

We move your business!



Energy & Data Transmission Systems

Solutions for RTG Electrification



Ports & Container Applications



1. *STS* | Ship to Shore Cranes
2. *RTG* | Rubber Tyred Gantry Crane
3. *RMG* | Rail Mounted Gantry Crane
4. Intermodal Cranes
5. Shore Power Supply (E-Shore)

RTG | Rubber Tyred Gantry Crane




- RTG are the main solution for moving containers in terminal yards worldwide
- RTG represent significant part of the total fuel consumption in a port (more than 50%)

Economical

Fuel saving concepts

- Conventional RTG's are not very fuel efficient
- Fuel consumption examples:



Conventional RTG	Ecological RTG	Hybrid RTG	Electrified RTG's
21 l/h	13 l/h	8 l/h	about 40 kWh/h

- Solutions:
 - Intelligent Generators can save up to 50% of fuel costs
 - Intelligent port planning and efficient RTG operation reduce costs
 - **Electrification – fuel and maintenance cost reduction + low emissions**

Economical

Diesel vs. Electric

Diesel



Cost/Liter:	\$ 1.00 US
10 container moves/hour =	20 Liters
Cost/hour:	\$ 20.00 US
Cost/year:	\$ 120,000 US

Electric



Cost/kWh:	\$ 0.17 US
10 container moves/hour =	40 kW
Cost/hour:	\$ 6,80 US
Cost/year:	\$ 40,800 US

- Electrification produces significant **cost savings for energy of up to 65%**.
- Additional savings for the reduction in maintenance costs associated with diesel generators:
 - Typical numbers for Maintenance cost per operating hours: 5-6 €/h
- Electrification with attractive Return of Investment (ROI)

E-RTG Solutions

Motorized Cable Reel Solutions

- ✓ MAG Drive
- ✓ Smart Drive
- ✓ CAP – Cable Auto Plug *

* launched in June 2018

Conductor Rail Solutions

- ✓ Plug-In
- ✓ Drive-In-P
- ✓ Drive-In-L

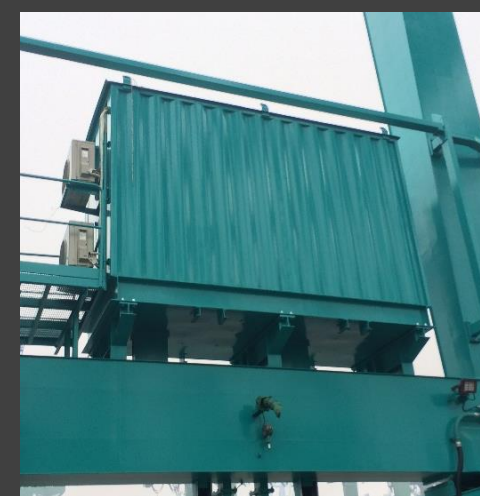
Hybrid Solution

- ✓ Hybrid with a small genset and a big battery pack

Zero Emission Solutions

- ✓ FE-RTG
- BE-RTG *
- FBE-RTG *

* Concept design



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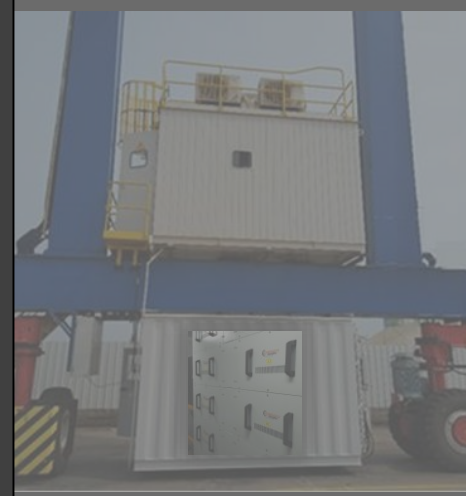
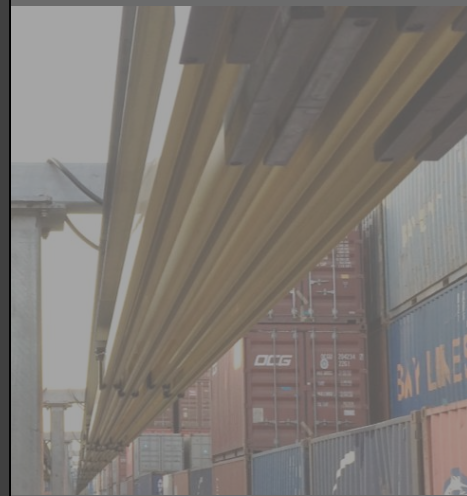
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Motorized Cable Reel Solution

- More than **400 units** ordered since 2006
- About **175,000 m system length** supplied
- Up to 400 m reeling length = up to **800 m** operating length
- Up to **135 m/min** of max operating speed



Motorized Cable Reel Solution

MAG Drive



- **Permanent magnet couplers**
- Magnetic pull control
 - For automatic applications
- Easy to wire and to control
 - Safety for the staff
 - Safety for the cable

SMART Drive



- **Frequency converter**
- Electronic tension control
- For automatic applications
- For very fast acceleration and for long travel distances
- Fully integrated control program

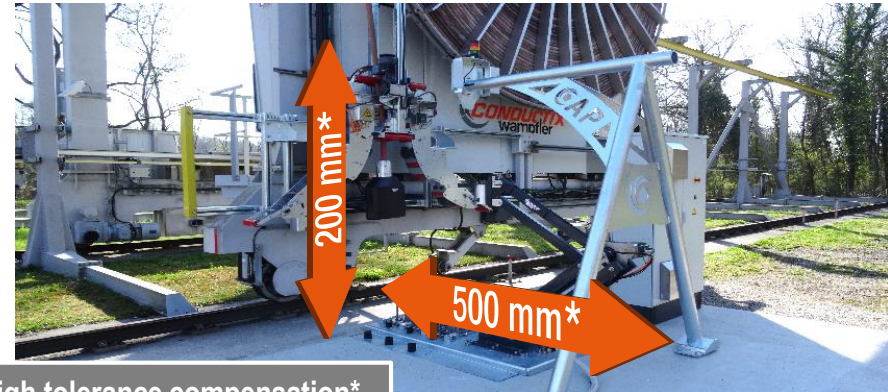
CAP – Cable Auto Plug



- **with SMART Drive only**
- automatic connection via robotic arm
- Plug handling by guiding device
- Cable strain relief integrated in plug
- No additional installation on the crane
- Up to 3 sockets in parallel (3 E-RTGs per block)

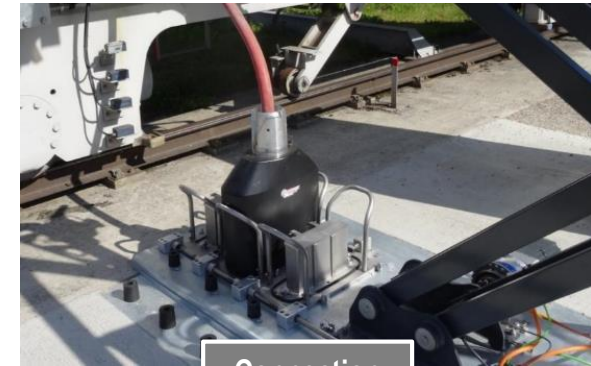
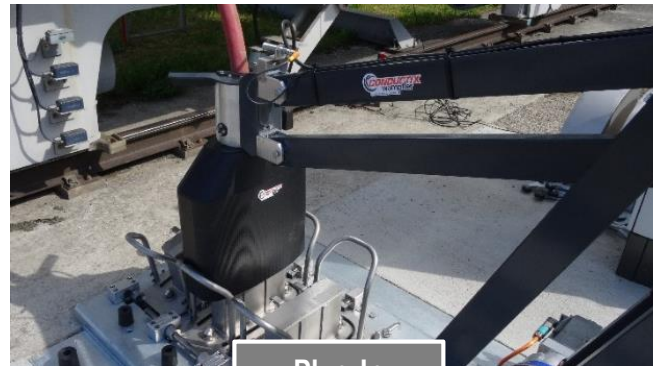
CAP - Function

1. Positioning



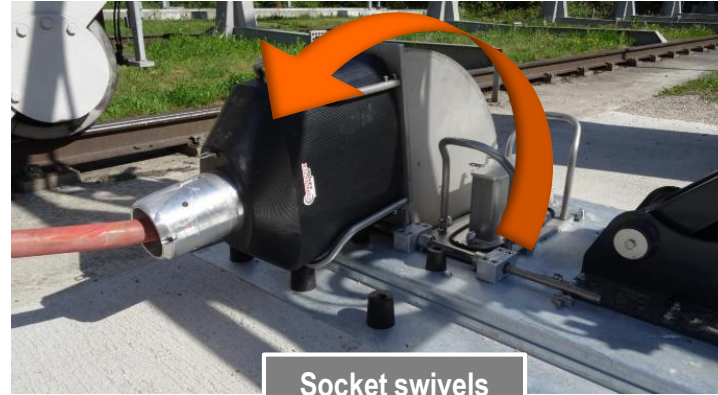
Auto-Stop-Positioning and high tolerance compensation*

2. Automated Plug-In



CAP - Function

3. Start of Operation



4. Operation



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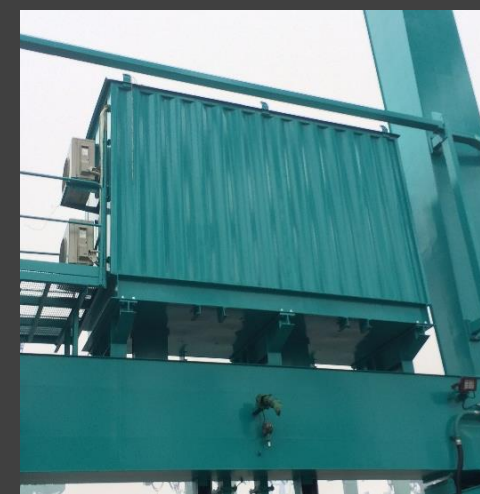
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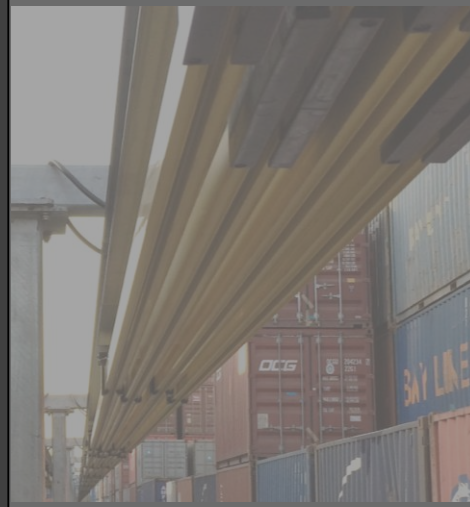
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Hybrid Solution H-RTG



Battery housing mounted under sill beam



Battery modules inside the housing



Small diesel genset mounted under sill beam

- Equipped with a big battery pack powering all movements
- Small size Genset to charge the battery when needed (e.g. 100kW)
- Hybrid power pack connected to the DC/DC bus

Hybrid Solution H-RTG

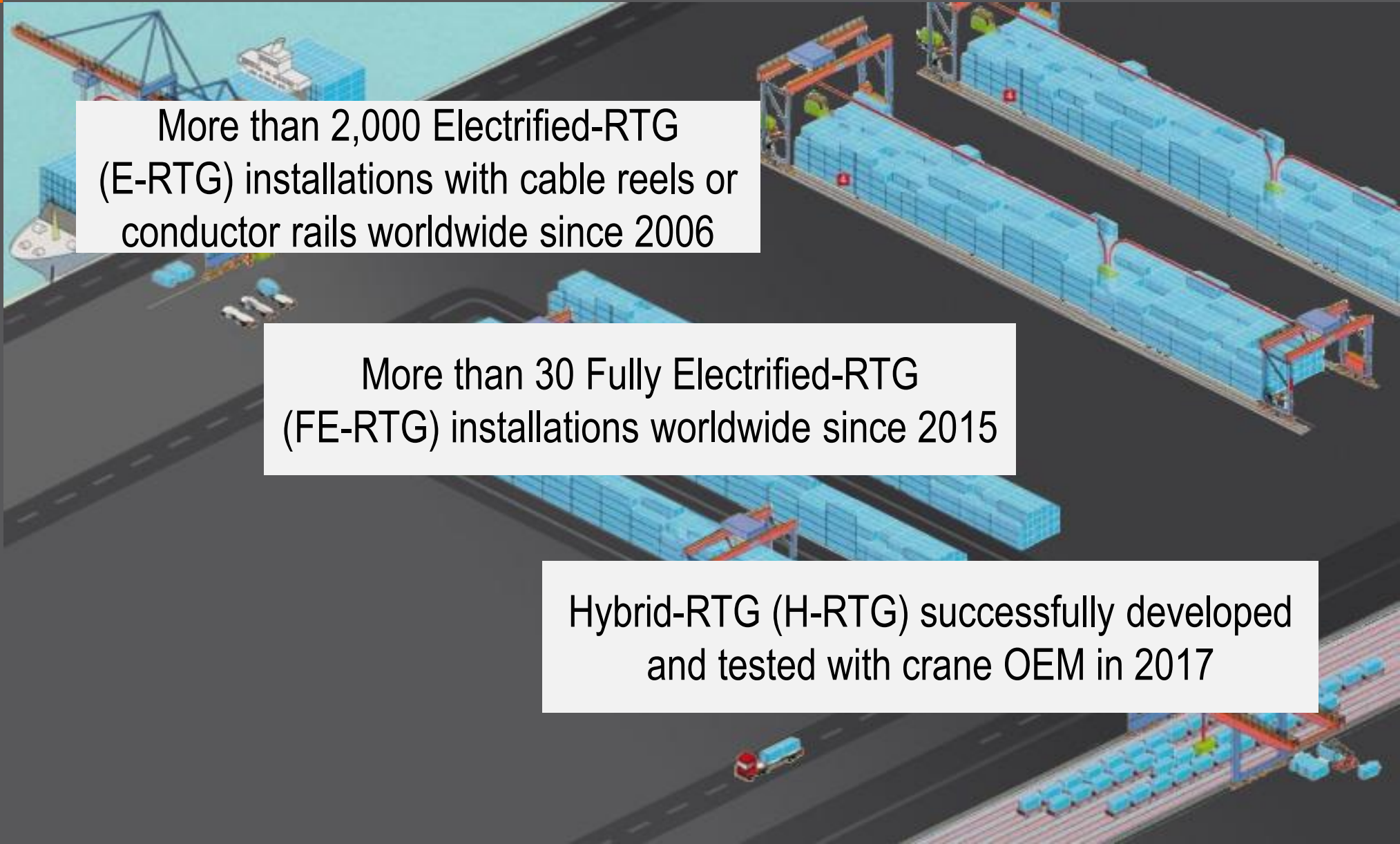
- Battery pack supports more than 30 container moves without recharging
- Regenerative energy during container lowering is fully utilized to charge the battery
- Up to 60% fuel saving compared with conventional genset
- Less Refueling operations
- Reduce maintenance cost
- Reduce considerably the environmental impact (CO₂, NO_x, SO_x, particulates + noise)
- RTG maintains full operational flexibility (e.g. block changes), no changes in operation
- Independent from power grid
- No yard infrastructure is necessary

CXW = E-RTG market leader

More than 2,000 Electrified-RTG (E-RTG) installations with cable reels or conductor rails worldwide since 2006

More than 30 Fully Electrified-RTG (FE-RTG) installations worldwide since 2015

Hybrid-RTG (H-RTG) successfully developed and tested with crane OEM in 2017



Conductix-Wampfler E-RTG solution around the world



References

- Drive-In L
- Drive-In P
- Plug-In
- Cable Reel
- Hybrid RTG

We add the “E” to your RTG

Thank you for your attention !

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