



国家电网
STATE GRID

南瑞集团有限公司
NARI GROUP CORPORATION



CHAdeMO

ChaoJi

面向未来的新一代充电方案

A Unified Future-Oriented Charging Programme



倪峰
能源行业电动汽车充电设施标委会 副秘书长
南瑞集团国际部 副主任

NI Feng

Deputy Secretary General,
EV Infrastructure Standardization Committee of Energy Industry
Depute director of International department, NARI group



今津 知也
日本CHAdeMO协会技术委员会主席
东京电力研究院副总经理

Tomoya IMAZU

Chair,

CHAdeMO technical committee

Deputy General Manager,

((e-Mobility Group,) Resource Aggregation Office,) TEPCO Research Institute

Objective of ChaoJi 设计目标



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CHAdemo



E 解决现有问题
Enhancement of existing solutions



R 适应未来技术发展
Ready for future technologies



A 引入新的应用
Adoption of new applications



T 灵活紧凑设计
Tremendously compact designs



H 引领标准统一
Harmonization

Components 构成



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控制及导引电路
Control & pilot circuit

通信协议
Communication protocol

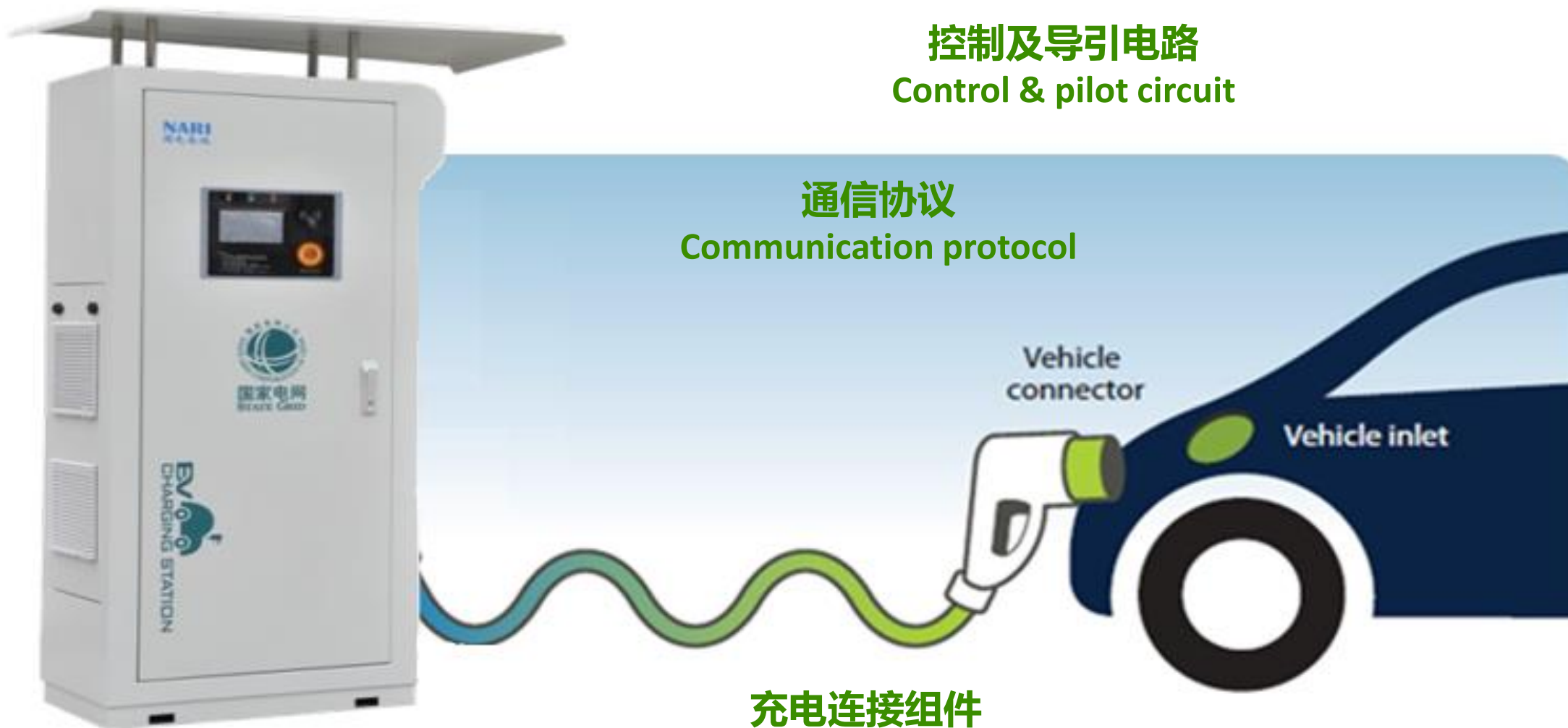
Vehicle
connector

Vehicle inlet

热管理
Thermal
management

充电连接组件
Charging connection assembly

充电系统安全
Charging system safety



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T 灵活紧凑设计
Remarkably compact designs

Major Parameter 主要参数



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最大电压

U_{max}

1000 (1500) V



最大电流

I_{max}

600A

with **cooling** system



最大功率

P_{max}

500 (900) kW

充电5分钟，行驶400公里 Charge 5 minutes for 400 km drive



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Key technological breakthroughs 关键技术突破

Liquid-cooled Cable Technology (600A) 冷却技术



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Cable diameter (conductor size)

Without liquid-cooling

With liquid-cooling

Charging current 充电电流

150A:

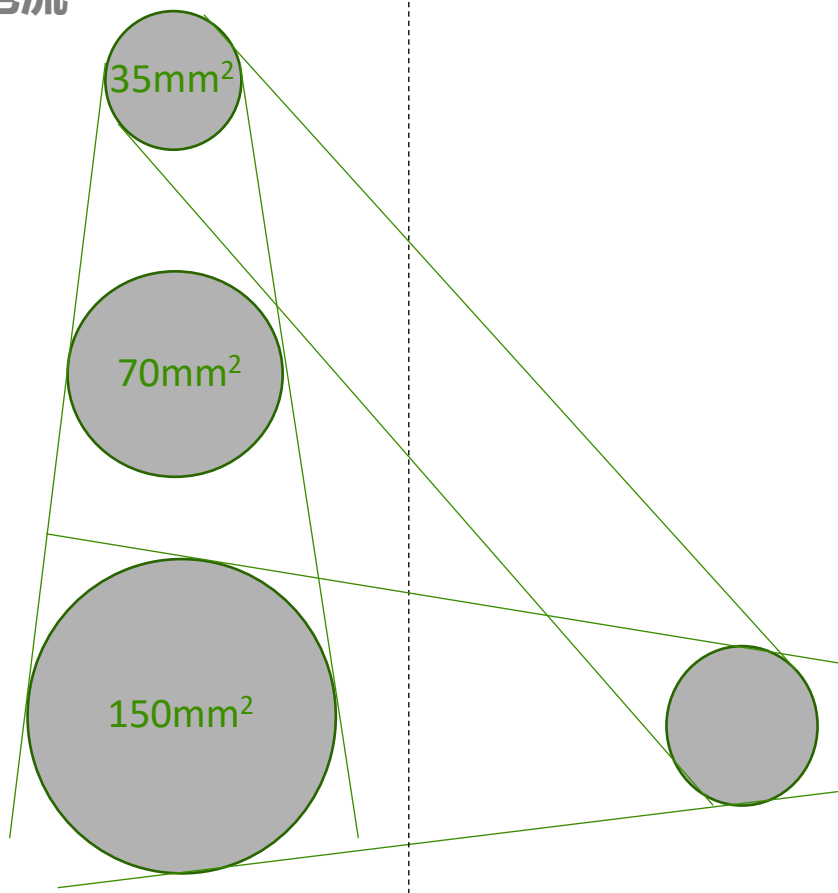
35mm²

250A:

70mm²

400A:

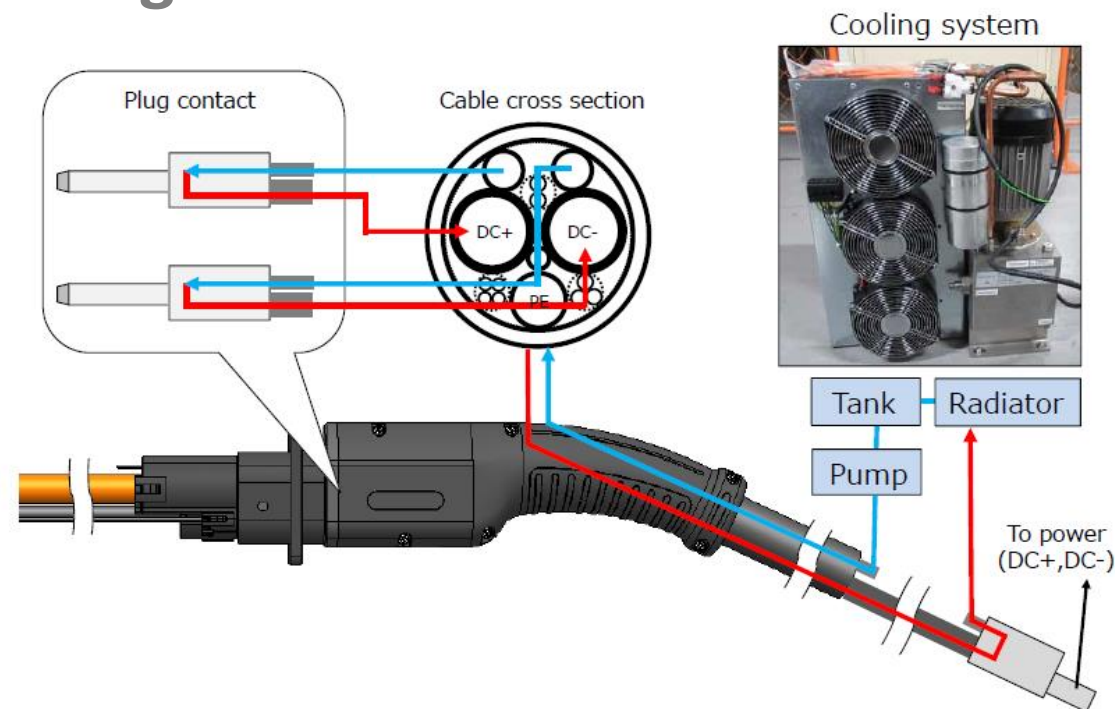
150mm²



600A



‘Thin and light cable.’
细和轻电缆



Compact Design 紧凑设计



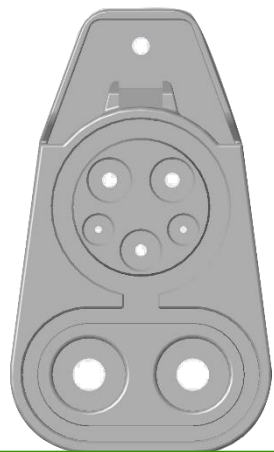
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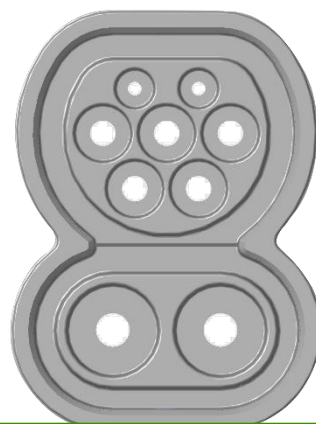


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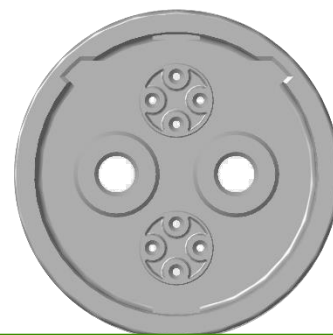
CCS1



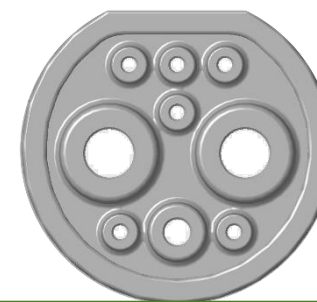
CCS2



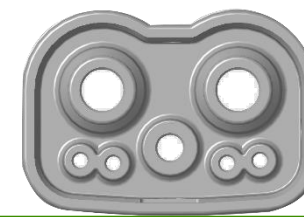
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GB/T 2015



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Flexible Arrangement 灵活布置设计



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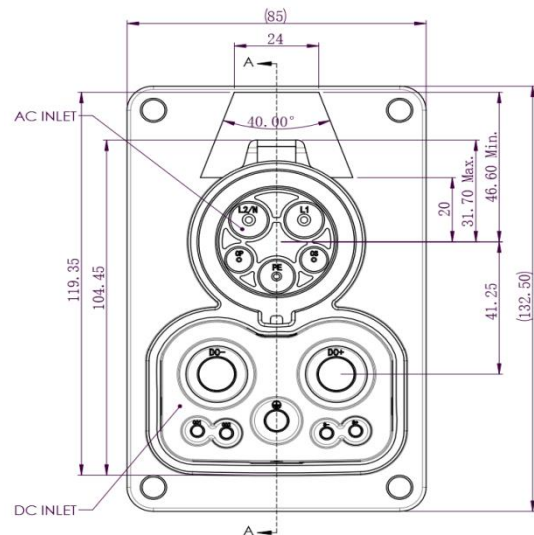
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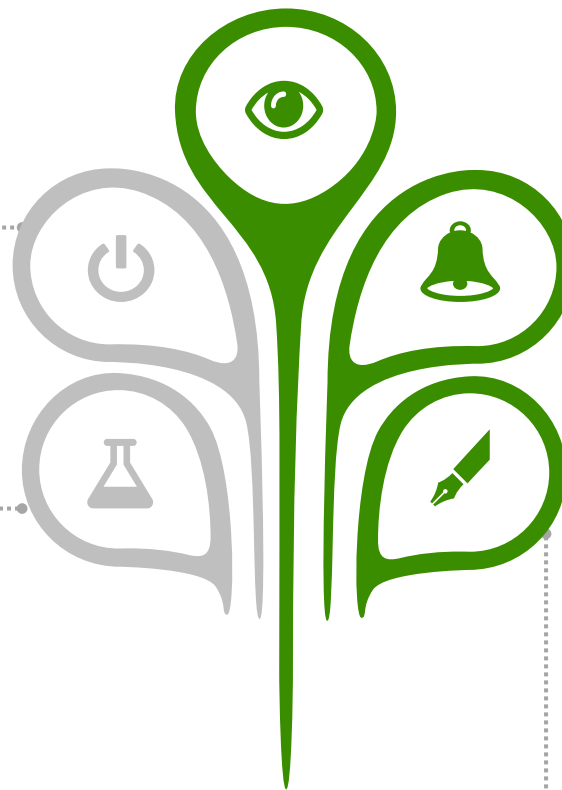
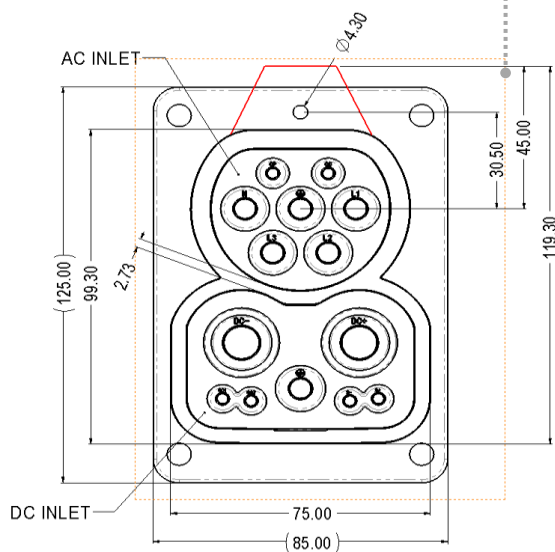
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ChaoJi+
TYPE1 combo



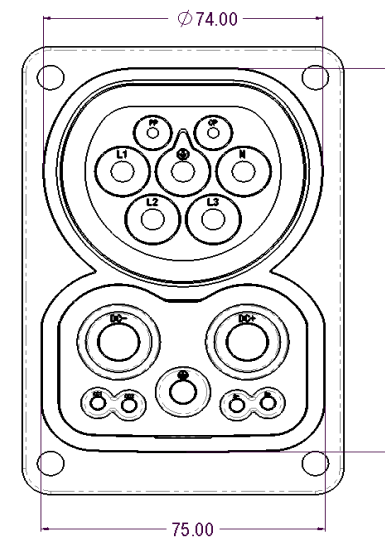
ChaoJi+
GB combo



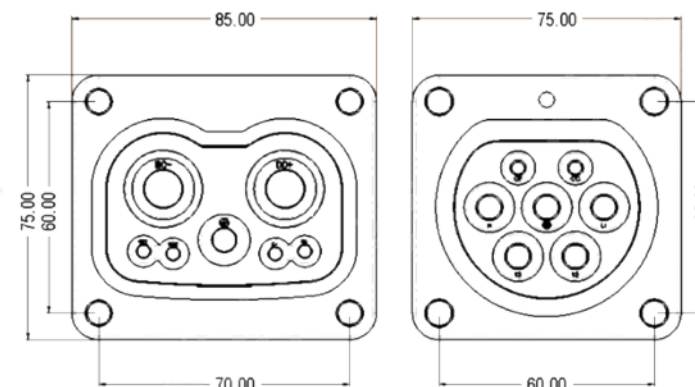
ChaoJi

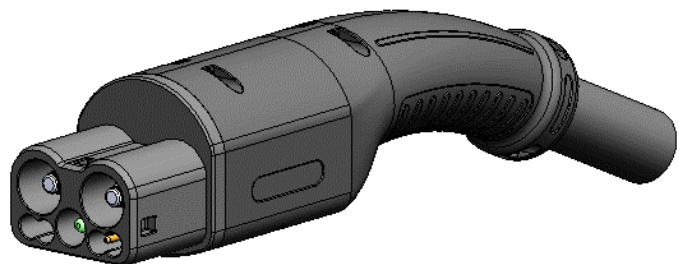


ChaoJi+TYPE2 combo



ChaoJi+AC (GB, Type 1, Type2)



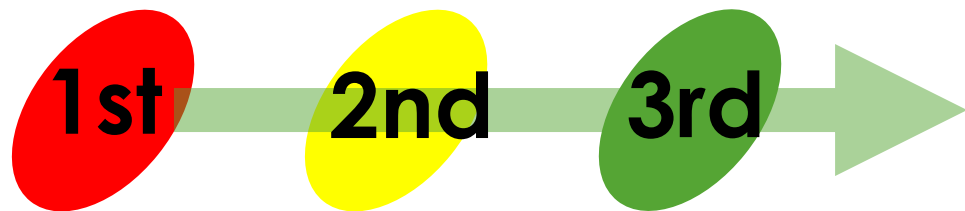


Strong connector **强度高**



Compliance with international standards

符合国际安全标准



Multi-level protection **多重**安全防护

'Human safety is the first priority.'

生命第一

'Drivers can always feel safe with ChaoJi charging.'

ChaoJi充电让车主安心出行

Mechanical Strength Tests in Japan

日本机械强度测试



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跌落测试 Drop test



没有明显损坏(PA66-GF25)
No significant damage

耐环境评估

Environmental resistant evaluation by SEI

Item	Evaluation Method	Require Performance
1	IP degrees for ingress of objects with mating condition Water spray test is done with Specified IP degree condition. If there is no problem in high-pressure washing test, this test may be omitted.	1)Appearance; No deformation, No breakage 2)Insulation resistance; >100MΩ 3)Dielectric withstand; No damage 4)Leakage current; <0.5mA
2	Dew point test Leave connector in 5°C×4hr condition, then put it into humidity thermostatic chamber (humidity:93%, temp.:32°C) within 1min.	1)No unusual behavior 2) Insulation resistance; >100MΩ 3)No damage
3	Air tightness Apply air pressure 10kPa × 30sec, when depth of connector from the water surface is about 100mm. Without air leakage, add 10kPa step by step.	No air leakage until 50kPa

Item	Evaluation Method	Require Performance
7	Salt water spray Spray the salt water, 5%concentration, PH5.5~7.2, 25°C, for 2 hr. Then leave connector in humidity thermostatic chamber 40°C, 93%RH, for 22hr. After 4cycles above, leave connector in room temp. for 72hr.	1)Function; Conduction, Insulation resistance, Dielectric withstand, Insert/Withdrawal force 2)Corrosion; No significant corrosion 3)Manner; No breakage after Insert/Withdrawal
8	Thermal shock Apply 1,000cycles of temp. variation. -40 °C × 20min ⇄ 80 °C × 20min	1)Appearance; No deformations, no breakage, which will affect the function 2)Insulation resistance; >100MΩ 3)Dielectric withstand; No damage
9	UV resistant ISO 4892-2 Method A 500h, UL 746C	No cracks or defects

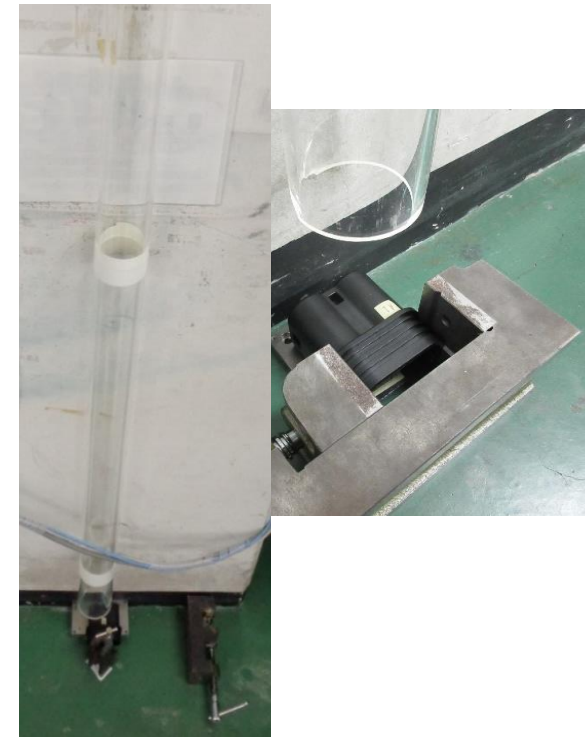
Item	Evaluation Method	Require Performance
4	High-temperature resistance Leave connector in thermostatic chamber (105 °C × 1000hr). Check the sample after return to room temp.	Waterproof confirmation 1)Appearance; No deformation, No breakage 2)Temp. rise; Power terminals: <50K
5	Low-temperature resistance Leave connector in thermostatic chamber (-30 °C × 120hr). Check the sample after return to room temp.	1)Manner; No unusual behavior 2)Temp. rise; Power terminals: <50K
6	Remove connector from inlet those are frozen together a)Charging operation in winter Put the water, in mating condition. Remove connector from inlet, after -40°C × min condition. b)Thawed by hot water Put the water, in mating condition. Put the hot water(95~100°C) for thawing, after -40°C × 30min condition. Check the sample after return to room temp.	1)Manner; No unusual behavior 2)Insulation resistance; >100MΩ 3)Dielectric withstand; No damage

冲击试验

Impact – ball test by JAE

试验装置参考图

Test device for reference



小球下落位置 Ball drop position

No.1



No.2



No.3



Mechanical Strength Tests in China

中国机械强度测试

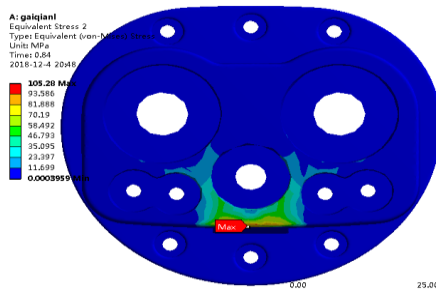
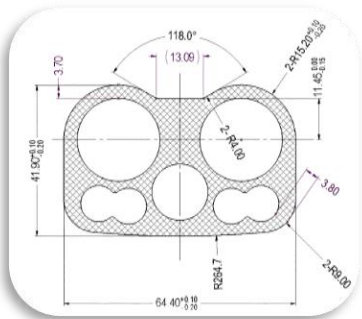
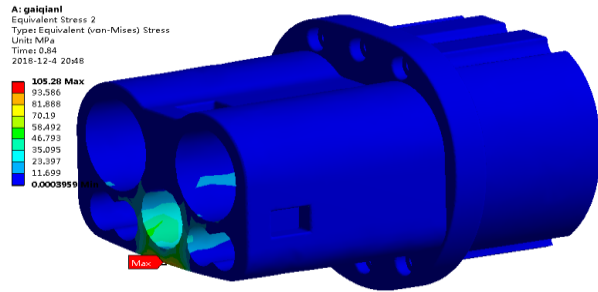


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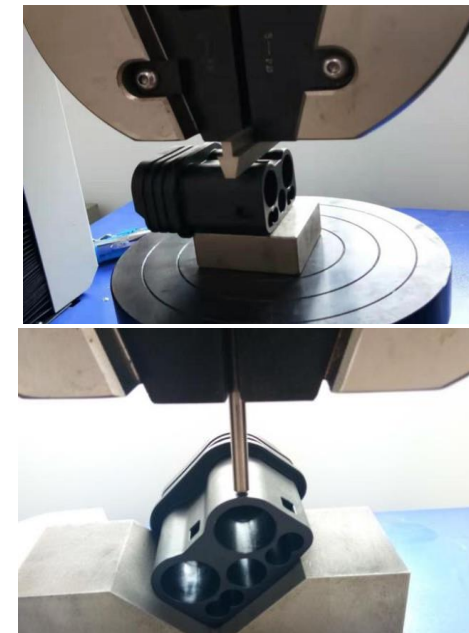
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静力学仿真分析
Statics simulation analysis



碾压试验
Run over ability test



压溃试验
Crushing test



跌落试验
Drop test



冲击试验
Impact-ball test

Mechanical Strength Tests in Japan

日本机械强度测试



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✓ 跌落测试 Drop test (after 80 drops)

ChaoJi

2.0m



轻微变形
Slight wear

1.8m



VS

CHAdEMO



壳体开裂
Shell cracked



等同或超过了目前国际上四个方案的最高机械性能指标

Currently the highest mechanical performance solution

✓ 碾压试验 Run over ability test (Wheel load of 5380N, Speed of (8 ± 2) km/h)

ChaoJi



接口完好
No cracking

VS

CHAdEMO



信号孔部分变形
Signal hole with slight deformation

CCS



接口完好
No cracking

Backward Compatibility 向前兼容



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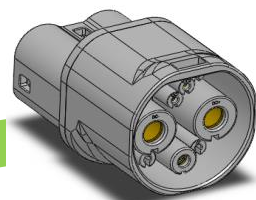


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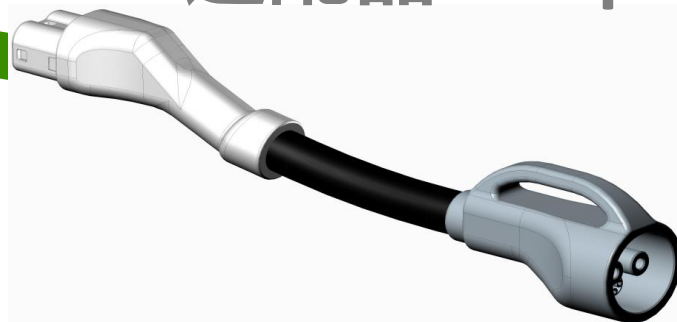
'ChaoJi EVs can be charged with
GB/T, CHAdemo and CCS (Combo) chargers
using a portable adapter.'



ChaoJi EV
电动汽车



适配器 Adapter



GB/T charger
充电桩



CHAdemo/CCS charger
充电桩



CHAdemo



ChaoJi电动汽车可以使用便携式适配器为GB/T,
CHAdemo和CCS (Combo) 充电桩充电

Forward Compatibility 向后兼容

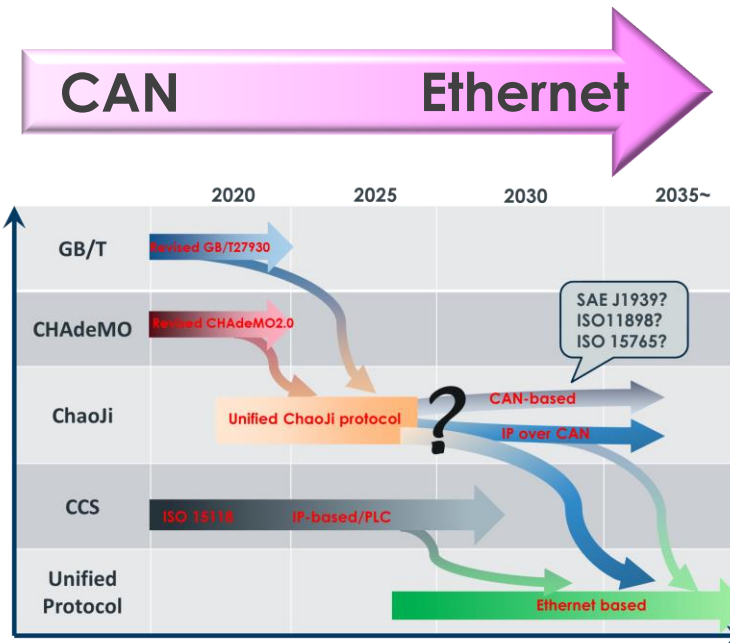
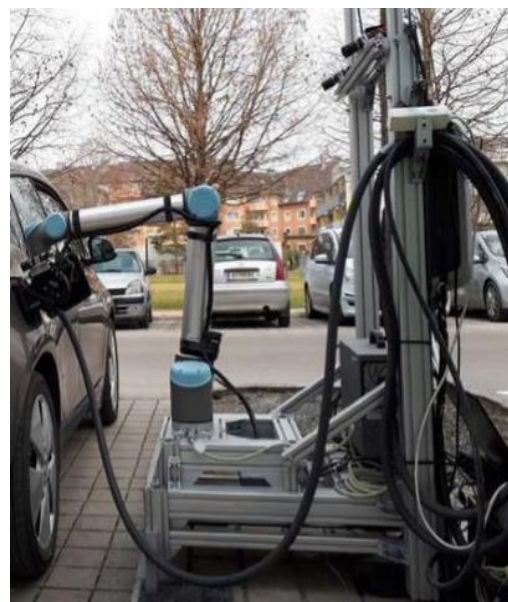
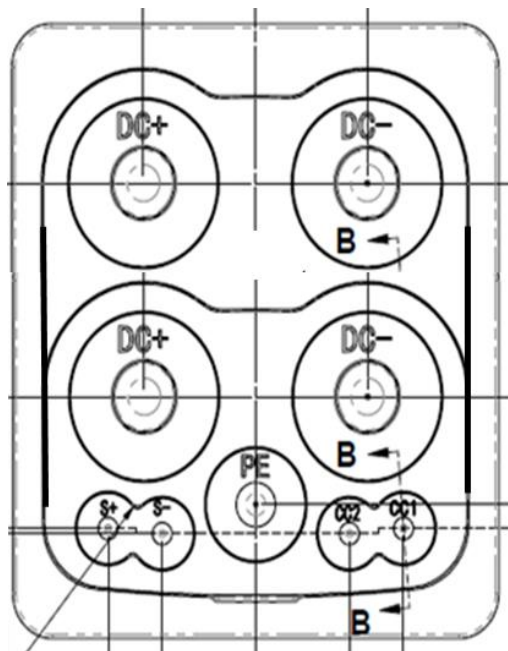


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超大充电功率
Super high power

支持机器自动充电
Support for machine-
assisted charging

支持未来高级通信技术
Advanced communication
technology

面向三网应用
V2X application

ChaoJi Demonstration in China 中国示范工程



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国网公司SGCC

北京 Beijing



南京 Nanjing



济南 Jinan



许昌 Xuchang



星星充电Star Charge

常州 Changzhou



长春 Changchun



奥特迅ATC

深圳 Shenzhen



ChaoJi Demonstration in China 中国示范工程



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示范车企

Demonstration

Automobile Companies

北汽 BAIC



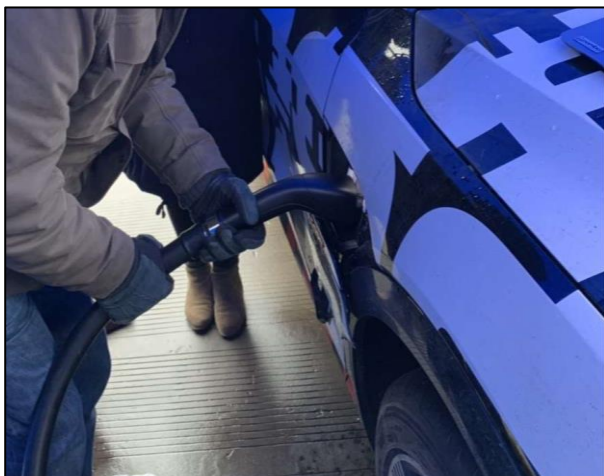
一汽 FAW



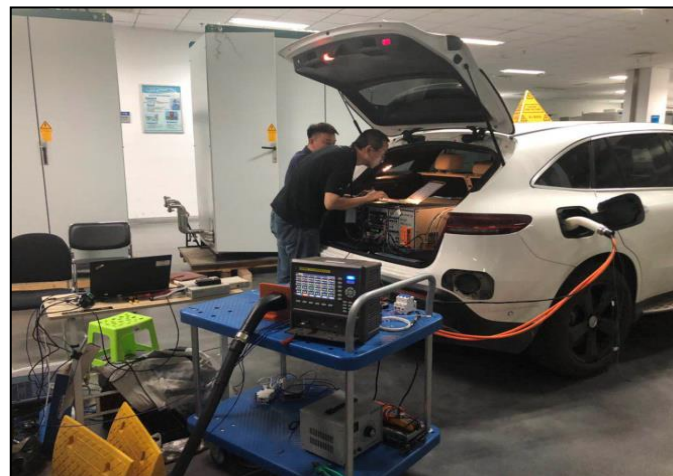
比亚迪 BYD



奥迪 AUDI



戴姆勒 DAIMLER



宝马 BMW



ChaoJi Demonstration in Japan 日本示范工程



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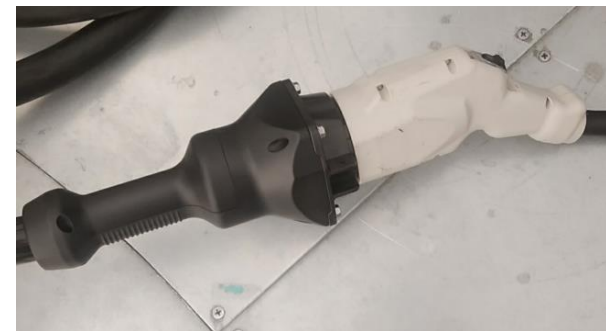
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ChaoJi车辆和模拟器
ChaoJi vehicle & simulator



向后兼容CHAdemo
Backward compatibility with CHAdemo



ChaoJi Demonstration in Japan 日本示范工程



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ChaoJi计划于2021年3月进行现场测试
ChaoJi field test planned for March 2021





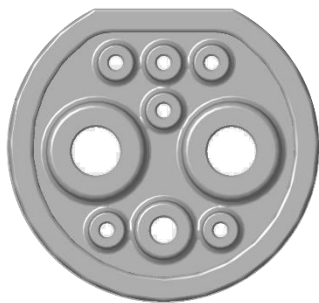
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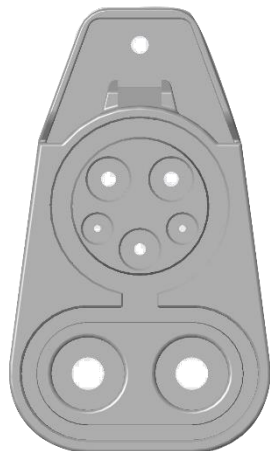


CHAdeMO

GB/T 2015



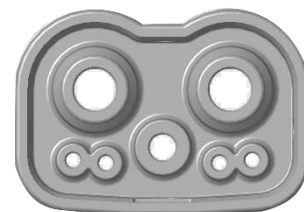
CCS1



中日携手合作共推充电接口国际化

China and Japan work together to promote the internationalization of the charging interface

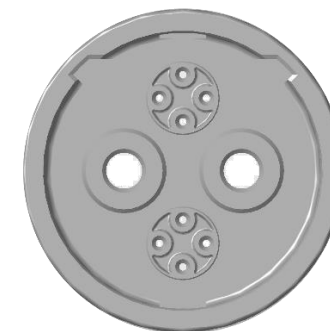
ChaoJi



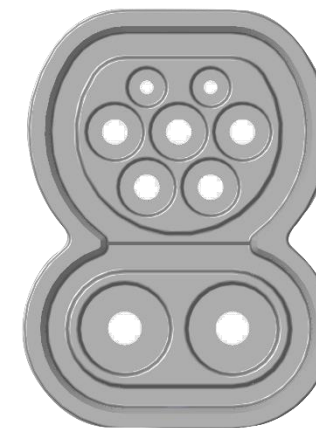
我们希望 ChaoJi 被世界各国接受
成为通用接口

We hope ChaoJi will be accepted by all countries
in the world and become a universal interface

CHAdeMO



CCS2





Thank You!
谢谢!