BESS/EVI Application

– TE solution

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EVERY CONNECTION COUNTS

EVI & BESS market overview

BESS/EVI Market	PACK	E-drive	OBC	ESS(Household)	ESS(Power)
					
	TAM:$340M				
Customer	BYD CATL EVE 国轩高科	INOVANCE BYD XPT	BYD VMAX SHINRY 欣锐 EVTECH	BYD POWERAMP SUNWODA 欣旺达 PYLONTECH	SUNGROW 海博思创 HyPER STRONG KELONG SERMATEC
Product/ Application	***D1000 series:*** *Low voltage collection* ***D3000 series:*** *High voltage collection* ***Mini series:*** *Low voltage collection* ***PCB terminal :*** *High voltage collection*	***D1000/Viola/Maxibridge/SMC :*** *Used for low voltage signal transmission between driver board and control board*	***D1000/ D2000/Mini/Minibridge :*** *Used for low voltage signal transmission*	***D1000/2000 series/Viola:*** *Low voltage collection* ***D3000 series:*** *High voltage collection*	***D1000 series:*** *Fan power & data transmission.* ***D3000 series:*** *Power & data transmission.* ***AMPMODU:*** *DC-DC control board connection*

EVI PACK Solution 1

Used local player WTB connector for collecting low voltage & Temp.

Used IRISO connector for collecting all signals

Blade Cell Unit

Blade Cell Unit

Blade Cell Unit

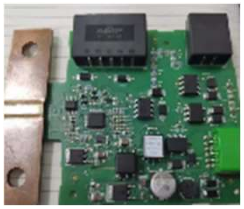
BDU

BIC

BIC

BMU

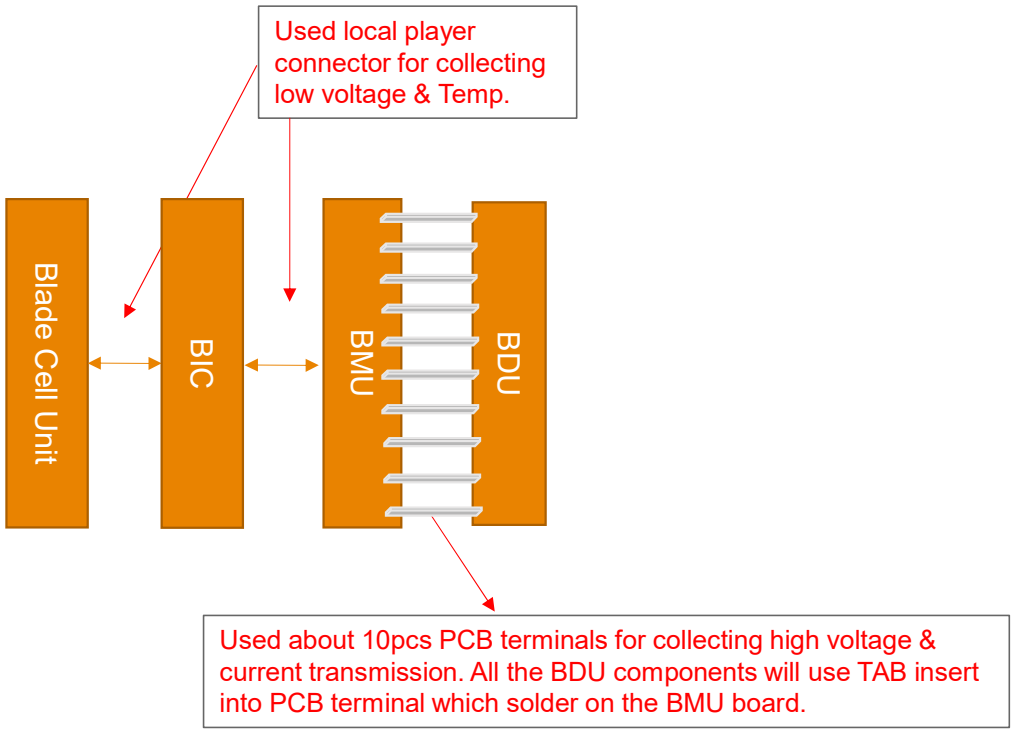
Used D3200 2pin&4pin or 6pos for collecting high voltage

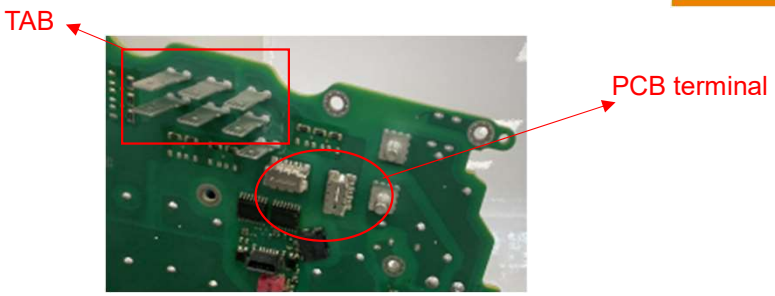


- ✓ Common Cell : Ternary polymer lithium battery(三元聚合物锂电池)
- ✓ Blade Cell : Lithium iron phosphate battery(磷酸铁锂电池)

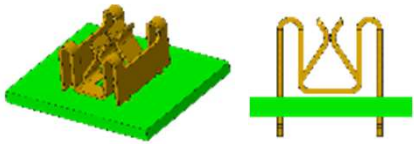
BYD EVI PACK Solution

BYD EVI PACK Solution 2

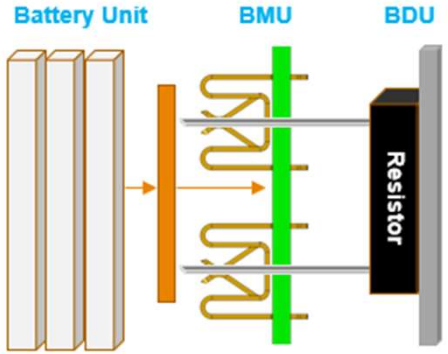




Porsche Solution



TE PCB terminal



BYD PACK Solution

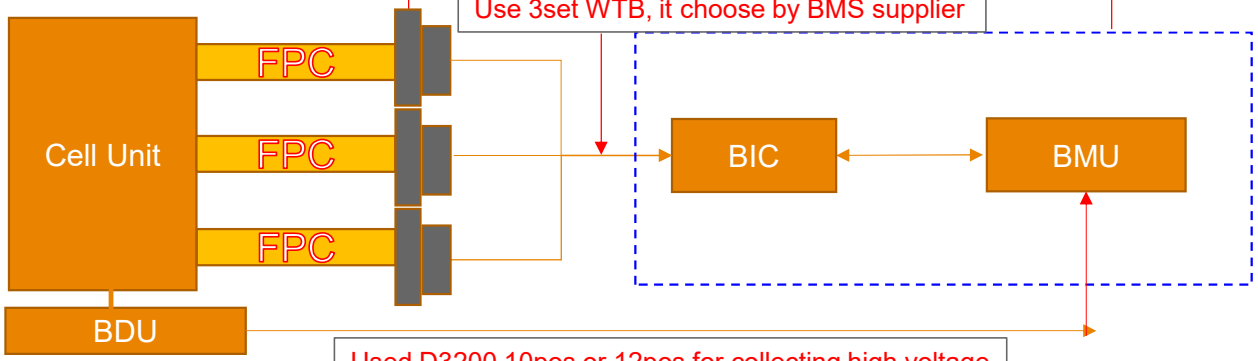
EVI PACK Solution 3

Solution 1

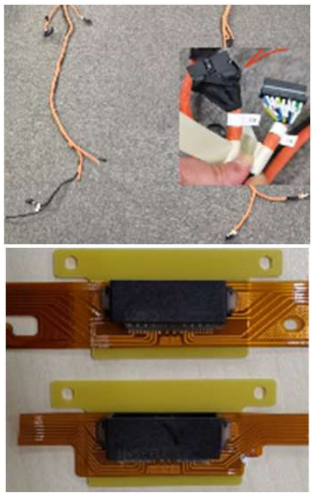
Use 3 ser 24pos mini dynamic to connect BIC board

EVE buy BMS board from outside. Now they plan to design BMS board by themselves

Use 3set WTB, it choose by BMS supplier

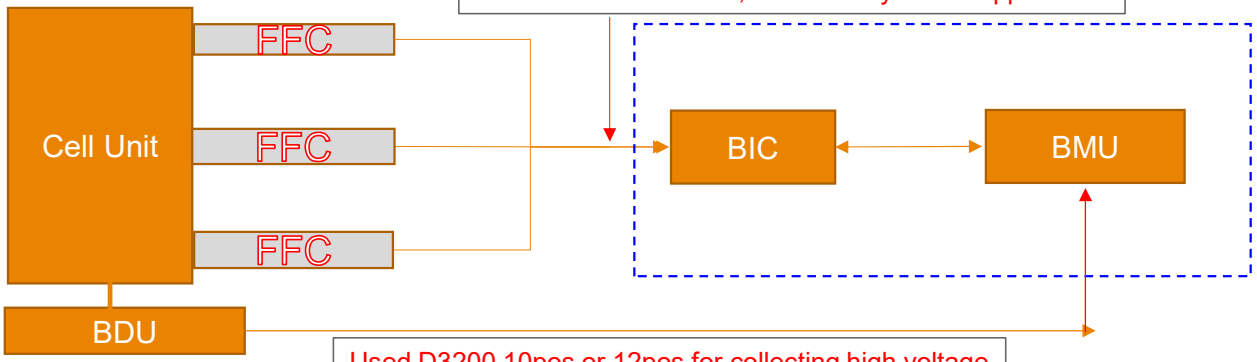


Used D3200 10pos or 12pos for collecting high voltage



Solution 2

FFC → Use 3set WTB, it choose by BMS supplier



Used D3200 10pos or 12pos for collecting high voltage

EVI PACK Summary

Application Snapshot

Key Trends

- ❖ As a leader in electric vehicles & battery, BYD has ability to redesign the battery pack structure and integrate BDU, cell, and BMS to reduce the use of connectors, reduce the volume of battery packs and increase battery density to improve the battery life of electric vehicles. Therefore, it will become a trend to replace WTB connectors with metal structural parts.
- ❖ Connector with smaller size due to reduce pack volume
- ❖ Connector with high voltage due to increase the battery density

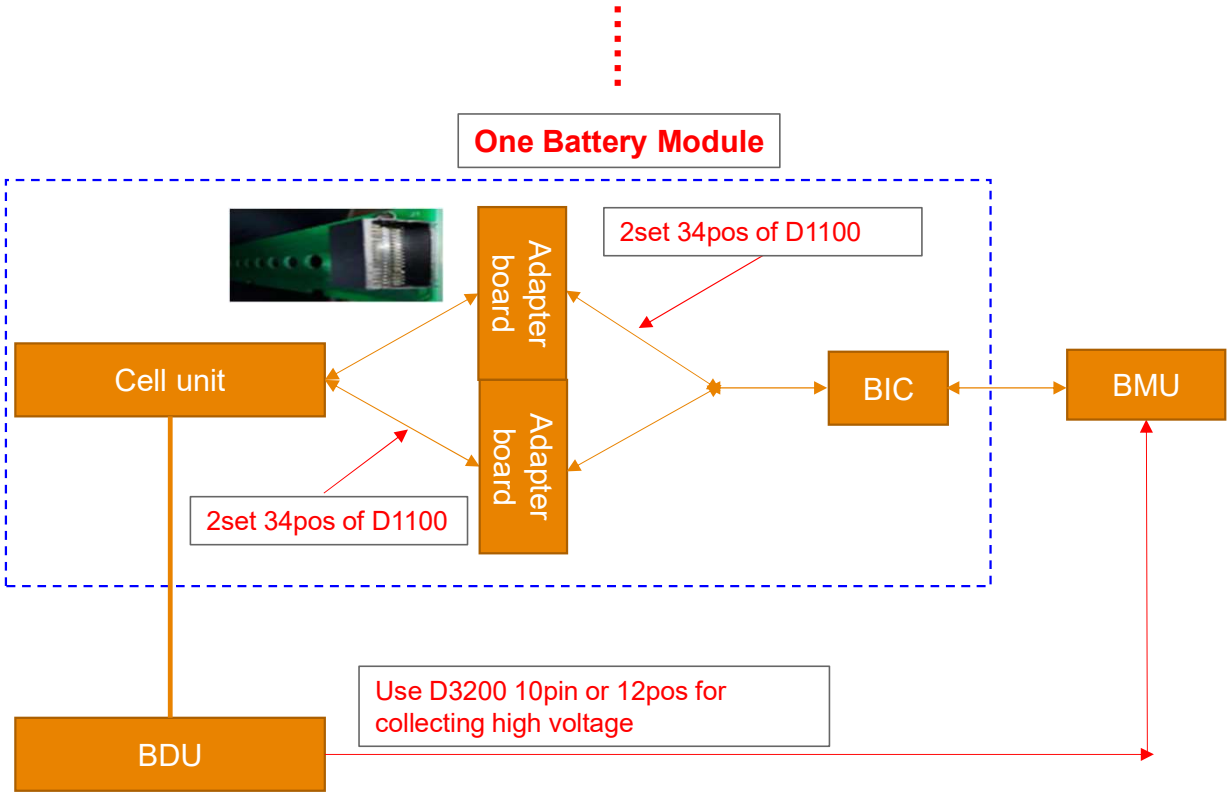
Product Suggest

Application	DEVICE Product	Competitor
Low voltage collection Temp. collection	Mini Dynamic Dynamic D1000 series PCB Terminal Metrimate	IRISO HRS JST Molex
High voltage collection Heating system	Dynamic D3000 series Metrimate	HRS JST Molex

Remark : If connector used in EVI PACK, it need to meet USCAR or LV214 standard.

ESS(Household) PACK Solution

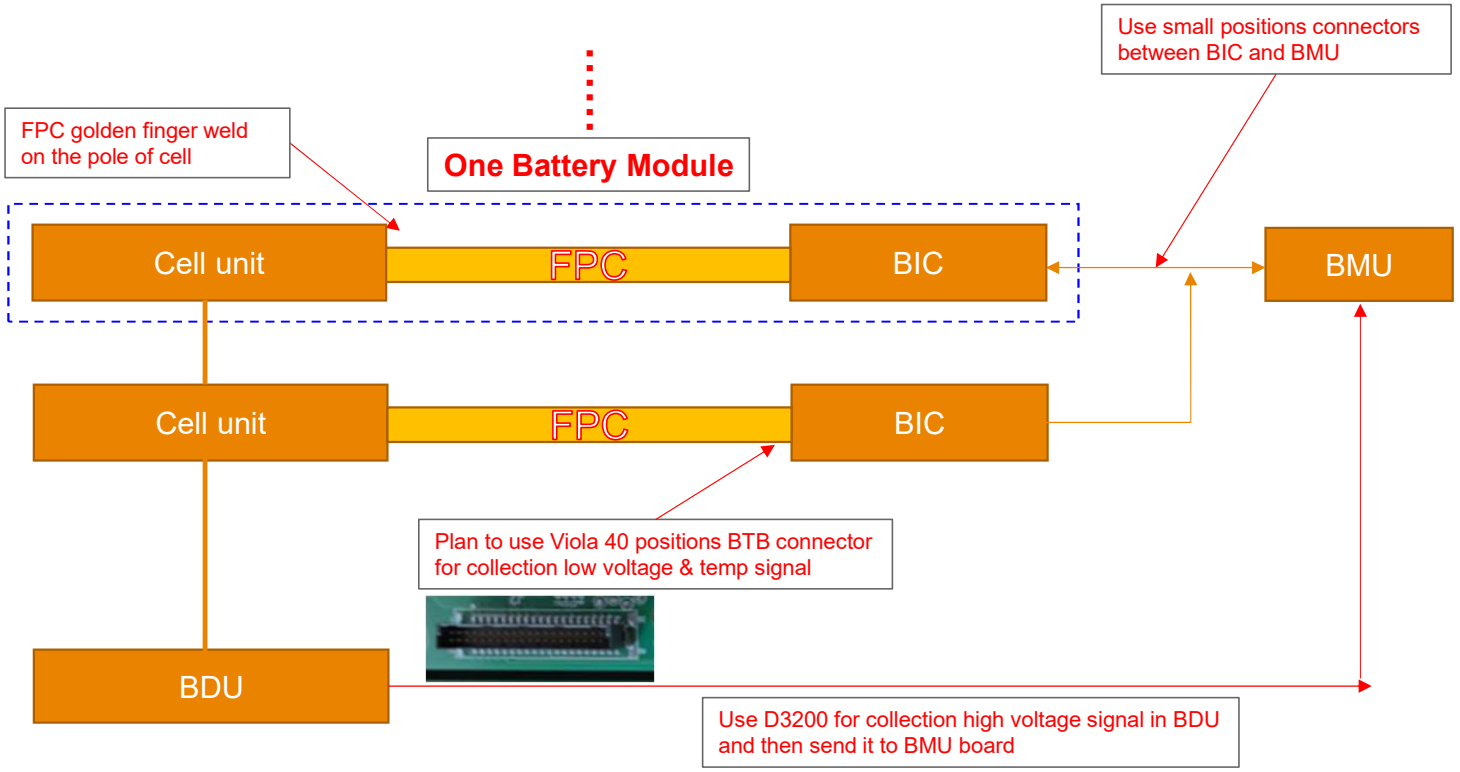
ESS PACK Solution 1

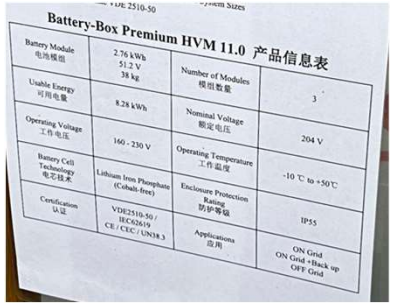


- ✓ ESS(Household) is composed by PACK and PCS
- ✓ Will use HDC connector to transmission the data between upper and lower battery modules
- ✓ Cell : Lithium iron phosphate battery(磷酸铁锂电池)

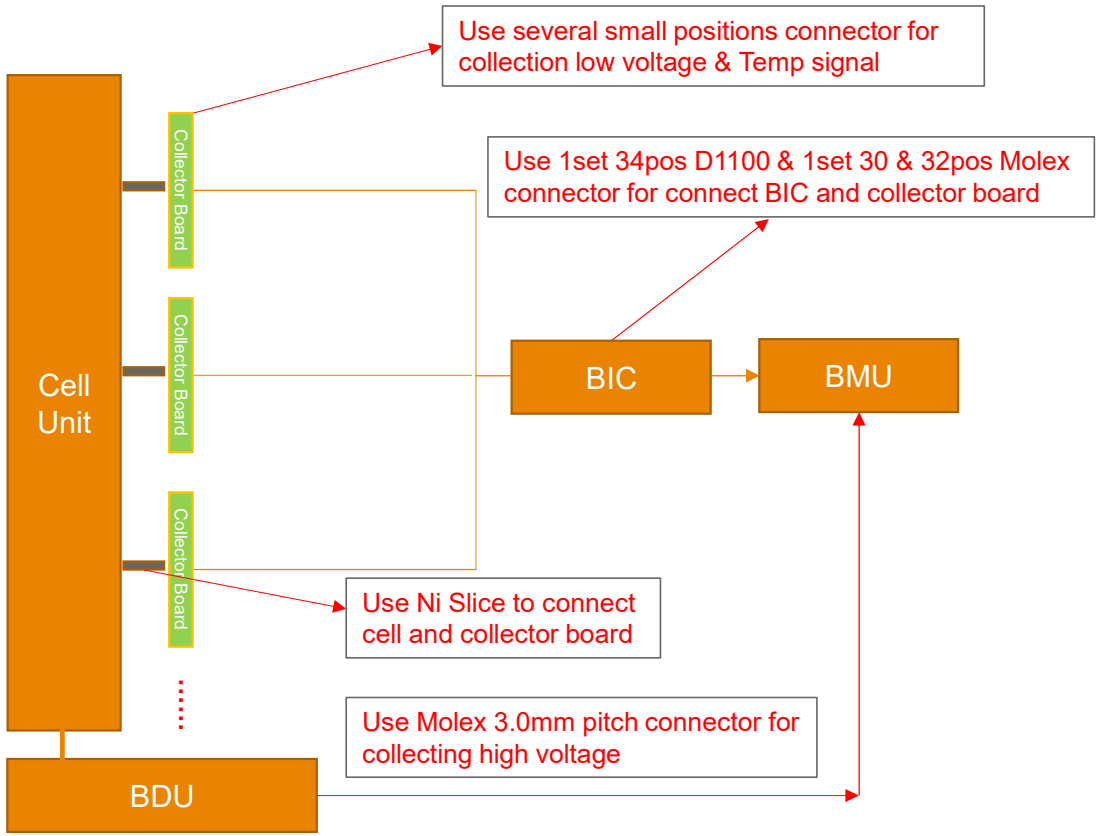
ESS(Household) PACK Solution

ESS PACK Solution 2

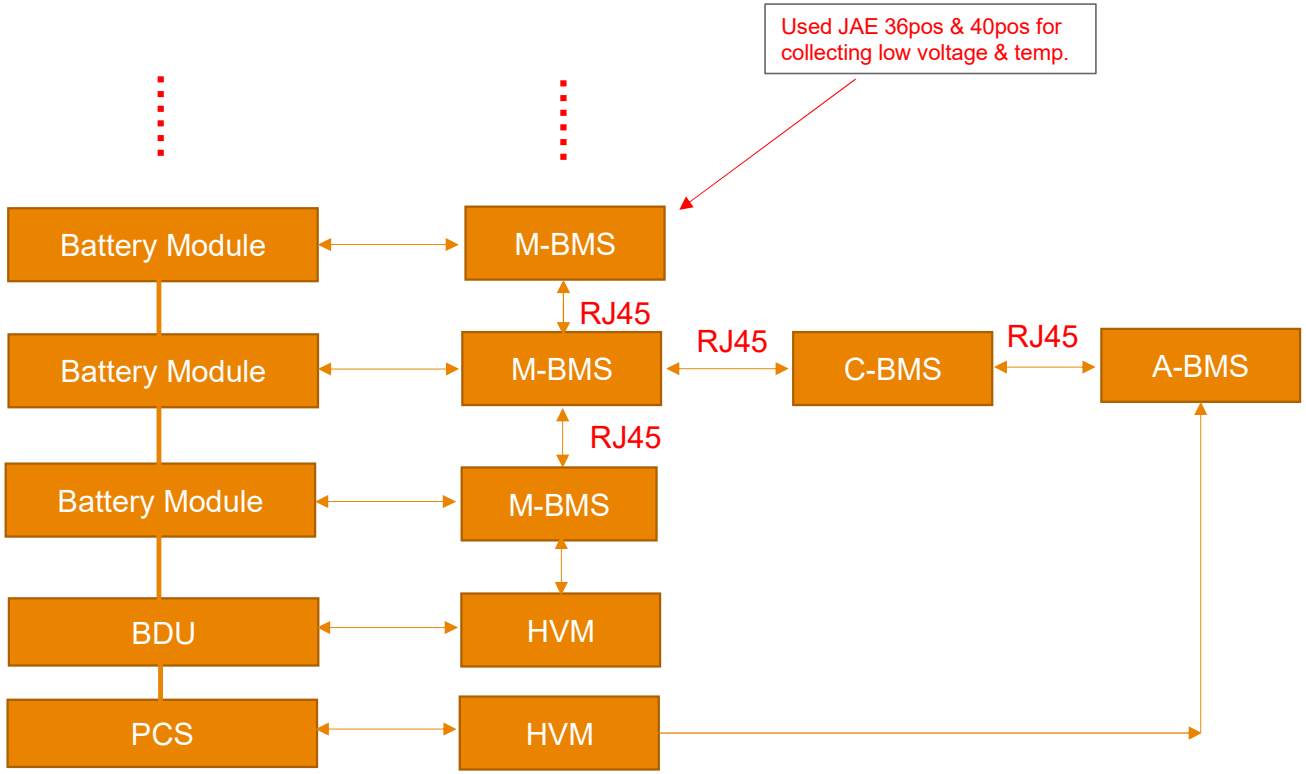




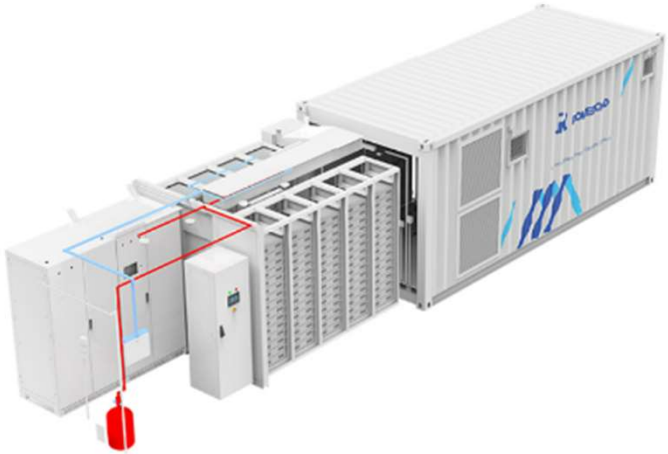
ESS(Household) PACK Solution



ESS(Power) Solution



M-BMS : Module BMS
C-BMS : Cluster BMS
A-BMS : Array BMS
HVM : High voltage monitor
PCS : Power conversion system



ESS PACK Summary

Application Snapshot

Key Trends

- ❖ Reduce the use of connectors due to cost down requirement.
- ❖ Used connector with BTB type instead of WTB
- ❖ Connector with high voltage due to increase the battery density

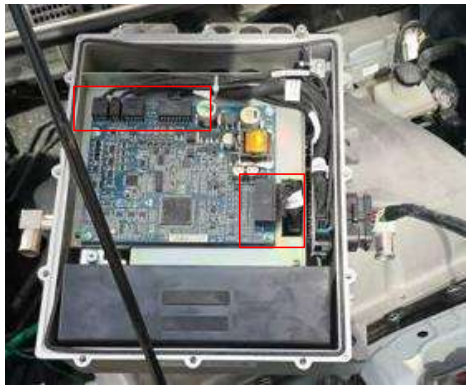
Product Suggest

Application	DEVICE Product	Competitor
1. Low voltage collection 2. Temp. collection 3. DC/DC 4. Fan power & data	Mini Dynamic Dynamic D1000 series PCB Terminal Metrimate AMPMODU	IRISO HRS JST Molex Samtec
1. High voltage collection 2. Power & data 3. Heating system	Dynamic D3000 series Metrimate	HRS JST Molex

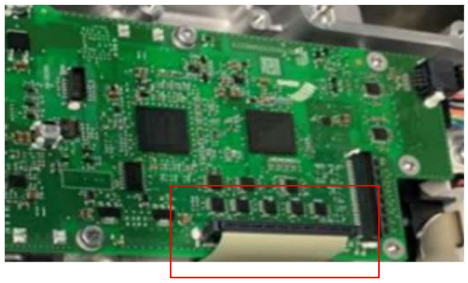
E-drive solution

E-drive is mainly composed by drive unit and control unit

- Used our Dynamic D1000 series WTB solution for low voltage signal transmission in drive board.

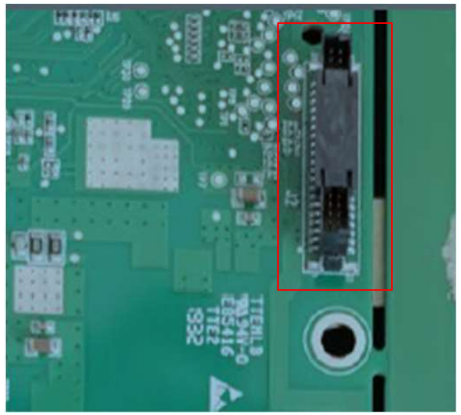


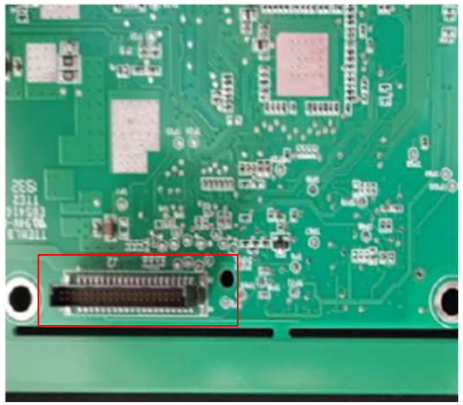
- Used ERNI SMC & MaxiBridge series WTB solution for low voltage signal transmission between driver board and control board.

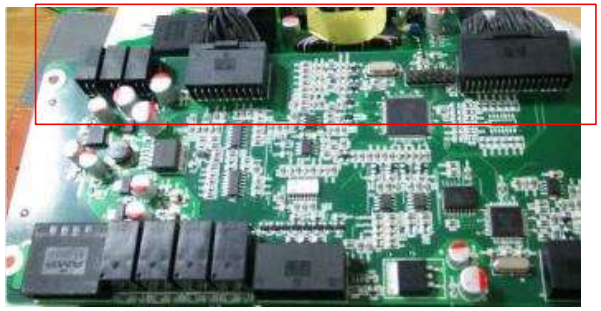


E-drive solution

- Used Viola BTB solution for low voltage signal transmission between driver board and control board.
- Used Dynamic D1000 series WTB solution for low voltage signal transmission in drive board.







E-drive Summary

Application Snapshot

Key Trends

- ❖ Mainly used WTB & BTB type connector
- ❖ Connector with smaller size due to reduce the volume in EV

Product Suggest

Application	DEVICE Product	Competitor
1.Driver board and control board communication 2.External communication of the control board	Mini Dynamic Dynamic D1000 series MaxiBridge SMC Minibridge Viola	IRISO HRS JST Molex

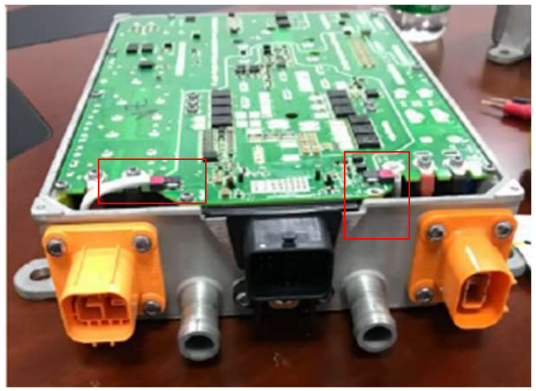
Remark : Connector used in E-drive, it need to meet USCAR or LV214 standard.

OBC solution

OBC is usually composed by PFC unit, control unit and DC/DC unit. The main charging power of OBC is 3.3kw,6.6kw and 11kw.

Remark: PFC mean power factor correction

- Used ERNI Minibridge series 2/6/12pos WTB solution for low voltage signal transmission between control board and DC/DC board.



OBC Summary

Application Snapshot

Key Trends

- ❖ Mainly used WTB & BTB type connector
- ❖ Connector with smaller size due to reduce the volume in EV

Product Suggest

Application	DEVICE Product	Competitor
1.Communication between control board and DC/DC board 2.External communication of the control board	Mini Dynamic Dynamic D1000 series MaxiBridge SMC Minibridge Viola	IRISO HRS JST Molex

Remark : Connector used in OBC, it need to meet USCAR or LV214 standard.

Conclusion

- For EV & ESS PACK, there are connector demand between cell unit and BIC , between BIC and BMU between BDU and BMU, heating system and BMU, cooling system and BMU.
- For E-drive, there are connector demand between driver board and control board, external communication of control board.
- For OBC, there are connector demand between control board and DC/DC board, external communication of control board.

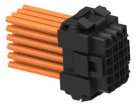
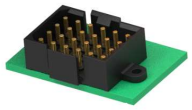
Appendix

Product Catalog

Dynamic Catalog


AMPMODU Catalog

Metrimate Catalog

ERNI-SMC

ERNI-MiniBridge

ERNI-MaxiBridge

ANY CONNECTION CAN CHANGE THE WORLD

EVERY CONNECTION COUNTS

TE connectivity