SIEMENS

siemens.com/mobility

Desiro ML

Reliability on the rails

Turn possibilities into reality. The Desiro ML.

Mobility is an important underpinning of modern society. Accordingly, the demands are high to keep up with progress. Connections in commuter, regional and interregional service must be fast, environmentally friendly, punctual, safe, and absolutely reliable. And only truly reliable, flexible systems can keep the pace.

Functional systems that better utilize existing resources. Reliable, highly available systems that ensure economically efficient operations and keep passengers satisfied. Systems that turn all that's possible on rails today into reality. Step aboard the new class of reliability: the Desiro ML.

You can rely on it.

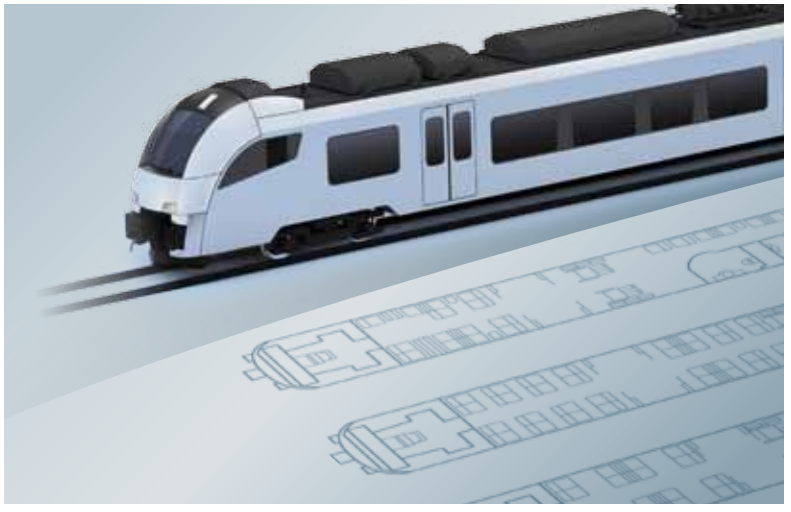
The Desiro ML helps you implement innovative train concepts in record time. Depending on the needs, you can select from various train configurations, types of drives, and equipment. We offer different electrical drive variants and a diesel-electric multiple unit variant whose limited emissions fulfill the latest emissions standards. All this creates new opportunities for you based on proven technology – with a reliable and experienced partner at your side. Whatever you envision for your commuter, regional and interregional service, you can make it a reality with the Desiro ML.

Reliable by experience

In these times of shorter innovation cycles and increasing cost pressure, rail-based transport systems must be fully operational from day one. This is a challenging requirement, but one that the Desiro ML, as a tried and proven train, fully meets. You benefit from more than 99 percent proven availability – thanks to its less number of components and correspondingly fewer failures. In addition, with Siemens, you have a partner at your side who has been providing comprehensive expertise in project management for 160 years, a partner who will support you in realizing your mobility plans – from the decision to planning to complete service: our comprehensive support for maximum reliability.

Room for flexibility

The future of commuter, regional and interregional service requires maximum flexibility of technology and equipment to handle more passengers, higher cycle times, and frequent stops. Desiro ML is the solution. Drives with strong acceleration, a maximum speed of 160 km/h, and the comfortable, amply dimensioned interior compartment design shorten your passengers' travel time – even over longer distances. As a low-maintenance single-car train with low-axle loads, the Desiro ML can be used in a variety of ways. Depending on the transport capacity, center cars can be added or removed with relative ease. This enables variable train lengths with two-, three- or four-car multiple units to be created. Depending on performance requirements, even longer train lengths are possible. In addition, a wide range of expansion and conversion variants create opportunities for individual design and increase the flexibility of train utilization.



Benefits of the Desiro ML

- **99 percent proven reliability**
- **Single-car concept with maximum flexibility inside and outside**
- **Energy efficiency and environmentally friendly**
- **Long-term efficiency in operation and investment security**
- **Can be used throughout Europe and for specific countries**
- **Comprehensive support, from the design to maintenance**

Sophisticated use of energy

In light of strict legal standards and other requirements, reliable, safe, and attractive mobility is also now, more than ever, an issue of sustainability. The energy balance of the Desiro ML meets the requirements of today and into the future. With its diesel-electric drive concept, combined with motor management, it uses energy more efficiently and reduces CO_2 emissions – compared to conventional diesel multiple units. Its excellent energy balance can be improved even further with an energy storage system, which converts braking energy into electricity, temporarily stores it, and makes it available as drive energy or for feeding auxiliary loads. You save up to 35 percent in fuel while also reducing your maintenance costs, because the mechanical brake is used far less often.

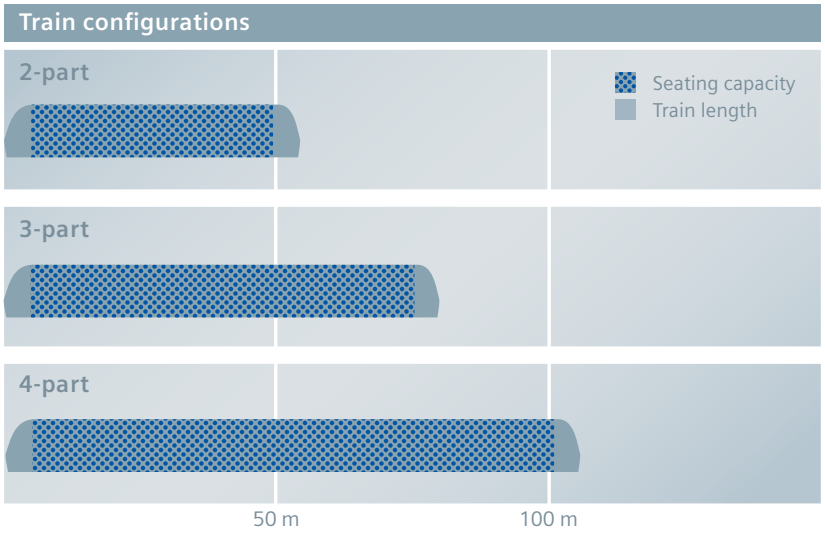
Economically efficient operation

The proven Desiro ML platform provides everything you need for reliable, cost-efficient operations. The reduced axle load expands the range of applications, for instance on lines where the axle load determines the amount of track fees or routes that are limited in terms of infrastructure. Thanks to the single-car concept, fewer components result in lower maintenance and repair costs. The short wheelbase of the bogie ensures excellent wear and tear behavior. The diesel-electric design reduces operating costs by maximizing the energy yield. You can easily adapt the vehicle equipment to new requirements, thereby ensuring a high residual value even after years of operation. And because even the most advanced vehicles are only as good as their overall concept, we also offer you customized comprehensive support – from technical support to long-term maintenance and repair to cost-efficient financing models.

Greater mobility on the rails.

Riding the rails while also being truly flexible: The Desiro ML makes it possible – reliably. There's a great deal of potential within the optimized single-car design of the tried and tested Desiro ML platform – for you, for your passengers, and for the environment. Take advantage of all the benefits – more capacity, more flexibility, and more comfort, greater energy efficiency, cost-effectiveness, and ultimately security for the future. Thanks to the optimal combination of state-of-the-art technology and proven technology, the Desiro ML provides more with less. You can rely on that today and in the future.

Adapting to passenger load
The Desiro ML is a match for any number of passengers. Customized for its mobile environment, it can be adapted quickly and easily to the actual passenger load. That's because the train is designed as a single-car train with a variable number of center cars. This means you can easily modify the train configuration. You can add and remove center cars as needed at the depot. Cars, or bogies, can be exchanged quickly. Train formations with up to four vehicles can be created. And by optimal use of the entire train length for seats, you benefit from a higher passenger capacity.



Optimal use of space: Up to 93 percent of the train length is available to the passengers.

Modifying the layout
The Desiro ML platform's configuration is flexible, providing leeway for your requirements: You can select one of two different heights for the floor. Comfortable low-floor entrances ensure barrier-free access without ramps. You can also configure the number of entries with wide doors. Depending on the train requirements, the number of doors and the floor height for each individual car can be individually configured.

Single-car concept

Customized configuration: Thanks to the single-car concept, the Desiro ML can be easily adapted to the number of passengers and customer-specific requirements.

Reduce operating costs

The Desiro ML provides you with more economic freedom as well. With fewer components overall and their placement on the roof, the single-car train saves you time and money in maintenance and repair. The single cars are easier to manage in the depot. They don't require supported tracks, significantly reducing your investment costs. Downtime is avoided through the fast, easy exchange of cars. Moreover, even at maximum load and with its longer individual cars, the train weighs less than 17 metric tons axle load. The advantages for you are less wear and tear and a greater number of application options in cases where the track fees are determined based on the axle load.

Advantages of the single-car concept

- **Higher passenger capacity**
- **Greater flexibility**
- **Higher availability**
- **Easier maintenance**
- **Lower repair costs**
- **Lower investment costs**
- **Improved accessibility**

Technology at a glance:
Two- to four-single-car train with option to add/remove a center car
Modular, individually configurable vehicle concept
High acceleration up to 1.1 m/s^2
Possibility to add/remove cars at the depot
Variable number of exterior doors and passenger capacity
Floor height at 600 mm and 800 mm
Possibility to convert floor height from 600 mm to 800 mm
Modular interior design (e. g. Basic, Comfort, Service)
Compliance with current European standards (TSI)
Short waiting time based on ease of replacing components
Higher residual value thanks to greater flexibility

Drive ahead into the future.

Attractive commuter, regional and interregional service includes more than just arriving at your destination reliably and relaxed. Attractiveness on the rails must be viewed holistically – from passenger safety to being responsible environmentally. With the Desiro ML, you'll be far ahead in every respect when it comes to sustainability. Thanks to innovative technologies and compliance with the latest standards, you'll have no trouble fulfilling legal standards on safety and environmental protection – today and in the future.

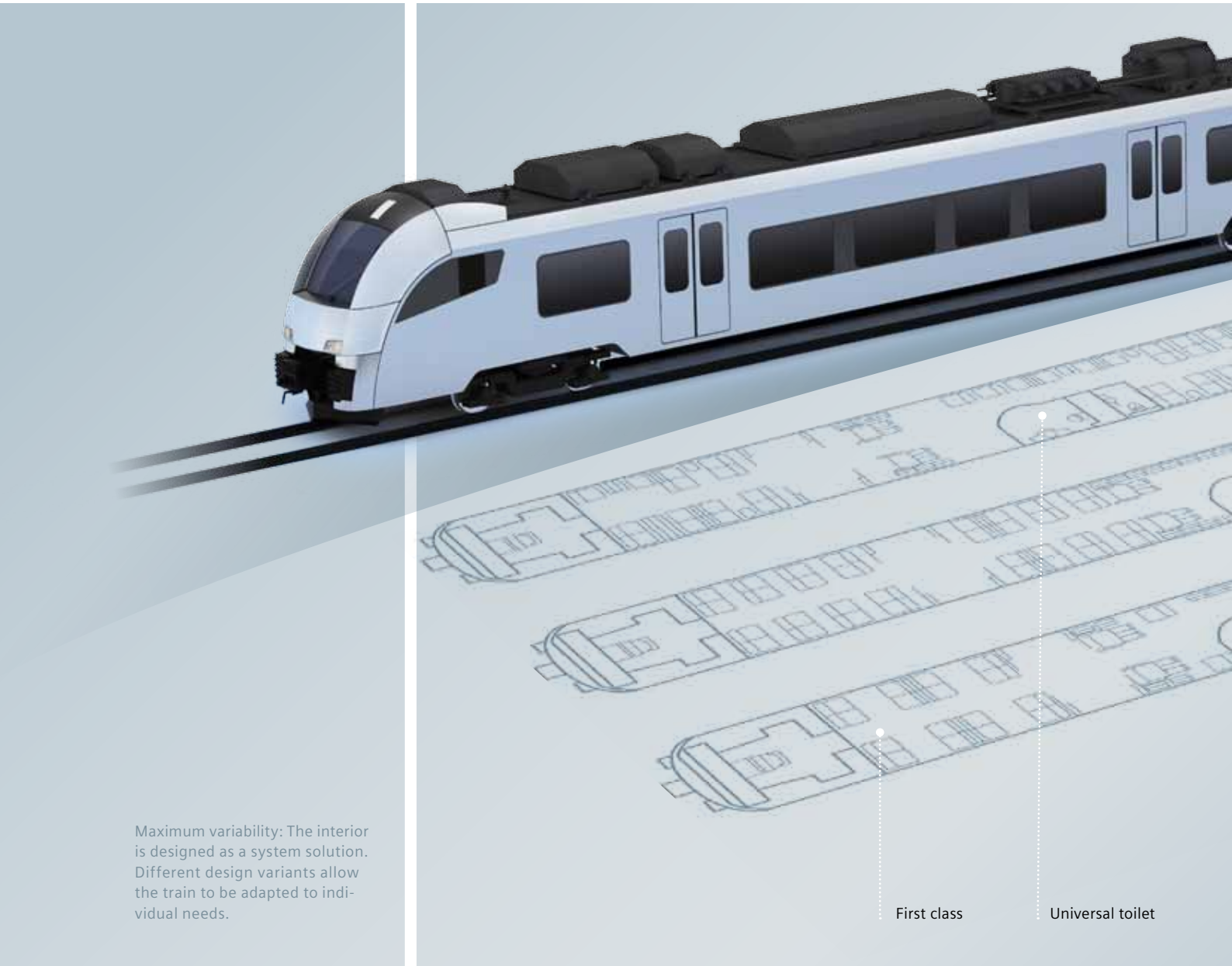
Economical and clean
The diesel-electric Desiro ML's high energy efficiency and lower CO_2 emissions are impressive in times of rising energy prices and stricter environmental requirements. Its drive chain achieves efficiency of up to 90 percent or more. As a result, the Desiro ML is far ahead of the diesel competition with their efficiencies of 60 percent to 70 percent. Depending on the route and driving behavior, you can save up to 25 percent in energy and reduce CO_2 emissions by 10 to 20 percent, because the diesel generator set always works at the optimum operating point. Optionally, the Desiro ML can also be equipped with water cooling for recovering energy. And the Desiro ML's energy balance can be improved even further: Equipped with a mobile energy storage system the Desiro ML temporarily stores braking energy and makes it available as an acceleration booster. As a result, you consume up to 35 percent less fuel. Because it is so economical and clean, the single-car train already fulfills the EU emission standard Stage IIIb – without any conversion or expansion. The Desiro ML is even equipped to meet the TIER 4 standard that will be in effect in the future: Retrofitting an engine with an improved exhaust gas purification system is easy due to identical dimensions and interfaces.

Energy storage system

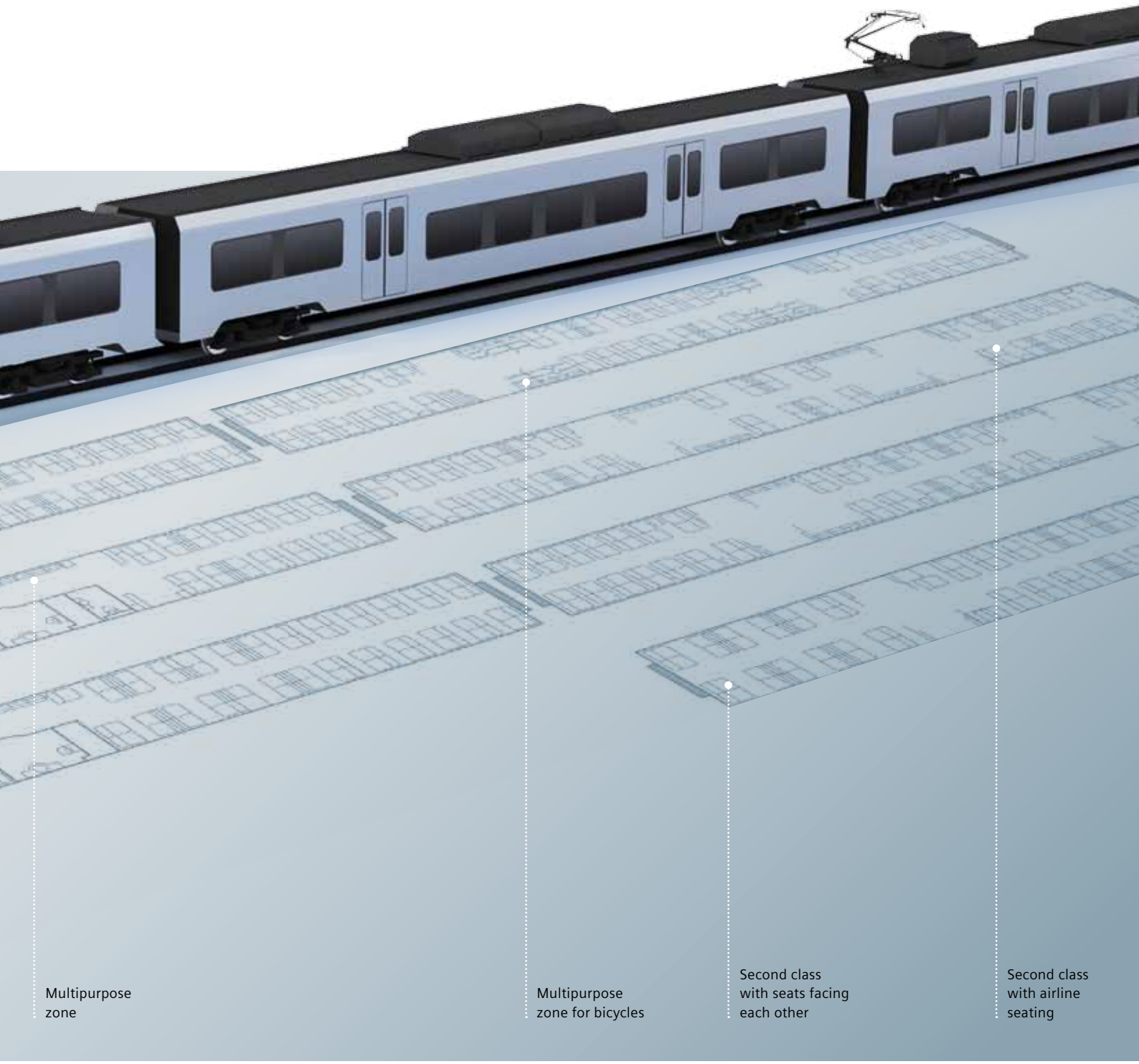
Protected and safe
The Desiro ML has been designed in accordance with the latest standards on ergonomics and safety so that your passengers arrive at their destination relaxed and safe. It provides optimal crashworthiness in accordance with EN 15227 and TSI Crash, scenarios I to IV. And fire protection has been implemented in accordance with CEN/TS 45545. The use of suitable materials, combined with technology for timely detection and reporting of fire sources, ensure a very high level of safety. If you and your passengers want even greater protection, the Desiro ML can also be equipped with a CCTV-monitoring system.

Make more of the space.

The modular train concept of the Desiro ML platform – comprising state-of-the-art technologies, tried and tested technology, complete compliance with standards, and lots of freedom for individuality – sets new benchmarks in modern rail transport. These benchmarks also provide for maximum variability and attractiveness in the interior. Discover a unique spatial experience on the rails and the possibilities created by low-floor seating arrangement, generously apportioned doorways and gangways and innovative design.



Maximum variability: The interior is designed as a system solution. Different design variants allow the train to be adapted to individual needs.


Multipurpose zone
Multipurpose zone for bicycles
Second class with seats facing each other
Second class with airline seating

Spacious and flexible:
the entrance areas
Passengers are happy to board this train: Its comfortable low-floor entrances ensure barrier-free access without ramps, even for wheelchair users and families with strollers. The floor height can be either 600 mm or 800 mm. Later conversion from 600 mm to 800 mm is possible as an option. Spacious entrance areas with 1,300 mm wide doorways help passengers board and exit quickly and safely. In addition, the number of entrance areas in the individual cars can be configured – you can select either one or two entrances.

Modern and variable:
the information system
Reliable arrival also means knowing at all times when that arrival will be. The modern visual and acoustic passenger information system in the Desiro ML orients passengers along the entire route with next-stop displays and clear announcements. The system can also be adapted to meet your specific individual route requirements through numerous pre-defined variants.

The step board helps passengers board and exit when platforms are low

Modern next-stop displays provide visual and acoustic orientation

Comfortable and sophisticated:
the system solutions
Comfort is systematic in the Desiro ML: The technology is not only innovative, but also verifiably reliable; the interior design is not only attractive, but also functional. For instance, all large components and the diesel generator set are located on the roof. The exhaust cabinets and the inspection hatch are no longer necessary in the vehicle floor. The entire train is reserved for passengers, especially for those with limited mobility. It has a low-floor design between the bogies. The train's design also maximizes peace and quiet: Passengers do not sit above the drive components. Acoustic noise on the platform escape up. The train is noticeably quieter, thanks to the optimum acoustics. With its diesel-electric drive, the Desiro ML passengers don't experience jolts, and the air suspension ensures an all-round sophisticated ride.

Multifunctional and climate-controlled:
the interior
Ride in the "feel good" class: The Desiro ML's interior is impressive, with its spacious ambiance, future-oriented design, and room for freedom in the layout. The atmosphere is friendly and open, thanks to extensive lighting and timeless color schemes. Seat spacing and layout can be varied flexibly, according to individual requirements. Large multipurpose zones offer sufficient space for wheelchairs, a modern, universal toilet, bulky baggage, and bicycles. All passenger areas include heat-insulated panorama windows. The powerful, reliable air-conditioning system creates a pleasant climate. The temperature can be adjusted quickly. Cold air enters the passenger area gently via integrated perforated ceiling panels.

The large multipurpose zone also offers sufficient room for bicycles

- High capacities with low axle load distribution
- Variable number of doors
- Highly changeable interior design
- Bright, pleasant interior ambiance
- Functional design for all passenger and operator requirements
- Maximum comfort for passengers and drivers

Ergonomic and comfortable:
the seats
The seats are simply better in the Desiro ML: The seat design follows not only practical aspects, but is also based on findings in anthropometry. The ergonomic shape of the seats and backrests provides optimal comfort. The seats' special design maximizes legroom. And the driver's seat is also ergonomic. For comfort during work, drivers can of course adjust the seat to their own sitting habits.

Modular and barrier-free:
the toilets
The toilet's location in the Desiro ML makes it fully accessible. It is located in the low-floor area and can be accessed without crossing any barriers. The size and layout are optimized toward the requirements of passengers with reduced mobility. In addition, the universal toilet, with its lengthwise sliding door, ensures optimal entry, even with a wheelchair. Bottlenecks in passages are avoided.

Practical and robust:
the luggage racks
Everything in its place: The passenger area is equipped with practical luggage racks to ensure adequate free space in the Desiro ML even when large numbers of passengers are traveling with luggage. In accordance with modern interior design, the robust racks consist of powder-coated aluminum extruded profiles with shelves made of safety glass. In this way, luggage and objects can be stowed and remain highly visible. Coat hooks and electrical outlets also add to the passengers' comfort.

Reliable from experience.

You can rely on the Desiro ML. And that's not just an empty claim. We can also demonstrate it through a concept that has already proven itself on the market and that we are continually improving, based on our gathered experience. The train has 99 percent availability. It provides investment security, and its flexibility is unique. It's a platform that you can build upon, today and in the future.

Successful vehicle platform
With the Desiro ML, you profit from maximum reliability based on our extensive experience. Since 1996, Siemens has already implemented two Desiro vehicle platforms: the Desiro Classic with more than 550 multiple units and the Desiro UK, designed especially for the British market with more than 380 multiple units. Based on this experience and proven results, we have continued to consistently develop the Desiro platform concept. The result is the Desiro ML, designed for a considerably broader range of requirements. It is designed for use in commuter, regional and interregional service. It is available either as an electric multiple unit (EMU) or diesel-electric multiple unit (DMU) on a uniform vehicle base. The Desiro ML has been in operation since 2008, with 99 percent availability, and is approved as two-, three- and four-car Desiro ML trains.

Complete support from a single source
Anyone who promises reliability does not do anything just half-way. That's why we focus not only on the technology and equipment of our future-oriented vehicles of the Desiro ML platform, but also on the overall concept. We offer you complete support for optimal vehicle use – from the design to technical support, to long-term maintenance and repair, all the way to cost-efficient financing models. Our goal is to consistently provide you with trains that are operational at all times.

1996

Classic

DB

Vogtlandbahn

Romania

ÖBB

Sophisticated service concepts
The service concepts are just as innovative and sophisticated as the Desiro ML itself. The smaller wheelbase, larger wheel diameter, lower axle load, and greater number of driven axles reduce wheel-rail wear. Combined with the less number of components (passenger air-conditioning system, short couplings, intervehicle gangways), you benefit from reduced maintenance and repair costs. Thanks to attractive conversion and retrofit packages, you remain flexible throughout the entire lifecycle. In addition, you save investment costs, because you don't need special depot equipment such as supported tracks, parallel lifting systems for a whole train, etc. You can use your existing infrastructure (short depots), thanks to the simplicity of separating the cars.

Tested reliability
We test each of our vehicles in a comprehensive series of tests – whether it's a prototype in development or a series-produced vehicle ready for delivery. To do this, we have tracks for a wide variety of test requirements at our Wegberg-Wildenrath test center (PCW). We test not only regional trains here, but also Intercity trains and even high-speed trains.

2006
ML

Mittelrheinbahn

2008

NMBS/SNCB

2009

RZD

2010

ÖBB

Siemens AG
Infrastructure & Cities Sector
Rail Systems Division
Nonnendammallee 101
13629 Berlin, Germany
siemensrailsystemscontact.ic@siemens.com

Printed in Germany
HL 12067078 199896 WS 06121.0
Dispo 21704 c4bs 1419
Order no.: A19100-V800-B810-V1-7600

www.siemens.com