



INTERACTIVE MOTOR DESIGN WITH GT-FEMAG DESIGNER

Simulation Solutions for E-Mobility Engineering

Interactive Design Environment for Rapid Motor Prototyping

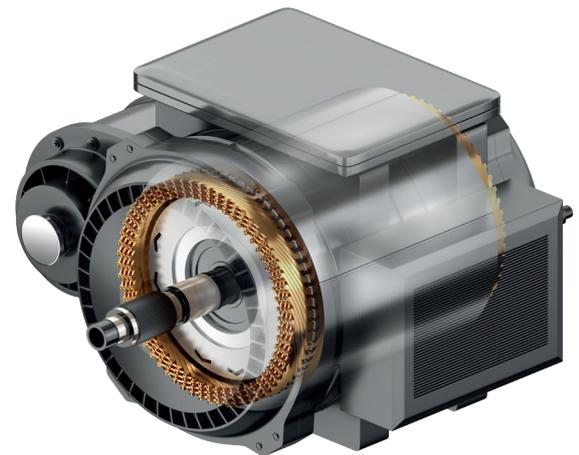
Designing an electric motor from a blank page is one of the most challenging stages of the development cycle. Motor designers must balance electromagnetic performance, manufacturability, thermal constraints, mechanical integrity, and winding strategies often under intense time pressure and with limited visibility into how design choices will behave once integrated into the full system. Early decisions carry a high impact, yet exploring multiple configurations can be slow, manual, and prone to iteration bottlenecks.

GT-FEMAG Designer was created to solve this challenge.

Purpose-built for the initial design phase, **GT-FEMAG Designer** gives motor engineers an interactive, intuitive environment where they can rapidly explore concepts, evaluate feasibility, and converge on manufacturable designs before committing to detailed multi-physics simulation.

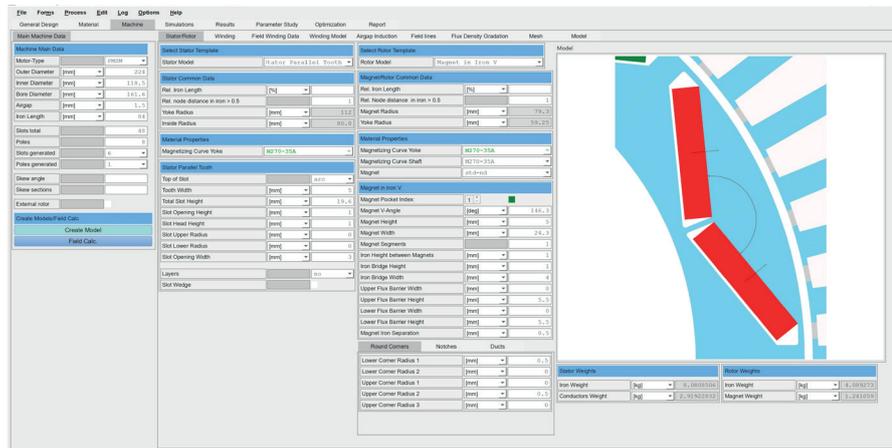
Benefits of GT-FEMAG Designer

- ▲ **Accelerated Design Process.**
Ideal for early-phase evaluations and concept refinement.
- ▲ **Manufacturing-Ready Designs.**
Create realistic, manufacturable motor designs
- ▲ **Comprehensive Early-Phase Insight.**
Seamless integration with GT-FEMAG's multi-physics capabilities
- ▲ **Intuitive, Engineer-Focused Workflow.**
User-friendly interface designed for motor engineers



Key Features

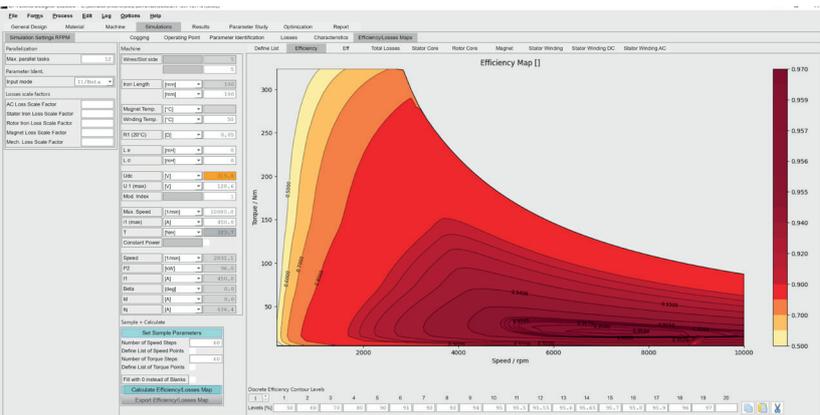
- Interactive Design Environment.**
 Rapidly iterate and test motor design concepts.
- Hairpin Winding Layout Designer.**
 Automatically determine optimized, manufacturable hairpin winding layouts that balance performance and feasibility.
- Segmented Magnet Simulation.**
 Model segmented magnets arranged in concentric rings for more realistic and production-ready rotor designs.
- End Winding Analysis.**
 Calculate leakage inductance and resistance of end windings with precise analytical tools.
- Skewing Analysis.**
 Evaluate and optimize skewing strategies to reduce cogging torque and improve acoustic behavior.
- Cogging Torque Analysis.**
 Perform detailed evaluation of cogging torque characteristics.



GT-Designer VMagnet Input

Advanced Performance Features

- Operating Point Calculation.**
 Compute comprehensive operating point characteristics, including dq-parameters and flux linkages.
- Parameter Identification.**
 Automatically identify key motor parameters essential for control development and model reduction.
- Boundary Curve Generation.**
 Generate Torque-Speed, Current-Speed, Voltage-Speed, and Efficiency/Loss-Speed characteristic curves quickly and consistently
- Efficiency & Loss Mapping.**
 Create detailed efficiency maps and component-specific loss distributions, including:
 - Stator and rotor iron losses
 - DC and AC winding losses
 - Magnet losses



GT-FEMAG Designer Efficiency Map

Ecosystem Integration



01 Start in GT-FEMAG Designer

Create, refine, and optimize early-phase motor designs

02 Move into GT-FEMAG

Perform detailed electromagnetic, thermal, and mechanical simulations using the full multi-physics engine.

03 Export to GT-SUITE

Integrate the validated motor model into complete drivetrain and system-level simulations.