

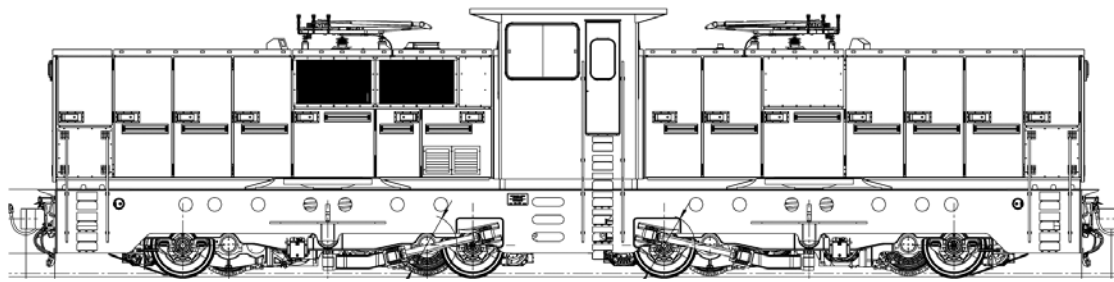


Electric rack and adhesion locomotive He 4/4 for MRS Logística S.A., Brazil

The railway line from Sao Paulo down to the port of Santos has an almost 10 km long rack section. The majority of the freight is iron ore being transported from the heart of the surrounding area. 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 an 850 t load on the 104‰ ramp, (triple-lamella Abt rack). The new locomotives, designed specially for intensive use (24 hours a day, 7 days a week), have a power of 5 MW at 3 kV DC catenary tension, and are able to recuperate braking energy. The position of the rack can be adjusted as the wheels wear down.

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Technical features

- Each bogie has two adhesion and rack engines
- High redundancy: each locomotive comprises two drive units powered independently of each other
- Multiple traction: two locomotives
- Robust and high-strength steel vehicle body, designed for 5,000 kN longitudinal compressive force
- Standard AAR couplers and adhesion brake system
- Rack system: Abt, three lamellas of 60 mm width each
- Maximum gradient: 104‰
- Air-conditioned driver's cab
- The locomotive is always on the downhill side, as the carriages have no rack brake. The driver's seat is therefore positioned at right angles to the direction of travel, and is turned around by the driver according to the direction of travel
- Power supply via an external diesel generator group is possible on the uphill side, enabling track maintenance to be mechanised and carried out independently of contact wires

Vehicle data

| | |
|-------------------------|-----------------------------|
| Customer | MRS Logística 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 | 2012–2013 |
| Overall length | 18,720 mm |
| Vehicle width | 3,280 mm |
| Vehicle height | 4,600 mm |
| Gross weight | 121 t |
| Bogie wheelbase | 5,000 mm |
| Wheel diameter (new) | 1,069 mm |
| Maximum power at wheel | 5,000 kW |
| Starting tractive power | 760 kN |
| Maximum speed | |
| Uphill | 30 km/h |
| Downhill | 25 km/h |