

A high-angle, low-perspective shot of a white Siemens Vectron locomotive in a factory. The locomotive is the central focus, with its front and side visible. The word "Vectron" is printed in a dark blue font on the side of the locomotive's body. The background shows the industrial structure of the factory, including overhead beams and skylights. The lighting is bright, highlighting the metallic surfaces of the locomotive.

SIEMENS

Ingenuity for life

Vectron

Vectron.
The locomotive that's
forging new paths.

Creating Corridors

[siemens.com/mobility](https://www.siemens.com/mobility)

Hauptluft
Main brat
Conduite
Conduite

in
Con
Condo

How to transform borders into connections?

In our globalized world, goods and passengers are on the move throughout Europe. New paths are needed – both in terms of ideas and geography. Liberalized markets and widely varying national requirements, changing customer needs and growing competitive pressure require more flexibility than ever. Turn borders into connections. With the locomotive that's forging new paths.





Vectron reliably satisfies all European requirements and transport tasks.

- With a modular construction that can easily be retrofitted or converted.
- With Europe-wide authorisations that opens up borders.
- With a comprehensive range of products and services to protect your investment.
- With sustainability that creates competitive advantages.

Electric locomotives: pure traction

Components

- Brake rack
- Traction-motor blowers
- Fire-extinguishing system
- Auxiliary equipment rack
- Low-voltage equipment cabinet
- Dynamic braking resistor
- Oil and water cooler
- Auxiliary transformer rack
- Traction converter
- Compressed-air equipment rack
- AC high-voltage equipment cabinet
- DC high-voltage equipment cabinet
- Train protection cabinet 3
- Train protection cabinet 1/2
- Diesel power module **



Vectron MS

Voltage system

AC 25 kV, 50 Hz
AC 15 kV, 16.67 Hz
DC 3 kV
DC 1.5 kV

Max. power at wheel (kW)

6,400

Max. speed (km/h)

160 / 200

Weight* (t)

approx. 87, max. 90



Vectron AC, high power

Voltage system

AC 25 kV, 50 Hz
AC 15 kV, 16.67 Hz

Max. power at wheel (kW)

6,400

Max. speed (km/h)

160 / 200

Weight* (t)

approx. 85, max. 90



* based on equipment and ballasting

** does not apply to Vectron MS

Length (mm)	18,980	Wheelset arrangement	Bo'Bo'
Width (mm)	3,012	Starting tractive effort (kN)	300
Height (mm)	4,248	Track gauge (mm)	1,435 to 1,668
Wheel diameter, new (mm)	1,250		
Wheel diameter, worn (mm)	1,160		



Option examples

- | Sanding axle 2 and 3
- | Axle isolating switches (MS, AC high power)
- | Active rotary damper
- | Auxiliary driver's control panel
- | External power supply 1 and 3-phase on one/both sides
- | Thermoelectric hot/cold box
- | Rear-view system (camera)
- | Remote data transmission
- | Fire-extinguishing system
- | Pressure protection
- | Oil-free compressor
- | Diesel power module **

Vectron AC, medium power

Voltage system	AC 25 kV, 50 Hz AC 15 kV, 16.67 Hz
Max. power at wheel (kW)	5,600
Max. speed (km/h)	160
Weight* (t)	approx. 82, max. 90

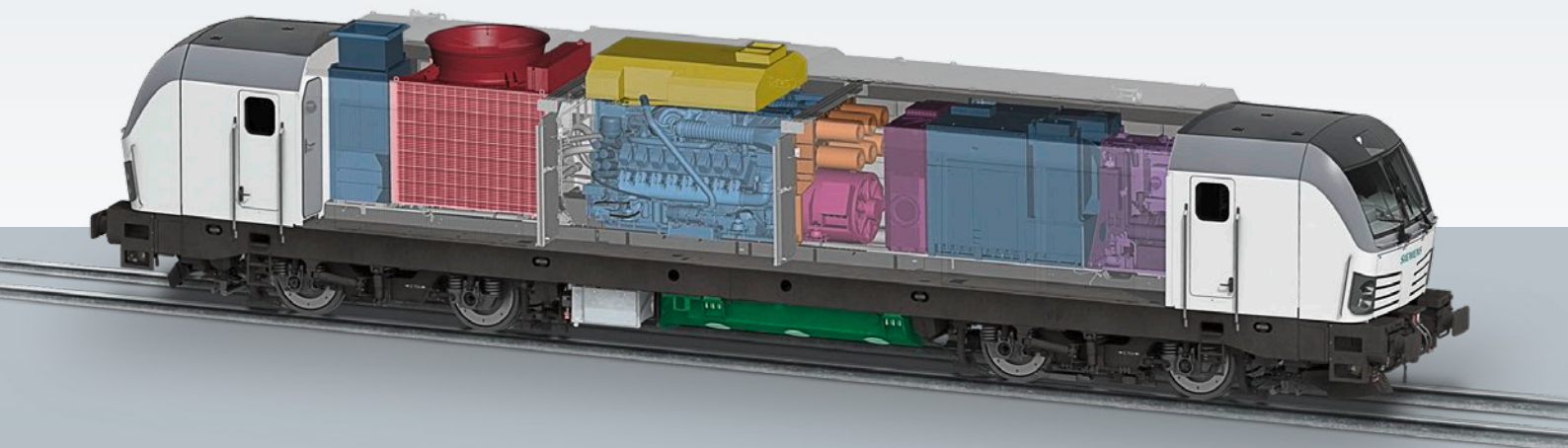


Vectron DC

Voltage system	DC 3 kV
Max. power at wheel (kW)	5,200
Max. speed (km/h)	160 / 200
Weight* (t)	approx. 80, max. 90



Diesel-electric locomotive: environmentally friendly trend-setter



Vectron DE

Wheelset arrangement	Bo'Bo'
Length (mm)	19,975
Width (mm)	3,024
Height (mm)	4,223
Wheel diameter, new (mm)	1,100
Wheel diameter, worn (mm)	1,020
Diesel engine power (kW)	2,400
Starting tractive effort (kN)	275
Max. speed (km/h)	160
Fuel tank volume (l)	4,000
Weight* (t)	approx. 82, max. 88
Track gauge (mm)	1,435 to 1,668



Components

- Dynamic braking resistor
- Train-protection cabinet
- Engine cooling plant
- Diesel engine
- Particle filter
- Engine air intake system
- Alternator
- Electric cabinet with central blower
- Brake rack
- Battery box
- Fuel tank
- HEP container or train protection cabinet

Option examples

- | Active rotary damper
- | Auxiliary driver's control panel
- | External power supply
1 and 3-phase on one/both sides
- | Thermoelectric hot/cold box
- | Rear-view system (camera)
- | Remote data transmission
- | Pressure protection
- | Oil-free compressor

* based on equipment and ballasting



Flexibility. Throughout the entire life cycle.

Wherever you are traveling – solve your transportation tasks efficiently and cost-effectively. And invest only in what you need.

Practical modularity.

Vectron focuses on what's most important – your success. That's why the vehicle concept makes no compromises when it comes to modularity. Modularized matching parts such as front end, driver's cab, braking equipment, and control technology ensure standardized operability and controllability as well as optimized lifecycle costs.

High-performance variants.

The importance of international traffic in the main European corridors is increasing. Serve today's main routes as well as tomorrow's growth regions. The electric versions, Vectron AC, DC and MS (multisystem), let you operate in four different voltage systems, and prove themselves with pure traction and cost-efficiency. For non-electrified lines, the Vectron DE, a highly environmentally friendly diesel locomotive, is available.

Pioneering national packages.

Discover new flexibility in national deployment. Vectron is flexibly scalable, thanks to a range of country-specific and equipment packages. As a national operator, you get a tailor-made locomotive for your country of use. Equipped with exactly the performance and components

you need in your region – without costly extra systems that aren't needed.

What if you have to cross national borders? In this case, national packages allow pan-European operation on ERTMS and other corridors. Pantographs, traction equipment, train protection system, train radio, and country-specific items of equipment are all designed to suit the specific features of the routes you take. The electric Vectron, for instance, can be upgraded and converted for use on different corridors simply and at low costs. Your vehicles will be ready to be deployed for new services within a short time.

Quick-response locomotive stockage strategy.

Market opportunities often occur at short notice. We build preferred variants with authorisations even when there is no immediate customer order – so we can guarantee you rapid delivery times that let you seize the opportunity without delay.

Freedom. Across borders.

Demands on routes are changing. Change with them, and leave behind technical headaches on continental European track networks and ERTMS corridors.

Standards-compliant interoperability.

Different voltages, different train protection systems, increasing transportation distances: the interoperable Vectron locomotives create a new freedom in transnational rail transportation, and of course satisfy all relevant TSI standards. Use cross-border connections whenever your business requires.

Future-proof train protection concept.

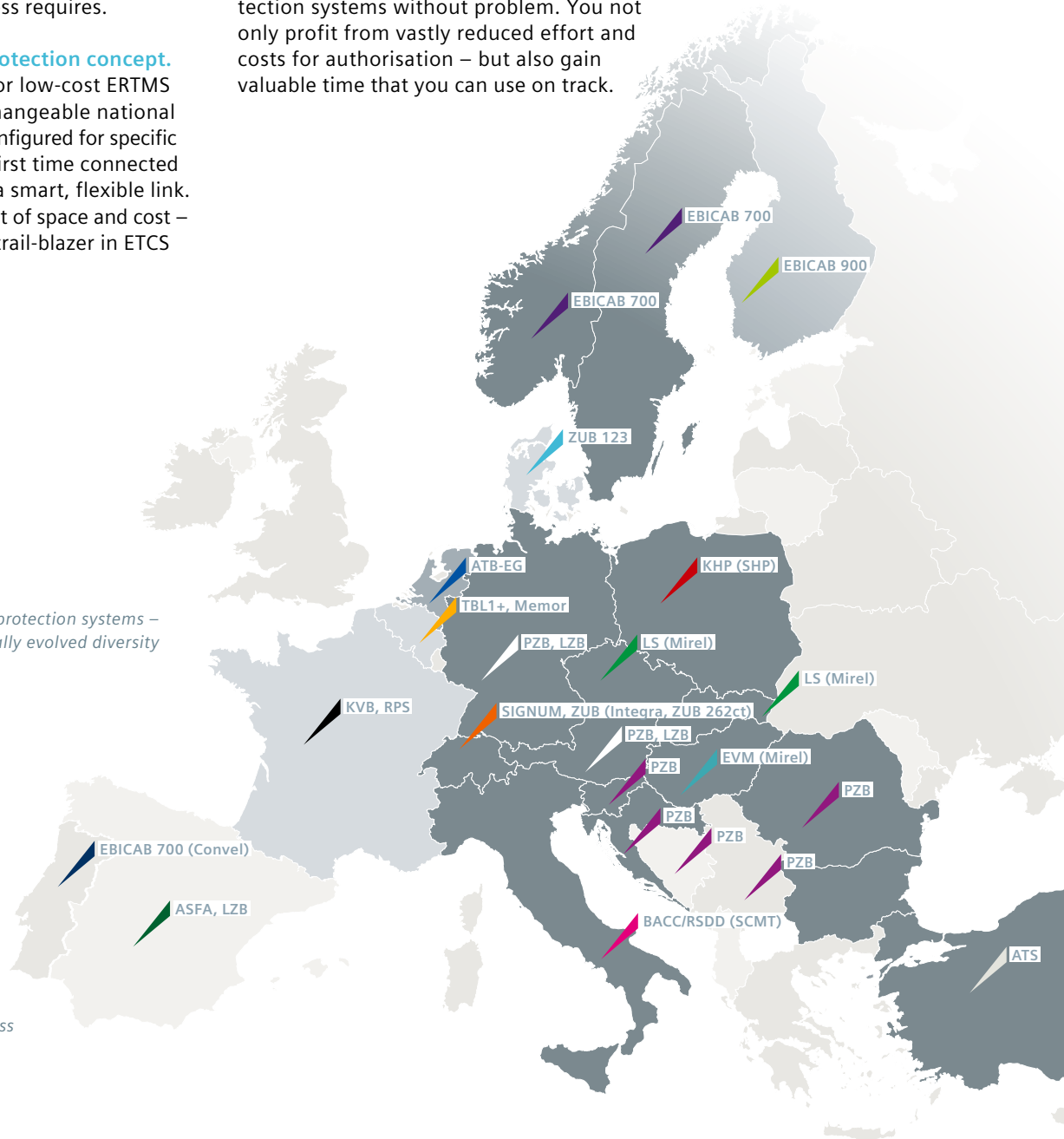
Vectron is designed for low-cost ERTMS migration. Easily exchangeable national systems that can be configured for specific countries are for the first time connected to an ETCS kernel via a smart, flexible link. This strategy saves a lot of space and cost – and makes Vectron a trail-blazer in ETCS authorisations.

Flexible upgrading.

With the electric Vectron locomotives, a pre-equipment package guarantees that cabling systems and installation places for all train protection systems used in Central Europe are already provided on board. That means it is now possible to add or omit train protection systems without problem. You not only profit from vastly reduced effort and costs for authorisation – but also gain valuable time that you can use on track.

European train protection systems –
historically evolved diversity

- Authorisation received
 - Authorisation in progress
 - Authorisation planned
- Date: July 2016





Certainty. Even in changeable times.

Europe is changing. Determine your future success by choosing the right locomotive now. And invest in the ability to plan reliably.

Lifelong adaptability.

Vectron opens up new freedom of motion. When the market requires it, the locomotives can be adapted swiftly to new tasks: whether it involves conversion or retrofitting for cross-border operations or modifying a high-power AC locomotive to a multisystem unit. Suitable pre-fit packages protect your investment. Vectron is also second and third-user capable as a result. You benefit from high residual value, which can be retained over the long term through ongoing service.

Seamless fleet integration.

Form high-performance train consists. All Vectron locomotives have multiple traction capability – compatible between the AC, DC, MS and DE types, with other modern Siemens locomotives and selected end-of-life or third-party vehicles. Besides TMC (ZDS*, ZMS**), optionally WTB with the Austrian remote control concept is available. Vectron offers unique flexibility in the market.

Expandable speed ranges.

Expand the deployment range of your vehicles. The bogie concept of the electric Vectron gives you long-term flexibility. With suitably preconfigured gear ratios, the entire speed range can be used with one bogie. This makes it easy to increase the speed subsequently in the Intercity area, for instance in the course of upgrading a freight train locomotive to a passenger train locomotive.

Extraordinary shunting ability.

In container terminals or on siding track, it is sometimes desirable to perform feed movements without overhead lines. The Vectron electric locomotive can now do this by itself, thanks to Vectron's Extra Mile. You save the costs for a separate shunting locomotive as a result. The diesel power module and the shunting remote control are based on the basic Vectron principles of maximizing flexibility and fungibility. The diesel power module is available as an option for high- and medium-power Vectron AC as well as Vectron DC locomotives. It can be retrofitted and is available on a leased basis. Save costs and simplify your logistical processes. Entirely to suit your requirements

* Time multiplex double traction control

** Time multiplex multiple unit control



Availability. Anywhere, any time.

You make money when your vehicles are on the move. Put your trust in the service experts who know Vectron like the back of their hand. And enjoy the freedom offered by reliable technology.

Needs-based service.

Locomotive maintenance can be complicated, depending on the fleet and the routes being served. Spare parts have to be in the right place at the right time. Service employees have to be specially trained. And transnational maintenance networks are often necessary to be able to respond rapidly in a worst-case scenario. Railcover is our answer to these challenges. The service concept is designed on a modular basis – you can pick from a

range of well thought-out elements, from support by mobile technicians in our service network to a 24/7 hotline or our complete service package. Our central spare parts logistics center in Frankfurt lets us supply spare parts throughout the EU in super-fast time. Create your own service package from the elements you really need.

Modularized matching parts.

Minimize your warehousing costs for spare parts. Even if you have a mixed fleet of different Vectron locomotive types, you can access a wide range of matching parts. Since Vectron is a genuine platform, you need fewer spare parts overall. And that further simplifies your service processes.

Standardized software.

Simplify your fleet maintenance. All Vectron variants use the same software. Whether it's the Vectron AC, DC or MS, experience from the entire Vectron fleet feeds into every individual vehicle. The adjustments have been tested and validated on Siemens' own vehicles to safeguard your locomotive operations.



Sustainability.

For the company and the environment.

Efficiency makes the difference. Stay relaxed, even as environmental guidelines grow tougher and tougher. And be pleased with consistently low operating costs.

More efficient use of energy.

Cut your energy costs. Vectron will help with an optimized system design and a wide range of functions to ensure a low-energy parking. The electric Vectron permits elevated electric braking effort of up to 240 kN. The recovered energy is used highly efficiently to supply auxiliary equipment – and is fed back into the grid wherever possible. Vectron’s energy efficiency looks after your budget – and the environment.

Intelligent driver assistance.

There’s another place for adjustments: driving behavior also has an effect on energy consumption. Vectron Eco Cruise lets you make the most of your savings potentials. The driver assistance system gives the engine driver recommendations for the most energy-efficient way of driving. A direct connection to the automatic speed control (ASC) helps take the load off the driver. However, he remains in control at all times, and can manually bypass Vectron Eco Cruise without switching it off.

Improved wheel service life.

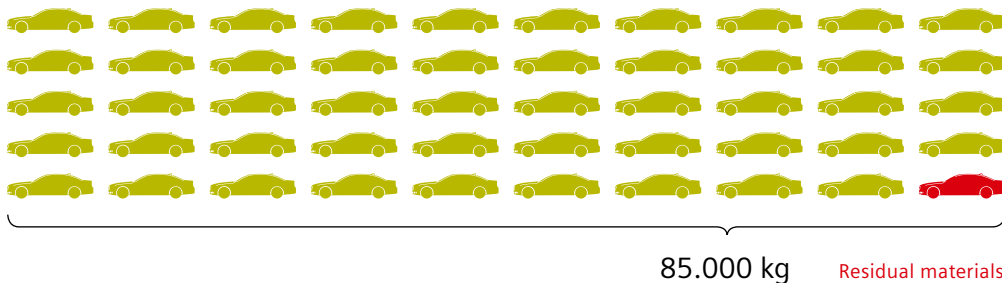
Wear to the wheels cannot be avoided. But the impact can be optimized: the electric Vectron locomotives have a greater reserve for wheel wear – 90 mm compared to the



usual 80 mm. That means the wheel disks have to be replaced less frequently. The result is lower costs for labor and materials.

Lowest emissions.

Even with diesel locomotives, you can satisfy the strictest environmental regulations. The Vectron DE is equipped with a Stage IIIB diesel engine and particle filter as standard. The improved efficiencies of the drive keep fuel consumption and emissions within reasonable limits



Environmentally friendly through the entire life cycle: With a total weight of 85 t and a 98% recycling rate, all that remains of a Vectron electric locomotive after recycling is about 1,700 kg of residual materials – the weight of a mid-size passenger car.

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