

TE Warehouse solution-AGV

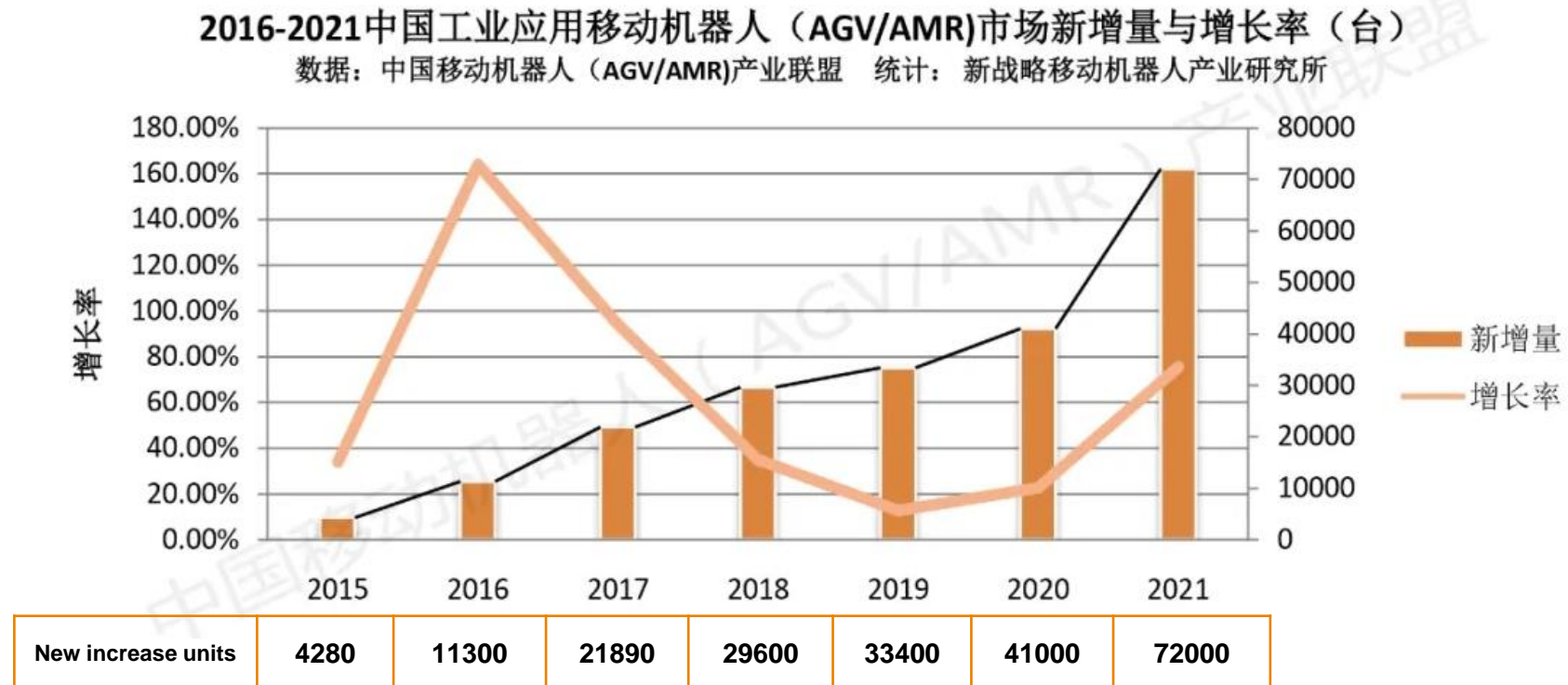
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Industrial sales manager

EVERY CONNECTION COUNTS

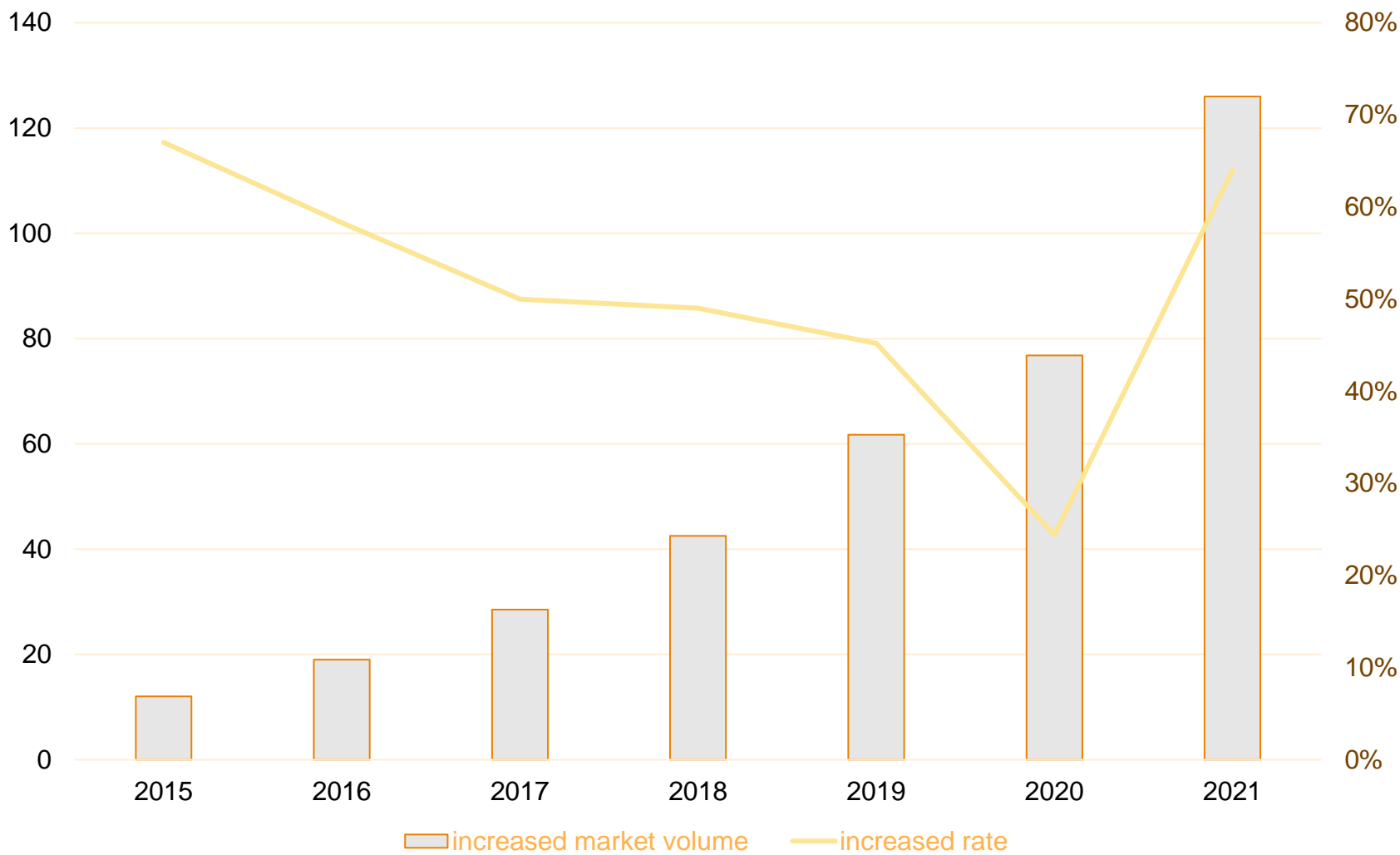


- The growth of the AGV market is driven by demand for automation in material handling across industries,
- The adoption of Industry 4.0 technologies in warehousing has enabled effective communication between warehouse operations, which will increase the opportunity for AGVs
- AGV market is very fragmented with the **top 10 players** only covering **<30% market share**; In China, up to **36 company's revenue exceed 100M cny**
- In China market, **YOY 75.61% growth** rate in 2021, reach to **70,000 set**. Market expect **40% CAGR/ 5yrs**.

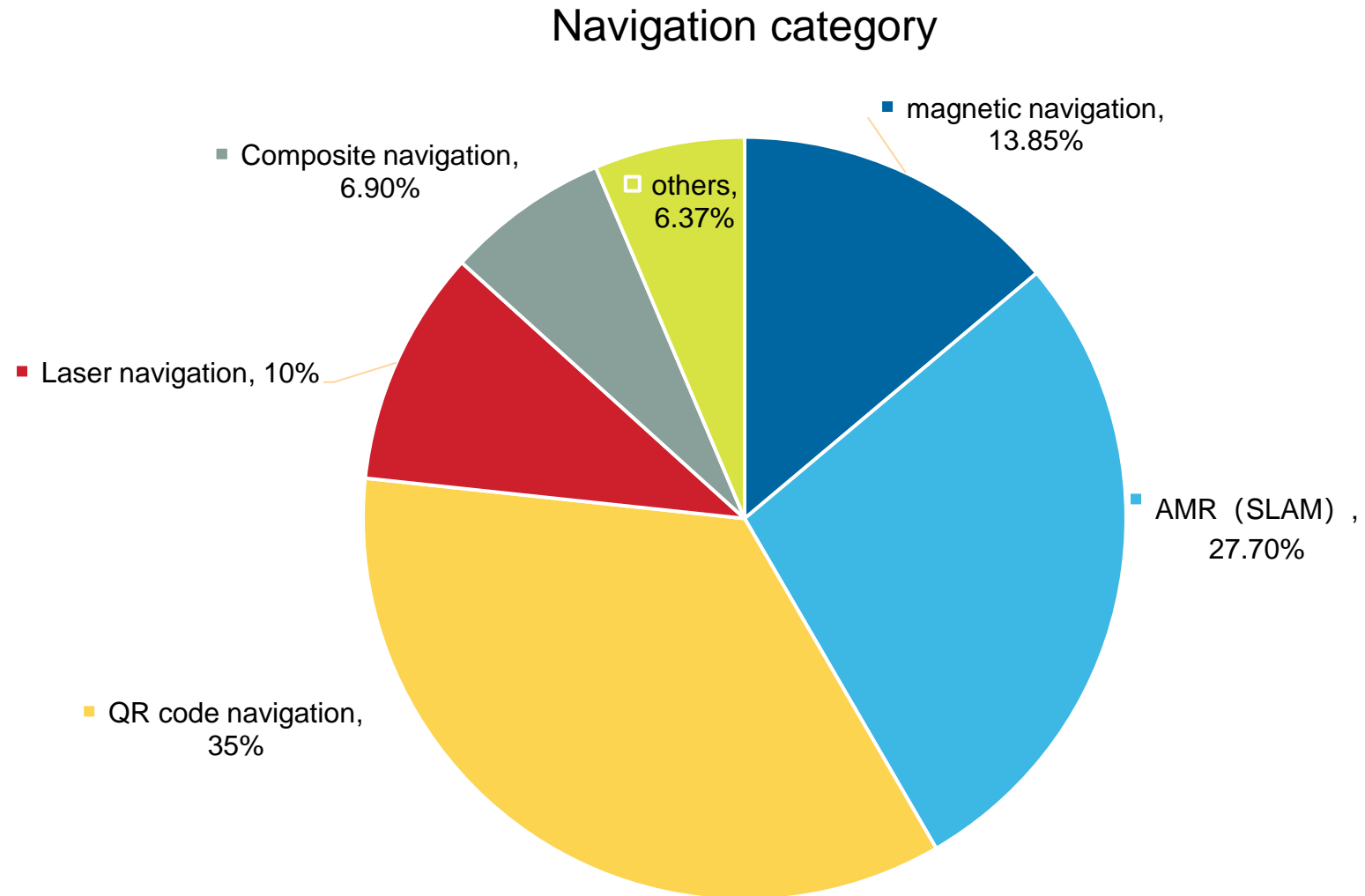
FY21 volume 72k units.

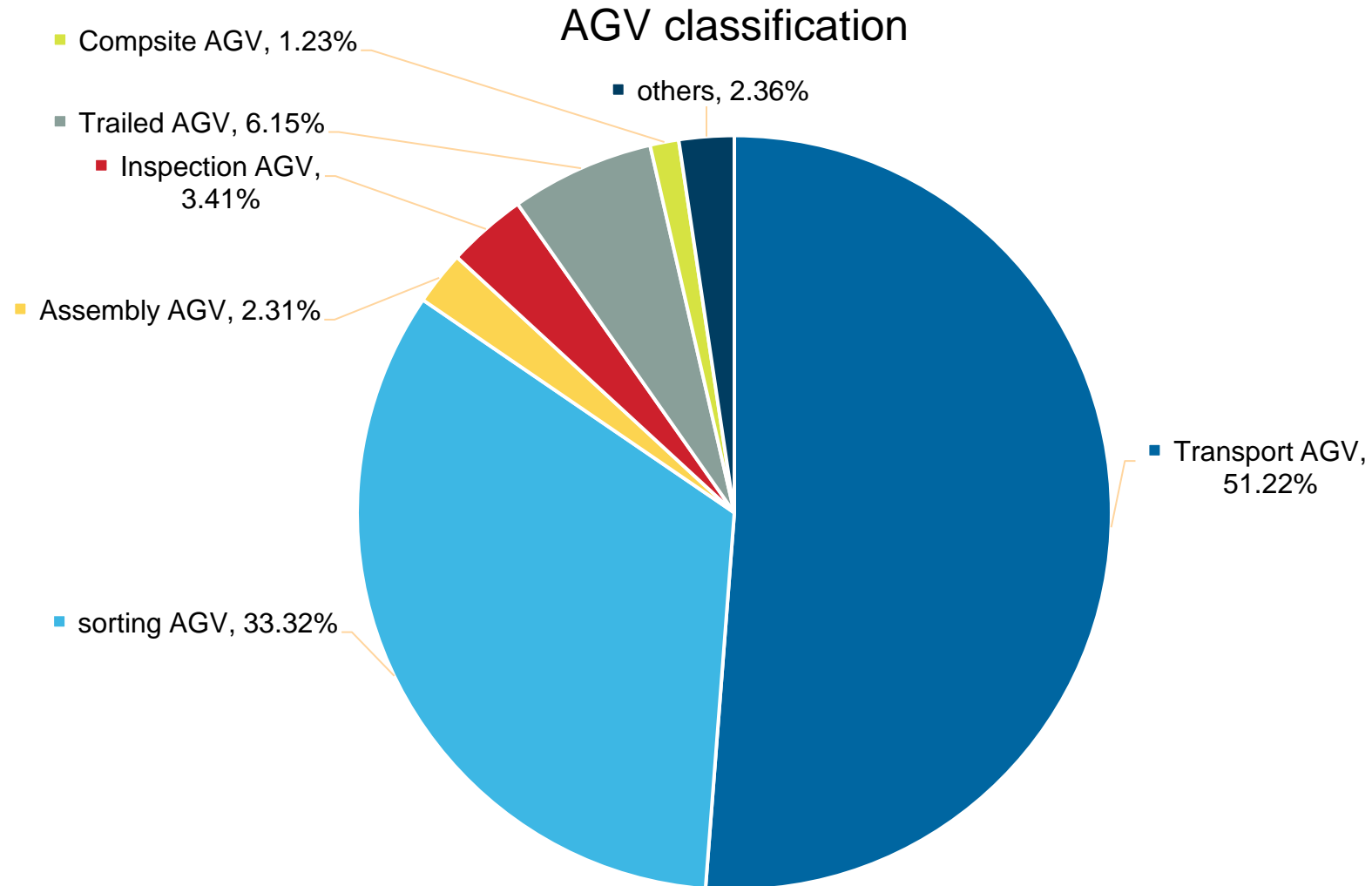


Chinese AGV market volume and increasing rate

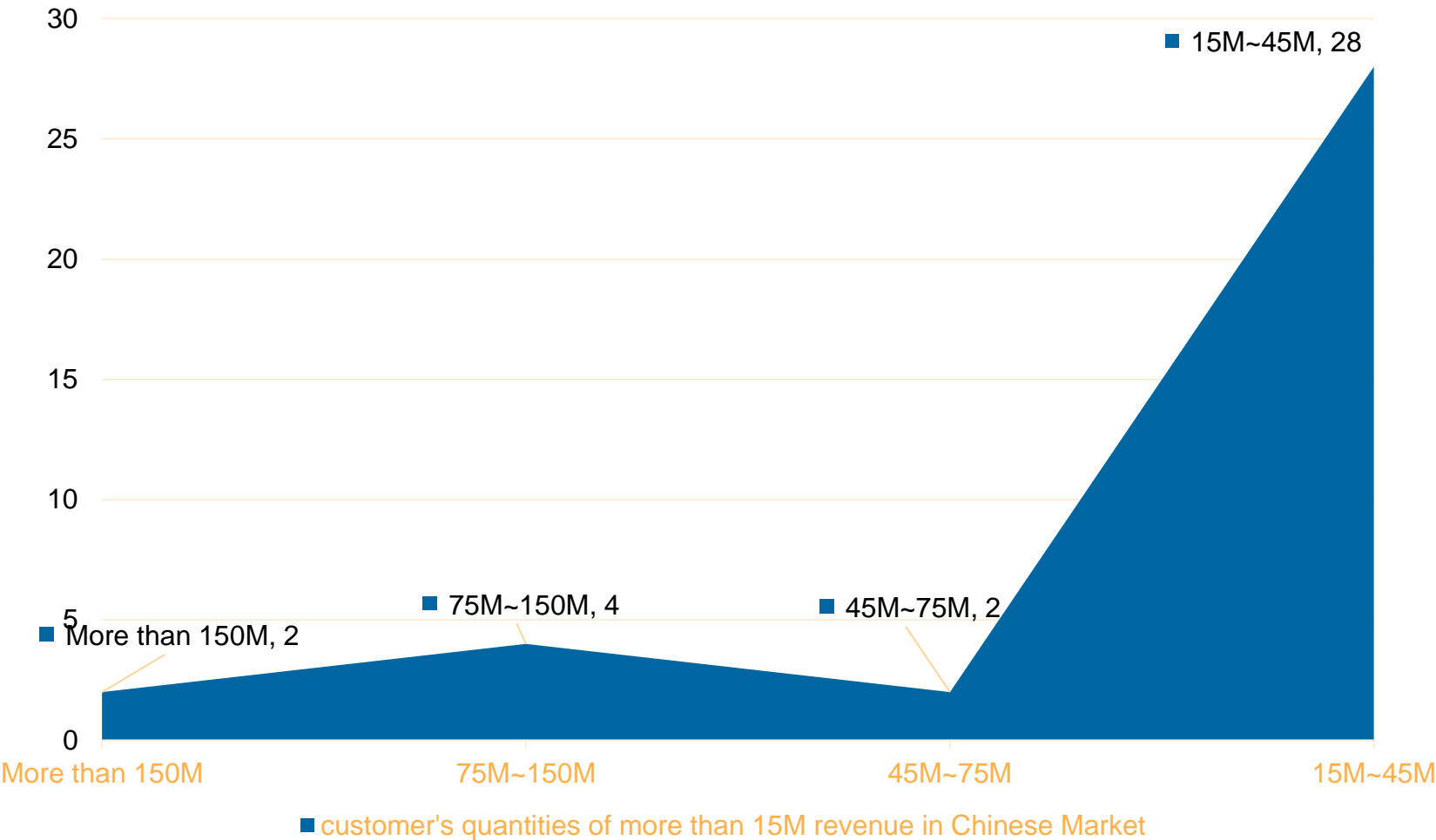


FY21 new increase market volume 12.6billion RMB, increasing rate 64%.





FY 21 AGV customers revenue more than \$15 million in Chinese market



AGV/AMR-charging



蓄电和充电装置
Battery and charger

- HDC charger connector
- Dynamic D3000
- DBL
- DC contactor

battery



What our customer
care more about the
charging connector?

AGV/AMR-charging



- The current
- The mating cycle
- Temperature incremental

HDC charging connector solution A

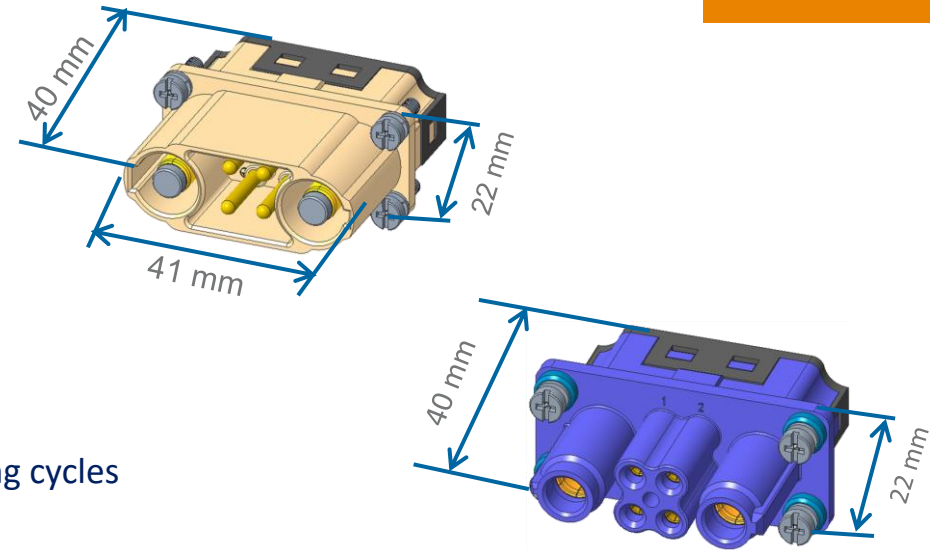
Solution A

feature:

- hybrid:
power: 60A/400V * 2pins
signal: 10A *250V *4pins
- Mating cycle: $\geq 30,000$ 次
- Floating design(0.5mm)

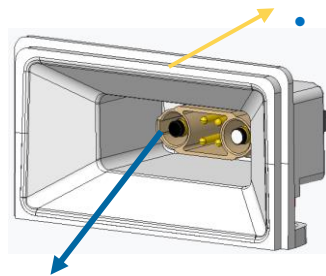
advantage:

- Space Saving with hybrid system
- High Conduction Performance with low TR
- High Reliability Performance with high mating cycles
- Floating design: Correct mating positions



Charging port - provided by customer

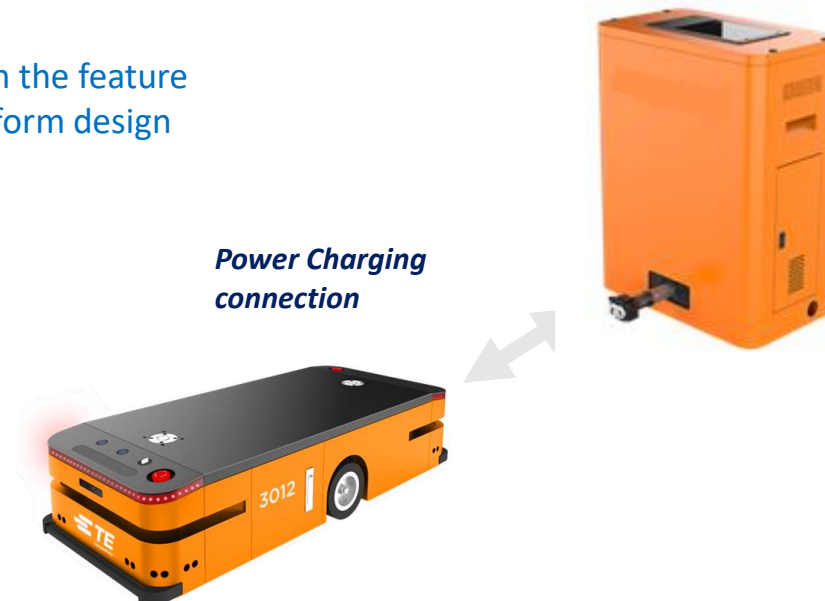
- Benefit for customer flexible design the feature
- Benefit for customer different platform design



Core insert - provided by TE

- Benefit for customer using in whole platform AGV

Power Charging connection



HDC charging connector solution B

Solution B

feature:

- Hybrid design:
 - power: 50A/125V * 2 or 3pins
 - signal: 0.5A * 8pins
- High mating cycle: $\geq 12,000$ 次
- Floating design

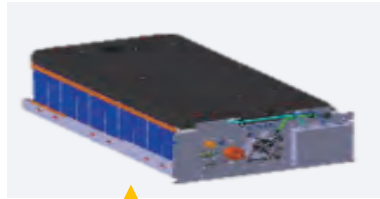
advantage:

- Error tolerance : $X \pm 15\text{mm}$, $Y \pm 10\text{mm}$, $Z \pm 0.5^\circ$
- Hybrid design

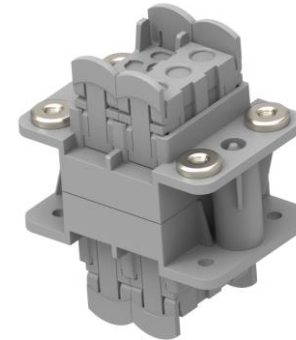


AGV/AMR battery change solution

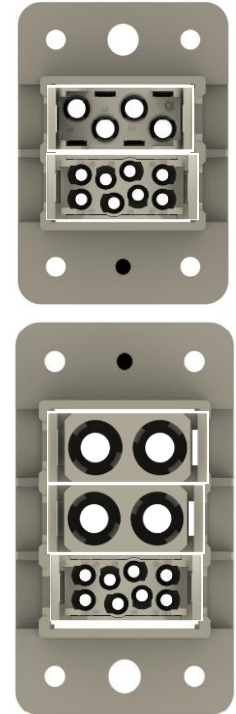
What our customer care
more about the battery
change solution?



battery



Battery change



AGV/AMR-battery change

- The full product portfolio
- The mating cycle
- Error tolerance

AGV/AMR battery change solution

Solution B

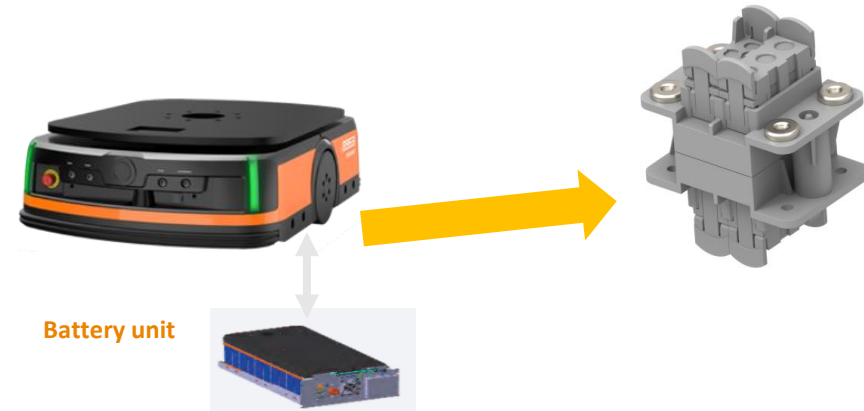
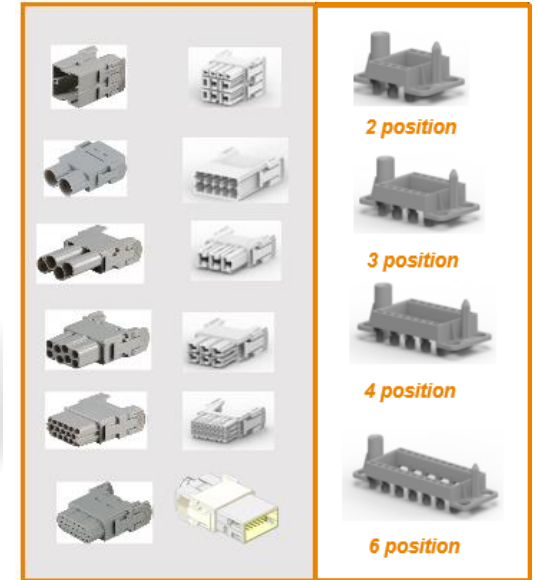
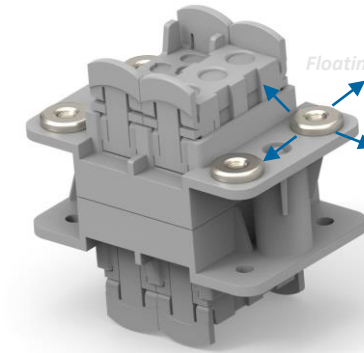
Battery Change Solution

Feature

- HDC Docking Frame modular system
- HMN-modules for Signal and power
- Pre-leading pins and float washers to balance the mechanical tolerances (2mm)
- Mating cycle (Options)
High mating $\geq 30,000$ cycles / Normal ≥ 500 cycles





BENEFITS

- Floating allow tolerance 2mm
- Design Flexibility with complete portfolio
- Space Saving with modular system



AGV/AMR battery change solution



type	pins	current	voltage	pin type	frame
HMN-001	1	200A	1000V	Machining contact	 2 position
HMN-D2	2	100A	1000V	Machining contact	
HMN-002	2	70A	1000V	Machining contact	
HMN-003	3	40A	690V	Machining contact	
HMN-004	4	40A	830V	Machining contact	 3 position
HMN-006	6	16A	500V	Machining contact	
HMN-006-P	6	16A	830V	Machining contact	
HMN-008	8	16A	400V	Machining contact	
HMN-012	12	10A	250V	Machining contact	 4 position
HMN-017	17	10A	160V	Machining contact	
HMN-20	20	16A	500V	Machining contact	
HMN-025	25	5A	50V	Machining contact	
HMN-HD1-48	48	2.2A	32V	HDC Dynamic	 6 position
HMN-HD1-24	24	3.7A	300V	HDC Dynamic	
HMN-HD3-10	10	11A	400V	HDC Dynamic	
HMN-HD4-6	6	16A	500V	HDC Dynamic	
HMN-HD5-3	3	40A	300V	HDC Dynamic	
HMN-HD1-32 (360° EMC 屏蔽)	32	2.2A	32V	HDC Dynamic	
HMN-HDW5/3-4/4	4 + 4	40A / 11A	800V	HDC Dynamic	

Battery Management System

Automated Guided Vehicles



Monitor the current/voltage of each battery cell
D1200, 4/6P
Mini Dynamic



Collect information from each battery cell to one connector
D1100, 34/40P



Heater, to avoid vapor, WTW
D3000, 2/3/4P

Transfer signal between battery cell and mainboard
D1000/D3000



Main-board
D1000/D3000

Dynamic Series

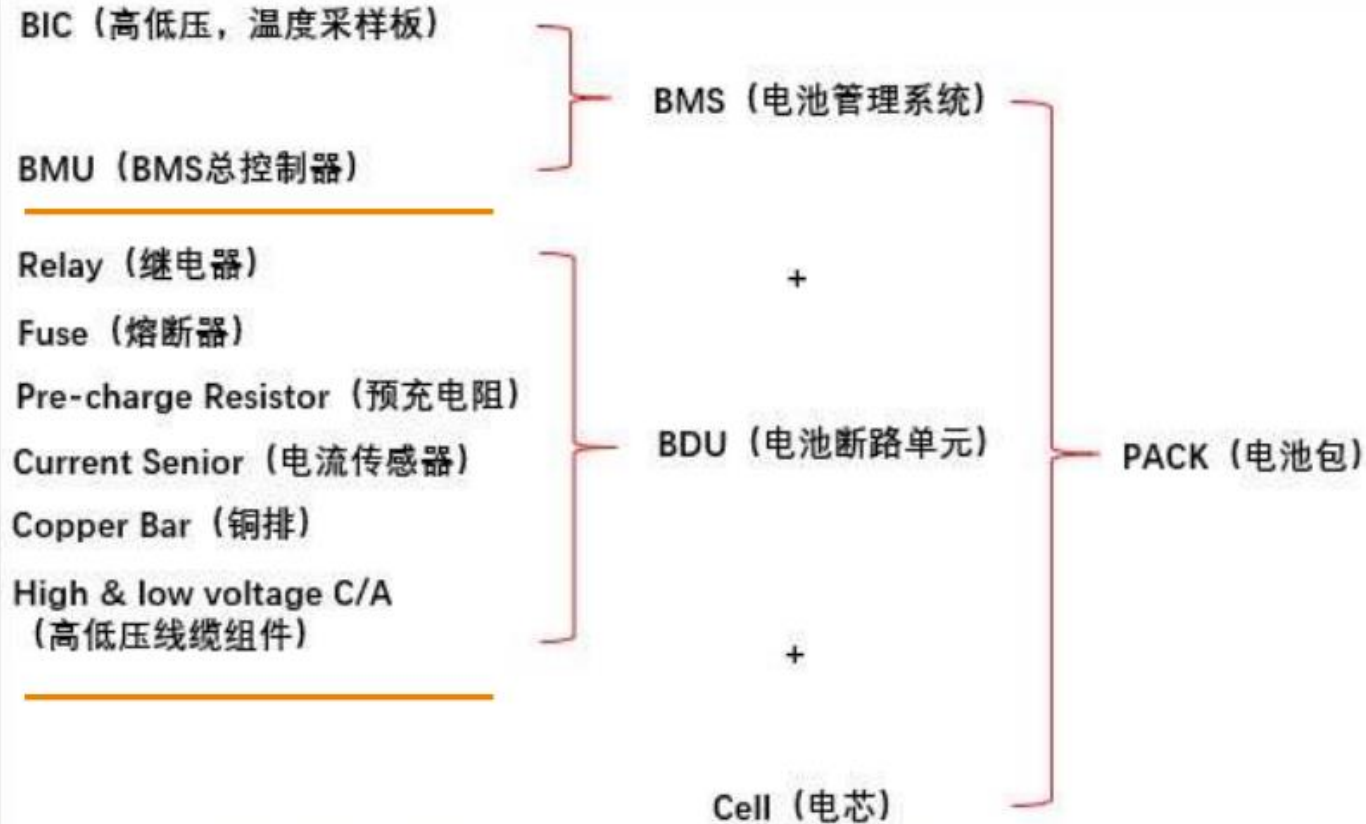
- D1100
 - D1100D, WTB, 10/34P, H & V type
- D1200
 - D1200D, WTB, 4/6, H type
- Mini
 - Mini 12/20P

Dynamic Advantages

- USCAR
- Low profile
- High reliability due to 3-points connection (D3000)
- UL 94 V-0, anti-flash capability
- Multiple options in plating, position, series

Battery Management System- New Design

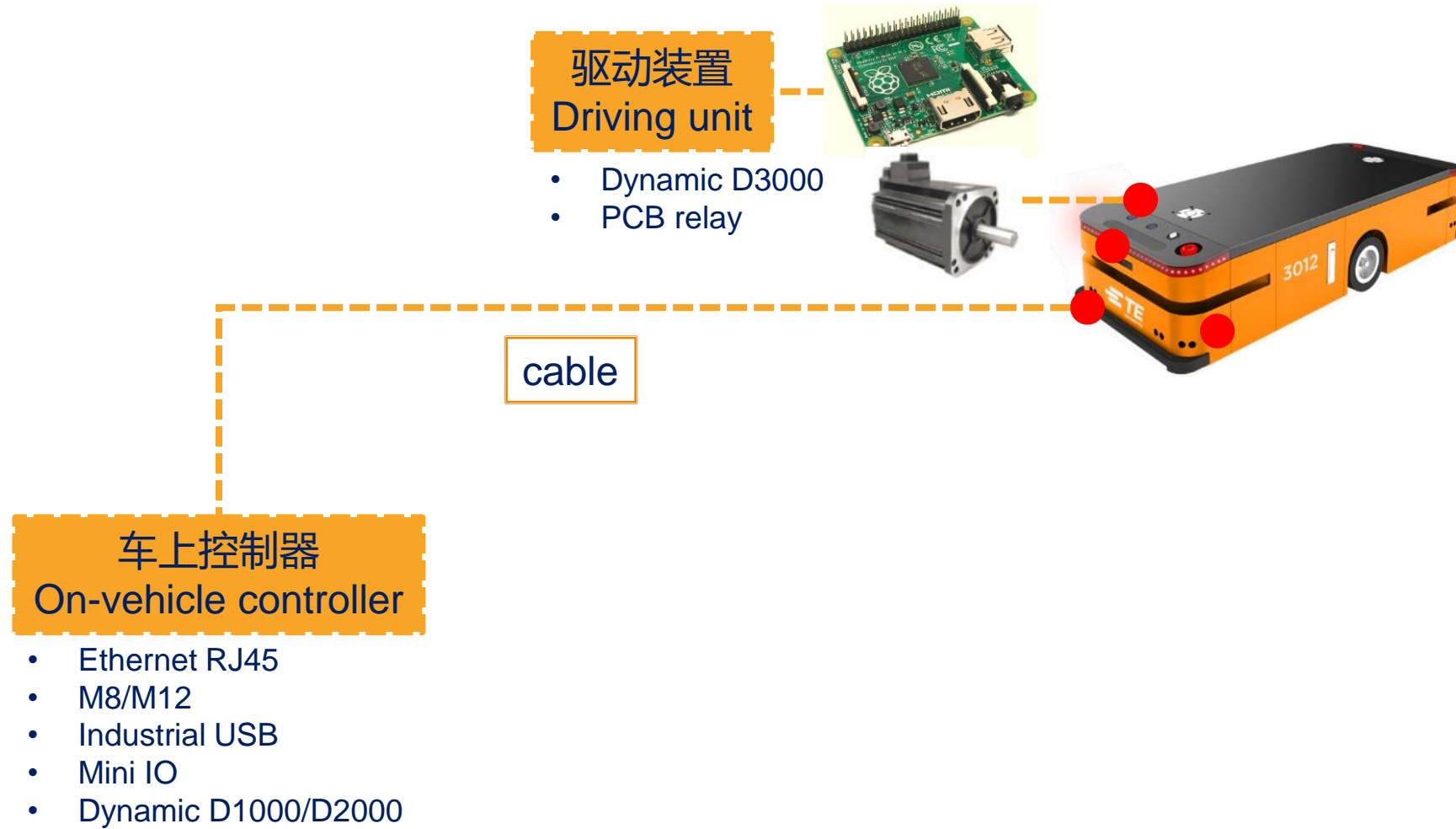
Automated Guided Vehicles



Remark: <1> 目前BIC板上使用TE D3200 2pin&4pin或6pin, 以及JAE 6pin用于高低压采样。
 <2> PCB terminal概念引入会替代BIC板, 在BMU板上实现采样功能, BDU各元器件也会集成在BMU板上。
 <3> BMU板上的部分通讯连接器会保留



AGV/AMR-controller/driving unit solution



ERNI SMC in AGV controller successful story



特征

间距	1.27 毫米
针数	12, 16, 20, 26, 32, 40, 50, 68, 80 针
端接技术	表面贴, 个别构型采用压接技术
应用	数据传输率可达 3 Gbit/s
	单端子额定电流可达 1.7 A
	板对板连接:
	- 堆叠 (夹层)
	- 垂直
	- 共面
	线对板连接 (扁平电缆):
	- 可插拔式
	- 固定式
连接器	公连接器, 垂直式和弯角式
	母连接器, 垂直式和弯角式
	板对板适配器
	板上 IDC 连接器
特殊版本	电缆装配:
	- 母连接器 IDC, 弯角式
	可锁定的连接器
	压接式公连接器
	减少定位柱数量 / 无定位柱
	先插先断式端子



Connector function
Main to Daughter board
connection 12p and 20p

Reason for design win

- Small size and layout of SMC
- Good service and continued follow-up
- Early promotion and catch up the new development module

Control & Drive Unit Solutions

Application		Dynamic Series
 		D1000 <ul style="list-style-type: none"> D1000, WTB, 40P, Vertical type D1200D, WTB, 2/6/10/20P, Horizontal type D2000 D3000 <ul style="list-style-type: none"> D3200S, 3P, WTB, Horizontal type D3200M, 6P, WTB, Horizontal type D4000/5000 <ul style="list-style-type: none"> D4200S, WTB, 3P
		Dynamic Advantages
<ul style="list-style-type: none"> Logistics Robot Transport Robot 		<ul style="list-style-type: none"> Meets USCAR requirement 3-points of contact providing ability to withstand higher vibration Plastic with anti-flash capability which complies with UL 94V-0, providing higher safety protection Keying design--higher effectiveness on assembly Complete product portfolio

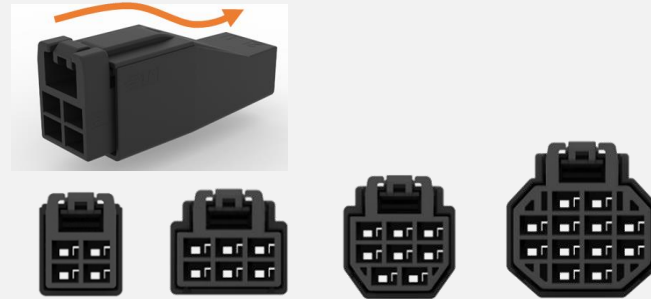
AGV/AMR-D1000Slim wire to wire connector

■ features

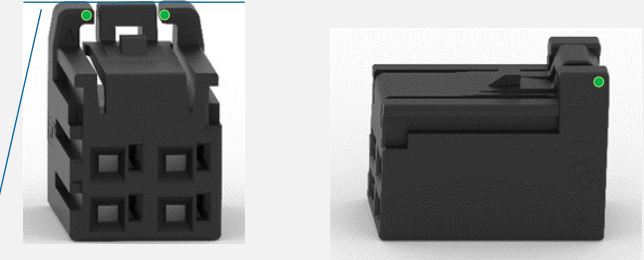
① 30%smaller size than D1000



② Streamlined design



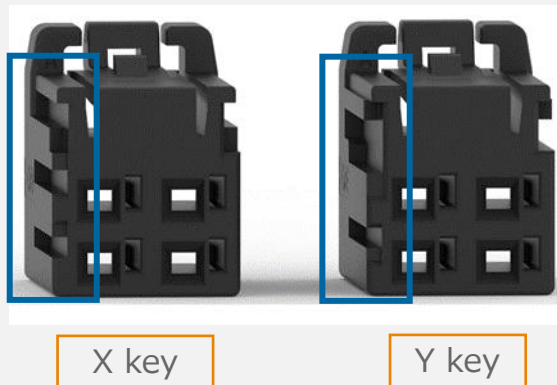
③ Indisputable lock



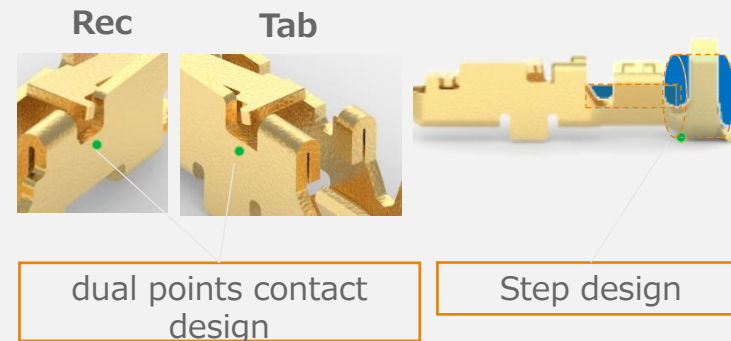
Avoid a lever breaking by hooked over

Advantage

④ X and Ykey avoid mis-mating



⑤ high reliability design



⑥ existing crimping tool



AGV/AMR-DBL

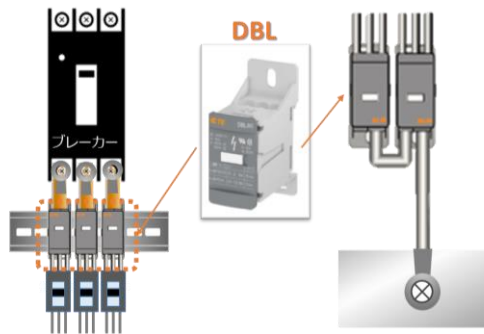


features

- Compacted connecting terminal;
- Save installation time

Electricity

- Current rating: 80A~550A
- Voltage rating: 1,000VAC / 1,500VDC (IEC)
1,000VAC/DC (UL)
- AWG: #4~250Kcmil
- Safety certification: IEC, UL, CSA, EAC, SCCR
- SCCR experiments: UL1059&UL508A SCCR



High Voltage Contactors ECK150/200/250 Series

TE Connectivity (TE) introduces the **ECK150/200/250** high-voltage DC contactor series which is designed for control in new energy applications. The ECK product line is an innovative and reliable solution for EV charging stations, solar inverters, battery energy storage systems, automated-guided vehicles (AGV) and e-Forklifts. The ECK series is hermetically sealed with ceramic sealing technology making it safe and reliable. These contactors can be used in 1000VDC system applications.



Key Features

- Hermetically sealed with ceramic technology
- Switching voltage up to 1000VDC
- Built-in PWM economizer with hold power 1.7W
- Optional auxiliary contact
- Comply with DC-1 utilization category
- Global Approvals

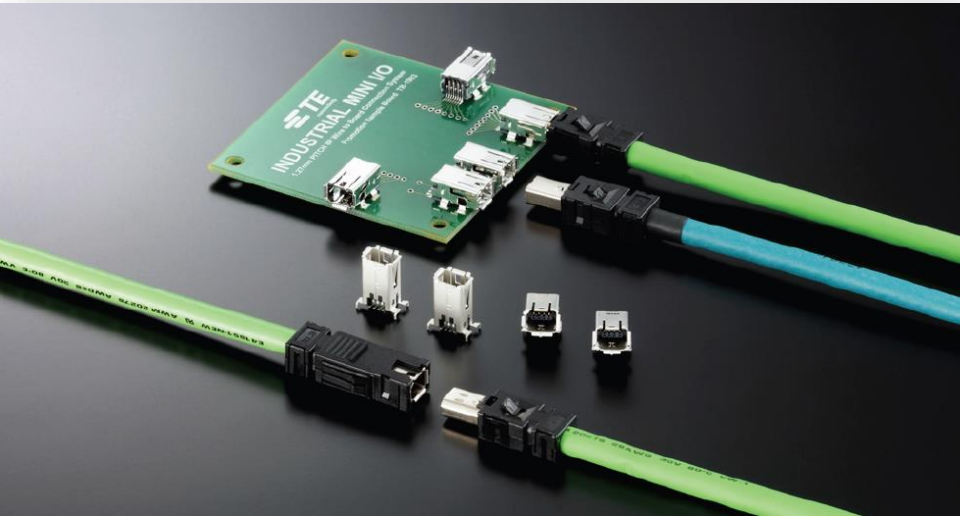
Benefits

- High reliability
- High performance in electrical endurance
- Small size for space saving
- Low power consumption
- Smart monitoring for main contact status

AGV/AMR-orientation function



AGV/AMR-industrial conn product



	■small
	■field installation
	■Dtype and Utype
	■high reliability

Panel installation	Filed installation	wire	Pcb board

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Applications

- EV Charging
- Photovoltaic inverters
- Battery energy storage system
- Auto-Guided Vehicle
- E-forklift

**WHEN
TECHNOLOGY
CONNECTS,
SO DOES HUMANITY.**

EVERY CONNECTION COUNTS

