



INNEO METROS

CITIES in Motion

TRANSPORT SYSTEMS
TRAINS
BUSES
SIGNALLING
COMPONENTS
SERVICES

Your Way
to Future Mobility

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INNEO SHAPING CITIES OF THE FUTURE



SUSTAINABLE METROPOLITAN TRANSPORT

Developing sustainable transportation solutions for cities has emerged as one of the major goals of the 21st century.

Expanding metropolitan areas make it necessary for high-capacity transport systems which are also capable of satisfying society's increasing environmental awareness and the need to reduce emissions and improve air quality.

Metros not only have one of the lowest impacts on the environment, transporting large numbers of passengers quickly and reliably, they are also safe and efficient and economically sustainable.



INNEO METRO

Safety and comfort for cities of the future.

CAF has extensive experience designing, manufacturing, supplying and maintaining metro units in cities around the world. Understanding individual customers' requirements enables CAF to provide expert advice and offer solutions tailored to operators' specific needs.

The Inneo metro platform features state-of-the-art technology to achieve the highest standards of safety, performance, comfort and maintainability. And, at the same time, guaranteeing maximum energy efficiency.

Designed for complex and global transport systems, the Inneo metro is equipped with in service-proven solutions, ensuring optimum reliability throughout its life cycle.

In addition to supplying rolling stock, CAF's comprehensive metro solutions include civil works, signalling systems and maintenance.

CAF guarantees the integration and compatibility of all subsystems, reducing the risks associated with negotiations between various suppliers and providing customers with a turnkey solution.

CAF offers an holistic project and engineering management approach at all stages.

INNEO, COMMITMENT TO SUSTAINABLE CITIES

The innovative Inneo metro solution is the product of CAF's years of experience in the implementation of clean and environmentally-friendly urban transport systems.

An ever-increasing number of cities around the world are turning to CAF's Inneo metro range to guarantee a sustainable, safe and high-quality means of mass transportation.

Implementing eco-design methodologies in the engineering processes, CAF optimises and controls the Inneo's environmental footprint from conception to service life end.

The Inneo platform operates on numerous prestigious projects across the globe, demonstrating exceptional reliability and availability.



RECYCLABILITY AND RECOVERABILITY

In addition to functional and technical requirements, the Inneo metro's manufacturing materials are specifically selected for ease of end-of-life decommissioning and recyclability. The Environmental Product Declaration (EPD®) developed by CAF for the Helsinki Metro, verified a high recyclability rate of almost 94%.

ENERGY EFFICIENCY

Advanced aerodynamic design, weight reduction techniques, efficient electrodynamic braking system, maximising the number of seats per unit and Driver Assistance and Energy Management Systems are all key to optimising energy consumption.

REDUCING ENVIRONMENTAL IMPACT

Modular and standardised solutions ensure the Inneo platform achieves high levels of component reliability and durability, resulting in lower maintenance costs and materials consumption.

The Inneo's vibration and noise emissions are minimised to prevent a negative impact on the ecosystem. CO₂ emissions comply with the latest environmental regulations.



PRIORITISING HEALTH AND SAFETY

Passenger health and safety is of uppermost importance to CAF.

Inneo metros are equipped with laser technology smoke detection and water sprinkler fire extinguishing systems in saloons and cabs. Derailment detection technology, photoluminescent emergency lighting and signage and doors equipped for emergency evacuation are prominent features for all units.

In addition, the Inneo's extensive equipment and systems include:

- Air purification systems.
- LeadMind: real-time data monitoring (capacity control).
- Command and control system; self-diagnostic and tracks system faults.
- Passenger information: PA system, intercom system between cabs and emergency cab intercom system and video information via TFT monitors/LED displays.
- CCTV.
- Event Recorder.
- Forward Collision Warning System.
- Systems adapted to extreme weather conditions.
- Overspeed protection.



ONBOARD COMFORT

Passenger comfort is the backbone of the Inneo design.

Spacious, with unobstructed gangways allowing passengers to move easily throughout the vehicle, designated areas for bicycles, luggage and pushchairs can also be incorporated.

Minimising noise and vibration levels is an integral feature of the Inneo platform, ensuring users the best possible journey experience.

Additional features to enhance passenger comfort include:

- Information and video entertainment systems: PA system, TFT screens and front and interior LED indicators.
- Independent saloon and cab ventilation/air-conditioning systems.
- Passenger Wi-Fi.

The driver's cabin is fully ergonomic to maximise comfort, with the seat meeting the industry's most stringent requirements.



AN INNEO FOR EVERYONE

Committed to accessibility.

CAF's Inneo design places special emphasis on ensuring accessibility for persons with reduced mobility. Designated areas for wheelchairs and automatic retractable ramps enable quick and effortless boarding and alighting for all passengers.

Additional features include adapted acoustic and visual signalling, stop request buttons, chromatic contrasts on door opening buttons and handles and Braille markings throughout the train. The acoustic signalling includes a T-mode PA system for individuals with hearing impairment.

CUSTOMER-SPECIFIC SOLUTIONS

No two cities are the same.
No two metro systems are the same.

CAF Inneo metro systems are synonymous with flexibility. The vehicle range encompasses all types of metro systems to meet the specific needs of every city. All interior and exterior components can be adapted to the specific requirements of individual operators and infrastructure.

- Carbody material: aluminium, steel, stainless steel.
- Running system: rail, pneumatic.
- Track gauge: 1,435mm, 1,000mm (Others: 1,445 mm and 1,600 mm).
- Power supply: 750 Vdc, 1,500 Vdc, 25,000 Vac.
- Configuration: Two to nine cars per unit.
- Doors: Bespoke number and width of doors per unit.
- Modular seating: longitudinal, transverse or combined.



HIGH PASSENGER CAPACITY

The modular design of the Inneo range means it can be specifically adapted to meet passenger capacity requirements of individual operators. The unit configuration ranges from two to nine cars and units can be quickly and easily coupled to increase capacity.

Each configuration can have different traction power levels, depending on the performance required.

ENERGY EFFICIENCY

Striking the perfect balance between maximum transport capacity and user comfort, optimising the Inneo's passenger capacity per unit also saves energy.

Equipped with systems to achieve maximum performance from energy used when the vehicle accelerates, brakes, signals and interlocks, highly efficient traction equipment minimises energy loss and improves energy use.

Reduced mass and weight of the carbody structure and all equipment and components, also contribute to optimising energy demands.

OPTIMISED RELIABILITY AND MAINTENANCE

CAF harnesses in-house engineering, manufacturing, testing and fine-tuning technologies to gain improved integration and unparalleled knowledge of the Inneo platform's performance.

A market leader in supplying and maintaining metro systems, CAF's extensive experience enables the company to offer exceptional maintenance options. Optimised Maintenance Plans, tailored to individual customer's specific operation,

benefit from CAF's expertise and innovative techniques including Reliability Centred Maintenance and Condition Based Maintenance supported by the LeadMind Computerised Maintenance Management System.



AUTOMATIC METROS

Cities of the future call for efficient, high-capacity metro solutions to cater for the increasing number of passengers who rely on this transport on a daily basis.

Metro network automation leads to increased operational flexibility and lower operating costs, while also offering a punctual service and user comfort.

The Inneo is one of several CAF metro solutions designed to operate at varying automation levels, including driverless automatic operation (GoA 4). The system provides maximum safety by leveraging cutting-edge traffic monitoring technology.

SAFE AND RELIABLE

Maximum automation removes the need for drivers' cabs, with operation completely automatic. The system is designed so vehicles stop automatically at the precise position for doors to open onto the platform, ensuring maximum safety and reliability.

CAF has supplied fully-automated and driverless Inneo metros for projects around the globe including Santiago de Chile, Istanbul in Türkiye, Amsterdam in the Netherlands, Brussels in Belgium, Sao Paulo in Brazil and London in the UK.



BENEFITS OF AUTOMATED METROS

Higher transport capacity

Improved punctuality

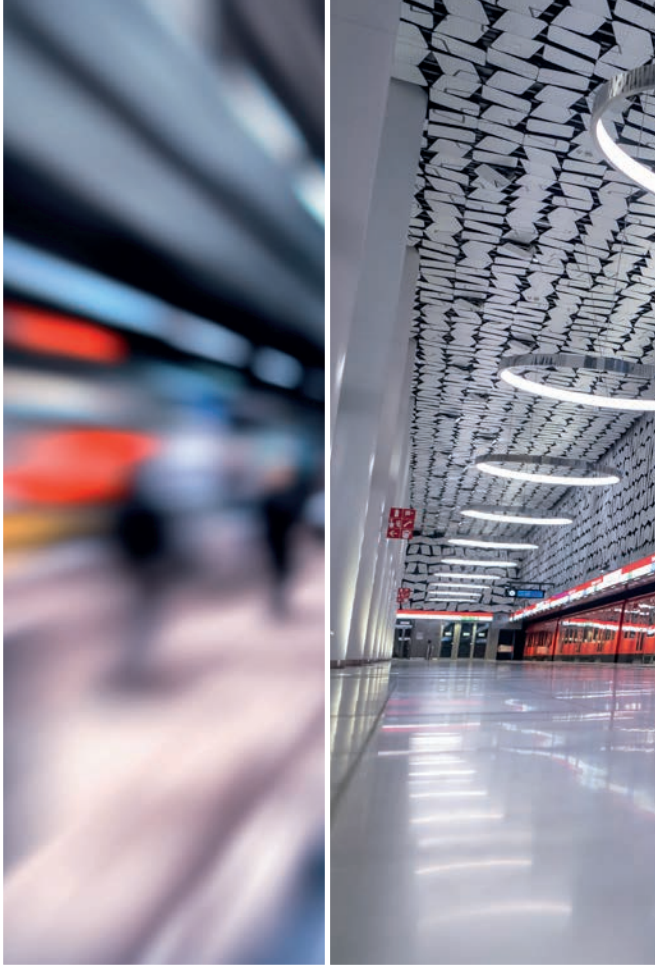
Greater fleet availability and reliability rates

Improved operational flexibility

Optimised maintenance and life cycle costs

Reduced operating costs





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