



Modula EBB

Technical Data

Hybrid locomotive for hauling freight

Electric Traction + 2 Large Batteries

Hybrid locomotive **Modula EBB**

The Modula is a hybrid locomotive concept with different traction modules on a standardised centre-cab locomotive platform. These systems have the same interfaces so that, for example, the two diesel engine unit can be replaced by a two battery unit.

Variants:

- **BDD** (small battery + two diesel engines),
- **EDD** (electric traction + two diesel engines) and
- **EBB** (electric traction + two larger batteries).
- In addition a **BFC** (Fuel Cell traction system) is in development as a further traction variant.

This modularity allows the operator to adapt the locomotive quickly and easily to changing requirements. It offers a range of standardised functions and systems that can be assembled into customised versions to suit the customer's specific requirements. With its high proportion of identical parts, the platform concept provides synergy effects and simplifies the management of replacement parts.

The benefits of a EBB at a glance

- Sturdy, mid-cab construction, excellent shunting locomotive qualities and a wide range of operational applications
- Optimised vehicle design that takes into account the full range of customer requirements
- Power at the wheel increases for line use by up to 2,500 kW – in 15/25 kV E-Mode approx. 50 % more output than a DE 18
- Simple and flexible integration of current and future energy storage and electricity generation technologies (also hydrogen-based systems)
- The EBB variants (draw power from the overhead catenary system) have considerable potential for savings in maintenance and energy costs
- High level of reliability through the use of high-quality components
- High availability thanks to a redundant drive configuration and two drive systems
- Remote Cloud access to data and the locomotive's condition enables its deployments to be precision-planned (an advantage when refueling or when replacing parts subject to regular wear and tear)
- Design and safety aspects structured according to the CSM and EN 50126 V-Model process
- TSI approval allows the locomotive to be used in many European countries



approx. **50%**

more power at the wheel
compared to the DE 18

The Modula combines the characteristics of a main-line locomotive with those of a classical shunting locomotive, and the focus here is on flexible power sources. The customer's application profile can be used to combine two power sources to make a single variant.

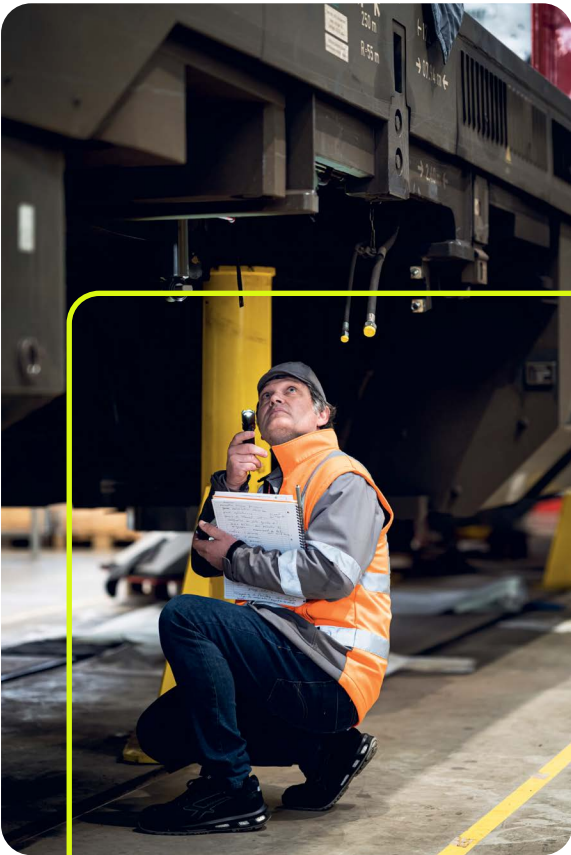
The control system in the Modula is designed with the future in mind; it can be upgraded with new functionality even years after delivery. It can also be equipped with a digital automatic coupling, a camera to identify obstacles or Augmented Reality applications for servicing. And if the locomotive's intended use changes in the future, modifications can also be carried out accordingly.

The Modula-EBB variant is designed for maximum energy efficiency and flexibility, with a focus on using electric traction supplemented by two large battery units. This configuration allows the locomotive to run on catenary (overhead) lines while also enabling it to operate in areas without catenary infrastructure using its high-capacity batteries.

The electric power at the wheel can reach up to 2,500 kW in 15/25 kV E-Mode, delivering 50 % more power compared to a DE 18 locomotive.

A key advantage of the EBB is its ability to recuperate energy during dynamic braking, feeding it back into the batteries or catenary. This makes the EBB an ideal choice for operators looking for a low-emission, cost-effective, and versatile solution for both main-line and shunting tasks.

The EBB also has the potential for significant maintenance and energy savings due to its reliance on electricity, making it an attractive choice for future-proofing rail operations.



Maintenance

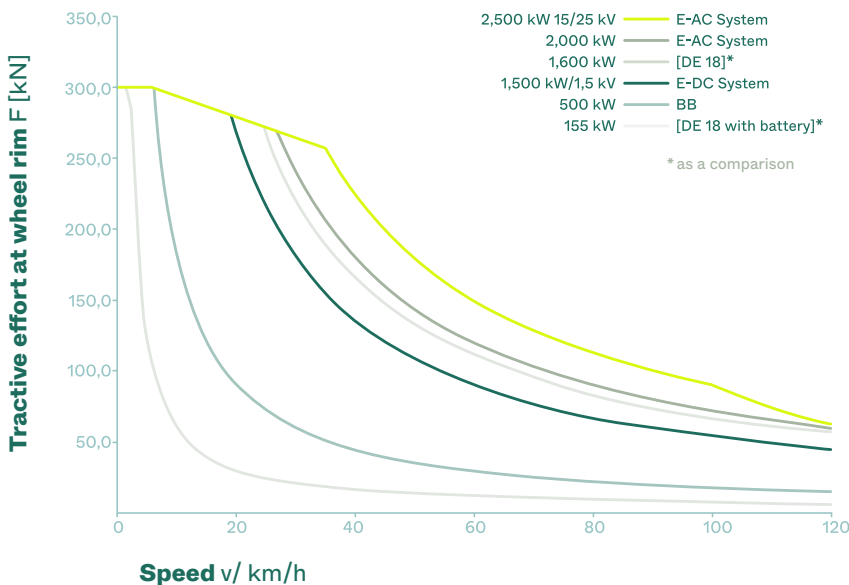
There's a focus on maintenance with the **Modula** platform because an electric locomotive also has to operate reliably. Consequently, every **Modula** variant is designed for easy maintenance. The continuous analysis of sensor data allows maintenance work to be predicted and planned better, which means that downtime can be reduced considerably. What's more, the modular system also allows the user to completely remove a diesel engine or battery unit, replace it with one that has already been serviced and go straight back into operation. This opens up completely new possibilities in the area of maintenance and service.

Modula EBB Technical Data

Wheel arrangement	Bo'Bo'
Length over buffers	18.700 mm
Min. curve radius	75 m
Vehicle mass	84 – 90 t
Fuel tank capacity	1,500 l
Diesel engine output	2 x 480 kW
Diesel engine in EDD	MAN D3876 6-cylinder, in-line engine
Exhaust emission restriction	EU 2016/1628 Stage V as per EU Regulation 2016/1628
Battery capacity (EBB)	2 x 175 kWh
Battery technology	LTO
Power transmission	AC/AC wheelset-selective control
Converter	IGBT-inverter
Power at the wheel E AC system	2.500 kW 15/25 kV
Power at the wheel BB	500 kW
Tractive effort	300 kN starting tractive effort
Top speed	120 km/h
Ambient conditions	T1 -25°C to +40°C
Tunnel classification	Category B (20 km) as per TSI SRT
Homologation	As per TSI initially planned in Germany, Austria and the Netherlands

Modula EBB

Power at the Wheel





**Vossloh
Rolling Stock**

Doktor-Hell-Straße 6
24107 Kiel, Germany
+49 (0) 431 3999 0
contact.kiel@vl-rs.com

vl-rs.com