

Vectron. The new locomotive for European rail transport

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Siemens AG
Industry Sector, Mobility Division

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Future demands on European rail transport

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Changing customer structure
→ Smaller order sizes

Increasing flows of goods over long distances

Changing requirements due to legislation and standards

Portfolio completion

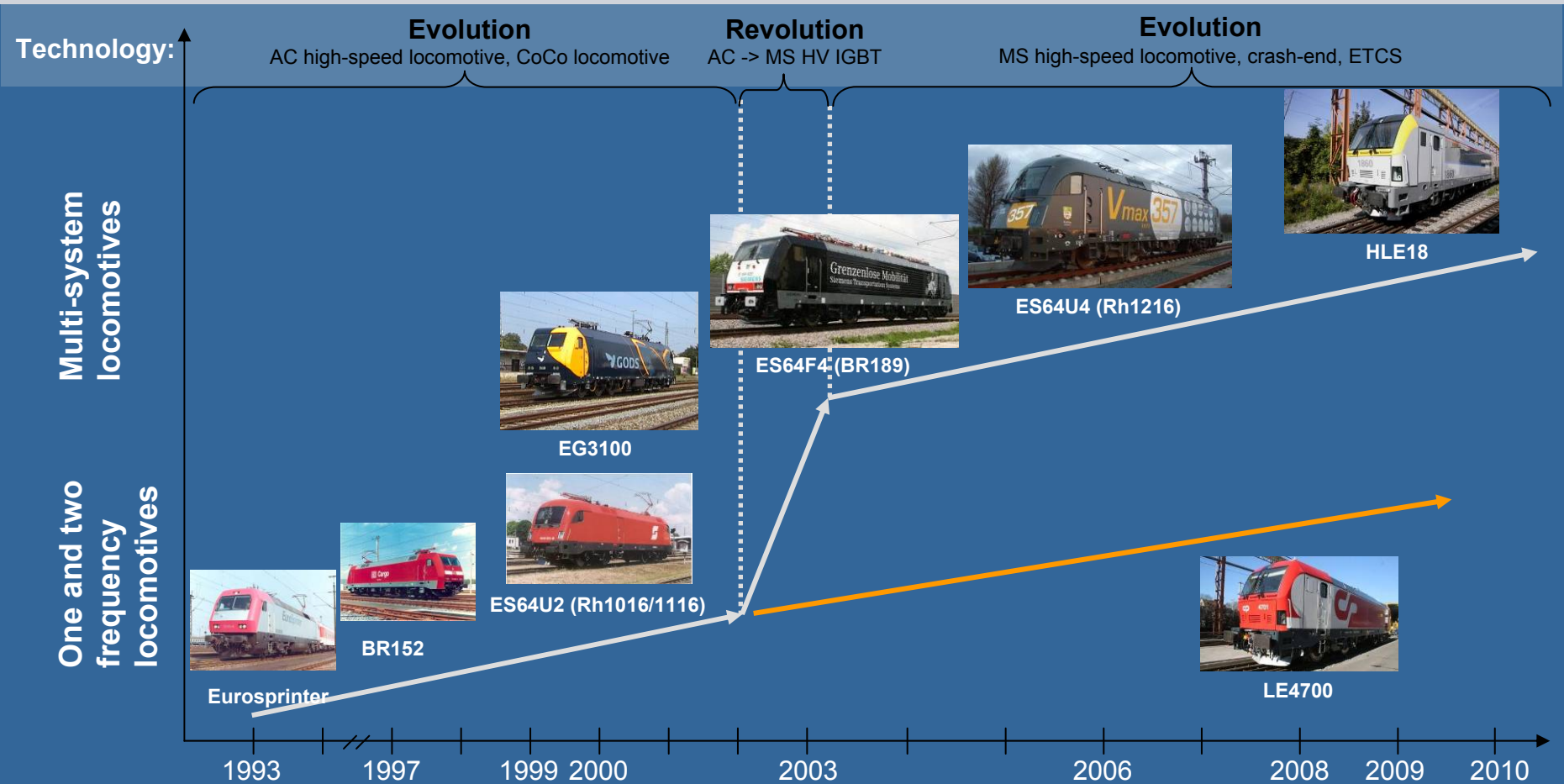


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The product of our experience

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Vectron Creating Corridors

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Long-term cost-efficiency

Borderless mobility

Highest availability

Extraordinary investment protection

Market-leading performance

Vectron

Long-term cost-efficiency

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Pure traction in various performance classes for a very wide range of traffic tasks



MS locomotive
High power

AC locomotive
High power

AC locomotive
Medium power

DC locomotive
Medium power

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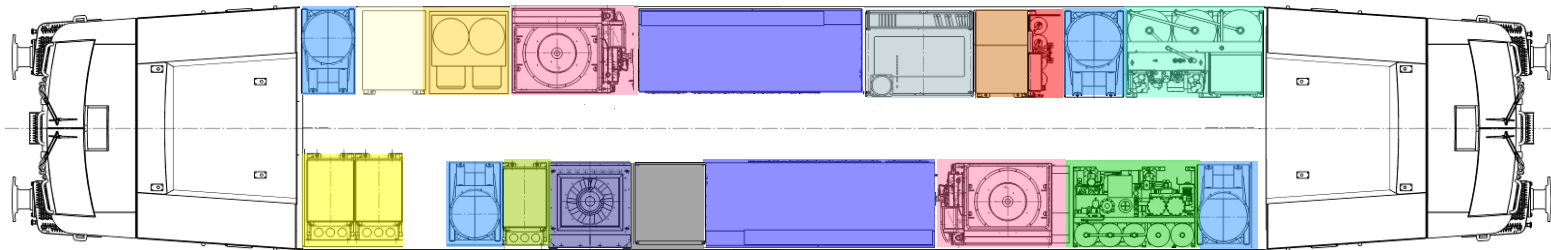
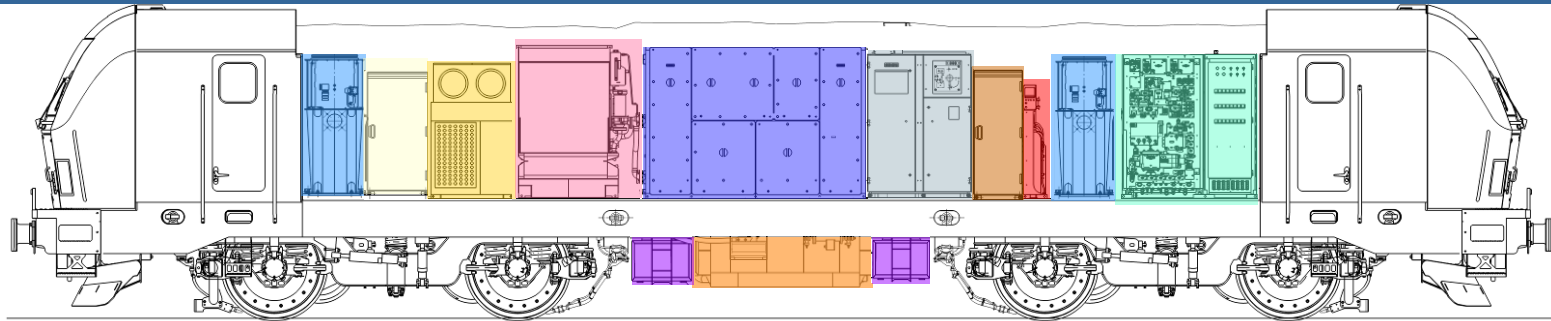
Vectron

















Exceptional investment protection

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Engine compartment layout

Vectron MS high power



- | | | |
|---|---|--|
|  Main transformer |  Compressed-air equipment rack |  Auxiliary eq. cabinet |
|  Traction converter |  Brake rack |  Train protection cabinet 1/2 |
|  Oil and water coolers |  Dynamic braking resistor |  Train protection cabinet 3 |
|  DC high-voltage eq. cabinet |  Low-voltage eq. cabinet |  Fire-extinguishing system |
|  Traction motor blower |  Battery compartment | |
|  Auxiliary transformer rack |  AC high-voltage eq. cabinet | |

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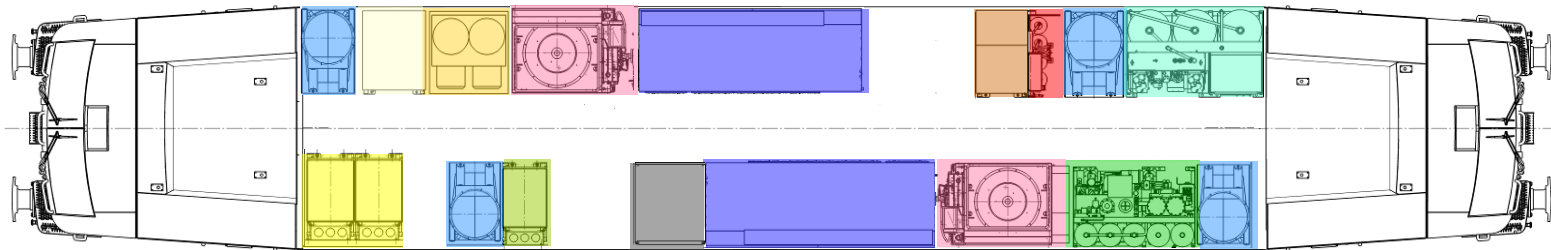
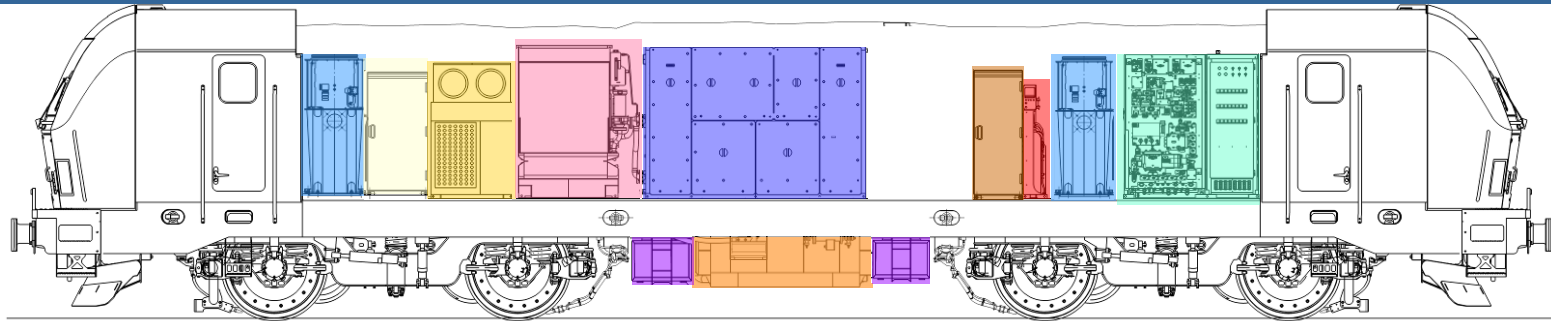
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Engine compartment layout

Vectron AC high power



- | | | |
|--|---|--|
|  Main transformer |  Compressed-air equipment rack |  Auxiliary eq. cabinet |
|  Traction converter |  Brake rack |  Train protection cabinet 1/2 |
|  Oil and water coolers |  Low-voltage eq. cabinet |  Train protection cabinet 3 |
|  Traction motor blower |  Battery compartment |  Fire-extinguishing system |
|  Auxiliary transformer rack |  AC high-voltage eq. cabinet | |

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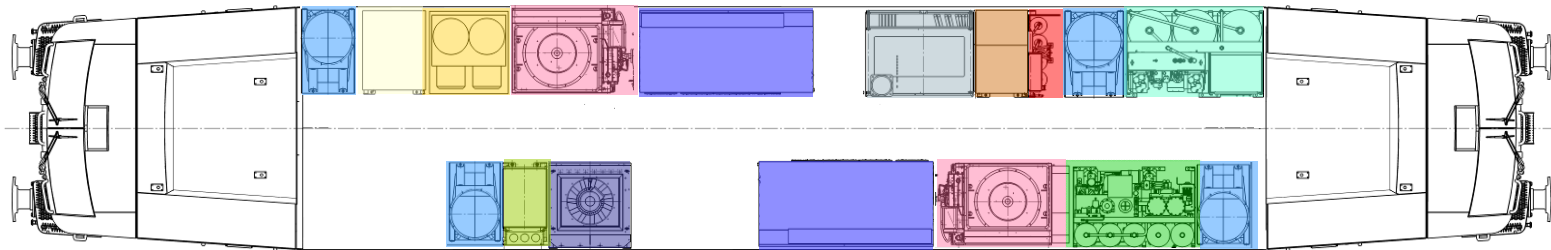
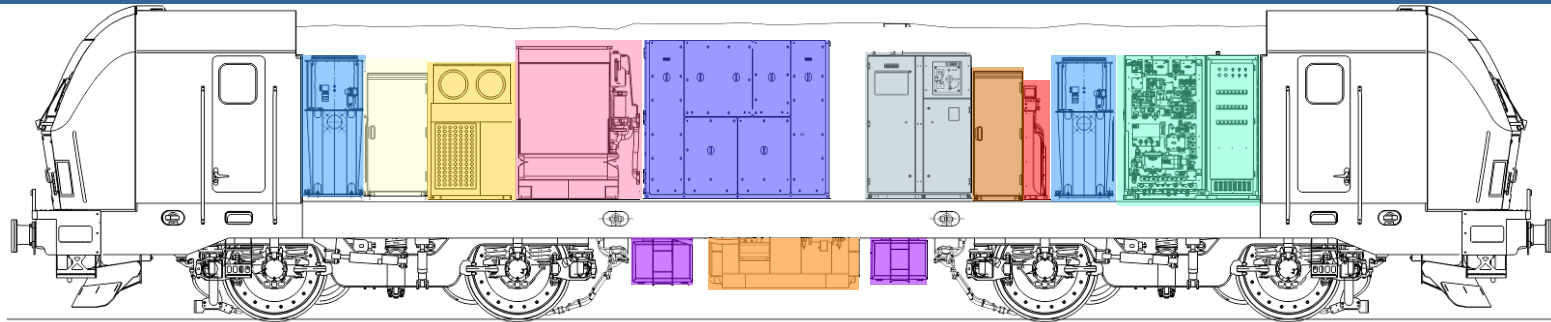
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Engine compartment layout

Vectron DC medium power



- | | | |
|---|---|--|
|  Line filter container |  Compressed-air equipment rack |  Auxiliary eq. cabinet |
|  Traction converter |  Brake rack | |
|  Oil and water coolers |  Dynamic braking resistor |  Train protection cabinet 3 |
|  DC high-voltage eq. cabinet |  Low-voltage eq. cabinet |  Fire-extinguishing system |
|  Traction motor blower |  Battery compartment | |
|  Auxiliary transformer rack | | |

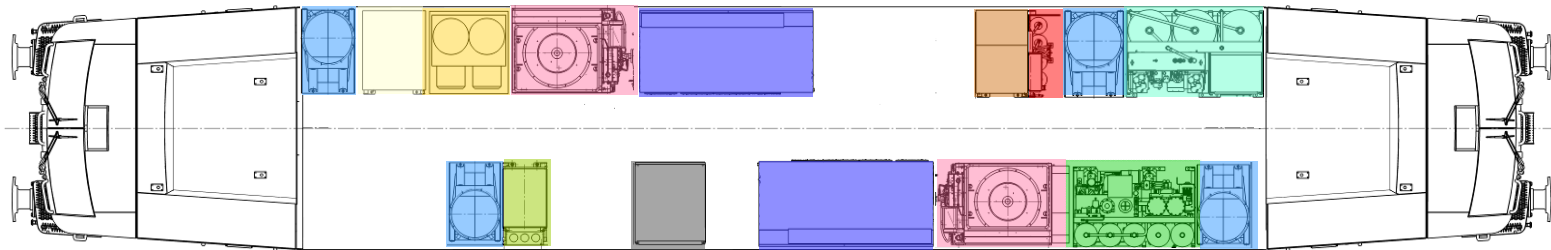
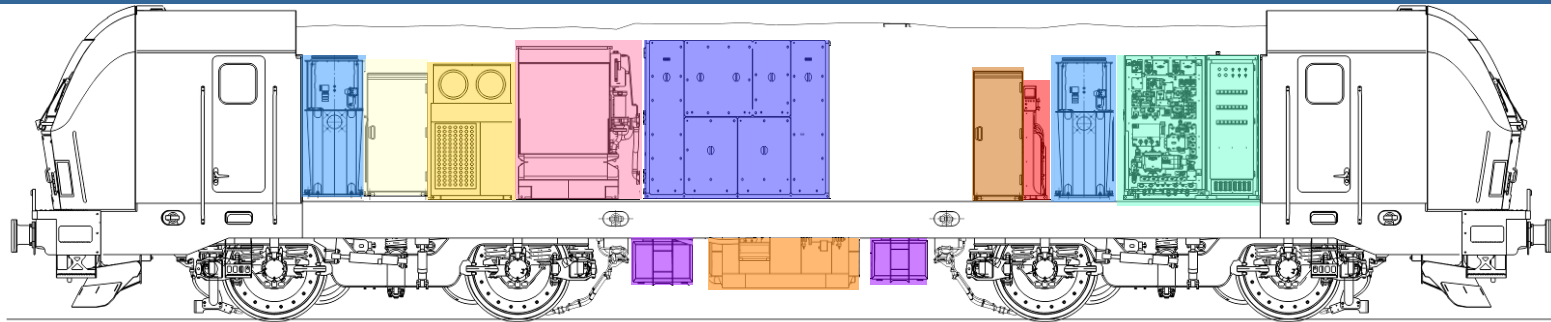
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
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Engine compartment layout Vectron AC medium power



- | | | |
|--|---|--|
|  Main transformer |  Compressed-air equipment rack |  Auxiliary eq. cabinet |
|  Traction converter |  Brake rack | |
|  Oil and water coolers | | |
|  Traction motor blower |  Low-voltage eq. cabinet |  Train protection cabinet 3 |
|  Auxiliary transformer rack |  Battery compartment |  Fire-extinguishing system |
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Exceptional investment protection

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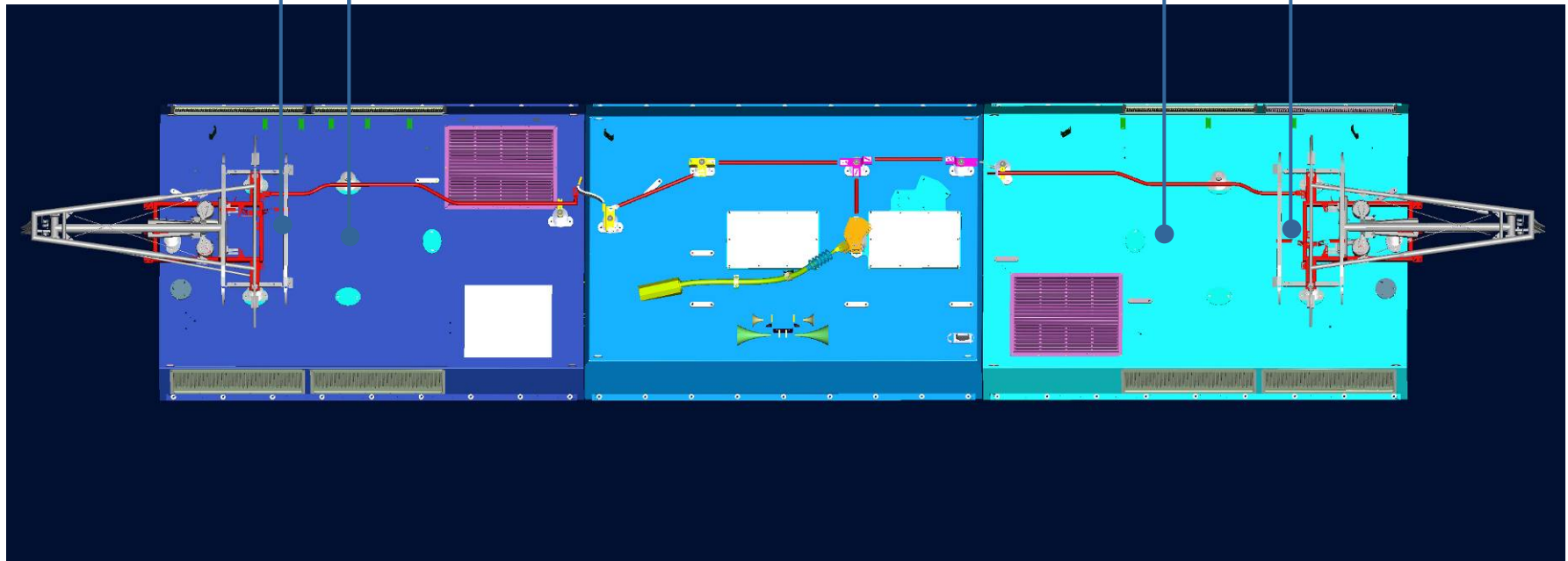
Roof layout of the Vectron AC

Position D
AC 1,950 mm

Position C
free

Position B
free

Position A
AC 1,950 mm



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Exceptional investment protection

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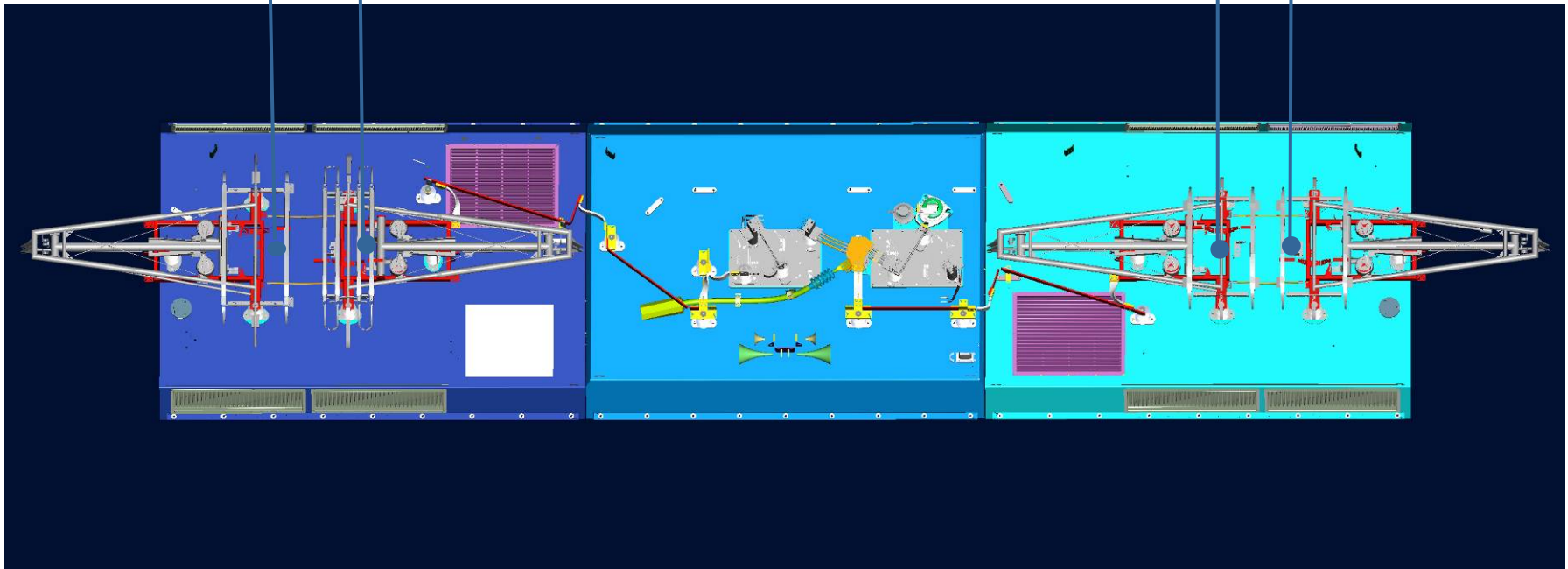
Roof layout of the Vectron MS

Position D
AC 1,950 mm

Position C
DC 1,950 mm

Position B
DC 1,450 mm

Position A
AC 1,450 mm



Train protection concept for use in Europe

Takes into account train protection systems for operation in:

Belgium, Germany, France, Italy, Croatia, Luxembourg, the Netherlands, Austria, Poland, Romania, Switzerland, Slovakia, Slovenia, the Czech Republic, Hungary

- European systems:
ETCS L1, ETCS L2
- National systems:
TBL EU, TBL1+, Memor, KVB, SCMT, RSxC,
LZB80, PZB90, EVM120 (Mirel), LS90 (Mirel),
SHP, ZUB262ct, Integra

In future for Denmark, Sweden and Norway:

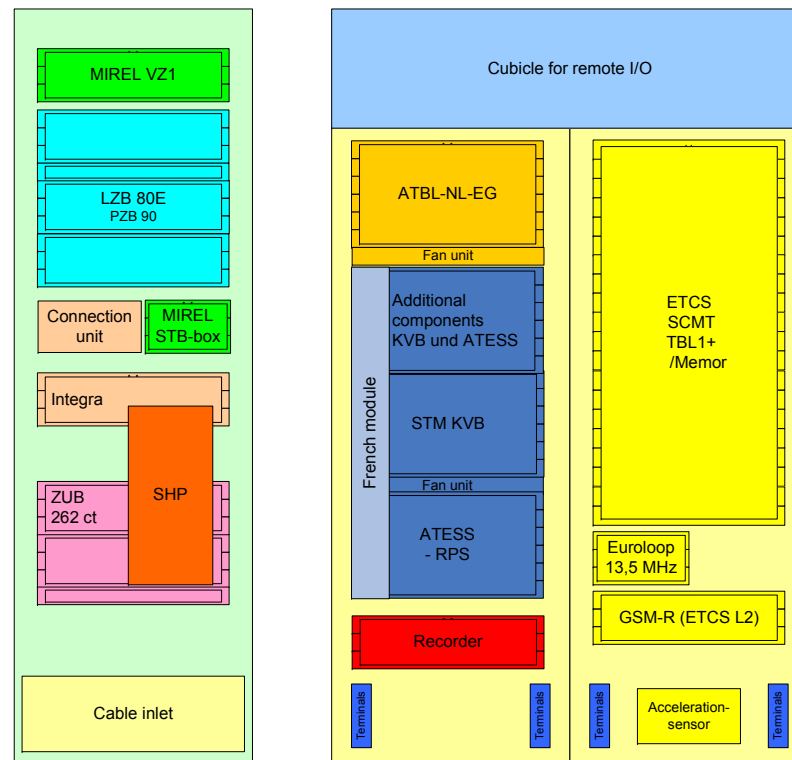
- National systems: ATC123, ATC-2



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Borderless mobility

A new type of intelligent train protection concept for flexibility today and tomorrow

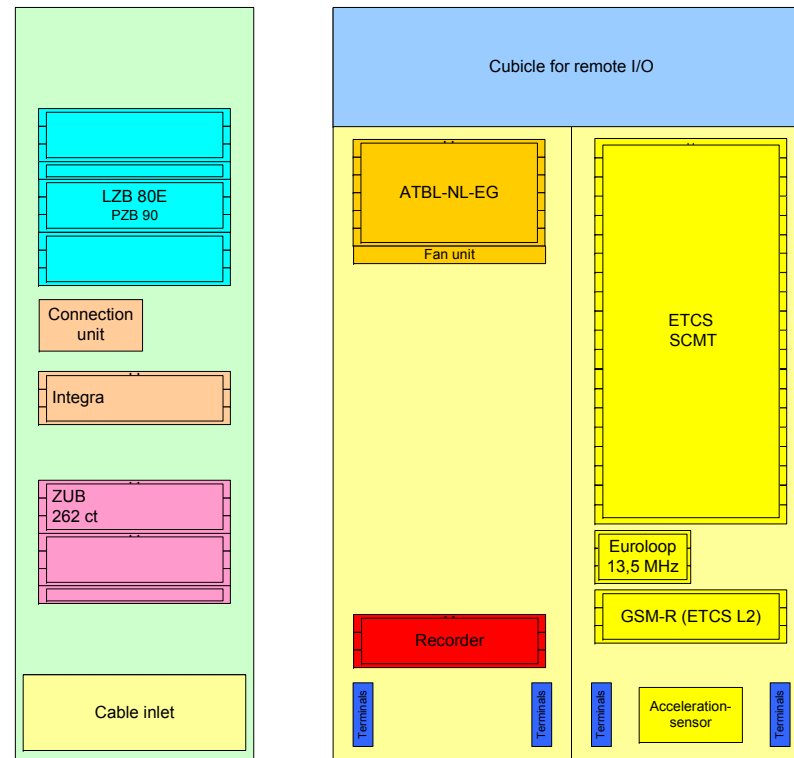


Fixed rack positions defined for all Central European train protection systems
>>> Flexible placement according to use

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Borderless mobility

Example of use for the "D-A-CH-I-NL" corridor

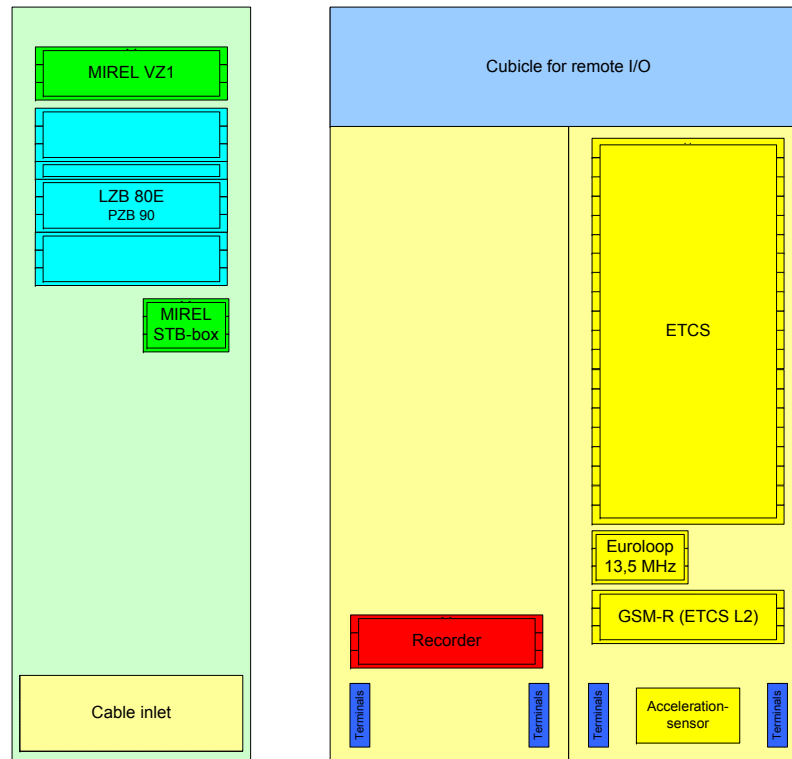


System layout for operation in:
Germany, Austria, Switzerland, Italy, Netherlands

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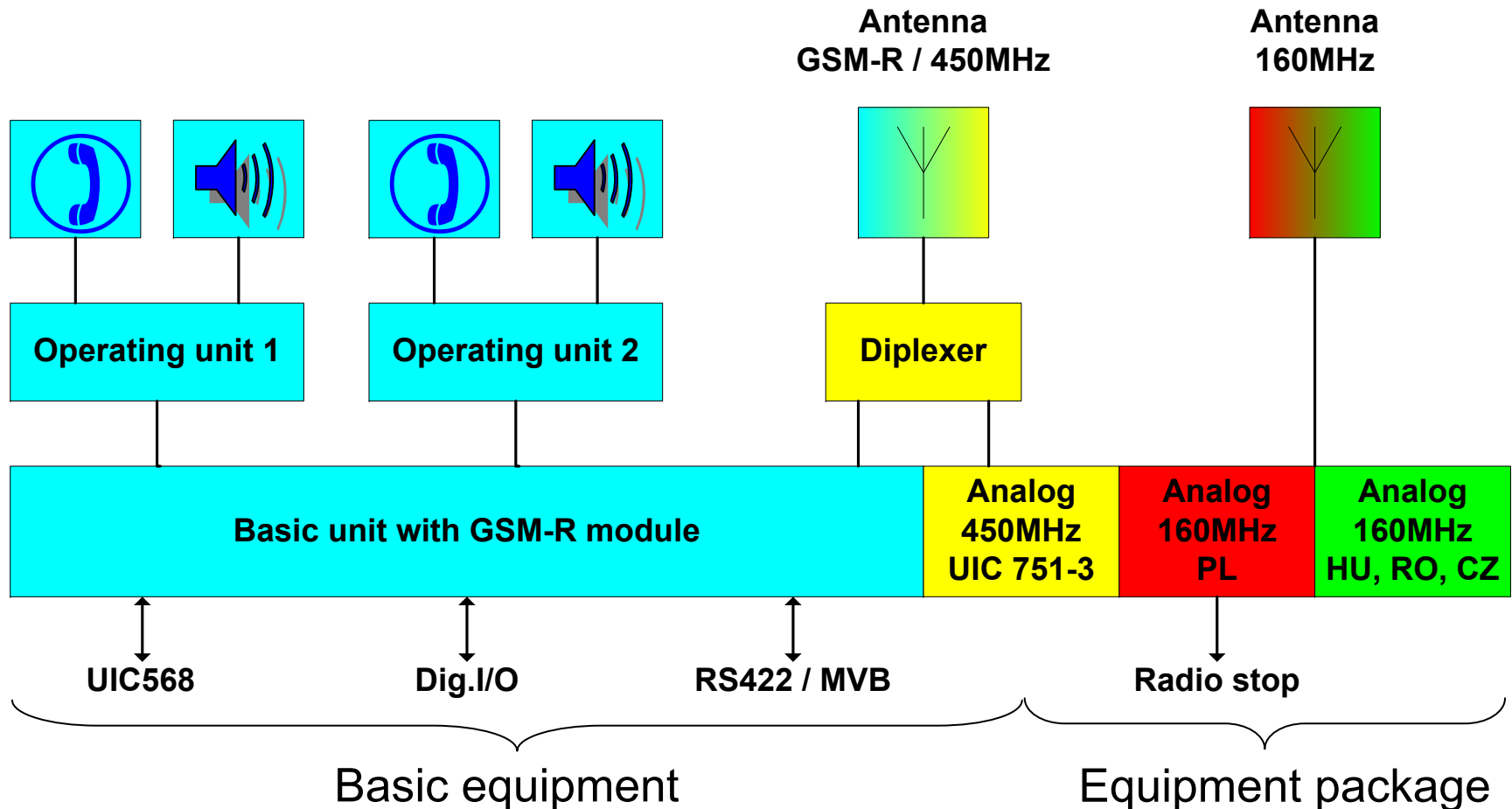
Borderless mobility

Example of use for the "D-A-HU-SK-RO" corridor



System layout for operation in:
Germany, Austria, Hungary, Slovakia, Romania

Integration of digital and analog train radio systems



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Borderless mobility

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Driver's desk with standardized control and display concept for Europe



Driver's desk with integrated additional consoles (right) providing more space if required.

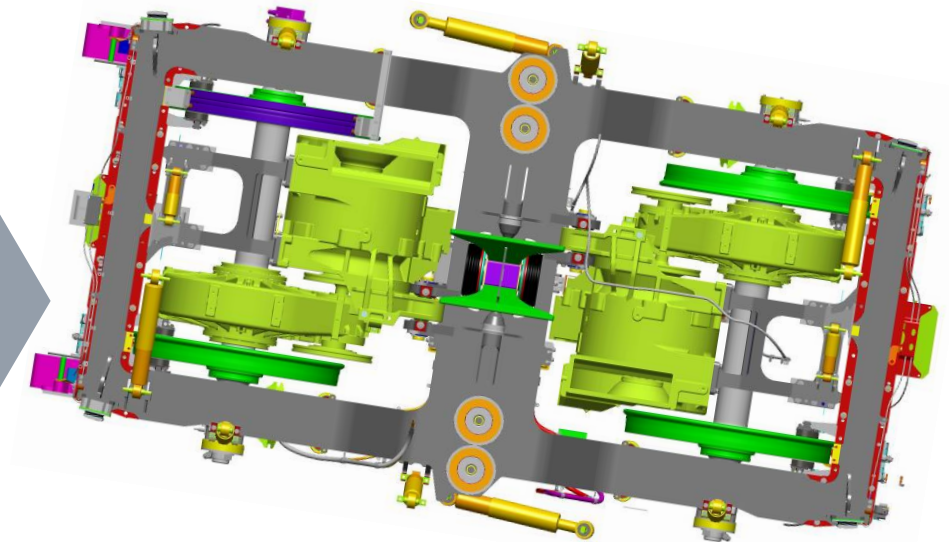
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Market-leading performance

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New universal bogie concept for speeds up to 200 kph

- 160 kph and 200 kph
- One bogie frame
- One drive
- One interface on the frame and to the drive
- Optional: use of ADD for tight curves



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Market-leading performance

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Simple repairs thanks to the front end



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Market-leading performance

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Innovation: laser hybrid welding






Vectron car bodies are welded using the laser hybrid process.

With this innovative, complete laser processing, a focused laser beam and an arc act together on the same joint.

➔ High-quality, high-speed welded joints with low heat input.

Just in case – the Railcover modules for prompt assistance

Railcover overview

| Support | Maintenance | Spare Parts |
|--|---|---|
|  |  |  |
| Rail Support Center <ul style="list-style-type: none">▪ Central „24/7“-Help desk▪ Direct access to locomotive experts | Maintenance Management <ul style="list-style-type: none">▪ Maintenance concept and organization▪ Maintenance documentation▪ Configuration management | New parts <ul style="list-style-type: none">▪ Short delivery times for defined range of parts |
| Mobile service technicians <ul style="list-style-type: none">▪ Locomotive specialists currently based at three locations in Germany | Corrective maintenance <ul style="list-style-type: none">▪ Fault clearance/repair▪ Quick performance of work to minimize downtimes | Replacement parts <ul style="list-style-type: none">▪ Short delivery times for replacement exchange parts from warehouse |
| Workshops <ul style="list-style-type: none">▪ Access to about 40 workshops in Central Europe | Preventive Maintenance <ul style="list-style-type: none">▪ Performance of general maintenance intervals/periods▪ Predictive maintenance activities | Periodic maintenance packages <ul style="list-style-type: none">▪ Preassembled spares and wear parts packages for periodic maintenance |




Service on request – tailor-made, customized, modular



Product characteristics: Examples

Railcover “Break-down and Accident cover” with direct access to

- Rail Support Center
- Mobile service technicians
- Workshops (partnering and our own)
- Spare parts supply

| Support | Maintenance | Spare Parts |
|---|---|---|
|  |  |  |
| Rail Support Center | Maintenance Management | New Parts |
| Mobile Service Technician | Corrective Maintenance | Exchange Parts |
| Service Facilities | Preventive Maintenance | Periodic maintenance packages |

Spare parts stock with fast logistics

- Defined parts list from warehouse
- Short delivery times by using company's established logistics infrastructure



Vehicle – Remote Data Transmission

- Vehicle reports autonomously in case of fault
- Rotational recall of diagnosis data and operational state
- Use of a most secure data encryption, proven and tested in the company



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Highest availability

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Consumables

All consumables can be refilled from the outside



Vectron Creating Corridors



The Vectron, designed for a wide range of traffic tasks, stands for pure traction in various performance classes and **long-term cost-efficiency**.

The Vectron's modular engine compartment and long-term retrofit capability ensure **exceptional investment protection**.

Standardized national packages and an innovative train protection concept provide **borderless mobility**.

The bogie and laser hybrid welding innovations underpin the **market-leading performance**.

The use of proven components and the needs-based Railcover service concept ensure **highest availability**.

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The product for European rail traffic

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