ŠKODA

ELECTRIC LOCOMOTIVES

HIGH PERFORMANCE

INTEROPERABILITY FOR EUROPEAN ROUTES

HIGH-SPEED OPERATION

LOW POWER CONSUMPTION

ENVIRONMENTALLY FRIENDLY

The production of locomotives at Škoda Transportation has a long tradition. The first 1 ELo type electric locomotive was produced in 1927. More than five and a half thousand electric locomotives have been produced since then. The locomotives were designed for different gauges, speeds and power systems.

The latest Emil Zátopek type locomotives are designed for continuous operation along the railway corridors of all the countries neighbouring the Czech Republic and Hungary. Thanks to the modular design of the electric parts, the locomotives can be operated using different power supply systems – 25 kV/50 Hz and 15 kV /16.7 Hz with AC voltage, and, potentially, 3 kV DC.

The Emil Zátopek type locomotives are also designed to incorporate economic regenerative braking systems in accordance with the European safety and control system ECTS/ERTMS. Thanks to its versatility, the Emil Zátopek type locomotive can operate throughout Europe.

TECHNICAL DEVELOPMENT

The design and development of locomotives grows out of a close relationship with the customer. For us, the customer is the one who determines the final design and implementation of the locomotive.

We use proven components from reputable suppliers throughout the development process to ensure the high quality of our products. Due to the use of a modular system, we can use various designs and layouts for locomotives according to the customer's requirements.

We always take advantage of the technical know-how from our long experience in production of locomotives, as well as making full use of modern technical equipment and our excellent human resources.

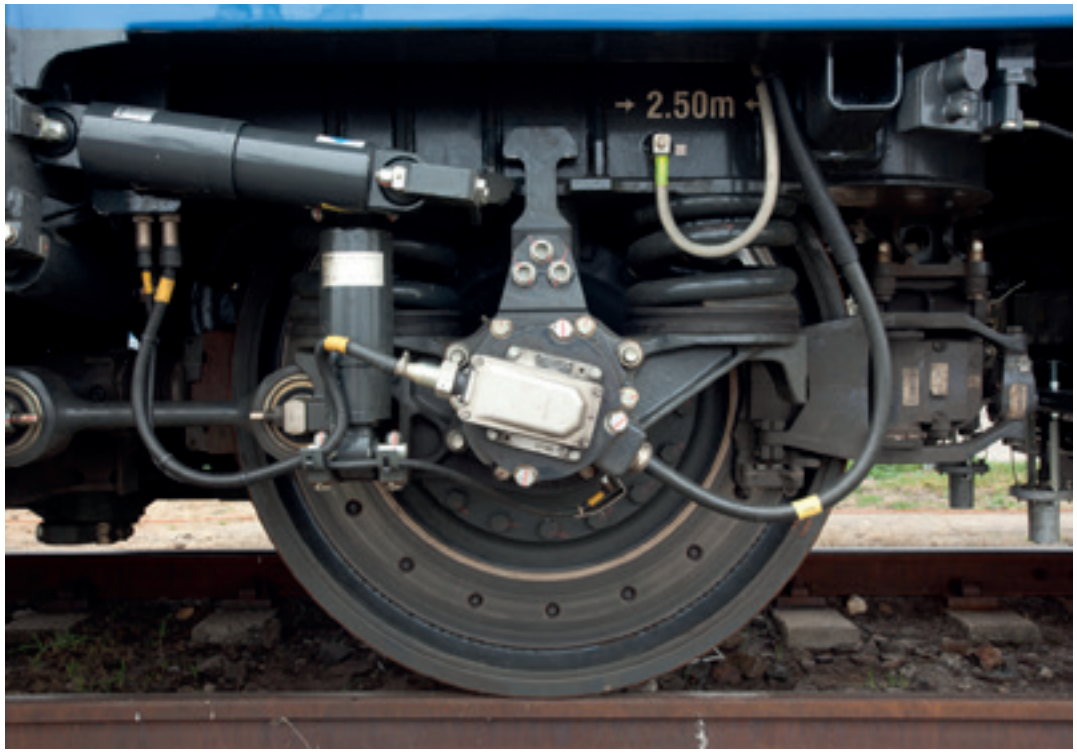
INNOVATIONS

The Emil Zátopek locomotive, the most powerful locomotive in the Czech Republic, meets all the demanding technological requirements of the latest TSI European safety regulations.

At the customer's request, the locomotive can be equipped with an external camera system, or frontal information boards.

The shape of the vehicle body is designed to minimize excess wind noise and frontal wind resistance at high speeds. The cabins of the locomotives are pressure-tight, and of course include heating, ventilation and air conditioning.

The control system includes a subsystem for operating, service and fault diagnostics. Data from the operations of locomotives are transfered in real time using the Datarail or MIP to a central server for possible further evaluation. It is also possible to use an alternative diagnostic system according to customer requirements.

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EXPRESS LOCOMOTIVE

MAIN TECHNICAL PARAMETERS

PARAMETER	EXPRESS LOCOMOTIVE		
Wheelset layout	B'o B'o		
Permanent output	6 400 kW		
Gauge	1 435 mm		
Wheel diameters	1 250 mm / 1 170 mm		
Starting traction force	275 kN		
Sustained traction force	220 kN		
Weight	88 t		
	109E	**109E2**	**109E3**
Power supply systems	3 kv DC 25 kV/50 Hz 15 kV/16,7 Hz	3 kv DC 25 kV/50 Hz 15 kV/16,7 Hz	15 kV/16,7 Hz
Maximum speed	200 km/h	160 km/h	200 km/h

FIBRE COMPOSITES SIMILAR TO THOSE USED IN FORMULA 1 CARS WERE USED IN THE MANUFCATURE OF THE EMIL ZÁTOPEK RAILWAY LOCOMOTIVE.

UNIVERSAL LOCOMOTIVE

MAIN TECHNICAL PARAMETERS

PARAMETER	UNIVERSAL LOCOMOTIVE			
Wheelset layout	**B'o B'o**			
Permanent output	**5 000 kW up to 6 400 kW**			
Gauge	**1 435 – 1 520 mm**			
Wheel diameters	**1 250 mm / 1 170 mm**			
Starting traction force	**300 – 350 kN**			
Sustained traction force	**250 kN up to 310 kN**			
Weight	**85 t up to 100 t**			
Maximum speed	**160 km/h**			
Power supply systems	**3 kv DC 1,5 kV 25 kV/50 Hz 15 kV/16,7 Hz**	**3 kv DC 25 kV/50 Hz**	**3 kV DC**	**25 kV/50 Hz**


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SAFETY AND RELIABILITY

The cabin design corresponds to crash scenarios in accordance with EN 15 227. To improve the safety of the on board operating staff, we use a system that only provides access to the various electrical components after they have been safely grounded.

The reliability of the individual components is verified by stress tests and it is always based on concepts tried and tested in practice during operations. The individual components of the traction drive chain are placed under optimal stress so they achieve the highest possible efficiency and to minimize power consumption according to the current operational load.

OUTPUT AND EFFICIENCY

The four-axle drive makes the Emil Zátopek type locomotive one of the most powerful engines of its kind in the world.

Other advantages are the low vehicle life cycle costs which cause more efficient total operating costs.

An energy meter is used to measure energy and the information gathered is transmitted to the operator online.

The layout of the locomotive driver cabin can be tailored according to the customer requirements. For example, a washing area, thermobox, moveable podium, lockers and more may be added.


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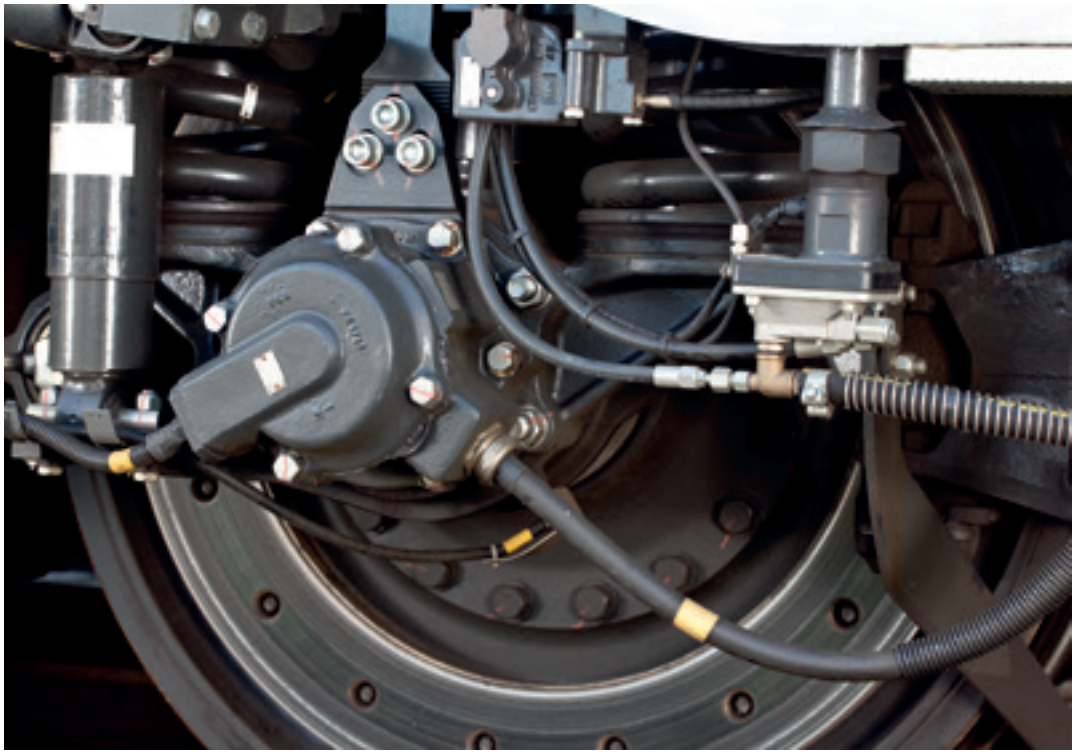

FULL SERVICE

The lifespan of the locomotives is more than 35 years. Škoda Transportation provides a warranty service for their products according to the guarantee agreed with the customer.

The European and world trend leans towards the complex care and maintenance of vehicles – commonly known as full-service. Škoda Transportation can provide full-service to support the operation of locomotives throughout Europe.

Due to the continuous development of the industry, we are able to offer appropriate services with regard to changing technologies and the development of new components.

ECOLOGY

Due to low maintenance costs and reduced energy consumption, significant savings in operating costs are made. This is positive for the environment and a lower consumption of natural resources.

During the production of vehicles we take into account the relationship with, and impact on the environment – in accordance with EN ISO 14001. Our suppliers adhere to the same principles.

The components and parts of the locomotives are more than 95% recyclable.

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