



发电侧

- 光伏发电
- 风力发电



电网侧

- 储能站



用户侧

- 交流充电桩
- 直流充电桩
- 家用储能
- 工商业储能

储能系统介绍



Lithium Battery Cell 3.2V

BYD



EVE



CATL



.....
3.2 V @ 125Ah
3.2 V @ 138Ah
3.2 V @ 280Ah
3.2 V @ 320Ah
.....

.....
3.2 V @ 50Ah
3.2 V @ 56Ah
3.2 V @ 100Ah
3.2 V @ 105Ah
3.2 V @ 280Ah
3.2 V @ 560Ah
.....

.....
3.2 V @ 150Ah
3.2 V @ 202Ah
3.2 V @ 280Ah
3.2 V @ 306Ah
3.2 V @ 314Ah
.....

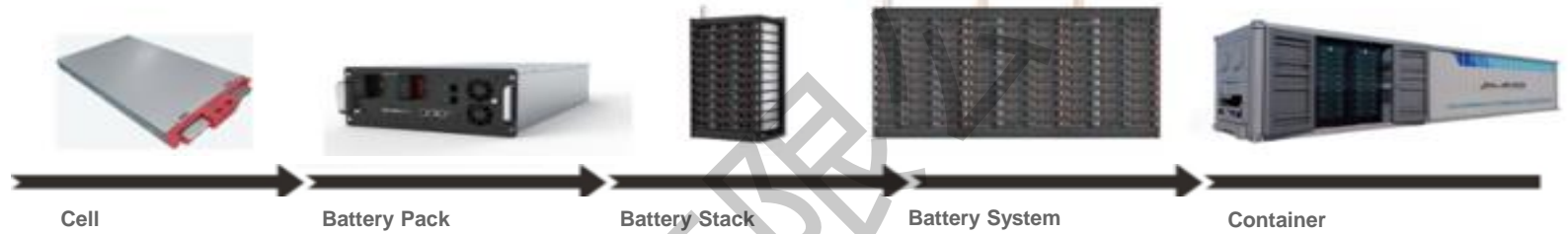
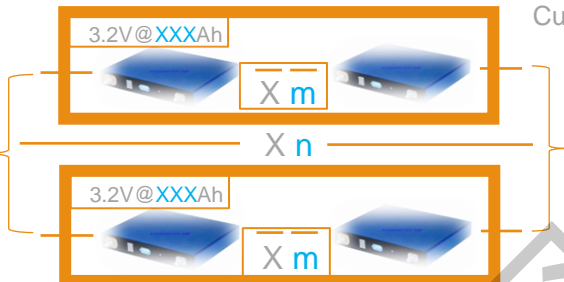
Voltage = 3.2V*m*n
Current = XXXA

Series Type



Series + Parallel Type

Voltage = 3.2V*m
Current = XXXA*n



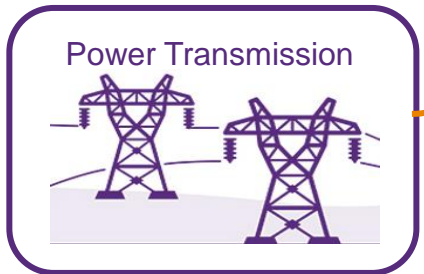
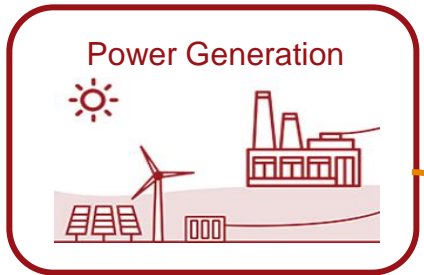
Typical Battery Pack

Nominal Energy	Nominal Voltage	Cell Capacity	Cell Configuration	Typical Application
2.76 kWh	51.2V	3.2V @ 50Ah	1P16S	Residential BESS Battery Stack
5.12 kWh	51.2V	3.2V @ 100Ah	1P16S	Residential BESS Battery Stack
43 kWh	153.6V	3.2V @ 280Ah	1P48S	Commercial BESS Battery Stack
46 kWh	153.6V	3.2V @ 306Ah	1P48S	Commercial BESS/Factory BESS Stack
104 kWh	166.4V	3.2V @ 314Ah	2P52S	Commercial BESS/Factory BESS Stack

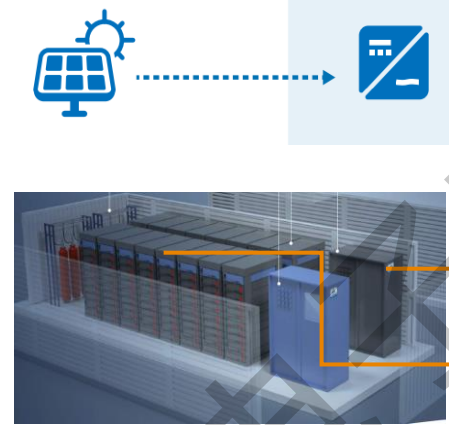
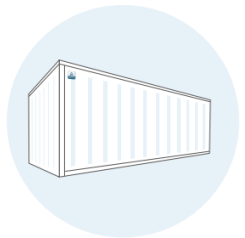
Typical Battery Stack

Nominal Energy	Nominal Voltage	Pack Energy	Pack Configuration	Typical Application
8.28 kWh – 22.08 kWh	153.6 V – 409.6V	2.76 kWh	1P3S – 1P8S	Residential BESS: Number of Pack: 3 - 8
5.12 kWh – 20.48 kWh	51.2V	5.12 kWh	1P – 4P	Residential BESS: Number of Pack: 1 - 6
344 kWh	1228.8V	43 kWh	1P8S	Commercial BESS/Factory BESS/BESS Station
368 kWh	1228.8V	46 kWh	1P8S	Commercial BESS/Factory BESS/BESS Station
832 kWh	1331.2V	104 kWh	1P8S	Commercial BESS/Factory BESS/BESS Station

储能及关键子系统概览



BESS Station >1MW

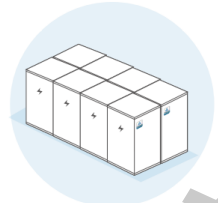


- A** Central Solar inverter
- B** String Solar inverter
- C** Power conversion system
- D** Battery system

Central/ String solar inverter in power generation station

Separated Power conversion system and Battery system

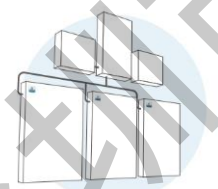
Factory/Commercial BESS 100kw~ 1MW



- C** Power conversion system
- D** Battery system

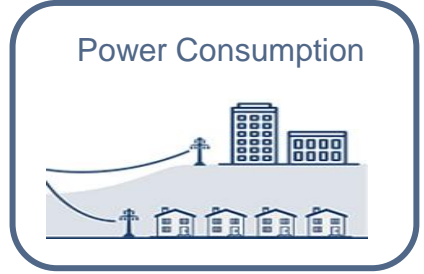
Integrated/separated Power conversion system and Battery system

Residential BESS <20kw



- B** String Solar inverter
- D** Battery System

Integrated/separated Solar inverter and Battery system



Battery Manufacture

2022(GWh) Battery	Global	China
	155	130



Customer Focus Products:
Battery cell, Battery Module, BMS

TE Focus Products:
Board connectors: **Dynamic**, Voltron, MicroBridge(FPC), Power Elements, PCB Terminal blocks

TE Focus SV:

- **Device**

(Customer coverage, penetration and VOC on BESS specs)

TE Focus Region:

- **China**
- **South Korea**

PCS

2022(GW) Battery	Global	China
	244	>90%



Customer Focus Products:
Power conversion system

TE Focus Products:
Dynamic, Relay, resistor, **DC contactor**, filter, terminal blocks, high power connector

TE Focus SV:

- **RPSF**
- **IEL**

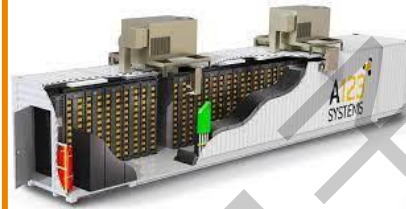
(Time to market and pricing)

TE Focus Region:

- **China**

System Integrator Large Scale

2022(GWh) Battery	Global	China
	124	>50%



Customer Focus Products:
Battery Rack, Control Unit, BMS, EMS

TE Focus Products:
Board connector, **DC contactor**, resistor, **HPC**, **signal connector**

TE Focus SV:

- **RPSF**
- **SYS**
- **IEL**

(Time to market and pricing)

TE Focus Region:

- **China**
- **US**

System Integrator Residential

2022(GWh) Battery	Global	China
	31	>20%



Customer Focus Products:
Battery Rack, Control Unit, BMS

TE Focus Products:
Board connector, **DC contactor**, resistor, **HDC**

TE Focus SV:

- **RPSF**
- **SYS**

(Time to market and pricing)

TE Focus Region:

- **Europe**
- **China**

Solar Inverter

2022(GW) Battery	Global	China
	225	>80%



Customer Focus Products:
Solar Inverter

TE Focus Products:
Dynamic, Relay, resistor, DC contactor, filter, terminal blocks, SMC

TE Focus SV:

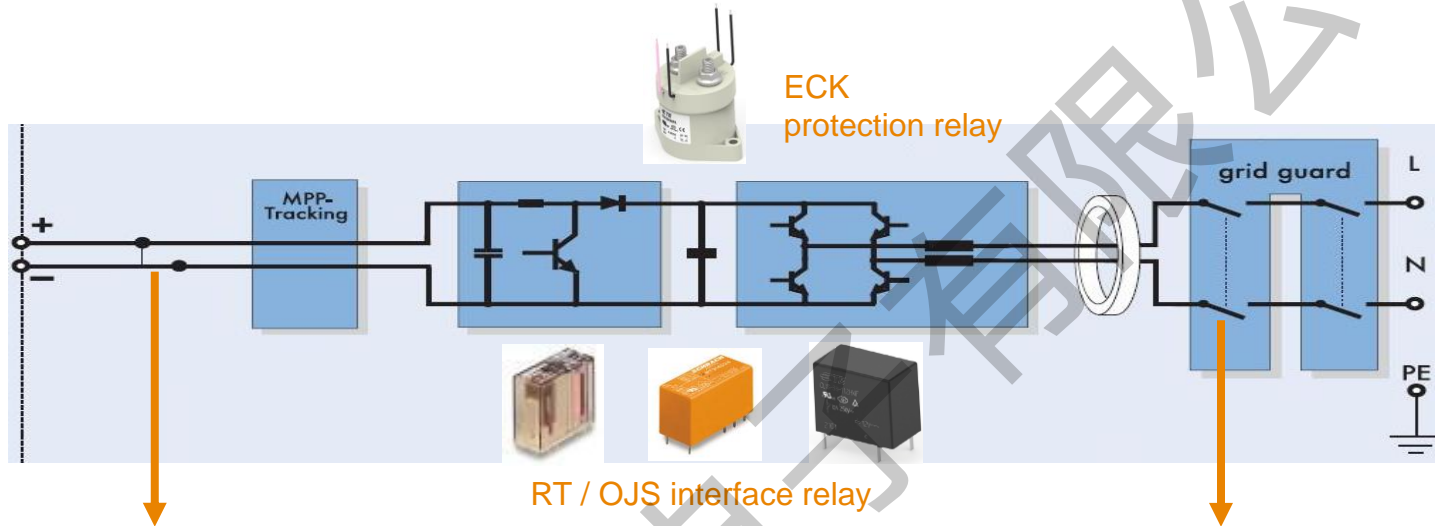
- **RPSF**
- **IEL**

(Time to market and pricing)

TE Focus Region:

- **China**

光伏系统...TE继电器/接触器解决方案



ECK150/200/250

ECK 150~250 系列接触器

- 产品系列全 — 150A, 200A, 250A
- 切换能力强 — 最大切换电压1000VDC
- 带辅助触点 — 可监测主触点状态



T9S

T9S系列继电器

- 触点间隙种类多 — 1.5/1.8/2.1mm
- 性能优越, 切换能力强 — 最大40A切换能力
- 温度范围宽 — 最大工作环境温度105°C



ECP350B

ECP350B 系列接触器

- 无极性可选 — 双向切换
- 分断能力强 — 额定350A, 1500VDC
- 带辅助触点 — 可监测主触点状态

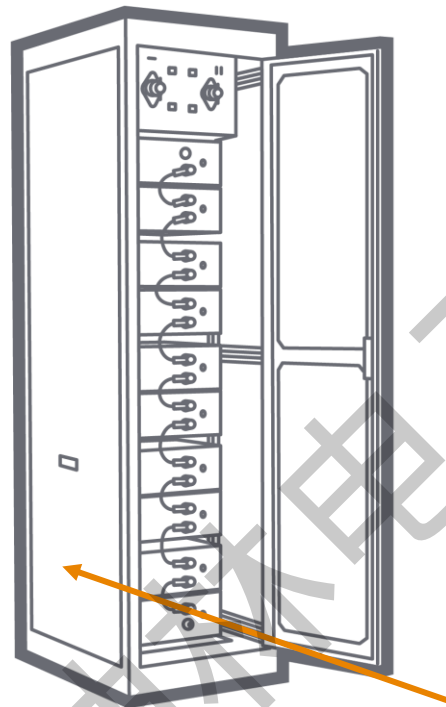
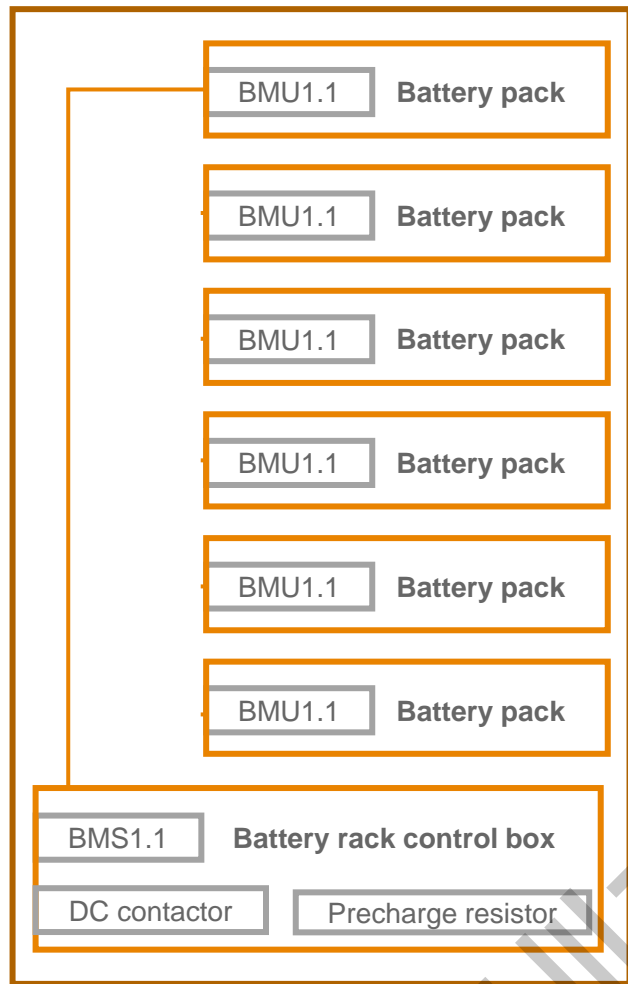


T92

T92系列继电器

- 2组触点50A, 满足美国L2 交流充电桩要求
- 性能优越, 可靠性高
- 切换能力强

D Battery System & Power Conversion System (PCS)



ECK 150~250 系列接触器

- 产品系列全 — 150A, 200A, 250A
- 切换能力强 — 最大切换电压1000VDC
- 带辅助触点 — 可监测主触点状态



ECP350B 系列接触器

- 无极性可选 — 双向切换
- 分断能力强 — 额定350A, 1500VDC
- 带辅助触点 — 可监测主触点状态

Configuration of Battery Rack in Commercial/Factory BESS

重载动力连接器



BESS Key Features



Key Technical Spec	Residential BESS (High Voltage Series)	Residential BESS (Low Voltage Series)	Commercial BESS	BESS Station
Cell capacity	50Ah – 100Ah	50Ah – 100Ah	>200Ah(314Ah as major)	>200Ah(314Ah as major)
Rated energy	<20 kWh	<20 kWh	50 - 1000 kWh	>3 MWh
Rated voltage	110 V – 600V	48V - 110V	≤1500V(1000V as major) (614.4V – 1331.2V)	≤1500V<2500V (614.4V – 1331.2V)
Rated charge/discharge rate			0.125C, 0.2C, 0.5C, 1C	0.25C, 0.5C, 1C, 2C
Standard charge/discharge current	25A - 60A	50A - 200A	100A - 314A	100A - 314A(628A perhaps)
Cooling	Natural cooling	Natural cooling	Wind-fan cooling, Liquid cooling	Liquid cooling
Mounting	Floor standing(Stacked)	Floor standing(Stacked)	Plug-and-play	Plug-and-play

Solution for Residential BESS



HDC Module

- Wide rating range 5A – 250A to meet different customers rating requirement
- Flexible combination of standard modules for data, signal and power



HDC Stacked Hybrid

- Hybrid all-in-one structure to meet key customer low voltage series solution
- Smaller size and lower price

Solution for Commercial BESS/ BESS Station



HPC Series

- Single pole and easy to plug structure
- High rating current 200A-350A

PSC-EasyLock IP67 塑壳信号连接器

FEATURES

- **Positions:** 8/12/4/6
- **Protection degree:** IP67
- **Installation:** Quick locking
- **Certification:** UL, TUV, CE
- **Color:** Black



PRODUCTS

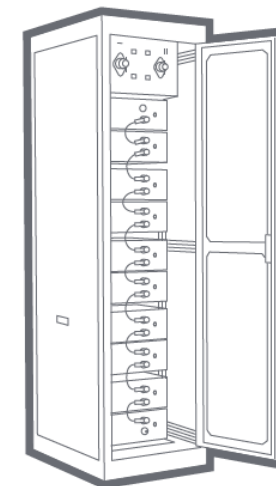
BENEFITS

- **Reliability:** IP67 protection & locking to secure the signal transmission
- **Easy Installation:** Quick locking system to improve efficiency on mating
- **Support automatic crimping:** Male & female contacts support machine crimping to improve efficiency
- **Keys for multiple application:** Different keys for customer using 2 or 3 connectors to prevent mis insertion
- **Panel compatible design** for 8 & 12 positions to reduce complexity on design & manufacture

TE PNs

TBD

APPLICATIONS



电池组的电池连接解决方案



低压信号连接

DYNAMIC MINI
DYNAMIC D1000
ERNI MaxiBridge
ERNI MicroBridge

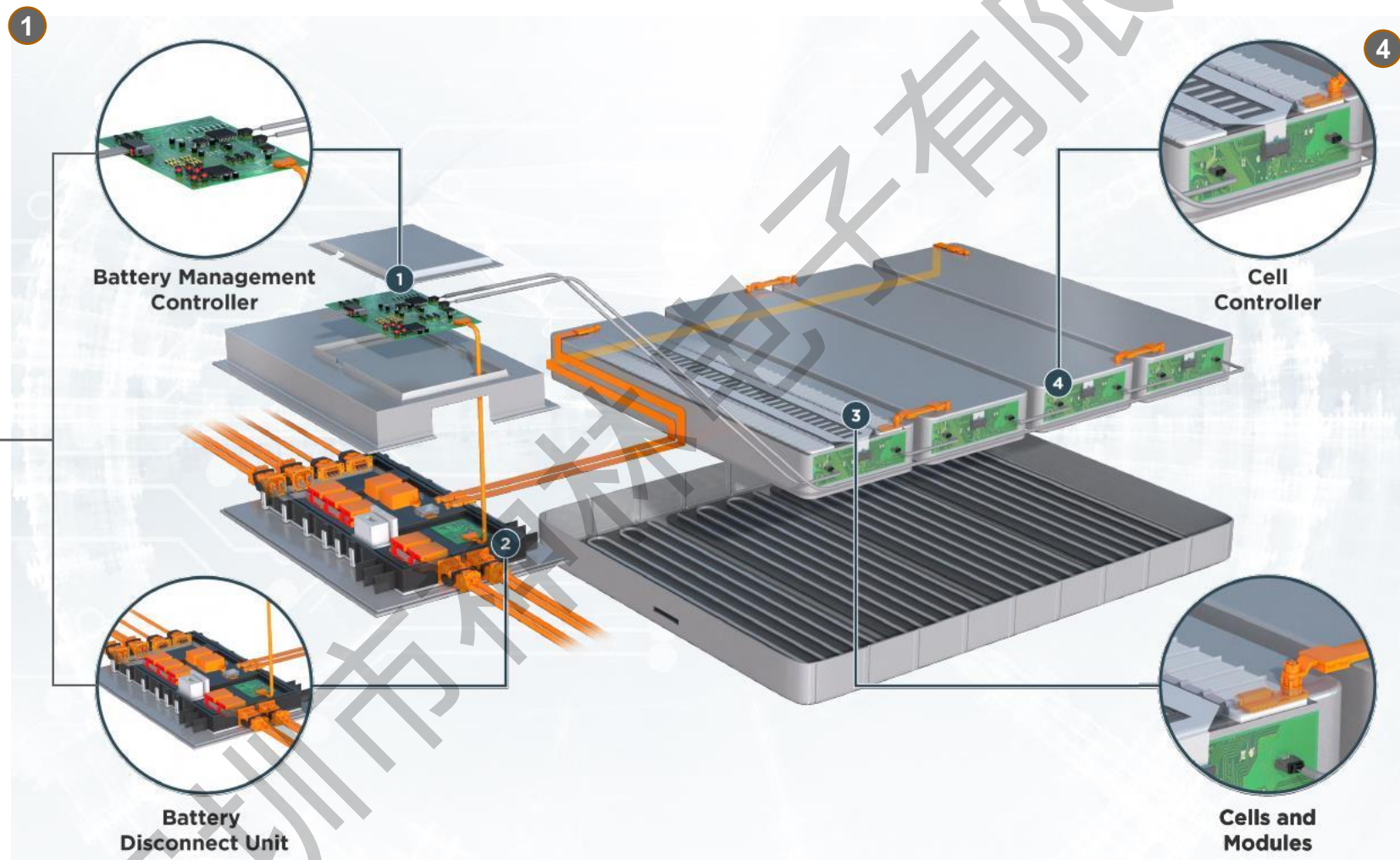
高引脚数和小型化，具有汽车级稳健性

高压信号连接 ②

600 – 1500V

DYNAMIC D3200
ERNI VolTron 1000
DYNAMIC New

引脚数多达 16 个引脚 1500V 能力和 PCB 小型化，具有汽车级稳健性



低压信号连接

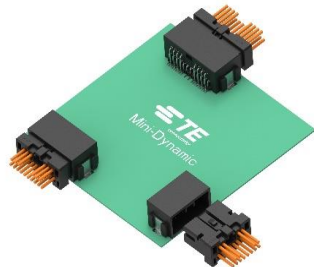
DYNAMIC MINI
DYNAMIC MINI F2B
ERNI MicroBridge & MicroBridge Flexfoil
ERNI SMC
SYSTEM 50
AMPFOIL ULTRA
DYNAFOIL

引脚数最多可达 80 个引脚，通过线材、FFC 和 FPC 选项实现小型化 汽车级稳健性

高压大电流动力连接
HPC Connector

大型储能系统TE解决方案 - 连接器(高低压信号采集)

Dynamic Mini



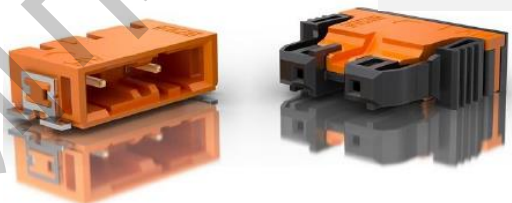
- 汽车级认证
- 小型化1.8mm pitch
- UL 94V-0抗阻燃等级塑壳

Dynamic 3200



- 800V 额定工作电压
- 3点接触的端子设计,高保持力
- UL 94V-0抗阻燃等级塑壳

Voltron1000

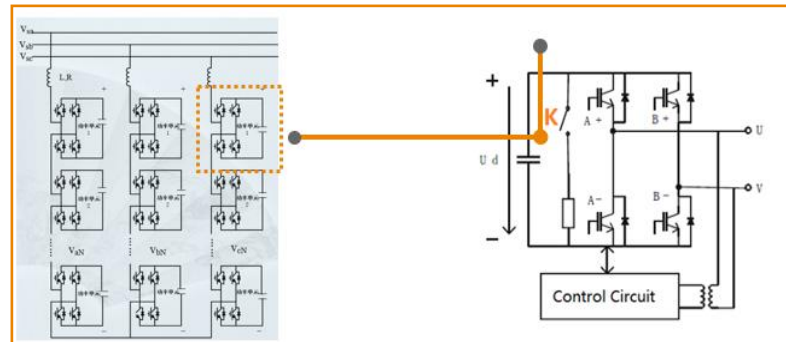


- 汽车级认证
- 1000V 额定工作电压
- UL 94V-0抗阻燃等级塑壳

2 电池管理系统 BMS



3 配电系统 PDU



1 电池系统 Battery System

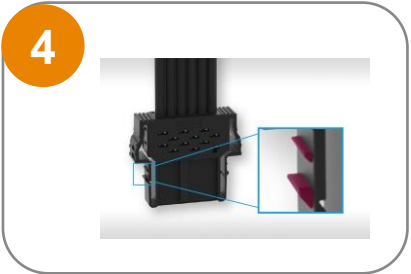
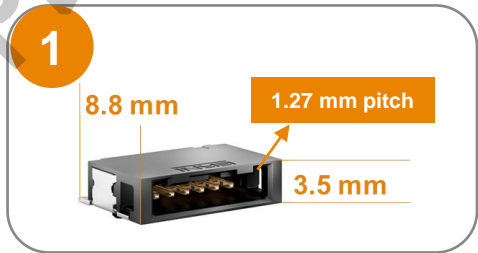


MicroBridge – 小型化电路板连接器



主要技术特点

- 1) 1.27 mm间距的小型化设计
- 2) KOSHIRI安全防范
- 3) 弯角和直线两种出线方式
- 4) 连接器双重锁定结构
- 5) 可选CPA版本
- 6) 双重IDC端子及集成应力消除结构



- 高抗震抗冲击等级
- 更长的端子刮擦长度
- 镀金的端子双弹臂梁设计

间距	1.27 mm
位数	2 – 16 pins (单排)
连接方式	板端SMT, 线端IDC
额定电流	20 °C温度下最大9A
额定工作温度	-40 °C ~ 150 °C
符合汽车标准	基于VW75174 和 USCAR-2标准
适用导向规格	IDC 单股导线 0.35 mm ²

主要应用领域

- 电池组
- 传动系统
- 车灯



Microbridge Flexfoil (FFC/FPC) 基于现有 Microbridge



现有 Microbridge 产品组合

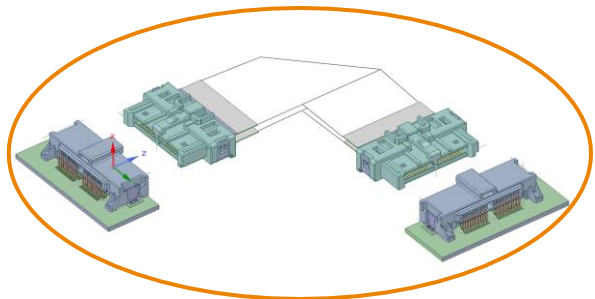
- 量产阶段
- 经测试符合VW75174
- 单股散线应用
- 1.27 mm 间距
- 2 – 16 位数

Microbridge Flexfoil (FFC/FPC)

- 产品开发阶段
- 规划特征:
 - 经测试符合VW75174
 - FFC 和 FPC 应用
 - 1.27 mm 间距
 - 提供 8 个和 20 个引脚 (其他引脚数有待讨论)

AMPFOIL ULTRA – 更方便的FFC/FPC连接器

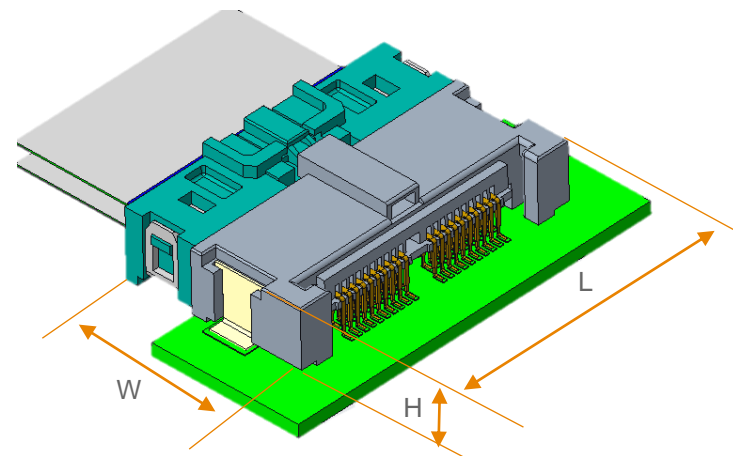
主要技术特点



- 1) 适配双层FFC/FPC连接
- 2) 母端和公端灵活的互锁结构
- 3) 同pin位数产品4种防呆键位
- 4) 上下层 FFC/FPC可以防止混插
- 5) 安装FFC/FPC时无需工具，对原材料无破坏

- 高抗震抗冲击等级
- 塑胶采用无卤材料
- 板端符合IP20B

外形尺寸 – 40位



L x W x H = 40 x 25 x 10 mm

间距	FFC: 1.0 mm / PCB: 0.5 mm
位数	24, 28, 32, 36, 40pins (双层FFC)
连接方式	板端SMT, 线端简单装配
额定电流	1A
额定工作温度	-40 °C ~ 105 °C
符合汽车标准	基于LV214 和 USCAR-2标准
适用FFC规格	FFC/FPC厚度: 0.3mm

主要应用领域

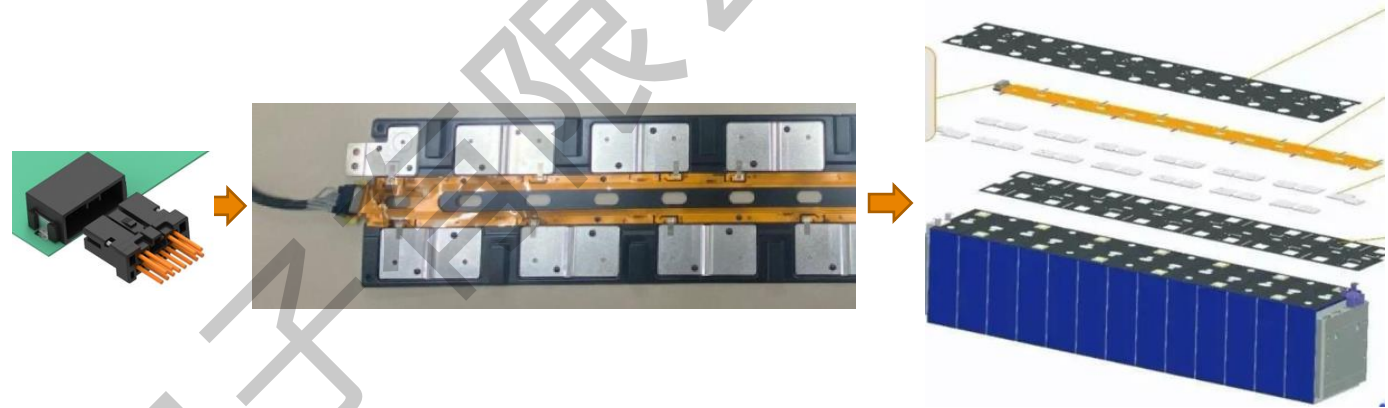
- 电池组
- 传动系统
- 车灯



EV-BMS(PACK)



SFDC # & Description	1534631
Acct Manager Field Engineer	Mike Qiu Andy Wu
Project Name	BMW SM01 PACK-MINI Dynamic
Customer Application	Cells contact system
1 st Year Revenue Value	FY24 \$ 326.29K
5 Year Revenue Value	\$ 1,6M
Production Start Date	2023.Q4



REASON TO WIN

- Value proposition for **compact size** of ERNI MaxiBridge series. with **USCAR/ILV214 Certification**
- **Good communication** of AM and FE with customer R&D team
- **Halogen free materials design**, fulfill the spec demand

RESULT & VALUE TO CUSTOMER

- **Halogen free materials** of Dynamic Mini is Existing solution for customer to quick catch up the timeline of project for fulfill the tight schedule from oversea market
- **Small size** 1.8mm pitch is suitable for less space mounting of BMS application

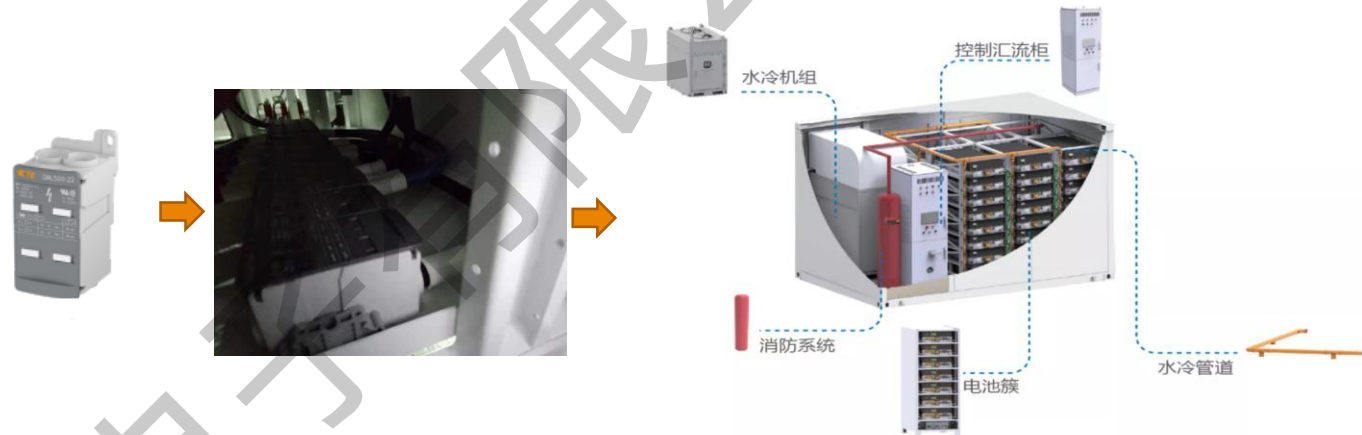
TE Solutions / Products

- **Subvertical:** BCS 24Pin Mini Dynamic
- Cells contact system assembling for temperature Voltage, signal collection
- **Customer:** Top 5 new energy in China (\$7B sales revenue 2023 FCST)
- **Design & project location:** Huizhou,China
- **Competitor:** Louts/Molex/TE AUT
- **Price level:** 1.1 USD/Set (Male+Female)
- **Core team:** Shiming(R&D Leader) George Fu (R&D) Jeff Chen (PM)
Mike Qiu (Sales) Andy Wu (FE)



BESS-(Cabinet Power distribution)

SFDC # & Description	1597469
Acct Manager	Boyd Xu/Mishel Sun
Project Name	<u>DBL for Commercial BESS</u>
Customer Application	Power distribution in Cabinet
1 st Year Revenue Value	FY24 \$ 306K
5 Year Revenue Value	\$ 1,4M
Production Start Date	2024.Q1



REASON TO WIN

- Value proposition for DBL has multiple advantages **compare with busbar solution by compact size, space-saving, and easy to install**
- Good communication** of AM and FE with customer R&D team

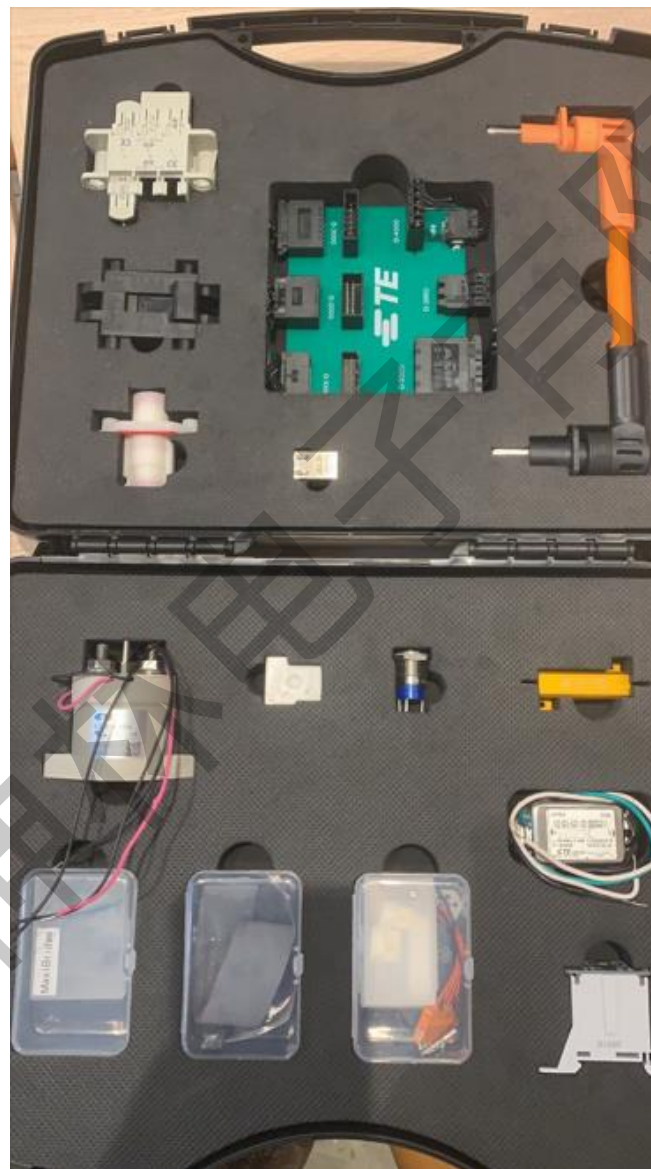
RESULT & VALUE TO CUSTOMER

- 80~550 A 1000V AC/1500V DC Multiple selection** of 2-in/14-out input and output--**Compact, space-saving, and easy to install**-- mature solution and stable client applications with small size
- 3 in 1: one pole/multi pole/ grouping. **reduce assembly time, Improve security compact volume=space saving**

TE Solutions / Products

- Subvertical:** IEL DBL
- DBL for BESS cabinet power distribution for water pump, air-condition, lighting.
- Customer: Top 10 new energy in China (\$1B sales revenue 2023 FCST)
- Design & project location:** Beijing, China
- Competitor:** Busbar supplier
- Price level:** 4 USD/unit
- Core team:** Boyd Xu/Mishel Sun(Sales) Weilong Cao, Tone Feng (PM)

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