



2024

Company Profile

Zhejiang Hechuan Technology Co., Ltd.



CONTENTS

- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- Humanoid Robot



About us



**Focus deeply on the main business of automation;
Actively go deep into major sub-sectors.**

A listed company (stock code: 688320.SH) that focuses on R&D, manufacturing, sales and application integration of industrial automation products and is committed to providing core components and system integration solutions for smart factories.

Established in **2011**

Assets **¥2.156** billion

Area **287**mu

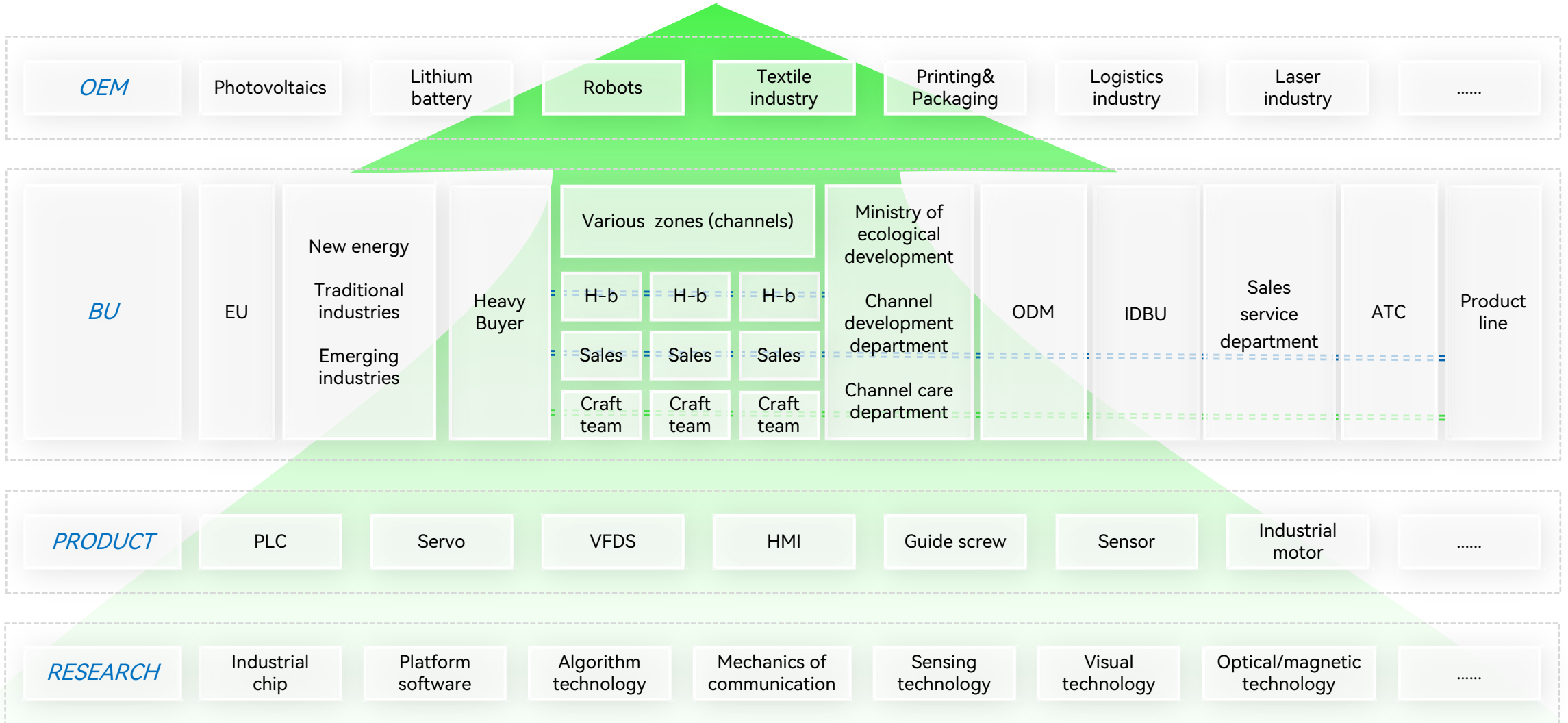
1695 employees

History

14 Years of milestones of development



Organizational Structure

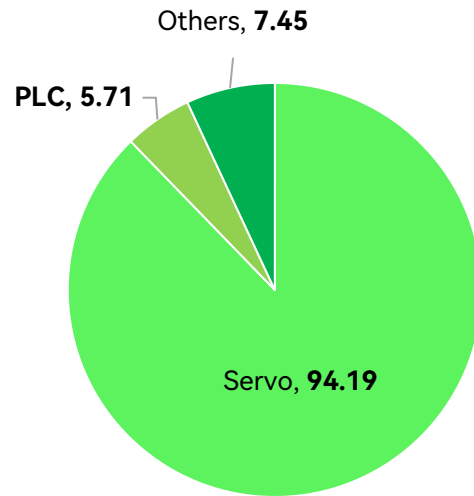


Sales structure of the company in the first 3 years

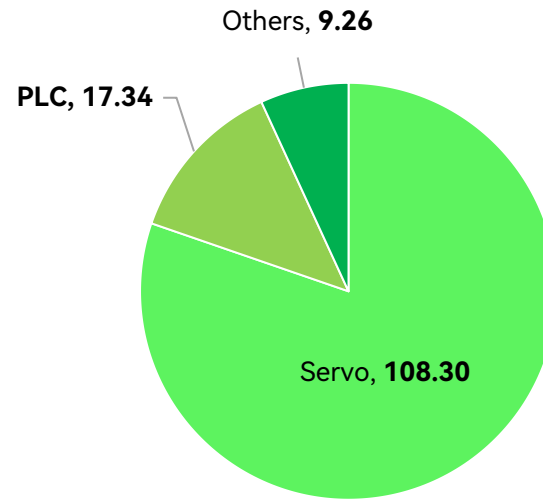


UNIT: USD million

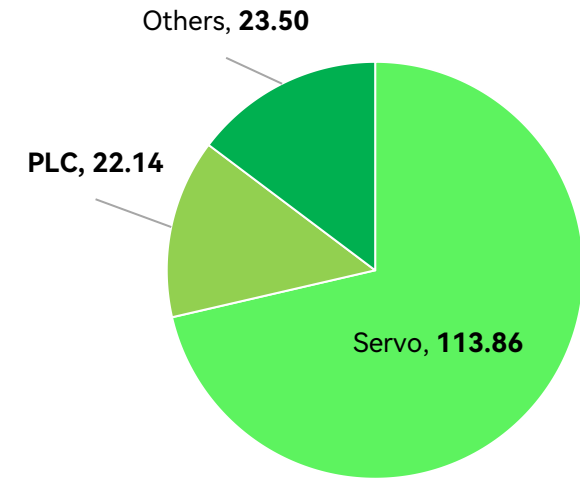
2021—107.35



2022—134.90



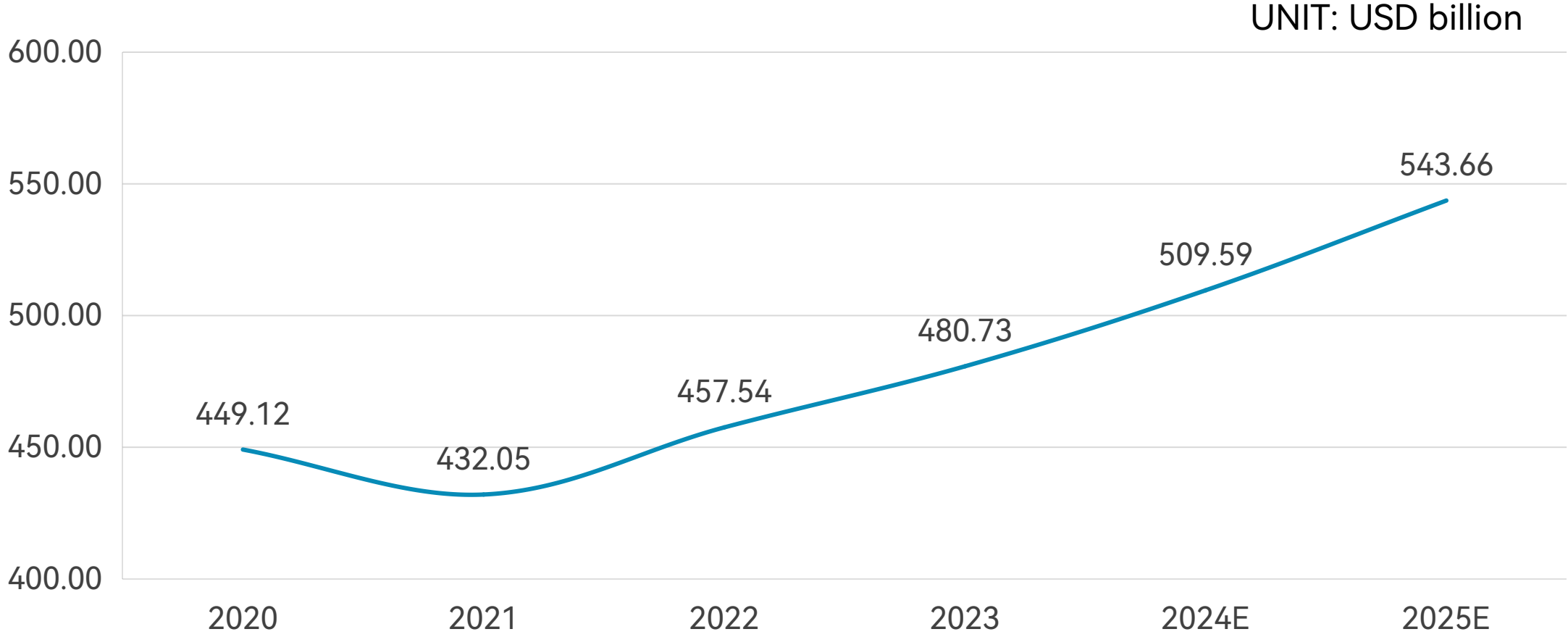
2023—159.50



Analysis of Global Market Size Trends



Forecast of Global Industrial Automation Market Size Trends from 2020 to 2025



Data source: China Business Intelligence Network www.askci.com

Cooperatives



2.76 hundred million

Bosch Group invests in HCFA

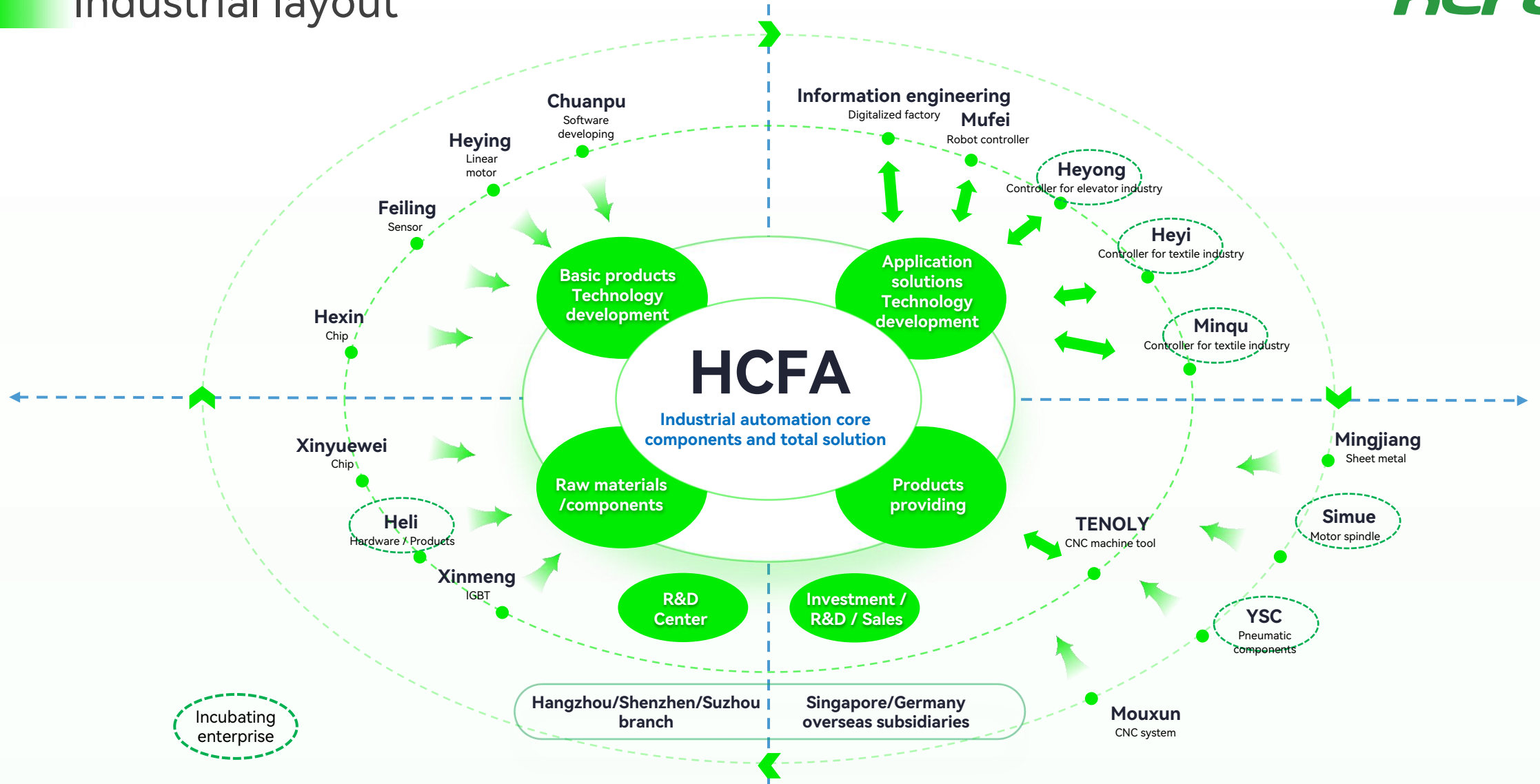
1.2 hundred million

HCFA and Bosch Rexroth
Propose to jointly invest and establish
a joint venture company

In 2023, Bosch Rexroth and HCFA will jointly
establish a joint venture to serve the Chinese
industrial automation market with a cost-
effective combination of automation and
electrical control products



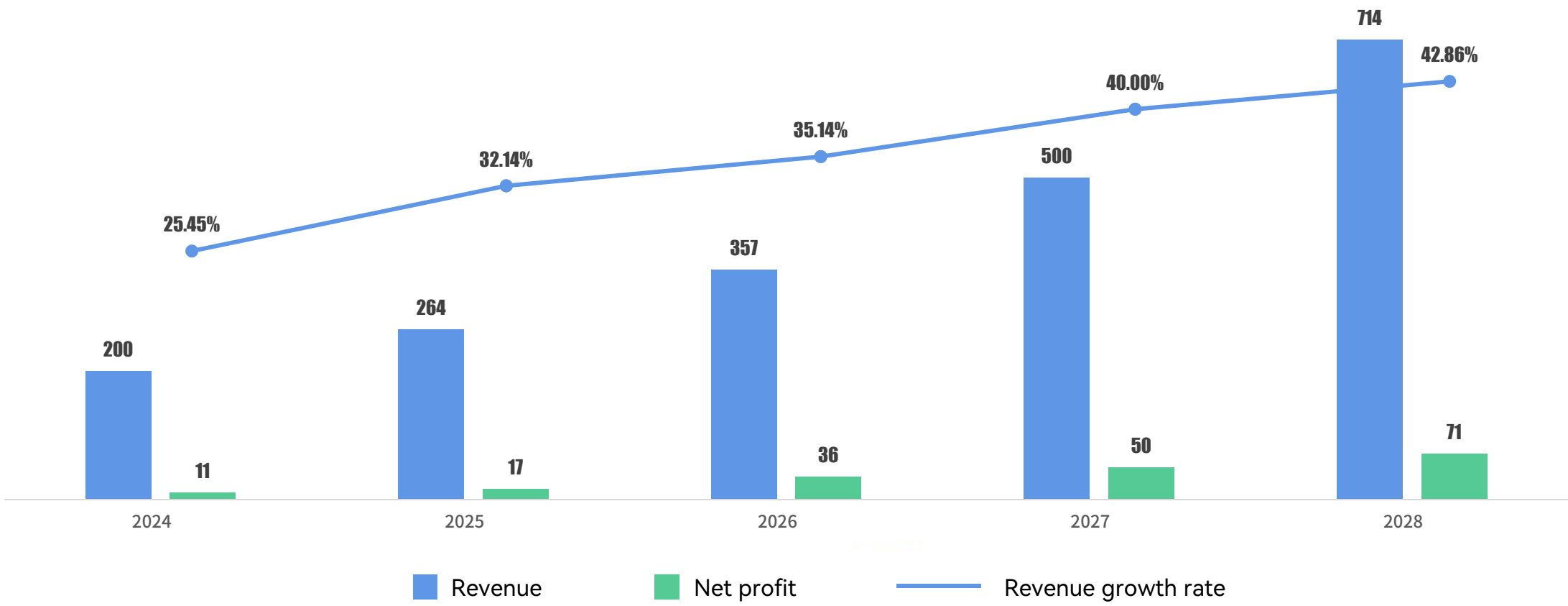
Industrial layout



Forecast of HCFA sales of 2024-2028



UNIT: USD million



CONTENTS

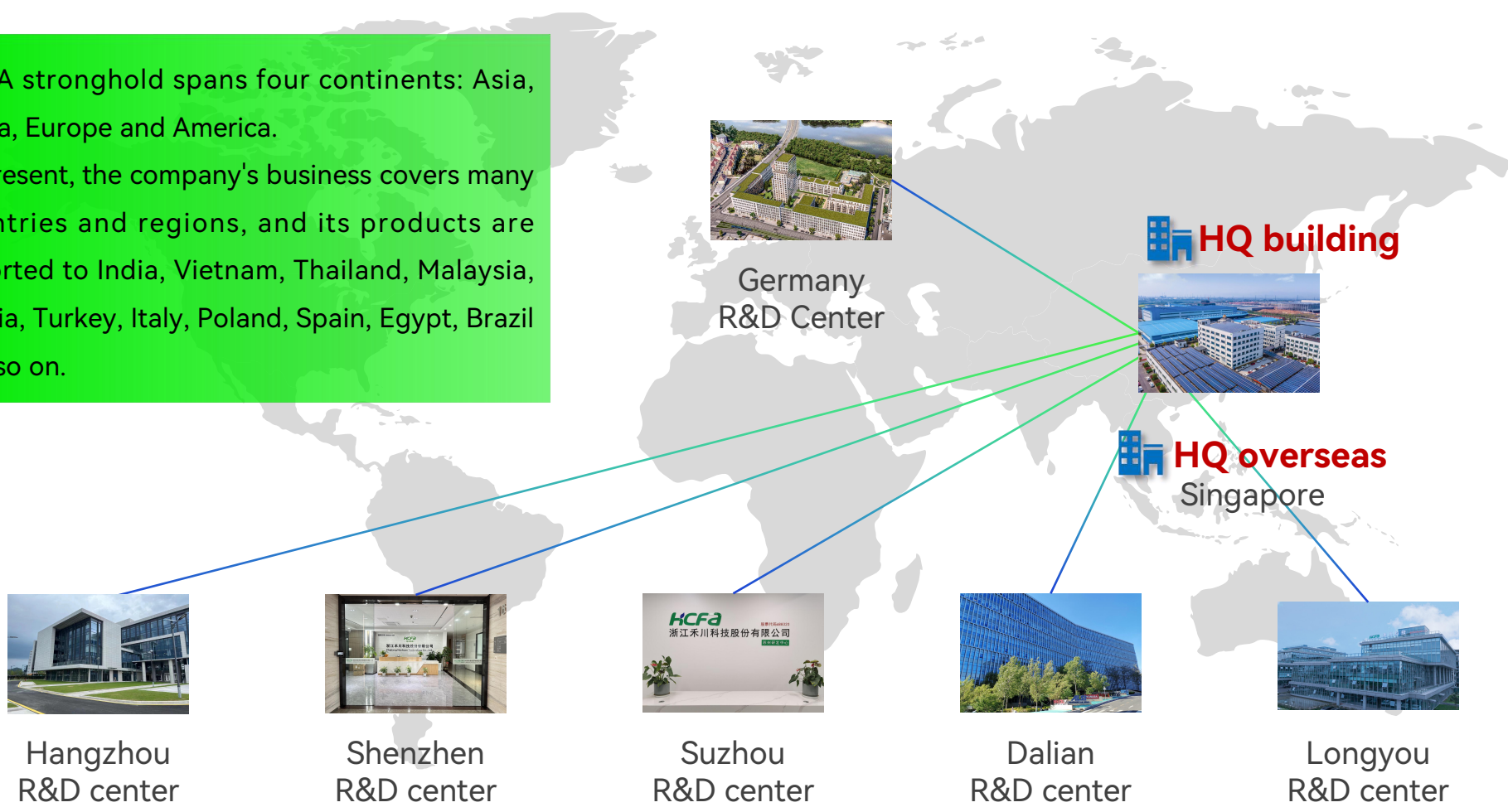
- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- Humanoid Robot

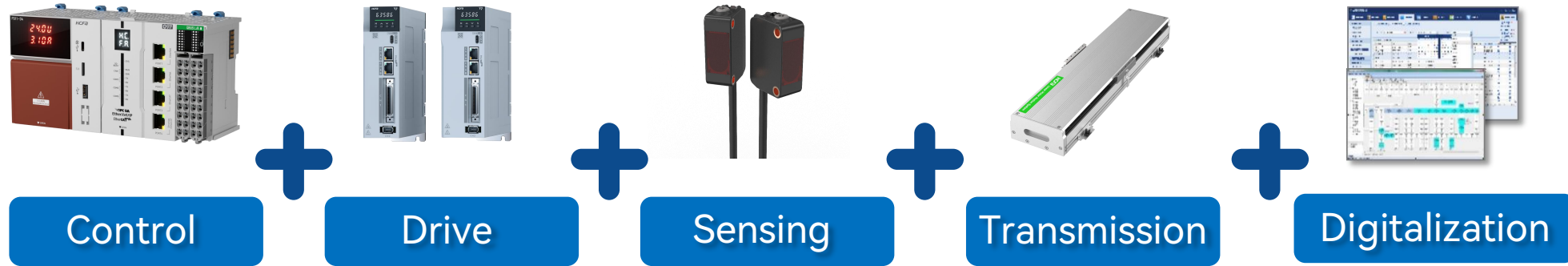


Distribution

Six R&D centers to help speed up the global layout

HCFA stronghold spans four continents: Asia, Africa, Europe and America.
At present, the company's business covers many countries and regions, and its products are exported to India, Vietnam, Thailand, Malaysia, Russia, Turkey, Italy, Poland, Spain, Egypt, Brazil and so on.





Control

- High performance real-time system technology
- High speed motion control technology
- Standard IEC61131 control platform technology

Drive

- High performance vector control Real-time automatic gain adjustment technology
- High speed real-time bus control PMSM electromagnetic analysis Motor design & craft

Sensing

- Sensor chip designing
- Absolute encoder algorithm technology

Digitalization

- Self-developed ERP/MES/WMS system
- Reliable manufacturing system based on the intelligent devices

Transmission

- Transmission motion control
- Motion function conversion
- EM simulation





6 Innovation platform

- Provincial Key Enterprise Research Institute
- Provincial Postdoctoral Workstation
- Provincial Enterprise Technology Centre
- Provincial Industrial Design Centre
- Provincial High-tech Enterprise Research and Development Centre
- Zhejiang Provincial Industrial Information Engineering Service Institution

10%+ Research input

- More than 10% R&D investment of sales amount per year
- More than 30% full-time researchers of total staffs

378 Intellectual property

- Domestic patents: 233
- Software patents: 135
- others: 10

In-depth Manufacturing



In-depth research and development of key core components, including industrial control chips, industrial software, drive and control algorithms, etc.

Key core components

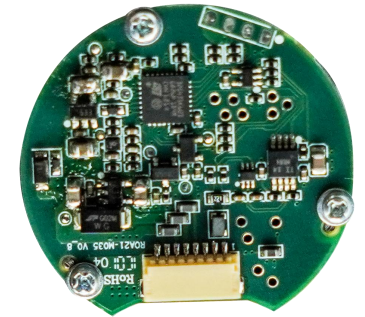
- Self-designed drive control integrated industrial control chip
- Technical bus integrating master MCU, motion control algorithm, storage and industrial real-time Ethernet.
- With high performance core of ARM&MCU and dynamic configuration logic architecture

- Self-developed industrial platform and digital factory solutions
- Basic technology platform of industrial automation overall solution

- High-speed and high-precision drive control algorithm
- High-speed real-time bus communication technology
- Embedded real-time operating system technology
- Electromagnetic IPM technology of high efficiency and high speed motor



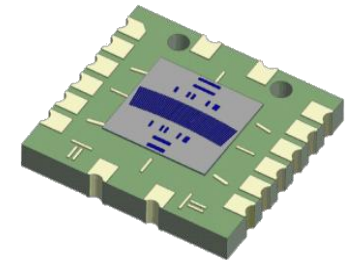
Industrial control chip



Magnetic encoder



Industrial platform software



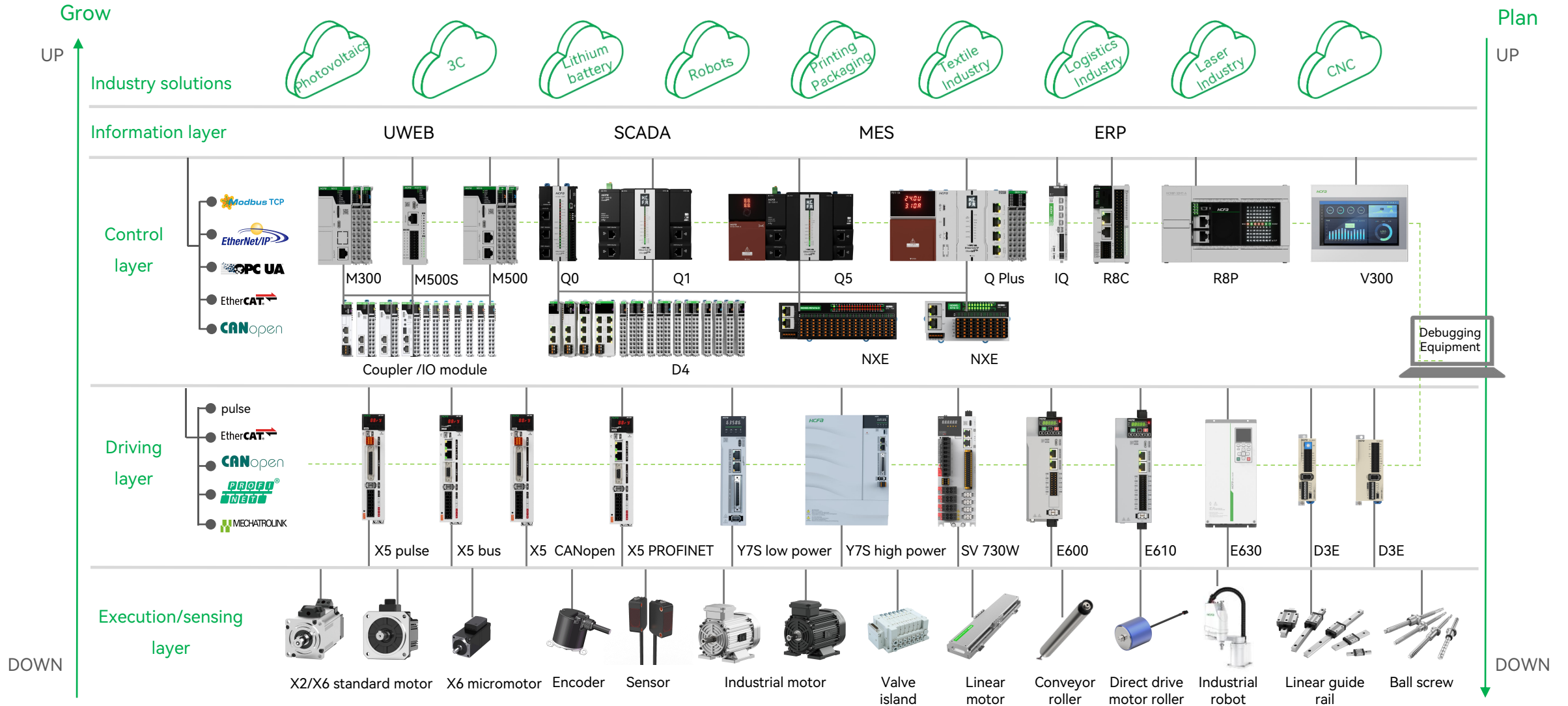
Sensor chip design/customization

CONTENTS

- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- Humanoid Robot



Complete Solution for Industrial Automation



M series PLC

A new generation of localization
Small and medium-sized intelligent controllers



EtherCAT

CANopen

Modbus

EtherNet/IP

Q Plus series PAC

Intelligent mechanical controller



EtherCAT

CANopen

Modbus

OPC UA

EtherNet/IP

Motion Control Products



SV-X5 series

advanced AC servo system

Meet the general market
The ultimate cost-effective industry demand



EtherCAT

PROFI
NET

CANopen

SV-Y7S series

high-end AC servo system

Meet the market demand for high
performance industries



EtherCAT

MECHATROLINK

Power
and
Performance

X-MOTOR



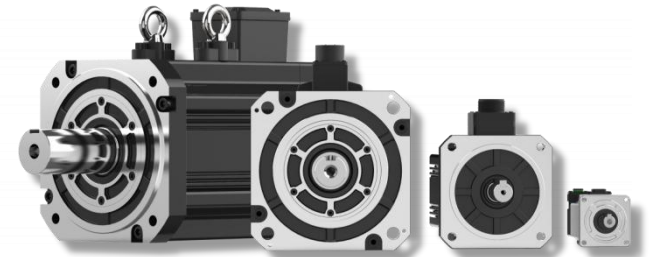
● AC220V

50W 0.16NM 2.3kW 15NM

● AC380V

400W 1.27NM 750W 2.39NM 7.5kW 47.8NM 22kW 140NM

8 series 80+ models



HDV-E600/E610 series

General Purpose Inverter

- Book style
- Safe and reliable
- Easy-to-use
- Internet of things module
- Multi use



HDV-E630 series

High Performance Vector Inverter

- Book style
- Intelligent
- Energy-efficient
- Easy-to-use
- Multi-functional
- Remote control



Automation Project Example



Carrier

- Shelves, pallets, boxes, etc.

Logistics robot

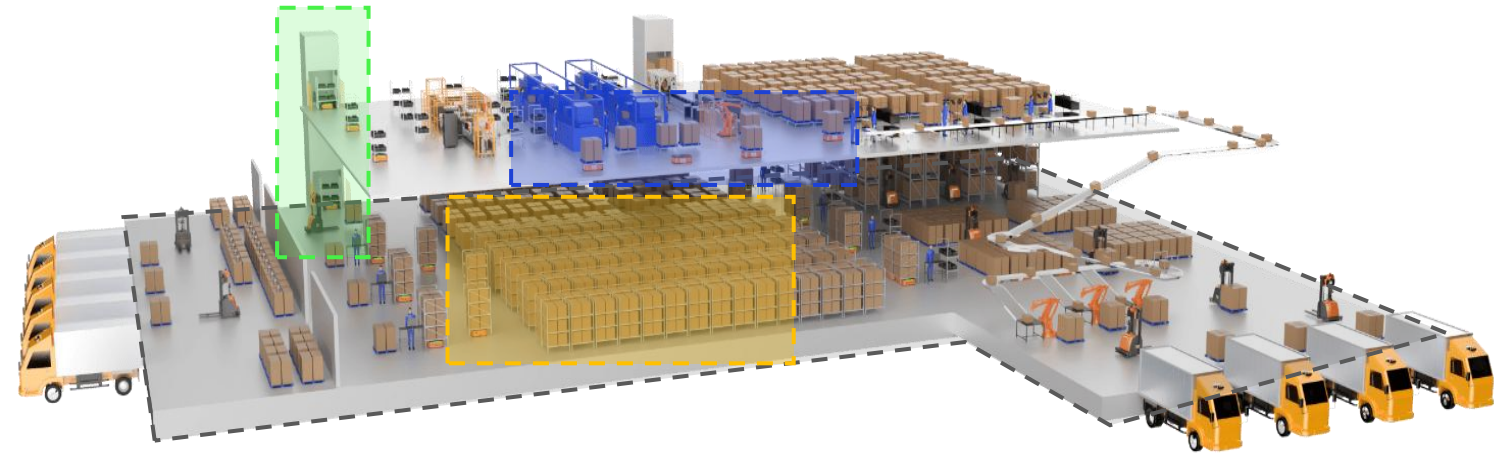
- AMR, fork, transfer, container robot, etc.

Storage location

- Plane storage points and three-dimensional shelf positions

Logistics peripherals

- Elevator, conveyor line, pager, automatic door, etc.



The dispatching system accesses relevant logistics elements for unified management.



CONTENTS

- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- Humanoid Robot



Quality Assurance

Strictly implement international standards, adopt IPD integrated product development management mode, and establish a comprehensive project management system



Product testing standard

Experimental type	Servo driver	Servo motor	Programmable controller
EMC	IEC 61800-3 GB/T 37414.3	IEC 61000-6-2 IEC 61000-6-4 GBT 17799.2 GB 4824	IEC 61131-2 IEC/CISPR11 GB/T 15969.2
LVD	IEC 61800-5-1 GB 12668.501	IEC 60034-1 GB 755 GB 18211	IEC 61131-2 GB/T 15969.2
Environment	IEC 60068-2 GB/T 37414.2 GB/T 37414.3	IEC 60068-2 GB/T 37414.2 GB/T 37414.3	IEC 61131-2 GB/T 15969.2
Reliability	IEC 60300-3-5 GB/T 16439 GB/T 5080.1	GB/T 7345 GB/T 4208 JB/T 10183	IEC 61131-2 GB/T 15969.2

4 types of quality test

Performance test/Environmental test
Mechanical test/Safety test

FA inspection ability

X-ray, AOI, automatic inspection



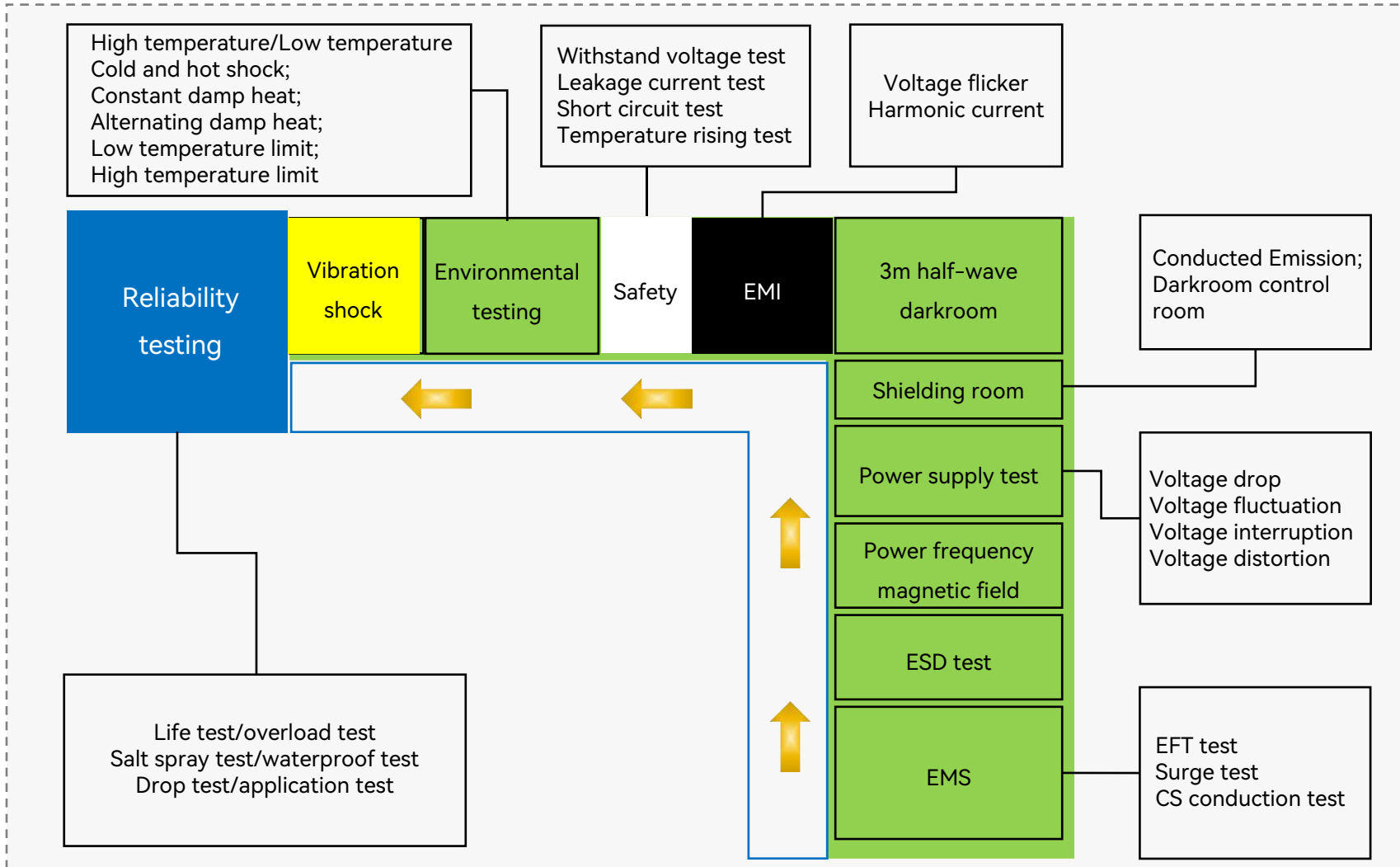
- Official recognition: ISO9001 and ISO14001 international standards
- Recognized by third-party organizations: UL, CE, RoHs, etc

QA Testing System



Sophisticated QA testing system to ensure the quality of product development

Testing Process



CERTIFICATION

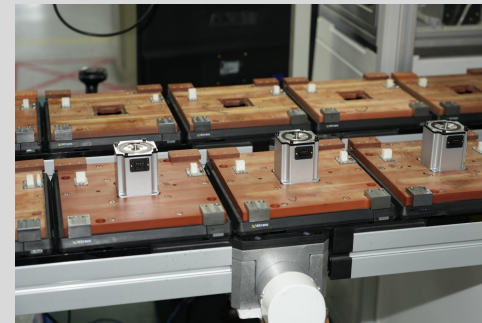
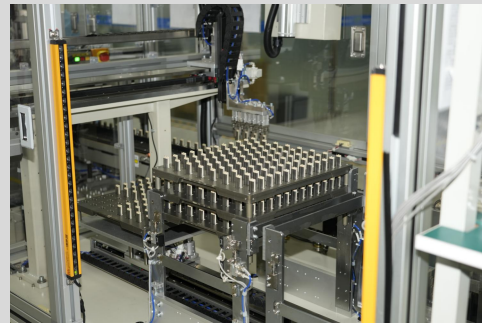
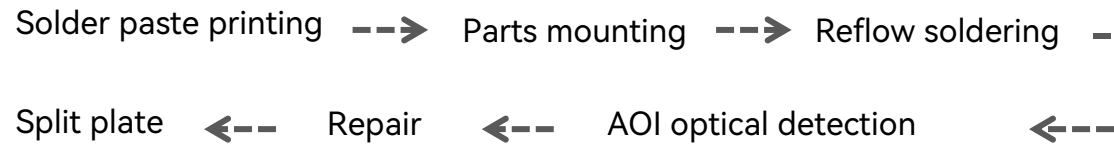


SMT Workshop



Industrial control automation production line: Take the lead in realizing the automation of domestic SMT, plug-in and assembly process

Basic technology

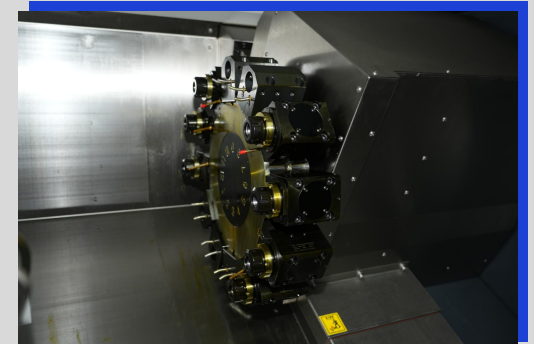
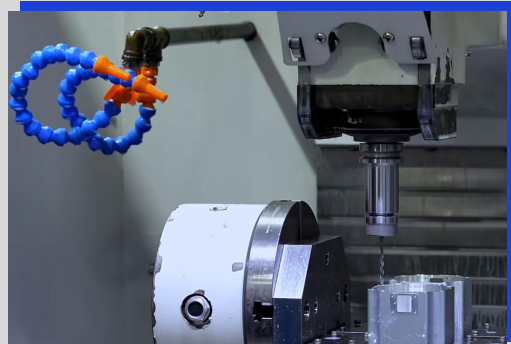


Finishing Workshop



Complete & independent finishing workshop to ensure production flexibility and non-standard machining

- Complete types of machine tools: CNC machining center, CNC machine tool, CNC grinding machine (cylindrical grinding, CNC centerless grinding), milling machine, turning and milling compound machine, core-moving machine, friction welding and ultrasonic cleaning.
- It only takes 7 days to design the process route, fixture and cutting tool independently and customize it quickly.
- Product quality adopts multi-directional control mechanism, and the production process is supervised by operators, team leaders and inspectors at the same time.



CONTENTS

- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- Humanoid Robot



Market Support



Experienced team of sales engineers

The company's main sales team members are engaged in sales work in the company for more than 5 years, an average of more than 10 years of sales experience.

After years of integration and exchange, the overseas operation team has established a perfect and efficient communication and collaboration mechanism with the domestic headquarter, and the employees have a high degree of recognition of the company's culture.

After-sales Service



Service Response Time

internal  24H

overseas  48H

Satisfaction Survey

Preliminary

Implementation program, questionnaire preparation, client list determination

Survey Implementation

Questionnaire distribution, reminder to customers to participate, questionnaire retrieval

Statistical Analysis

Questionnaire data analysis, release of customer customer satisfaction report, feedback processing and follow-up tracking



CONTENTS

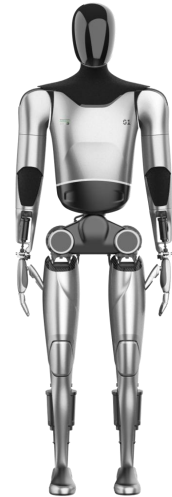
- Company Profile
- R&D Innovation
- Key Products
- In-depth Manufacturing
- Service Support
- **Humanoid Robot**



Advantages of Getting into Humanoid Robotics Market



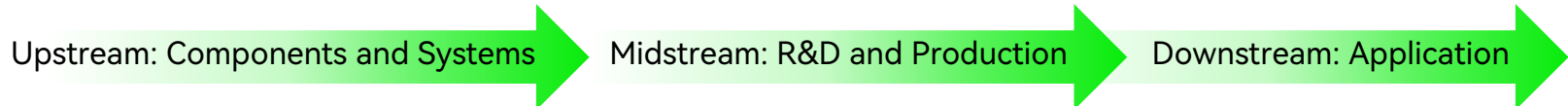
- Technology accumulation: Self-developed chip, wireless transmission technology, high precision of humanoid robot limbs due to encoder algorithms, professional motor capabilities.
- Accumulation of industrial robot industry: Drives, motors, robot controllers have covered the mainstream manufacturers of industrial robot industry, such as Erfurt / Xinsong / Xinshida.
- Industry experience accumulation: Get order from Agibot, ByteDance and launch technical cooperation with Fourier.
- Scientific research projects: Lead open bidding for Humanoid robot project organized by the National Ministry of Industry and Information Technology, participate in Zhejiang humanoid robot implementation project.



Lead open bidding for Humanoid robot project organized by Ministry of Industry and Information Technology

Participate in Zhejiang humanoid robot implementation project

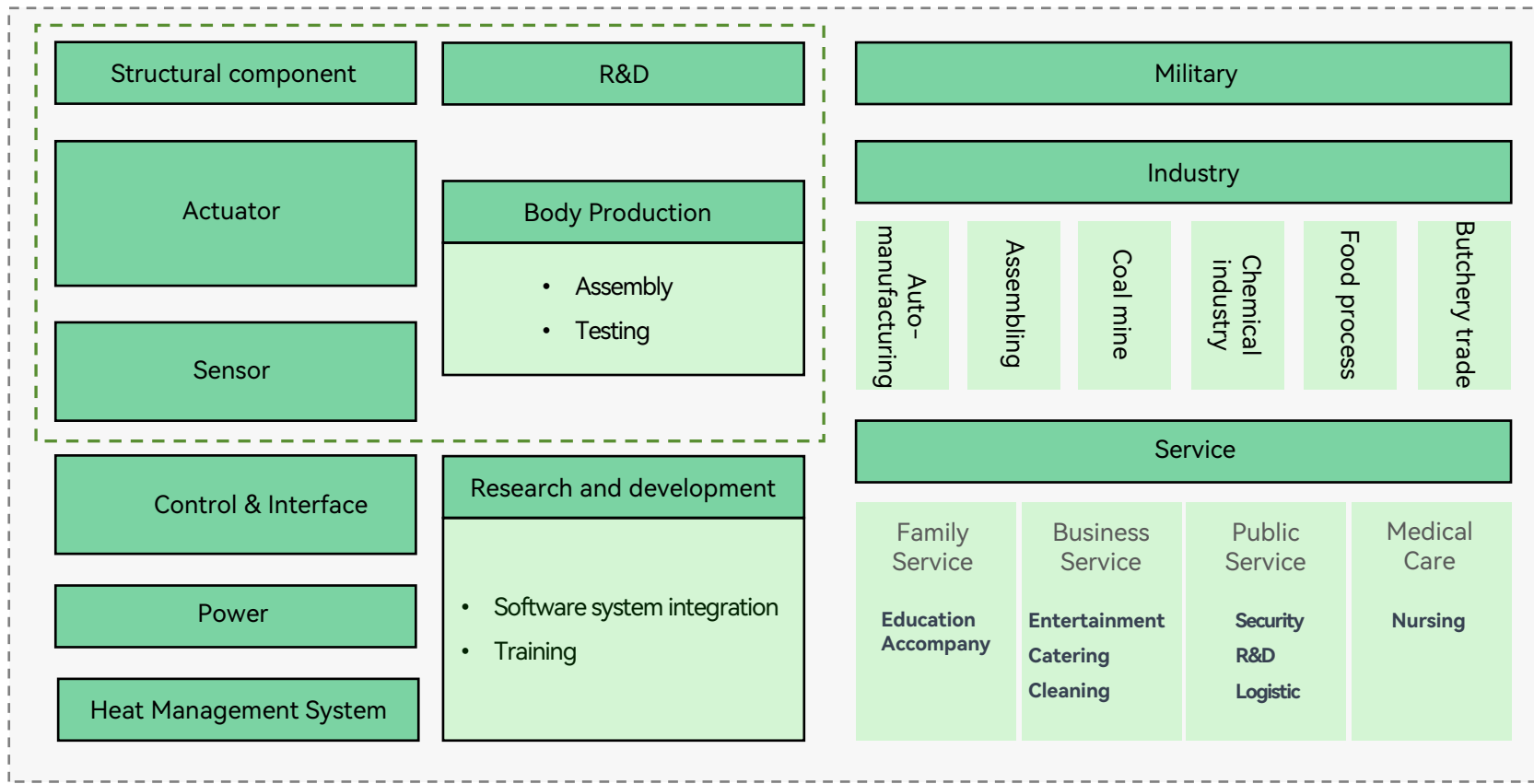
Industry Chain



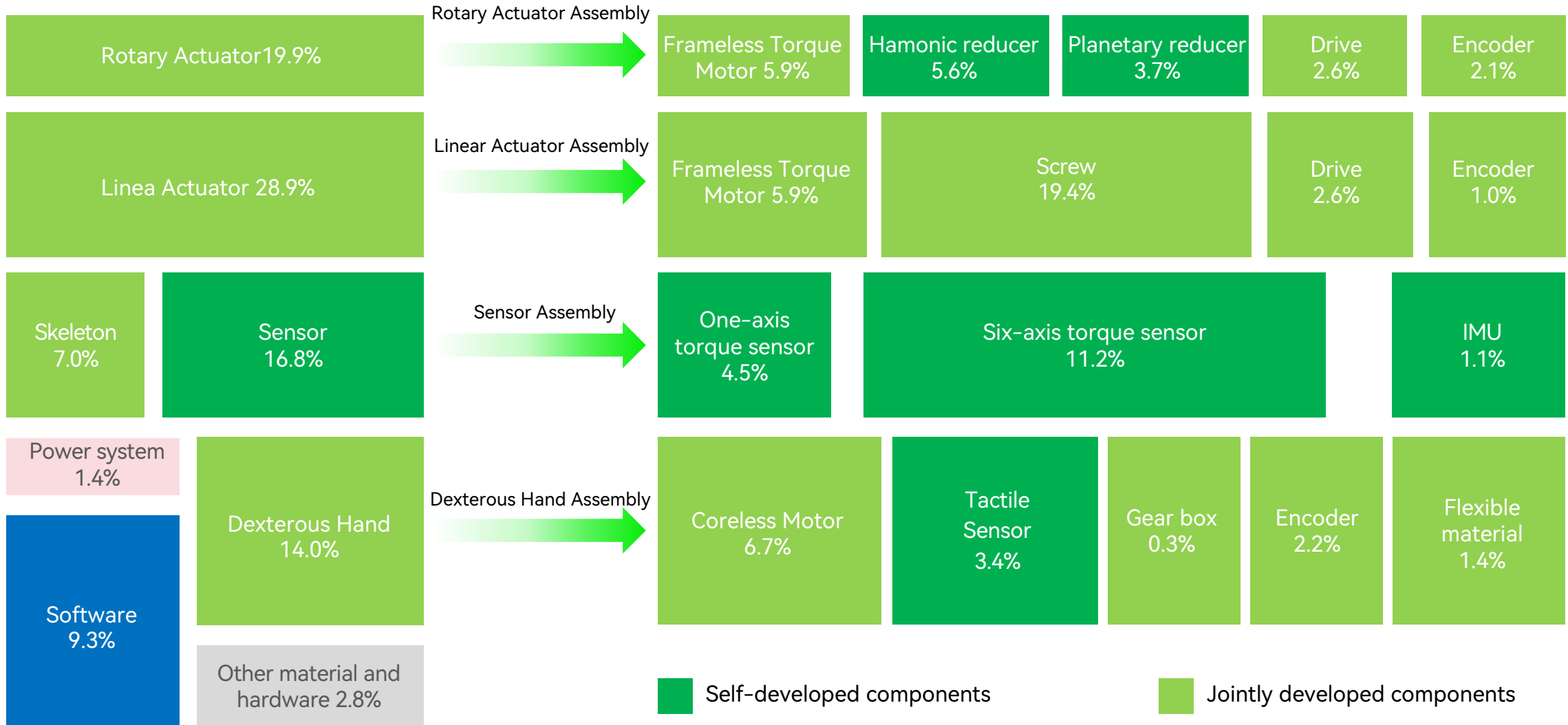
To be the most competitive humanoid robot
OEM supplier

For assembly manufacturers:
core components, actuators

For application vendors:
core components, actuators, hosts



Hardware Architecture



Main Products



Frameless torque Motor



- Outer diameter: 23.7|50|60|86 mm
- Torque range: 0.032~3Nm

Coreless Motor



- Outer diameter: 13|10|8 mm
- Hall/Encoder type

Collaboration Module



- Integrated assembly
- Voltage: 24|48VDC
- Bus type: EtherCAT

Hollow Module



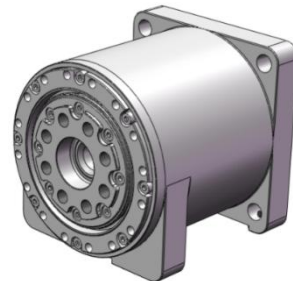
- Rated torque: 112Nm
- Instantaneous torque: 337Nm
- Voltage: 24|48VDC

Joint Motor



- Max torque: 40Nm
- Voltage: 24|48VDC

Rotary Actuator



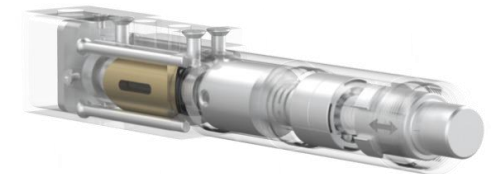
- Max torque: 110Nm
- Voltage: 24|48VDC

Linear Actuator



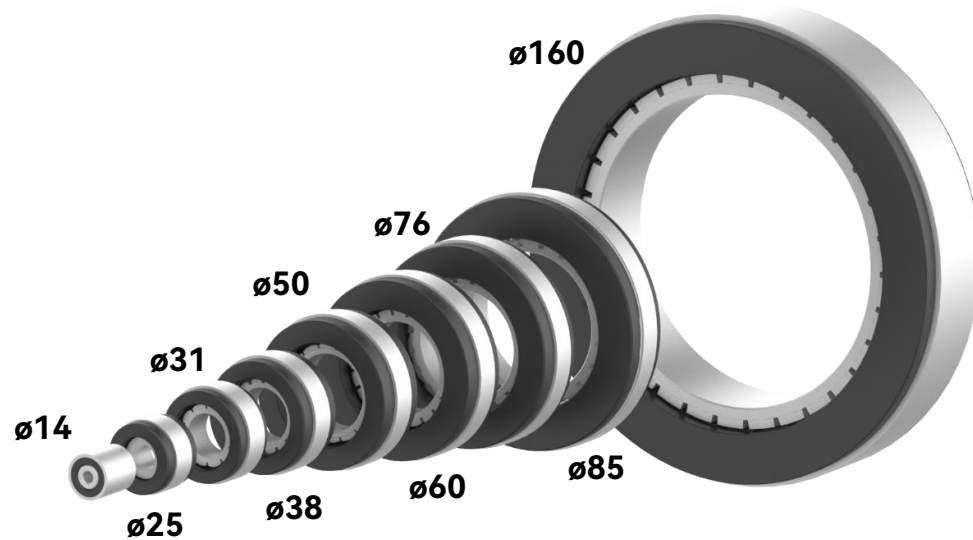
- Max thrust: 8000N

Finger Actuator



- Max thrust: 120N

Frameless Torque Motor



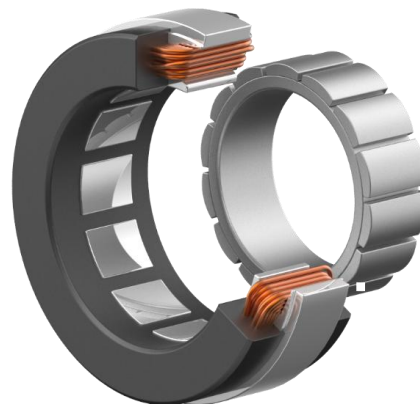
Specification

- Size: $\varnothing 14 \sim \varnothing 160$ mm optional
- Rated torque: 0.012~12N.m
- Peak torque: 0.036~65N.m
- Max speed: 8000rpm

Customized for high dynamic and efficient robotics applications

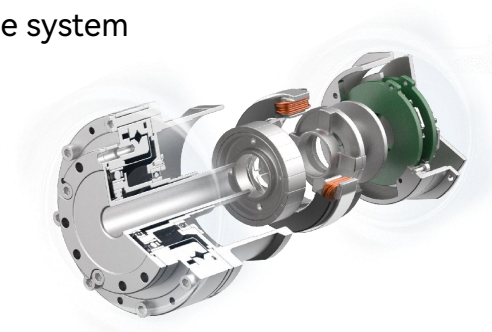
Features

- Excellent cracking ratio, small size, higher efficiency and efficient torque
- Integrated temperature sensor
- Big hollow inner diameter to meet flat structure
- Excellent N-T and overload features



Applications

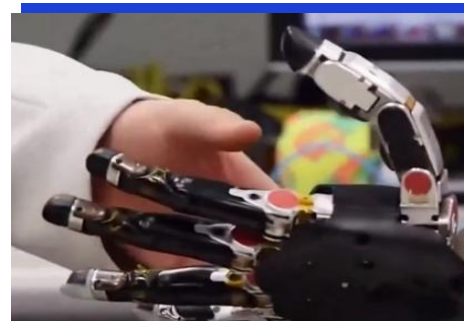
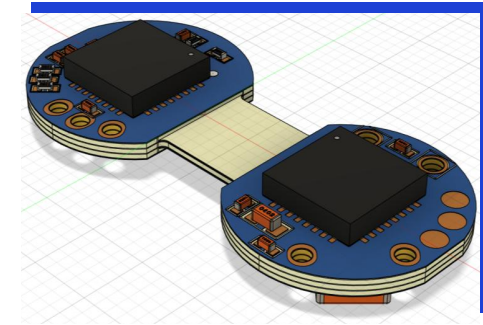
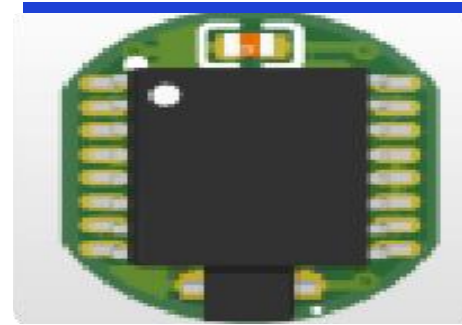
- Combined drive system
- Robot module
- Specific module system
- ... etc



Coreless Motor



- Unique hollow cup wiring
- Small size, lightweight
- High speed and quick response
- High efficiency, high power density
- High overload
- Ø8/Ø10/Ø12/Ø13
- Built-in driver



Applications

- Micro drivers
- Medical instruments
- Chip mounting
- Detection equipment
- ...etc

The research and development of core components such as frameless motors, coreless motors, encoders, drives, integrated joints, etc., as well as investing more technological research in dexterous hands and man-machine assembly, have led to more innovative technology layout to the humanoid robot machine.

Linear Actuator for Highly Integrated Electromechanically System



- **New robot drive system technology**
- Harmonic reducer + frameless motor+ brake + dual encoder/driver highly integrated
- Higher efficiency and precision output
- Meet with flange quick locking device
- Lighter weight, high torque density
- Flat, high-dynamic performance



Φ70 mm

● 50 Nm



Φ80 mm

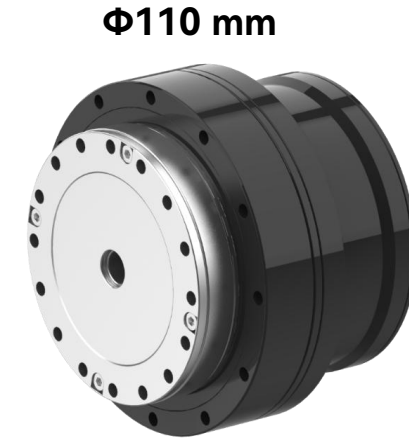
● 80 Nm



Φ90 mm

Rotary actuator

● 110 Nm



Φ110 mm

● 180 Nm

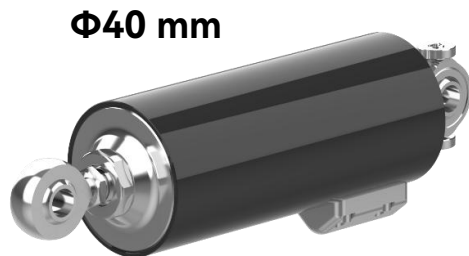
Applications

- Robot joints
- Industrial cooperation
- Medical industry
- Semiconductor
- ...etc

Linear Actuator for Highly Integrated Electromechanically System



- **New robot drive system technology**
- Highly compacted, maximized integration design
- High-precision position feedback
- Self-designed integrated drive technology for reverse roller screws
- High efficiency and dynamic acceleration capacity



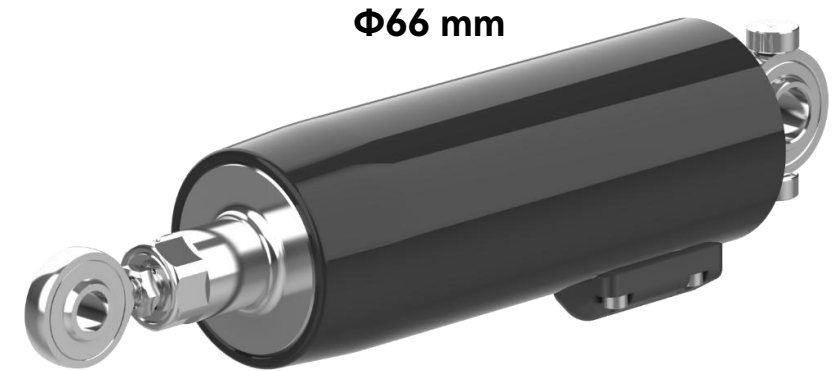
Φ40 mm

- **2000N F** small size, lightweight
- Increased thrust density



Φ55 mm

- **5000N F** small size, lightweight
- Increased thrust density



Φ66 mm

Linear Actuator

- **8000N F** small size, lightweight
- Increased thrust density

Encoder- Key core components for closed-loop feedback of position and speed



Meet position feedback system of high-resolution

- Covering a wide range of products from miniaturized sizes to hollow sizes.

- Resolution: 2500C/T**
- Φ 8.7x7.6mm

● Resolution: 17Bit
- 16x12mm

● Resolution: 17Bit
- 21x21mm

● Resolution: 17Bit

Magnetic encoder

Φ 35x16mm(H)

- Resolution: 20Bit

Optical encoder

Φ 35x16mm(H)

- Resolution: 25Bit

Hollow shaft encoder (only for robot)

ϕ 60x ϕ 32

- Resolution: 19Bit

ϕ 38x ϕ 15

- Resolution: 19Bit

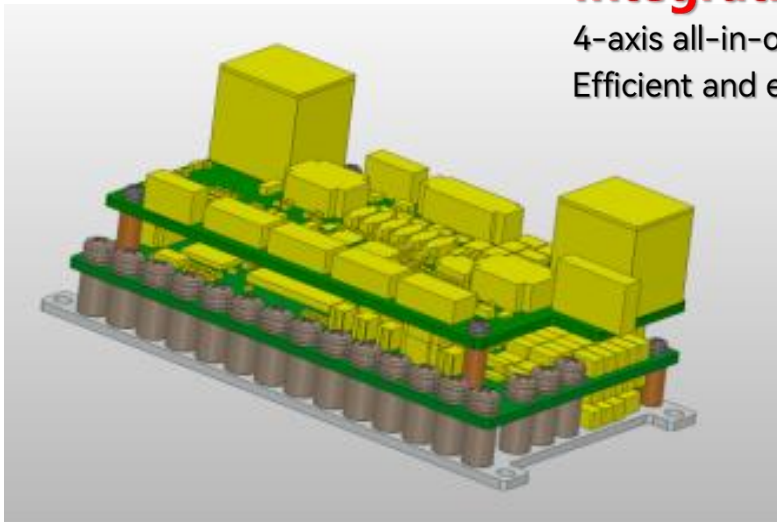
Encoder technology: high precision position/Sensors for angle measurement and speed detection

Low voltage multi-axis driver

■ 24V-60V DC

Integration !

4-axis all-in-one
Efficient and energy-saving



Extensible !

Saving space

Compact! Card size

Size 100Hx40Wx70D (mm)

	Project	Specification
Current	Continuous current	10 Arms[250W]
	Peak current	20 Arms[750W]
Rated voltage	Input voltage for driver	48V (Max60VDC)
STO	Interface	SS1、SS2
Communication interface	EtherCAT	4 axes
Encoder	Interface 1	Serial data 19bit
	Interface 2	Serial data 19bit
Motion control	Current loop	Bandwidth 2.5kHz, max frequency 16kHz
	Velocity loop	Bandwidth 250Hz, max frequency 8kHz
	Position loop	Bandwidth 80Hz, max frequency 4kHz



Thank you for trusting HCFA

Zhejiang Hechuan Technology Co., Ltd.

Vision

Be dedicated to creating values in automation industry

Mission

Better Work, Better Life

Value

Initiative, Integrity, Innovation