

paxos

HIGH POWER CHARGING SYSTEM BY PAXOS

17TH OCTOBER 2019



OVERVIEW



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ABOUT PAXOS

Who we are



- › Founded in 2015
- › ~ 30 Employees
- › Located in NRW - Germany

What we do



- › Strong Experience in Technical Development (Engineering, Consulting, Project Management, Training)
 - › Automotive
 - › Energy
 - › Industries & Automation

What makes us different



- › Strong experience + Creativity → Innovation
 - › We have registered more than 40 patents since 2015
- › We are different from conviction, passion and experience!

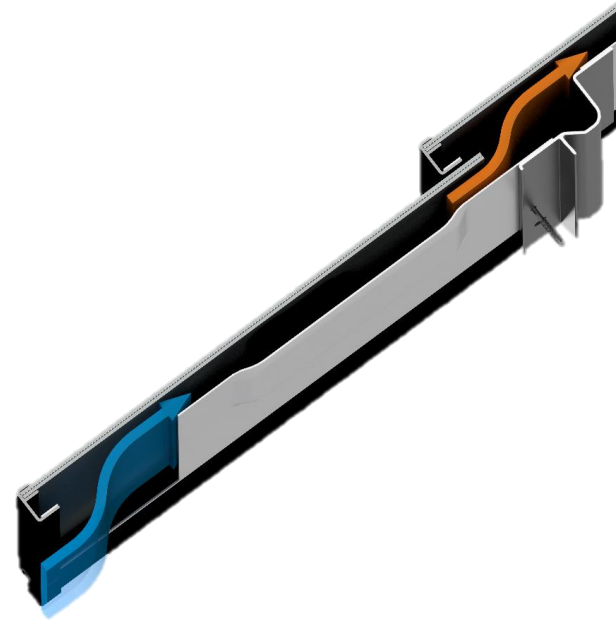
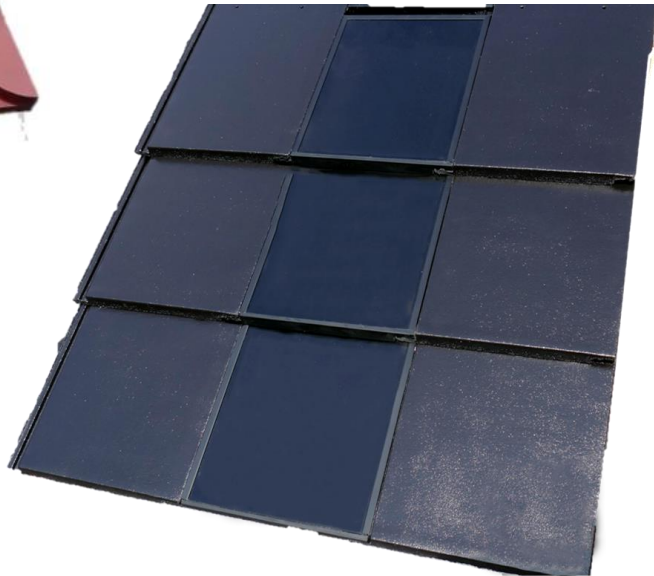


SOLAR ROOF TILE (AIR COOLED)

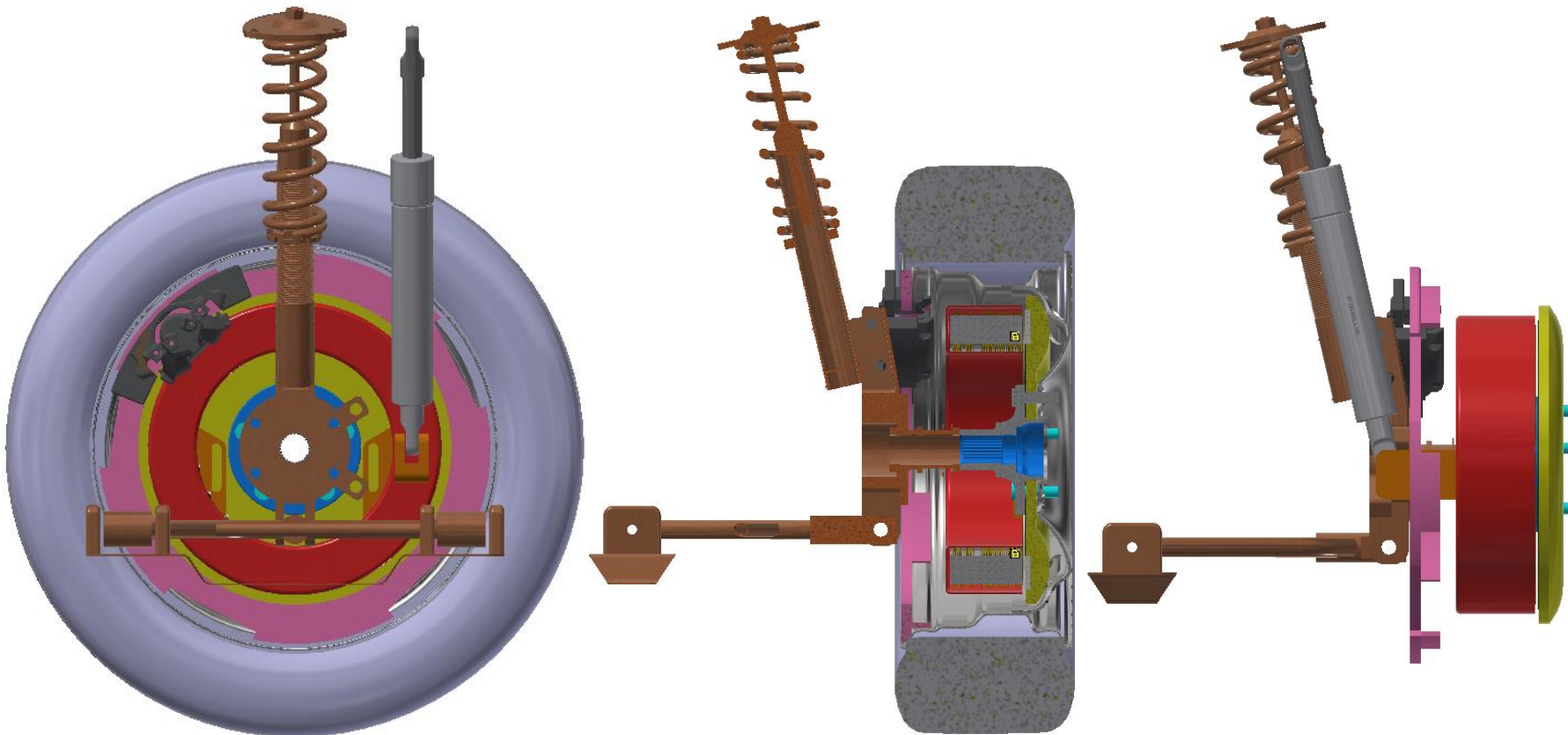
Traditional style – Air cooled



Modern style – Air cooled

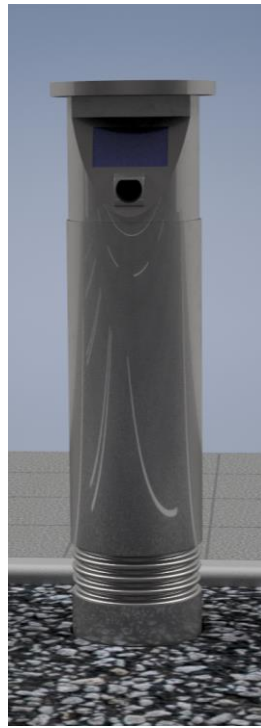


WHEEL HUB MOTOR (ULTRA LOW UNSPRUNG MASS)





SMALL CHARGING STATION (CRASH SAFE)



PROBLEMS OF CURRENT SOLUTIONS

› Contact area based on standard Pin- & Socket-Systems

- › Axial connector system
 - › **Low current** due to small contact area
 - › **High insertion force** due to necessary pressure between contacts
- › Cumbersome insertion-withdrawal operation - also only one insert position

CHAdeMO



[1]

CCS Combo HPC



[2]

„COOL-LOAD MEGAWATT“

- › **Similar Dimensions, Weight, Flexibility** compared to conventional refuelling systems



Low insertion & detachment Force
whereas contact force stays the same

- › Insertion force: 0 N (user exertion)
- › High contact force due to mechanical assistant
- › Safe connection due to visible light response on plug and force- and form-fit locking

„COOL-LOAD MEGAWATT“

- › Radial connector system leads to **large contact area**
- › **Contact protection** with cover of poles
 - › PE- and Data-Contacts will connect first
 - › Automated disabling of protection cover while insertion of plug
- › **High pressure** between plug and socket contacts due to mechanical assistant system in socket
- › **Active cooling** of all electrical components (active battery cooling enabled)
- › **High charge rate** (>3000 kW)

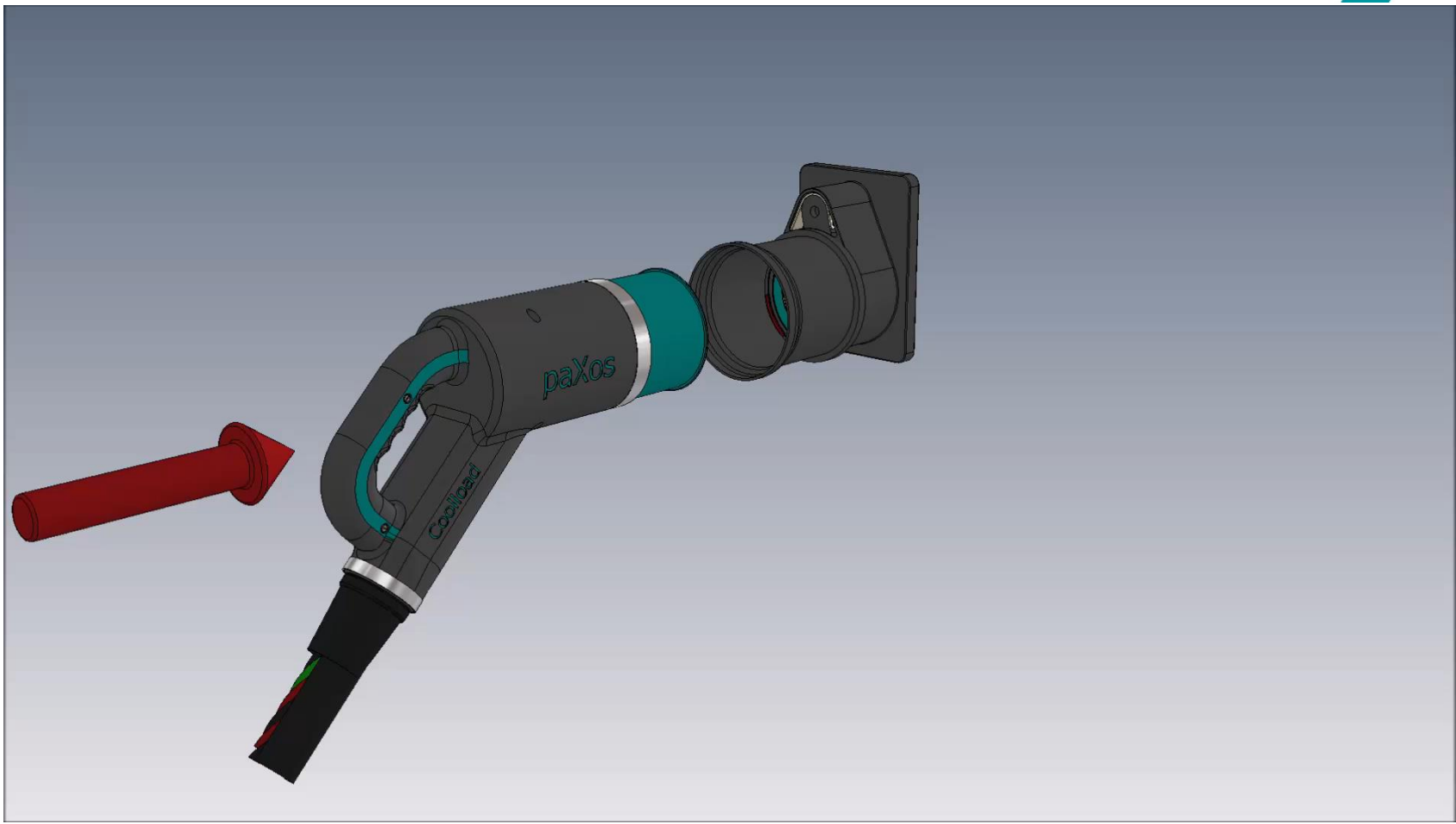




TECHNICAL FUNCTION OF THE INSERTION PROCESS

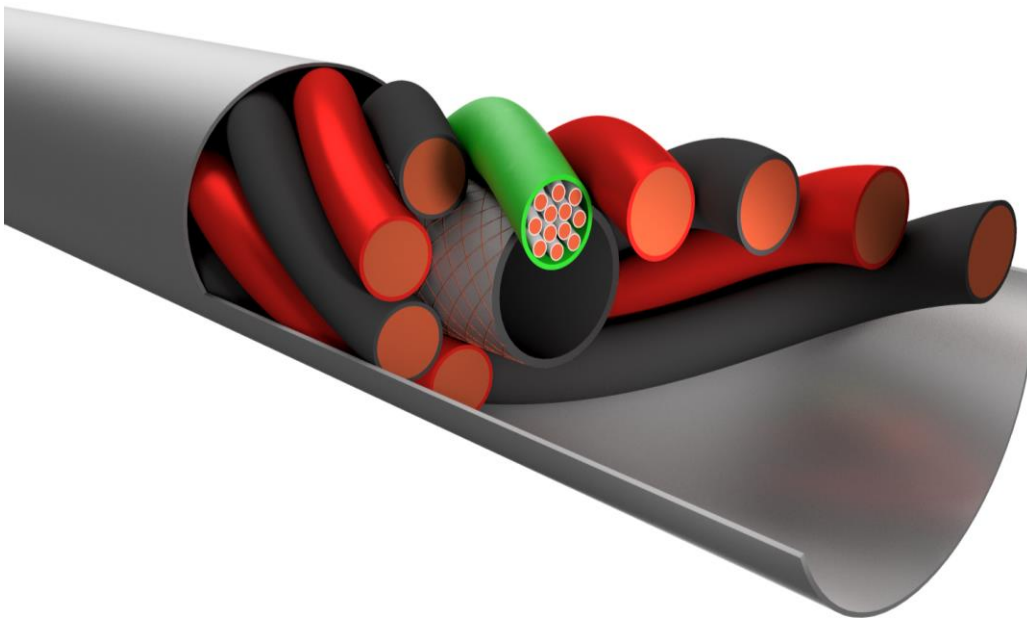
- › Independent insertion position due to radial connector
- › Conical inlet nozzle for easy positioning
- › **3-step connection process**
 1. Contact with PE- and Data-contacts in inlet nozzle
 - › Protection Cover snaps in at the same time
 - › Visible light feedback for user
 2. Automated mechanical insertion
 - › protection cover is pushed back till end-stop of protection cover is reached
 3. Mechanical closing of the power contacts
 - › Visible light feedback for user

ANIMATION OF INSERTION PROCESS



CABLE SPECIFICATIONS

- › Plus- and Minus-Power line is stranded alternating around forward pipe to achieve higher flexibility



Cable Specifications (3 MW)

power lines:	8 x 35 mm ²
PE cable:	1 x 35 mm ²
Data cables:	12 x 1 mm ²

Fluid pipe specifications:

Forward pipe:	226 mm ²
Return pipe:	225 mm ²

ADVANTAGES OF CHARGE SYSTEM „COOL-LOAD MEGAWATT“

	CCS Combo 2 „HPC“	paXos Charger
Power	500 kW	> 3000 kW
Current	500 A (Phoenix Contact)	> 3000 A
Contact area	~ 500 mm²	4250 mm²
Contact Current density	0.7 – 1 A/mm²	< 1 A/mm²
Cable diameter / lenght	35 mm / 5 m	35 - 55 mm / 4 - 6 m
Cable Current density	10 A/mm²	10 - 20 A/mm²
Cooling	Cable and Contacts	Cabel, Contacts and Battery
Cooling System	600 W / 1-2 bar	> 13 kW / 4-6 bar
IP Protection	IP 54 connected	IP 6 (connected/disconnected)
Insertion Force	100 N (user exertion)	0 N (user exertion)
Safe connection	No	Latch in socket (100 N)
Safe disconnection	No	Switch on Charger

NEXT STEPS

- › Finding Partners to co-invest in further development and to shorten the development timeframe
- › Kick-Off Silicone-Tooling for next prototype phase (functional samples)
- › Build Prototypes
- › Functional Testing
- › ...
- › Certified Product, Market Launch



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**THANK YOU VERY MUCH
FOR YOUR ATTENTION**

ANY QUESTIONS?

www.paxos.gmbh

