Alternative to the Central Drive: The Drive-Brake Unit  
Modular and integrated drive solution on up to all four wheels

Propulsion and braking are among the core functions of any vehicle. Until now, the components required for these functions have been physically separated. Electrification of the drive makes it possible to position the drive directly on the wheel – together with other chassis components – in the future. To best meet the diverse requirements of electric vehicles, such as long range, low weight, compact installation space and easy serviceability, comprehensive vehicle level optimization is essential. A perfectly coordinated integration of brake and drive plays a key role in achieving this.‑level optimization is essential. A perfectly coordinated integration of brake and drive plays a key role in achieving this.

Integrated Drive-Brake Unit instead of a central drive

AUMOVIO is contributing its expertise in brakes and system integration to the development of Drive-Brake Units, for example in cooperation with Munich-based company Deep Drive. This integrated unit, consisting of an in-wheel motor and brake, is installed directly on the wheel and serves as an alternative to a central drive. Because the Drive-Brake Unit eliminates many components of a conventional drivetrain, such as the transmission, it is also comparable to current systems in terms of cost.

New capabilities and development opportunities with the Drive-Brake Unit

Interest from established vehicle manufacturers and new market participants is strong. Compared with the electric axle drives that are widely used today, the Drive-Brake Unit offers OEMs and drivers numerous market-relevant advantages. Its key strength is its ability to support very different OEM priorities – whether maximizing installation space, enabling torque vectoring, reducing fine dust emissions or improving sustainability. relevant advantages. Its key strength is its ability to support very different OEM priorities – whether maximizing installation space, enabling torque vectoring, ‑relevant advantages. Its key strength is its ability to support very different OEM priorities – whether maximizing installation space, enabling torque vectoring,

* **More installation space:** Integrating the drive and brake into one assembly frees up valuable space between the wheels.
* **Torque vectoring:** With the drive installed on the wheel, torque can be controlled individually for each wheel without having to install additional clutches in the transmission.
* **All-wheel drive option:** Front and rear-wheel drive vehicles can be upgraded to all‑wheel drive with minimal additional effort.
* **Optimal blending:** The close coupling of drive and brake enables precise coordination of motor and friction‑brake torque during deceleration, improving recuperation efficiency.
* **Safety:** With up to four motors in the vehicle, the Drive-Brake Unit increases overall system availability. If one motor fails, the vehicle can continue driving using the remaining motors.

Flexible integration of enclosed brakes for efficient space utilization

The motor and brake can be flexibly combined within the Drive-Brake Unit and tailored to meet different customer requirements. Depending on the required brake performance – especially in applications without recuperation – various brake concepts can be used, ranging from an integrated drum brake inside the in‑wheel motor to internally or externally mounted disc brakes.

Enclosed brakes, whether disc or drum, offer decisive advantages. They take full advantage of the available space inside the motor, reducing installation depth and space requirements. Their sealed design makes them significantly less susceptible to corrosion, even after long periods without brake actuation. At the same time, they already meet the significantly tightened fine dust emission limits anticipated under the upcoming Euro 7 regulations.‑dust emission limits anticipated under the upcoming Euro 7 regulations.

In the long term, AUMOVIO is developing a fully integrated “dry” disc brake solution that operates electromechanically without hydraulic actuation. In this concept, the entire Drive-Brake Unit is connected via a single cable and controlled by software. This significantly reduces system complexity, while at the same time creating greater freedom in vehicle architecture and function integration. In the long term, this will also make it possible to eliminate the central drive entirely. The resulting space between the wheels could then be used flexibly – for larger batteries and greater range, enhanced interior comfort or additional cargo volume.

Outlook: further evolution with more integrated functions

For the next evolutionary step after the drive-brake unit, AUMOVIO has already developed a concept for a complete Corner Module, which – beyond the Drive-Brake Unit – also integrates wheelguidance components, suspension, damping, wheel rim and tire, and, in its highest configuration level, the steering system. Brake Unit – also integrates wheelguidance components, suspension, damping, wheel rim and tire, and, in its highest configuration level, the steering system.‑Brake Unit – also integrates wheel‑guidance components, suspension, damping, wheel rim and tire, and, in its highest configuration level, the steering system.

Thanks to its modular, building‑block architecture, the Corner Module can be adapted to the performance and functional requirements of a wide range of vehicles and can meet numerous application demands. AUMOVIO is contributing its core expertise in vehicle dynamics, wheel brakes, air suspension and industrialization.

Further information on the concept and current development status of the Corner Module can be found in the corresponding backgrounder in the media kit.

**Images and Captions**

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| 01\_AUMOVIO\_Drive-Brake\_Unit\_Car | As an integrated unit consisting of a wheel hub motor and brake that is installed directly on the wheel, the Drive-Brake Unit represents an alternative to the central drive – also in terms of costs. |
| 02\_AUMOVIO\_DriveBrakeUnit\_Wheel | Thanks to its enclosed design, the brake in the Drive-Brake Unit is less susceptible to corrosion and already meets the stricter requirements for brake dust emissions in accordance with the upcoming Euro 7 emissions standard. |
| 03\_AUMOVIO\_DriveBrakeUnit\_exploded | The brake of the Drive-Brake Unit makes optimum use of the available installation space inside the motor, thereby reducing installation depth and space requirements. |