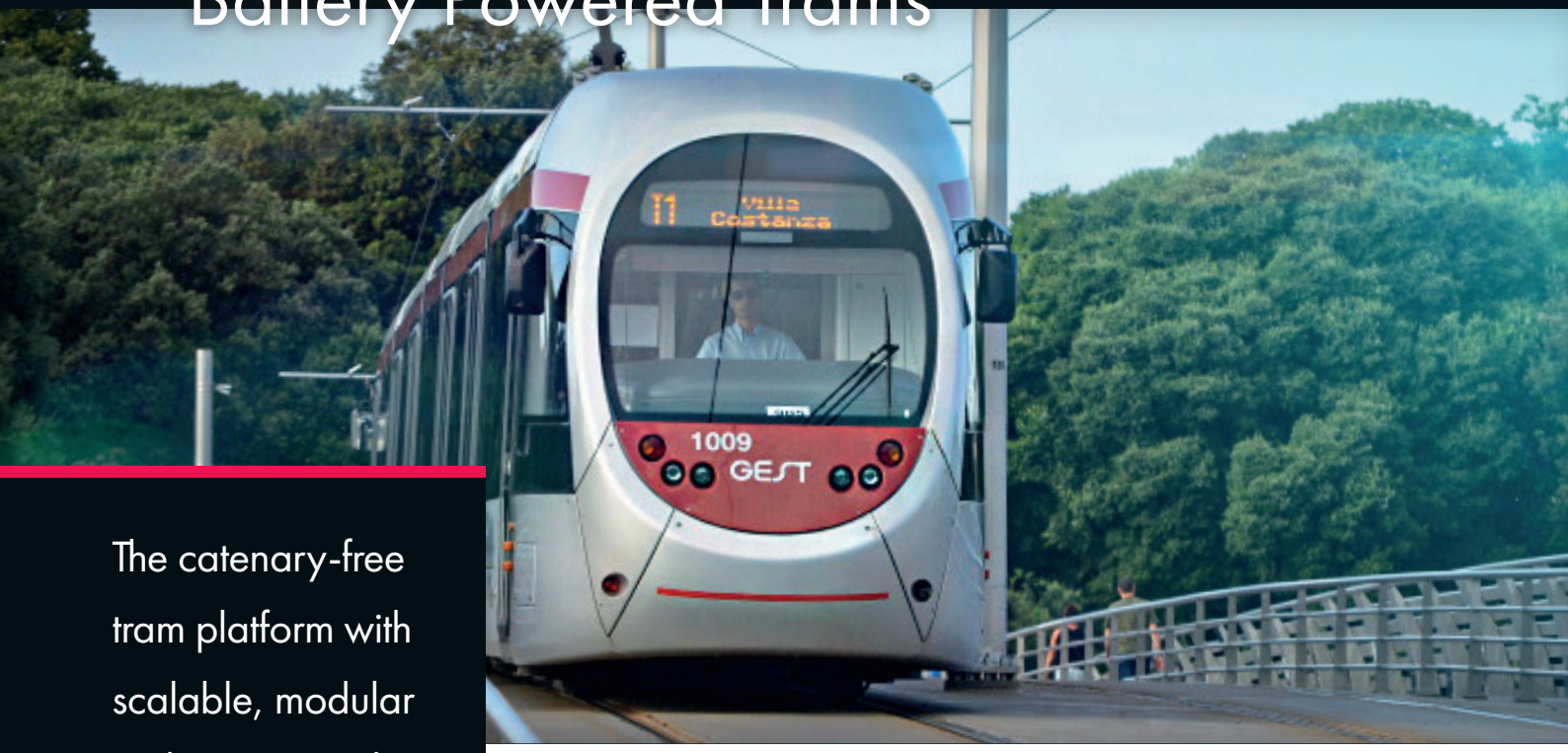
Battery Powered Trams



The catenary-free tram platform with scalable, modular architecture and On-board Energy Storage System, combining high performance and low environmental impact.

NEW TRAM PLATFORM AT A GLANCE

Operating modes	Hybrid
Year built	2020÷present
Cars per unit	5
Vehicle type	Bidirectional articulated
Number of motors	2
Number of trailer bogies	1
Max Vehicle length (m)	33.5 (variable)
Vehicle width (m)	2.4
Height (m)	3.3
Floor Height from ToR (mm)	350
Bogie wheelbase (mm)	1800
Wheel diameter (mm)	620 / 540
Minimum turning vertical radius (m)	18 / 350
Passenger seats	54
Accessible spaces (wheelchair)	4
Standing passengers (6 pax/m2)	223
Max. Speed (km/h)	70
Max. acceleration (m/s2)	1.1

Hitachi Rail's New Tram Platform is the evolution of the SIRIO tram, introducing innovative technologies to support urban integration, enhanced safety, energy saving and lower environmental impact.

The battery-powered tram uses battery-electric hybrid technology to enable the tram to run on electrified and non-electrified routes, at speeds of up to 70km/h. This bidirectional "catenary-free" operation uses modular architecture and the latest generation lithium-ion batteries to ensure best in class performance, as well a DC/DC converter to provide controlled battery charging. With scalable battery capacity, the new tram delivers up to 5km in extended battery range.

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CATENARY-FREE OPERATION

The new tram platform offers an On-board Energy Storage System (ObESS) to provide catenary-free operation. With scalable battery capacity, the ObESS can be sized and designed according to operational needs, such as limiting the overhead line to peripheral areas and recharge the batteries under the catenary, or total catenary-free lines, allowing for fast battery charging points at some stops, line terminus and depot.

The Bidirectional, articulated, 5-car vehicle, equipped with ObESS and DC/DC converter, includes a Battery Unit (cells assembled in modules), BMS (Battery Management System), BDU (Battery Disconnect Unit) and BTMS (Battery Thermal MS).

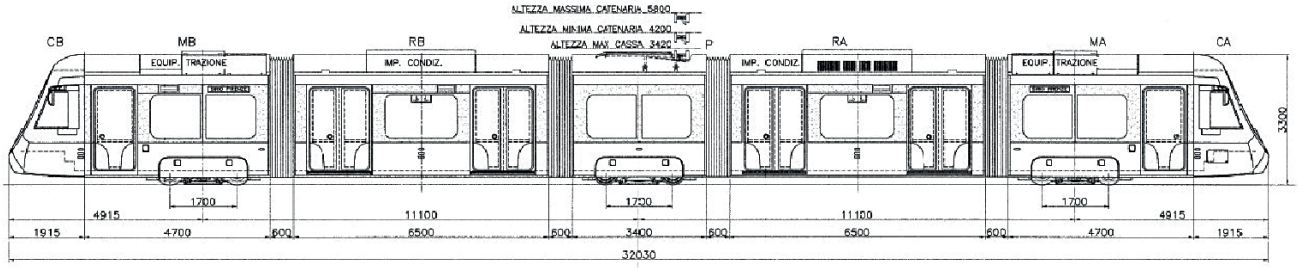
PASSENGER EXPERIENCE

Designed with urban integration in mind, large window surfaces provide a brighter environment and increased visibility for a better passenger experience. The HVAC system manages the distribution of internal air and air introduced from outside based on the actual number of passengers.

The Passenger Information System has Wi-Fi connectivity for passengers and Full-Ethernet architecture to incorporate information displays, ticket validation, real-time passenger counting, audio-visual communication between driver and control centre, as well as rear-view and boarding video surveillance for the driver.

ECO DRIVING

The new tram is designed for sustainable mobility. The driving control system uses algorithms aimed at optimising energy consumption, travel comfort and journey time. Depending on the position of the tram, accelerations, maximum speeds, coasting time and decelerations on each section can be defined in advance. The technology integrates seamlessly with other track-side systems such as traffic light systems that give priority to the crossing of the tram or the use of reserved lanes.



URBAN INTEGRATION	ENERGY SAVING & ENVIRONMENT	SAFETY
» Improved visibility	» Lightweight with innovative materials	» Obstacle detection sensors
» Catenary-free	» On-board batteries	» Driving assistant with radars and cameras
» EMC reduction	» Drive by wire	» Security cameras
» Steering bogie	» Full Ethernet	» Pedestrian protection
» Active acoustic control	» Optimized HVAC	