



Glosten

WSF MEDIUM VOLTAGE SHORE POWER FEASIBILITY STUDY

PREPARED FOR
WASHINGTON STATE FERRIES
SEATTLE, WASHINGTON

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CAVOTEC APS (Automatic Plug System)

- 12m high tower, on a 2x2m foundation platform
- The tower frame is composed by 4 different structural blocks bolted together
- Provision of a door for internal inspection in the bottom section
- Snow roof at the top to cover the entire length of the fixed arm and the plug block
- Slide function towards ship
- Automatic adaption to tidal variations
- Customized plug, 1300 Amp, 690 VAC, 700 kg
- Unboard socket behind a hatch for mating



Ferjekonferansen 2014, Molde



Figure 38 Cavotec APS presentation (Reference 6)

FerryCHARGER

eMobility on land and on water

Modern mobility concepts and well thought out transport connections on land and on water are fundamental growth factors for tourism and the economy. Environmentally acceptable and economically efficient concepts are required to meet the ambitious targets, eg. to reduce the CO₂ emissions of the transport sector across Europe by 60% until 2050.

Due to improved battery capacities and optimized charging cycles, the radius of action of electric vehicles and other electrically driven vehicles is continuously expanding.

Short distance ferries are an ideal or partly indispensable means of transport in urban and rural regions. Nowadays, for example, ferry services that were shut down years ago are put back into operation to avoid overloaded road traffic. In cities with suitable waterways ferries once again take over important transport tasks, which can not be realized in "car-free city centre", otherwise.

Nowadays these connections are already partly operated by electric ferries. In the near future, this development will be strengthened.



FerryCHARGER ■

Various designs for the ideal integration in the ferry harbour area

Automated compensation of the ferry movement

Fast and automatic contact between ship- and land side for optimal charging cycles



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Figure 39 FerryCHARGER brochure page 2 (Reference 7)

Charging power supply at the highest level

Our FerryCHARGER system is the ideal charging system for all possible conditions and different ferry harbours.

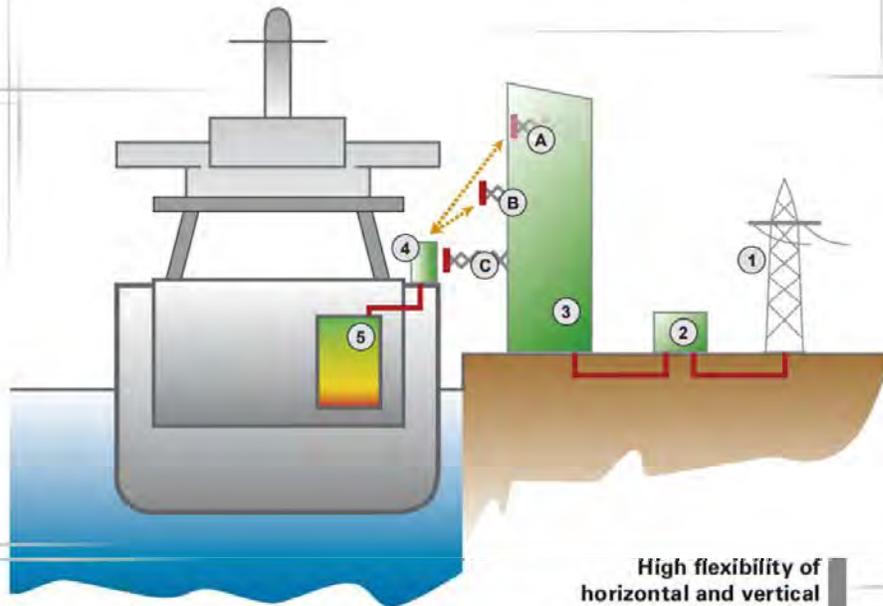
We develop, manufacture and assemble optimized units for land- and ship site.

Connection after arriving of the ferry within 7 seconds

Individual integration into any ferry quay/harbour

Remote maintenance/-control incl. video monitoring

Automatic compensation of ferry movements



High flexibility of horizontal and vertical working range

Optimized charging capacity

Secure housing when not in operation

Safe operation at low-/medium voltage

Proven components for highest requirements in maritime environment

- FerryCHARGER**
- ① Regional electricity grid
 - ② Transformerstation
 - ③ FerryCHARGER tower versions
 - ④ FerryCHARGER ship site connection unit
 - ⑤ Battery storage of the ferry
 - Ⓐ Ⓑ Ⓒ Automatic supply process
 - ➡ Sensors for position detection

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Figure 40 FerryCHARGER brochure page 3 (Reference 7)

Experience counts

For decades our products are present in almost every port of the world.

Based on the knowledge through development and manufacture of countless energy- and data transfer systems in maritime environment we are developing solutions for the new application field of electric ferries.

Trust in our Know-how from decades of development and production of energy and data transfer for maritime applications

Our FerryCHARGER systems based on efficient design are suitable for various types of ferries

e.g. Low voltage (AC/DC) 200 kW up to 4 MW
Medium voltage (AC) up to 8 MW



left: ship side connection unit with sensor-controlled position detection and magnetic lock.

below: contact bars (ship side) and chargingPANTO (land side) of the 1st FerryCHARGER generation



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Figure 41 FerryCHARGER brochure page 4 (Reference 7)