Auxiliary Units (BEV)

In battery electric vehicles (BEVs), auxiliary units perform all the supporting tasks that are not directly related to propulsion but are essential for safe, efficient, and comfortable operation. These include systems for steering, cooling, climate control, and brake assistance. Unlike in vehicles with internal combustion engines, these components are not mechanically driven but operate entirely electrically.

Function

Auxiliary units in BEVs support and enable the key comfort, safety, and thermal management functions, operating electrically on demand regardless of driving conditions. Mechanical coupling to a crankshaft is completely eliminated, as there is no internal combustion engine.

Auxiliary units supporting key vehicle functions, include:

- **Steering assistance:** Electric power steering systems that adjust support depending on the speed and driving conditions.
- **Thermal management:** Electric coolant pumps regulate the temperature of the high voltage battery, electric motors, power electronics, and the cabin (heating/cooling).
- **Climate control:** Electrically driven air conditioning compressors allow cabin cooling, independent of the driving conditions, even when the vehicle is stationary.
- **High voltage heaters** provide cabin heating.
- Depending on the braking system, **electric vacuum pumps** ensure reliable operation of the brake booster.

With increasing electrification and a growing number of electronic systems, the energy demand of modern vehicles is rising. Therefore, auxiliary units are specifically controlled to optimise energy consumption, range, and overall efficiency.

Environmental Protection

Auxiliary units in BEVs actively contribute to the vehicle's environmental friendliness. They produce no local emissions and operate efficiently, as they are only activated when needed. The elimination of permanently driven mechanical systems reduces energy losses and improves the overall efficiency of the electric drivetrain. This supports the high efficiency that is a characteristic of electric vehicles.

Safety

Electric auxiliary units play a crucial role in the functional safety of a BEV. Steering and braking assistance remain available regardless of whether the vehicle is moving or the drive system is active. Reliable thermal management of the high voltage battery is particularly critical, as extreme temperatures

can lead to performance loss or damage.

Modern systems are often designed with redundancy, for example through multiple coolant pumps or separate cooling circuits. In addition, electronic monitoring and diagnostics enable early detection of malfunctions and enhance operational safety.

Value Retention

The electric operation of auxiliary units significantly reduces mechanical wear. Since no belts, tensioners, or idler pulleys are required, the number of traditional wear parts is greatly reduced. This leads to lower maintenance costs, higher reliability, and longer component service life. At the same time, the performance of key vehicle systems remains stable over time, which positively impacts the vehicle's value retention.

Despite reduced wear, regular maintenance remains essential. Drivers should adhere to the maintenance intervals specified by the vehicle manufacturer, as electrically operated systems, control units, cooling circuits, and sensors must also be inspected. For inspections, repairs, or component replacements, the use of branded replacement parts or components of OE (original equipment) quality is recommended. These meet the manufacturer's technical specifications and ensure their proper function, safety, and durability. Properly documented maintenance also helps to preserve the vehicle's value over the long term.

BorgWarner

Bosch

DENSO Aftermarket

HELLA

MAHLE

SEG Automotive

Source: https://www.my-cardictionary.com/dictionary/drive-system/auxiliary-units-bev