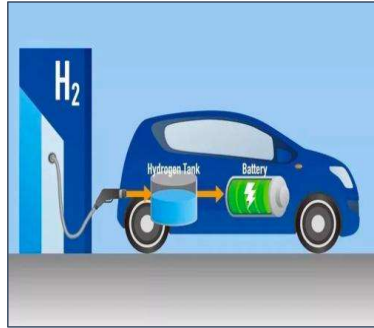




Amphenol Industrial Technology

AIOC EV Market Segments (1/2)



Fuel Cell Vehicle



Electrical ship



Electrical traffic



BEV/PHEV



Electrical fork truck



Electrical Equipment



Battery Swap Electric Vehicle



EV Market Segments (2/2)



E-Heavy truck



E-Construction



E-Light logistics vehicle



E-Bus



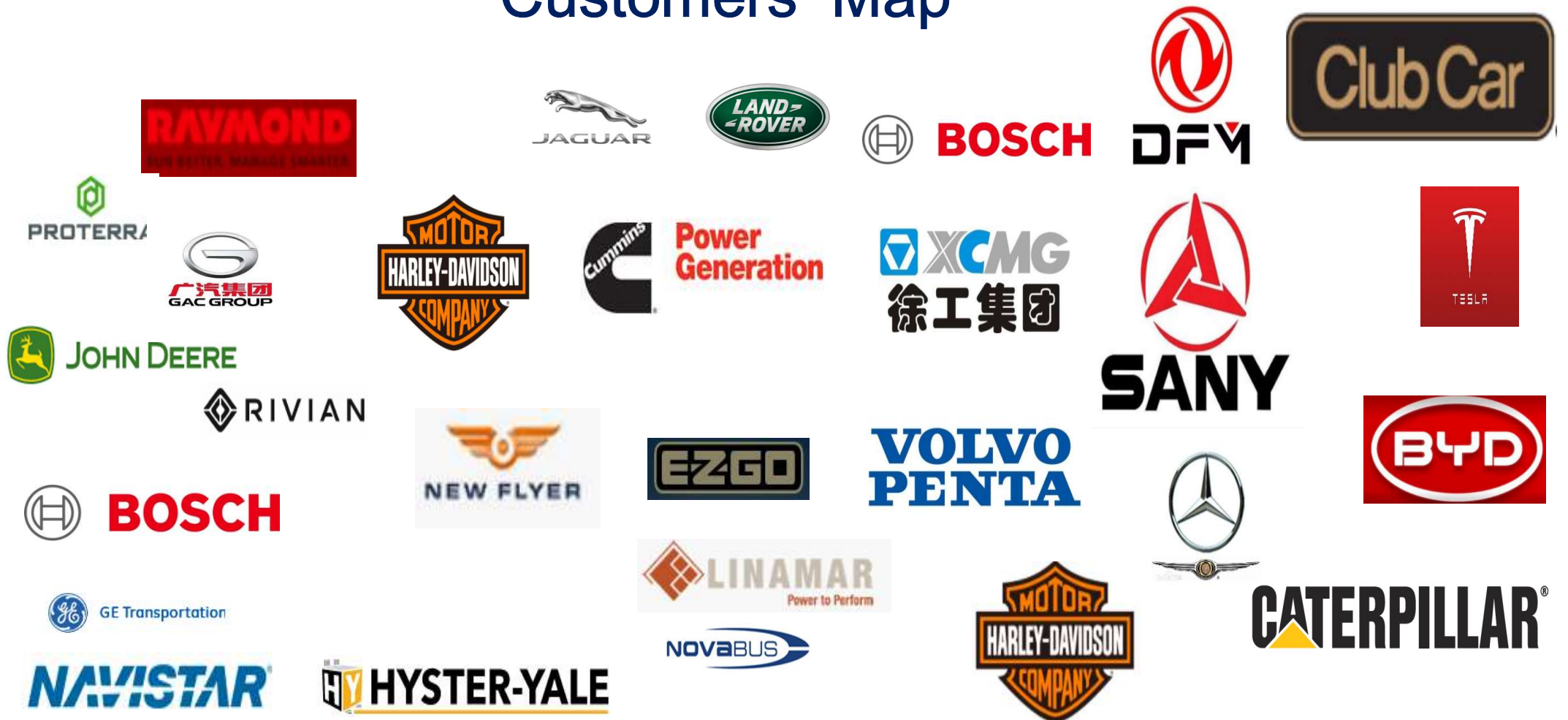
E-School bus



E-Agriculture



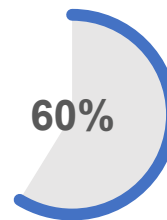
Customers Map



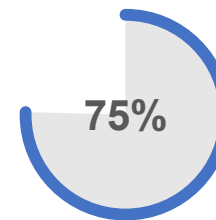
Product

ePower-Lite

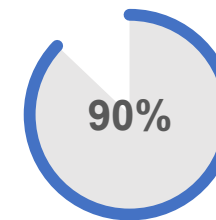
ePower-Lite is a plastic power connector series designed to be used in the hybrid electric vehicle and heavy equipment markets. The RADSOK® high amperage contact technology utilizes high tensile strength properties of a stamped and formed, high conductivity alloy grid to produce low insertion forces while maintaining a large conductive surface area. The R4 version of the RADSOK represents the culmination of three years of research and development in laser welding copper based alloys.



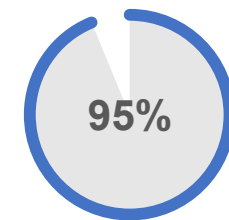
Market



Product



Application



Benefits



ePower-Lite

Features & Benefits

Current range

Mini
3.6mm
5.7mm
25A to 120A application

Contact Quantity

2ways
3ways
4ways

Waterproof

IP67

RADSOK

RADSOK R4 technology, provide more power in limit space application

Flammability

UL 94 V-0

EMI shielding and HVIL

Optional

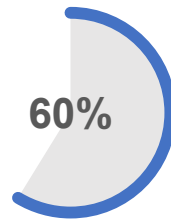


Product

UPC

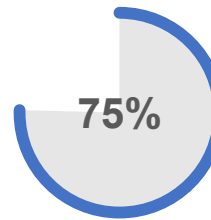
UPC (Ultimate Power Connector) is a plastic power connector series designed to be used in the hybrid electric vehicle and heavy equipment markets. The 2-pole and 3-pole connectors incorporate patented RADSOK technology which provides higher amperage, lower T-rise and voltage drop, and less resistance. RADSOK's twisted grid configuration allows for up to 50% more current to pass through the same size pin, while providing increased reliability and cycle durability, as well as lower mating forces.

The compact plastic shell structure is light weight with a small footprint. There is a 9.1mm and 14.0mm version which can carry currents up to 200A to 450A, field installable and repairable. These attributes make the UPC robust and the interconnect of choice for the EV and Hybrid markets.



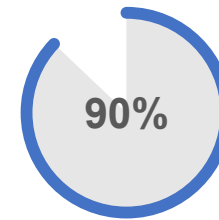
60%

Market



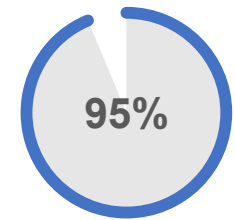
75%

Product



90%

Application



95%

Benefits



UPC

Features & Benefits

Current range

9.1mm
12mm
14mm

120A to 450A application

Contact Quantity

2ways
3ways

Waterproof

IP67

RADSOK

RADSOK R4 technology, provide more power in limit space application

Flammability

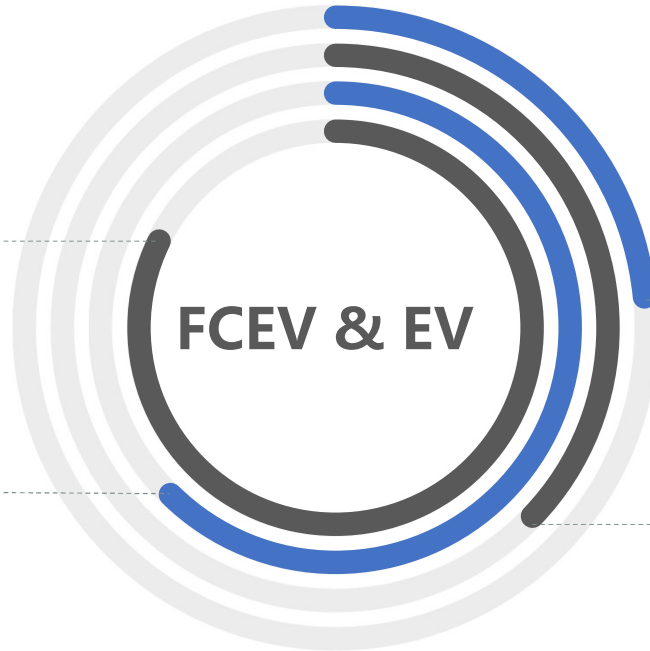
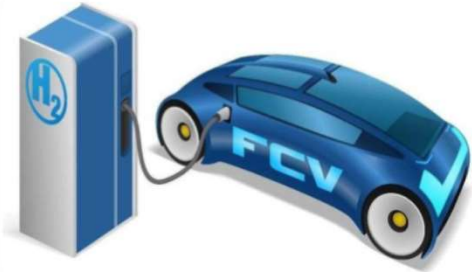
UL 94 V-0

EMI shielding and HVIL

Optional



Key Product Application



Compressor and Controller

3.6mm ePower-Lite
5.7mm ePower-Lite

Stack Pack/PDU/Motor

9.1mm UPC
12mm UPC

OBC

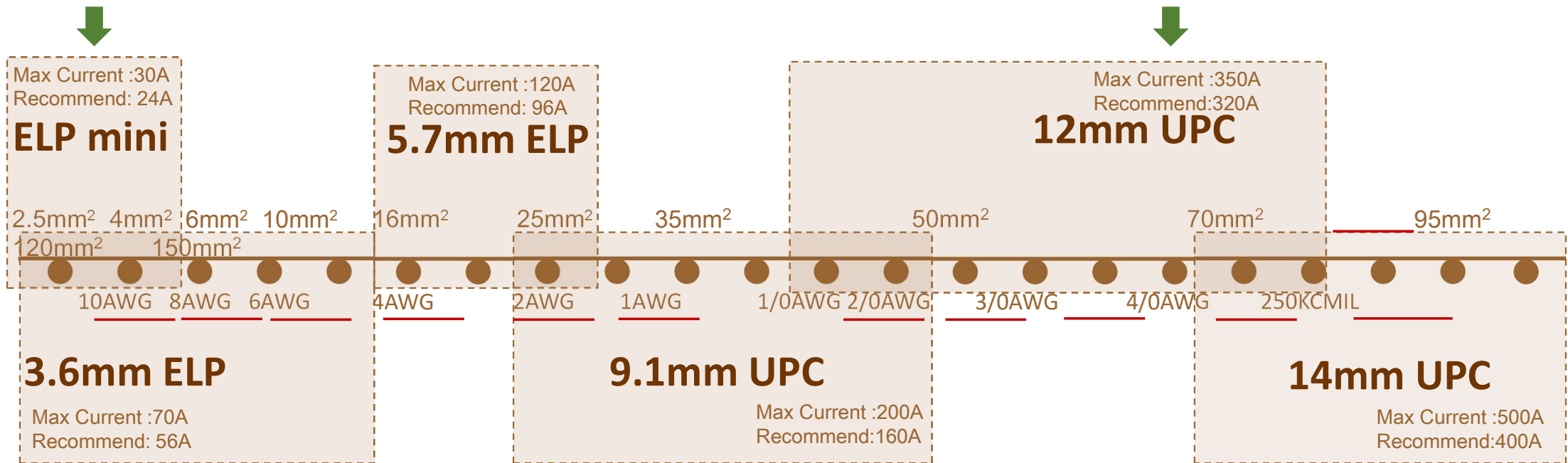
3.6mm ePower-Lite
5.7mm ePower-Lite
ePower-Lite mini

DC/DC

3.6mm ePower-Lite
5.7mm ePower-Lite
ePower-Lite mini



Product Cable Range Plan



ePower-Lite and UPC cable range



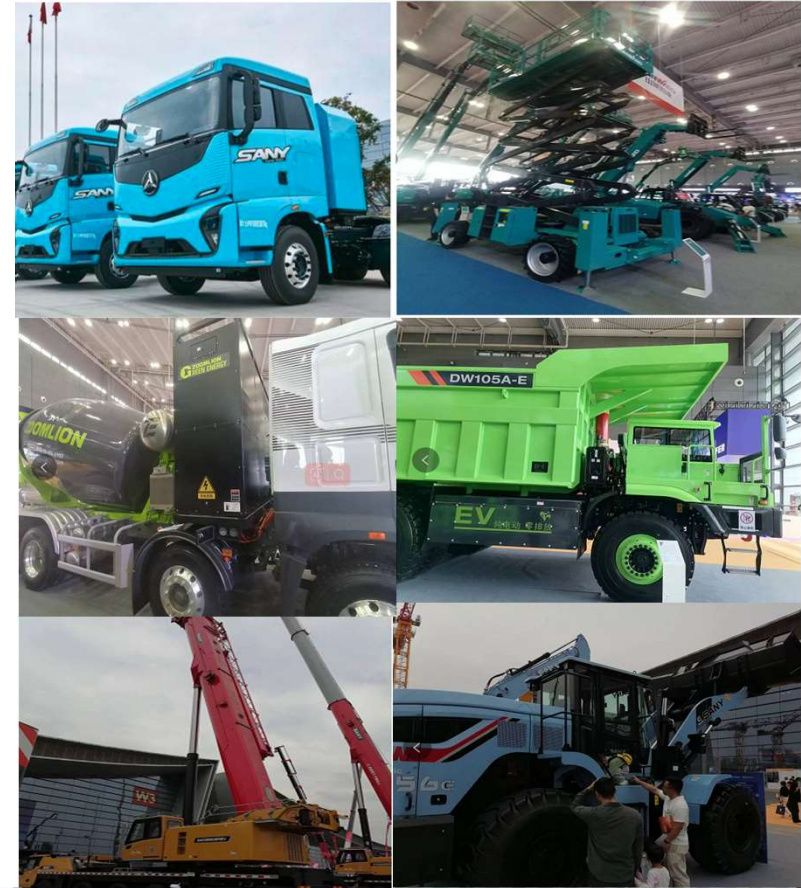
TS1 SERIES

MARKET SEGMENT: E-HEAVY TRUCK AND E-CONSTRUCTION

APPLICATION: OBC/PDU/BATTERY/PUMP/CONTROLLER /DC-DC/PTC/AC/MOTOR

KEY FEATURE

- Metal Shell/Latch
- EMI And HVIL
- 1 Pole
- Up to 300A
- Wire Size 35/5070mm²
- 1000VDC
- IP6K9K
- 720H
- Vibration 20G
- IP2XB

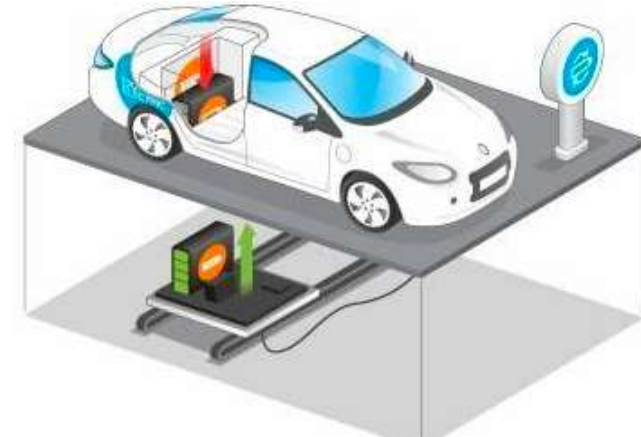


TBT Series Battery Swap Connector

The TBT swap connector. This innovative connector series is designed for battery swapping station and battery swap electric vehicle.

KEY FEATURE

- Metal Shell/Latch
- EMI And HVIL
- 1 Pole
- Up to 400A
Wire Size 95mm²
- 1000VDC
- IP6K9K
- 720H
- Vibration 20G
- IP2XB



TBT Series Battery Swap Connector

The TBT swap connector. This innovative connector series is designed for 2 wheel electric motor cycle

KEY FEATURE

- Metal Shell/Latch
- EMI And HVIL
- 1 Pole
- Up to 100A
Wire Size mm²
- 150 V AC
- IP6K9K
- 720H
- Vibration 20G
- IP2XB



SAE 1772 Charger Gun/Inlet

Power Supply type	AC Charging
Connector type	Type1
Powering system	Single phase (120V AC level 1, 250V AC Level2)
Cable rating	level 2
Charging speed	Private and Slow
Mode types	2,3
Standards/Regulation	SAEJ1772 IEC 62196-2
Certiciation	UL2251
Mechanical	
Mating Cycles	10000+
Insertion/Withdrawal force	Less Than 75N
Electrical	
Voltage Rating Of Power	Up to 250V AC
Current Rating Of Power	20A,32A,40A,50A,80A
Environmental	
Salt Spray	96H
Degree of Protection	Type 3S
Ambient Temperature(Operation)	-30~50°C

AC charging cable with Vehicle Connector and open cable end for charging electric vehicles (EV) with alternating current (AC) via type 1 Vehicle Inlets, for installation at charging stations for E-Mobility (EVSE)



NACS J3400 Charger Gun/Inlet

Power Supply type	AC Charging
Connector type	NACS
Powering system	Single phase Level2
Mode types	2,3
Standards/Regulation	J3400
Certification	UL2251
Mechanical	
Mating Cycles	10000+
Insertion/Withdrawal force	Less Than 100N
Electrical	
Voltage Rating Of Power	250 VAC 500 VDC
Current Rating Of Power	20A,32A,40A,50A,80A
Environmental	
Salt Spray	96H
Degree of Protection	3S mated and single IP67
Ambient Temperature(Operation)	-30~50°C

AC charging cable with Vehicle Connector and open cable end for charging electric vehicles (EV) with alternating current (AC) via type 1 Vehicle Inlets, for installation at charging stations for E-Mobility (EVSE)



Key project/customer

End Customer: 400V Platform Project
Market: Electric Boat / Forklift / E-HEAVY
TRUCK

Application: Battery Pack

Product: TS1 / MSD / M8&M12

Annual usage:

TS1:20000 PCS/Year

MSD: 10000 PCS/Year

M8&M12 : 20000 PCS/Year

Status :

Structural design \ Connector selection

Design in location: China

Purchasing location: China

Manufacturing location: AnHui China



New Projects Key Customer

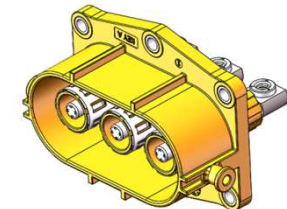
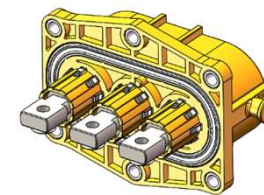
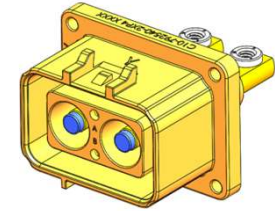
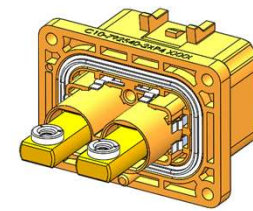
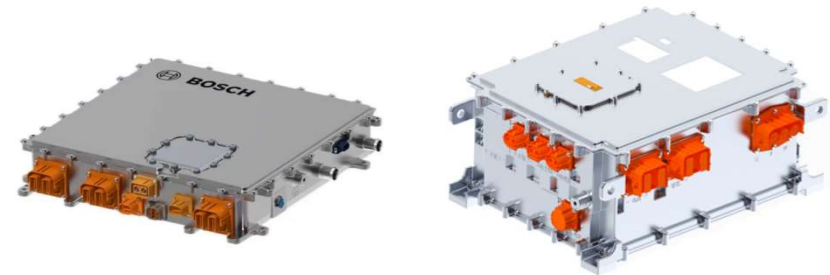
Market: FCV

Application: Air compressor controller & control unit & Inverter

Product: e-Power Lite series

Project Milestone:

Verification are completed and received customer's MP order



2024 \$0.5M

2025 \$1.5M

2026 \$1.5M



New Projects Key Customer



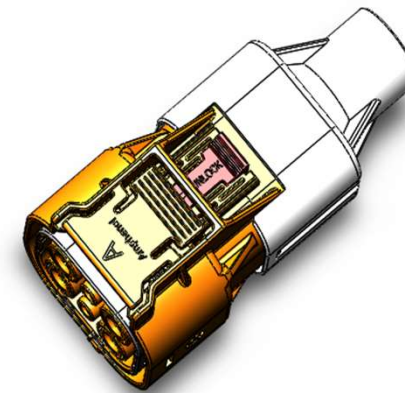
Market: EV

Application: Control unit

Product: e-Power Lite customized 4ways plug

Project Milestone:

Special cap tooling development completed,
sample build ongoing



2024	\$0.5M
------	--------

2025	\$0.5M
------	--------

2026	\$0.5M
------	--------



New Projects Key Customer

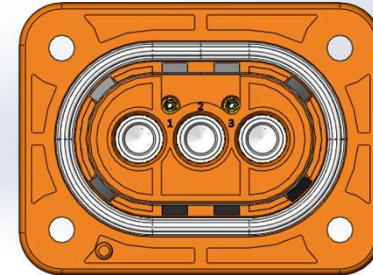
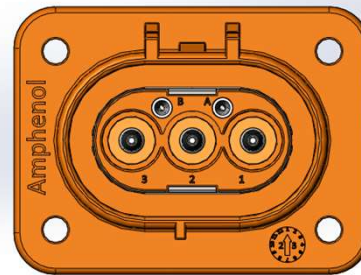
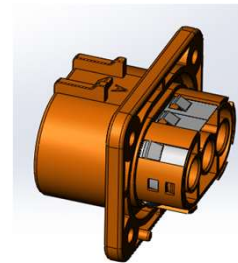
Market: FCV

Application: Inverter

Product: e-Power Lite series

Project Milestone:

New tooling are developed, components sample under trial and verification



2024 \$0.5M

2025 \$1M

2026 \$1M



New Projects Key Customer

Market: Agriculture

Application: Inverter

Product: e-Power Lite 4ways customized metal REC and Plug

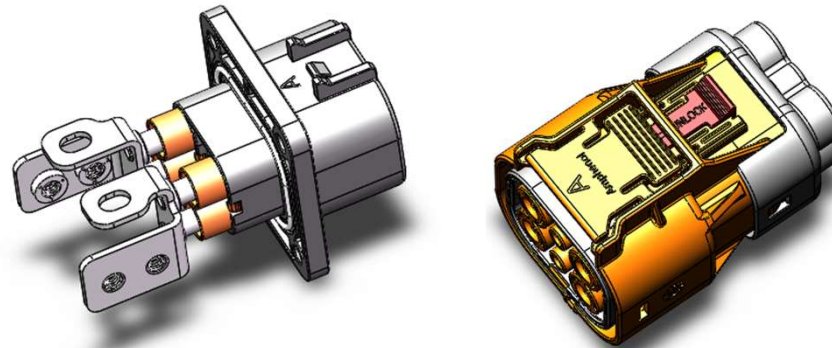
Project Milestone:

Metal REC and mating plug drawing are under finalizing, tooling PO and 250pcs order received

2024 \$0.2M

2025 \$0.2M

2026 \$0.2M



New Projects Key Customer

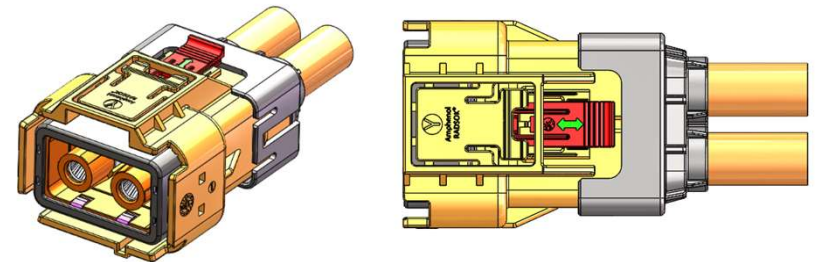
Market: EV

Application: Controller

Product: e-Power Lite 5.7mm 2ways Plug

Project Milestone:

Customized cable size related components tooling are developed, sample build ongoing for customer verification



New Projects Key Customer

Market: Energy storage

Application: industrial energy storage

Product: e-Power Lite 3.6mm 2ways Plug/REC

Project Milestone:

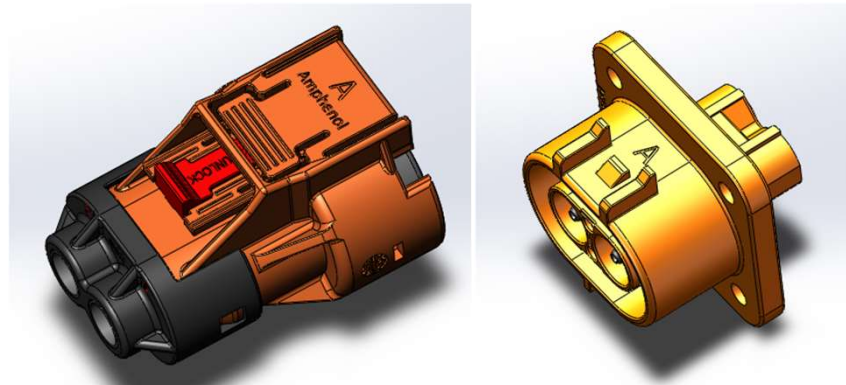
Sample verification and UL test are completed



2024 \$0.5M

2025 \$1.0M

2026 \$1.0M



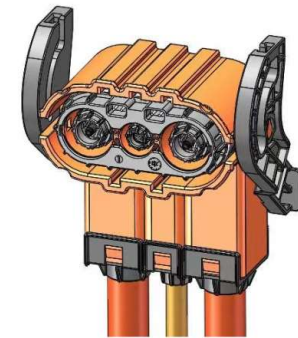
New Projects Key Customer

Market: EV Transportation

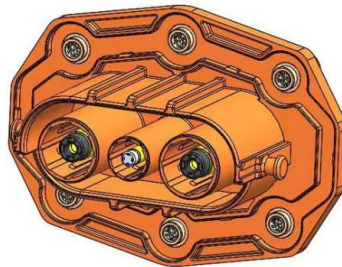
Application: Battery System

Product: Customized UPC

Status: Design frozen and components drawings preparation



2023	\$50K
2024	\$200K
2025	\$ 500K



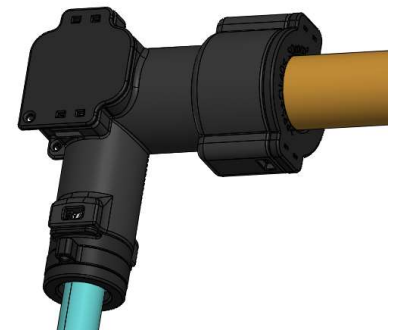
New Projects Key Customer

Market: EV market

Application: Engine system

Product: Customized UPC

Status: Design frozen and components tooling is kicking off.



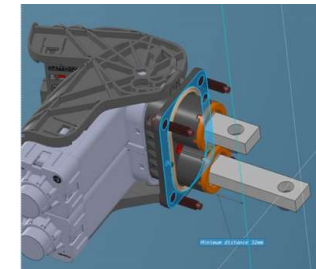
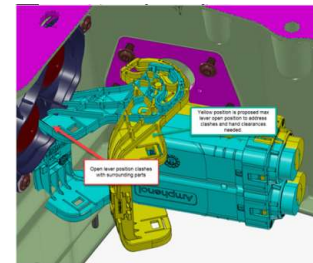
Success Story Key Customer

Market: Electric Commercial vehicle

Application: Battery System

Product: 12mm 2pole right angle customized UPC

Status: Final design frozen stage



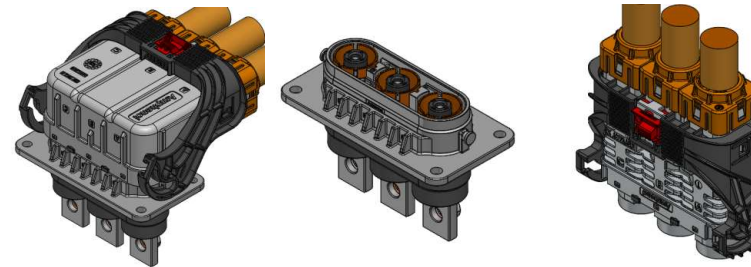
Success Story Key Customer

Market: EV

Application: Motor system

Product: 12mm 3pole right angle UPC

Status: Push T0 sample submission

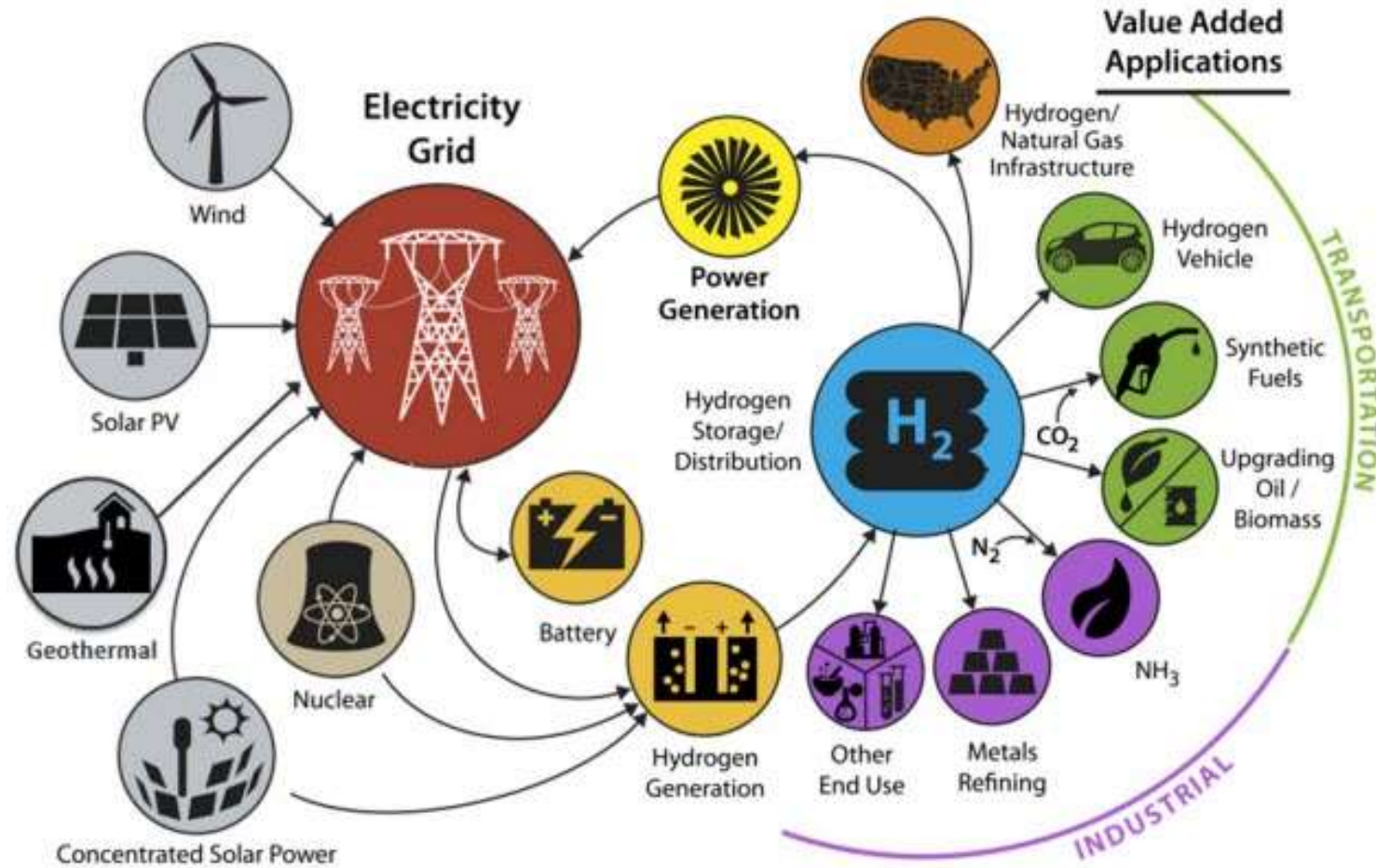




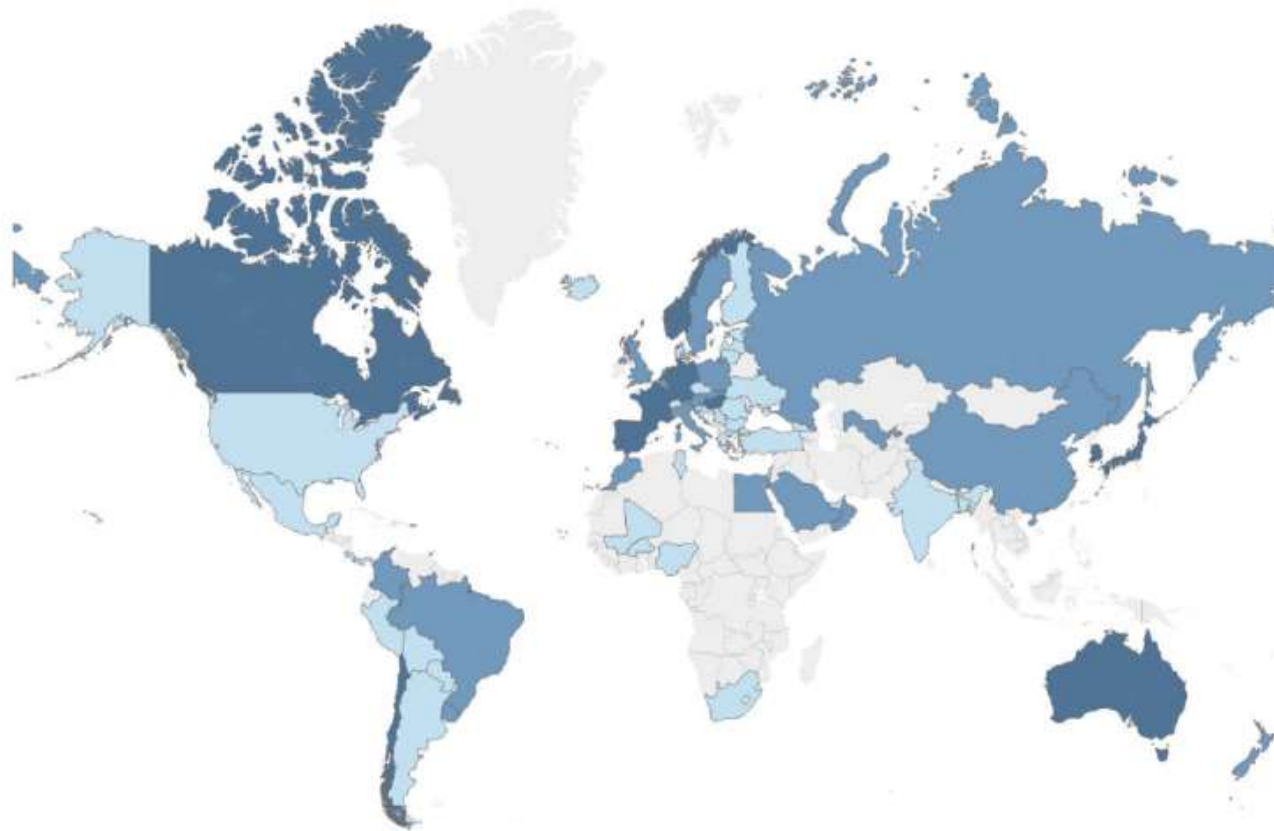
Hydrogen Strategy



- Pursue low-cost, efficient technologies for hydrogen



- Overview map of the countries activities towards developing a hydrogen strategy



State of play

- Published national strategy
- National strategy in preparation
- Policy discussions/Initial demonstration projects

Source: World Energy Council



● Global Targeted Customers



BOSCH

Garrett
ADVANCING MOTION



NIKOLA
MOTOR COMPANY



亿华通
SinoHytec

Symbio



捷氢科技
SHPT



DFM

Bolken

REFIRE

LIEBHERR



势加透博
XecaTurbo Technologies



Kingston
TECHNOLOGY



长城汽车
Great Wall Motors



玉柴动力
YUCHAI POWER

ZINSIGHT
致 瞻 | 科 技



动力源



中国一汽
FAW GROUP



潍柴动力
WEICHAI POWER

雪人股份
SNOWMAN CO., LTD.



scrollTEC
昂科涡轮科技(杭州)有限公司



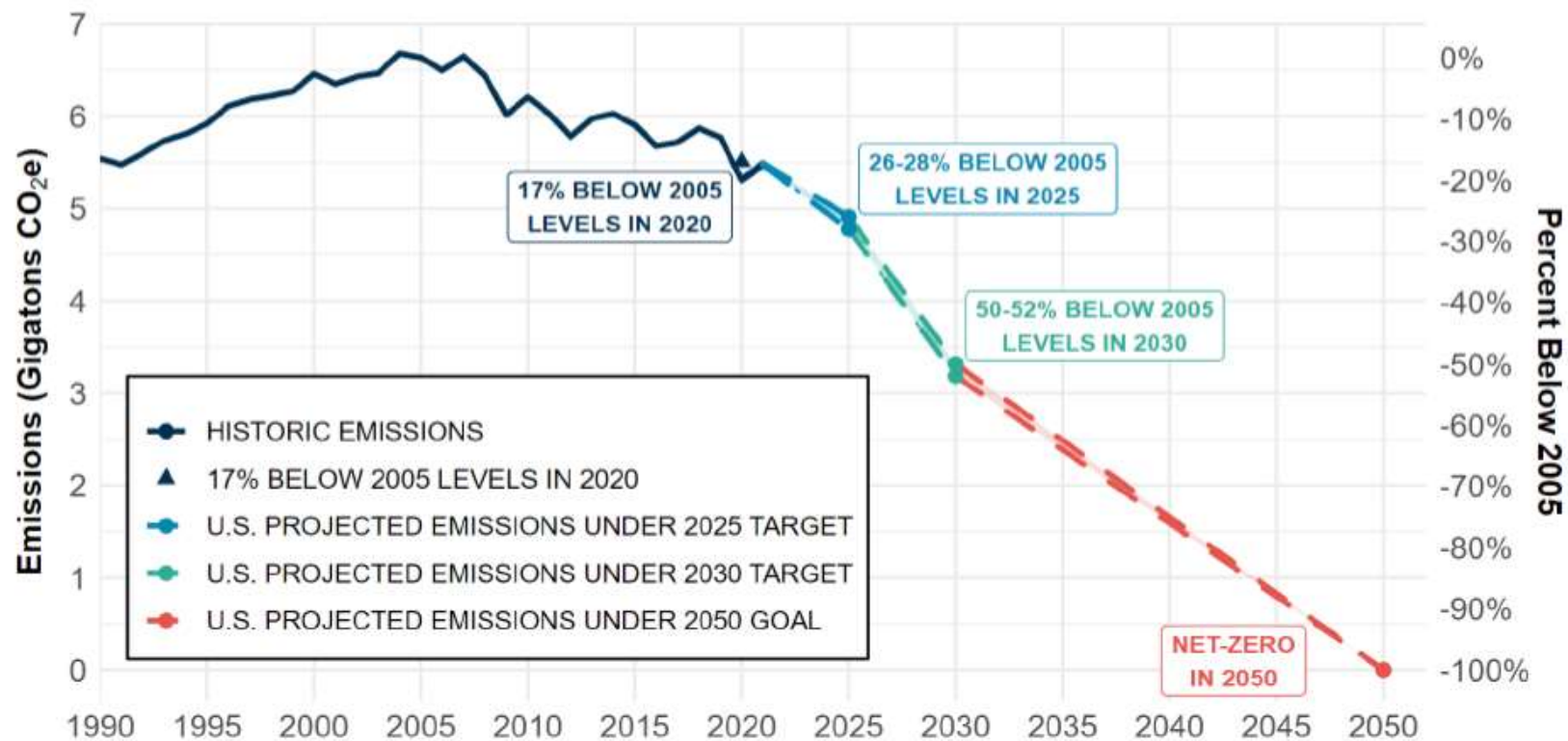
SHINRY 欣锐科技

FORIPOWER

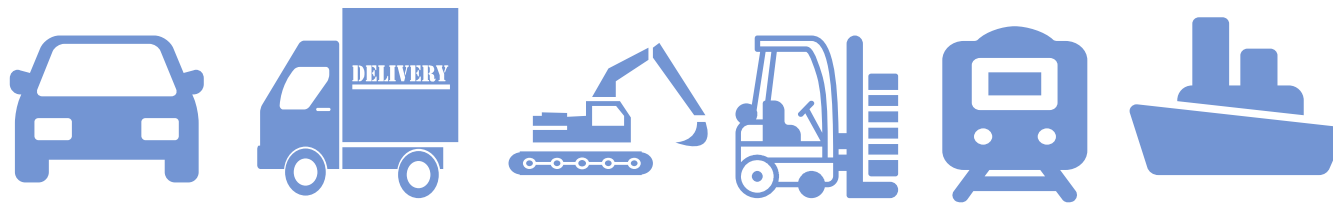
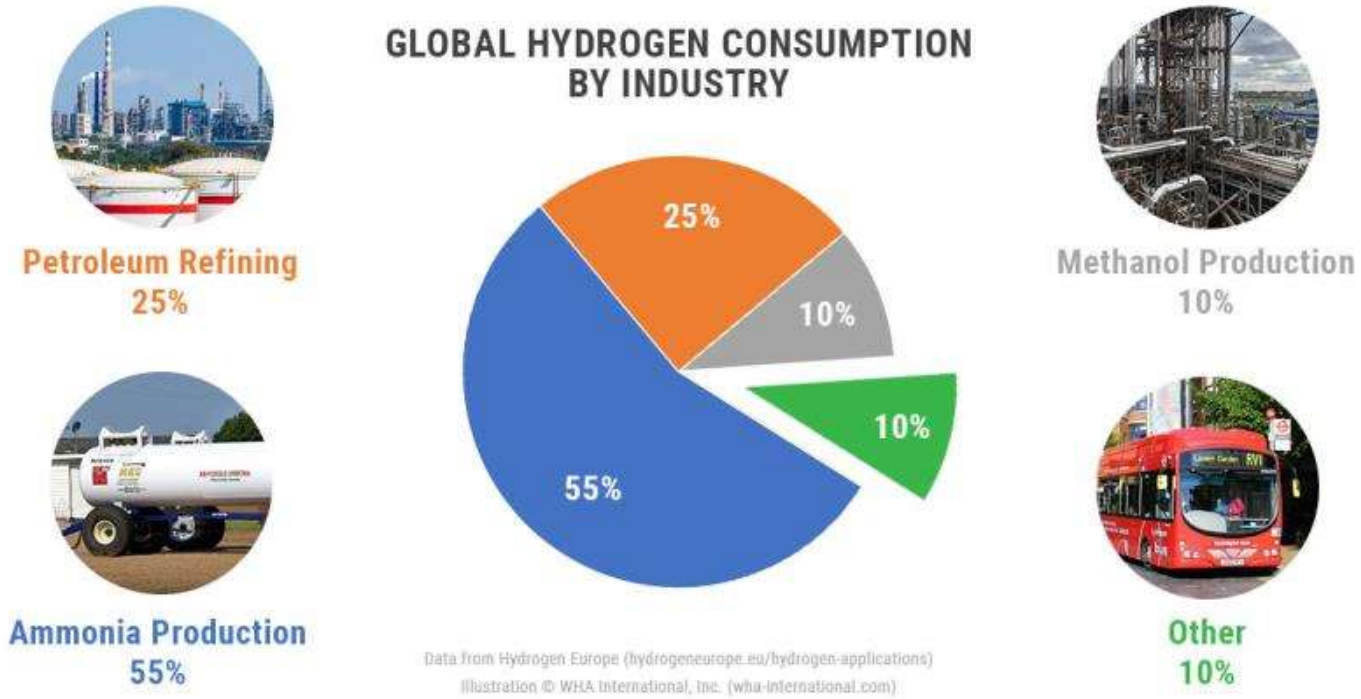


- U.S. economy-wide net greenhouse gas emissions

- The U.S. national climate strategy lays out a long-term approach and pathways for the United States to meet its 2030 Nationally Determined Contribution (NDC) toward global climate objectives objectives—an ambitious 50 to 52 percent reduction relative to 2005 emissions.



● Global Hydrogen Consumption By Industry



● Global FCV Market Outlook 2020-2030

2021

- Till 2021, about 50K units fuel cell vehicles globally

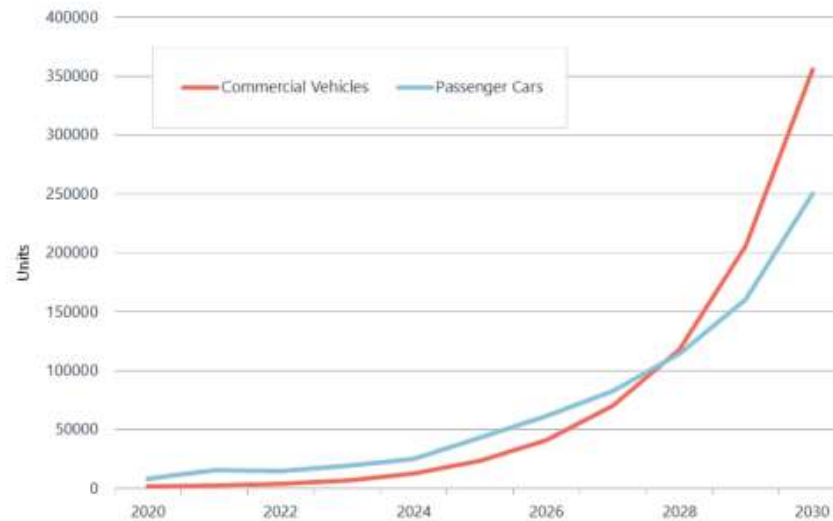
2025

- Till 2025 will be triple compared with 2021
- Expect to have 200k units globally till 2025
- Commercial vehicles are growing rapidly

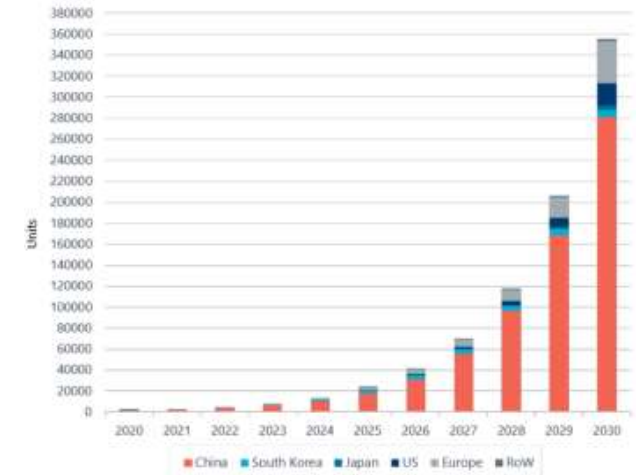
2030

- 55% CAGR till 2030 to reach 600k units globally from 2025-2030
- Commercial vehicles will become dominate especially about heavy truck market

Annual Deliveries of H2 on-highway Vehicles worldwide 2020-2030



Annual Deliveries of FC Commercial vehicles worldwide 2020-2030



● Global FCV Market update

USA

- Zero-emission regulations and government funding have promoted the penetration of fuel cell heavy trucks
- Nikola plans to deliver hydrogen fuel cell heavy truck in 2023



Europe

- Small-scale demonstration projects in Northwest Europe are deploying fuel cell heavy trucks for logistics distribution
- HYUNDAI hydrogen fuel cell heavy trucks are launched commercially in Switzerland and Germany

Asia-Pacific

- China government policies strongly support fuel cell commercial fuel cell heavy truck
- South Korean government begin to increase subsidies for the purchase of hydrogen fuel cell commercial vehicles



● Other Heavy-duty Application: Hydrogen to decarbonize non-electrified railway

USA

- 2021- Caterpillar, BNSF and Chevron begin hydrogen locomotives demonstration project
- 2025 - Stadler expects to deliver the first hydrogen train in California

China

- 2017 - Trial operation of hydrogen urban rail in Tangshan
- 2019 - Foshan 5 hydrogen urban rail lines begin commercial operation

Germany

- 2023 - Alstom expects to deliver 27 hydrogen trains (2019 order)
- 2024 - Siemens expects to deliver 7 hydrogen trains (€13.74M)

Korea

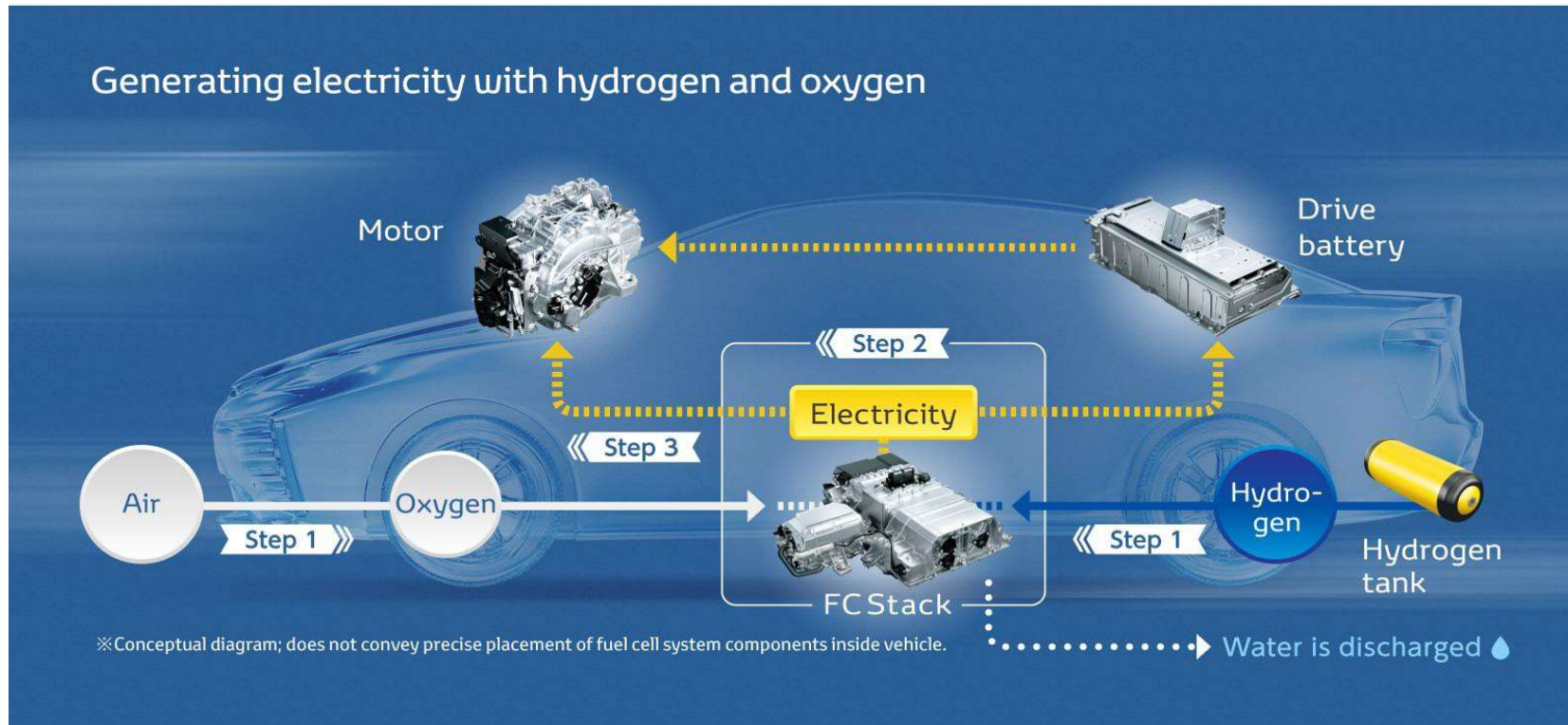
- 2023 - Hyundai Group begins trial operation of hydrogen urban rail in Ulsan
- 2024 - Mass production of hydrogen urban rail

Indian

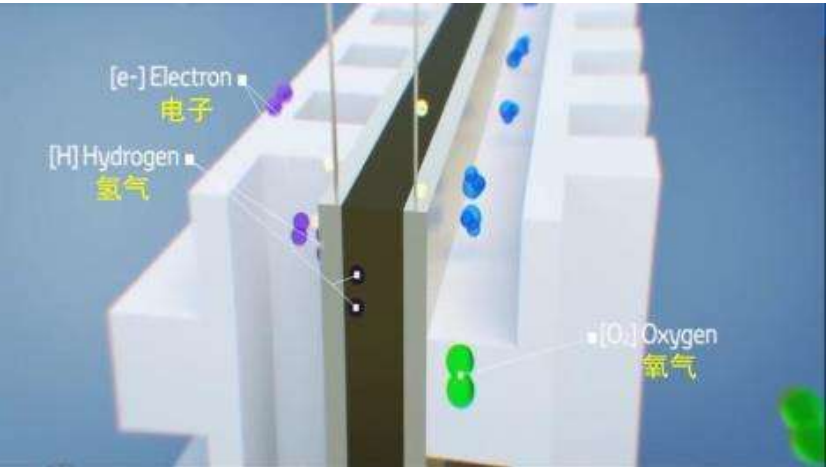
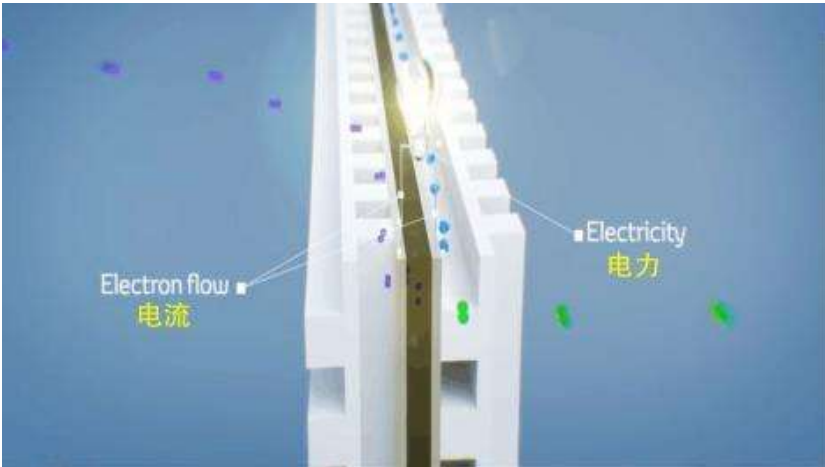
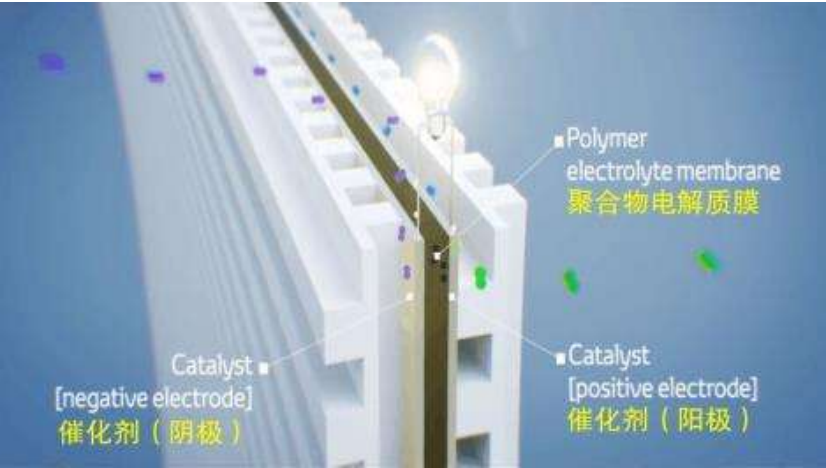
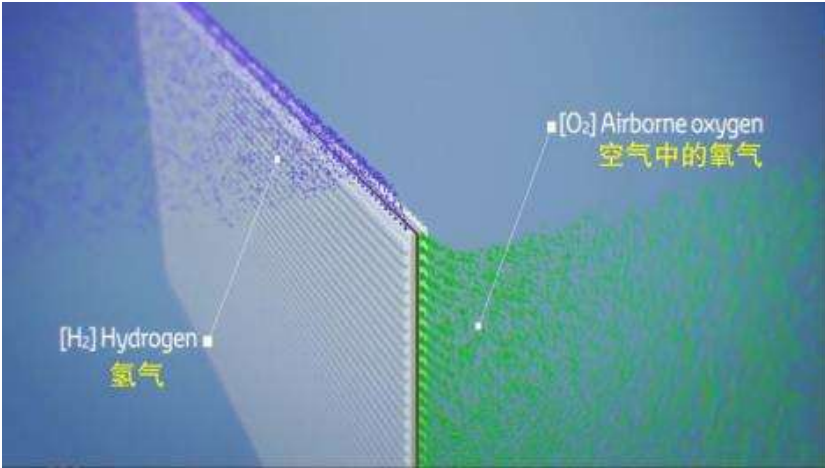
- 2023 - Medha Servo contracts with National Rail to launch the first hydrogen train—Vande Metro



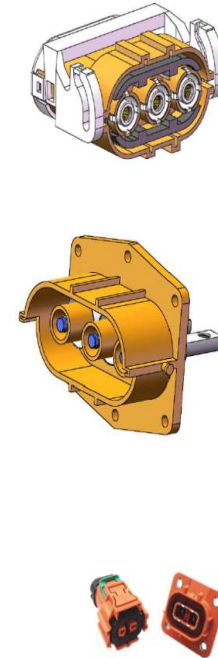
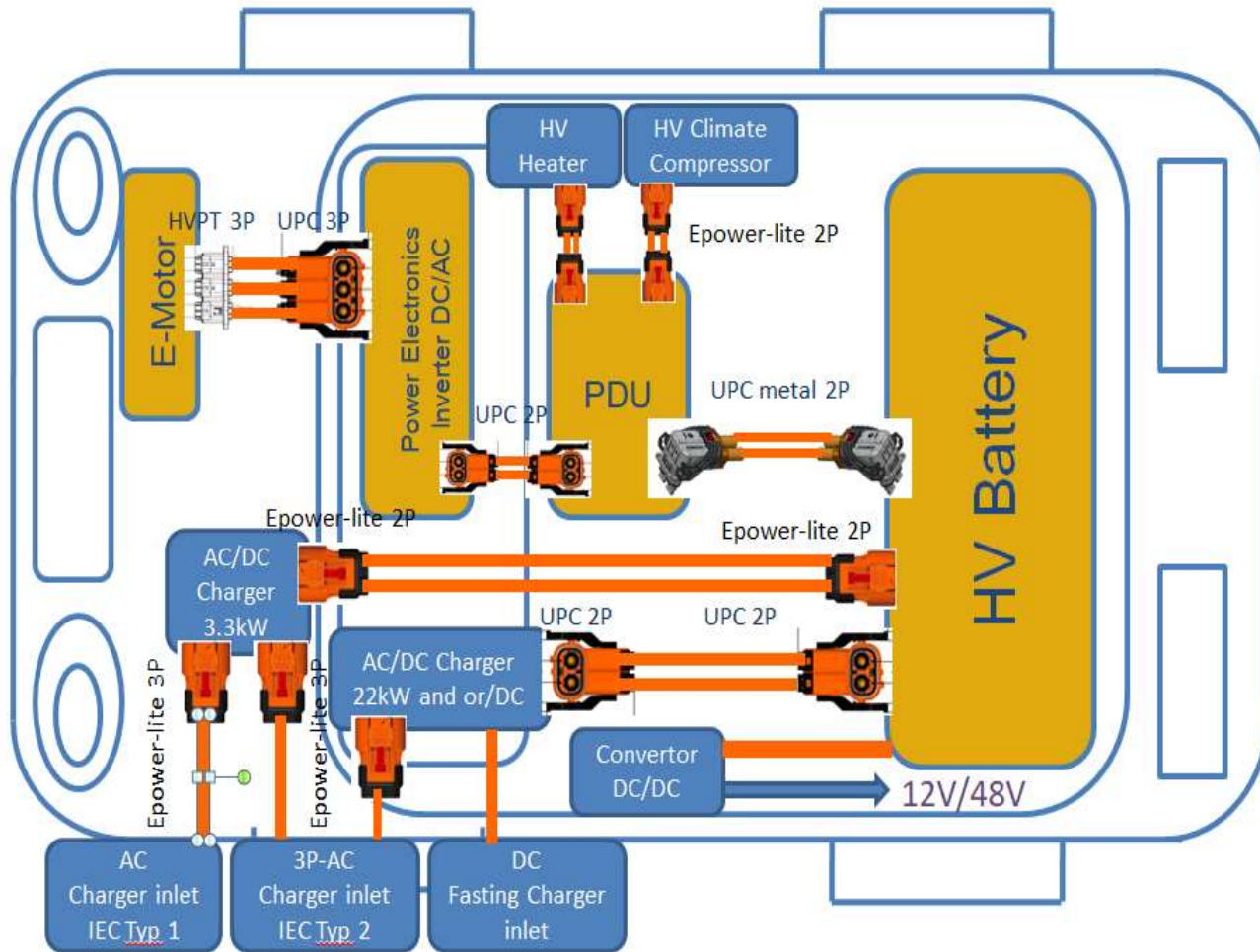
➤ HOW FCEV WORKS



Fuel Cell Theory



➤ BEV/Super charge application



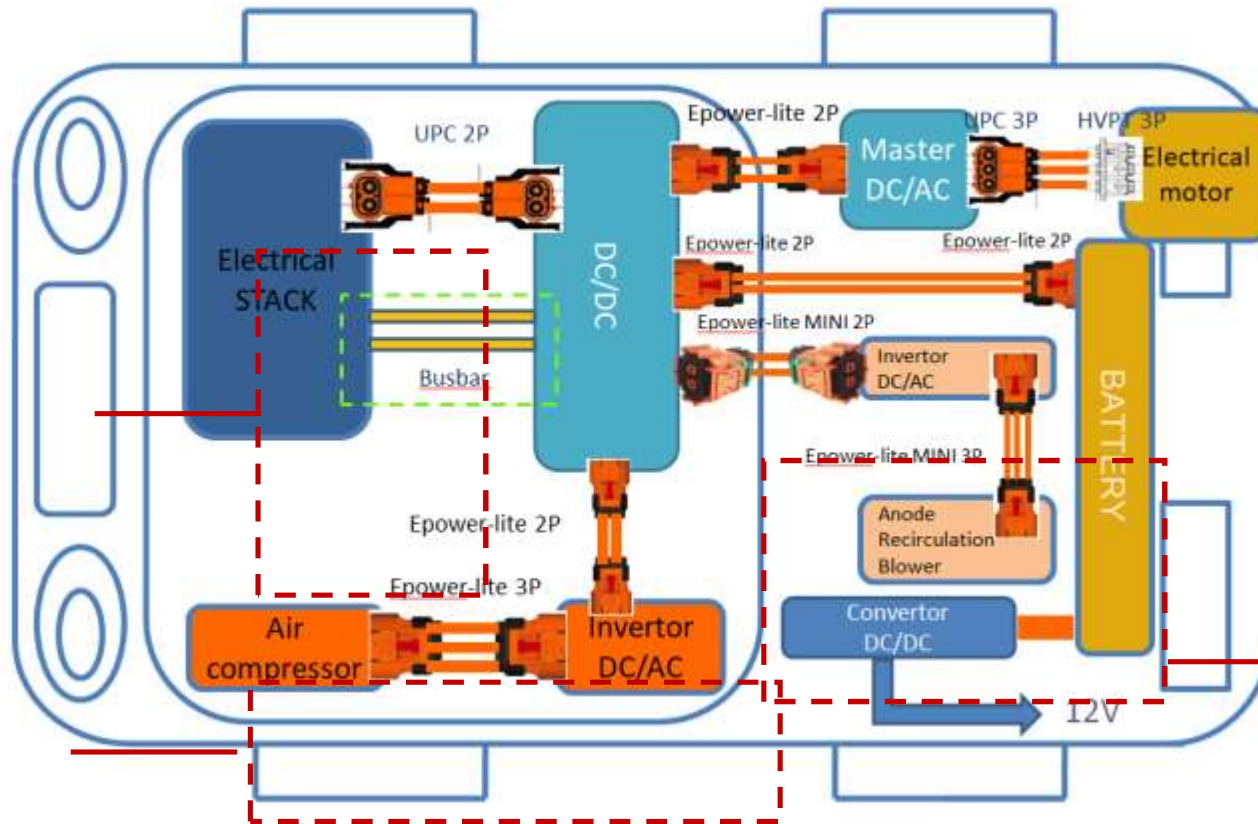
FCV Application



Stack



Air-Compressor



Invertor



Anode Recirculation Blower



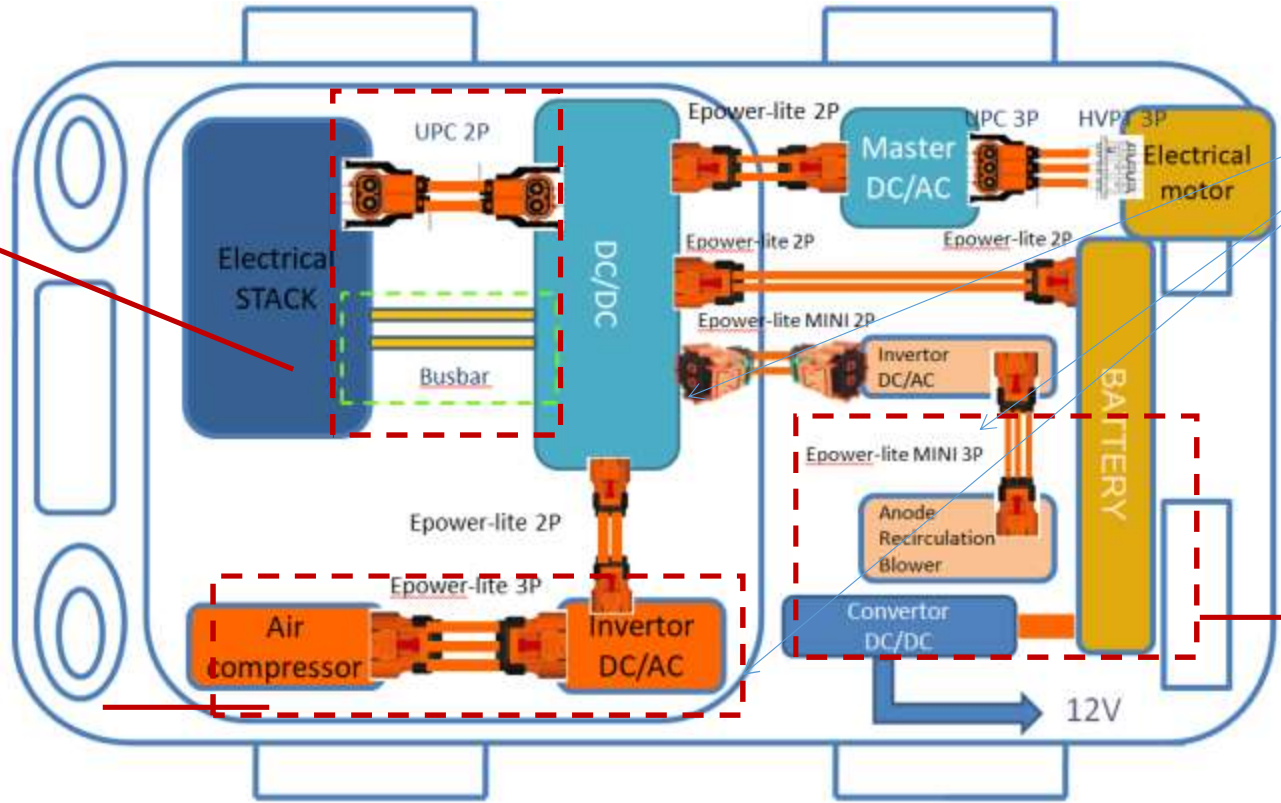
FCV Application



UPC Metal



e-Power Lite 3.6 2P/3P
e-Power Lite 5.7 2P/3P



e-Power Lite 3.6 2P/3P/4P
e-Power Lite 5.7 2P/3P



e-Power Lite mini 2P
e-Power Lite mini 3P (TBD)

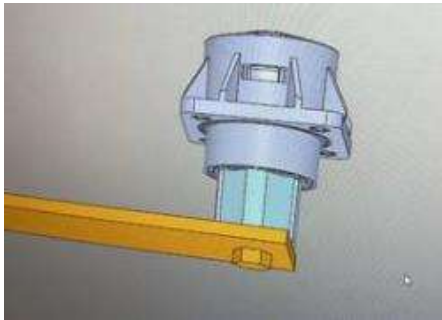
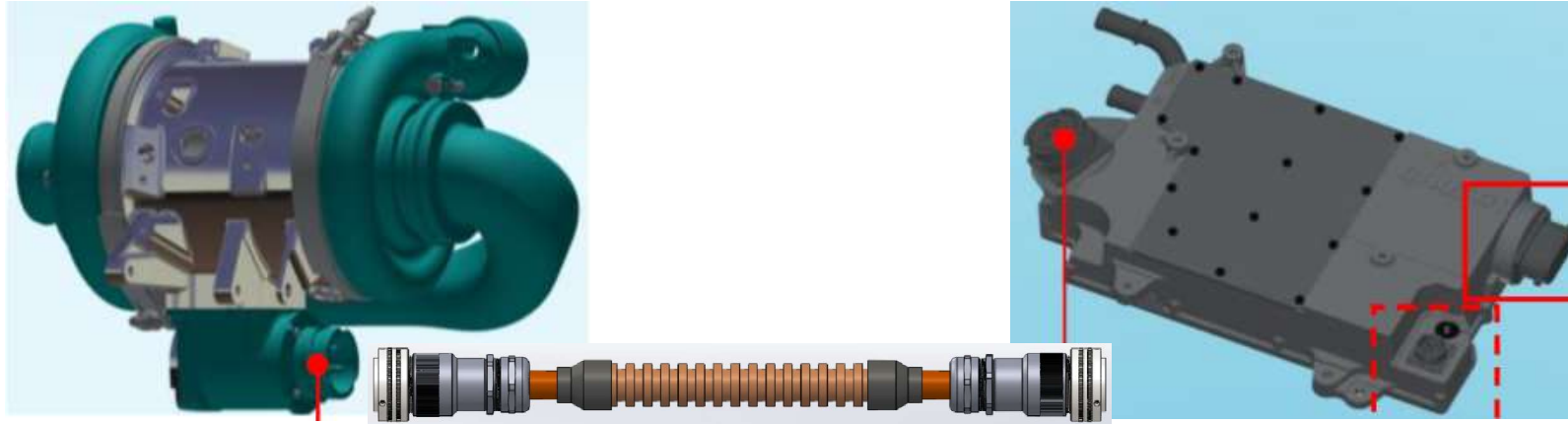


Application

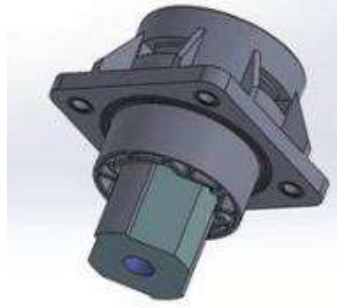
Fuel Cell Power Module



● Circular Connector Application



GT cable assembly



Customized connector for



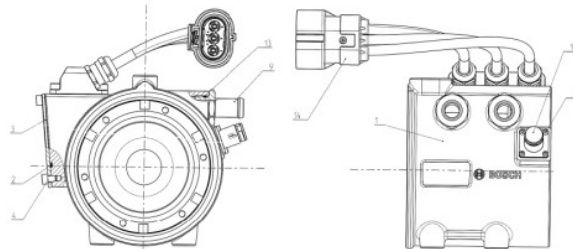
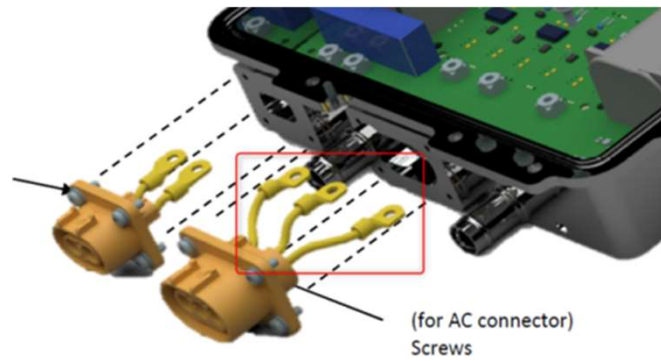
PT

● Success Story

Application: Air compressor/ARB

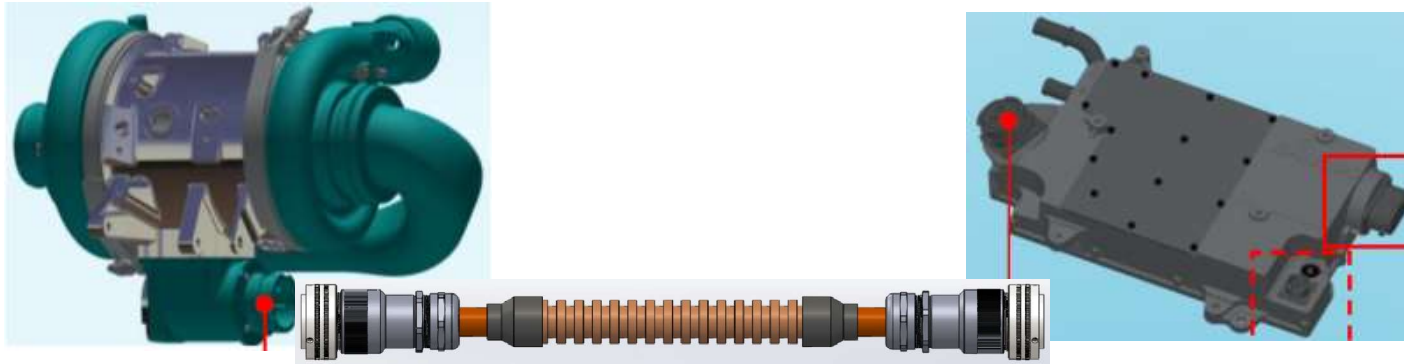
Product: e-Power Lite 3.6/5.7

LPT

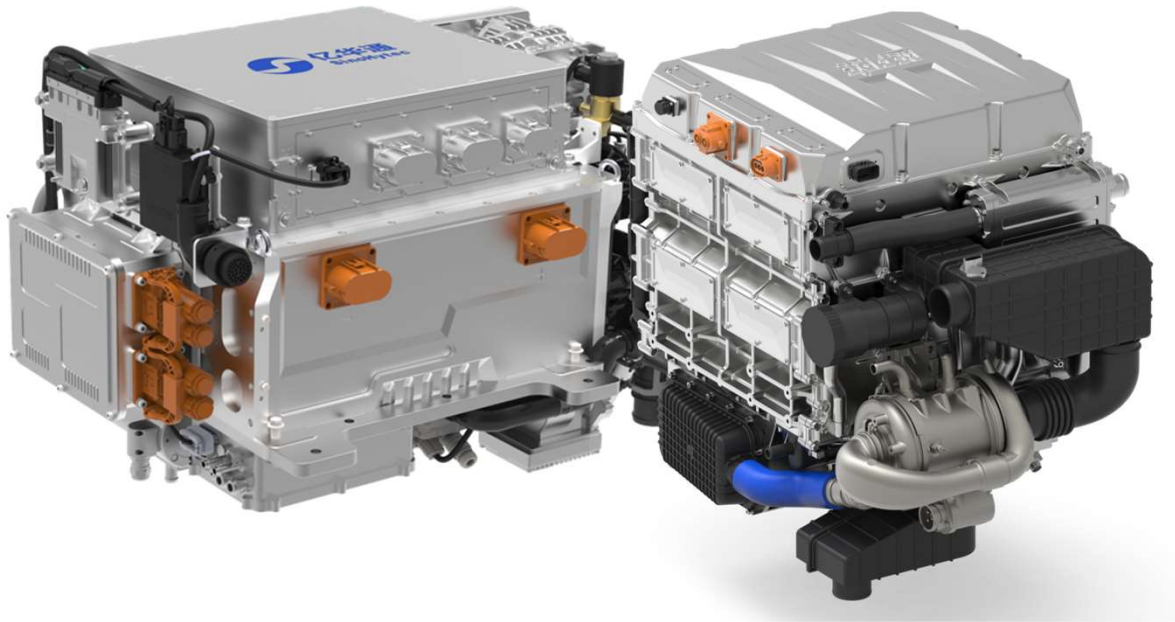


Success Story

Application: Air compressor
Product: GT cable assembly
e-Power Lite 3.6
LPT



Market



FUEL ENGINE SYSTEM



STACK



AIR-COMPRESSOR



Application

Application: Battery System
Product: UPC, ePower-Lite

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 6mm²; 25mm²,35mm²

Current: 40A, 120A,150A



Application

Application: Battery System

Product: UPC

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 35mm²

Current: 150A



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Application

Application: Compressor
Product: 3.6mm ePower-Lite,2,4ports

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 10mm²

Current: 85°C, 60A



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Application

Application: Compressor
Product: 3.6mm ePower-Lite,3,4ports

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 10mm²

Current: 85°C, 60A



Application

Application: Compressor

Product: 3.6mm ePower-Lite, 2,3,4ports

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 10mm²

Current: 85°C, 60A



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Application

Application: Low Power PDU

Product: ePower-Lite mini, Surlok Plus

Lock: Secondary locking

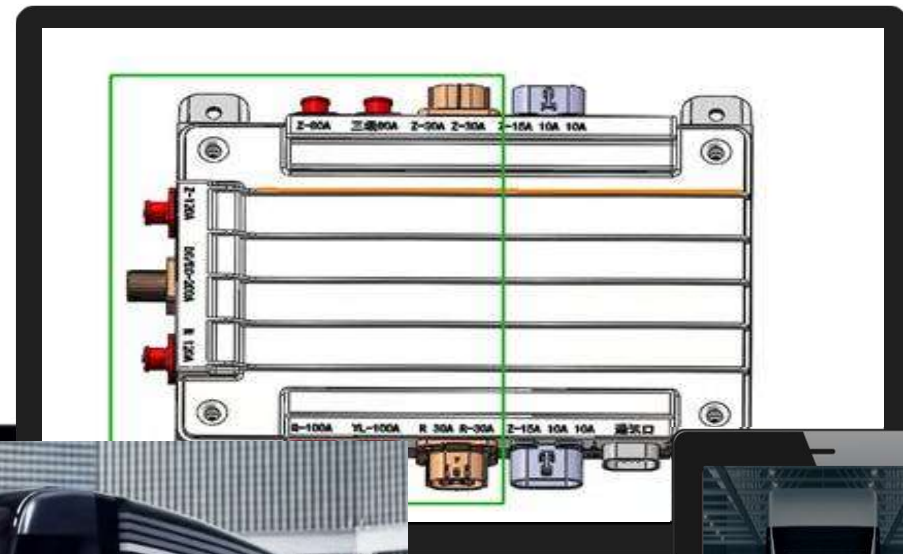
Voltage: 1000V DC / 1500V DC optional

Protection: Touch Proof

Cable: 4mm²~50mm²

Current: 30A~200A

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Application

Application: Stack Pack

Product: UPC,2,3 ports

Location: RD in EU, Manufacture in China

Lock: Secondary locking

Shell: Plastic housing

EMI: EMI Shielding

HVIL: HVIL optional

Voltage: 1000V DC optional

Protection: Touch Proof

Cable: 70~95mm²

Current: 85°C, 400A



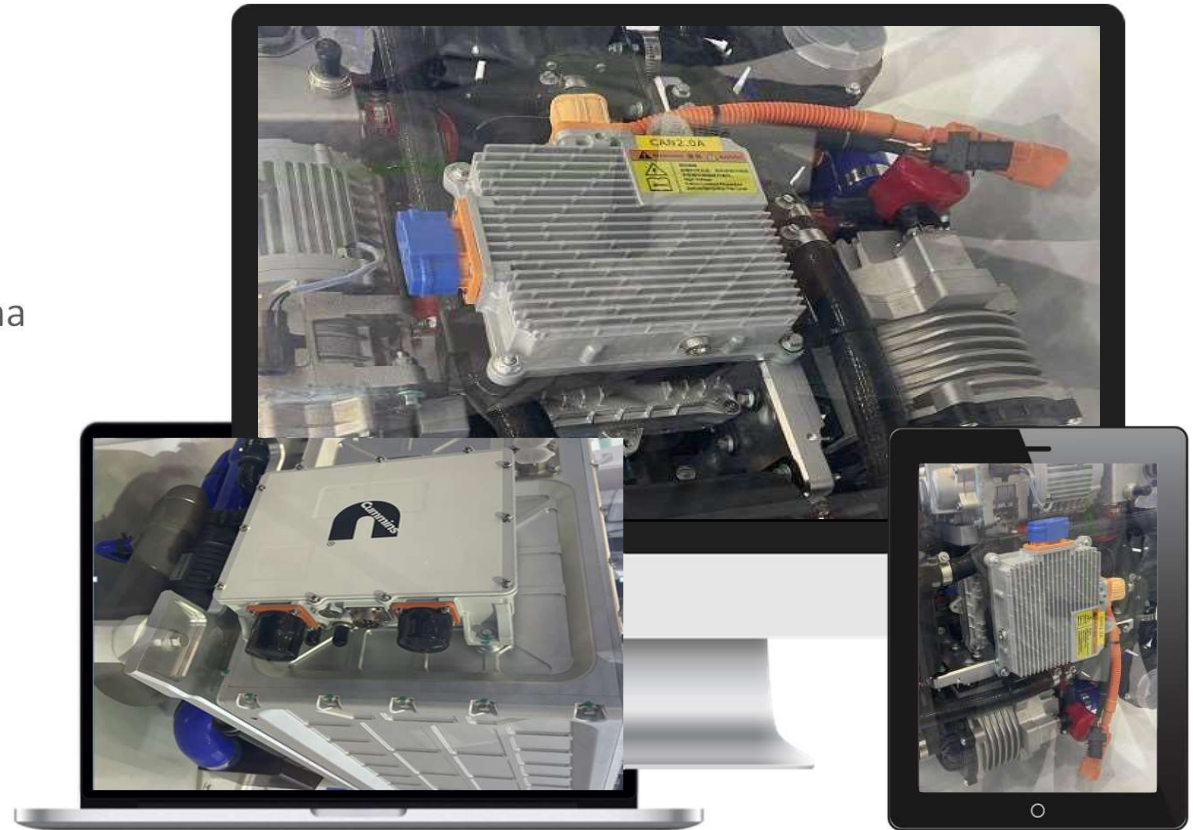
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Application

Application: Stack Pack
Product: UPC,2,3 ports, epower-lite
Location: RD in EU, Manufacture in China

Lock: Secondary locking
Shell: Plastic housing
EMI: EMI Shielding
HVIL: HVIL optional
Voltage: 1000V DC optional
Protection: Touch Proof
Cable: 10~95mm²
Current: 85°C, 80~400A



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