Stay competitive with a safe, sound, simple and sustainable technology

IPT® Charge Bus

Heavy Duty Wireless Charge

The future is wireless, we set the standard

Think about your daily world – how would that be in the near future if we don't boost and flexibilize the energy transition that's taking place?

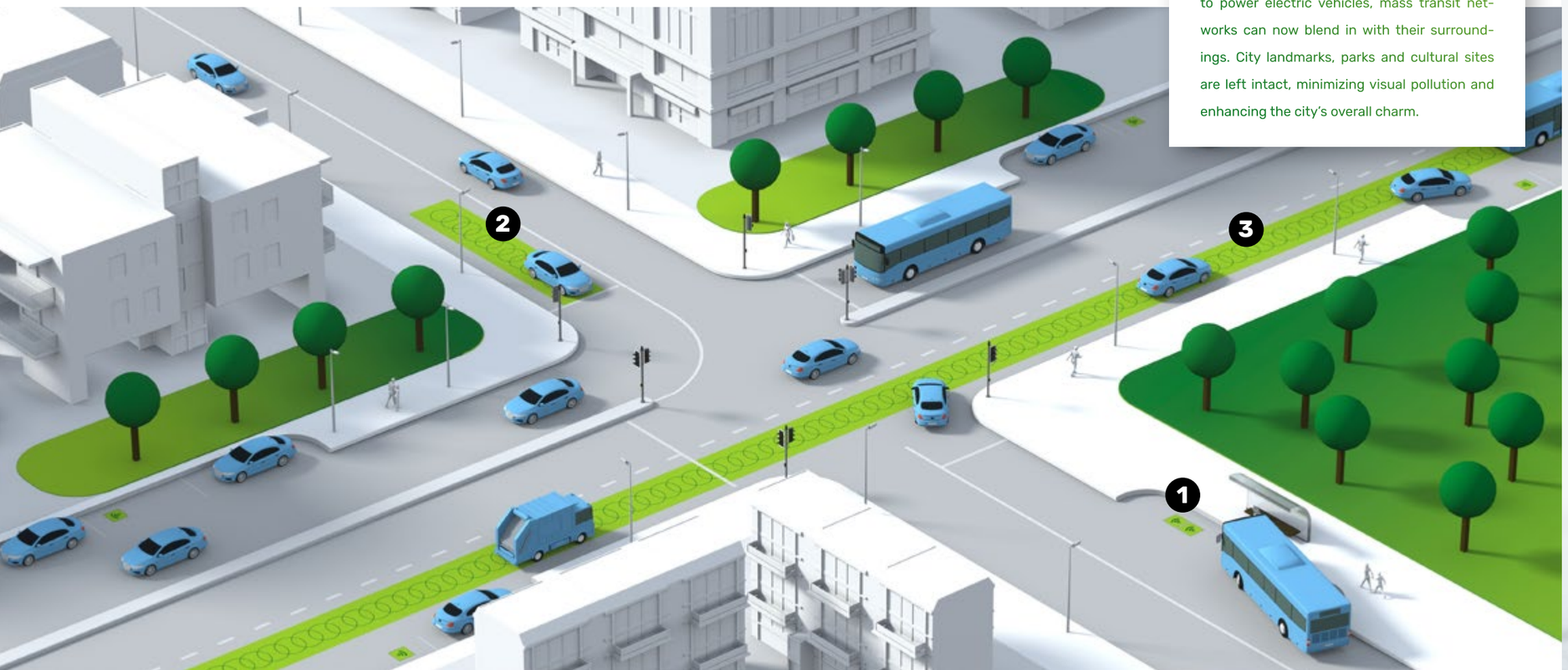
What would the cost of transport be if there's nothing more than expensive fastcharging solutions? How would our infrastructure look like if we contaminate our streets with charging stations? And how could we introduce autonomous driving or electrify our supply chains if there is no infrastructure that supports autonomously charging? Next generation wireless charging solutions give an answer to these questions.

Combine megatrends like mobility, zero-emission, sustainability, digitalization and all-electric and one thing will become clear: the world as we know it is rapidly changing. Worldwide people are co-operating to reduce the use of natural resources and make transport cleaner, safer and future-proof. Our product and system solutions seize the opportunities of digitization and use magnetic induction to allow all kinds of transport as well as industrial processes to be powered electrically in a cost-effective way.

Next generation charging

Muscles, steam, fossil fuels and electricity. We've been powering and charging our transport and industrial processes in many ways. Now it's time for the next generation: wireless charging. A generation that supports smart grids and connected vehicles and enables vehicle-sharing and autonomously driving. Wireless charging is the logical next step in the energy transition and avoids many troubles that come with other, more traditional solutions. By the Paris Agreement, any city is obliged to lower CO2 towards zero-emission forcing the need of electrification of any mean of innercity transport (e.g. buses, taxis, ferries, delivery vans, cars, garbage trucks). This proven technology eliminates the use of physical connectors and cables and uses wireless charging units with a capacity ranging from only a few milliwatt to hundreds of kilowatts.

The invisible power transfers operate without contact at very high levels of efficiency (>92%). Vehicles can be charged rapidly and seamlessly either in 1 static charging and soon in motion with 2 semi-dynamic and 3 dynamic charging without the need for more fleet vehicles or batteries. By eliminating the cables and other wires previously needed to power electric vehicles, mass transit networks can now blend in with their surroundings. City landmarks, parks and cultural sites are left intact, minimizing visual pollution and enhancing the city's overall charm.



Safe, sound, simple and sustainable

Wireless charging is rapidly changing the way we charge our consumer and industrial devices. Take your smartphone or electric toothbrushes – why using cables and connectors if it can be as simple as wireless? Based on the same technology we offer wireless charging systems for a variety of industrial applications and electric vehicles ranging from Automated Guided Vehicles (AGV) to buses.

Safe

With thousands of vehicles using IPT charging technology since 1996 and with kilometres of continuously charged track supplies integrated into the floor or monorail of worldwide industrial manufacturers and distribution centres the technology is entirely accepted in daily operations.

Simple

Making life easier is a key issue when transforming the way we electrify our processes or charge our vehicles. Wireless charging offers a simple way to increase the charging capacity without investing heavily in the grid or charging network. With our wireless charge technology, the need for battery capacity will be massively reduced as will the need for high power grids. Simply charge en-route or during operation.

Sound

With a world that that is digitizing the need for sound solutions increases. Wireless charging is a technology that offers the stability and robustness required for industrial processes, continuous operation or reliable transport solutions. Introducing wireless charging is above all, a sound investment in a technology with a low total cost of ownership.

Sustainable

We 'Make the world a better place to live in'. Wireless charging and electrification are based on sustainable technology. With en-route wireless charging solutions, minimal onboard energy storage is needed and therefore reducing cost and weight per vehicle.

By eliminating the cables to power electric vehicles, mass transit networks can now blend in with their surroundings. City landmarks, parks and cultural sites are left intact, minimizing visual pollution and enhancing the city's overall charm.

IPT® Charge Bus

For Heavy Duty Wireless Charge

IPT Technology offers a complete portfolio for wireless charging heavy duty vehicles such as buses and trucks.

Stay competitive with clean technology

Public transport is evolving rapidly to remain competitive and become more environmentally friendly. In parallel public transport operators need to maintain the high reliability and availability that is required by the character of their service. And with public authorities getting more and more involved in keeping their cities clean, there is also an ever-increasing demand for clean and silent technologies to power public transport. IPT® Charge Bus puts clean, silent and zero-emission at your fingertips. The technology is used to charge buses of all sizes, full electric as well as hybrid buses.

IPT® Charge Bus reduces battery cost and weight per vehicle and wins space, therefore reducing life cycle-related costs.

Reducing life cycle-related costs with en-route wireless charging

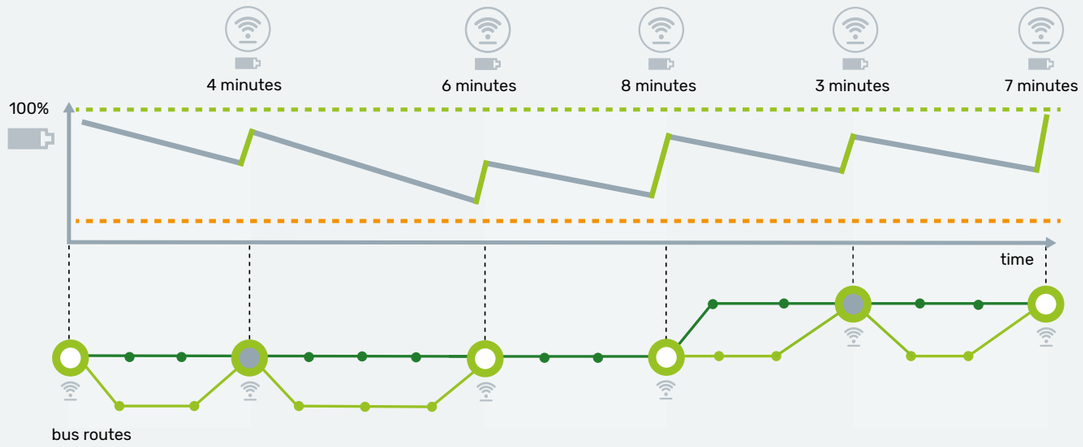
IPT® Charge Bus is a unique system which enables electric buses to operate fully on the principle of en-route charging to extend the range of an electric bus. A minimal onboard energy storage, enough to reach the next charging station plus a small safety margin, becomes practically sufficient to operate a vehicle optimally. The optimal charging scenario depends on the type of bus, size of battery pack and the profile of the route. But common for all scenarios is that IPT® Charge Bus offers entirely new perspectives for the operation and design of electric buses. IPT® Charge Bus reduces battery cost and weight per vehicle and wins space, therefore reducing life cycle-related costs.

IPT® Charge Bus is a wireless power transfer system that allows electrical energy to be supplied to consumers without any electrical or mechanical contact or intervention. Charging can be made possible at virtually any opportunity. The modularity of IPT Charge Bus makes it versatile and suitable for all typical bus sizes. Besides, it allows extremely flexible adaption to operational demands.

In London, hybrid electric double-decker buses equipped with IPT® Charge run in electric mode for more than 80% of the time over an operational day (20h), 7 days a week. Buses are equipped with 60 kWh batteries, and distance between charging options is 11 km.

Fast en-route opportunity charging

Charging stations are located in the depot, at end stops and en-route at strategically positioned bus stops for wireless recharging while letting passengers on and off. The charging process is seamlessly integrated to allow continuous service, optimum fleet availability and high efficiency.



The technology behind IPT wireless charging

IPT® wireless charge bus is based on high power inductive energy transfer between components integrated into streets and the receiving equipment installed beneath the vehicle. These components communicate with the vehicle to start the contactless charging process automatically as the vehicle simply covers the charging segment on the floor.

1. Track Supply
2. Primary Coil
3. Secondary Coil (Pickup)
4. Rectifier
5. Battery
6. Communication System

Technology of choice

Our innovative and user-friendly charging and electrifying solutions are available in a power range from 1 kW - 300 kW. With a high ROI, our intrinsically safe technology is one of the most futureproof investments that allow you to seize the opportunities of wireless charging.

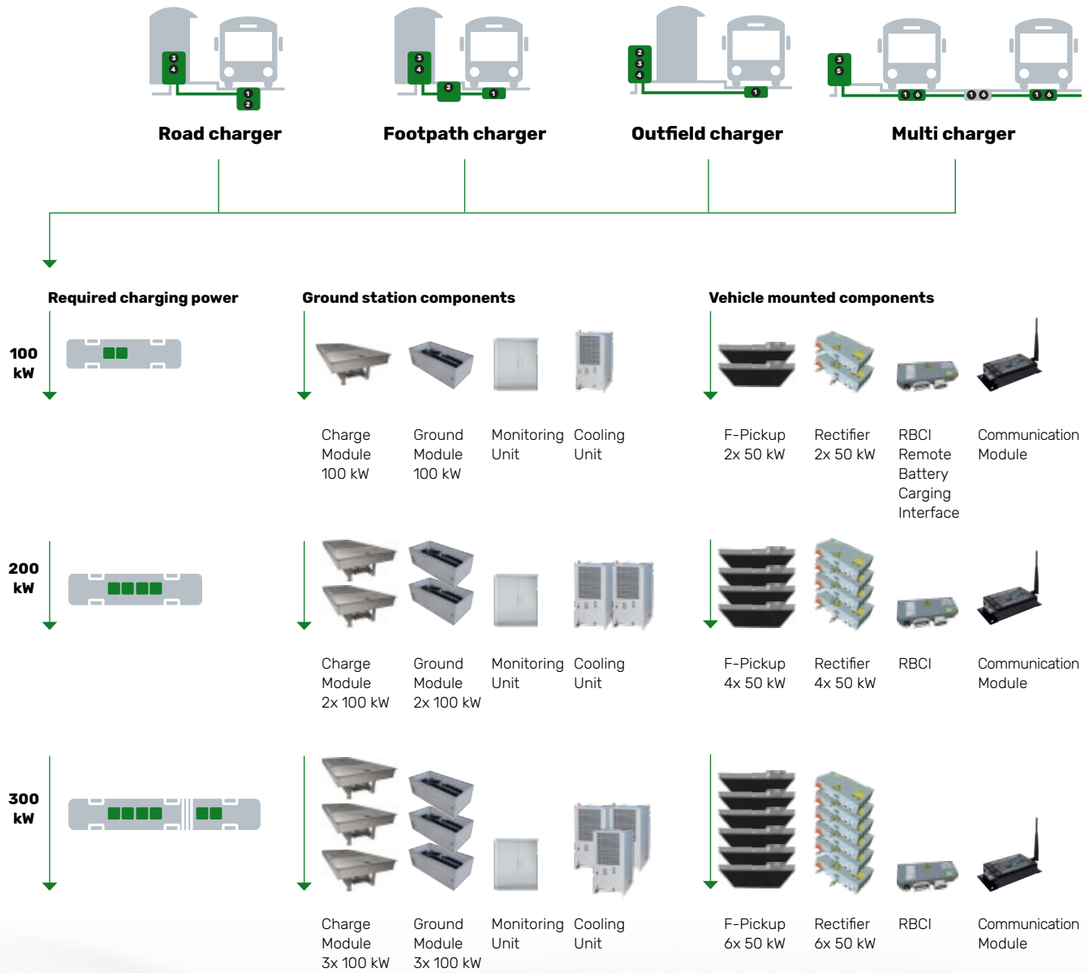
- Highest energy efficiency (>92%)
  → more power per euro
- High power transmission 1kW-300kW
  → one technology for broad range of applications
- Environmentally friendly
  → sustainable solution that requires less batteries and, keeps your city streetview clean.
- No moving parts
  → less maintenance, longer lifetimes
- Lowest radiation
  → safe technology with no disturbances
- First class interoperability
  → seamless integration with other vehicle devices
- Large tolerance
  → installer friendly and easy to embed
- User-friendly
  → fully automatic charging makes user involvement obsolete

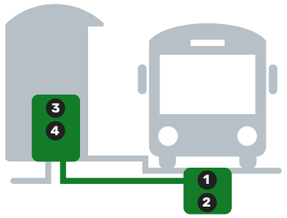
Product portfolio

IPT® Charge Bus - For Heavy Duty Wireless Charge

IPT Technology offers a complete portfolio for wireless charging Heavy Duty Vehicles such as buses and trucks.

Charging can be done during daily operation at any given stop or rest opportunity, charge time typically is between 3 and 6 minutes. This so-called 'En-Route Charging' provides an ideal solution to ensure zero-emission public transport during the day without impacting the regular operation on the route. Modules are chosen individually depending on the required charging power and other operating parameters.

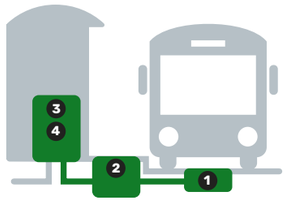




1 Charge Pad (Primary Coil)
2 Track Supply
3 Monitoring Unit
4 Cooling Unit

Road charger

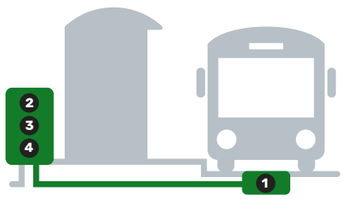
With the “Road Charger” the Track Supply 2 is buried underneath the Primary Coils 1 which means minimum usage of the surface.



1 Charge Pad (Primary Coil)
2 Track Supply
3 Monitoring Unit
4 Cooling Unit

Footpath charger

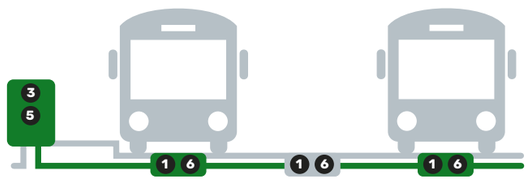
With the “Footpath Charger”, the Track Supply 2 is embedded into the footpath which allows easier access to the Track Supply for maintenance works, if necessary.



1 Charge Pad (Primary Coil)
2 Track Supply
3 Monitoring Unit
4 Cooling Unit

Outfield Charger

All electric parts are installed into a cabinet which is erected some way off the charging station – next to the bus shelter for example. Only the Coils 1 are buried into the road. Consequently, no deep digging is necessary and all electronics are in one place.



1 Charge Pad (Primary Coil)
2 Track Supply
3 Monitoring Unit
4 Cooling Unit
5 PFC Stage
6 Inverter mod

Multi Charger

In this installation, the Track Supply 2 is split into the Power Factor Controller (PFC) stage 5 and the Inverter module 6 (embedded into the ground with the Primary Coil 1. The PFC stage serves several charging stations at once. This minimizes the need for components and maximizes the use of each part. Each charging station will only be switched on when a suitable bus arrives.

IPT® Charge Bus

Ground Station Components Road Charger

In-Ground Module 100 kW

Type prefabricated steeleinforced concrete structure with premounted cables

Outside Dimensions
3100 x 1550 x 1030 mm

Pre-mounted terminal box, energy guiding chain, lid sealing

In-Ground Module 100 kW

Type prefabricated steelre-inforced concrete structure with premounted cables

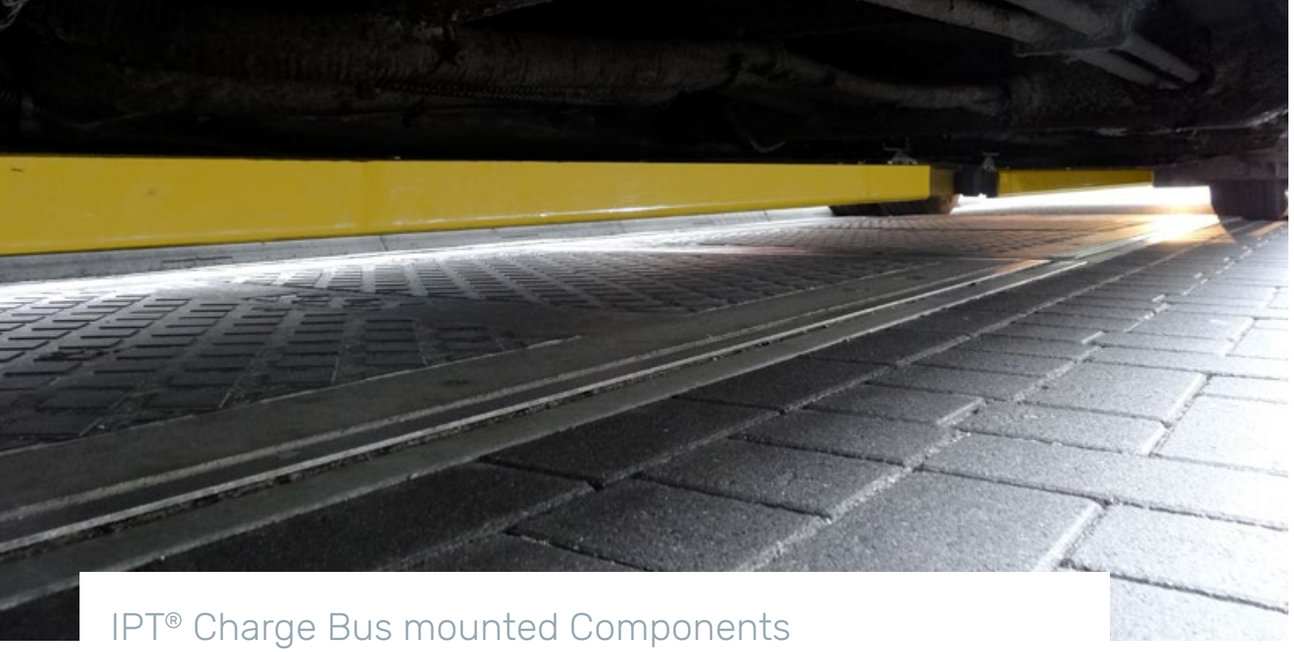
Outside Dimensions
3100 x 1550 x 1030 mm

Pre-mounted terminal box, energy guiding chain, lid sealing

Monitoring Unit and Cooling Unit (individual choice)

The Cooling Unit concept and the Monitoring Unit need to be evaluated individually, considering specific operating conditions, specific requirements and intended use, city design, etc.

The modularity of IPT® Charge Bus makes it versatile and suitable for all typical bus sizes.



IPT® Charge Bus mounted Components

For battery voltages from 400 to 750 V DC

F-Pickup

Nominal power 50 kW at 100% Duty Cycle

Nominal voltage 600 V

Dimensions 1100 x 1080 x 55 mm

Nominal air gap 150 mm air gap to surface of the street (130 mm to Charge Pads)

Remote Battery Charging Interface (RBCI)

Dimensions 362 x 125 x 81 mm

Interface CAN, other on request Different I/O's

Rectifier 50 kW

Nominal power 50 kW at 100% Duty Cycl

Nominal voltage 600 V

Output current 83 A

Dimensions 600 x 310 x 110 mm (plus connections)

Communication Module

Standard Radio Modem

Safe and solid – for your and others safety

Frequently Asked Questions

Magnetic fields are safe

Isn't the magnetic field dangerous for humans? The electromagnetic field generated during the charging process is principally limited to the air gap between the primary and secondary coils under the bus. Measurements show that the field generated by IPT® Charge is by far within the limits of the reference levels of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Without a suitable bus above the Charge Pads, the charging system in the ground is deactivate, and thus no magnetic field can create.

Reliability

Wireless charging for buses is new - is it a reliable technology yet? IPT® Charge Bus has a long history. Wireless charging was applied for the first time with electric shuttle vehicles already in 1998. First IPT® Charge Bus projects were realized in 2002 in Genoa and Turin, Italy. Installations are to date in operation. IPT charged buses had made more than 12 million kilometres already.

Winter operation

Does IPT® Charge work in snowy winters? Yes, even better than with any other charging technology. Snow or water do not influence the charging process, and without any moving parts, the system is not vulnerable to dirt or frozen elements. The Components are maintained at the right operating temperature with cooling liquid which is mixed with antifreeze and can be heated up at extreme cold weather conditions. IPT® Charge is entirely weatherproof and will work with snow and freezing temperatures as well as with lasting heat waves.

Modular system

What if due to adding more e-buses, the chosen initially 100 kW is no longer sufficient? Besides being flexible in the original setup, IPT® Wireless Charge Bus also allows for future adaption of charging power. With the modular setup, charging power can be added at any time, as long as the grid connection allows the extra power.

Efficiency

How efficient is the system altogether? Isn't it much less efficient than plug-in chargers? IPT® Charge is designed for high frequencies and equipped with the most recent electronics. Regarding the entire functional chain, its efficiency value is in the vast majority of setups over 92%. Which is just as good as the whole operational chain of typical pantograph solutions or plug-in chargers.

Battery chemistry

Is IPT® Charge designed for specific battery types? IPT® Charge is designed to charge a wide range of very different batteries. You may look at it as a wall socket. Whether you connect a vacuum cleaner or a TV-set to it, makes no difference to it. It leaves the charging management always to the vehicle and adapts to the requirements from there. Communication inside the vehicle uses standard CAN-based interface.

Different sizes and widths of buses

Can one charging station be shared by buses of different sizes and widths? Yes. While the position of the Pickups under the bus depends on the distance to the curbstone. It is always the same about the Charging Coils, whether it is a small or a more extensive bus. Hence the station can be shared by different buses. Therefore, for best integration, it is recommended to use an offset to allow the use of varying bus widths if desired.

Who we are

For more than 20 years IPT Technology is active in wireless power transfer. We design, manufacture, install and service wireless to charge all type of vehicles ranging from cars and buses to ships, robots and material handling equipment. Our products are applied in both industrial and electrical mobility applications that use wireless power transfer to provide a highly efficient, reliable, hassle-free charging experience. Onshore and offshore!

Our installed base of IPT® Charge in Europe

Milton Keynes
8 fully-electric buses are using inductive charging.

Bristol
2 hybrid double-deck buses are using inductive charging.

London
3 hybrid double-deck buses are using inductive charging.

Madrid
5 fully-electric buses are using inductive charging.

Fredrikstad
Our first e-ferry assignment for the realization of a 100kW inductive charging solution.

Utrecht
3 fully-electric buses are using inductive charging.

Den Bosch
1 fully-electric bus is using inductive charging.

Aachen
7 fully-electric vehicles are using inductive charging.

Turin
23 fully-electric buses are using inductive charging.

Proven Partner

For more than 20 years, our high-tech solutions guarantee a low total cost of ownership while bringing you at the forefront of the worldwide energy transition. Our solutions for charging transport and powering industrial processes are Made in Germany and fit for purpose all over the world. With a track record of decades and an installed base that already represents more than 12 million kilometres.

Source of inspiration

Your business is our source of inspiration and a guiding principle for the solutions that we develop. We provide innovative charging and electrifying products and systems as an answer to the worldwide trend towards electrification of transport. Wherever your business is and whatever type of onshore or offshore transport you use, we can provide a solution that fulfils your requirements and guides you on the way from ‘fossil fueled’ to electric.

Complete package

Our offering ranges from easy to install standalone products to customized total charging solutions. We support you from start to finish and beyond: from the first sketch and product development to implementation, training and service.

High quality

Our processes, from R&D, production, sales, commissioning, up to service and maintenance, meet high-quality standards and are certified according to ISO 9001. Our engineers are committed to delivering high-quality products and systems. We invest continuously in training and expertise to offer you the highest quality. Our success is proven by products and systems that are in service for more than 20 years!

We are guaranteeing the availability and reliability of your business.

Charging public transport

- > 17 years of successful operation
- > 50 buses use wireless charging
- > 15 charging stations in operation
- > 12 million kilometres
- Experience in projects with many partners and different interests

Industrial charging and electrifying

- High reliability and availability
- > 20 years of successful operation
- In operation worldwide
- Experience in dealing with complex projects
- Power rates up to 35 kW
- > 2,000 sold pieces per year
- > 75,000 meters continuously powered track in daily use

Charging ferries

- Experience in dealing with complex projects
- Versatile applicability
- No cable connections ship to shore
- Excellent weather protection

Fleet charging

- High level of standardization and interoperability
- First successful pilots already in 2012
- Enabling autonomous driving
- Optimaltechnologyforcarsharing
- Enabling autonomous driving
- Optimum technology for car sharing

Innovative power transfer for a world of movement

Whether public transport, commercial vehicle fleet, industrial applications or ferry: IPT Technology provides the solution for continuous or discontinuous wireless charging. We combine the know-how and expertise into a total solution that contributes to your success.

Industrial mobility – when power transfer becomes smart

IPT® Rail Keeps you on track

When supplying power to rail-mounted vehicles, a continuous inductive supply is generally required along the entire path of travel. IPT® Rail features a protruding primary track that is installed parallel to the rail. The elevated installation of the cable to guide vehicles allow the use of E-shape pickups that are attached to the driven vehicle and envelope both track cables from several sides. By using this technology, you'll benefit from reduced maintenance costs since there is no mechanical wear and tear and related maintenance is not required. IPT® Rail solutions could be used even under the most critical conditions making your plant a safer and more reliable place to work.

IPT® Floor Powering without obstacles

For floor surface conveyors, the goal is to achieve a level floor with no obstacles in the factory environment. In co-operation with our partner, Conductix, IPT® Floor features one or more cable loops embedded in the floor of your industrial environment inductively powering vehicles.

Once the inductive power solution embeds in the floor, it doesn't require any maintenance. There is no mechanical load on the cables preventing them from wear and tear and allowing you to focus on your core business.

IPT® Charge Charging your trucks, robots and lifting systems

To optimize efficiency or fulfil the occupational health and safety requirements. Industrial companies make use of robots, lifting equipment and forklift trucks to heavy-duty trucks.
Wireless charging of trucks and equipment could be done overnight or en-route. It requires minimal onboard energy storage and offers entirely new perspectives for the operation and design of your production equipment.

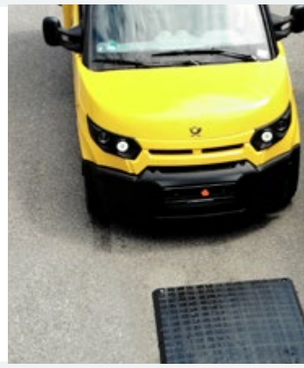
E-mobility – Turn your charging challenges into reality

IPT® Charge Bus Stay competitive with clean technology

IPT® Charge Bus is a wireless power transfer system that allows electrical energy to be supplied to consumers without any electrical or mechanical contact or intervention. IPT® Charge Bus is a unique system which enables electric buses to operate fully on the principle of en-route charging to extend the range of an electric bus. Minimal onboard energy storage becomes practically sufficient to work a vehicle optimally. IPT® Charge Bus offers entirely new perspectives for the operation and design of electric buses.

IPT® Charge Fleet Charge your fleet via contactless power transfer

Electric mobility is taking off as technology of choice for fleet owners leaving fossil-fueled combustion engines behind and charging of the onboard energy storage by plugging a connection into the vehicle. A user-friendly alternative offers the contactless, intervention-free power transfer. This technology enhances the efficiency and suppresses all kinds of operational risks. Having the primary coil beneath the ground, it also prevents any vandalism and the build-up of dirt. Combining modern charging algorithms, energy regeneration and intervention-free en-route charging, IPT® Charge overcomes common problems of onboard energy storage with today's technology.



IPT® Charge Personal Car Convenient and safe domestic solution

With electric vehicles becoming the standard wireless charging is in the spotlight as a cost-effective, safe and hassle-free alternative for the traditional wired charging stations. It's convenient, safe since the absence of wired connections, maintenance-free and immune to dirt and water. Wireless charging solutions can take you from overnight to charging en-route enabling wireless semi-dynamic or dynamic for autonomous driving.

IPT® Charge Ship Your safe journey starts with IPT

Go green not only applies to onshore e-mobility anymore. Evermore operators of (coastal) ferries and vessels are searching for solutions that enable them to fulfil the environmental regulatory demands. Wireless charging offers a higher utilisation of the available charging time, increased safety and unprecedented system reliability. Wireless charging eliminates the cable connection between the vessel and shore. It guarantees safe connections but also reduces maintenance since wear and tear to physical connection lines is eliminated. From consulting, R&D, production, sales up to project management, commissioning and service and support – we're there to help you.

IPT Technology GmbH

Im Martelacker 14
79588 Efringen-Kirchen | Germany

Phone +49 (0)7628 692 960
E-mail info@ipt-technology.com

www.ipt-technology.com