



Fully automated battery switch system guarantees reliable and economic operation

The hybrid energy storage system made of lithium-ion-batteries and capacitors with double layers increases the cycling stability of the battery cells and enables an economic operation. The battery switch system guarantees maximum availability of Urbanio 24 hours a day. The battery switch is executed within three minutes by fully automated battery switch stations. These stations are situated at distances of 15-20 kilometers at central interchange stations.

Thus the infrastructure can be used for several transport lines. The recharging of the batteries is carried out in a very battery-friendly way and under ideal surrounding conditions in the battery switch station. The intelligent battery charging concept and the integration with the power grid enable the use of 100% renewable energy. This feature makes Urbanio a real green traffic solution.

The battery switch system offers numerous advantages:

- Maximum availability of the vehicles even under challenging operation conditions
- Increased transport capacity
- Optimization of battery life-time
- Cost advantage by standardization of the battery modules
- Simplified recycling
- Time-controlled charging and grid integration of the batteries simplify the use of renewable energy



Transport capacity

Seats	56
Standees (6 passengers/m ²)	120
Total	176*

*based on 3 car train, optional extension up to 6 cars possible

Dimensions

Length [mm]	25.000*
Width [mm]	2.440
Height [mm]	3.220
Wheelbase [mm]	6.900
Tyre size	275/70 R 22,5
Overhang [mm]	2.175
Ground clearance operation [mm]	220
Ground clearance stop position [mm]	170
Turn radius [mm]	22.500

*based on 3 car train, optional extension up to 6 cars possible

Vehicle weight

Empty weight [kg]	21800*
Admissible total weight [kg]	35.000*
Axle load (axle 1/2/3/4) [kg]	7.500/10.000/10.000/7.500

*based on 3 car train

Vehicle doors

Access height [mm]	340
Access width [mm]	1.250

Drive

Driven axles	Axle 2 and 3 (both middle axles)
Motors	4 asynchronous motors (60 kW each)

Continuous power [kW]	240
Peak power [kW]	480
Max. speed [km/h]	50
Max. inclination [%]	12

Chassis

Steering	Regulated electro-hydraulic multiple axle steering mechanism
Axle 1 and 4	Conventional front axle system with independent wheel suspension
Axle 2 and 3	Newly developed axle system for bidirectional operation
Guidance	Inductive/optical for elevated operation, manual on the ground
Suspension	Adaptive air-damping on all axles
Service brake	Disc brakes on all axles
Permanent brake system	Regenerative brake (recuperation) at axle 2 and 3
Energy storage	
Battery modules	9 x 16 kWh in the vehicle floor
Supercapacitor modules	18 x 0,1 kWh on the vehicle roof
Min. operational distance [km]	15
Min travel time [h]	1
Battery switch	
Switch process	Across the driving direction, above ground, fully automated
Duration of battery switch [min]	< 3
Safety	
	Antilock braking system (ABS)
	Traction control system
	Programmable speed limits for particular sections of the track
	Vehicle video surveillance system
	Emergency exit in driver's cab