



METRO CLASS 777 IPEMU

Merseytravel, Liverpool (UK)

Stadler has developed an innovative Independent Powered Electrical Multiple Unit (IPEMU), based on the Merseytravel Class 777 and equipped with a battery-based energy storage system. The new battery traction equipment is mounted in the underframe and the cooling system is located on the roof. The interior, the high levels of passenger comfort, and the number of passengers it can carry, are the same, with the IPEMU retaining all the basic functionalities of the Class 777. IPEMU trains can operate beyond the electrified third rail network on non-electrified systems, preventing costly infrastructure changes for clients, who can extend the network beyond the third rail. This provides greater flexibility and means more services for passengers. While an IPEMU is running on the electrified network, the batteries can be charged from the third rail, as well as through regenerative braking. IPEMUs have the potential to replace diesel powered units, which helps clients and local and national governments meet de-carbonisation targets. The ride quality is smooth and passengers will not notice the transition from EMU to IPEMU mode. Furthermore, IPEMUs avoid passengers having to change trains, enhancing the journey experience and reducing travel time.

IPEMUs can be recharged in less than 15 minutes. The IPEMU battery can undergo more than 10,000 charge/discharge cycles, which is about four times the lifetime of a battery used in EVs. The battery/vehicle weight-ratio of a Tesla is about 25 per cent, while the ratio of the IPEMU is only about 6 per cent.

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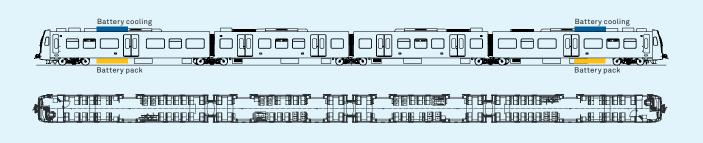
Stadler Rail Group

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Technical features

Technology

- Lightweight carriage body made of extruded aluminium profiles
- Electrical front door combined with a sliding step for front evacuation and detrainment between two units (patented solution)
- Newly developed Jacobs motor and trailer bogies with internal bogie frames and pneumatic suspension
- Plug sliding doors and automatic sliding steps
- Prepared for later retrofit of ERTMS equipment
- Meeting highest fire protection requirements EN45545 Level HL3
- Powerful traction battery equipment allowing to serve nonelectrified networks and decarbonise the public transportation

Comfort

- Bright, passenger-friendly interior with an iconic design
- Wide entrance doorways for rapid passenger flow
- Level access at all entrances
- Spacious multifunction areas and wheelchair spaces
- Advanced passenger information system, CCTV and TCIS (Train Connectivity and Information System)
- Powerful HVAC system
- Transition between electrified and non-electrified networks without interruption, reducing travel times
- No exhaust gases and noise pollution

Personnel

- Spacious cab with enhanced driver sight lines
- Ergonomically designed driver's desk
- Automated cab side doors for comfortable access

Reliability / Availability / Maintainability / Safety

- Redundant drive equipment with maintenance-friendly air-cooled
- IGBT power converters
- Remote vehicle diagnostics to support condition-based maintenance

Vehicle data

OperatorMerseyrailArea servedLiverpool, UKTrack gauge1,435 mmAxle load16.9 t (full load)Supply voltage750 V DCAxle arrangement2'(Bo)'(Bo)'(Bo)'2'Seat capacity184Standing capacity (4 pers./m2)302Starting tractive effort162 kNStarting acceleration1.1 m/s²Maximum speed (EMU mode)120 km/hMaximum speed (IPEMU mode)1 kWh/100 km/pass.Traction power6x350 kW (2.1 MW)Battery technologyLTO-NMCInstalled battery capacity320 kWhBattery operation voltage386 V DCBattery expected lifetimemin. 8 yearsRange in normal operation55 kmRecharging time< 15 min.Floor height960 mmEntrance width1,300 mmCoupler compression load1,500 kNUnit length64,980 mmVehicle width2,820 mmVehicle height3,828 mmBogie wheelbase2,400 mmWheel diameter760 mm	Owner	Merseytravel
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Vehicle height 3,828 mm Bogie wheelbase 2,400 mm	Unit length	64,980 mm
Bogie wheelbase 2,400 mm	Vehicle width	2,820 mm
	Vehicle height	3,828 mm
Wheel diameter 760 mm	Bogie wheelbase	2,400 mm
	Wheel diameter	760 mm