

The background of the entire page is a high-speed train track with several trains. The trains are rendered in a blue, wireframe-like style, giving them a futuristic appearance. They are positioned on multiple tracks that recede into the distance. The sky is a light blue gradient. In the foreground, a large, blue, wireframe structure, likely a power supply unit, is positioned on the tracks.

**SIEMENS**

*Ingenuity for life*

## Auxiliary Power Supply

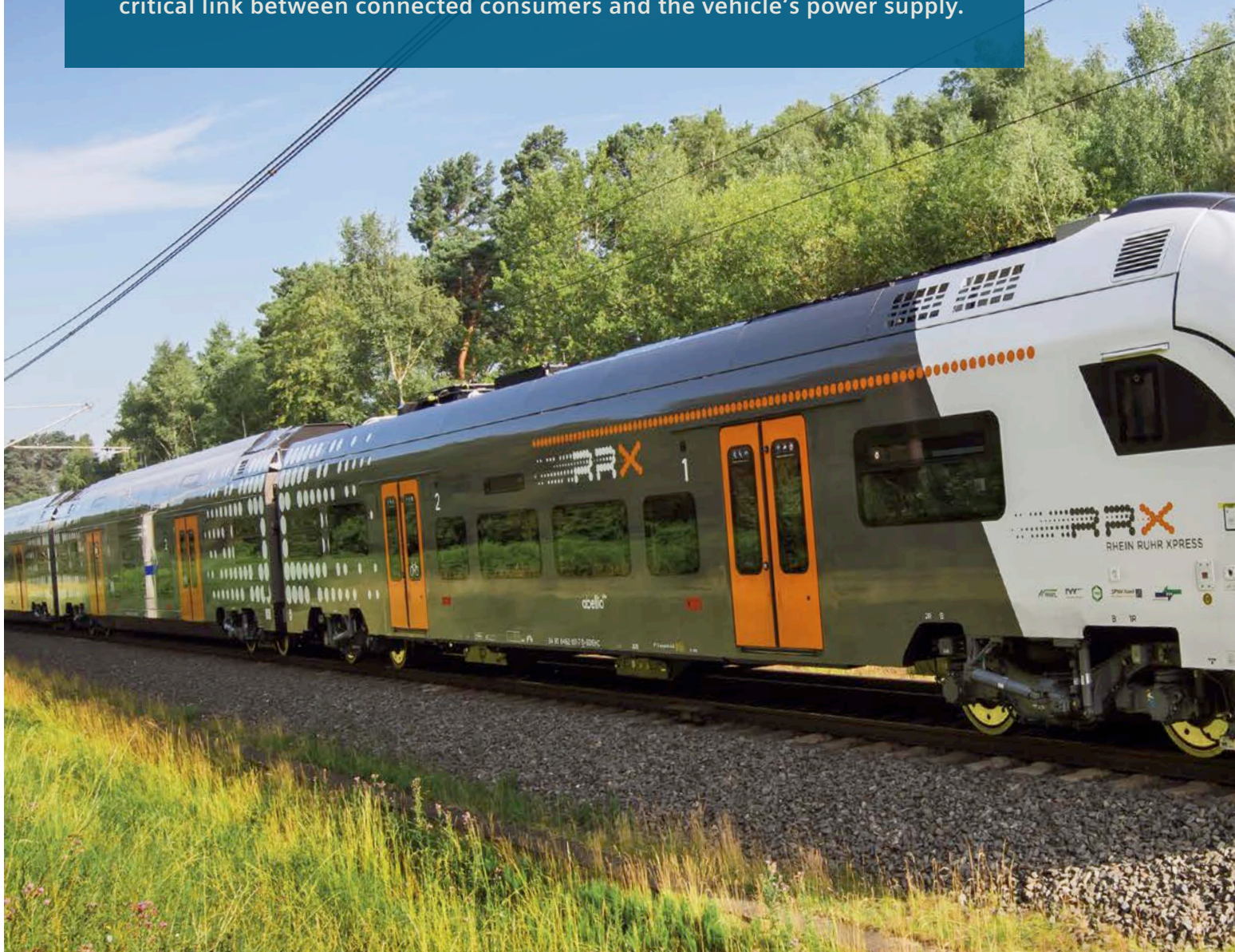
Versatile power source for onboard applications

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



# Auxiliary converters: As unique as your application

With the ongoing development of rail vehicles, electric buses and hybrid buses, passenger comfort and information are becoming increasingly important. As a result, the importance of the power supply for electrical and electronic consumers is also growing. Auxiliary converters are the critical link between connected consumers and the vehicle's power supply.







# The Siemens brand

**A symbol of quality with a proven track record.**

- Decades of experience in the railway sector
- Longstanding market and technology expertise as the foundation for targeted developments

## **Solid, reliable performance**

- Auxiliary power supply for all standard voltages and networks: from 750 V, 1,500 V, or 3,000 V to 15,000 V / 16.67 Hz or 25,000 V / 50 Hz single-phase direct current (secondary power supply via main transformer, as required)
- Wide variety of auxiliary power supply products to perfectly match customer requirements
- Global requirements are covered by global production facilities
- Compact, flexible, highly efficient, high-quality, and lightweight construction

## **Persistent and durable**

Our large installed base reflects extraordinary experience and expertise.

- Proven technologies in a global installed base
- Reliable components with a long service life
- All auxiliary power supplies have been developed, designed, simulated, tested, and built as a system

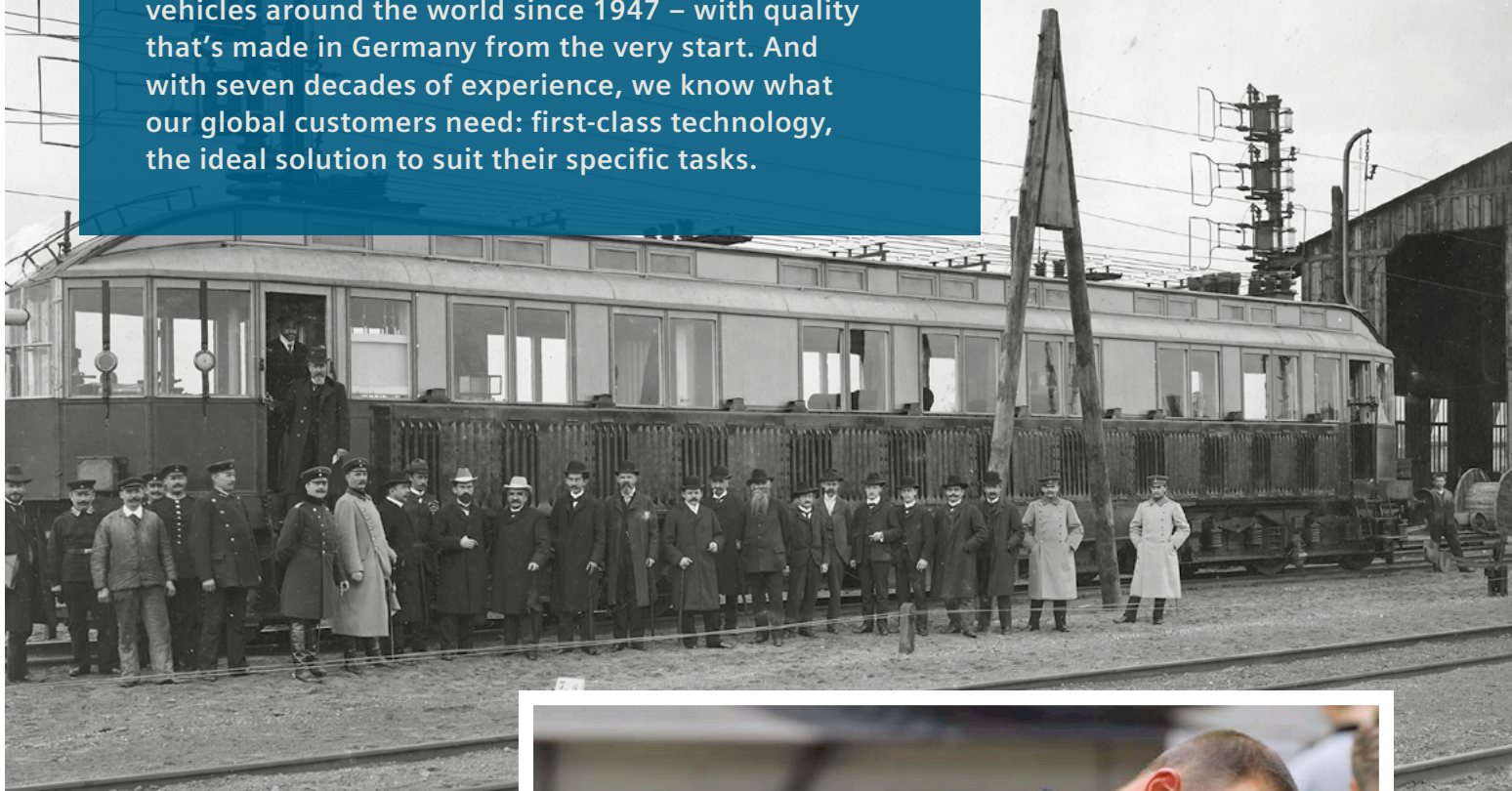
## **Components you can rely on**

- Market-relevant certifications and standards
- Long-term spare part and service concepts
- Global service network



# Meeting your rail requirements – since 1947.

We've been building electrical equipment for rail vehicles around the world since 1947 – with quality that's made in Germany from the very start. And with seven decades of experience, we know what our global customers need: first-class technology, the ideal solution to suit their specific tasks.



More than 15,000  
auxiliary converters  
in operation in rail  
systems worldwide.

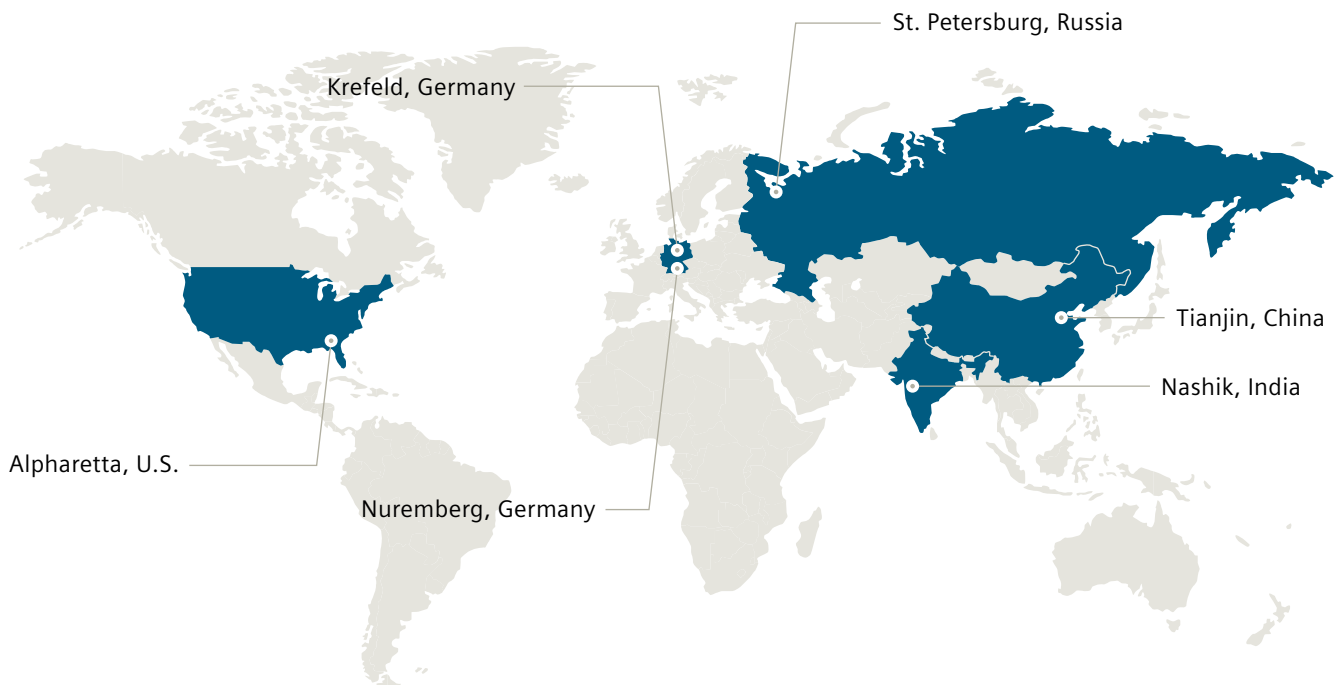


## From Krefeld to the entire world

About 100 employees at the Mobility Factory in Krefeld develop auxiliary converters. It goes without saying that many of our products are intended for our own vehicles, but many other vehicle manufacturers also value the superior auxiliary converters from the Lower Rhine region for their own rail vehicles – from high-speed trains to trams.

## Lead Factory Traction – Nuremberg

At our Lead Factory in Nuremberg, around 1,050 employees develop and manufacture drive systems and motors for rail vehicles. Complete system tests for all traction equipment are performed in our special test facilities on-site.



### Alpharetta, Georgia, U.S.: Specializing in converters

The facility in Alpharetta manufactures complete propulsion solutions for the North American rail market. Products are both innovative and well-proven, providing the highest degree of reliability with minimum maintenance costs. The product portfolio includes converters, motors, gearboxes and auxiliary power supplies. Product design is project-specific, ensuring proper adherence to customer requirements.

### Auxiliary and traction converters from Nashik, India

The Nashik Works has been an important technology location for Siemens since 1987. This is where auxiliary and traction converters are developed and produced, in addition to electrical control panels, drives, and rail automation products, and they also develop test equipment.

### St. Petersburg: Motors and drives for the Russian market

Founded in 2006, the Russian factory specializes in developing, manufacturing, and maintaining high-voltage motors and frequency converters for Transneft and RZD (Russian Railways), among others. Its portfolio also includes traction motors and converters and auxiliary converters, drives, and APSs for infrastructure applications.

### Factory in Tianjin, China

The factory in Tianjin is our central location for electrical rail components in China, and it produces large electrical motors and converters. The product portfolio includes traction motors and converters as well as APSs for high-speed trains and metros. The location was inaugurated in 1995 and currently employs approximately 140 workers.



# Auxiliary power supplies

(For example, for commuter and regional trains)

## Benefits

- + Reliable and rugged
- + High power in compact dimensions
- + Lower conduction losses by using less cabling and shorter cables
- + High efficiency

## Main fan

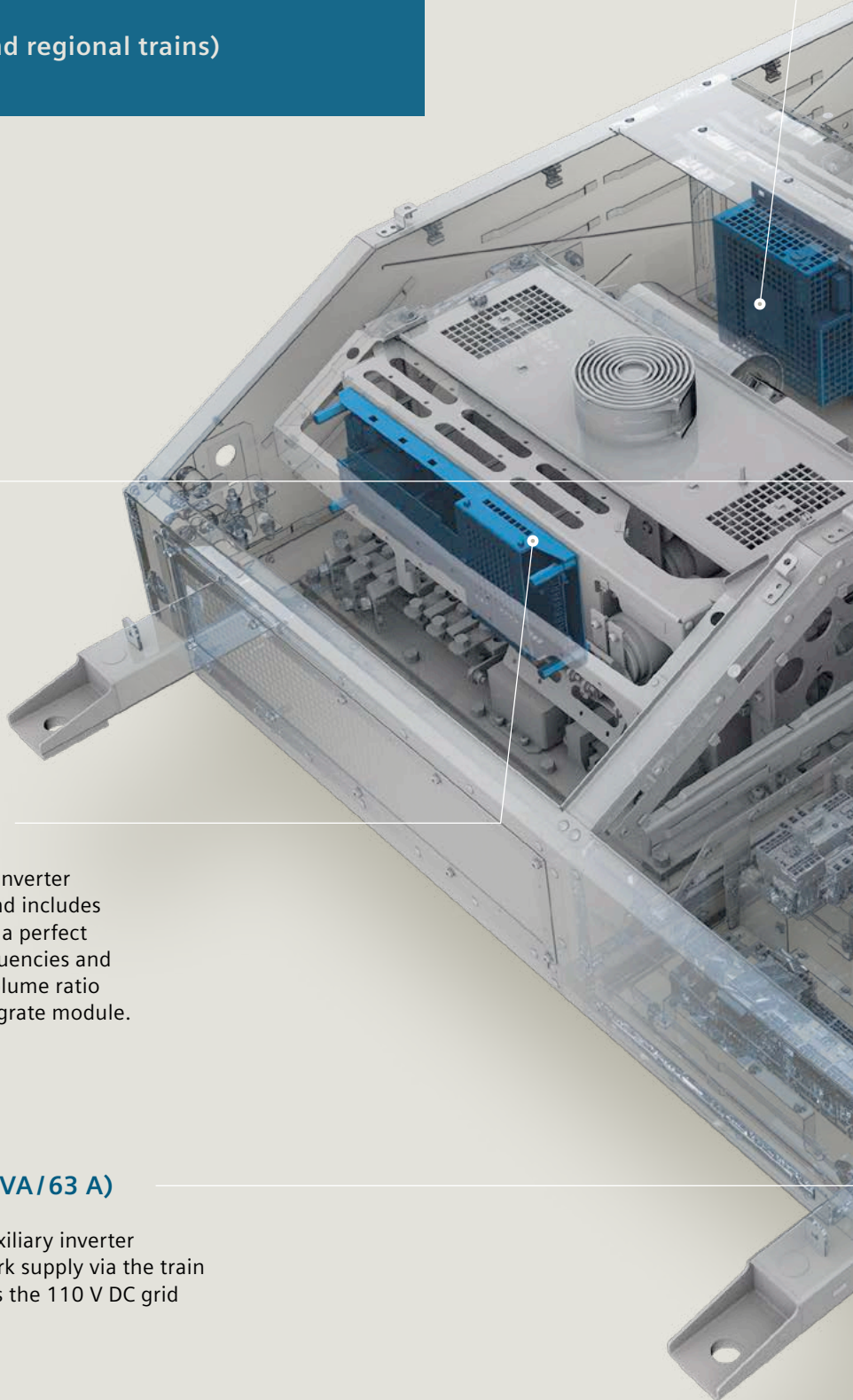
Auxiliary power supplies are forced-air cooled, which allows for lower weight and costs. Efficient air filters enable low maintenance, and minimized noise levels are achieved through acoustic optimization and perfect fan-speed control.

## Output converter Low-voltage unit

The Low Voltage Unit (LVU) consists of a 3 AC inverter and a battery charger. It is highly integrated and includes all the necessary filters and sensors to achieve a perfect sinusoidal output voltage. High switching frequencies and a compact design ensure an optimal power/volume ratio and minimal power losses with an easy to integrate module.

## Local power supply (3 AC 400 V 45 kVA/63 A)

For service and maintenance purposes, the auxiliary inverter can be supplied with a 3 AC 400 V local network supply via the train busbar. The APS picks up the voltage and feeds the 110 V DC grid and charges the vehicle's batteries.



## Master control unit

The master control unit performs and monitors all the essential functions of the auxiliary power supply. It's connected to the inverter control units on the internal side via CAN and to rail communications by MVB or Ethernet. The master control unit provides a wide range of digital and analog input and output ports to meet all project requirements.

## Input inverter high-voltage unit

The input inverter high-voltage unit convinces with its compact design, potential insulation between input and output as standard safety function as well as integrated sensors and magnetic components in an easy-to-integrate control module.

## Precharging unit

For low-inrush current and a smooth start, the unit always starts with a precharge resistor (switched off in normal operation).

## Input filter

The input filter guarantees the input impedance and limits the interferent current usually generated by high-frequency switching inverters (IGBT) to prevent disturbances on the line and input side.



# Our auxiliary converters' range of applications

Our auxiliary converters work on all types of rail vehicles and passenger coaches, and provide onboard power for 3 AC/1 AC electrical equipment as well as DC supply and charging batteries quickly, reliably, and safely. The systems don't necessarily have to be installed on board: They can also be used in stationary applications, as in the case of our charging systems for electric buses.





# Technical data

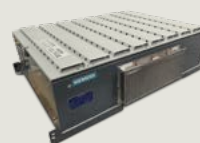
The technical data specified here represents values typical of standard devices for the selected application that can be implemented especially quickly and economically. The auxiliary converters from Siemens can also be individually adapted to the specific rail vehicles and passenger coaches.



## Light-rail vehicle



## Metro



### Nominal power/battery charger

20 or 40 kVA / 11 kW

90 kVA / 14 kW

MidCap:  
120 kVA / 40 kW

HighCap:  
170 kVA / 30 kW

### Nominal voltage

600 / 750 V DC

600 / 750 V DC

750 V / 1,500 V DC

### Temperature

–25° C to +45° C

–37° C to +47° C

–25° C to +45° C

### Installation / mounting

Roof

Roof

Underfloor

### Weight

260 / 300\* kg

590 kg

530 kg / 600 kg

### Cooling type

Forced-air cooling

Forced-air cooling

Forced-air cooling

\* Options \*\* Module weight only (new platform)



## Commuter rail



160 kVA / 15 kW

1,500 V DC

–40° C to +45° C

Upright / overhead

240 kg\*\*

Forced-air cooling



## High-speed train



160 kVA / 16 kW

1,500 V DC  
3,000 V DC (on request)

–40° C to +45° C

Underfloor

240 kg\*\*

Forced-air cooling  
and water cooling



## Charger



### Offboard

150 kW, 300 kW,  
450 kW, and 600 kW  
(according to  
IEC 61851-23-1)

In accordance  
with customer grid

–25° C to +45° C

Infrastructure

n/a

Forced-air cooling



### Onboard

Onboard DC / DC  
converter with 60 kW  
and 180 kW (double-  
insulated according  
to ECE R36)

750 V DC

–25° C to +45° C

Roof

250 kg\*\*

Forced-air cooling



## Coaches



3 AC: 40 kVA – 95 kVA  
DC: 6 kW – 20 kW

Multiple voltage  
power supply (UIC 550)  
1,000 V AC  
1,500 V AC / DC  
3,000 V DC

–25° C to +45° C

Underfloor

1,350 / 1,550 kg

Forced-air cooling



# APS portfolio

Light-rail vehicle (low-power)



20/40 kVA

Light-rail vehicle (high-power)



< 100 kVA

Metro



MC 120/HC 170 kVA

Commuter rail



160 kVA

High-speed train



160 kVA

Offboard and onboard charger



150 kW to 600 kW offboard  
60 kW to 180 kW onboard



# Services

Our services department includes both Field Service and Repair Service. The task of Field Service is to quickly come to your aid on-site – for all tasks ranging from the commissioning of our APS and High Power Charger to field data acquisition and maintenance/repair. We also offer our Repair Service at the Krefeld factory or APS/HPC power modules and for Sibcos® microprocessor controls. In addition to EBG-compliant repairs, services also include electrical and climatic testing and much more. We also provide special services for all railway applications.



## Maintenance Services

Our Maintenance Services help you to sustainably ensure the operational readiness of your vehicles and rail infrastructure, independent of your own resources.

We're there wherever you need us, with a service concept tailored to your light-rail, regional, main-line, or high-speed service. Whether it's overhead contact lines, signals, interlockings, grade crossings, trainsets, locomotives, metros, trams, or light-rail vehicles, our experts have many years of experience when it comes to maintaining fleets and systems worldwide.

## Spare Part Services

Spare parts cost you money – especially when they sit unused in your warehouse. On the other hand, stockpiling is sometimes essential so that you can respond quickly to demand and keep your operation running.

With Easy Spares®, we make sure that your specialists have exactly the parts they need – quickly, easily, and reliably, any time they're needed – whether you want new, repaired, or refurbished parts. And thanks to Siemens' pioneering position in the field of additive manufacturing, you can get even the most unique or rarely-needed parts, even in small runs, and often with design improvements. Easy Spares – for a lifetime.





## Upgrade Services

Whether you're modifying the interior or performing a system upgrade or overhaul, there are many good reasons for modernizing, extending, or repairing your rail vehicles and infrastructure: for instance, to enhance attractiveness, boost energy efficiency, improve passenger comfort, increase reliability, and even improve sustainability just by extending the service life. A long service life conserves resources, and our Siemens Upgrade Services will help you head into the future comfortably, energy-efficiently, and with low emissions.

## Qualification Services

With Qualification Services, you invest directly in the future of your company, because updating your employees' expertise and reliably testing systems contributes to your success. At our accredited and certified Test and Validation Center Wegberg-Wildenrath in Germany, we offer customized tests and certifications around the clock. Given the rapid progress of technology, our practical training programs are becoming increasingly important to ensure that your employees have access to the latest knowledge.

## Digital Services

Digital services from Siemens Mobility Services are your key to guaranteed availability, maximized throughput, and the ability to implement new business models – with smart remote monitoring and innovative data services. From sensor technology and intelligent algorithms to the latest IT security standards and precise analytics, we offer a complete foundation for optimized operation – supported by our experts' decades of practical experience in rail service. Digital services are based on the powerful platform architecture from Siemens and our improved Mobility Application Suite, which will allow you to get even more out of your systems. You can look forward to using the Railigent® application suite – and "managing your assets smarter!"

## Operation Services

One of the greatest challenges of our time is ensuring cost-effective and sustainable mobility while at the same time providing rail customers with an attractive range of services. Our Operation Services helps you make better use of your available capacities, which ensures high performance and quality even in exceptional operational situations. This in turn allows the growing rail traffic flows to have a fighting chance to achieve higher revenues, increased customer satisfaction, and greater sustainability.



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