

ELECTRIC UNITS AND PUSH-PULL TRAINSETS



MODERN CONCEPT

OPTIMAL ENERGY CONSUMPTION

SOPHISTICATED TECHNICAL SOLUTIONS

COMFORTABLE MEANS OF TRANSPORT

SIMPLE CONTROL AND SAFETY



Our satisfied customers confirm that the Škoda Transportation electrical units rank among the most reliable vehicles.

Over one hundred modern double-deck electric units and pushpull trains are currently in operation in the Czech Republic as well as in the Slovak Republic, Lithuania, Ukraine and Germany. Currently, you can see several dozen modern single-deck vehicles on tracks in the Czech Republic while more are in production at the moment.

All our trains stand out through their lightweight construction made of aluminium profiles and their modern and very reliable driving systems. Operating costs are significantly reduced thanks to the recovery of electrical power during electrodynamic braking.

The Škoda Transportation Group also offers several types of double-deck cars.

CUSTOMISED SOLUTIONS

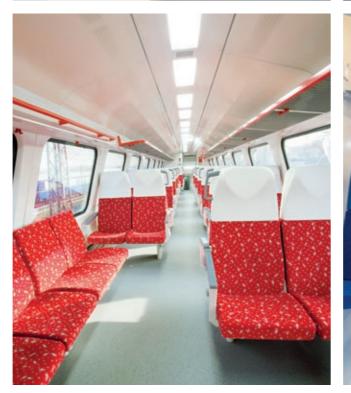
Škoda Transportation's products offer versatility and modularity. This is why the company is able to adapt to specific customer requirements. The production of each unit entails development which is then carried over into future projects.

The electric units are intended for electrified tracks with different power systems and they can be supplied with various widths of the vehicles, entry floor heights or interior designs. The default configuration of the electrical units contains three cars but the trains can of course be combined as required. The quick connection of multiple units into one functional unit is enabled by automatic end couplers. The produced push-pull train sets can be pulled by various locomotives including state-of-the-art electric locomotive Emil Zátopek.

The train capacity depends on customer requirements, the specific implementation can vary – it always depends on the spacing of seats, the number of seats in 1st class, the number of places for bikes, the desired size of boarding openings etc. Each unit features enough room for wheelchair passengers and is adapted for the transport of passengers with reduced mobility and orientation. The units are equipped with barrier-free toilets. Other arrangements depend on customer requirements. The interior space may be completely open, with no internal doors or partitions, or it can consist of individual passenger compartments separated by doors.

















TECHNOLOGIES

All electrical units are low-floor and wheelchair accessible. If necessary, the floor height can be adapted to the customer's requirements. An open multifunctional space at the entrance door provides storage room for luggage, bicycles and pushchairs. The cars offer the option of Wi-Fi connection and are equipped with 230 V electrical outlets for the easy charging of mobile phones, laptops or tablets.

Our trains are controlled from a comfortable and safe driver's cabin using a control system. Up to four multiple connected units can be controlled from one position thanks to the superior WTB communication system. The units are equipped with an automatic driving system which includes automatic speed control.

Wireless transmission of diagnostic data assists with the on-line monitoring of vehicles while in operation. The electric units are equipped with both internal and external CCTV systems.

All electrical units meet the latest requirements set by TSI or GOST including those for fire safety according to EN 45545. The car body and interior design are made from modern noncombustible materials. The train cars have an in-built automated system for the monitoring and detection of smoke and fire and a central door closing and locking system that is activated once the train is in motion.

SINGLE-DECK ELECTRIC UNITS

A single-deck electric unit can consist of two to seven cars.

Head coaches are always positioned at the end of the unit with
the embedded cars between them.

The cars use the classic bogie layout – each car is carried by two separate bogies. The concept of the driving system allows the use of traction bogies under the head and the embedded cars. The overall performance of the vehicle depends on customer requirements and the operational characteristics of the electrical unit. Single-deck electrical units are designed for 1,435 mm and 1,520 mm gauge tracks. The width of the vehicle body varies according to the gauge.

The cars have a G1 profile according to either EN 15273-2 or GOST 9238. Low-floor vehicle and wheelchair boarding are guaranteed by the wide range of heights available for the entrance doors.

There can be one or two pairs of doors in each car.

ONE-FLOOR ELECTRIC UNITS	PARAMETER
ONE FEODINE CHAITS	PARAMETER
1,435 mm / 1,520 mm	Track gauge
3 kV DC, 3 kV DC+25 kV/50 Hz, 25 kV/50 Hz, 15 kV/16,7 Hz	Power supply voltage
160 km/h	Maximum speed
Up to 1,1 m/s²	Maximum acceleration
2,820 / 3,400 mm	Total body width
4,260 mm	Vehicle / body height
580 - 760 mm above TK	Boarding height
1,300 - 1,500 mm	Entrance door width
Number of traction engines × 340 kW	Unit output



REGIOPANTER

The RegioPanter vehicle is designed primarily for regional routes where passengers will appreciate the comfortable luxury seating, air conditioning, and Wi-Fi connection. The wide entrance doors and the full continuous interior without internal doors allow quick and smooth passenger movements at the stations. There is wheelchair access with retractable footrests for different platform heights.

The RegioPanter electrical units are a single-system for 3 kV DC or a dual-system for 3 kV DC and 25 kV 50 Hz. They are designed for a 1,435 mm track gauge and all cars are equipped with a driving bogie with two asynchronous engines and one common bogie.

Two and three-car RegioPanter are used in several regions of the Czech Republic. Based on the request of the customer two-car-single-deck electric units can provide 147 seats with a total capacity of 317 passengers. Three-car single-deck electric units offer 241 seats with a total capacity of 497 passengers. Inside the train there is also plenty of space for people with reduced mobility or bicycles.

In 2018, Škoda Transportation and company ŽOS Trnava won the tender for the supply of up to 25 RegioPanter electric units for Slovenské železnice (ZSSK). Two designs of the electric unit will be supplied: the first one with a length of 80 m and a capacity of 247 seats and the second with a length of 106 m and a capacity of 343 seats.













INTERPANTER

The InterPanter units are designed for interregional and long-distance transport. The interior of the InterPanter electrical units is designed for comfortable travel over long distances.

The InterPanter electric unit features spatially and acoustically separated compartments for passengers, first class, compartments for mothers and children and spacious shelves for excess baggage.

Both three and five-car versions are used in the Czech Republic. Based on the request of the customer, the three-car InterPanter has 200 seats and the five-car version 350 seats. There is also plenty of space for people with reduced mobility or bicycles.

The InterPanter electric units are a dual-system produced for 3 kV DC and 25 kV 50 Hz voltage and are designed for a 1,435 mm track gauge.

DOUBLE-DECK ELECTRIC UNITS

Double-deck electric units can consist of two to six cars.

The vehicles feature a typical bogie concept with two separate bogies under each section of the vehicle. Double-deck electric units are designed for 1,435 mm and 1,520 mm track gauges. The width of the vehicle body also varies depending on the gauge.

The cars have the G2 profile with extension DE2 or DE3 of the upper section in accordance with either EN 15273-2 or GOST 9238.

The units are of course low-floor vehicles with wheelchair access to the bottom deck. There are two pairs of doors in every car ensuring that the movement of passengers is quick and smooth.

PARAMETER	DOUBLE-DECK ELECTRIC UNITS
Track gauge	1,435 mm / 1,520 mm
Power supply voltage	3 kV DC, 3 kV DC+25 kV/50 Hz, 25 kV/50 Hz
Maximum speed	Up to 160 km/h
laximum acceleration	Up to 1 m/s²
Total body width	2,820 / 3,370 mm
Vehicle / body height	4,635 mm
Boarding height	550 - 960 mm above TK
Entrance door width	1,300 - 1,500 mm



CITYELEFANT

The CityElefant double-deck electric units are designed for suburban transport. The vehicles are designed to be used on a 3 kV DC electrical system with a gauge of 1,435 mm. The cars are equipped with wide doors and a lifting boarding platform for wheelchair access to the bottom deck. The open space by the entrance door offers plenty of storage room for luggage, bicycles and pushchairs.

The interior of the car is fully air-conditioned, airy and easily accessible. A varied arrangement of seats provides comfort and convenience with plenty of room for people with reduced mobility.

Based on the request of the customer, the CityElefant three-car units provide 310 seats with a total capacity of 640 passengers.

Four asynchronous traction motors with an output of 500 kW, combined with an electrodynamic brake that allows energy recovery, reduce significantly the energy consumption during operation.













DOUBLE-DECK UNITS IN EUROPE

Škoda Transportation has already supplied Slovakia, Lithuania and Ukraine with double-deck electric-units. The design and main dimensions of all cars are the same. Units for Lithuania and Ukraine are designed for the wide gauge of 1,520 mm and a maximum speed 160 km/h.

The double-deck unit for Lithuania is designed for suburban transport using two and three-car designs. The three-car unit has 304 seats and a total capacity of 640 passengers.

The double-deck electric unit for Ukraine is a dual-system unit and is intended for interregional transportation. The vehicles are specially adapted for harsh weather conditions. The units for Ukraine are six-car vehicles that have 636 seats.

The Slovakian train unit is a dual-system unit, prepared for the ETCS European security system. The double-deck unit is designed for a 1,435 mm gauge and suburban transport in Slovak cities. The three-car unit has 307 seats with a total capacity of 640 passengers.

PUSH-PULL DOUBLE-DECK UNITS

Push-pull units are non-traction vehicles that are towed or pushed by a locomotive. For example, the latest Škoda Transportation electric locomotive, the Emil Zátopek series, can tow up to seven cars.

Push-pull units are designed for both 1,435 mm and 1,520 mm gauges.

The different entry height allow to operate with platforms from 200 mm to 960 mm height above rail surface. The units are, of course, wheelchair accessible; the car can provide retractable footrests for different platform heights.

The first generation of this unit is designed for a maximum speed of 160 km/h and is intended for suburban and regional transport. The second generation of push-pull units is designed for intercity and long-distance transport and has a maximum speed of 200 km/h.

PARAMETER	DOUBLE-DECK PUSH-PULL UNIT
Track gauge	1,435 mm / 1,520 mm
ower supply voltage	15 kV/16,7 Hz
Maximum speed	Up to 200 km/h
Total body width	2,800 / 2,820 / 3,370 mm
ehicle / body height	4,630 / 4,635 mm
Boarding height	550 – 960 mm above TK
Entrance door width	800 - 1,340 mm



IMPLEMENTATION IN SLOVAKIA

The push-pull unit for Slovakia consists of a double-deck driving car and double-deck intermediate cars.

The unit is designed for a maximum speed of 160 km/h and 1,435 mm gauge.

The vehicle body which is made of large aluminium parts reduces the weight of the units significantly and extends their life. The internal CCTV with recording and video transmission in real time to the driver's cabin and the exterior anti-graffiti paint help improve passenger safety and reduce the effects of vandalism.

Wide low-floor entrance doors contribute to the fast, comfortable and safe boarding and exiting of passengers including those with reduced mobility and passengers with luggage and prams.

Based on the request of the customer, the unit is provided with 362 seats with a total capacity of 714 passengers.













IMPLEMENTATION IN GERMANY

The push-pull unit for Germany is designed for operation by Deutsche Bahn on the Nuremberg-Ingolstadt-Munich line.

The unit consists of a driving car, four intermediate cars, the end car and the latest Škoda Transportation Emil Zátopek electric locomotive.

The unit is designed for a maximum speed of 200 km/h and will be operated with a maximum speed of 190 km/h.

Škoda Transportation is the first supplier to Germany to offer vehicles with wheelchair access from platforms at a height of 760 mm. The push-pull unit meets the strictest German and European standards.

The units are equipped with a special pressure-tight vehicle body which enables units to pass each other in tunnels at speeds of up to 300 km/h; this leads to a smooth and unimpeded travel.

The interior of the vehicle is divided into the first and second class while a new section for children has recently been added.

Based on the request of the customer, the unit provides 676 seats. Each unit also provides 37 places for bicycles and several places for people with reduced mobility which also includes places for their helpers. Taking all this into consideration, travel in this kind of unit adds up to an ideal choice.

DOUBLE-DECKER CARS

All our double-deck cars are produced by Škoda Transtech – A subsidiary of Škoda Transportation located in Finland. The company's portfolio includes several types of double-deck car; namely passenger, steering, restaurant and sleeper cars. All types of car are designed to be pressure-tight with excellent thermal insulation which makes them ideal for use in harsh northern conditions where temperatures drop to -35 °C. The corridor connections are also pressure-tight, ensuring safe and comfortable transfer between cars.

All cars are constructed from aluminium and are designed to meet current safety standards so that, in case of collision, the deformation zones absorb the impact and protect the passenger sections of the vehicle.

PARAMETER	DOUBLE-DECKER CARS FOR FINLAND
Track gauge	1,524 mm
Power supply voltage	25 kV
Maximum speed	up to 200 km/h
Overall car body width	3,200 mm
Car height	5,200 mm
Platform height	550 mm above TR
Entrance door width	2,100 - 2,200 mm



PASSENGER AND STEERING CARS FOR FINLAND

The first double-deck passenger car was used on Finnish railways in June 1998. There are currently over 150 of these cars carrying passengers on all major lines. Thanks to their comfort and reliability, the double-deck cars made by Škoda Transtech have become a favourite among passengers. The cars have become a success with their spacious and light interior, offering a wide range of services on both floors. The lower floor which is at platform level enables easy access to the car for passengers with reduced mobility.

Škoda Transtech offers three main types of passenger car. The basic model Ed comes with seats for passengers on both floors and also in the end section. The Eds model has been designed especially for families and passengers with reduced mobility. It is divided into two parts. The layout of the lower floor is designed for handicapped people, while the upper floor offers a play area and a quiet section for passengers with young children. Edfs, the third model in the series, provides a space for passengers with reduced mobility as well as for families with children. Other features of the car include a section for the conductor and a dining section with a cooler.

Škoda Transtech has recently expanded its operations with the production of steering cars. The train cars are connected using the Push-Pull system which means that the steering car is at one end and the locomotive at the other. This system allows for the train set to be steered from both ends without the need to re-connect the locomotive. All the driver has to do at the final destination is to move from the locomotive cabin into the steering car cabin and the train can simply set off in the opposite direction. These cars are as enjoyable and safe as the double-deck cars.













SLEEPER AND RESTAURANT CARS FOR FINLAND

The first double-deck sleeper car produced by Škoda Transtech was launched in February 2006. The sleeper cars offer a comfortable and peaceful environment to rest in during long or overnight journeys. Currently, Finnish railways have 40 double-deck sleeper cars in use. Each compartment offers two beds. On the lower floor it is also possible to merge some compartments into one spacious family section. The upper floor compartments are en-suite. All cars are air-conditioned and each compartment can adjust its own temperature.

Škoda Transtech's very latest product is the restaurant car. These cars complete the portfolio and allow the double-decker cars to operate with a full service for passengers. The passenger section on the upper floor can also be used as a conference room for up to 41 people. The restaurant section on the lower floor includes a kitchen, a sales desk and a dining room. There is a coffee shop at the end of the car on the walk-through floor. It offers an open space for passenger gatherings and it can also be used as a venue for social events. At the other end of the car there is a kiosk which also takes care of the upper floor service.

SERVICE

Škoda Transportation's obligations to the customer do not end once the vehicle has been delivered. Regular high-quality service is provided for both single and double-deck electric units.

All modern vehicles meet the demanding requirements of the European market. Their warranty service guarantees that the the entire fleet of these modern units are ever-available for daily service.

Škoda Transportation has extensive experience of servicing trains in a number of countries which is a further guarantee of the quality of the service provided. The electrical units are serviced in the Czech Republic, Slovak Republic, Lithuania and Ukraine.



ECOLOGY

The entire production cycle of Škoda Transportation's electric units including their operation right through to their disposal is environmentally friendly.

During vehicle production we take into account the relationship with and impact on the environment – in accordance with EN ISO 14001. Our suppliers all keep to the same principles.

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

Components and parts of the electric units are more than 95% recyclable.



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