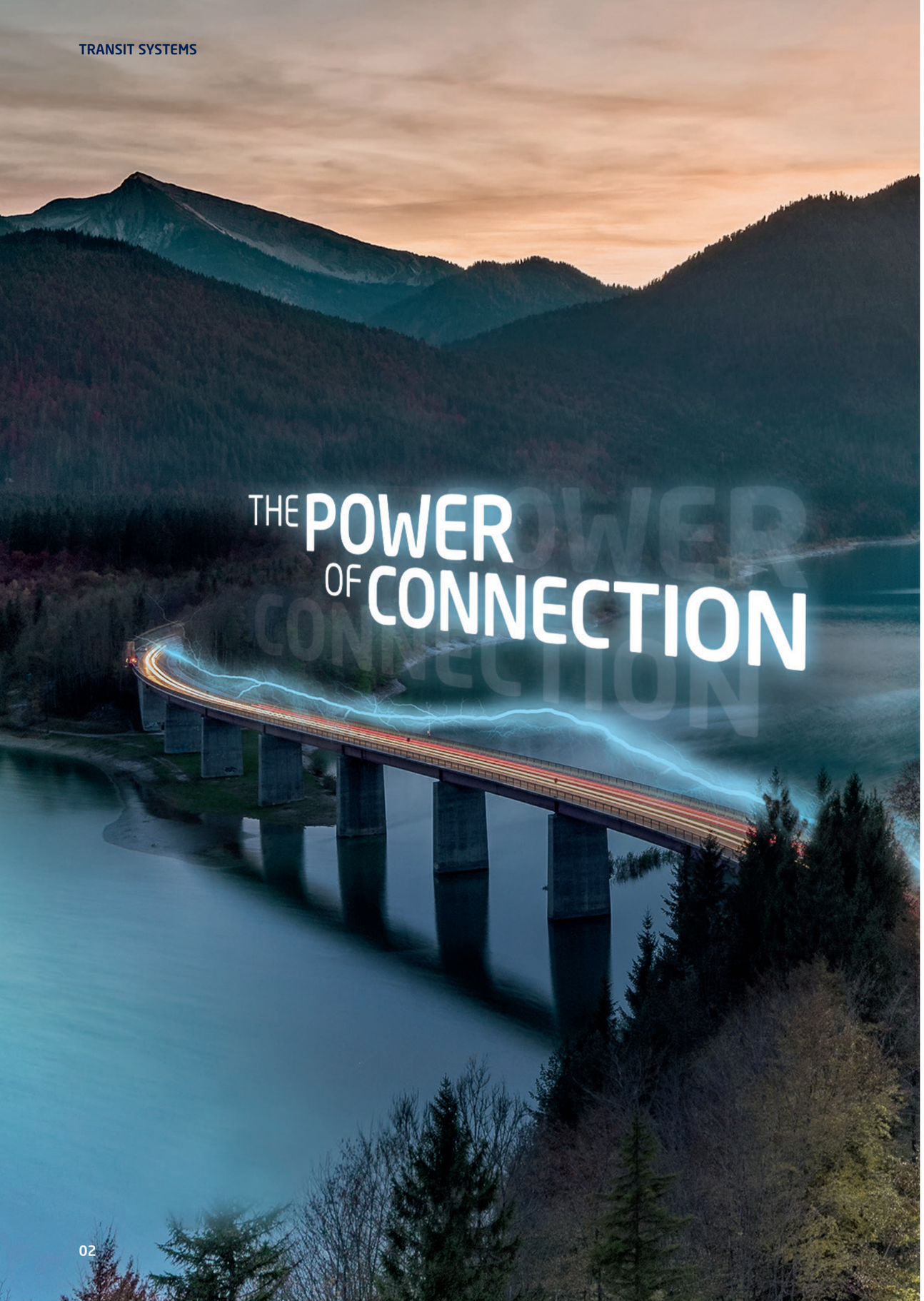
Transit Systems

ALWAYS A PERFECT CONNECTION

Pioneering solutions for the rail and bus industry

schunk-transit-systems.com



CONNECTIONS THAT TAKE YOU TO A NEW LEVEL

Schunk is one of the world's leading providers in the field of reliable current transmission. Our developments set technological milestones and constantly push the boundaries of the possible. Benefit from our decades of experience and use our know-how as a development partner.

When it comes to the mobility of the future, nothing will run smoothly without the right connections. Only a perfect contact ensures safe current transmission, allows batteries to charge quickly, and protects sensitive areas from interference currents. Schunk's products are already setting new standards worldwide in all areas of mobility and wherever power needs to be transmitted safely and reliably.

On the rail, our pantographs, grounding contacts, carbon fiber grounding-systems (CFG systems), and third-rail current collectors provide the rail industry with innovative ways to make operation safer, more economical, and more reliable.

On the road, our innovative Schunk Smart Charging system opens up completely new possibilities in terms of economy, performance, and flexibility. It charges battery-driven vehicles safely, reliably, and within seconds in the depot or even during operation.

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SET THE COURSE FOR SUCCESS – WITH OUR SOLUTIONS FOR LOCAL AND LONG-DISTANCE TRANSPORTATION

Railways play an important role in mobility today and will continue to do so into the future. All the more important that you set the course for success – with Schunk as a competent development partner at your side.

For safe and efficient current transmission, we develop in close coordination with our customers system solutions that combine robustness, functional reliability, and cost efficiency.

The result is leading technological products that are in demand worldwide, for example, pantographs for all speed ranges as well as third-rail current collectors with patented safety technology. Our carbon strips, carbon collector shoes, and carbon brushes with brush holders are perfectly matched to our systems.

Moreover, we take care of the currents that lead to impairment of locomotion in rail vehicles or to costly shutdown,in the worst case. High-frequency, stray currents affect the drive shafts during operation, which can severely damage bearings as well as engine and gearbox components. This is where our CFG systems helps – an efficient and powerful solution that reliably grounds interference currents and provides greater protection.

With us, you get everything from a single source: technology concept, comprehensive accessories from our own production and customer service that provides you with targeted support – through maintenance, repair and application-specific advice.

DEPENDABLE FROM DELIVERY THROUGH OPERATION – YOU CAN RELY ON OUR PANTOGRAPHS

High availability, efficient lightweight construction, and reliable performance: Schunk pantographs are impressive in operation on high-speed lines as well as local transport.

Our pantographs do their job every day all over the world – quietly, durably and economically. In a wide range of and even under extreme operating conditions, they have only one goal: to avoid costly downtime. Low-wear materials, technologically leading systems and our know-how in finding the best connection ensure that everything remains reliably in in motion. For example, the excellent material properties of our collector strips contact strips, in conjunction with the sophisticated design of our current collectors, enable current transmission to function without interruption.

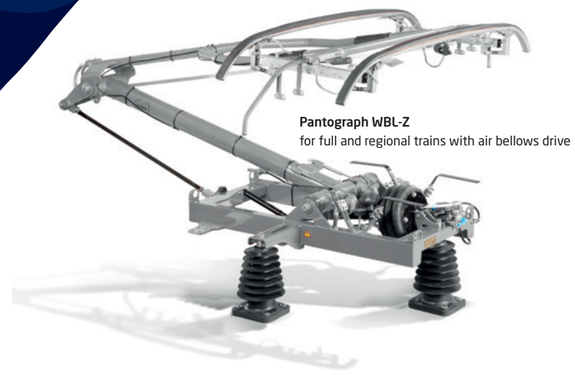
And we can do much more. Keyword: digital maintenance. In the future, we will make our electricity pantographs intelligent! Schunk OnTrack Monitoring records data on the condition of pantographs and overhead lines during operation before irregularities develop into serious problems and lead to damage. The retrofittable digital measuring system thus ensures increased availability of vehicle fleets and infrastructure.

Your most important benefits:

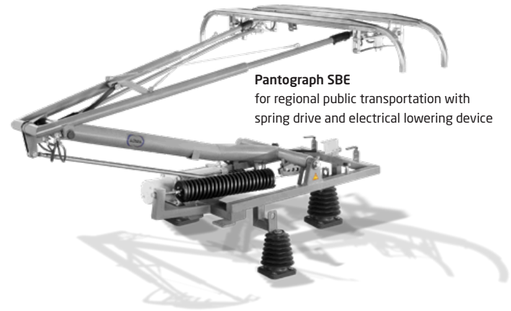
- Compact pantograph construction
- Use of lightweight components for high-speed applications
- Reliable and cost-optimized design
- Optimally matched overall system with Schunk carbon strips in the best quality
- Comprehensive range of complete pantograph controls
- Worldwide after-sales service with original components from the manufacturer
- Retrofittable with digital onboard monitoring solution

SCHUNK ONTRACK MONITORING: INTELLIGENT PANTOGRAPHS FOR INCREASED AVAILABILITY

- Digital condition monitoring of overhead line and pantograph
- Detection of hard spots (damaged areas) on the overhead line
- Retrofit system for many Schunk pantographs



Pantograph WBL-Z
for full and regional trains with air bellows drive



Pantograph SBE
for regional public transportation with spring drive and electrical lowering device

For smooth railway operation

Always energized, yet quiet, with reduced weight and compact design – with the world's leading pantographs for railway operations, we offer reliable and long-lasting solutions. Individually spring-supported contact strips create a permanent and reliable contact with the overhead line. Or in other words: You benefit from maximum operational safety with minimal maintenance effort. In addition to two concepts for lowering the pantograph, individual customer adjustments are possible.

Integral carbon strip

LCC/RAMS-optimized

All Carbon strip

arc protection

Multicomponent carbon strip

LCC/RAMS-optimized

High-current carbon strip

for max. power transmission

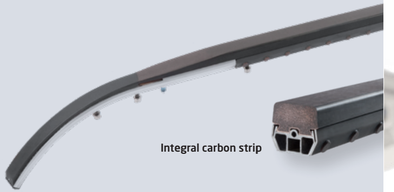
Ice scraper strip

heated/unheated

Tough as nails

Despite continuous load and climatic stress: Schunk quality carbon contact strips are extremely resilient, durable, and protect the overhead line. This is an investment in maximum operational safety.

Numerous customers have relied for decades on the outstanding product properties of our carbon contact strips. The excellent electrical conductivity and the long service life of our products set new standards for functionally reliable and low-maintenance use. The variety of our materials, which are perfectly matched to the respective requirements, is unique in the industry and enables you to create a completely tailored solution.



Integral carbon strip

Your most important benefits:

- Unique material diversity and production technology
- Unequaled long service life through the highest quality
- Maintenance- and environmentally-friendly system
- Good electric arc resistance
- Extremely low overhead line wear
- Special and standard solutions for all applications

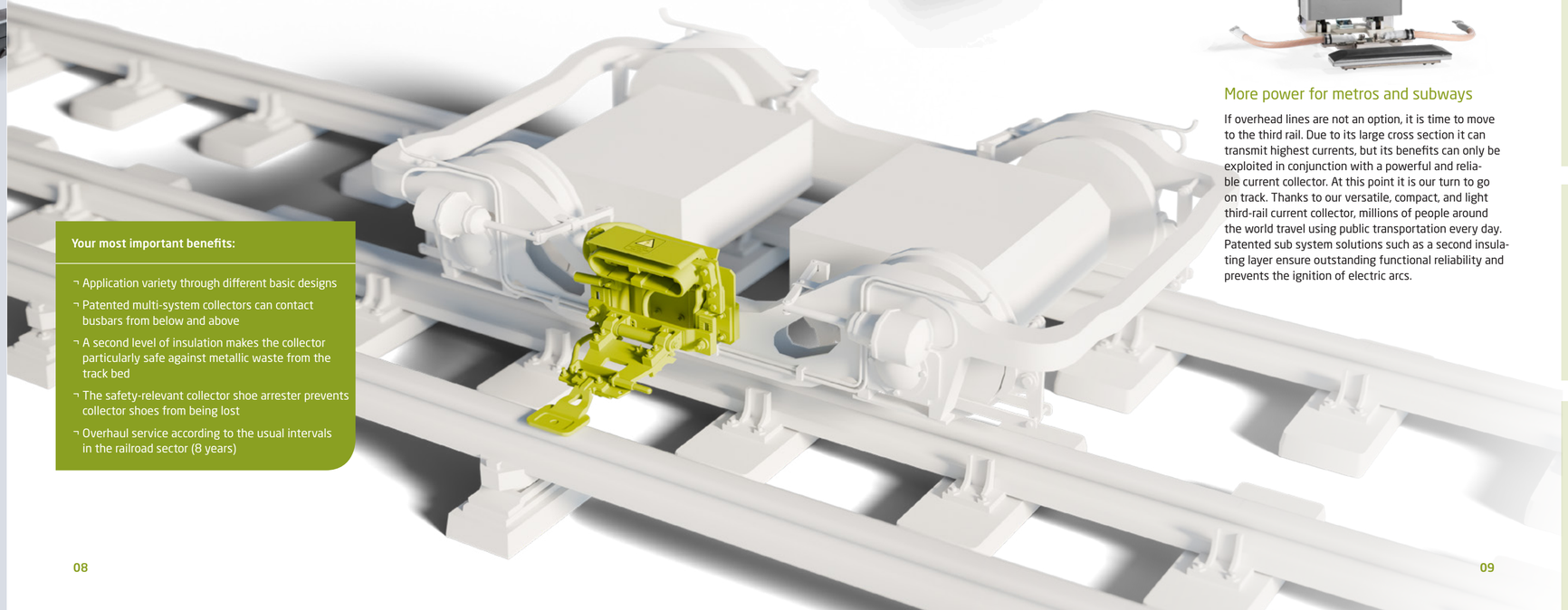
WE PUT YOU ON THE RAIL TO SUCCESS – WITH OUR PATENTED THIRD-RAIL CURRENT COLLECTORS

Even under the toughest of conditions, third-rail current collectors need to function reliably around the clock. Our leading technology with patented features makes it possible.

Schunk's robust third-rail current collectors are in use worldwide. We offer our customers the optimum solution for every speed range and every operating voltage. Even with fluctuating of rail and bogie, our developments ensure perfect current transmission – with design and pioneering technology.

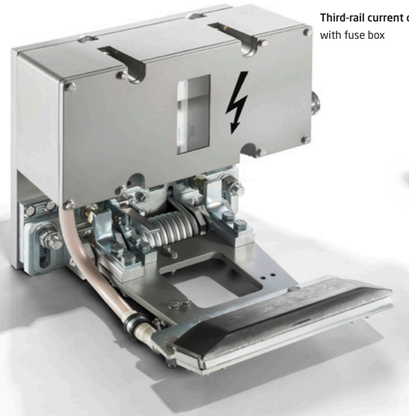
You benefit from our know-how in several ways: As one of the largest manufacturers of collector shoes, we can offer you perfectly matched complete systems with innovative connection technologies for secure holding of the system components.

And that's not all: our modular platform system consisting of basic and optional modules gives you numerous configuration options to suit your needs.



Your most important benefits:

- Application variety through different basic designs
- Patented multi-system collectors can contact busbars from below and above
- A second level of insulation makes the collector particularly safe against metallic waste from the track bed
- The safety-relevant collector shoe arrester prevents collector shoes from being lost
- Overhaul service according to the usual intervals in the railroad sector (8 years)



Third-rail current collector
with fuse box

Third-rail current collector
with very compact dimensions

Fusebox
with individual fuse assembly to protect the vehicle electrics

Third-rail current collector

More power for metros and subways

If overhead lines are not an option, it is time to move to the third rail. Due to its large cross section it can transmit highest currents, but its benefits can only be exploited in conjunction with a powerful and reliable current collector. At this point it is our turn to go on track. Thanks to our versatile, compact, and light third-rail current collector, millions of people around the world travel using public transportation every day. Patented sub system solutions such as a second insulating layer ensure outstanding functional reliability and prevents the ignition of electric arcs.

Third-rail carbon collector shoe

for composite busbars

Third-rail carbon collector shoe

with overrun/stop protection

Third-rail cast collector shoe

for composite busbars

Third-rail cast collector shoe

for conventional steel busbars

Third-rail cast collector shoe

with integrated predetermined breaking point for conventional steel busbars

Quality in one piece

Our long-lasting carbon and cast collector shoes are also impressive in continuous operation with maximum power up to the wear limit. They make it extremely easy to create operational safety while keeping maintenance costs.

The basis for the advantages of our collector shoes are the perfectly matched materials. For steel busbars, we offer collector shoes made of cast iron or milled from solid metal. With aluminum busbars with stainless steel supports, our individual carbon materials have proven their worth – we deliver these collector shoes clamped and brazed. Excellent temperature resistance and a stable power level up to the wear limit characterize both versions.

Your most important benefits:

- Materials perfectly matched to your requirements
- Tailored solutions for aluminum busbars with stainless steel supports as well as for steel busbars
- Unequaled long service life through the highes quality
- Maintenance- and environmentally-friendly
- High corrosion resistance
- Best emergency operation properties

Polyax grounding contact

for outboard bearing bogie applications

Polyrad grounding contact

for mounting on the gearbox

Polyax grounding contact

for inboard bearing bogie applications

Your most important benefits:

- Extremely long service life of all grounding contacts
- Various systems cover all common installation situations and interfaces
- High design and development competence

PERMANENTLY IN USE FOR YOU – OUR GROUNDING CONTACTS WITH EXTREMELY LONG SERVICE LIVES

Grounding contacts must function reliably over the longest possible period. Schunk offers long-lasting solutions for all common installation situations and interfaces.

It is no coincidence that leading vehicle manufacturers rely on Schunk grounding systems, because our technology has revolutionized signal current transmission and created new dimensions for maintenance intervals.

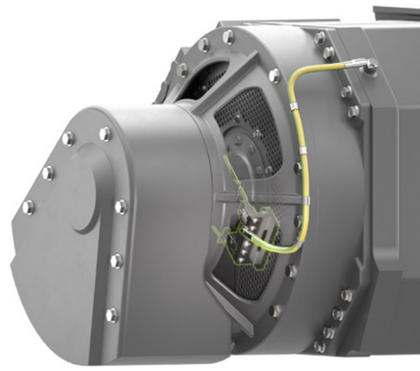
Whether versatile all-carbon grounding contacts, or high current density systems, whether axle-end or gear-box mounting position – great material know-how, maximum robustness, low wear, and a very long service life characterize all variants. Of course, our carbon brushes for grounding contacts are also available separately as spare parts.

Polyax grounding contact with 600 A continuous current

PERFECT PROTECTION – WITH OUR CARBON FIBER SHAFT GROUNDING

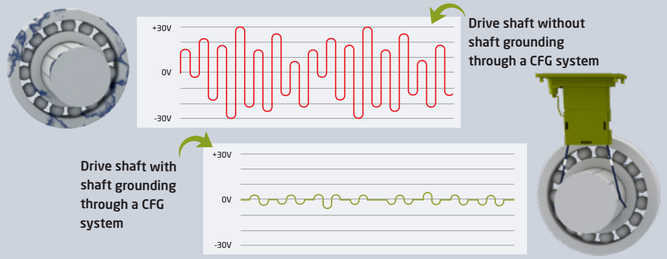
Bearing or gearbox damage caused by shaft voltages can lead to costly breakdowns of the vehicle fleet.

Extend the service life of your trains with the patented Carbon Fiber Grounding Systems CFG from Schunk:
The shaft grounding systems made of carbon fiber reliably dissipate vagrand shaft voltages and safely protect against damage to bearings in motors or gearboxes.



Gearbox-side shaft grounding in customized design

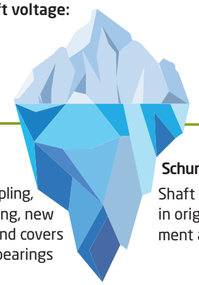
Comparison of interference voltages on a ball-bearing drive shaft without and with shaft grounding by a CFG system.



Typical shaft voltage damage pattern:

- Bearing damage in motors or gearboxes with excessive noise and additional heat generation
- Functional limitations due to changes in the viscosity of oils and greases
- Expensive (unplanned) downtimes and increased replacement rates

Unexpected costs in the event of bearing damage due to shaft voltage:



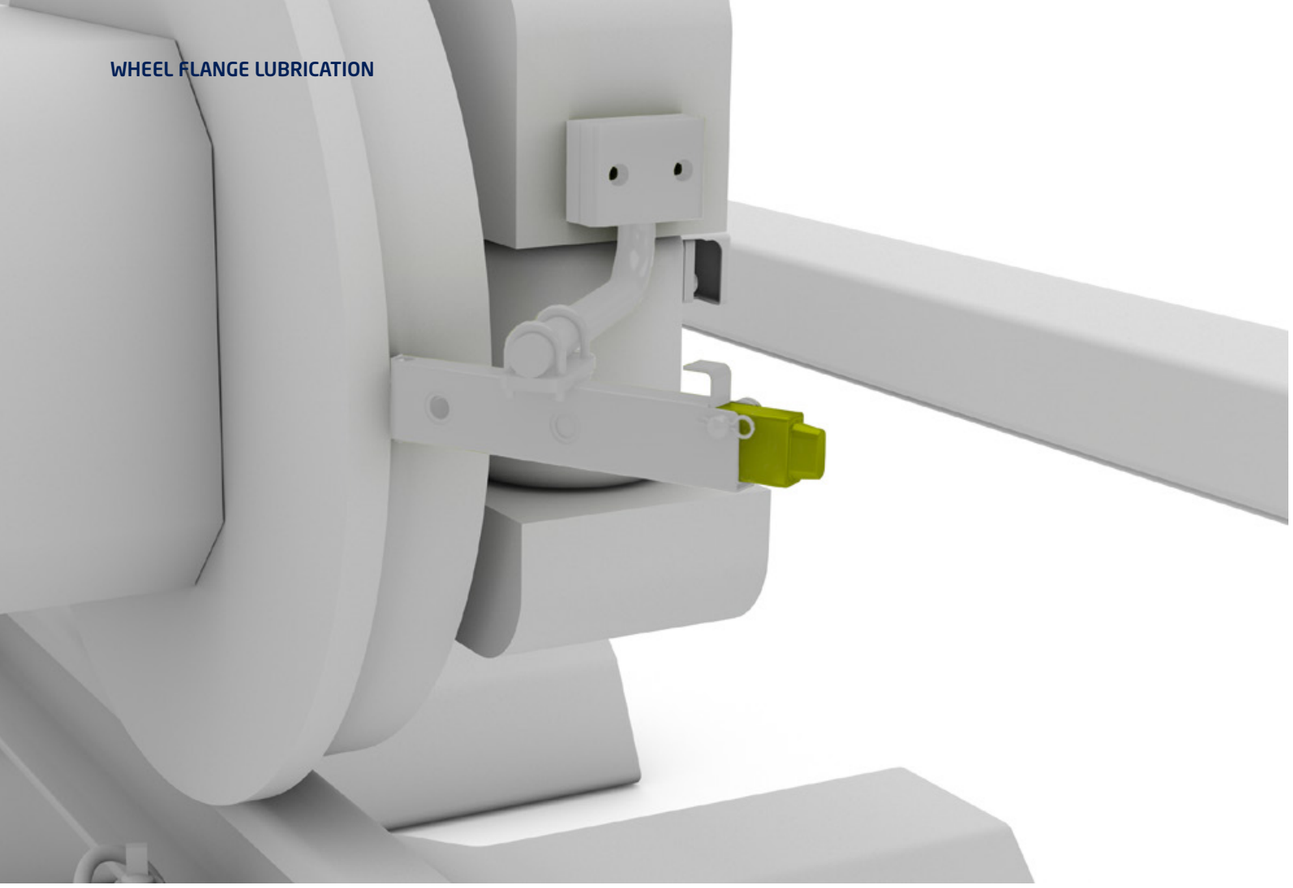
Isolation:
Isolated coupling, new balancing, new labyrinths and covers and hybrid bearings

CFG
Schunk Grounding
Shaft grounding in original equipment and wear

That pays off:
In direct comparison, Schunk grounding is up to 5x cheaper! Please contact us for more information on this topic.

Your most important benefits:

- **Customizable** for any customer interface
- Designed for **long life**
- **Easy** assembly and retro-fit installation
- **Robust** against changing and demanding environmental conditions
- **Easy** maintenance and inspection



RUNS SMOOTHLY – THANKS TO OUR NOISELESS WHEEL FLANGE LUBRICATION

When steel rolls on steel, friction and noise are generated. Wear and operating costs can be measurably reduced with Schunk wheel flange lubrication. It also eliminates annoying squeaking.

Schunk's wheel flange lubrication concept is as simple as it is ingenious: A carbon-based dry lubricant reduces the frictional forces between the wheel flange and rail. A holder with a solid lubricant stick is attached directly to the bogie for this purpose. A spring presses the stick onto the wheel flange where it ensures permanent lubrication in an ideal dosage. The result is significantly lower wear – and thus longer service life of the wheels and rails.

Your most important benefits:

- Economical consumption due to solid lubricant
- Low wear and tear of wheels
- Environmentally friendly: less drive energy required, no oil on the rails, less running noise
- Schunk's materials expertise enables optimal solutions for every requirement

Stick for wheel flange lubrication

Carbon brush for ground contacts

POWER AND SIGNAL TRANSMISSION IN PERFECTION – WITH THE HELP OF OUR LONG-LIFE CARBON BRUSHES

Carbon brushes and brush holders from Schunk have been the driving force in electric motors for decades. Our know-how will keep you moving forward in the future.

Schunk carbon brushes are characterized by good electrical and thermal conductivity as well as a long service life. They ensure optimum current transmission in grounding contacts and traction motors.

Carbon brushes for grounding contacts even score in two respects. They not only reliably transmit current from a fixed to a rotating part, but can also serve for signal or safety transmission. We tailor the structure and design of the carbon brushes to your individual requirements, with the aim of optimizing the lifecycle costs over the entire service life.

Conductor shunts

Brush holders for railway applications

Contact levers

Carbon brushes for regional traffic

E-MOBILITY IS BECOMING SUITABLE FOR EVERYDAY USE

With the innovative Schunk Smart Charging system, you can economically bring e-mobility to your roads today. The system allows electric buses to be charged quickly and reliably along the route or in the depot.

UITP MEMBER

More and more municipalities and companies are banning diesel-powered gensets in favor of zero-emission, battery-powered vehicles. The most serious problem is the batteries. For the e-buses to have a range suitable for everyday use, they either have to be sized appropriately or recharged more frequently.

Schunk Smart Charging solves this dilemma in one fell swoop. Innovative charging systems enable completely new short charging times and the associated high ranges of the buses, completely new possibilities in terms of efficiency, performance and flexibility. E-buses and battery-powered vehicles are charged safely, reliably and in seconds at the depot or during operation.

This means that batteries can already be sufficiently charged while passengers are getting on and off at a stop. Even a complete charge of completely empty batteries is possible in less than 20 minutes. As a result, the required battery size can be significantly reduced and a highly effective ratio between battery size, passenger load and range can be achieved.

Extremely flexible charging systems can be designed according to customer. The extremely flexible charging systems can be designed and optimally integrated according to customer specifications, both for a completely new charging infrastructure and for interaction with existing solutions.

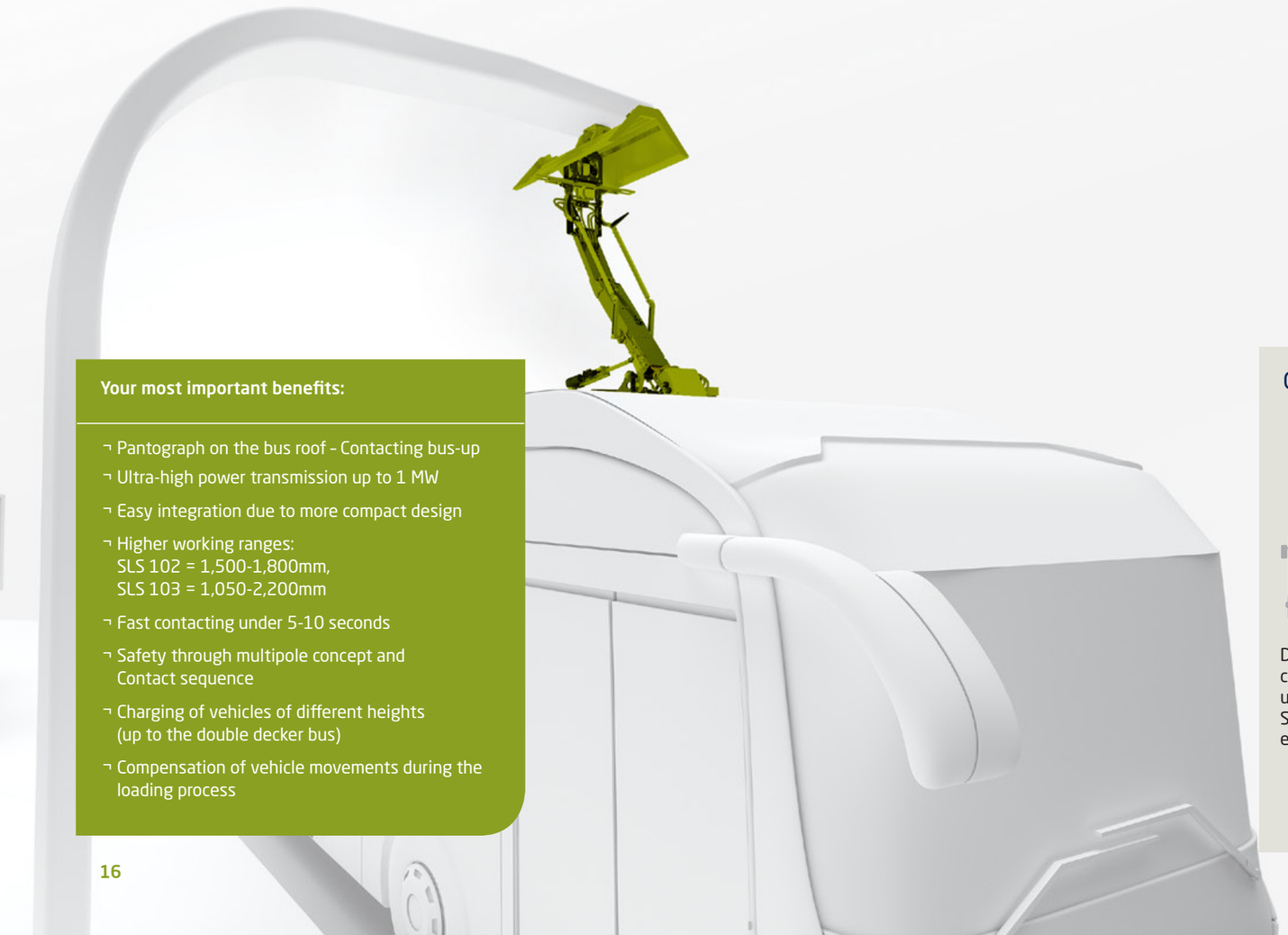
NEXT STOP: **RECHARGE**

Our SLS 102 and SLS 103 roof-mounted pantographs are technological milestones that, thanks to years of development expertise, set unprecedented standards in the market segment for conductive and fully automatic recharging of e-buses.

The compact roof-mounted charging pantographs are mounted on the roof of the e-bus and work according to the „bus-up" principle: the bus stops under the charging station, where the roof-mounted pantograph extends, connects to the charging station and charges the batteries.

Thanks to the extremely fast contacting of less than 10 seconds, the multipole concept with at least four poles and the possible 30-second pulse charge of up to 1 megawatt, the bus is recharged in a flash. With our SLS 102 and SLS 103 roof-mounted charge current collectors, vehicles of different heights up to double-decker buses can be charged reliably and safely. The drive mechanisms of the systems compensate for vehicle movements during recharging as well as parking tolerances. Both systems are compatible with the contact domes already installed on the charging infrastructures and can therefore be used with existing infrastructures.

Our roof-mounted charging pantographs can also be individually tailored to customer requirements or existing infrastructures in terms of design and contact interfaces.



Your most important benefits:

- Pantograph on the bus roof – Contacting bus-up
- Ultra-high power transmission up to 1 MW
- Easy integration due to more compact design
- Higher working ranges:
  SLS 102 = 1,500-1,800mm,
  SLS 103 = 1,050-2,200mm
- Fast contacting under 5-10 seconds
- Safety through multipole concept and Contact sequence
- Charging of vehicles of different heights (up to the double decker bus)
- Compensation of vehicle movements during the loading process

No matter how you would like to charge your electric vehicles – Schunk has the right charging system for you.

INNOVATIVE. PROCESS EFFICIENT. FUNCTIONALLY RELIABLE.

Contact Dome

Roof-mounted pantograph
SLS 103

Roof-mounted pantograph
SLS 102

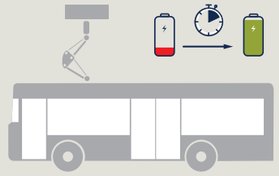
CONTACT UNITS

Depending on the framework conditions, different contact units can be used. SLS 102 and SLS 103 are compatible with existing infrastructures.

COMPENSATION OF TOLERANCES

With our drive mechanisms, we offer fast and efficient reloading – in any road conditions. This compensates for vehicle movements during reloading as well as parking tolerances.

POWER TRANSMISSION



We offer a functionally reliable and high power transfer in a few seconds. This provides an ideal balance between battery size, passenger load and range.

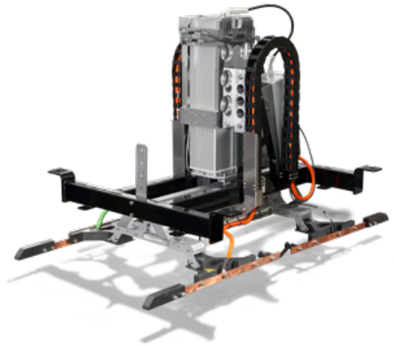
AUTOMATED AND HANDS-FREE CHARGING
AT THE DEPOT

Whether in Seattle, Zaragoza or Los Angeles: Our inverted pantographs are in use all over the world. They form the internationally proven standard for flexible, fast and safe charging of e-buses and battery-powered industrial vehicles.

Our patented contact systems can also be adapted to other vehicles and specific customer requirements.

The SLS 201 inverted pantograph is integrated in a central location on the infrastructure side, where its contacting works according to the „top-down" principle: The vehicle parks under the inverted pantograph, which descends, connects with its compact counterpart on the vehicle roof and charges the batteries.

With the Depot Charger 301, we also offer a charging device for automated charging at the depot. The advantage is that although the Depot Charger can charge at high power, similar to the standard inverted pantograph, its simple, compact and lightweight design makes it an economical solution for charging in the depot. Both pantograph systems can contact existing vehicle interfaces (High Power Charging Rails), making them compatible. The systems are UL-certified and Buy America compliant.



Depot Charger
SLS 301

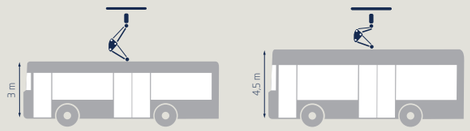
Inverted pantograph
SLS 201

High Power Charging Rails

Your most important benefits:

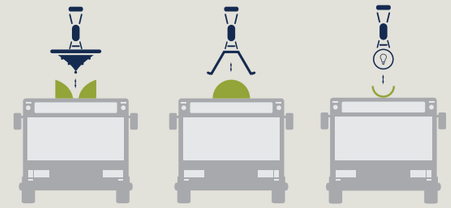
- Ultra-high power transmission up to 1 MW
- Easy integration due to more compact design
- Very high working range of up to 2.3 m and high extension length
- Fast contacting under 5-10 seconds
- Mechanical contacting sequence
- Charging of vehicles of different heights (up to the double decker bus)
- Space-saving and simple design for economical charging

WORKSPACE



The flexible half-shear design of the inverted pantograph allows charging of different vehicles at one station or charging point.

CONTACT UNITS



The 4-pole system ensures constant contact force distribution to all four busbars and reliably compensates for vehicle movements during reloading.

FULLY AUTOMATIC UNDERFLOOR CHARGING SYSTEM
FOR E-LOGISTICS TRUCKS

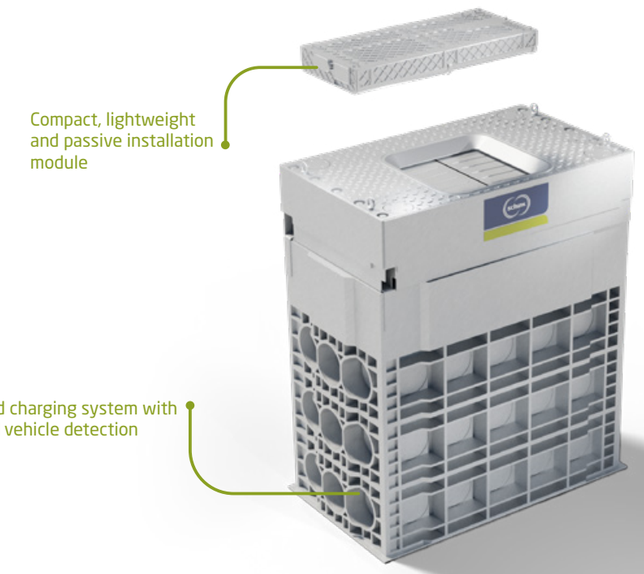
Rising energy costs and increasingly restrictive environmental regulations are forcing many logistics and transportation companies to act more sustainably. Electromobility offers itself as a lever here, but at the same time brings with it new challenges.

In order for the use of electric logistics trucks to contribute to greater energy efficiency and cost reduction in the company, transport companies must carefully examine which parameters can be changed. Fast, safe and space-saving charging of e-trucks is a crucial point here - and Schunk offers an innovative solution for precisely this with its fully automatic underfloor solution.

The charging station of the future is in the ground

With the Underbody Charger, Schunk has developed a fully automatic charging system that sets new standards.

Bulky charging columns and error-prone charging cables are nowhere to be found here. The underbody solution consists of a charging system sunk into the road surface and an interface built into the vehicle floor as a counterpart. If the logistics truck drives over the charging system, charging starts fully automatically with an extremely high power transmission of up to 1 megawatt. The Underbody Charger thus enables fast, safe and efficient recharging without touching a cable.



Compared to a plug-in solution, there are many advantages:

- Up to 1 megawatt charging power - resulting in shorter downtimes and around ten charging processes on one contact system per hour
- Space-saving - no charging stations required in the loading depot
- Error-proof - no manual operation, no charging cables
- A hands-free alternative to the MCS (Megawatt Charging System)
- Secure connectivity - integrated vehicle detection system and integrated parking tolerance compensation +/- 60 mm
- Easy to retrofit - as a passive module, the interface can be easily and cost-effectively integrated into the logistics truck

SAFE & RELIABLE

STRENGTHS OF THE UNDERBODY SOLUTION
COMPARED TO THE PLUG-IN

The fully automatic underbody loading system is space-saving, simple and safe. It complies with DIN EN 61851-23-1 and ISO15118 and meets all relevant design standards and basic safety regulations.

To ensure a high system voltage, the contact systems are designed to be particularly safe and reliable. This includes protection against accidental contact, the prevention of electric arcs and unwanted heating as well as fused charging sequence control.

#PASSION FOR SERVICE ON RAIL AND ROAD

Whether pantographs, earthing contacts or smart charging: our current transmission systems are subject to mechanical, electrical and environmental stresses. If they fail, expensive downtime is inevitable. Fortunately, we are always at your side as a reliable service partner. With regular maintenance, we increase the availability of your vehicles and ensure excellent operational reliability and cost-effectiveness.

Regular inspections and preventive maintenance are extremely important, as they prevent damage, loss of performance and total failure. You can therefore rely on Schunk's maintenance expertise. Both for the power transmission systems of your rail vehicles and for your battery-powered vehicle fleet, our service ensures excellent operational safety, reliable operation and long-term cost-effectiveness.

In addition to the professional technical overhaul, our overhaul for pantographs also includes suggestions for optimizing function and life cycle costs, e.g. through digital condition monitoring (OnTrack Monitoring).

A SERVICE STRATEGY, THAT PAYS OFF FOR YOU.

SAVINGS

With our service, you minimize downtimes and maximize your profitability. Optimize maintenance costs and benefit from optimized products and know-how. Thanks to an improved service life, your investment will quickly pay for itself.

QUALITY

Our customers benefit from the highest service quality thanks to our expert knowledge and the use of components in OEM quality. This ensures optimum performance and longevity of their appliances. This not only saves our customers time and money, but also allows them to concentrate on the essentials.

LONG-TERM PARTNERSHIP

A long-term partnership in service offers our customers continuous support and customized solutions. Our experts know your specific needs and can respond quickly and efficiently. Together we optimize processes to achieve maximum efficiency. This means you benefit from a stable and reliable partnership.

Always close to you -
at more than 65 locations worldwide

TAILOR-MADE SERVICE FOR A LONG-TERM PARTNERSHIP

OUR SERVICE PRODUCTS

TECHNICAL SUPPORT
Our technical support is at your disposal to ensure that your systems run smoothly. Rely on our experts to assist you efficiently with any technical challenge.

SHOP MAINTENANCE
Our shop maintenance service ensures that your systems always remain in perfect condition. With regular maintenance and repairs, we want your systems and components to remain highly available throughout their entire life cycle.

TRAINING & CONSULTING
Our training and consulting service offers customized training and consulting to take your team to the next level. Benefit from our expertise and practical solutions that support your business goals and increase your efficiency.

SPARE PART MANAGEMENT
A spare parts management system can be set up with you to ensure that your specific needs are optimally met. Through close cooperation and tailor-made solutions, we want you to always have the right parts available at the right time.

No matter where you are: Our experts are on hand to answer any questions you may have about our service.

YOUR CONTACT
TO OUR EXPERTS

Certified by:
IRIS Certification

SCHUNK GROUP

ENGINEERING COMPETENCE IN MATERIALS TECHNOLOGY AND MECHANICAL ENGINEERING

The Schunk Group is a global technology company. The company is a leading supplier of products made of high-tech materials – such as carbon, technical ceramics and sintered metal – as well as machines and systems – from environmental simulation to air conditioning technology and ultrasonic welding to optics machines. The Schunk Group has around 9,600 employees in 26 countries and generated a turnover of 1.6 billion euros in 2023. The company is divided into ten different Business Units.

The Business Unit Transit Systems is driving ahead technologically – whether in the propulsion of high-speed trains or in efficient charging processes for electrically powered buses. Schunk's current collectors, third-rail systems and collector strips are technological pioneers worldwide in power transmission for rail transport. And with Smart Charging, Schunk ensures emission-free travel for electrically powered buses in public transport.

10.03e/150/2024

Schunk Transit Systems GmbH
Hauptstrasse 97
35435 Wettenberg, Germany
Phone +49 641 803 0
Fax +49 641 803 139
E-Mail sales.0077@schunk-group.com
www.schunk-transitsystems.com

Join us on LinkedIn