

Inductive Charging System[®]

Making every second count



The future is wireless



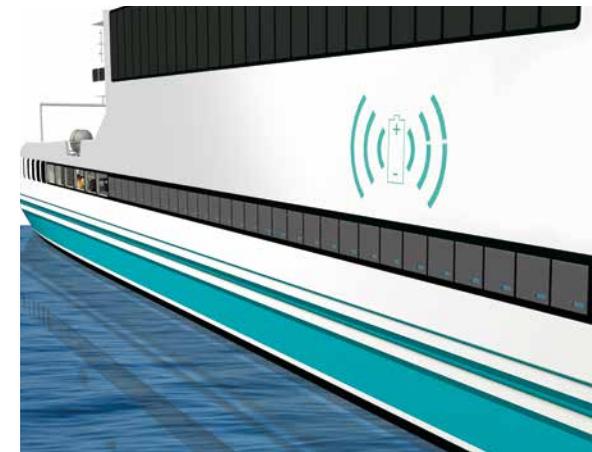
Wireless energy transfer by EST-Floatcheck & INTIS



Until now, electric ships have not been accepted as widely as they could be, due, in part, to the inconvenience of opportunity charging with plugs. Wireless energy transfer systems change all this. Together with INTIS – the global technology leader in the area of induction charging for mobility – EST-Floatcheck introduces an Inductive Charging System® for the marine sector. The system will be specifically designed for electric and hybrid power propulsion and is intended for application on yachts, commercial vessels and ferries. The ICS® combines the INTIS wireless technology with the Li-Ion NMC battery chemistry.

Making every second count

The Inductive Charging System® works without cables and makes contact-free charging possible. Charging begins the moment the ship docks at the quay and ends the moment it resumes its journey – all completely automatically. Inductive transfer technology is a game-changing addition to current EV technologies and will have a decisive role to play in the acceptance of electric ships. The crew of a wirelessly and automatically charged ship can concentrate on the job, the journey and the joys of being on the water.



Smaller battery pack, smaller investments

Because the recharging process begins immediately with every berthing, the battery packs can be smaller. This saves space on board and requires smaller investments in storage capacity. The system can be installed with an absolute minimum of changes to the vessel and existing infrastructure, and enables the safe transfer of large amounts of energy. Installation requirements are kept to a minimum.

Hands-free, for ease of use and safety

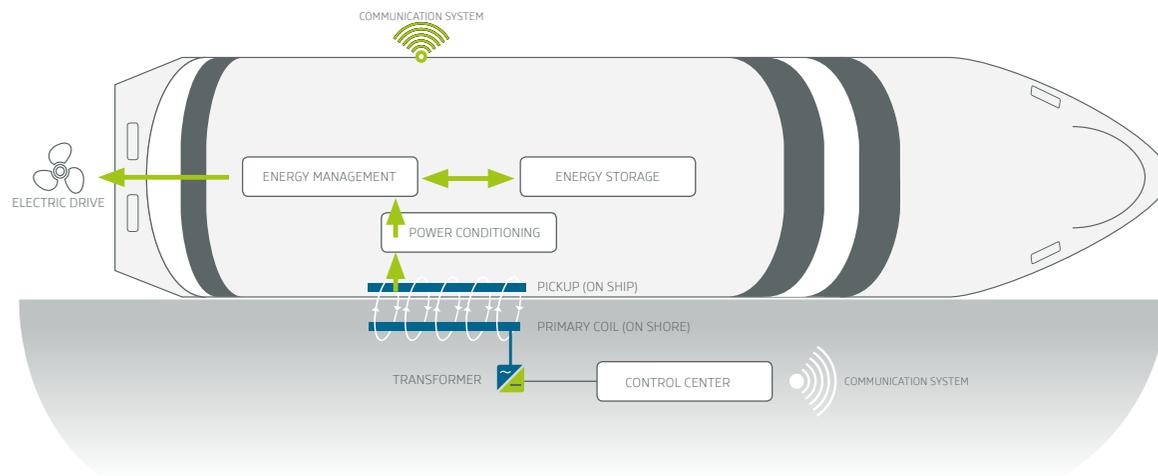
In addition to financial benefits, the Inductive Charging System® offers ease of use and safety. It eliminates the need for cable connections, so the attention of everyone on board can be dedicated to the berthing process and other routine tasks. The Inductive Charging System® also reduces the need for maintenance: there are no cables that can wear out and no electrical connection points to become damaged or worn by water/seawater, snow and ice.

Leading technology

The wireless INTIS technology was originally developed in 2013 for charging heavy vehicles (e.g. electric buses) on the move. Since then, INTIS has adapted this 'dynamic' technology for stationary applications. Each wireless inductive charging system is composed of land-side and ship-side components. The land-side components consist of a power electronics cabinet, connected to the power grid and communications network, which first rectifies incoming 3-phase power



and then converts the resulting DC current to high-frequency AC for wireless transfer. This high-frequency AC power flows through a charging plate, which creates an alternating magnetic field. On the ship-side, a pick-up plate converts this alternating magnetic field back into high-frequency AC current. Our ship-side power electronics then rectify this AC current and supply the resulting DC power to the ship's DC intermediate circuit. The transfer of power between the charging and pick-up plates of our inductive charging technology is not affected by water in any way, even if the plates are submerged.



Easily integrated

For maritime applications, primary coils are installed at specific locations on the ship's route. They can be installed directly on the quay site, or on a floating pontoon to account for changes in water level. These primary coils are only operational when they are needed. Wireless energy transfer systems have the benefit of maximum convenience for the operator, as charging is automatic and requires no additional crew or procedures. The land-side installation is hidden and vandalism-proof. Installation of this 'invisible' technology leaves the mooring point completely visually unaffected. Our system can easily be integrated into existing and future electric ships. The amount of power our systems can transfer meets all energy requirements for small electric ships and ferries.

All benefits

- *Economical:* Battery capacity can be significantly reduced with automatic opportunity charging.
- *Simple & convenient:* No wires, no fuss, just charging. Thanks to the user-friendly charging process, the crew can get on with their jobs and let our automated technology take care of charging.
- *Invisible:* The quay side is unaffected and the infrastructure is vandalism-proof.
- *Battery-friendly:* Transmitted energy can be used directly to power consumables when charging – without passing through the battery. Additionally, more frequent and lower powered charging reduces battery wear-and-tear.
- *Safe:* Wireless technology means components are fully enclosed and no electrical contacts are accessible.
- *Low-maintenance:* No moving parts, so the energy transfer system suffers no wear and tear.
- *Compatible:* Primary coils can be installed almost anywhere, while the design of our ship-side coils allows easy installation.

Inductive charging system[©] – Specifications

	30 kW system	100 kW system
Rated power	30 kW	100 kW
Rated air gap	3 cm	5 cm
Rated frequency	30 kHz	30 kHz
PRIMARY COMPONENT		
Area	0,5 m ²	1,5 m ²
Thickness	34 mm	34 mm
SECONDARY COMPONENT		
Area	0,75 m ²	2 m ²
Thickness	22 mm	22 mm

* Expandable to 900 kW