SmartCarbon

Wear detection

Current Collector

No waste of material & less frequent replacement

- Precise detection of defined wear limit.
- Carbon strip completely used.
- Dynamic replacement interval saving up to 50% of material.

No waste of material & less frequent replacement

- Lightweight solution (<400g),
- Compact design.
- Easy to integrate on existing fleets.

No more strip thickness measurement on the roof

- Alert chosen at customizable wear level.
- Alert sent to location defined by customer.
- Saving up to 7h of train maintenance per year per pantograph.
- Extending maintenance intervals.

Technical characteristics	
Power supply	No external source required (internal battery)
Additional power bank (option)	12VDC external battery
Communication	Wireless communication protocol BLE type
Analog / Digital inputs	2 x isolated digital inputs
Storage	Flash 512kb
Protection Class	IP65
Specific peripherals (options)	1 x PT1000 input measurement 6 axis accelerometers Internal temperature and HR measurement

Contact:

PanTrac GmbH
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Arc Protection Design

Winter strip

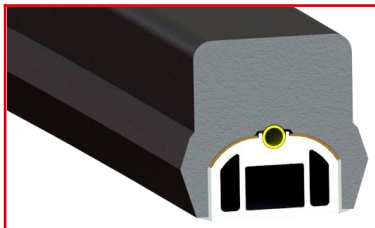
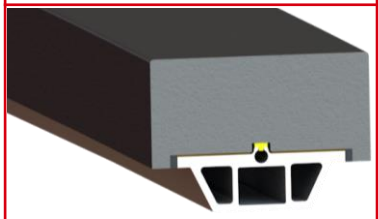
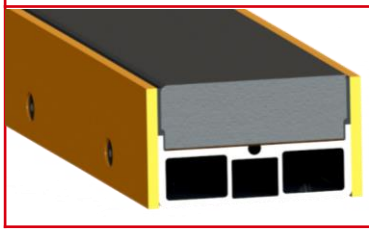
Current Collector

Protection against damage caused by arcing

- Carbon strip replaced less frequently
- Up to 3x higher strip lifetime during sever winter service

Less delamination risk

- Aluminum carrier fully covered by carbon.
- Increased bonding section between carbon and aluminium carrier

	Technical characteristics	
	Value	**Advantage**
	• For AC networks • Dimensionaly compatible with standard designs	• Longest lifetime in winter conditions due to best arcing protection • Robust ADD system (independent)
	• For DC networks • Applicable for dimensionally compatible CCCs on similar carrier	• Best LCC • High level of arcing protection
	• For AC and DC networks with different widths • Applicable for almost all CCC designs	• Very robust design • Increased mechanical stiffness
	• For AC and DC networks with different widths • For rectangular carriers	• Carbon chipping protection • Smooth catenary contact

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TRCC

Modular TRCC

Third Rail Current Collector

One flexible solution for all platforms

- 4 standard solutions to cover 95% of networks.
- Adaptable length of the insulator and swinging arm.
- Modular interface plate fitting to all plaforms.
- 3 plug and play options.

Less frequent carbon part replacement

- Increased lifetime of shoe by 33%.

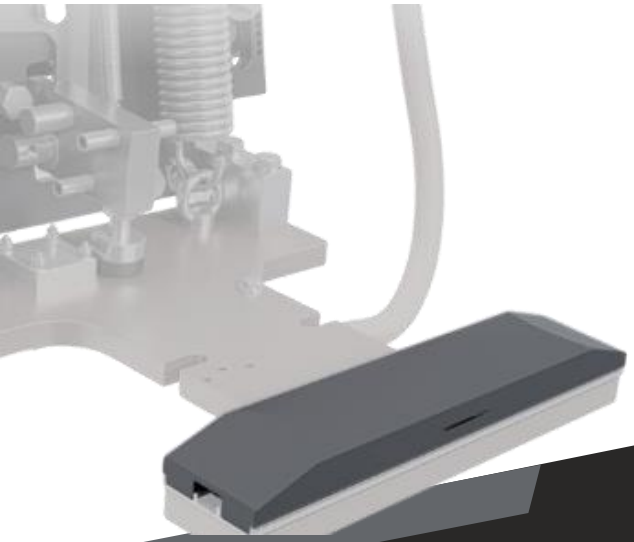
Reduced time-to-market

- Technical proposal ready within 1 month from the demand.

Easy maintenance

- Maintenance time divided by 2.
- All replaceable parts easily accesible for quick maintenance.

	Technical characteristics	
	Value	**Advantage**
Voltage	1500VDC	Maximum voltage level of most TRCC projects
Nominal current	1100A	Standard value for carbon collector shoes
Contact force	120N +-24N	Standard value for carbon collector shoes
Collector shoe material	Copper impregnated carbon	increased wear height from 15mm to 20mm
Working Range	Third rail gap 230mm	Matching bogie dynamic movements
	Standard working position 170mm	
	Latched position 125mm	
S&V	EN 61373 cat2	Standard for bogie mounted equipment
Fire safety	EN 45545 HL2	Most common hazard level With changes to fuse box also HL3 possible
Weak link breakage energy	300J to 500J	limiting damages to bogie frame without risk of fatigue breaking in normal train operation
IP protection	IP65	Standard protection degree of most TRCC projects
Weight	Current Collector 10,6kg	Low weight for easy handling



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GRU O.N.E

Compatible GRU

Ground Return Unit

Easy maintenance

- From 25-min maintenance to 5-min per GRU.
- No need to replace the brushes.
- Very low wear rate of 1 to 2mm per 100,000 km.
- Product lifetime superior to 10 years.
- Easy dismounting with only one standard tool.

Reduction in unsprung mass

- Increased reliability and lifetime of the axle box thanks to reduction in unsprung mass.

Flexible solution

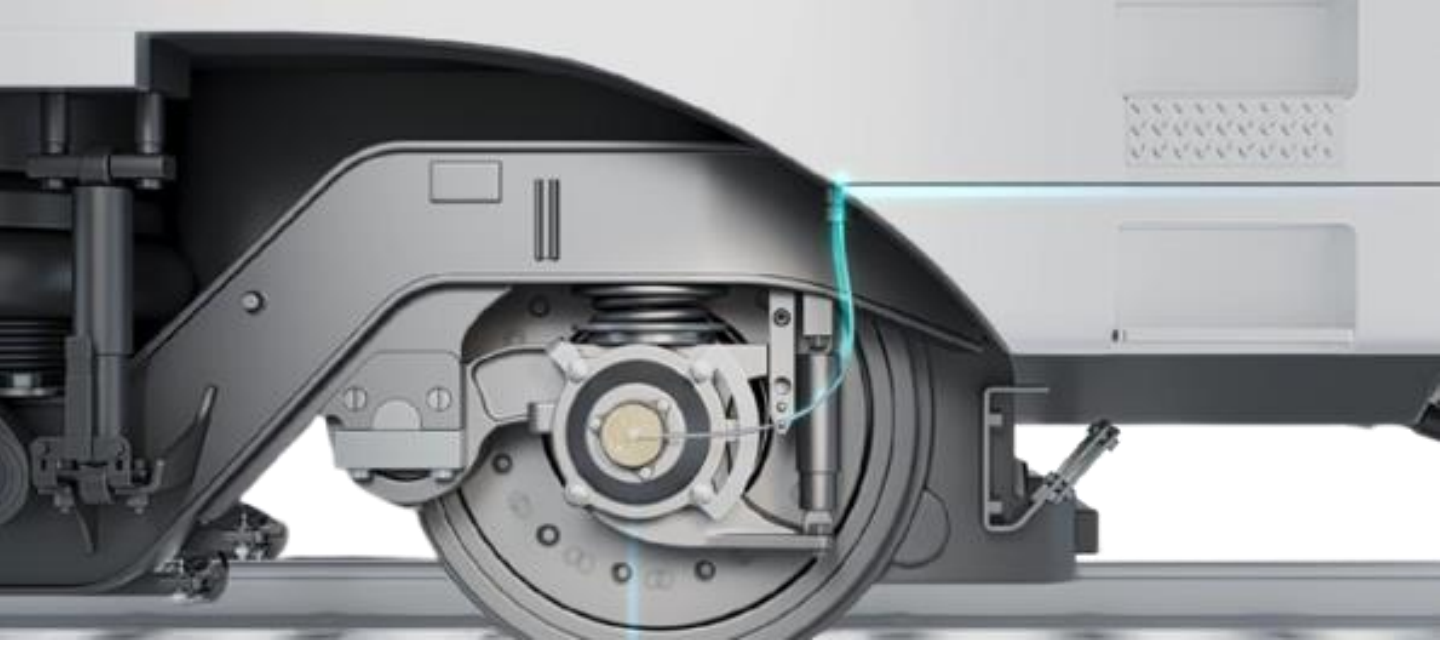
- Upgradable with 3 plug-and play options.

Lightest solution on the market

- 30% less weight vs lightest solutions on the market.
- 2 kg per unit (without contact disc).

Standard solution compatible with most interfaces

- Standardized solution with two possible fixations.
- Possibility to adapt the number of brushes according to current requirements.
- Contact disc adaptable to all bogie interfaces.
- Easy to retrofit on existing fleets.



	Technical characteristics	
	Value	Advantage
Max. permanent current	600 A	Same as standard
IP protection	IP66	Same as standard
EN standard	IEC 61373 cat3 v2010	Conforme to standard
Short circuit resistance	AC/DC 40kA – 20ms	Conforme to customer requirements
Fire & Smoke standard	EN 45545-2 : HL3 R24	Conforme to customer requirements
Weight	≈2,1 kg (without contact disc)	30% saving compared to standard device

Contact:

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No load changeover switch

High current performance

Electro-mechanical switch

Light and compact solution for traction convertors

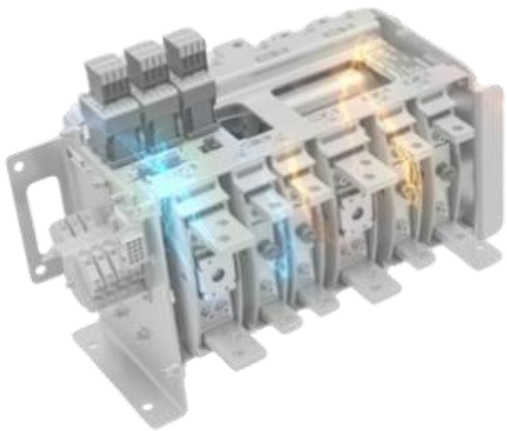
- 20% more compact than previous high current switch.
- 16kg weight reduction.

Effective transmission of high current

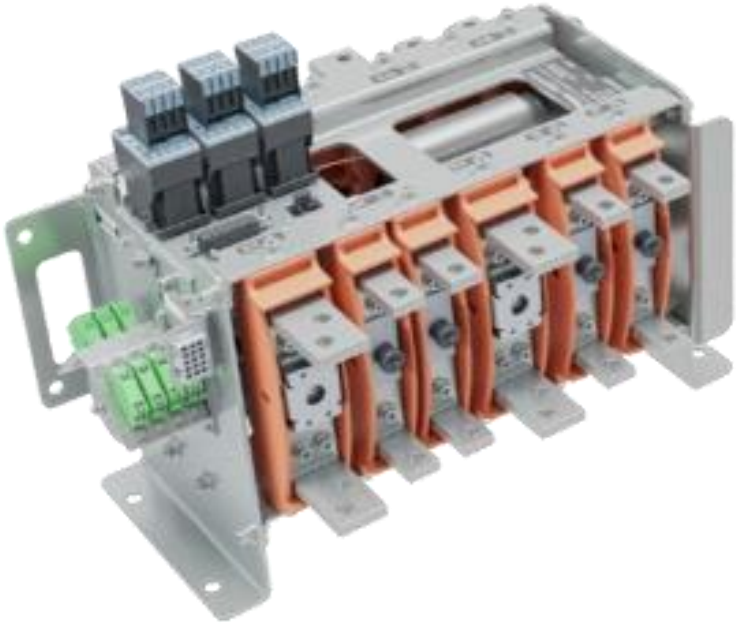
- 100% increase current capacity (up to 2200A).
- 66% higher short circuit current value together with 10x higher withstand time.
- From 15,65 kA/20ms to up to 26kA/200ms in short-circuit withstand current.

Carbon footprint reduction

- 60kg CO2eq carbon footprint reduction.



Technical characteristics	
Descriptions	**Parameters**
EN Standard	EN 60077-1, -2
Nominal voltage	Up to 3 kV
Nominal current per pole	Up to 2,200 A
Short circuit resistance	48kA$_{peak}$, 26kA/200ms
Pollution degree	PD2
Overvoltage degree	OV2, OV3
Number of positions	From 1 to 10
Control voltage	(24, 64, 72) 110 V DC or according to request



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