

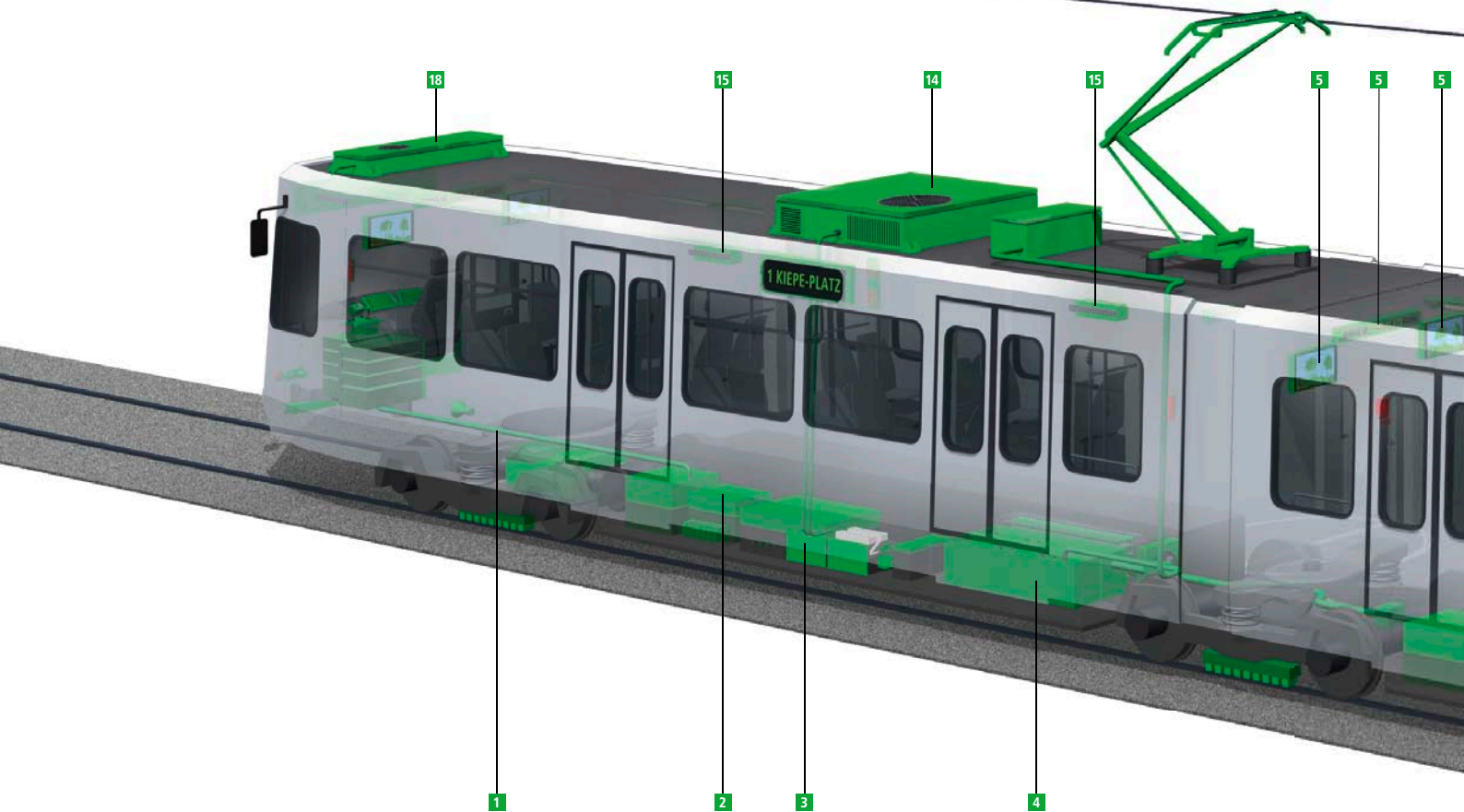


Rail Systems

Modernisation

Modernisation

Modernisation is more important today than ever before. In these fast-moving times of technical progress, high-quality rail vehicle components and systems can very quickly become outdated.



Cost-efficient management for transit companies requires new strategies for the optimisation of one important task: being able to offer attractive and modern vehicles to the passengers while keeping the costs for investment and maintenance low.

Today, the question is often raised whether vehicles that have already run a large part of their estimated life-cycle maybe subject to life-time extension – especially if the car-bodies and bogies are still in good condition. Many operators also face the problem of ensuring proper maintenance of their

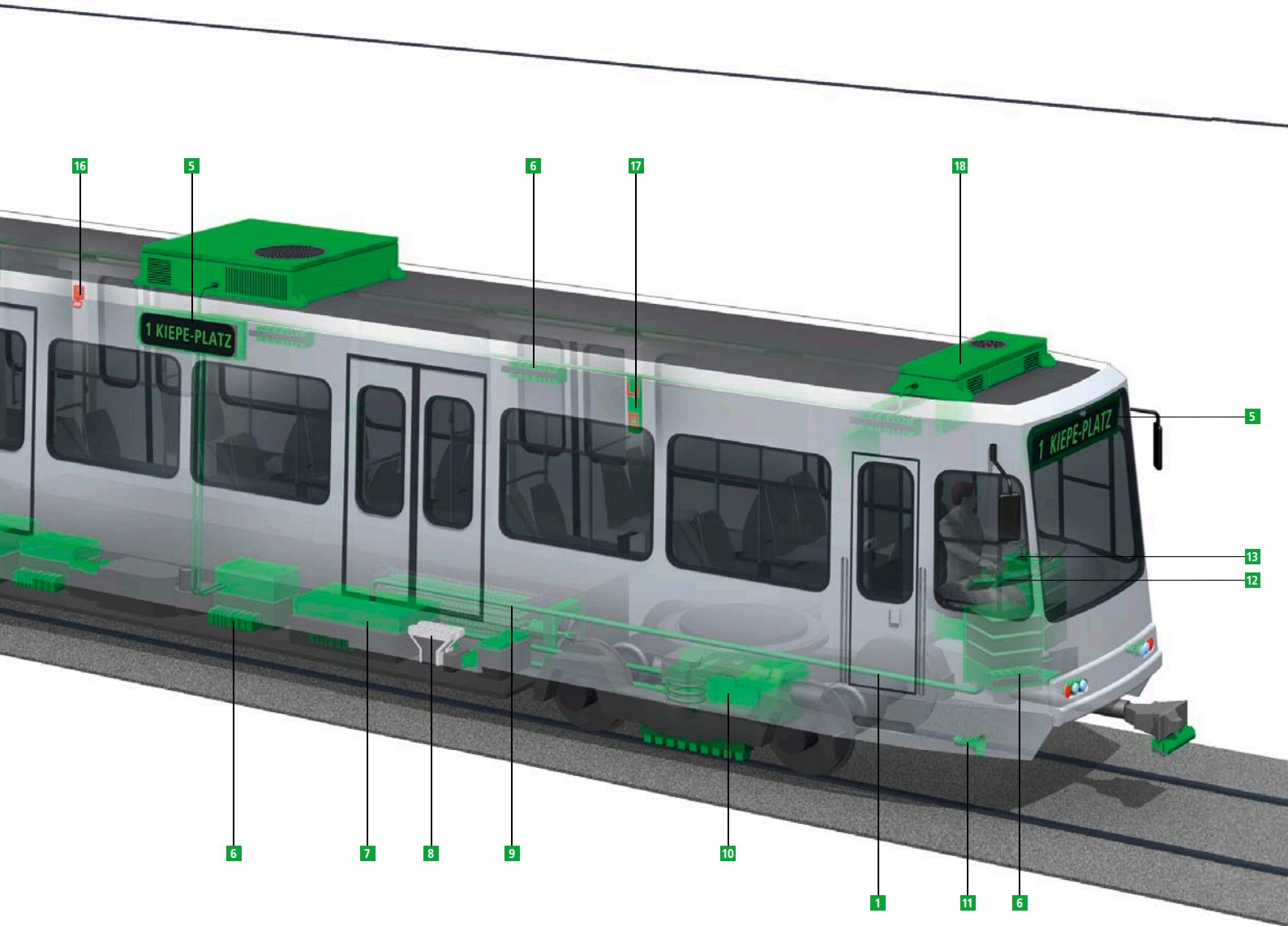
vehicles in a time that features increasingly shorter innovation cycles in the fields of micro- electronics and performance electronics – which usually result in components becoming obsolete.

Vossloh Kiepe has accepted this challenge and is able to offer optimised solutions for each application. All from one source. Our staff of modernising experts consists of specialists with years of experience in rail vehicle development and project management.

- 1 New Cabling
- 2 Brake Resistor
- 3 Static Converter
- 4 Direct Pulse Inverter / DC Chopper
- 5 Passenger Information (Infotainment)
- 6 Control System

- 7 SuperCap Energy Storage
- 8 Contactors
- 9 Camshaft / Contactor Control
- 10 Engine Transmission Unit
- 11 Electronic Warning Bell
- 12 Touch Screens

- 13 Mastercontrollerr
- 14 Passenger Air Conditioning
- 15 Door Control
- 16 Emergency Brake Switch
- 17 Passenger Security/Emergency Intercom
- 18 Driver's Cab Air Conditioning



Combined with permanent coupling and synergising with our specialist teams for new vehicle equipment, these advantages enable us to refurbish even older vehicle models to the latest technology standards. This saves on investment costs while keeping passenger satisfaction at a high level.

At the same time, we also take the environment into consideration: by converting resistance controls to DC choppers or, even better, to three-phase drive technology, it is possible to save considerable amounts of traction energy. This is an investment in the future that is doubly important, considering increases in energy prices.

The many faces of modernisation

... you wish to save on maintenance and energy for a switching assembly vehicle but you rely on your DC motors? A conversion to **DC chopper technology** would be the solution to consider...

... there are no replacement parts for your Thyristor or GTO converter? We have customized **IGBT direct pulse inverters** for you ...

... you wish to use brake energy more efficiently or to make full use of your energy supply through lower peak loads? Our **SuperCap energy storage** makes sure that no kilowatt-hour is lost and that the vehicle can sometimes even be operated without permanent contact to the overhead lines ...

... your **control system** has seen better days, the manufacturer has very few replacement parts and no longer supports the software? Our modular control system can replace your control system using standardised and proven CANopen bus technology, even if it's "only" a new **door control** system...

... you wish to modernise your driver's area? Easily replace all switches and illuminated indicators with our **touch screens** ...

... you still don't have a WLAN-supported fleet management system or PC-based diagnostic tools? We have a **vehicle data management system** (FDM/SDH) to meet all your needs ...

... your routing/destination display system has become an isolated application and is far from still being state of the art? Modern **passenger information systems (Infotainment)** can be networked, save on costs and satisfy today's information needs of all your passengers ...

... you have a historical vehicle and need expert advice from people with sound knowledge? We can also help you here! We specialise in reconditioning or renewal of **drive and braking equipment**, chassis and the professional restoration of carbodies...

... your passengers and drivers moan and complain about the summer heat? Our **air-conditioning systems** guarantee happy customers ...

... or you can revitalise and update your on-board power system with a **static converter** (BNU) ...

... the cabling has become too old or you need help in installing new components? We provide as much support as necessary, all the way to complete **new cabling** ...

We have an extensive portfolio of components in stock for you if you are looking to update: **contactors, signal generators/controllers, resistors, emergency brake switches, warning bells.**

No matter what ideas you have, the sky is the limit with Vossloh Kiepe. We provide support for everything con-

nected to the modernisation of railway vehicles. Just ask us!

Drive modernisation

Refitting to from	Cam Controller	Camshaft Control, Contactor Control	DC Chopper	Three-phase AC-Drive
Cam Controller	Processing, Delivery of Replacement Parts	Wagon Control Unit, Contactors, Mastercontroller	DC Chopper, Drive Control Unit, Mastercontroller	Direct Pulse Inverter, Drive Control Unit, Mastercontroller
Camshaft Control, Contactor Control		Wagon Control Unit, Processing, Replacement Parts	DC Chopper, Drive Control Unit, Mastercontroller	Direct Pulse Inverter, Drive Control Unit, Mastercontroller
DC Chopper			DC Chopper, Drive Control Unit, Mastercontroller	Direct Pulse Inverter, Drive Control Unit, Mastercontroller
Three-phase AC-Drive				Direct Pulse Inverter, Drive Control Unit, Mastercontroller

References



Lisbon
Historical Tram Type 21 E



Gotha – Thüringerwaldbahn KT4D



Geneva Be-4/6 and Be-4/8 Motor Cars



Philadelphia PCC Tramcar



Philadelphia Metro B-IV Orange Line



LAUBAG EL 2 Electro-locomotive



Berlin F74/76/79



Berlin GI/1E Underground Railcar

A total of 45 historical two-axle vehicles were equipped with new bogies and electrical systems for Portugal's capital city of **Lisbon** between 1994 and 1996. Vossloh Kiepe supplied brake resistors, DC traction motors,

From 1996 to 1999, Vossloh Kiepe supplied new electrical systems for the entire then current fleet of Type KT4D Tatra articulated light-rail vehicles for Thüringerwaldbahn and **Gotha Straßenbahn**. They were installed in cooperation with employees from the transit

From 2005 to 2008, Vossloh Kiepe delivered modern IGBT DC Chopper conversion sets for 46 six-axle / eight-axle tram motorcars which the **Geneva Public Transit Authorities (TPG)** in Switzerland installed themselves.

18 PCC tramcars from the 1930s (belonging to the SEPTA transportation authorities in **Philadelphia, USA**) were completely modernised between 2002 and 2003. They received new bogies and air-conditioning

From 2006 to 2010: SEPTA's entire fleet of 136 Metro B-IV light-rail vehicles (the SEPTA Orange Line, **Philadelphia, USA**) received new DC chopper traction equipment, replacing the previous switching assemblies including control systems. All retrofitting work which the

Lausitzer Braunkohle AG (now Vattenfall Europe Mining AG) in Saxony had 53 of its four-axle electro-locomotives used in open-cast mining extensively modernised between 2001 and 2008. With a service mass of 100t each can pull coal tubs of up to 1600t.

A total of 91 Series F74/76 and F79 twin railcars belonging to the **Berlin Public Transit Authorities (BVG)** will be renovated between 2010 and 2019 (option) and will receive microprocessor drive controls for the camshaft gears, new DC 110V static converters

Berlin Public Transit Authorities (BVG) had their entire fleet of 52 Type GI/1E twin railcars (called "Gisela" by company employees) were completely modernised from 2003 to 2009. The drive controls, consisting of low

static converters and – as the main component – the comparatively "modern" cam controller. The vehicles' outer appearance – very popular with tourists – was able to be almost completely maintained.

authorities. The equipment also included IGBT DC Choppers, static converters designed especially for the Tatra articulated light-rail vehicles as well as new door controllers.

First, an initial project refitting drive equipment was carried out at Vossloh Kiepe. This was then used as a presentation and training model for the remaining installations.

Vossloh Kiepe replaced the old DC accelerator controllers with modern regenerative IGBT three-phase AC-drive equipment. The vehicles also received updated on-board power supplies.

vehicles required as well as the equipment installation was carried out by the SEPTA authority themselves, after appropriate training. In addition, Vossloh Kiepe also supplied all of the testing equipment.

The locomotives, which are operated at DC 2.4kV, received new traction DC choppers with up to a 1 MW capacity, new 98kVA static converters and vehicle control systems. An additional six vehicles followed in 2010.

as well as new heating and door controls, replacing the programmable logic controller (PLC) currently in use. In addition, Vossloh Kiepe is responsible for modernising the pneumatic equipment.

voltage camshaft controller, were replaced by so-called electronic contactor registers. Replacement of the drive control unit as well as the updating of the on-board power supplies were also included in the order.

References



Linz Pöstlingbergbahn
Historical Vehicle

Between 2009 and 2010, Vossloh Kiepe delivered three-phase AC-drive systems, on-board power supplies as well as the remaining electric equipment for 3 "Pöstlingbergbahn" historically protected vehicles. These vehicles belong to the world's steepest adhesion railway (featuring an average slope gradient of 10.7% in relation to the complete route), operated in **Linz**, Austria.

Due to the high slope gradients that occur on the route the vehicles have to be equipped with more powerful motors. Traction inverters, braking equipment and on-board power supplies were redundantly designed. This turned out to be quite a challenge in a two-axle vehicle of 8.30 metres in length.



Mülheim an der Ruhr
M6-NF C Light-rail Railcars

In order to facilitate easy entry for handicapped passengers, 11 Type M high-floor light-rail railcars in the city of **Mülheim a.d. Ruhr** received a low-floor mid-section between 1998 and 2000.

The contactor control was exchanged for IGBT DC Choppers by Vossloh Kiepe and the wagons were equipped with new, more powerful BNU 400 static converters.



Erfurt Low-floor Tram

The static converters of the first twelve low-floor trams being used in **Erfurt** are being replaced between 2010 and 2012. Using standard devices and an adapter frame ensure that the electrical and mechanical interfaces on the vehicle require no modification.

This results in a cost-efficient refitting solution. The performance data and the electrical interfaces of the static converter used were specially chosen so that a multitude of applications in rail and urban railway vehicles can be covered.



Munich
R2.2 Tram Railcars

During the period from 2010 to 2011, the Stadtwerke München (**Munich** City Utilities) will have a total of 50 Type R2.2 tram vehicles modernised. They are receiving a new design, completely new interiors and will be repainted. All of this will contribute to a modern appearance of the vehicles. In order to increase the comfort level for

the drivers, the vehicles will be equipped with air-conditioning in the driver's cab. The modernisation is being carried out under the consortium management of Vossloh Kiepe together with a partner. Vossloh Kiepe is responsible for the complete installation process.



Bonn B100S Light-rail Railcars

25 Type B100S light-rail railcars belonging to the Stadtwerke **Bonn** (SWB) will be modernised from 2010 to 2016. They were constructed from 1974 to 1977, which is one reason why an upgrading to modern standards is necessary. Core components include two fully electronic DC choppers.

In addition, all static converters, driver's cab air-conditioning, heating controls and dashboard panels will be refurbished. Video monitoring, passenger emergency intercoms, fire alarm systems and tachographs will also be modernised.



Frankfurt am Main
U4 Light-rail Vehicles

From 2009 to 2012: 39 Type U4 light-rail articulated railcars from **Frankfurt am Main** VGF (Frankfurt am Main Transport Company) will be equipped with air-conditioning in the driver's cabs. Vossloh Kiepe supplied the HVAC for both driver's cabs, the KGU auxiliary inverters, which take the necessary AC 400V for the air-condi-

tioning from the line voltage, as well as the complete set of air-conditioning ducts for the driver's cabs and the roof areas. Delivery of the first vehicles will also include guided installation as well as initial operation service in the scope of services.

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