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Guangzhou (CN) and New Delhi (IN)

Furrer+Frey
Overhead contact lines

CHARGING SOLUTIONS FOR E-BUSES



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furrerfrey.ch

Technically elegant, economically appealing

In line with our tradition of innovation, we are constantly evolving – for almost 100 years now, we’ve been experts in overhead contact line systems for short- and long-distance routes. This historical accumulation of know-how also helps us today in the development of individual and flexible charging stations for e-buses, urban and regional trains.

An overview of our products and services

E-Mobility

Charging systems for e-buses

Products:

- ZFP charging solution for depots, bus terminals and covered bus stops
- AIO fast-charging station for charging en route

Services



Charging station for battery trains

Product:

- VOLTAGE

For more information:

→ **voltap.de**

Services



Consulting



Development & design



Planning



Execution



Service



On-call service



Internationa

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CHARGING SYSTEMS

Developed for the future – our innovative charging systems

Our products are developed with Swiss precision and care. We tailor our fully automatic charging infrastructures to meet your individual needs and requirements in a holistic and comprehensive approach.



Zero-Foot-Print
Ceiling-mounted ZFP charging solution

Zero-Foot-Print Ceiling-mounted ZFP charging solution

Buses need space. Especially when manoeuvring in the limited spaces of depots, in bus terminals and under covered bus stops. Here, charging points are in the way and present a safety risk.

The modular ZFP charging station from Furrer+Frey solves this problem in an innovative approach.

Safe and compact. Our charging station is mounted at a safe height that enables buses and lorries to move around freely and safely in depots, bus terminals and under covered bus stops.

Installed and ready to use in no time. The rapid installation process is cost-effective, and the system can be up and running in just a few hours once the ceiling construction has been prepared.

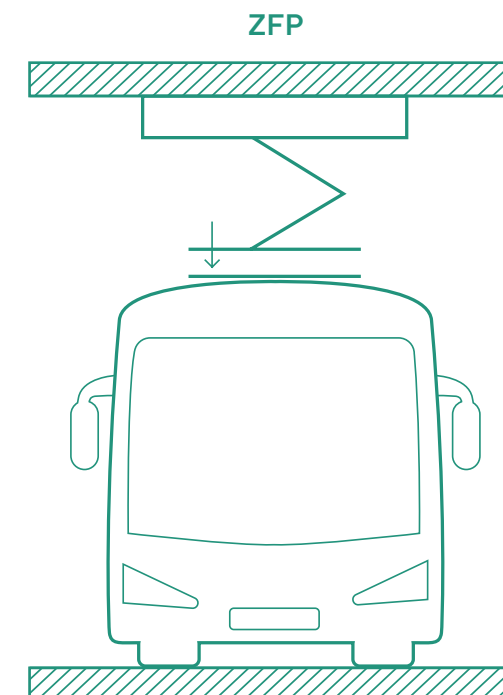
Fully automatic. Depending on the type, the fully automatic ZFP charging station can deliver outputs of between 60 and 240 kW. The e-bus establishes communication with the suspended (top-down) charging station as soon as it arrives at the designated spot, with a pantograph being lowered onto the charging rails on the roof of the bus. The charging process starts automatically, with no plugging-in in or -out by drivers or staff.

Interconnected and economically attractive. If several ZFP charging units are in use, they can be connected to a management system. The system coordinates the charging and preconditioning of the buses via the OCPP protocol, and an RFID reader checks whether the right e-bus is in the right place. If necessary, the power at the charging stations is limited and a charging management system can be used to stagger the charging of various buses, so every bus is ready to go exactly on time.

Swiss made. When you opt for a ZFP charging station, you choose a product that was developed in Switzerland based on Swiss quality standards.

**“A great infrastructure is one you don’t notice.
Our modular ZFP charging solution is mounted
on the ceiling and doesn’t get in anyone’s way.”**

Beat Winterflood, Senior Consultant E-Mobility



→ https://youtu.be/dEAq_OYJ0TI

Find out more about this innovative solution in our product video, and see the ZFP charging station in action.

All-In-One
The integrated AIO fast-charging station



All-In-One

The integrated AIO fast-charging station

Our AIO fast-charging solution charges e-buses at any bus stop – in a fully automatic process that takes just a few minutes. All of the necessary power electronics are compactly integrated in the mast. With a solution that doesn't involve control cabinets for rectifiers, there's no need for complex, costly and inconvenient additional structures. The concept of top-down pantographs and opportunity charging means that the buses are both lighter and less expensive, thanks to lightweight roof rails and smaller batteries.

Our standardised AIO fast-charging station helps you to save time, space, and money and prepare for the future.

Integrative. The compact system can be aesthetically integrated into new and existing structures. This helps to simplify the building permit procedure, and there are no disruptive additional structures with the noise emissions involved. In fact, the overall project can cost less due to the simpler engineering requirements.

Unique. The AIO charging solution has a free height of 5 metres, meaning that midi and double-decker buses can be charged safely on roads and in spaces with heavy traffic.

Installed and ready to use in no time. The rapid installation process is cost-effective, and the system can be up and running in just a few hours.

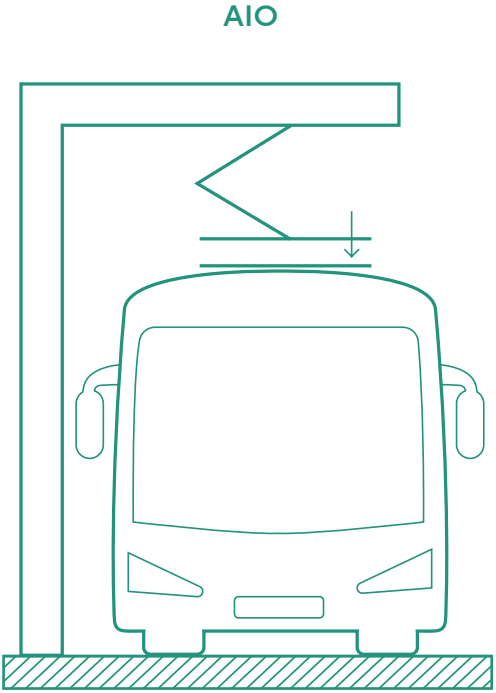
Powerful. Depending on the type, your e-buses are charged with 300 kW or 450 kW.

Mobile. Our fast-charging solution is also available as a mobile version. Charge your buses flexibly and regardless of location – even during a test phase or during roadwork diversions.

Swiss made. When you opt for a AIO fast-charging station, you choose a product that was developed in Switzerland based on Swiss quality standards.

“Reliable and punctual – two words that describe the public transport system in our home country, Switzerland. Our innovative AIO and ZFP charging systems ensure smooth running in the age of E-Mobility and smart charging.”

Rico Furrer, CEO



→ <https://youtu.be/I1MBOsmXut0>

Our en-route charging solution means you're fit for the future – see our product video for a closer look at how the AIO fast-charging station works.

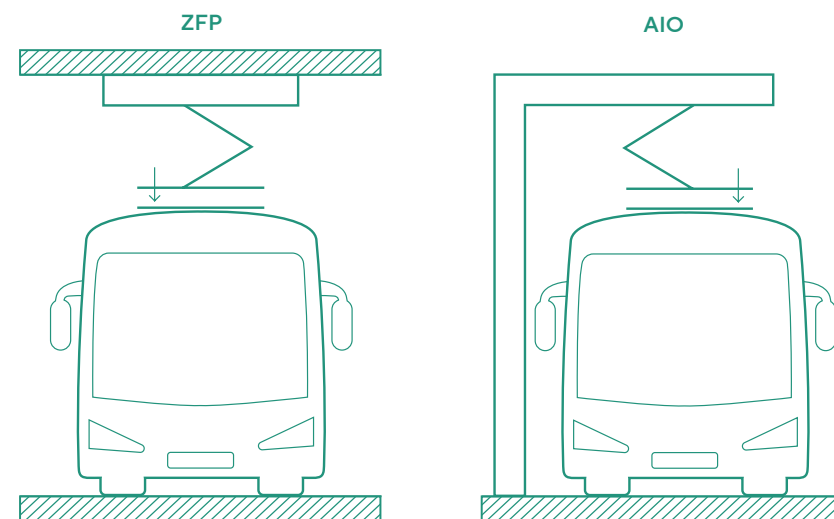


A clever combination

Ceiling-mounted ZFP charging solution and AIO fast-charging station

Combining the ZFP charging solution with our AIO fast-charging station allows for a particularly elegant and economical approach.

Use of the two technologies in combination eliminates the need for plug connections or heavy pantographs on bus roofs. The two charging solutions complement each other perfectly, with one system temporarily taking over the performance of the other in the event of a partial failure. Thanks to our near-by locations, a specialist from our team can be on site in no time. The synergies created by this product combination mean that our customers can benefit from service, maintenance and spare parts organisation all from a single source. Both charging solutions meet the requirements of the OppCharge industry standard widely in use throughout Europe, which means they're compatible with most e-bus models.



“We’re here for you! Also after commissioning, we’ll be happy to advise you on further expansion steps.”

Bernhard Nägeli, E-Mobility Electrical Engineer

Our strengths at a glance:

- **Space-saving charging solution** – Thanks to the All-In-One concept with the AIO and ZFP charging stations
- **High utility** – Thanks to customer-specific engineering
- **Comprehensive planning and site management** – From the energy supplier to the charging rails of the e-buses
- **Project support from A to Z** – Including commissioning with the e-bus
- **All from a single source** – Chargers, civil engineering, steel structures, cable installations, etc.
- **Interoperability** – Thanks to OppCharge, OCPP and other interfaces that comply with the relevant standards
- **Manageable spare parts inventory** – The same components on the route and at the depot
- **Mobile solutions** – Thanks to their compact design, our systems can be easily reassembled at another location
- **Unique** – For mixed fleets from midi to double-decker buses, regardless of manufacturer. The Furrer+Frey patented inverted pantograph moves 100% vertically, so double-deck and single-deck buses can charge precisely at the same parking spot
- **Training** – For operating personnel



Charging management

All of our charging units can be connected to a management system. This system controls the charging and preconditioning of the e-buses via OCPP protocol, and an RFID reader checks whether the right e-bus is in the right place. If necessary, the power at the charging stations is limited and the charging process is staggered.

OppCharge

Our charging solutions comply with the OppCharge charging standard. This standard governs the geometry of the charging contacts, the arrangement of the pantograph as part of the charging station, the vehicle positioning and the communication protocol between the bus and the charging station. OppCharge ensures the safe and correct charging of any bus with any charger that complies with the standard. If you as a transport company decide in favour of this standard, which is in use worldwide, you will be able to push ahead with the expansion of your e-bus system regardless of brand. Furrer+Frey has tested its chargers in an internationally recognised laboratory to ensure compliance with the OppCharge standard.

More than charging systems: we're also a service provider

We offer our customers a complete package. We provide the services you need in connection with our charging solutions, so that you can concentrate on your core business.



Consulting

Our customers have diverse needs that sometimes vary significantly. Our expertise allows us to find an individual and tailor-made solution for your transport business.

- System consulting for charging infrastructures
- Organisation of consulting partners for in-depth network studies
- Creation of simulations and route calculations for planned routes
- Planning and organisation of test routes
- Rental charging station for pilot routes
- Close cooperation with bus manufacturers and organisation of demo e-buses for your pilot project
- Integration of our communication box in connection with our top-down charging station if not yet installed in the bus
- Inclusion of depot and charge management systems for targeted fleet deployment planning as well as for active load control that makes it possible to reduce peak loads and thus cut energy costs.



Planning and execution

Planning a charging system involves overcoming a series of different challenges. As a comprehensive provider, we design and implement solutions for our customers, who benefit from our many years of experience in the construction industry and our in-depth expertise in charging infrastructure.

- Optimal integration of the charging station in a new location
- Aesthetic integration of the charging station in the existing architecture
- Mobile solutions thanks to their compact design. In addition to this, our systems can easily be reassembled at another location.
- Training for operating personnel



Service

Our charging systems are extremely reliable, but there is still the possibility of the occasional fault or emergency. We're always on hand and ready to support our customers ourselves or via certified partners. Guaranteed response times and individual customer requirements can be defined within the framework of a service agreement.

Our services include the following:

- Remote monitoring
- Fault analysis
- Three-level support, from remote maintenance to on-site troubleshooting
- Local service partners
- Service hotline
- Service agreement based on customer requirements
- Data evaluations at the customer's request
- Organisation of spare parts



International

The knowledge and experience we have acquired over the decades in electrification projects enable us to offer our charging stations for e-buses and now also for battery trains, worldwide. Depending on the customer's requirements, we offer engineering and the materials involved.

- Swiss quality services worldwide
- Close cooperation between our E-Mobility and Export teams
- We take a networked approach, think systemically and build long-term partnerships

OUR STAFF



Our success is built on the dedication of 340 employees who serve our customers all over the world. We are proud of our multinational team.

Thanks to the skills of our individual employees, we are able to meet the challenges we face, combining tried-and-tested skills with new approaches. We are committed to making sure our staff have access to the best possible training and further education and are able to develop their full potential. Fostering a healthy team spirit is extremely important to us, and we want life at Furrer+Frey to be varied and motivating.

In our family business, each generation passes on its knowledge to the next, with new ideas and technologies constantly being added over the years. With the right people on board, we continuously expand our expertise.

Our goal, in everything we do, is to move forward together.

With our expertise on board, you're on the right track.

Let us take charge of your charging! Contact us for a system consultation. We'll answer your questions and help you to plan and execute your journey into the new world of E-Mobility.

