Electric Rack and Adhesion Locomotive

for MRS Logistica S.A., Brazil

The railway line from Sao Paulo down to the port of Santos has a nearly 10km long part with rack drive. The great part of good trains operating there are iron ore trains. The new locomotives will be able to haul 50% more load than the existing old locomotives at higher speeds. Two new locomotives in multiple traction can haul a 750to good train on the 104‰ ramp, using a strong triple rack bar system.

The especially designed new locomotives will have the enormous power of 5 MW at 3kVDC catenary tension. They will be able to recuperate the produced energy while braking down the heavy trains. The rack gears and braking systems are built in a brand new design and are unique in the world.

The modern electronic control and diagnosis system will allow a great benefit in maintenance and energy saving.

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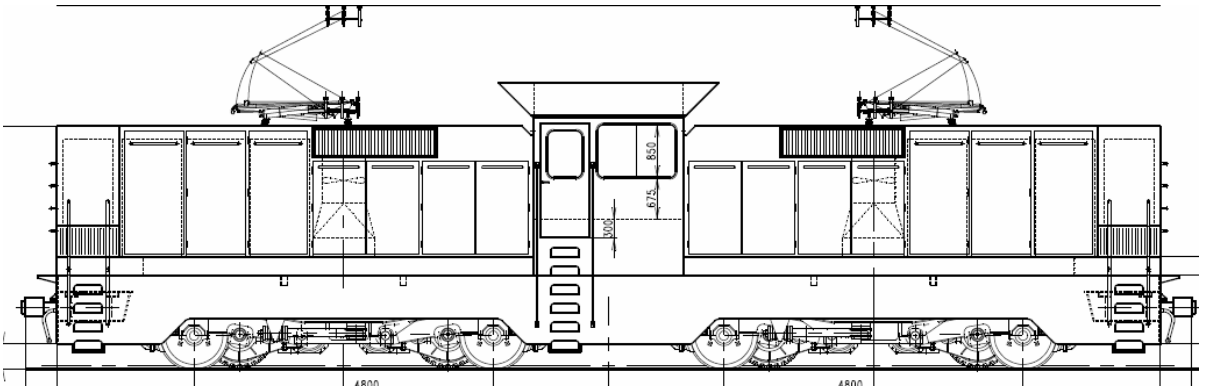

Technical features

- Unique design of rack bogies with 4 traction motors each (2 for the rack pinions, 2 for the adhesion axles)
- High power traction equipment with water cooled ABB-IGBT-traction-converters
- High redundancy in the whole traction equipment
- Selectron vehicle control system with train bus and diagnosis computer
- Multiple traction for up to two locomotives
- Heavy and robust vehicle body of steel construction
- Standardized AAR-couplers and adhesion brake system
- Rack system: ABT, three laminas of 60mm width each
- Maximum gradient: 104 ‰
- Air-conditioned driver compartment

Vehicle data

Customer	MRS Logistica S.A. Brazil
Line operated	Paranapiacaba – Raiz da Serra
Gauge	1‘600 mm
Designation	He 4/4
Catenary supply voltage	3‘000 VDC
Axle arrangement	Bozz‘ Bozz‘
Number of vehicles	7
Service start-up	2013
Overall length	18‘720 mm
Vehicle width	3‘200 mm
Vehicle height	4‘600 mm
Tare weight	110 t
Bogie wheelbase	4‘800 mm
Wheel diameter (new)	1‘069 mm
Maximum power at wheel	5‘000 kW
Starting tractive power	700 kN
Maximum speed uphill	30 km/h
downhill	25 km/h