Horse Powertrain reveals methanol REEV engine and generator

- HORSE D20 Methanol is a range-extended EV (REEV) powertrain integrating a four-cylinder, 2L turbocharged engine, power electronics, and a generator
- Powertrain's engine burns 100% methanol fuel, from cold starts as low as -35°C
- Features one of automotive's first mass-market axial flux motors: 46% shorter than equivalent radial flux motor, with 63% greater volumetric power density
- Overall powertrain achieves a 47% fuel-to-energy conversion ratio, enabling 40kWh battery recharge from just 19.6L of fuel

London, UK (14th July 2026) – Horse Powertrain, a global leader in innovative, low-emission hybrid and combustion powertrain solutions, has revealed its new HORSE D20 Methanol range extender powertrain.

First shown at Beijing Auto Show 2026, the HORSE D20 Methanol is intended for use in range-extended EVs (REEVs), where it acts as a reserve power source to recharge a vehicle's battery. Outputting up to 105kW, the powertrain weighs 170kg and combines a motor, power electronics, and a 2.0-liter turbocharged four-cylinder engine.

The HORSE D20 Methanol's engine is designed to run off 100% methanol fuel blends, and features a range of cutting-edge technologies such a 240mJ high-energy ignition system to enable ultra-lean burns of methanol in the engine cylinders. Along with increasing fuel economy, these technologies also allow the engine to undertake pure-methanol cold starts from temperatures as low as -35°C. The HORSE D20 Methanol's NO_x emissions comply with China's CN6b standard of 35mg/kWh, and consequently the Euro 7 standard of 60mg/km.

Key to the powertrain is its all-new generator architecture, in the form of an axial flux motor mounted directly on the engine crankshaft. Unlike traditional radial flux motors, where the rotor typically exists as a cylinder nested within the stator, axial flux architectures layer the rotor and stator as disks stacked atop one another – in the case of the HORSE D20 Methanol, its axial flux motor is of a "yokeless" design consisting of two rotors surrounding a single stator.

Compared to a like-for-like radial flux motor, the new axial flux motor on the HORSE D20 Methanol is 46% shorter and can output 63% more kW per unit of volume, enabling a range of packaging opportunities and efficiencies. The motor also boasts an extremely high electrical efficiency of 96.4%, leveraging solutions such as an embedded silicon carbide power module to minimize electrical losses.

Bringing together the efficiency of the engine with the electrical systems, the HORSE D20 Methanol achieves unprecedented fuel economy. In lab testing, the powertrain achieves a 47% fuel-to-energy conversion ratio, with 1kWh of electrical energy produced for every ~2.1kWh of methanol burned. As a result, the HORSE D20 Methanol can fully recharge a 40kWh EV battery with just 19.6L of fuel.[1]

Fortune Zhao, CTO of Horse Powertrain, said: *"The HORSE D20 Methanol is one of our boldest statements of intent so far. Along with reflecting our commitment to alternative fuels via its central methanol engine, and offering a flexible mobility solution as a range extender powertrain, the HORSE D20 Methanol is a staging ground for a range of cutting-edge technologies to deliver a powertrain of unparalleled compactness and efficiency. This can be seen in our use of an axial flux motor to achieve the necessary width and volumetric power density for the unit, marking one of the first uses of the technology in a mass-market automotive powertrain."*

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About Horse Powertrain

Horse Powertrain is a global leader in innovative, low-emission hybrid and combustion powertrain solutions, supporting automotive OEMs with a range of systems including engines, transmissions, power electronics, range extenders, and integrated hybrid platforms. Horse Powertrain has operations in Europe, China, and South America, and employs over 19,000 people across 18 plants and five R&D centers. Its 25 customers include Renault Group, Geely Auto, Volvo Cars, Proton, Nissan, and Mitsubishi Motors Corporation. Horse Powertrain is headquartered in London, UK.

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Notes

[1] Assumes a gravimetric energy density of 19.5MJ/kg for methanol, and a volumetric density of 0.8kg/L.