

SYNCHRO-SYM™ Retrofit Enables ~50% Better Performance-to-Price from Existing E-Motors — Eliminates Rare-Earth Magnets

BEM's SYNCHRO-SYM™ upgrades today's E-motors enabling ~50% better performance-to-price, 2× nominal power, no rare-earth magnets—OEM-ready.

BOSTON, MA, UNITED STATES, November 5, 2025 /EINPresswire.com/ -- Best Electric Machine (BEM) today announced new performance findings demonstrating that its patented SYNCHRO-SYM™ symmetric motor architecture can retrofit into conventional electric-motor system packaging geometries while delivering approximately 50% higher performance-to-price than state-of-the-art permanent-magnet and reluctance drive systems.

Unlike today's electric-motor systems relying on asymmetric passive-rotor architectures — including permanent magnets, reluctance, induction, or field excited designs — paired with external derivatives of field-oriented control (FOC), which rely on packaging optimizations and incremental magnetic material improvements — SYNCHRO-SYM introduces a fundamentally different approach: a symmetric electromagnetic circuit and control with an active-rotor architecture, unified with Brushless Real-Time Emulation Control (BRTEC™).

This architecture doubles usable electromagnetic contribution by enabling both stator and rotor to independently participate in real work conversion, overcoming the inherent limitations of passive-rotor machine systems, including magnetic saturation.

"Industry has spent decades admirably refining packaging geometries and materials," said Fred Klatt, CTO of Best Electric Machine. "SYNCHRO-SYM changes the physics inside the same



Best Electric Machine Logo – Representing SYNCHRO-SYM™

geometry — delivering higher power density, wider speed range, less material, and lower cost-per-kilowatt without rare-earth magnets.”

Key Advantages of SYNCHRO-SYM™

- ~50% better performance-to-price in like-for-like form factors
- No rare-earth permanent magnets — mitigating supply risk and cost volatility
- Active rotor power contribution — doubling utilization vs. today’s passive rotor machine systems
- 2× nominal power — with the same package geometry, port voltage, and excitation frequency
- Up to 8× peak-torque capability — sustained without magnetic saturation
- Lower controller cost & loss via direct AC-to-AC BRTEC architecture
- Reprogrammable 3D-printing motor manufacturing (MOTORPRINTER™) for rapid scale and domestic production

SYNCHRO-SYM maintains compatibility with existing radial-flux, axial-flux, in-wheel, and direct-drive packaging formats, allowing vehicle OEMs to adopt the architecture without platform redesign — and, with unified BRTEC, simplified electrified-platform integration.

Industry Relevance

As EV manufacturers face rare-earth supply constraints, cost pressures, and demands for higher drive-unit density and efficiency, SYNCHRO-SYM offers a novel physics-based alternative that achieves superior torque-speed characteristics, 2× constant-torque-speed range, and high efficiency across load conditions. This comes at a pivotal moment for the EV sector, where drivetrain efficiency, supply chain resilience, and manufacturing scalability are priority challenges.

SYNCHRO-SYM technology has been validated through prototype development, patents, and comparative electromagnetic analysis using industry-standard packaging. BEM is now preparing early-adopter deployments as part of its commercialization program, aligned with increasing OEM interest in rare-earth-free motor solutions.

About Best Electric Machine

Best Electric Machine develops and manufactures advanced symmetric electric-machine systems and integrated drives for automotive, aerospace, and renewable-energy applications.

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