

ADHESION AND RACK-AND- PINION RAILWAY ORION, ABEH 8/12

Matterhorn Gotthard Bahn, Switzerland

Matterhorn Gotthard Bahn ordered 37 three-car ORION-type electric combined rack-and-pinion and adhesion multiple units.

The vehicles operate on the routes Zermatt to Andermatt and via the Oberalp Pass to Disentis. The ORION also operates through the Schöllenen Gorge from Andermatt to Göschenen and the part of the RhB network between Disentis and Landquart. The three-car multiple units are replacing the locomotive-hauled trains, which are being decommissioned. The ORION is fitted with powerful redundant drive equipment with one adhesion and rack-and-pinion drive per motor bogie to achieve the highest possible availability. The multiple units are built for a maximum running speed of 120 km/h and can also be used for three-car multiple unit traction and are equipped with the new rake-and-pinion brake system that allows the same maximum speed in the rack rail for uphill and downhill travel. The modern vehicle concept, with fully air-conditioned passenger compartments is 57 meters long and have 142 seats, including 24 in first class. Vehicle functions, such as gear wheel synchronization, rail head conditioning, train radio and traversing neutral sections, are controlled via GPS and can be configured as needed.

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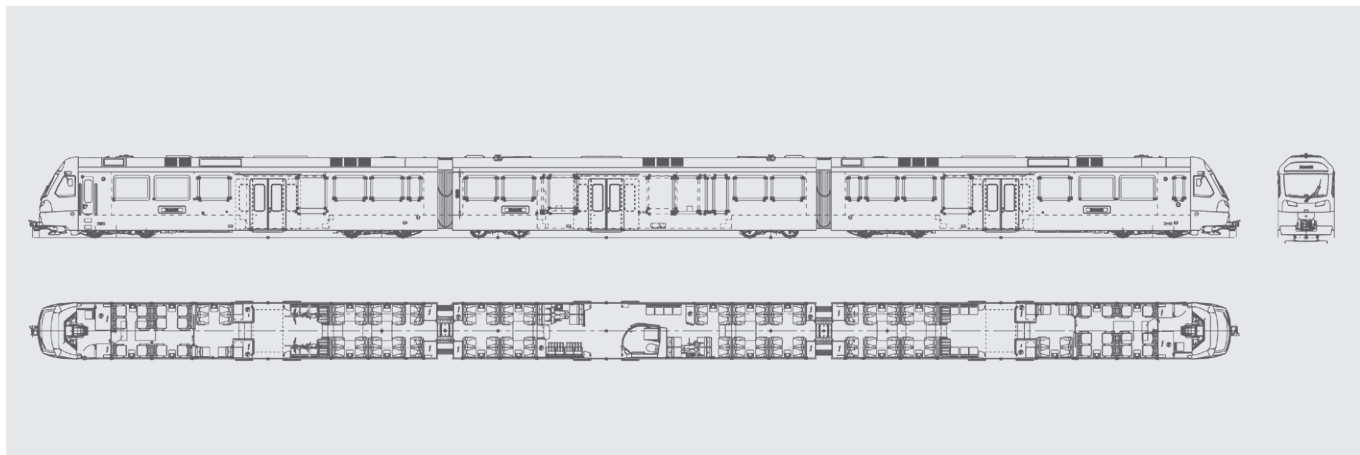
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Technical features

Engineering

- 3-car adhesion and rack-and-pinion multiple unit ABeh 8/12
- Height-adjustable rack-and-pinion drives (compensation for wheel wear)
- Weight-optimised dry-type transformer
- Compatible for RhB network between Disentis and Landquart
- Same speed in uphill/downhill travel on rack rail (v+)

Comfort

- Contemporary appearance with modern levels of comfort (elegant vehicle front, air suspension, HVAC system, passenger information system, low-floor entrances)
- Two wheelchair bays and PRM universal WC in the intermediate carriage
- Two bicycle spaces and generous luggage racks

Personnel

- Ergonomically designed driver's cab
- Modern, simple vehicle design
- Comfortable tip-up seat for driver's assistant in the driver's cab
- Double traction

Reliability / Availability / Maintainability / Safety

- Completely redundant drive concept to ensure high level of availability
- Geofencing for automatic triggering of vehicle functions
- Passenger compartments designed for orientation and safety

Vehicle data

Customer	Matterhorn Gotthard Bahn	
Operated networks	Zermatt - Disentis Andermatt - Göschenen Disentis - Landquart	
Track gauge	1,000 mm	
Designation	ABeh 8/12	
Operating voltage	11 kV, 16 2/3 Hz	
Axle arrangement	Bo'Bo'2'2'Bo'Bo'	
Number of cars	37	
Commissioning	2023	
Seats	First class:	24
	Second class:	90
	Tip-up seats:	32, of which
	8 tip-up seats for the disabled	
	Standing capacity: 209	
Floor height	Low-floor area: 435 mm High-floor area: 1,050 mm	
Entrance width	1,400 mm	
Axial thrust	800 kN	
Length over couplers	56,600 mm	
Vehicle width	2,650 mm	
Vehicle height	3,885 mm	
Wheelbase bogies	Motor bogie: 2,400 mm Trailer bogie: 1,900 mm	
Driving wheel diameter, new	790 mm	
Carrying wheel diameter, new	790 mm	
Continuous output at wheel	1,160 kW (adhesion) 1,600 kW (cog wheel)	
Max. output at wheel	1,600 kW (adhesion) 2,400 kW (cog wheel)	
Starting tractive effort	320 kN	
Starting acceleration, gross	0.8 m/s ²	
Maximum speed	120 km/h (adhesion) 35 km/h (cog wheel)	