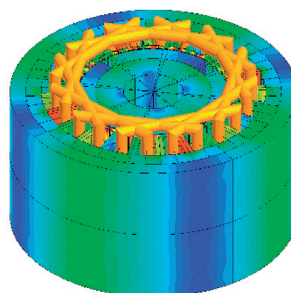
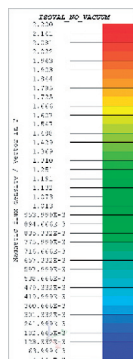
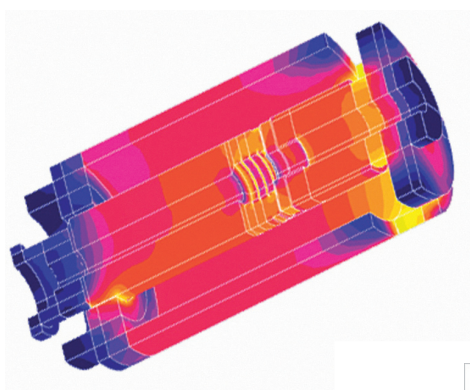
FLUX Motor® Highlights

- Dedicated to electric rotating machine design
- User-oriented winding tool
- Automated tests and reports, allowing quick evaluation of machine efficiency
- Fast, without compromising accuracy
- Open material database
- Effective machine parts management
- Innovative management of projects



Benefits

- Rapidity of design
- High productivity gain
- Efficient working environment
- Model creation and evaluation within minutes
- Better visualization of machine performance
- Useable by both beginner and expert
- Easy data export for advance studies



MACCON – OPTIMIZING MOTION CONTROL SYSTEMS

SYSTEM DESIGN & APPLICATIONS

System Design and Co-Simulation with FEM

Automotive (BMW i3)

The i3 is one example, where MACCON provides the tools and engineering support to design high-performance drive trains, in this case for an electrically powered car. MACCON also provides its own motor designs for electric vehicles up to 200 kW.



General Feature

- System Simulation with Activate and MATLAB
- Real Co-simulation FLUX-Activate
- Import of FLUX 2D/3D models in Activate system simulation
- Simulation of PWM and other effects on FEM model
- Supports Hardware-in-the-loop simulation

Simulation and Optimization Results

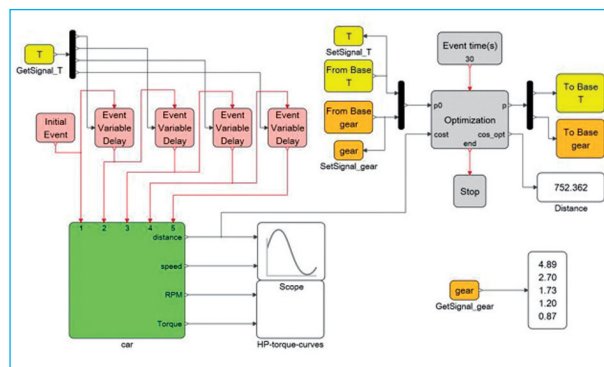
- Best Electro-magnetic design
- Best thermal performance
- Best sound and vibration characteristics
- Best servo- and dynamic response
- Highest system viability
- Minimum volume and mass
- Lowest production cost
- Minimum implementation risk
- And many more benefits

White Goods (Thermomix®)

MACCON also supports manufacturers of consumer goods in perfecting electric motors for mass production.

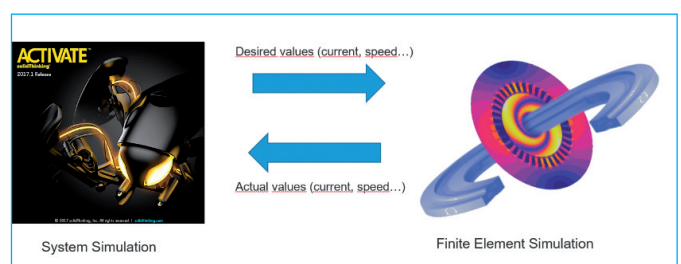


For the Thermomix we developed a high-speed motor design based on switched reluctance technology. Over 1 million units are produced every year.



Science (SOFIA)

The test installation for the 3D torque motor of the SOFIA telescope. Many large telescopes and tracking antenna systems are fitted with MACCON torque motors.



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Stepper, Servo and Traction Motors	Aschauer Str. 21 • D-81549 Munich
Drive Electronics and Controllers	Tel. 089/65 12 20-0
Actuators and Sensors	Fax 089/65 52 17
CAE Tools and Engineering	sales@maccon.de
Motion Control Systems	www.maccon.de

Company Portrait

MACCON is a leading supplier of electric motors, EM-actuators, drive and control electronics in the range of 1 W to 250 kW. The company was founded in 1982.

MACCON provides drive solutions to meet demanding system requirements. We co-operate with many reputable product manufacturers, combining their high-quality products with our own custom-developed designs, to create high-performance yet cost-effective drive systems.

Our mission is to serve users in solving their real-time motion control problems in machines, processes and experiments. We ensure that the target machine exhibits:

- Precise, dynamic and smooth motion
- Compatibility with electrical and mechanical interfaces as well as with the host control
- Perfect adaptation to the physical environment

We are committed to providing our customers with top quality products and performance along with expert technical support. We strive to be the technical leader in motion control systems.

Firmenportrait

MACCON ist ein technisch führender Anbieter von Elektromotoren, EM-Aktuatoren, Antriebs- und Steuerelektronik in der Leistungsklasse 1 W bis 250 kW. Das Unternehmen wurde 1982 gegründet. MACCON löst anspruchsvolle Antriebsaufgaben, die hohe, technischen Anforderungen stellen. Wir arbeiten mit vielen renommierten Partnerunternehmen zusammen, deren hochwertige Produkte, kombiniert mit unseren eigenen Entwicklungen, die Realisierung leistungsfähiger und zugleich wirtschaftlicher Antriebssysteme ermöglichen.

Es ist unsere Aufgabe, Anwender bei der Lösung ihrer Echtzeitbewegungsprobleme in Maschinen, Anlagen und Experimenten zu unterstützen. Wir stellen in der Zielmaschine sicher:

- Eine genaue, dynamische und gleichläufige Bewegung
- Die Anpassung unserer Produkte an die Hoststeuerung sowie an die mechanischen und elektrischen Schnittstellen
- Eine perfekte Anpassung an die physikalische Umgebung

Wir sind dem Grundsatz verpflichtet, unseren Kunden sowohl eine erstklassige Produktqualität und -performance als auch eine gute technische Beratung zu liefern. Wir streben die fachliche Führung im Bereich der elektronischen Antriebstechnik an.

