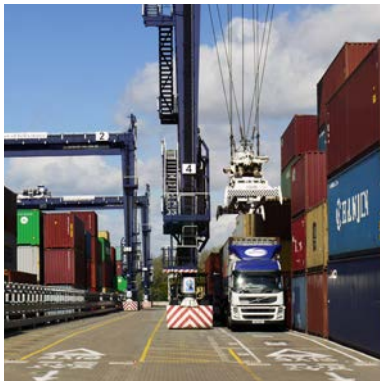


## **PORT TECHNOLOGY**



**PRODUCTS AND SYSTEMS FOR  
ELECTRIFICATION, POSITIONING &  
DATA COMMUNICATION**



## VAHLE PORT TECHNOLOGY

### THE RIGHT SOLUTION FOR ANY REQUIREMENTS


Every day, millions of tons of goods are handled in ports worldwide.

To ensure these procedures run in a safe, efficient, cost effective and environmentally friendly way, VAHLE offers the right solutions for your port.

From individual modules to complete systems utilising conductor systems or cable VAHLE has the tailor-made solution for every challenge in the port!

Over a 100 years of experience and expertise, coupled with vision and modern technology - VAHLE PORT TECHNOLOGY

### YOUR VISION, OUR SOLUTION



<b>4</b>	<b>VAHLE VISION</b>
<b>6</b>	<b>FESTOON SYSTEMS</b>
<b>8</b>	<b>UNIPOLE CONDUCTORS / SMGX</b>
<b>10</b>	<b>ERTG – ELECTRIFIED RUBBER TIRED GANTRY CRANES</b>
<b>12</b>	<b>VAHLE ENERGY STORAGE TECHNOLOGY</b>
<b>14</b>	<b>SERVICES &amp; SUPPORT</b>
<b>15</b>	<b>CHARGING OF HORIZONTAL TRANSPORTATION</b>
<b>16</b>	<b>CHARGING</b>
<b>18</b>	<b>MOTOR-DRIVEN CABLE REELS</b>



# VAHLE'S VISION 2035

Fully electrified container terminals  
by using renewable energy.

Are you ready for the future?

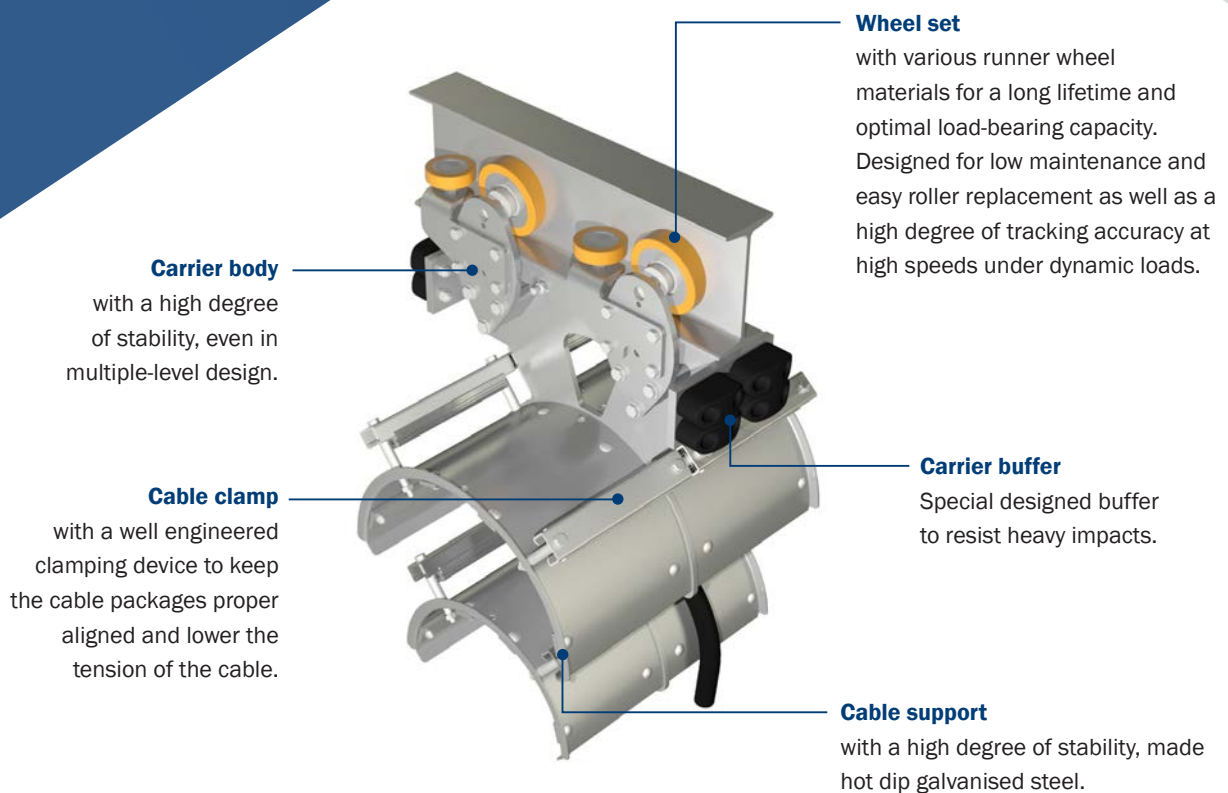
Take the lead and learn more about  
VAHLE technology.







# FESTOON SYSTEMS



## FESTOON SYSTEMS

Our long-standing proven system used worldwide and absolutely reliable - a real VAHLE classic. You can put together the individual modules according to your special needs:

The VAHLE rollers are durable, the material is of

course protected against corrosion and environmental influences.

Your desired modules can be delivered prefabricated by our experienced service staff. The individual cable carriers are then completely “threaded” on the crane.

Track clamp

Steel rope

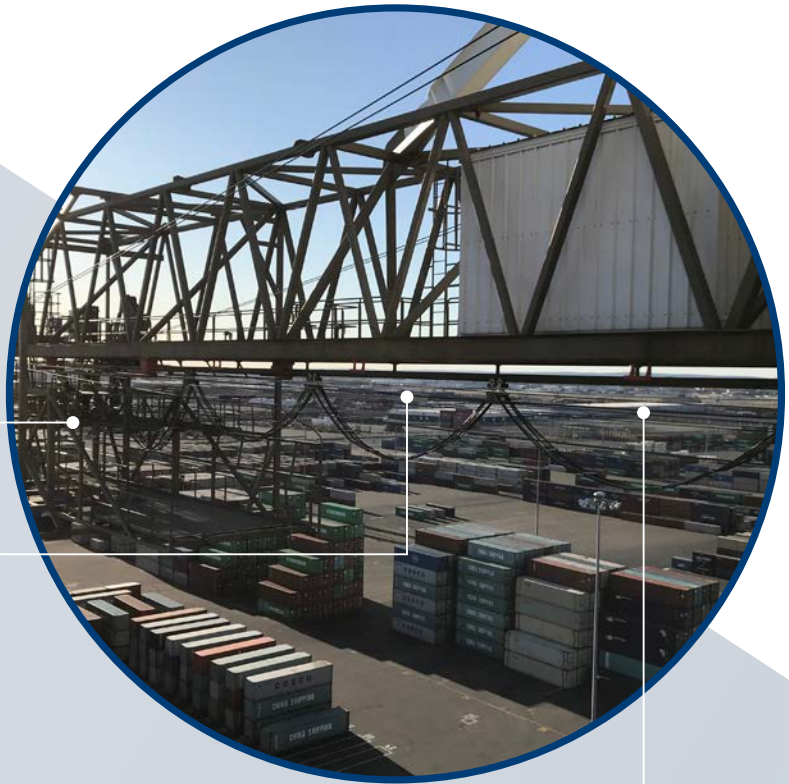
Cable carrier

Elastic rope

Lead clamp carrier

Cable clamp

Cables



# UNIPOLE CONDUCTOR SYSTEMS AND SMGX DATA TRANSMISSION

Ship-to-shore cranes are among the most important technical equipment in the container terminal. They ensure fast handling times and smooth transfers to reach stackers, straddle carriers and AGVs. Nothing works without them. This makes it all the more important to ensure a reliable, safe and continuous supply of power and data to the STS cranes.

Container gantry cranes are predominantly equipped with cable trolleys. For the power supply, VAHLE offers a modular system that has proven itself over many years and can carry various power and data lines individually according to customer requirements.

Alternatively, power and data rails are also used today for the automation of STS cranes. This makes the systems less susceptible to wind and weather, and also allows higher travel speeds. The modern technology ensures a reliable power supply as well as trouble-free and fast transmission of communication, video and control signals. In addition, the entire system can be controlled remotely via a control center.

As a long-standing expert in port technology, VAHLE supplies various components for the power supply, positioning and control of STS cranes.





## YOUR BENEFITS FROM THIS SYSTEM:

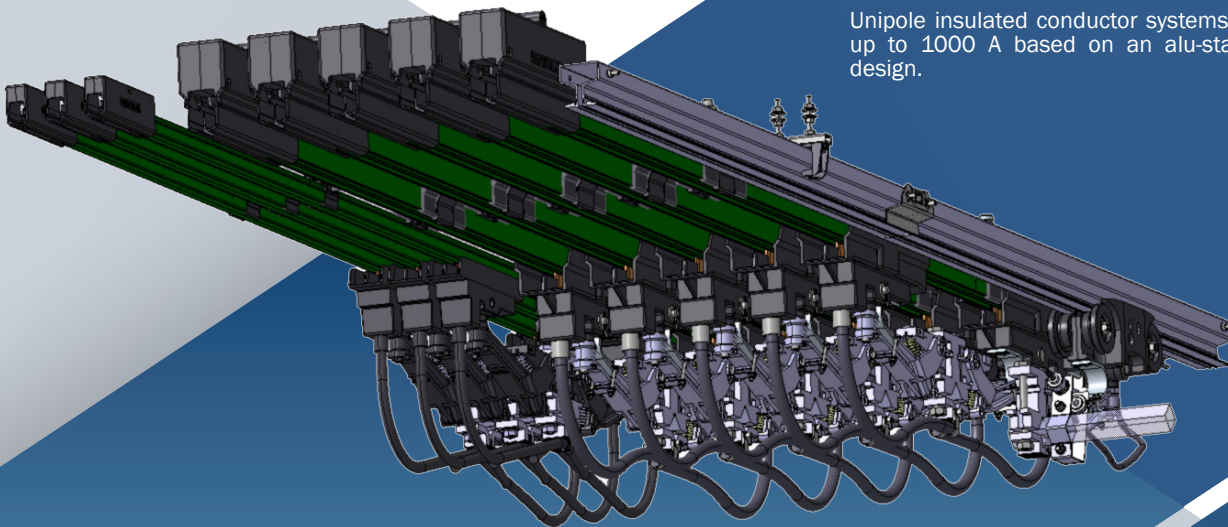
- High trolley speed, up to 300 m/min
- No cable loops, therefore larger container stacking height
- Less weight and therefore more crane load bearing capacity
- Simplified crane construction – no need for the storage area
- Higher degree of operational safety due to fewer moving parts
- No impairment due to wind, frost or salt
- Minimisation of maintenance works thus reduction of operational costs

## SMGX

Waveguide profile designed for an operational frequency of 5 to 5,8 GHz. The extruded aluminium profile with special treatment for harshest environment is the new backbone of flexible data communication for mobile clients.

## CONDUCTOR SYSTEMS

Unipole insulated conductor systems for current up to 1000 A based on an alu-stainless steel design.



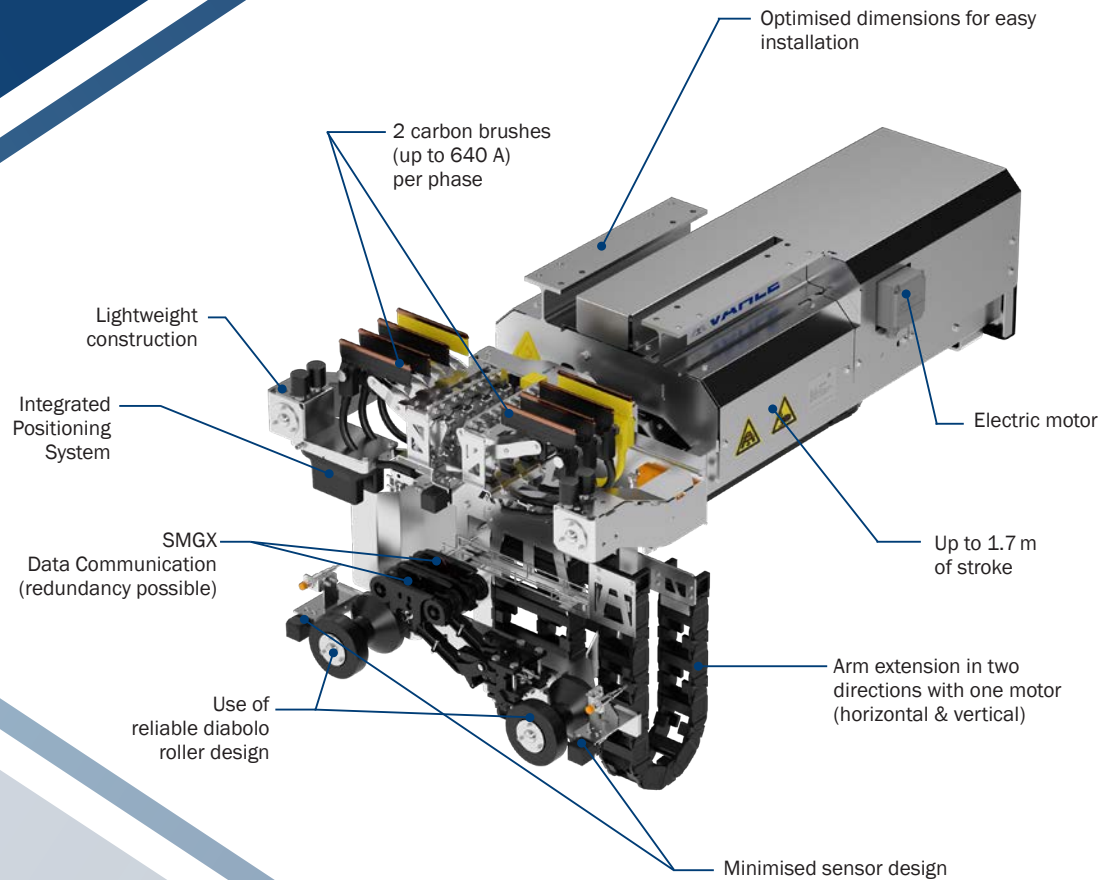


## **eRTG – ELECTRIFICATION OF RUBBER TYRED GANTRY CRANES**

The loading and unloading of ships, the “stopover” of the containers at the port and the distribution by rail and truck – all of this is the logistical feat of modern ports. Any disruption or standstill to this process has large financial impacts.

Vahle has introduced the “e” to the RTG - enabling a more silent, environmental friendly and cost efficient operation of the working horse in ports operation.





The shifting of containers is managed faster, safer and in a more targeted manner – absolutely reliable and from within a remote control room, regardless of the weather. Simply by using the power and data transmission and positioning provided by Vahle.

Green ports are the ports of the future – VAHLE already takes all this into account with the eRTGs:

Noise and CO<sub>2</sub> emissions of diesel powered systems are a thing of the past. The operation of our system with electricity is quiet, effective and ecological.

# ENERGY STORAGE SOLUTION

Right from the beginning of the greenification of ports VAHLE has shown proof of the reduction of CO<sub>2</sub> emissions while electrifying the diesel RTG to an eRTG. Until now the diesel engine had to be turned on for an aisle change.

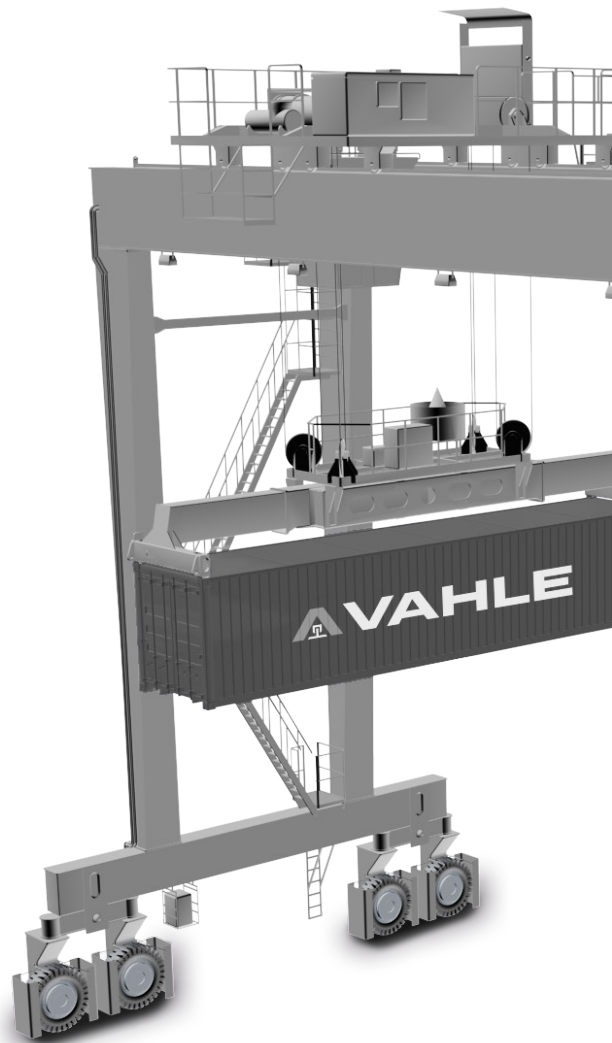
These days are now over and you could completely get rid of all generator and diesel tanks on your RTG.

The VAHLE eRTG is electrified with the proven VAHLE equipment like the conductor systems, the telescopic arm and current collector trolley. Furthermore a battery pack is added to enable the eRTG to change the container stack running under battery power.

## BATTERY TECHNOLOGY

Lithium-ion battery technology presents itself as a very suitable basis for the application of high-performing storage systems.

In the exact selection of specified requirements were close partnerships with cell manufactures established.



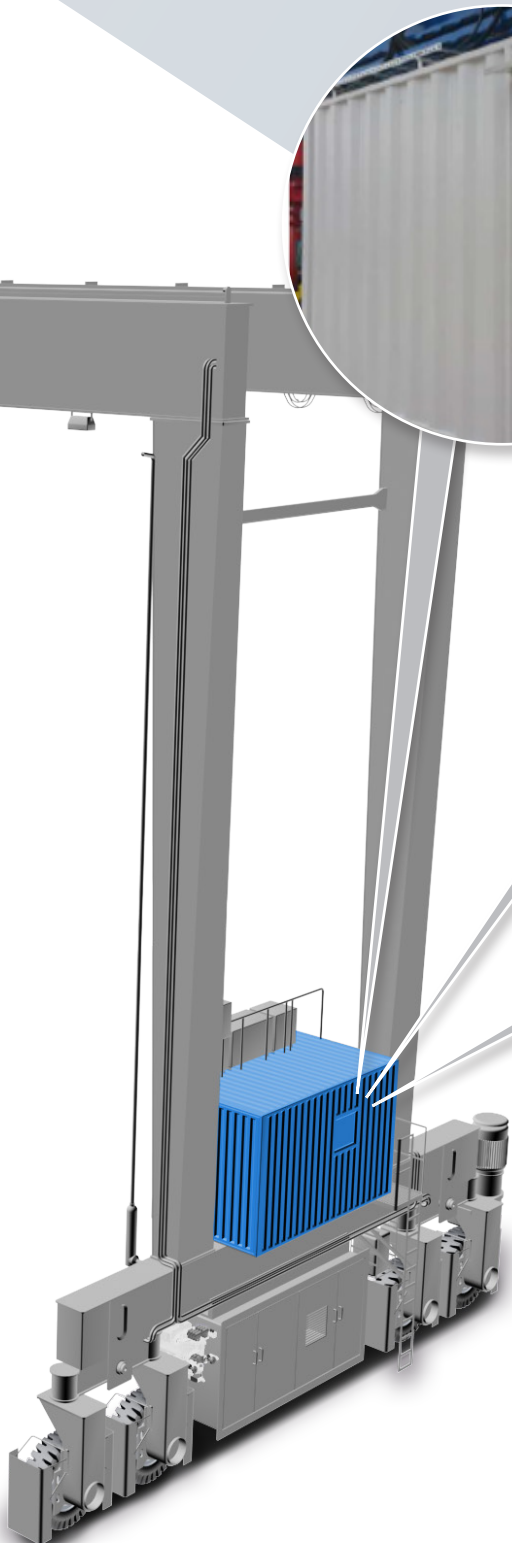
## ADVANTAGES OF 100% ELECTRIFIED ERTG

- Zero emissions
- No dependence on oil price fluctuation
- Easy spare part management
- Zero handling interruptions
- Automation ready



## Energy Storage Technology (LiFeP04)

- VAHLE customized modular energy storages
- Peak load management (operational cost savings)
- Power oscillation damping
- Voltage support and control
- Black start capabilities



### MOBILE ENERGY STORAGE ON THE RTG

Battery storage system replaces the generator on the RTG. Batteries get charged during the operation in the conductor system.

- Generator gets redundant, therefore no CO<sub>2</sub> emission and fuel consumption of the RTG
- Saving maintenance cost
- Saving expensive load peaks, which can be reduced by the batteries



## SERVICE & SUPPORT

### WE DEVELOP TAILORMADE SOLUTIONS FOR YOUR PORT

The successful range of VAHLE systems is complemented by a comprehensive range of services tailored to meet our customers' requirements, including

- System design
- Project management
- Commissioning
- Engineering
- Installation supervising
- After-sales service
- Product training courses
- Maintenance packages

We will be glad to apply our expertise to develop specific solutions for your company. Give us a call and arrange for a appointment to learn more about VAHLE systems and services to meet your requirements.

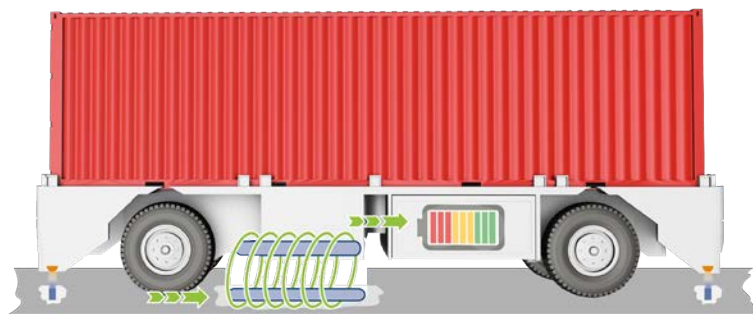


# CHARGING OF HORIZONTAL TRANSPORTATION

By incorporating an intelligent battery management system the state of charge to the batteries is continually monitored and regulated to both provide the AGV motive power when required and to minimise levels of battery discharge when the AGV is stationary thus maximising battery life. The method of transferring the electric power from the grid to the transport vehicles provides an almost invisible integration of our charging system into the port's infrastructure.

VAHLE's solutions offer two ways of charging without interfering the existing infrastructure:

- Inductive / contactless high power charging
- Charging by Charging Station



## INDUCTIVE CHARGING

Technologies enable:

- fuel saving
- higher availability
- extend of battery lifecycle

and a reduction of downtime compared to conventional charging.



# CHARGING STATION FOR HORIZONTAL TRANSPORTATION

## FEATURES

### Compact size

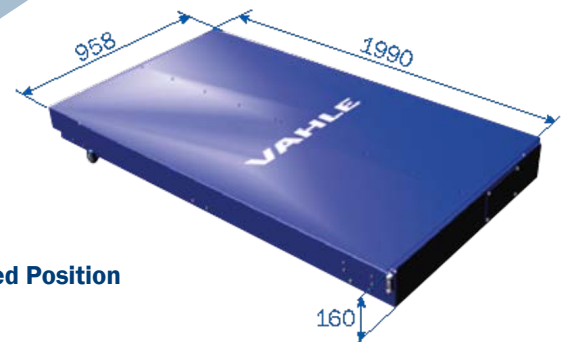
- width < 960 mm
- height < 160 mm (retracted position)

### Large positioning tolerances

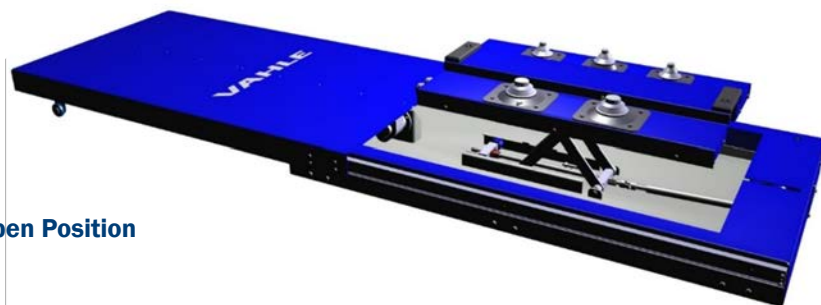
- up to 200 mm laterally & in travel direction
- up to 300 mm lifting height

### Self-regulating contact pressure

- Protective cover against harshest weather conditions
- Corrosion-resistant charging contacts
- Based on VAHLEs long-standing charging contact experience



Closed Position



Open Position



Extended Position



# CHARGING CONTROL

## FEATURES

**CCS compliant HP charging up to 920 VDC & 175 KW**

**No intervention to the charger/vehicle-communication**

### **Comfortable control cabinet**

- LCD touch panel
- Sensor-controlled monitoring of all functions
- Redundant safety concept via current sensors
- Driver Friendly

**Safe guidance by optical display elements**

**Equipment protection by guiding tubes**



# MOTOR DRIVEN CABLE REELS

The current modernisation of port installations and the increasing handling performance result in ever higher energy demands. For the power supply systems, this means larger cable cross-sections and higher voltages, higher travel speeds and acceleration values.

Today, flexible 20 kV high-voltage cables with fibre optical cores are used as energy carriers for such power supplies, which are managed under normal operation by cable reels. Apart from the high-voltage cables for longitudinal travel, additional cables are frequently used for control, communication or data transmission. Additionally, cable reels are used for the vertical operation of spreaders, magnets, grabbers etc.







### **THE FOLLOWING COMPONENTS ENSURE TROUBLE-FREE OPERATION:**

- Reel body for monospiral and multi-layer drum
- cable winding
- Drive with variable frequency technology ensures
- constant cable tension which protects the cable
- Slipping body installed in heatable enclosure for
- corrosion protection
- Guide roller assembly with tight and slack cable
- monitoring for defined cable deposit





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A stylized world map composed of a grid of dots, with the Vahle logo placed over the North American continent.

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