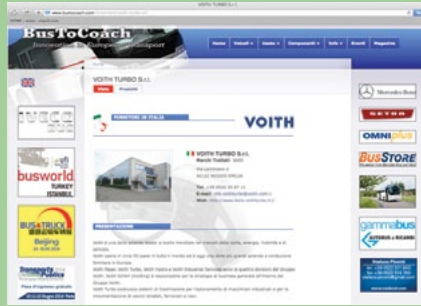


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ALLISON



Allison Transmission has developed an electric hybrid system with an extended electric range up to 15 km. The system features zero-emissions with engine off, including on approaching, during and leaving passenger stops. Among the innovations there are a high-energy lithium-ion battery for extended engine off range; a smaller

and lighter dual inverter with water ethylene glycol cooling for more efficient operation; and Increased Power Accessory II to improve fuel economy by using the hybrid system to power accessory components such as air conditioning, air compressors and power steering.

The system is electric-only capable, but no electric charging infrastructure is required. Battery is recharged via regenerative braking and engine operation. The regenerative braking capability can extend the brake change interval by up to 350%, while the two-mode split parallel architecture improves fuel economy up to 25%. ●

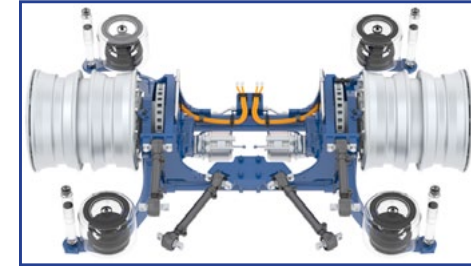
MICHELIN

The new tire for long-distance coaches branded Michelin is called X® COACH™ Z. It replaces the well-proven MICHELIN X® COACH™ HL Z and combines two innovative technologies. The first, which is called Regenion, adopts differently shaped grooves that ensure minimal tread deformation, reduce rolling resistance and lead to less fuel consumption. In addition, the longitudinal grooves regenerate as wear progresses, giving the tire a high level of grip and traction throughout its lifecycle and in all weather conditions.



The second is called Infinicoil and features a continuously wound steel wire inside the belt that increases load capacity and optimizes the ground contact patch. The new MICHELIN X® COACH™ Z is suitable for use in all seasons. ●

ZIEHL-ABEGG

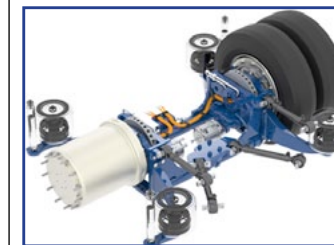


Independent suspension in-wheel hub drives (ZAwheel) and a modular construction kit for the spring system – conventional pneumatic or hydro-pneumatic. These are the innovations that the electric motor manufacturer Ziehl-Abegg launched at the last edition of the IAA in Hannover.

The independent suspension system significantly extends the usable space above the drive axle, even compared with the current axle drive module from Ziehl-Abegg, with two in-wheel hub motors, already less bulky than conventional axle systems.

In addition to this solution, Ziehl-Abegg also offers another step in the development process, absolutely new for the configuration of the installation space: a hydraulic braking system combined with hydro-pneumatic suspension. A modular system has been developed for this purpose, enabling all the available pneumatic, hydraulic and electric technologies to be combined.

By adopting this strategy, sufficient space is created for the battery packs in the vehicle sub-structure, shifting the center of gravity downwards. This makes it possible to adopt the principles of lightweight construction, also for electrically-powered commercial vehicles.



Travelling with hydro-pneumatic independent suspension, the rolling motion is completely eliminated, without requiring the use of a mechanical anti roll bar. The chassis can also be raised or lowered completely. This allows ultra-low-floor designed vehicles. "Independent suspension is the logical further development of our ZAwheel engine", emphasizes Ralf Arnold, Director of the Ziehl-Abegg Automotive operating sector, «because the significant saving in space can only be achieved with genuine in-wheel hubs». ●