

Ingeteam

Modernization of electrical multiple units UT-200



Ingeteam Traction has modernized the electrical units for 1,500 Vdc and metric gauge trains for the regional operator EuskoTren.

The modernization process involved renovating the unit control system, as well as the traction systems and the auxiliary power systems.

Ingeteam Traction has replaced the units' direct-current traction system with a new asynchronous traction system, thus increasing the traction power by 40%. Likewise, a substantial improvement has been obtained in the rates of reliability and availability of material, as well as a reduction in operating costs due to the increased efficiency of the system and the inclusion of the regenerative braking solution. Maintenance costs have also been reduced, thanks to the constructive simplicity of the alternate-current motors when compared to the direct-current ones.

The units' air-cooled traction converter incorporates the latest technology in IGBT semiconductors. Furthermore, the electrical engine has been designed to be mechanically compatible with the previous direct-current motor, whereby no significant mechanical modification has been necessary.

Two auxiliary converters with natural cooling have been included in the

modernization. Thus, incorporating redundancy into the system and a minimal need for maintenance.

The newly incorporated control system connects to the various elements of the train by means of a TCN network integrated in the train. The modernized unit has a new driver's control desk which allows for more efficient control of the unit on the part of the conductor, with a diagnosis interface that allows any system incident to be quickly resolved.

Likewise, the new unit has a video surveillance and passenger communication system integrated in an added-value Ethernet network, and a control system for data communication with land.

The modernization carried out by Ingeteam Traction has allowed the useful life of the material to be extended, improving its reliability and maintainability, reducing operating costs by improving efficiency and reducing maintenance costs, improving the dynamic performance of the units and contributing value-added systems to the operation without the need for significant mechanical changes, thus reducing the need for investment on the part of the operator.

The modernization carried out lead to a significant improvement of availability rates and to reduced maintenance and operating costs

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Technical data

1 Unit characteristics

Track gauge	1,000mm
Coach arrg.	M-T-T-M
Catenary voltage	1500 Vdc +25%-30%
Max. Speed	80 km/h
Continous Power	1,400 kW
Max. Power	2,066 kW
Max. Tracting Effort	186 kN
Converter Technology	3.3 kV IGBTs
Motors	Asynchronous
Auxiliary converters	2
Cooling system	Air

2 Traction converter

Dimensions	1,600x655x1800mm
Weight	1,500 kg
Nominal power	1,000 kVA
Maximum power	1,200 kVA
Stablished intermediate circuit voltage	1,500 Vdc
Output current	550 Arms/phase
Output voltage of inverter	0 to 1,170 Vrms
Output frequency of inverter	0 to 82 Hz
Cooling system	Forced air
Brake method	Regenerative to catenary
Secondary Brake method	Rheostatic

3 Traction motor

Weight	1,500 Kg
Continous power	350 kW
Max. torque	5,639 Nm
Nominal voltage	1,170 Veff
Nominal frequency	41 Hz
Motor speed	1,207 rpm
Cooling system	Selfventilation
Insulation class	200

4 Auxiliary converter

Dimensions	1,600x655x1,800mm
Weight	1,500 kg
Continous power	125 kVA
Max. output	150 kVA
Input voltage	1,500Vdc
Output Voltage	3x400V/50Hz+N
Cooling System	Natural air

Multilevel Topology
Special isolation through blue technology.
Inverter Technology - IGBT 1.7kV

5 Battery charger

Continous power	8 kW
Charger technology	High frequency IGBT 1.2 kV
Cooling system	Natural air

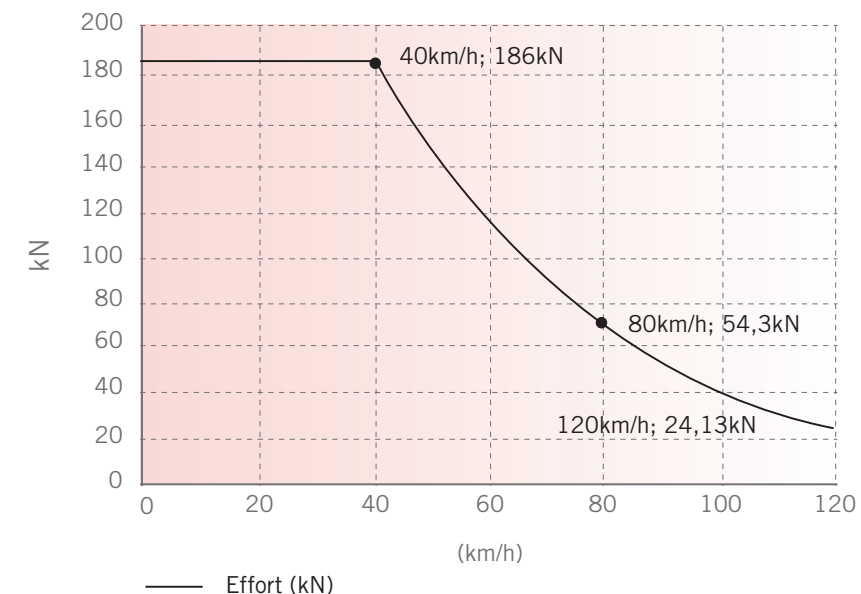
6 Control system

Based on Ingeteam's SISTEAM OCS control system and HMI-s, with decentralised, redundant configuration, with MVB and WTB communicating buses according to IEC 61.375-1 TCN standard.

7 Driver's assistance system

The train is equipped with an on-board video surveillance system, and with a controlled train-land communication system based on broad-band, allowing the wireless upload and download of information.

Maximum traction effort characteristic in train speed function.
Traction system for UT-200 units



Maximum braking effort characteristic in train speed function.
Traction system for UT-200 units

