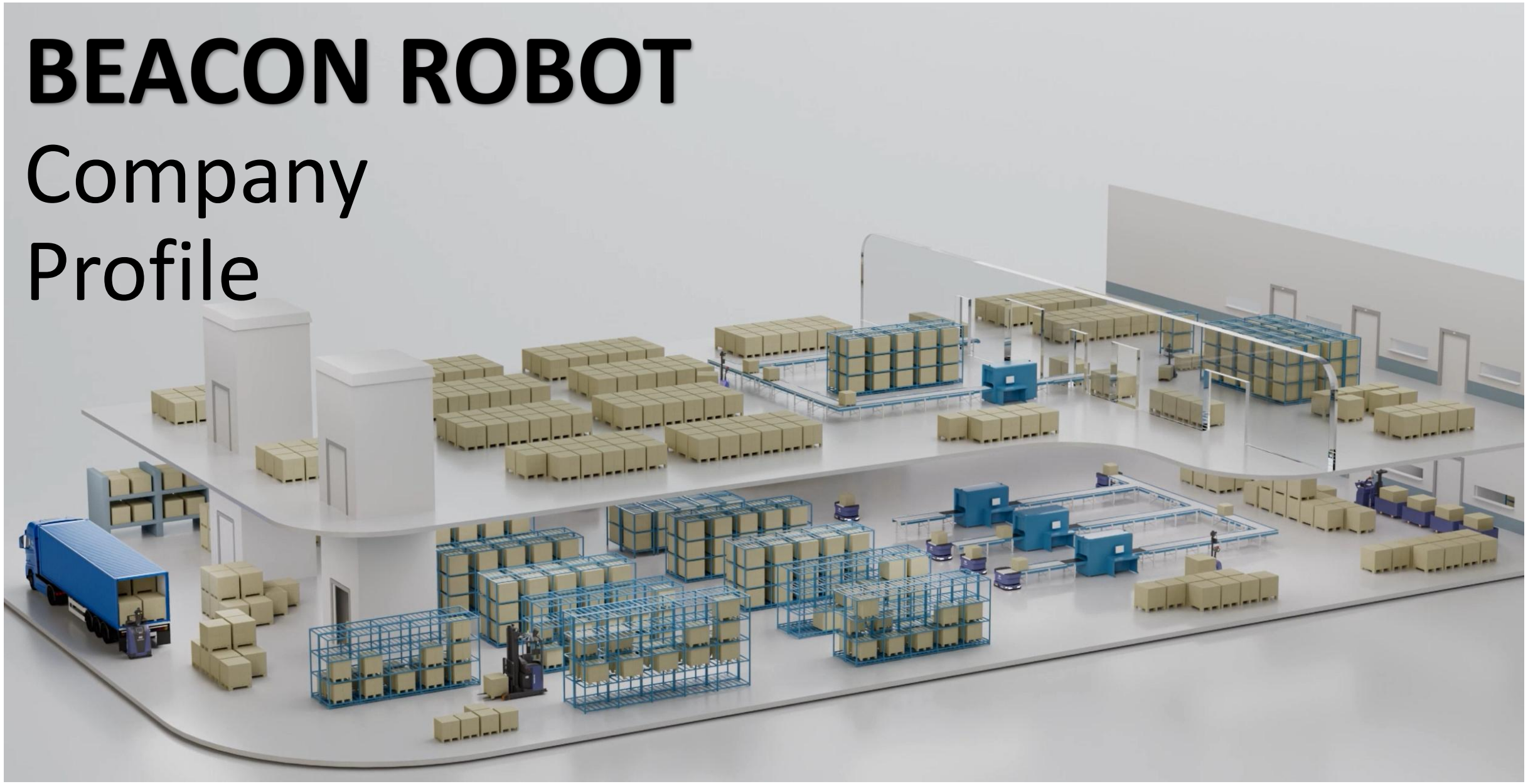
# BEACON ROBOT

## Company Profile



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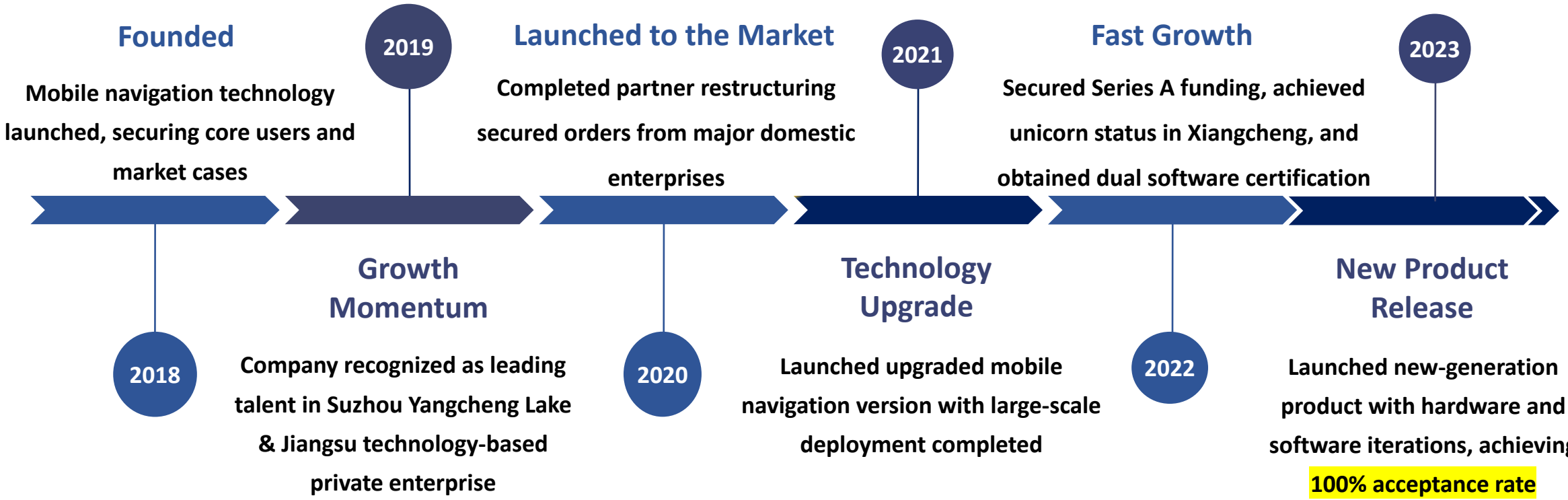
# About the Company

## 1.1 About the Company

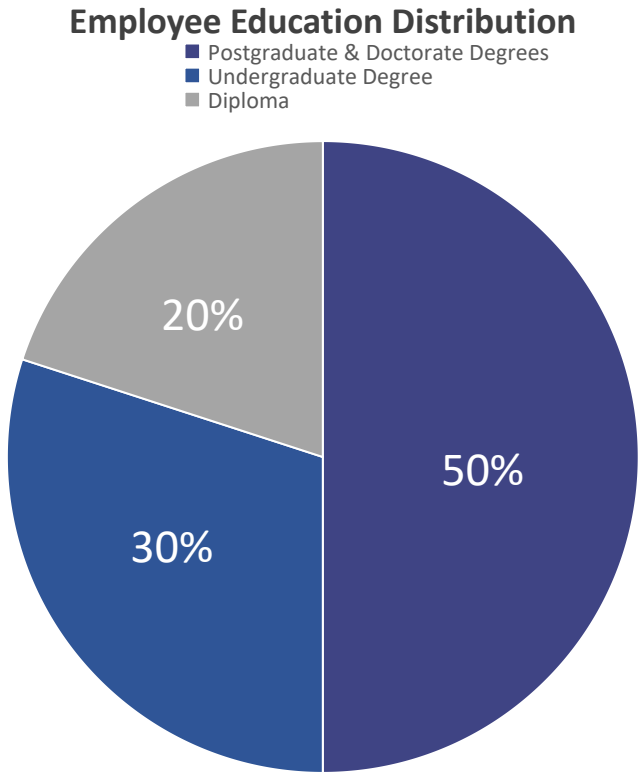
The company was established in 2018 and is located in Xiangcheng District, Suzhou, Jiangsu Province. It is a company dedicated to the research, design, assembly, sales, and installation of a full range of intelligent mobile robots (AMRs). The company primarily provides smart logistics and material handling system solutions for unmanned workshops.


1. Government-funded, Unicorn Company in Suzhou
2. Demonstration Benchmark Project Enterprise for Artificial Intelligence in Suzhou
3. National High-Tech Enterprise
4. Suzhou Gusu Angel Program
5. Leading Enterprise in Suzhou Yangcheng Lake
6. Dual Software Certification Enterprise
7. Software Eagle Program Enterprise
8. ISO 9001 Quality Management Certified Enterprise

## 1.2 Company Growth Journey



## 1.3 Technological Innovation Capability




2 Jiangsu Master Craftsmen & Jinji Lake Talents

1 Member of China Electrical Safety Standards Committee

50% Core Staff with Master's/Doctoral Degrees

Over 70 Intellectual Property Items

## 1.4 Company Advantages

### Most Comprehensive Product Line

Covers Full Range of Forklifts and AMRs

Forklift Examples Include: Flat Transport, Stacking, Reach, Counterbalance, and Three-Way Forklifts

### In-House Developed Hardware & Software

All systems and components, including RMS, WCS, WMS, onboard APP, dashboard, base motion control boards, and various AMR models, are developed in-house.


### Industry-Leading Core Technical Specifications

Positioning Accuracy: ±2mm; Operating Speed: Up to 2 m/s

Multi-Vehicle Scheduling in the Same Area; Online Mapping

### Rapid Implementation & Deployment

Software with guided design; fastest project acceptance in 2 days

## 1.5 Collaborative Clients

**3C/Semiconductors**

鹏鼎控股 AVARY HOLDING · AT&S · LENS 蓝思科技 · FOXCONN 富士康科技集團 · dynamic · 领益智造 LY iTECH

**Automotive Industry**

广汽丰田 · LAND ROVER · NISSAN 东风日产 · BOSCH · NOK-FREUDENBERG(CHINA) 恩福（中国） · SAIC 上汽集团 SAIC MOTOR · DZ · AISIN We Touch the Future

**Home Appliances**

SAMSUNG · AUX 奥克斯 · Coma 西馬 · MAX · makita

**Aerospace**

CASIC 中国航天 · 中国航发 AECC · 寶勝 · 中航锂电 CA LI-BATTERY · 航天星航

**New Energy Photovoltaics**

吉利硅谷 GEELY Si-VALLEY · 德福新材 DEFU NEW MATERIALS · 璞泰来 PUTAILAI · ZEISS · 赣锋锂业 GanfengLithium · HTGD 亨通集团 HENGTONG GROUP

**Medical Industry**

UNION SHENZHEN HOSPITAL · 高济健康 COWELL HEALTH

**Synthetic Fiber Industry**

**Power Industry**

NARI 南瑞集团 NARI GROUP CORPORATION · SIENLINE 森蓝智能

**Food Industry**

味の素 AJINOMOTO

etc.

## 1.6 Summary of Advantages

### Geographic Advantage

Based in Suzhou

2-hour reach in the Yangtze River Delta

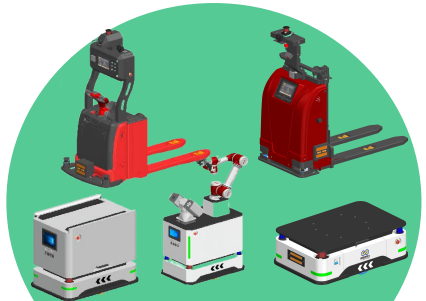
24-hour reach to other domestic cities

Extensive Industry Experience

Professional PMP Certification

Team Collaboration

### Professional Team



### Product Advantages

Complete System

Modular Hardware Design

Guided Software Design

3-5 units delivered within one week

Accelerates clients' smart technology implementation

### Fast Delivery

02

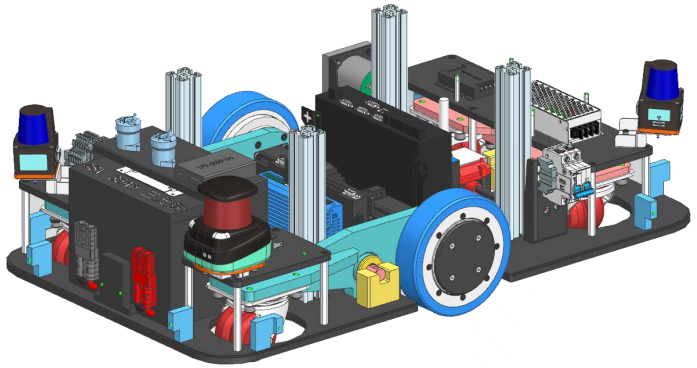
# AMR Product Overview

# 2.1 AMR Main Body

## Differential Drive Structure

In-House Design:

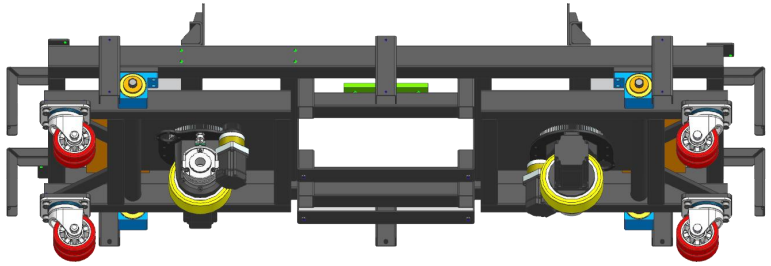
- Cost-Effective: Simple design, low cost, easy maintenance.
- Easy Debugging: Short development cycle.
- High Precision: ±5mm with reflective aids; ±2mm with QR codes.



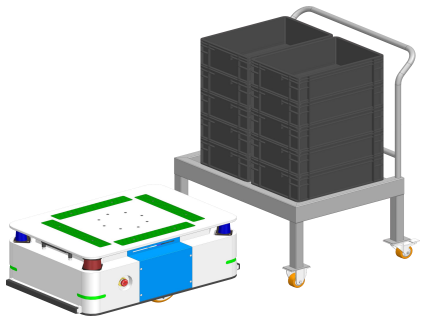
## Steering Wheel Drive Structure

In-House Design:

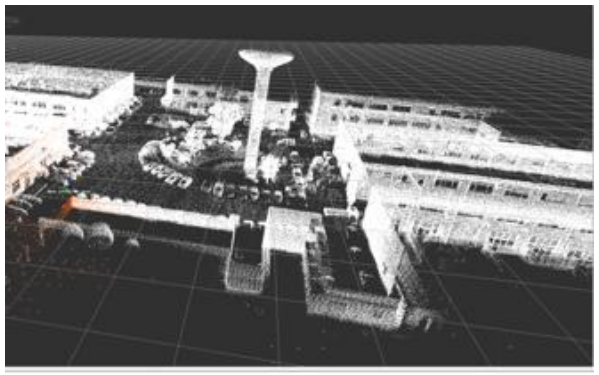
- Steering Wheel Drive Structure: High load capacity, up to 10+ tons.
- Flexible Mobility: Omnidirectional movement supporting forward, backward, sideways, and pivot turns.
- Compact: Requires minimal space for movement.
- Versatile Docking: Supports multiple docking directions.



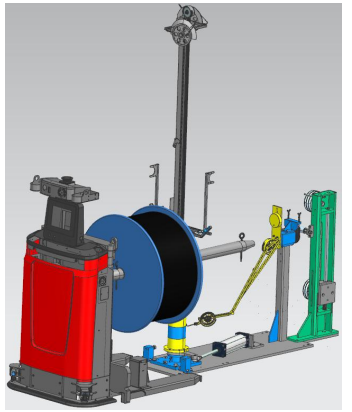
## 2.2 Various Positioning and Recognition Methods



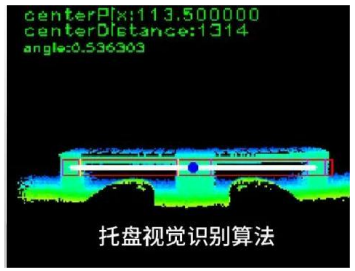
**Leg Detection for Material Carts:**
Suitable for material rack handling and docking at transfer stations.



**3D SLAM Navigation:**
Enhanced scene adaptability, unaffected by ambient light constraints, significantly improving deployment efficiency.



**Visual Recognition for Shaft Detection:**
Suitable for roll material handling; acquires and learns recognition models, integrating with motion control for precise picking.



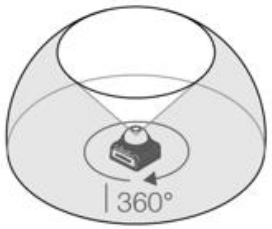

**Visual Pallet Recognition:**
A 3D camera on the fork front enables automatic pallet recognition and high-precision handling after correction.

**QR Code Secondary Positioning:**
Accuracy: ±5mm.
With QR Code Strips: Accuracy can reach ±2mm on differential AGVs.

**Reflective Sticker Secondary Positioning:**
Accuracy: ±5mm.
Usage: Suitable for machine docking.

※Additional Technologies: Rack Stacking & Pallet Stacking

## 2.3 Key Components




**Multiple LiDARs enhance scene adaptability**

To meet the diverse needs of various AMRs, application scenarios, and customer requirements, our company offers a range of LiDAR solutions:

- P+F: High-end imported German LiDAR, extensively used on a large scale, market-proven with a robust after-sales system.
- FREE OPTICS Laser: High-quality domestic LiDAR with a scanning range of up to 40 meters, offering excellent cost-performance and reliable product quality.
- MID-360: 3D navigation LiDAR with strong anti-interference capabilities, unaffected by ambient light, providing three-dimensional perception

**Kinco Drives & Motors Market Share No. 1**

Kinco leads in low-voltage DC servo motion control for logistics robots, offering a broad range of core drive components.

- High Stability and Reliability: Widely used in logistics robots, market-validated with robust after-sales support.
- High Control Precision: Seamless control transitions, smooth motion, and quick response.
- Highly Integrated: Precise installation and excellent maintainability.

**Motion Control Boards In-House Developed**

Our motion control boards, fully developed in-house, manage AMR base motion and external devices (such as lights, sensors, and switches), offering significant advantages in control precision and integration.

- High Integration: Supports multiple communication methods (IO, serial, CAN) and fits most mainstream devices.
- Compact Design: Consolidates functions previously sourced externally, reducing space significantly.
- Autonomous Control: Fully in-house developed for optimal motion control solutions.

## 2.4 Chassis Expansion

Lifting and Rotating Chassis

Hybrid AMR

Roller AMR

Belt Conveyor AMR

Note: Supports customization for external device integration and chassis height adjustments.

## 2.5 Product Matrix

| Product Model | BR-D10/BR-M10 | BR-D10R/BR-M10R | BR-D10B/BR-M10B | BR-D10A/BR-M10A |
|---|---|---|---|---|
| Product Rendering |  |  |  |  |
| Product Name | Lifting and Rotating AMR - Standard Chassis | Roller-Type AMR | Belt Conveyor AMR | Collaborative Robotic Arm AMR |
| Vehicle Dimensions | 1160*820*250 | 1160*820*(300~1000) | 1160*820*(310~1000) | 1160*820*(500~1000) |
| Rated Load (kg) | 1000kg | 500kg | 100kg | 20kg |
| Rotation Diameter (No Load) (mm) | 1230 | 1230 | 1230 | 1230 |
| Operating Space (No Load, Single/Double Channel) (mm) | 1630/3060 | 1630/3060 | 1630/3060 | 1630/3060 |
| No Load Operating Time (h) | 10 | 10 | 10 | 9 |
| Full Load Operating Time (h) | 8 | 6 | 8 | 6 |
| Vehicle Weight (kg) | 192kg | 282kg | 236kg | 278kg |
| Navigation Position Accuracy (mm) | ±10mm | ±10mm | ±10mm | ±10mm |
| Angle Accuracy (°) | ±1° | ±1° | ±1° | ±1° |
| Charging Time (h) | 2h | 2h | 2h | 2h |
| Secondary Positioning Accuracy | ±5mm | ±5mm | ±5mm | ±5mm |
| Operating Speed (m/s) | 1.5m/s | 1.5m/s | 1.5m/s | 1.5m/s |

| Product Model | BR-F12SL-H | BR-F14SL-M | BR-F15P | BR-F16R | BR-F30G | BR-F15E-IN | BR-F20E-OUT |
|---|---|---|---|---|---|---|---|
| Product Rendering |  |  |  |  |  |  |  |
| Product Name | Compact Pallet Stacker | Compact Pallet Stacker | Forklift | Forklift | Tow Tractor | Front Moving Stacker | Counterbalance Forklift |
| Vehicle Dimensions | 1740*920*1960 | 1740*970*1915 | 1650*935*1960 | 2470*1370*2550 | 1580*980*1850 | 2490*1090*2105 | 3210*1270*2365 |
| Rated Load (kg) | 1200kg | 1400kg | 1500kg | 1600kg | 3000kg | 1500kg | 2000kg |
| Lifting Height (mm) | 1844 | 2500 | 95 | 5755 | / | 3000 | 3000 |
| Turning Diameter (Empty) (mm) | 2566 | 2320 | 3100 | 3570 | 2530 | 2602 | 3740 |
| Right-Angle Stacking Aisle Width | 2300 | 2280 | 2320 | 3350 | / | 3179 | 4200 |
| Navigation Position Accuracy (mm) | ±15mm | ±15mm | ±15mm | ±15mm | ±15mm | ±15mm | ±15mm |
| Angle Accuracy (°) | ±1° | ±1° | ±1° | ±1° | ±1° | ±1° | ±1° |
| Drive Mode | Single Steering Wheel | Single Steering Wheel | Single Steering Wheel | Differential | Single Steering Wheel | Single Steering Wheel | Differential Drive + Steering Wheel Steering |
| Secondary Positioning Accuracy | ±10mm | ±10mm | ±10mm | ±10mm | ±10mm | ±10mm | ±10mm |
| Operating Speed (m/s) | 2m/s | 1.3m/s | 1.5m/s | 2m/s | 1.8m/s | 1.5m/s | 2m/s |

03

# Automated Warehouse Product

# 3 Automated Storage and Retrieval System

Stacker Crane
Racking System

Shuttle Car
Racking System

Box-Type AGV
Racking System

High-Level Forklift
Racking System

## 3 Edge Warehouse

### Edge Warehouse

Due to the nature of manufacturing enterprises, conventional warehouses cannot be placed next to every production line. Some companies use third-party logistics and VMI (Vendor Managed Inventory) to support production lines. Since production operates in real-time and cannot afford any downtime, edge warehouses are essential.

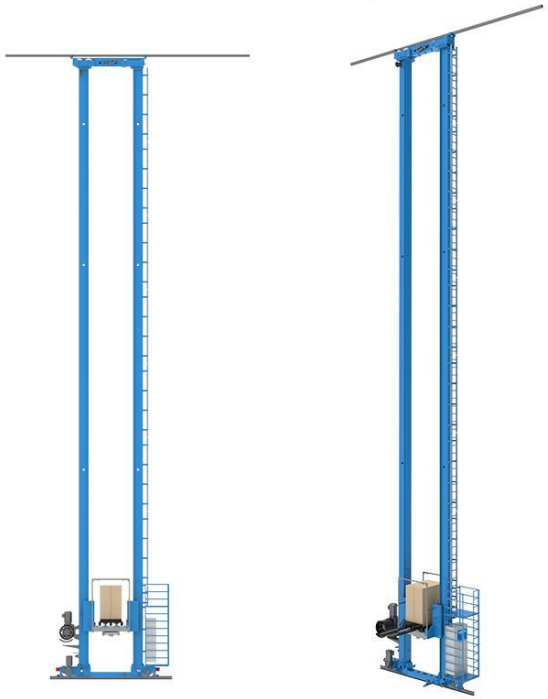
Shelves hold bins containing small, loose items, used for storing scattered and small materials.

## 3 Pallet Racking System

**Pallet Racking System**

Materials are stored on pallets, typically used for large items with heavier weights.

## 3.1 Stacker Crane Racking System

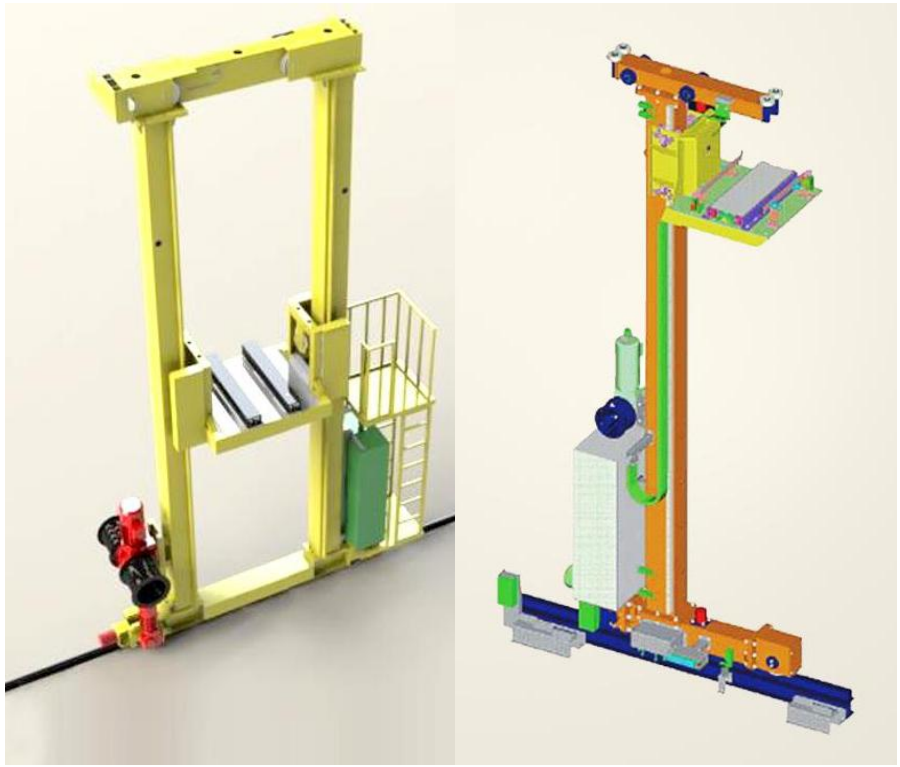


**Stacker**

a storage and retrieval device used in automated high-bay warehouses, available in single-mast and double-mast configurations. It operates through three key mechanisms: traveling, lifting, and fork movement.

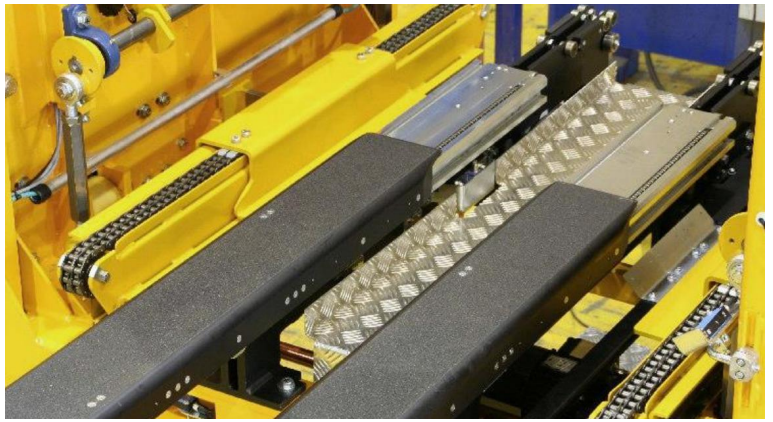
| Item | Parameters |
|---|---|
| Specifications | Customized according to needs |
| Horizontal travel speed | 0-120 m/min |
| Vertical lift speed | 0-45 m/min |
| Fork extension speed | 0-30 m/min |
| Acceleration ($m/s^2$) | Horizontal H 0.5; Vertical V 0.7; Fork F 0.4 |
| Common positioning method | Laser positioning / Barcode laser positioning / Encoder + Address chip |
| Common communication method | Wireless communication / Infrared communication / Carrier communication |
| Mast | Double mast / Single mast |
| Pallet identification method | Barcode / RFID |
| Load capacity | 100-3000KG |
| Operation method | Straight / Turning / Switch track |
| Positioning accuracy | ±5mm |

## 3.1 Stacker Crane Racking System



Double Mast Stacker Crane

Single Mast Stacker Crane

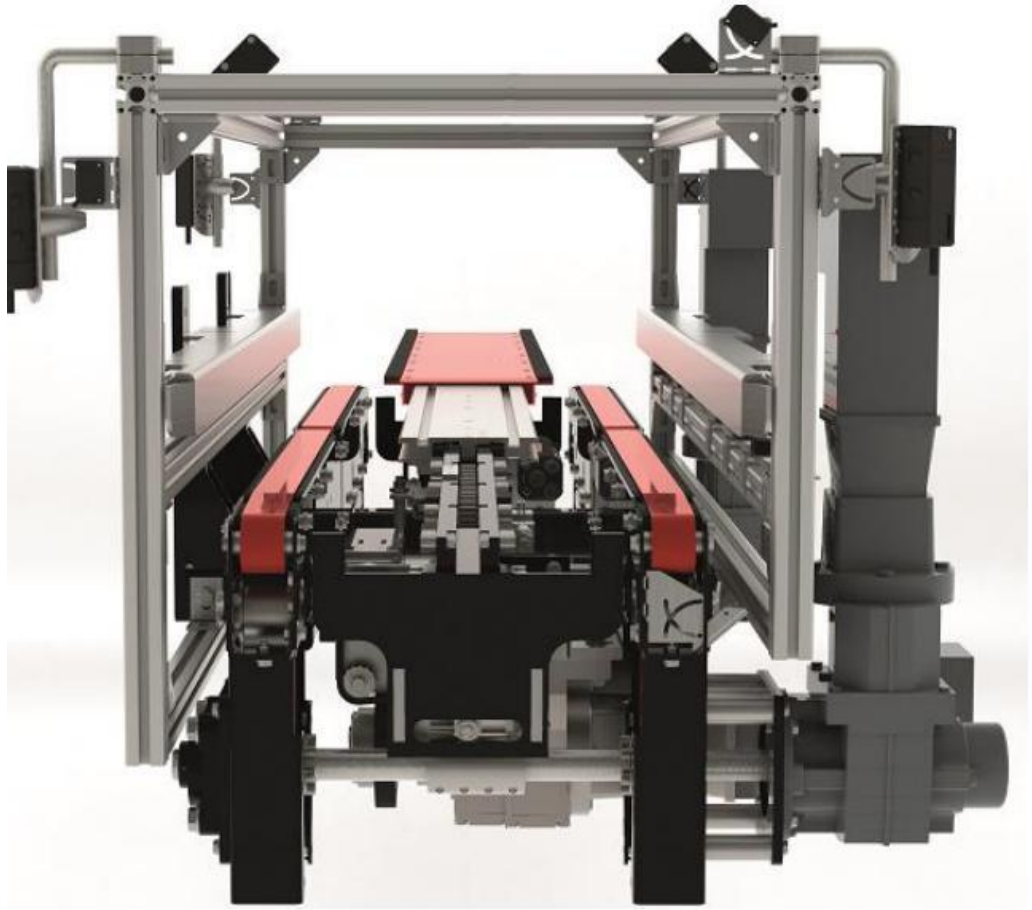
**Telescopic Fork**

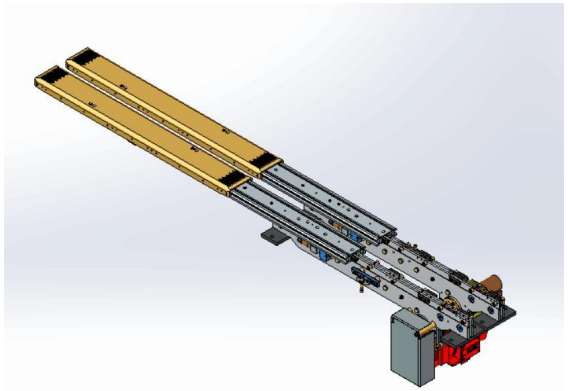
Features a German MIAS three-layer double-extension design with gear, rack, and chain drive. The 64mm upper fork height suits European 1210 pallets and can be customized as needed.

Drive Motor: Equipped with a German SEW motor, customizable per client requirements.

The system offers high precision, load capacity, minimal deflection under full load, ensuring reliability and stability.

## 3.1 Stacker Crane Racking System





**Stacker Crane Fork**

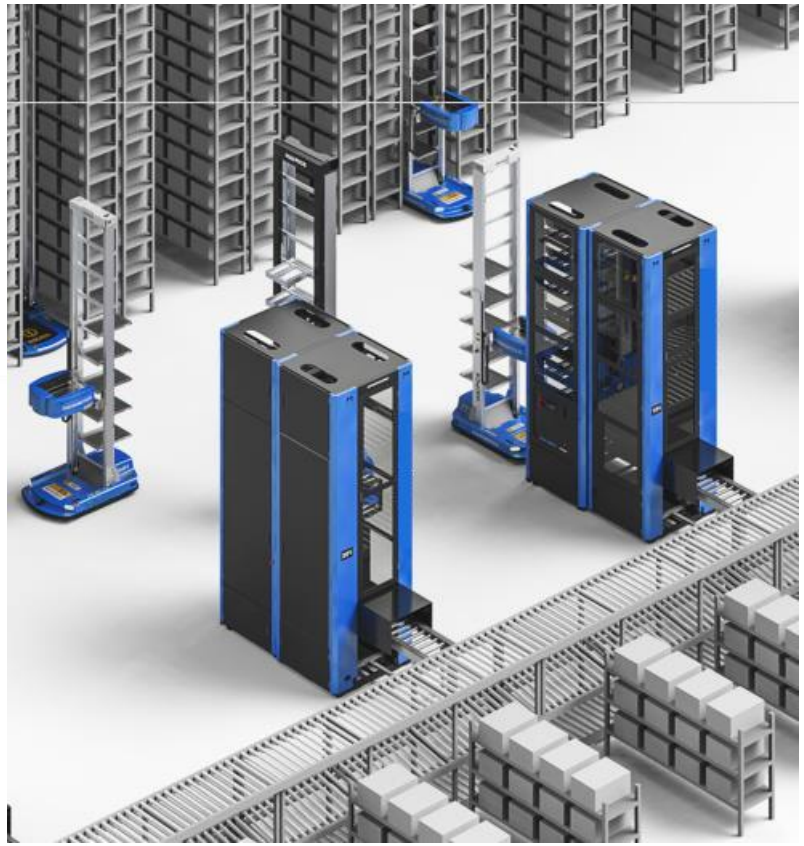
The fork typically has 3 to 4 sections and is controlled by a drive motor for extending and retracting to pick up goods. It can extend and retract sideways for efficient cargo handling.

## 3.2 Shuttle Rack System

Shuttle Car

High-Precision Lift

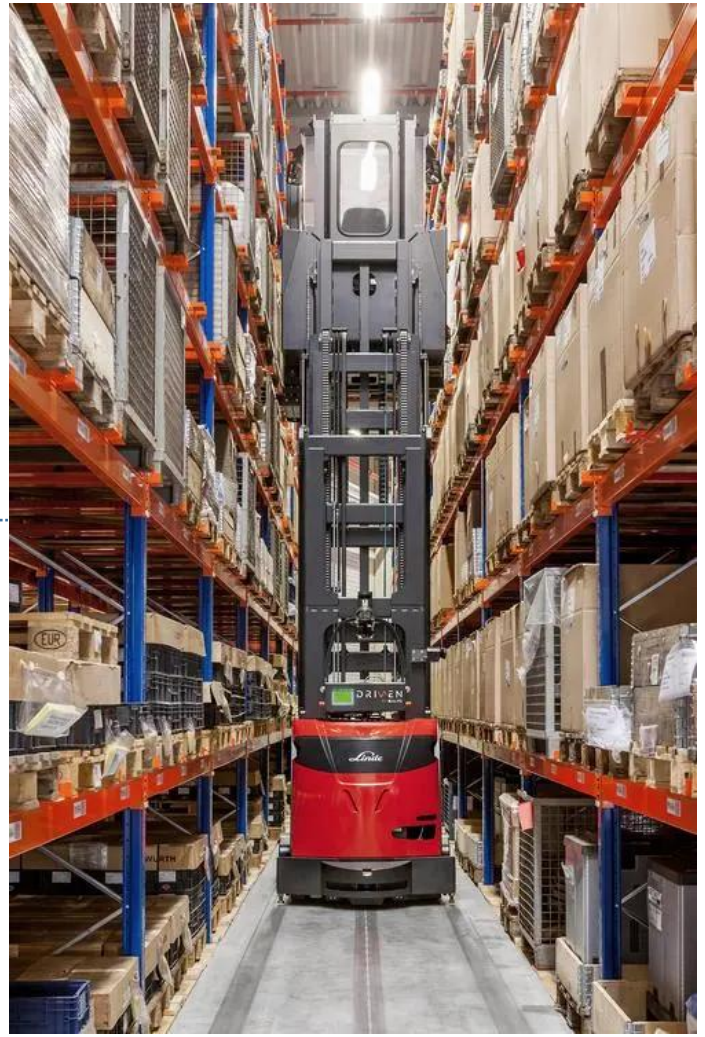
## 3.3 Box-type AGV Racking System



# 3.4 High-Reach Forklift Racking System

Omnidirectional Vehicle

- **Multidirectional forklift for handling long materials,** with a lifting height of 3m to 7.2m. Compared to standard reach forklifts, it features multidirectional movement and full in-place rotation, making it ideal for handling long, elongated goods.
- **Equipped with a full AC drive system,** offering strong climbing ability, maintenance-free operation, regenerative braking, good operational stability, and high efficiency. It eliminates the need for replacing carbon brushes in DC motors, reducing maintenance and servicing requirements.
- **External wide fork carriage** with adjustable width design, suitable for storing long materials, ring-shaped items, boards, pipes, and irregular goods.



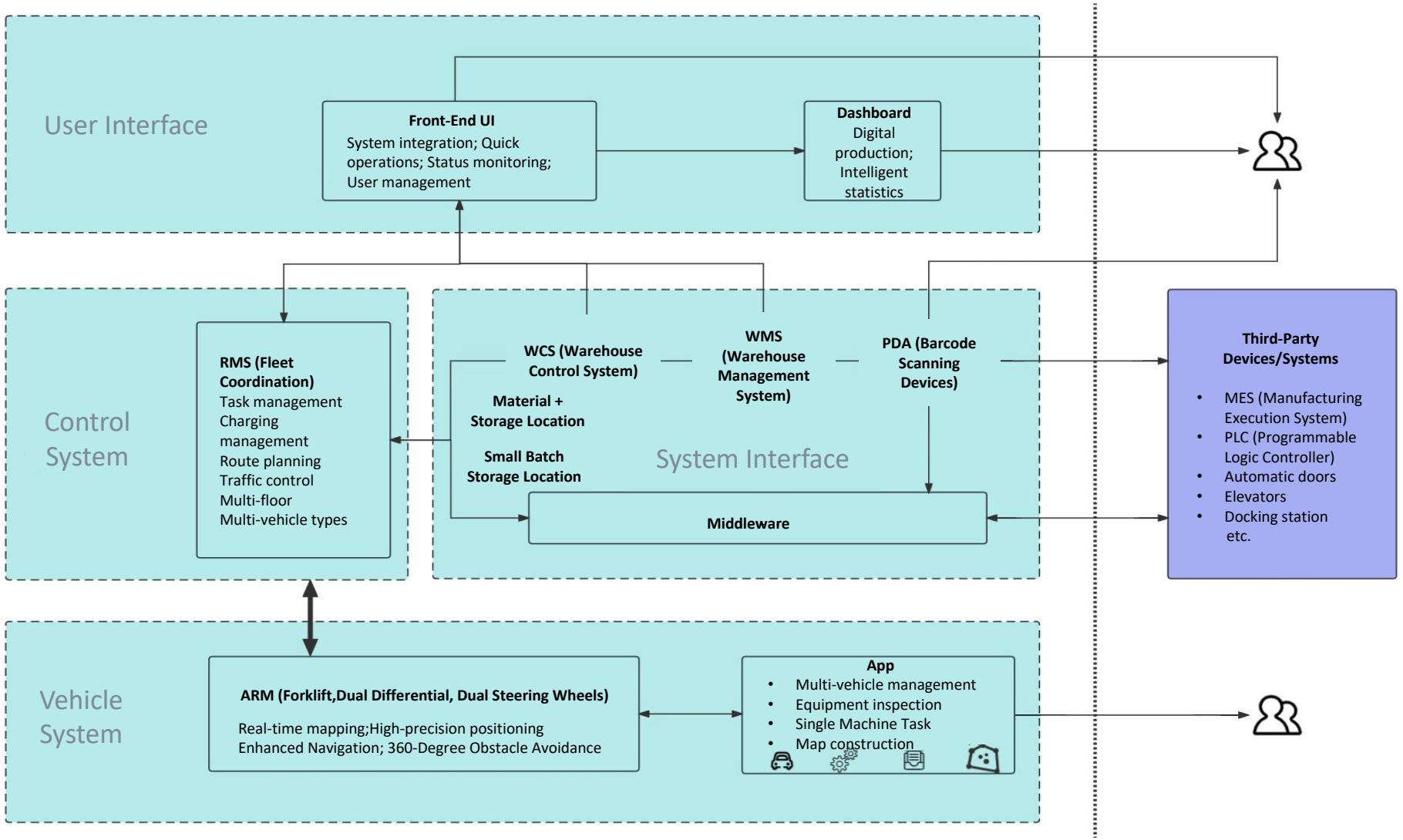
- **Three-way stacking:** Forks rotate 180 degrees and shift laterally without moving the vehicle body, enabling dense storage for warehouse expansion.
- **Rear axle stability:** A locking mechanism increases rigidity and stability during lifting and side stacking.
- **User-friendly design:** Soft landing for goods, reduced mast vibration, and standard wheel display and camera (above 4.5m) for efficient operation.

Three-Way Forklift

04

# Proprietary Software

## 4.1
# Software Architecture – Fully In-House Developed Systems



# 4.2 WMS System

**The WMS system consists of two terminals: the PDA terminal for issuing task instructions and the WEB PC terminal for service support. These terminals work in tandem to manage storage locations. The system is structured around three primary functions: Basic Configuration Management, Core Business Management, and Statistics and Visualization, comprising a total of 16 functional pages.**

**Basic Configuration Management:**

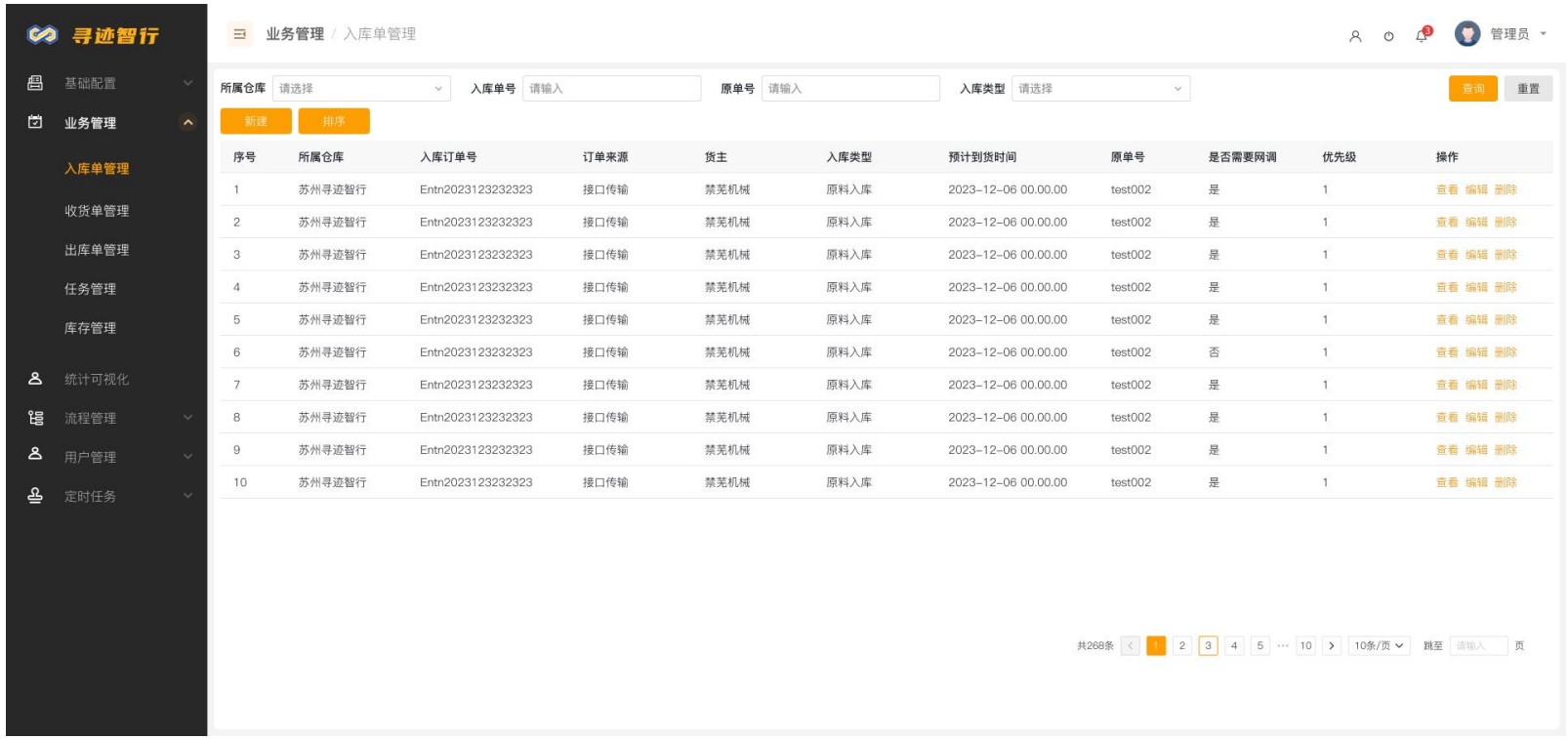
Manages foundational resources like warehouses, storage areas, aisles, storage locations, materials, and pallets.

**Core Business Management:**

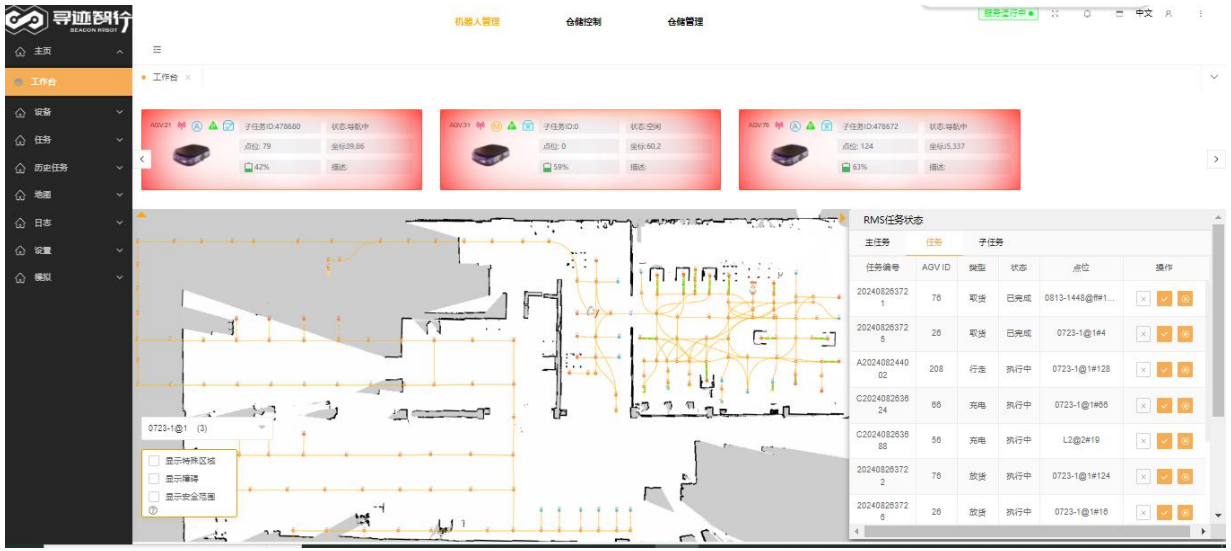
Handles key operations, including inbound/outbound orders, tasks, inventory, stocktaking, and quality inspections.

**Statistics and Visualization:**

Manages 2D/3D components and scene design, displaying resource statistics and 3D storage layouts.



# 4.2 Scheduling System





## Scheduling System Function Introduction

Ø Support for Cross-Floor and Cross-Facility Operations;

Ø Support for Multi-Vehicle Scheduling;

Ø Wait, Avoid, and Reroute (Reversing;

Ø Static and Predictive Traffic Control, Collision Detection, and Heat Maps;

Ø Path Planning, Traffic Control, Task Management, Status Monitoring, and Charging Management;

## Scheduling System Compatibility

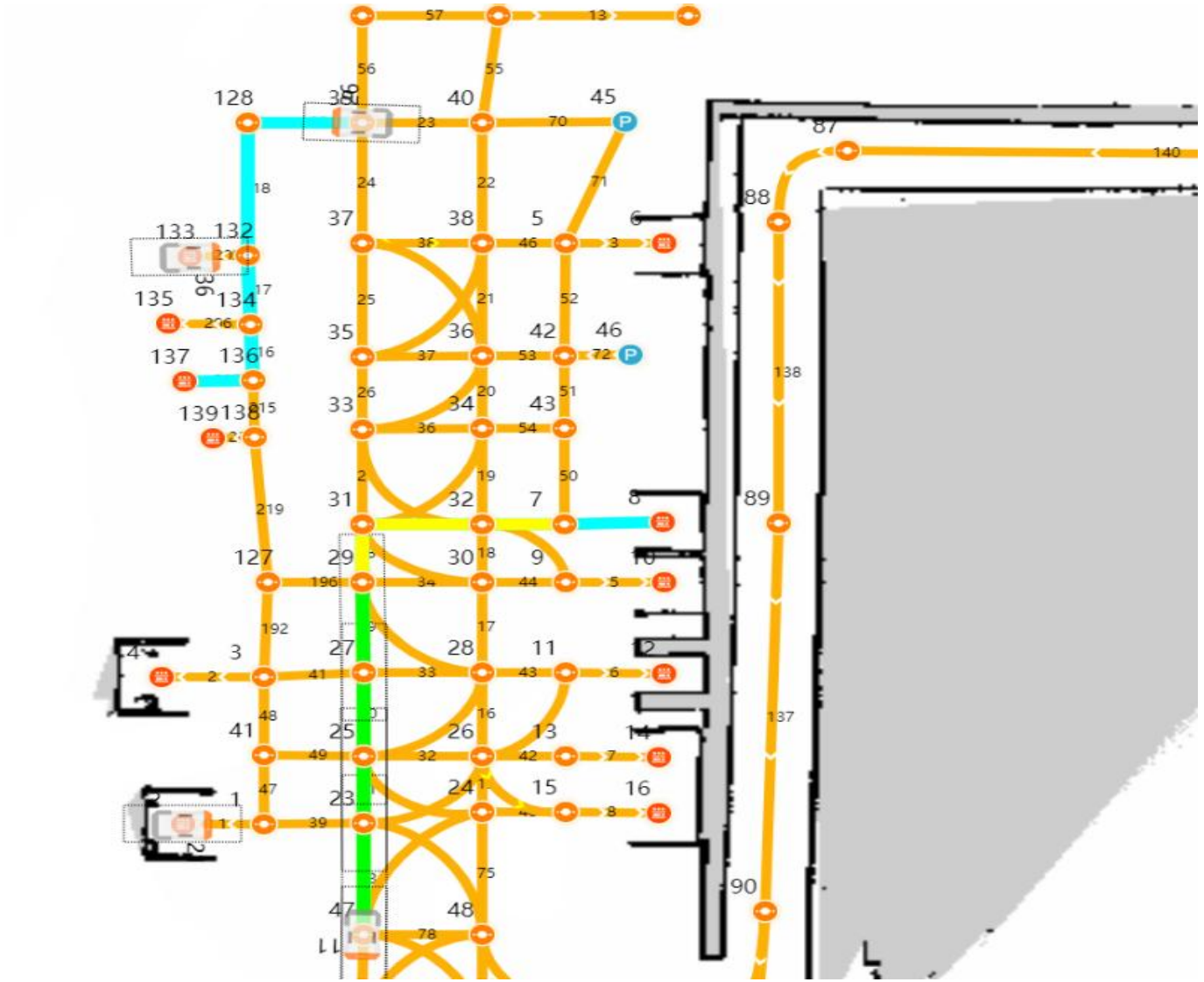
➢ **Scheduling Server**

- Compatible with Ubuntu and Windows 7 or higher.

➢ **WCS System**

- Compatible with Ubuntu and Windows 7 or higher

# 4.3 Scheduling System – Path Planning



**Real-Time Path Planning**

- Global, Predictive, and Local Path Setup: Real-time path planning to ensure optimal routes.
- Increased Efficiency: Enhances execution efficiency for smooth multi-vehicle operations.

**Path Analysis**

- Global Path: Generates a globally accessible route when a task is assigned.
- Predictive Path: Identifies the next possible drivable path.
- Local Path: Extracts the drivable route from the predictive path.

# 4.4 AMR Standalone Control Software

## Traffic Map Editing

Rapid Point Collection for path planning
Edit path attributes and set up restricted areas;

## Task Management

Tasks can be edited and dispatched to vehicles without the need for scheduling, allowing for preliminary testing;

## Parameter Configuration

Configure basic parameters such as fork height and number of levels; Enable or disable sensors;

APP


## Manual Control

Manual control of vehicles and upper-level equipment for executing single-step actions, used for initial debugging and later troubleshooting;

## Real-Time Monitoring

Real-time output of current tasks, speed, and other information; Error codes displayed promptly.

## Full Range of Vehicle Models

Supports differential drive and the full range of forklift products.
Supports integration with upper-level equipment such as rollers, robotic arms, and rotary devices.

# 4.5 Onboard Navigation System

## Map Functionality

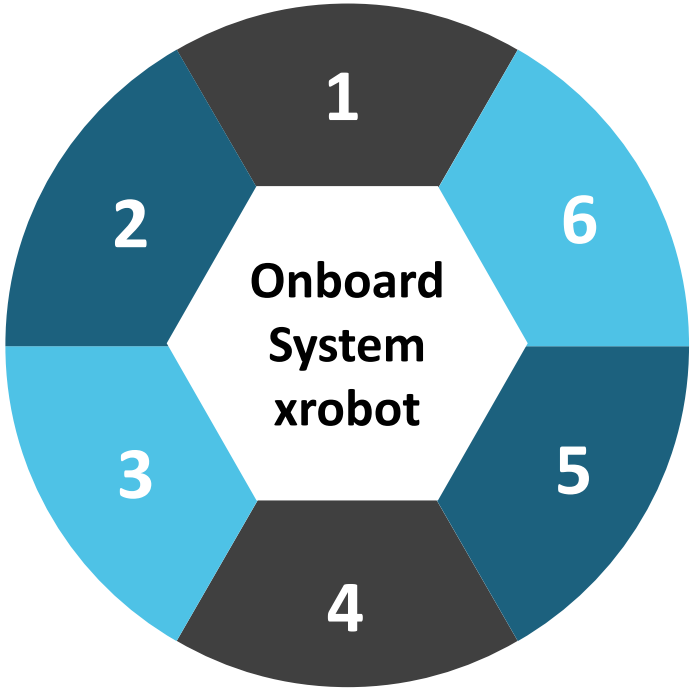
- Real-time mapping with instant publishing.
- Supports manual closed-loop for complex environments.
- Reflective pillar-only mapping.
- Maps areas up to 500,000 square meters.

## Fusion Positioning

- Supports pure reflective positioning and fusion positioning to adapt to various environments.
- High repeat positioning accuracy with strong environmental adaptability.;

## High-Precision End Positioning

- Supports various positioning methods, including QR codes, reflectors, and code strips.
- Can interface with terminal devices, achieving positioning accuracy of up to ±2mm.




## Embedded Controller

- Embedded design with high scalability.
- Reduces industrial PC resource consumption.
- Communication speed of up to 50Hz.

## Smooth Navigation

- Supports speeds up to 2m/s.
- Smooth acceleration and deceleration with no stuttering or overshooting.

## Manual/Automatic Switching

- Physical buttons for convenient manual/automatic mode switching.
- Quick and easy manual error clearing.

# 4.6 Automatic Charging

## Safety Considerations

- Check if battery temperature meets charging requirements before starting.
- Monitor battery temperature during charging to determine whether to continue or stop.

## Single Vehicle Consideration

- Proceed to work if battery is sufficient and task demand is high; continue charging if demand is low.
- Verify battery temperature before charging and monitor current reduction during the process.
- Initiate charging at low battery levels, with emergency charging for critical levels.
- Terminate charging when battery reaches high capacity.
- Implement current limitation for high temperatures and automatically disconnect if overheating occurs.

**Visual Interface Display:**


**Automatic Safe Charging:**

## Workload Consideration

- Charging Strategy Based on Operational Workload:
- Busy Mode: Increase the charging threshold, allowing vehicles to prioritize tasks and minimize charging time.
- Idle Mode: Lower the charging threshold, encouraging vehicles to charge as much as possible.
- Regular Mode: A balanced approach between busy and idle modes, optimizing both work and charging time.

## Balanced Workload Consideration

- Adjust the number of vehicles based on regular, balanced workload to ensure operational efficiency and avoid over- or under-utilization.

# 4.7 Key Product Advantages

## High Mapping Quality & Strong Scalability

- Reflective Pillar Mapping with real-time progress view.
- Expandable Mapping on existing maps.
- Max Area: 500,000 sqm.
- Industry Comparison: Competitors use offline mapping with limited scalability.

## Flexible and Easy to Use

- Android-Based Standalone Scheduling App
- Guided Design: Easy to use and quick to learn.
- Superior User Experience: Outperforms competitors.
- Fast On-Site Deployment: Enables rapid function verification.

## High-Precision Positioning

- New Multi-Sensor Fusion Positioning Technology
- Navigation Accuracy: ±10mm
- End-Point Docking Precision: Up to ±2mm
- Automatic Positioning and Online Setup at startup

## Stable and Fast Operation

- Operating Speed: Up to 2m/s, leading the industry.
- Quick Response: Agile with no unnecessary movements.

## Embedded Software & Hardware Integrated Controller

- Versatile Chassis Controller: Compatible with various types of forklifts and AMR models.
- Rare Expertise: One of the few companies in the country with this technology.
- In-House Developed Navigation Control System.

## Comprehensive Design Capabilities

- Scheduling System: Supports mixed-use of different vehicle models and navigation methods (2D/3D laser, QR code) within the same environment.
- Navigation System: Capable of handling different motion control models with high stability and robustness.
- Hardware Design: Expertise in designing modifications for light and heavy-duty vehicles, including various forklift models.

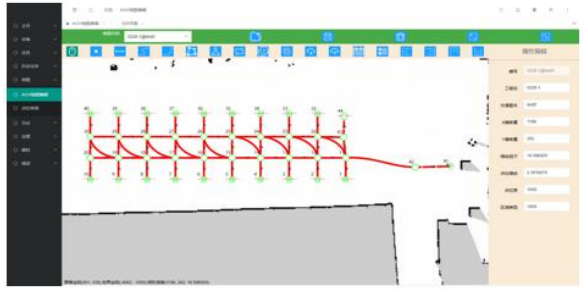
05

# AMR Safety Protection

# 5.1 Safety Protection Design

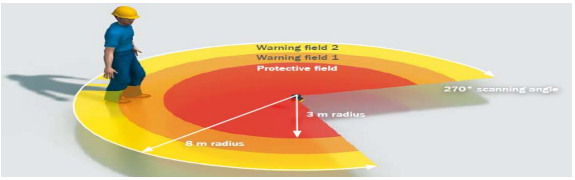
## System-Level Safety Protection

- The Scheduling Management System serves as the central dispatch hub, implementing efficient, integrated command and control. During normal operation, AMRs adhere to traffic control rules. The system software features intelligent diagnostics and can process and resolve abnormal faults based on the information it receives.



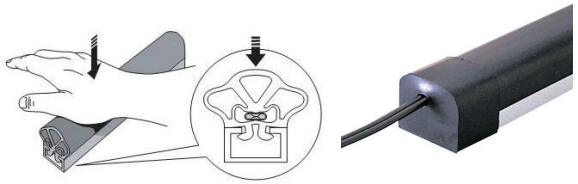
## Contactless Safety Protection

- Utilizing laser and ultrasonic technology, a multi-level obstacle proximity detection system is implemented. Within a certain range, it slows down the AMR robot, and at a closer range, it stops the robot entirely. Once the obstacle is removed, the AMR robot automatically resumes its normal operating speed.




## Contact-Based Safety Protection

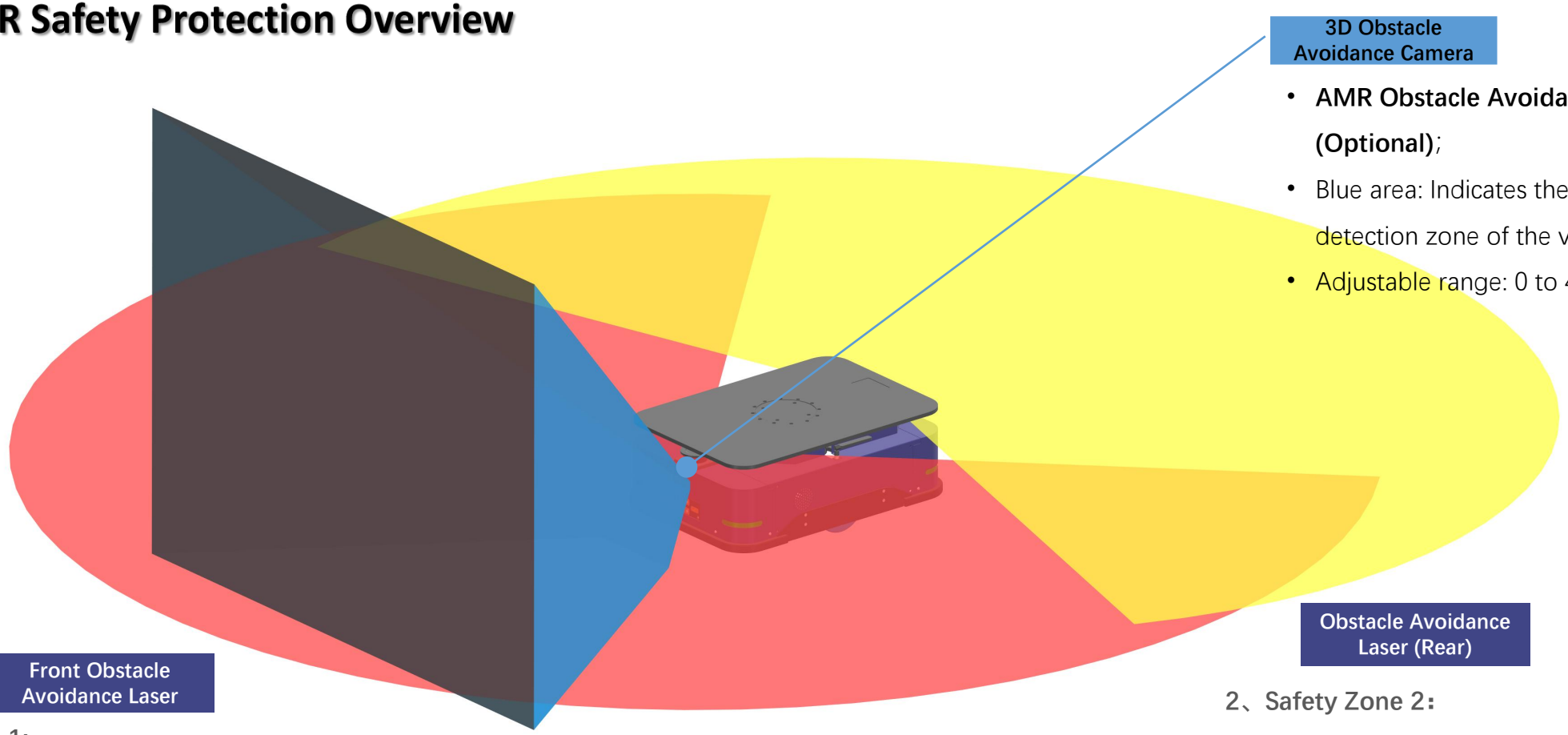
- Contact-based protection devices are typically installed at the front and rear of the AMR vehicle in its direction of travel. These devices are made of elastic and flexible materials. When the AMR vehicle comes into contact with an object, the contact protection device deforms, triggering the limit switch, which forces the vehicle to power off and stop.



## Emergency Stop Button Safety Protection

- The Emergency Stop Button is typically a red button installed at the front or rear of the AMR. In case of an emergency, pressing the button will immediately stop the AMR. To resume normal operation, the emergency stop button must first be released, and then the reset button must be pressed to restore the AMR's functionality.

## 5.2 AMR Safety Protection Overview




- **AMR Obstacle Avoidance Camera (Optional)**;
- Blue area: Indicates the adjustable detection zone of the visual camera;
- Adjustable range: 0 to 4 meters

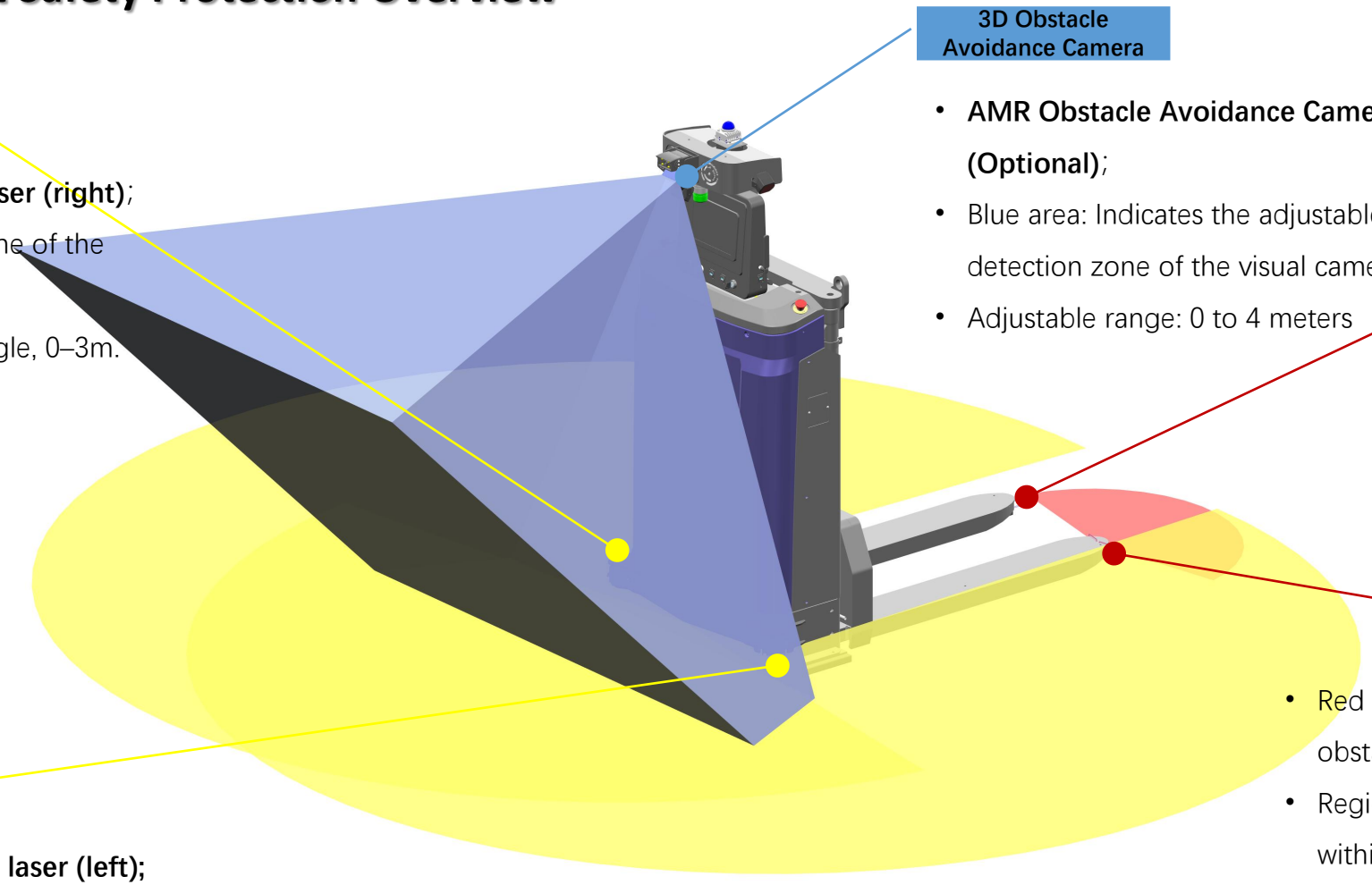
1、Safety Zone 1:

- **Front obstacle avoidance laser for AMRs**;
- Red area: configurable zone of the obstacle avoidance laser;
- Range: 270° angle, 0–3 meters adjustable

2、Safety Zone 2：

- **AMR Obstacle Avoidance Laser (Rear)；**
- Yellow area: configurable range of the obstacle avoidance laser;
- Configurable range: 270° angle, 0–3m.

# 5.3 AMR Forklift Safety Protection Overview




- **AMR obstacle avoidance laser (right)**;
- Yellow area: configurable zone of the obstacle avoidance laser;
- Configurable range: 270° angle, 0–3m.

- **AMR Obstacle Avoidance Camera (Optional)**;
- Blue area: Indicates the adjustable detection zone of the visual camera;
- Adjustable range: 0 to 4 meters

- Red area: configurable zone of the obstacle avoidance laser;
- Region size: Angle 108°, configurable within the range of 0 to 1.5 meters.

- **AMR obstacle avoidance laser (left);**
- Yellow area: configurable zone of the obstacle avoidance laser;
- Configurable range: 270° angle, 0–3m.

Note: Safety range, distance, and zones can be freely configured and can be intelligently switched by the upper-level system.

06

# Technical Service Support

# PM(project management)

**project management** Full-service, hands-on support.

## project planning

- Logistics Consulting
- System Planning

| | |
|---|---|
| Project manager responsible | Project management |
| Professional planning team | Warehouse logistics |
| Project implementation team | System docking/secondary development |
| Quality assurance team | Financial control |

## project implementation

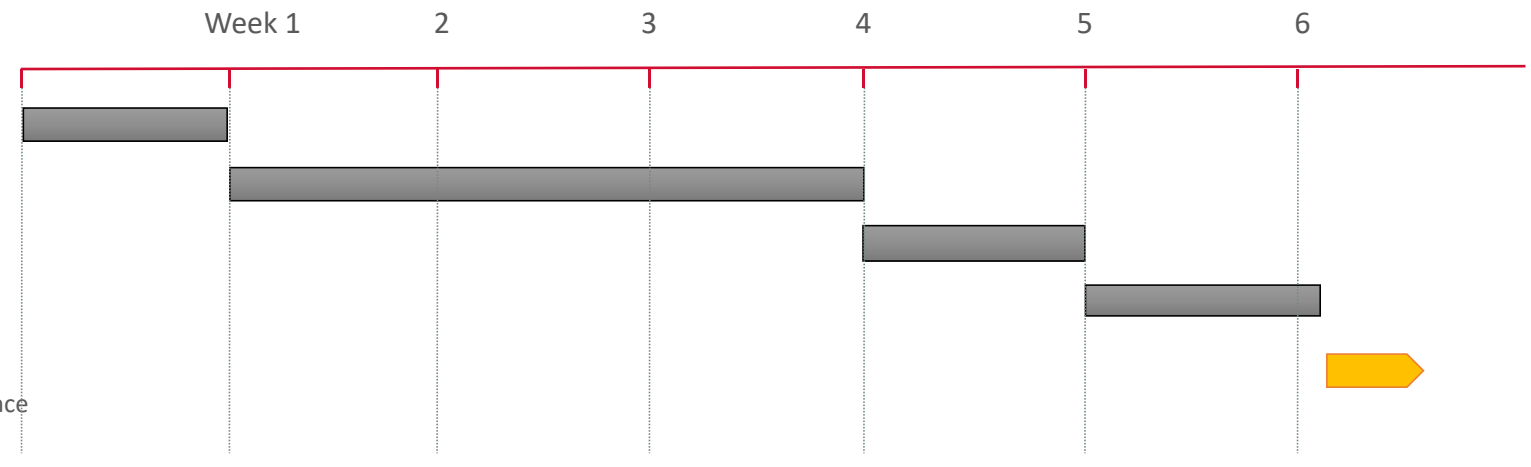
- Material Preparation
- Project Implementation
- Floor Repairs (if applicable)
- Electrical Installation (if applicable)
- Network Setup (if applicable)
- System Installation and Implementation
- Project Acceptance and Inspection

## after-sales support

- Maintenance, Upgrades & Renovation Support
- Operational Support

**Implementation cycle**

**Total project hours**




Note: This is a typical project timeline for standard models. Actual timelines depend on the scale and specific requirements of the project.

## 6.2 Project Delivery

### Pre-sales

Extensive Experience

- Professionals with 3+ years in the industry
- In-depth Understanding of Client Needs: Identifies and addresses potential risks.

### Delivery

Speed and Agility

- Up to 5 units: Go live within 5 days.
- 6-10 units: Go live within 10 days.
- 11-20 units: Go live and deliver within 20 days.


### Implement

Energetic and United Team

- Implementation Supervisors: Each has over 6 projects of management experience.
- Field Application Engineers (FAE): All have associate degrees or higher, with regular in-house training and assessments.

### Management

Full Process Integration

- Comprehensive Management Procedures
- Full Project Management Involvement: Deep understanding of project progress with seamless coordination between on-site and off-site teams.

## 6.3 Service Support

07

# Company Case Studies

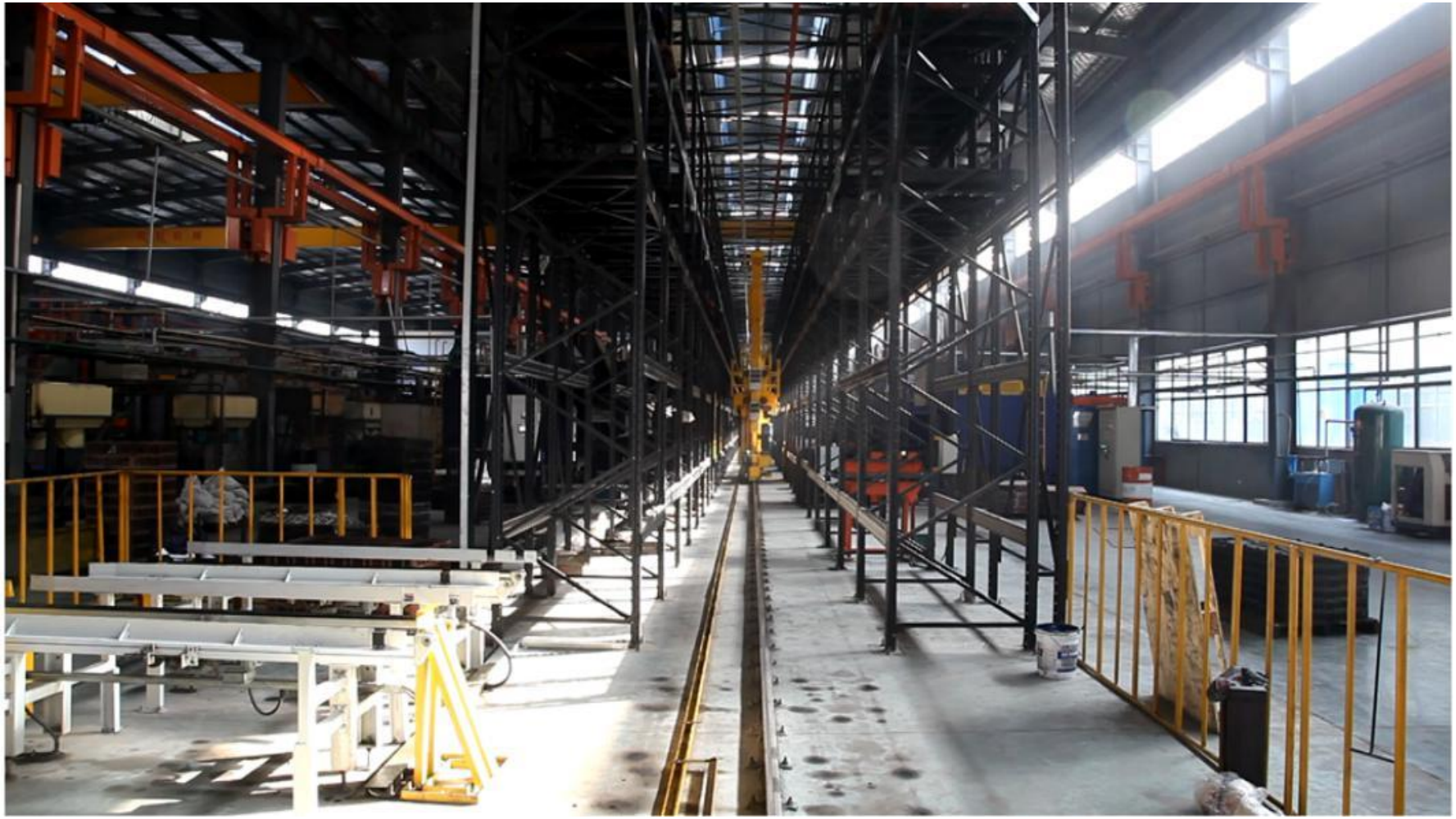
# 7.1 AMRCustomer performance statement

| sequence number | category | customer name | project name | Imported model | quantity |
|---|---|---|---|---|---|
| 1 | AGV trolley | 鹏鼎控股 | Shenzhen Pengding SA01, SA06, SA02 project | 300kg、 Latent Lifting AGV | 25 |
| | | | | 150kg、Class 1000 Cleanroom AGV | |
| 2 | | 国家电网宁波鄞州电网公司 | Ningbo power Grid | Composite Operation and Inspection Robot | 13 |
| 3 | | 奥特斯（中国）有限公司 | Chongqing factory project | 300kg、Box-Type Cleanroom AGV | 7 |
| 4 | | 广汽丰田发动机有限公司 | Engine project | 500kg、Latent Lifting AGV | 24 |
| 5 | | 广汽丰田发动机有限公司 | Engine upper cover item | 500kg、Carrying-Type AGV | 8 |
| 6 | | 广汽丰田发动机有限公司 | Engine casting table project | 300kg、Carrying-Type AGV | 6 |
| 7 | | 敦南微电子（无锡）有限公司 | Welding shop project | 300kg、Latent Lifting AGV | 3 |
| 8 | | 胜伟策电子(江苏)有限公司 | Changzhou project | 200kg、Latent Lifting AGV | 2 |
| 9 | | 富士康 | Yancheng project | 500kg、Latent Lifting AGV | 3 |
| 10 | | 安川电机 | Shengyang Project | 200kg、Latent Lifting AGV | 16 |
| 11 | | 牧田（昆山）有限公司 | Kunshan Project | 1500kg、Tail-Towing AGV | 4 |
| 13 | | 上海芸志机械自动化有限公司 | Xuzhou Project | 5kg、Mecanum Wheel Composite AGV | 2 |
| 14 | | 天津嘉昱科技有限公司 | Tianjin Jiayu | 200kg、Carrying-Type AGV | 3 |
| 15 | | 苏州领裕电子科技有限公司 | Suzhou Project | 50KG、Belt Transfer AGV | 40 |
| 16 | | 北京星航机电装备有限公司 | BEIJING XINGHANG | 300kg、Carrying and Lifting AGV | 13 |
| | | | | 160kg、Telescopic Fork AGV | |
| | | | | 10kg、Composite AGV | |
| 17 | | 甘肃德福新材料有限公司 | Lanzhou Project | 3.8T、2T、50KG Carrying and Lifting AGV | 5 |
| 18 | | 昆山同日工业自动化有限公司 | Huazheng project | 1000kg、Carrying and Lifting AGV | 7 |
| 19 | | 地壳机器人科技有限公司 | Winning project | 5kg、Composite AGV | 3 |
| 20 | | 坤厚自动化科技有限公司 | Avic Baosheng | 500kg、1000kg、1500kg，Latent Lifting AGV | 20 |
| 21 | | 坤厚自动化科技有限公司 | Pingqian factory project | 500kg、1000kg，Latent Lifting AGV | 13 |

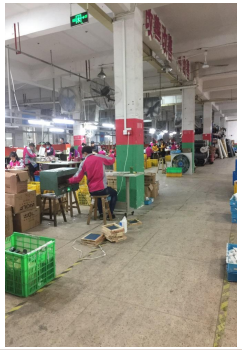
## 7.2 Forklift Customer Performance Table

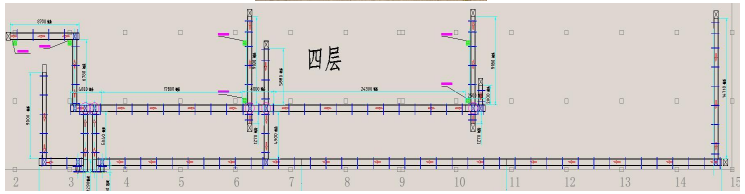
| sequence number | category | customer name | project name | Imported model | quantity |
|---|---|---|---|---|---|
| 22 | AGV forklist | 汇专科技集团股份有限公司 | 汇专工具项目 | L16 林德 | 2 |
| 23 | | 杭州中亚机械股份有限公司 | 中亚机械项目 | T30、L16林德 | 1 |
| 24 | | 沈阳道和科技有限公司 | 道和项目 | T20 林德 | 1 |
| 25 | | 博众精工科技股份有限公司 | 博众项目 | T20 林德 | 2 |
| 26 | | 盟立自动化股份有限公司 | 盟立331718A项目 | L16 林德 | 1 |
| 27 | | 盟立自动化股份有限公司 | 盟立334267A项目 | L16 林德 | 1 |
| 28 | | 博众精工科技股份有限公司 | 博众科勒项目 | L16 林德 | 2 |
| 29 | | 健芮智能科技（昆山）有限公司 | 健芮智能项目 | L14 林德 | 1 |
| 30 | | 上海同锐工业自动化设备公司 | 上海同锐项目 | L14 林德 | 4 |
| 31 | | 科大智能物联技术有限公司 | 科大扬州项目 | L16 林德 | 6 |
| 32 | | 科大智能物联技术有限公司 | 华电项目 | T20 林德 | 1 |
| 33 | | 佰联圣智能仓储物流系统（苏州）有限公司 | 长沙国网项目 | AC30，平衡重，海豚 | 4 |
| 34 | | 苏州和丰工业设备有限公司 | 和丰项目 | 1000kg，窄巷道，诺力 | 1 |
| 35 | | 佰联圣智能仓储物流系统（苏州）有限公司 | 湘潭项目 | AC30，平衡重，海豚 | 2 |
| 36 | | 苏州速易德工业装备系统有限公司 | 速易德项目 | T20 林德 | 1 |
| 37 | | 林德叉车(中国）有限公司 | 奇华顿项目 | L14 林德 | 2 |
| 38 | | 成都佰联圣智能科技有限公司 | 常德项目 | L16 林德 | 2 |
| 39 | | 科大智能物联技术有限公司 | 江铜项目 | L14 林德 | 11 |
| 40 | | 上海交大智邦科技有限公司 | 某光伏新能源项目 | L12、L14 林德 | 35 |

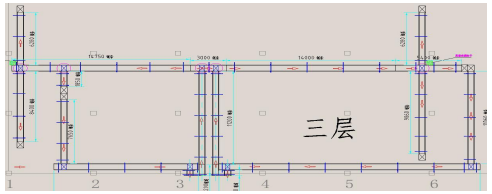
# 7.3 Yongkang Qiujing Heat Treatment Workshop Logistics System

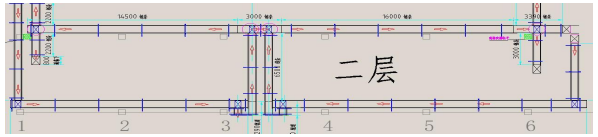


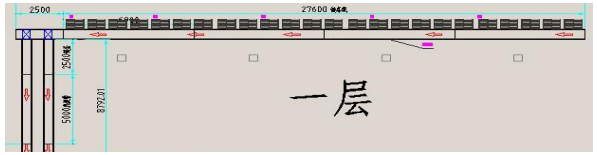
# 7.4 Yongkang Qiujing Heat Treatment Workshop Logistics System

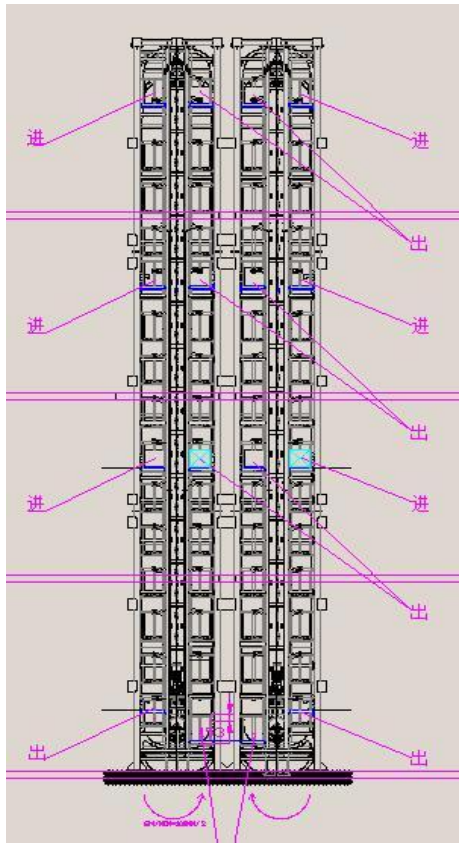





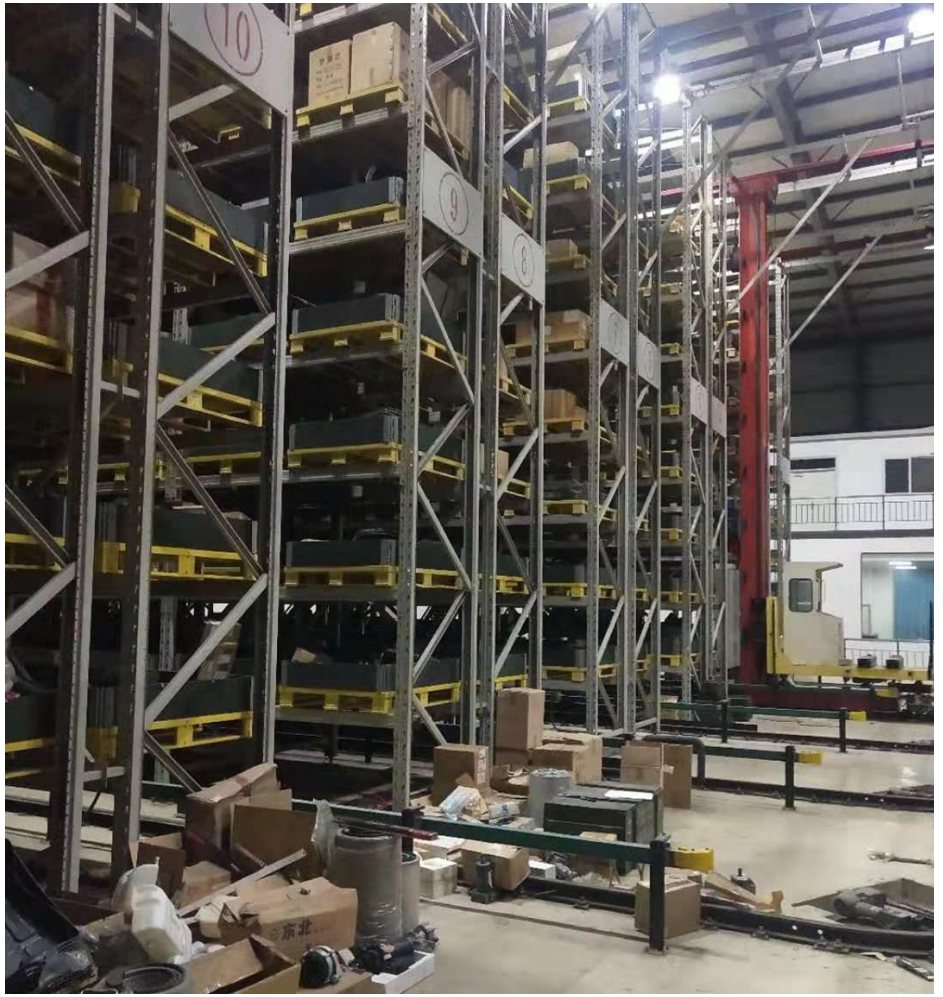









## 7.5 Publicly Available Cases - Automated High-Bay Warehouse

## 7.6 Publicly Available Cases - Single-Rail Aisle Stacker Crane

# Case Study - Leading Enterprise in the PCB Industry

**Project Details**

Vehicle Type: Carrying Roller AGV (Dual Workstation)

Drive Type: Differential Drive

Load Capacity: ≤100kg (per workstation)

Navigation Method: SLAM Laser Navigation + QR Code Hybrid Navigation

Positioning Accuracy: ≤±5mm / Angle ≤1°

**Customer Requirements**

Each AGV transports two hanging baskets per trip.

Tasks are triggered by automatic feeding machine calls.

Connection table sensors detect storage status.

AGV body must withstand acid and alkaline environments.

**Project Status**

Phase 1: 2 units completed.

Phase 2: 2 units in progress, total project includes 12 units.

Additional project orders expected to reach 39 units.

**Customer Benefits**

30% increase in single-trip transport efficiency.

Roller design improves process optimization.

# Case Study - Home appliance industry


**Project Details**

Vehicle Type: Lifting and Rotating AGV

Drive Type: Differential Drive

Load Capacity: ≤500kg

Navigation Method: SLAM Laser Navigation + Reflector-Based Secondary Positioning

Positioning Accuracy: ≤±5mm / Angle ≤1°

**Customer Requirements**

Automatic material identification

PDA-triggered tasks

Flat storage location management and material management

Large screen display for storage locations

Multiple vehicles operating in narrow, one-way channels

**Project Status**

Phase 1: 5 units completed.

**Customer Benefits**

40% increase in daily throughput.

# Case - Power tools industry

**Project Details**

Vehicle Type: Tail-Towing AGV

Drive Type: Differential Drive

Load Capacity: ≤1500kg

Navigation Method: SLAM Laser Navigation

Positioning Accuracy: ≤±20mm

**Customer Requirements**

Maximum load of 1500kg.

Ability to tow 10 pallets at once.

Tasks triggered by MES system.

**Project Status**

Phase 1: 1 unit completed.

Phase 2: 3 units completed.

Phase 3: Under negotiation, with a total project expectation of 18 units.

**Customer Benefits**

20% reduction in logistics staff.

24 hours operation, meeting production cadence requirements

# Case - Tray transfer in a 3C industry (Apple supply chain)

**Project Details**

Vehicle Type: Belt Transfer AMR

Load Capacity: ≤50kg

Navigation Method: SLAM Laser Navigation

Positioning Accuracy: ≤±5mm

**Customer Requirements**

Maximum load of 50kg.

Integration with 12 machines.

Narrowest docking channel width of 1000mm.

**Project Status**

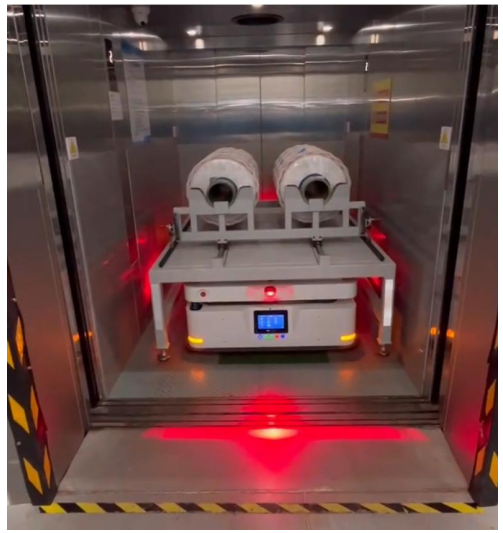
A total of 40 units were introduced, and the project is completed.

**Customer Benefits**

20% reduction in personnel.

30% improvement in production cycle efficiency.

# Case - a photovoltaic new energy coil transfer



**Project Details**

Vehicle Type: Belt Transfer AMR

Load Capacity: 3.8T, 2T, 50kg

Navigation Method: SLAM Laser Navigation

Positioning Accuracy: ≤±5mm

**Customer Requirements**

Maximum load of 3.8T.

Automatic docking with gantry robots.

Heavy material handling with elevator integration.

**Project Status**

A total of 5 units were introduced, and the project is completed.

**Customer Benefits**

Automatic elevator docking for fully unmanned material transport.

# Case - a photovoltaic new energy material transfer

**Project Details**

Vehicle Type: L12, L14, Custom Forklift

Load Capacity: ≤1600kg

Navigation Method: SLAM Laser Navigation

Positioning Accuracy: ≤±10mm

**Customer Requirements**

Maximum load of 600kg.

Indoor and outdoor operation, cross-plant transport.

Integration with MES system.

**Project Status**

A total of 35 units were introduced, and the project is completed.

**Customer Benefits**

High-precision positioning ±2mm.

360° safety protection.

# Case - a GOV enterprise power grid

**Project Details**

Vehicle Type: R16S Reach Forklift AGV

Load Capacity: ≤1600kg

Navigation Method: SLAM Laser Navigation

Positioning Accuracy: ≤±10mm

**Customer Requirements**

Maximum load of 1500kg.

Docking with truck containers, depalletizing machines, and turtle carts.

**Project Status**

Phase 1: 2 units completed.

Phase 2: 3 units completed.

**Customer Benefits**

45% improvement in warehouse data accuracy.

20% reduction in labor costs.

01

02

03

# Thank you

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