



In May 2006, the contract was signed between the Russian railway company OAO "Rossijskije zheleznyje dorogi" (RZD) and Siemens for the development and construction of high speed trains. The project encompasses the supply of 8 train-sets equipped with components and systems whose performance characteristics have been adapted to the climatic requirements as well as to the standards of the Russian Federation. These trains make use of a distributed traction system and are being supplied in two different versions: namely, as single-system (3 kV DC) and dual-system (3 kV DC and 25 kV AC) trains. This kind of capability will enable the units to be universally deployed. These trains are intended for high-speed passenger services on the Moscow – St. Petersburg and Moscow – Nizhny Novgorod lines. Besides benefiting from a modern and attractive design, they are based on high-tech standards which are the most up-to-date in the world. The car bodies, for instance, are made of aluminum, the train material of the future.

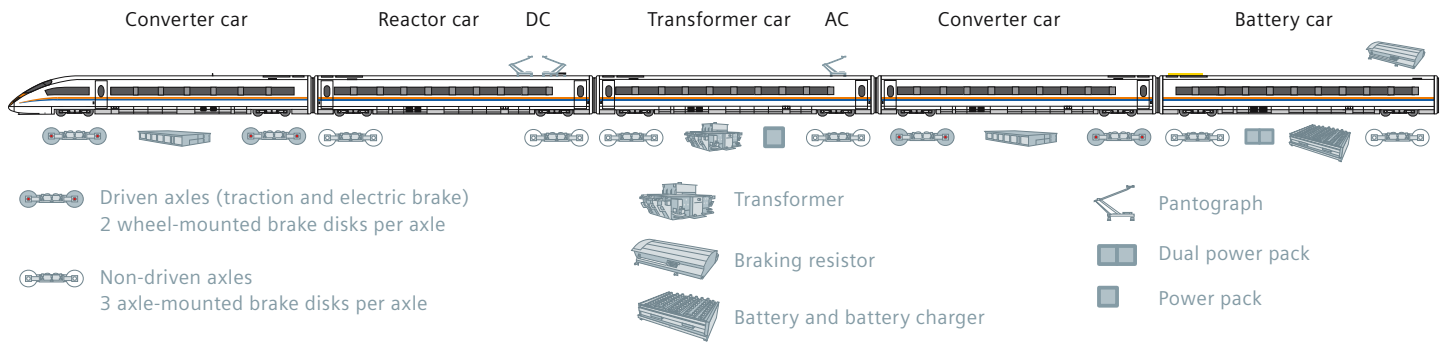
The Velaro® RUS is based on the modern technology of the Velaro platform of trains such as those which are already providing reliable service to the German Rail (DB AG), Spanish National Railways (RENFE) and those which have also been sold to the Chinese Ministry of Railways (MOR).

Technical Data	B1	B2
Voltage system	3 kV DC	25 kV AC, 50 Hz 3 kV DC
Maximum operating speed	250 km/h	
Number of cars	10	
Train length	250 m	
Traction power at wheel rim	8.0 MW	
Maximum starting tractive effort	328 kN	
Average acceleration up to 60 km/h	0.43 m/s ²	0.42 m/s ²
Average acceleration up to 120 km/h	0.40 m/s ²	0.39 m/s ²
Track gauge	1,520 mm	
Operating temperature range	(-50 °C) -40 °C ... +40 °C	
Car width	3,265 mm	
Length of end car	25,535 mm	
Length of intermediate car	24,175 mm	
Car body material	aluminum	
Maximum axle load	170 kN	180 kN
Height of floor above t.o.r.	1,360 mm	
Serving platform heights above t.o.r.	1,100 mm – 1,300 mm	
Total operating distance per year	up to 500,000 km	
Weight of fully occupied vehicle	662 t	678 t
Total number of seats	604	
Service life	30 years	

High speed trainset Velaro RUS

for Russian Railways (RZD)





The car body geometry and the arrangement of the interior furnishings have been specially coordinated to achieve the best combination of high travel comfort and high seating capacity. The train offers two classes in which catering is provided for the passengers. Passengers may also visit the bistro restaurant for snacks and beverages. In first and second class, a video and audio entertainment system meets high expectations. With an installed traction rating of 8,000 kW, the Velaro RUS is designed for a maximum service speed of 250 km/h. Upgrading to 300 km/h is possible. The electric brake permits the regenerative feedback of braking energy into the power system. A smooth ride and a high level of safety are ensured by the proven bogie technology from Siemens. The train is protected by the Russian Klub U safety system.

Service-proven trainset concept

Like its predecessors – Germany's ICE® 3 and Spain's Velaro E – the Velaro RUS is based on a multiple-unit concept which distributes the traction and technical equipment over the entire underfloor area of the train. This makes the full length of the train available for passengers. Compared to conventional trains with locomotives, these trainsets are of multiple-unit design and can therefore offer a significantly higher seating capacity for the same train length, creating 20% more space than conventional trains with similar seating arrangement. This concept is increasingly embraced by customers and has become very successful at the international level. The trainset concept and its components have continually undergone further development for over 15 years. Their reliability and availability has been improved.

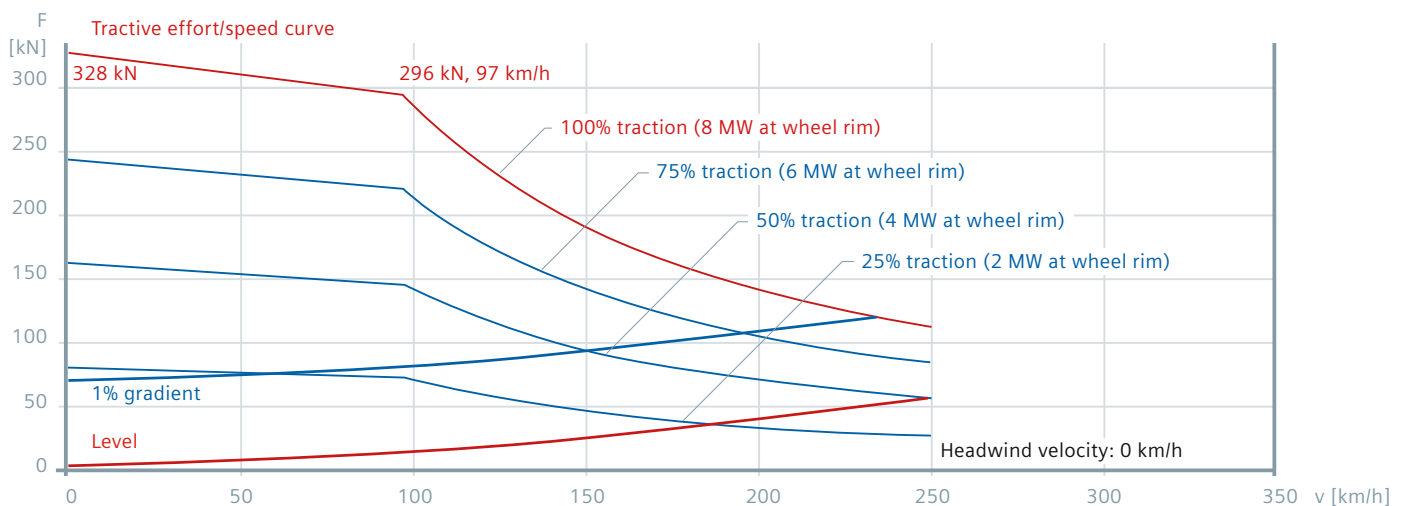
The clear advantages

Optimized running performance. The trainset concept results in the overall operating advantages:

- Improved leverage of the adhesion coefficient during acceleration because 40% of the axles are driven.
- Capability to run on line sections with steeper gradients.
- The evenly distributed weight over the entire trainset means lower individual axle loads. This lessens the amount of track wear and reduces the maintenance requirements of the running gear.

Additional benefit

Comfortable ride. The evenly distributed weight also improves the running characteristics and this the travel comfort.



Tractive effort/speed curve for both train types

Impressive traction

The Velaro RUS has four identical, independent traction converter units. This principle provides clear advantages in continuous service:

- Any failure of one converter will not affect the remaining units. This enables the train to safely reach its destination with 75% of its maximum rated traction power.
- Low-maintenance three-phase asynchronous motors with cage rotors ensure high availability.
- At 8,000 kW, the power rating of the traction system is designed to ensure high acceleration and deceleration levels even at full load.

A train with high seating capacity and full comfort

The Velaro RUS is a revelation in passenger space. Thanks to a wider car body, it offers seats for 604 passengers and full comfort. At both ends of the train, a lounge with 1st class seating is located directly behind the driver's cab. A particular highlight is the transparent partition wall separating the lounge and driver's cab and giving passengers with an unobstructed view of the track ahead. An intermediate car with bistro restaurant provides catering with meals and beverages. Another intermediate car accommodates space for passengers in wheelchairs as well as a universal toilet.

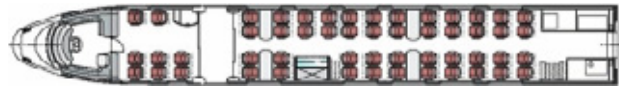
The result

A revelation in space that does not compromise on comfort.

Exciting entertainment

The passenger information system is based on the full range of experience and incorporates advanced technologies.

- In the 1st and 2nd class cars (except bistro car), large video screens that are clearly visible from every seat provide exciting entertainment.
- The compatibility with advanced media and formats, such as DVD and MP3, makes sure that passengers have access to the latest productions in top quality.
- Five different audio programs can be received at each seat in 1st and 2nd class cars (except bistro car). Passengers in the 1st class and the bistro restaurant car can also access the Internet over W-LAN.
- 4 cars equipped with repeaters for improved mobile phone signals.



Converter car, Business class



Reactor car, Tourist class



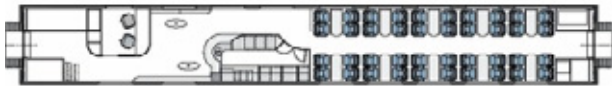
Transformer car, Tourist class



Converter car, Tourist class



Battery car, Tourist class



Battery car, Bistro restaurant, Tourist class



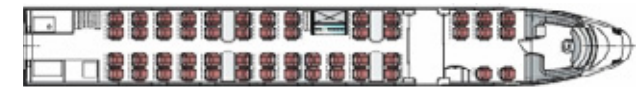
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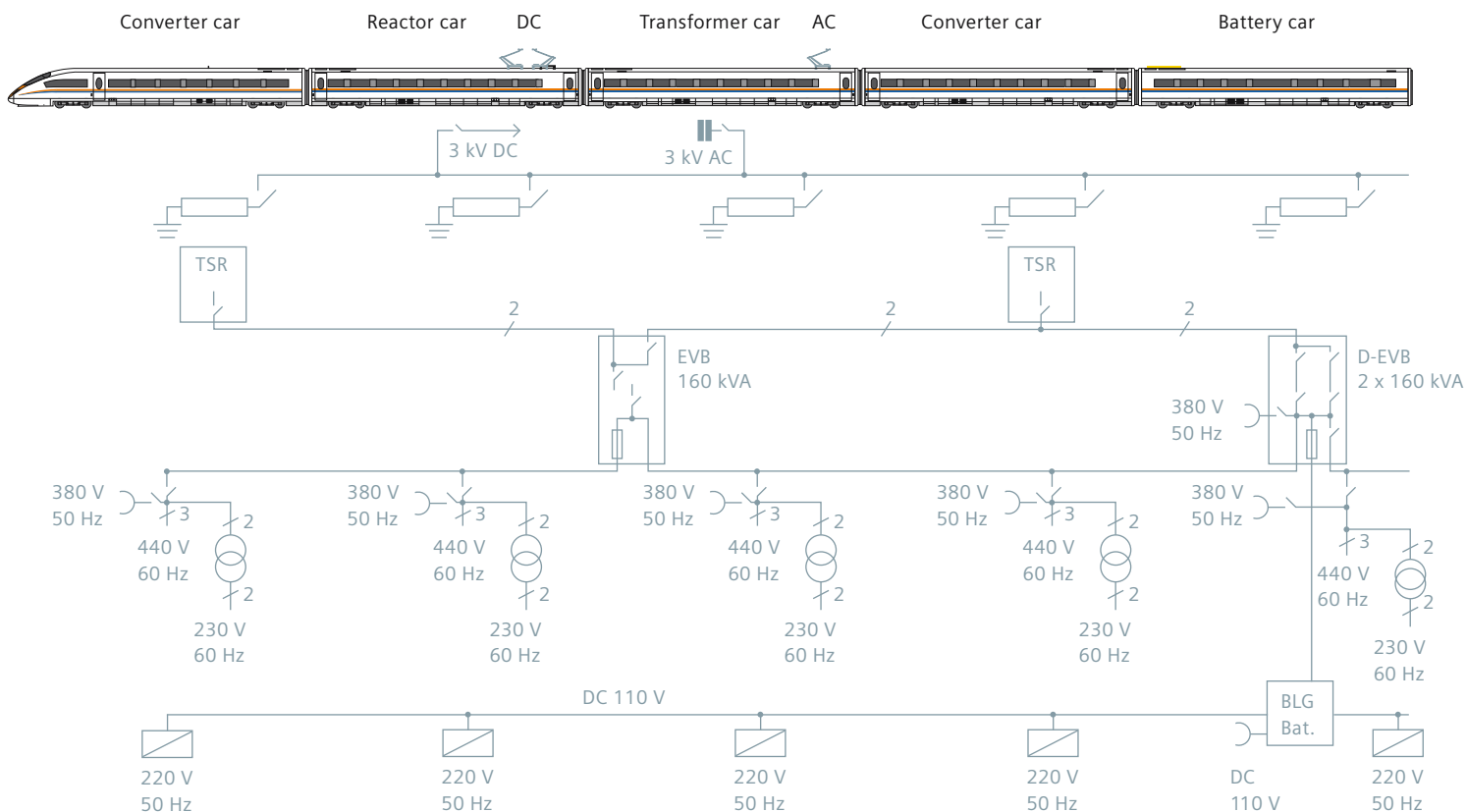


Converter car, Business class

The latest news for all passengers

- The central announcements for all passengers are coordinated from the train manager's office via a computer.
- Announcements and internal messages can also be forwarded from fixed intercom stations in every car. Announcements can also be made for selected groups (e.g. for individual cars or car classes).

- Passengers receive information via interior and exterior LED displays.



Onboard power supply system

Perfect control

The Train Communication Network (TCN), consisting of the train bus (WTB) and the vehicle bus (MVB), ensures a smooth and reliable data transfer between the traction units of a train. The consistently redundant design of the TCN system provides additional advantages:

- Significant improvement of the availability of the communications paths
- Savings in terms of hardware, installation dimensions, weight, and lifecycle costs
- Increased data transparency and shorter data propagation delays through the reduced number of interfaces

Efficient onboard power supply system

An efficient onboard power supply system reduces the energy consumption and increases the cost-effectiveness of the train. With the Velaro RUS, the onboard power supply system has been optimized with a view of the entire power supply system. The selected topology is characterized by a low number of power conversion steps. Since every conversion causes losses, this allows to increase the overall system efficiency. In addition, redundant structures ensure the reliable supply of auxiliary equipment in all operational situations. For example, the auxiliary supply is maintained when the train passes through neutral sections and is temporarily disconnected from the traction power system.

Proven safety

The proven bogies SF 500 that are designed for speeds up to 350 km/h contribute to the exemplary lateral guidance performance of the Velaro RUS. They also maximize the stability for an excellent running comfort. Even more important than a rapid acceleration is a rapid deceleration. The Velaro RUS is equipped with a brake management system that controls automatic switchover between the electric and pneumatic brakes. Braking in (electric) regenerative mode is preferred in routine service. Only when the power system is no longer able to absorb the electric braking energy of the traction motors, a gradual transition is made to the pneumatic brake. This concept saves energy and also reduces mechanical wear.

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The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.