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Q&A with Tesla's Motor Man

The principal motor engineer at Tesla describes why modeling and optimization is so vital to its design process.

By Christian Ruoff

Creating a state-of-the-art electric vehicle requires a deep understanding of all the components. More importantly, it requires a continual process of analysis and optimization of the components to push the limits of driving range, efficiency, performance and cost reduction. The internal combustion engine has had the benefit of millions of man-hours in engineering analysis and refinement over the past century, while the collective engineering effort of the EV industry has just begun.

It comes as no surprise that Tesla, the EV trailblazer, spends a considerable amount of resources on internal R&D to develop better parts for EVs, and that its testing facilities and engineering talent are at the forefront of the industry.

As Tesla's Principal Motor Designer, Konstantinos Laskaris is responsible for the electromechanical design and optimization of the company's existing and future traction motors. Before joining Tesla, Laskaris earned a PhD from the National Technical University of Athens, Greece. There he combined advanced methodologies and developed algorithms for motor geometry optimization.

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Charged recently chatted with Tesla's motor guru to learn more about the process the company uses to continually evaluate and optimize motor design choices.

Charged: In general, how are electric motors inherently better for traction applications than combustion engines?

Laskaris: When you simply compare any other high-end conventional car to a Tesla, you see a tremendous difference. This is because of the technology.

As for the motor, specifically, there is a huge efficiency advantage, and it is extremely quiet and vibration-free, with very high power density and instantaneous direct response to inputs. All these characteristics of electric motors give an unparalleled performance advantage.

This is why it was so important for Tesla, as a company, to break the stereotype that's been out there for years. People needed to see that performance, efficiency and range can coexist in an EV. The dual-motor powertrain Model S is the fastest sedan that has ever been mass-produced. The total motor power exceeds 700 hp, and it spins as fast as 18,000 rpm - speeds that we previously only found in Formula 1 racing vehicles.

You could say that the electric motor is magic from the perspective that it awakens the sedan car.

Charged: When Tesla decides to change a parameter of its vehicles - like increase the peak battery current or add towing capacity - what does that mean for your motor design team? Do you have an iterative design process?

PLAN

- 1. I will put elecrostation in Almaty
- 2. Buy 4 boxes for studio
- 3. Dont pay taxes for bigger profit
- s4. I sure rich people will buy my cars cause electro engine faster then sport engine
- 5. Buy my stock and take Stonks and profit !


AG

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