



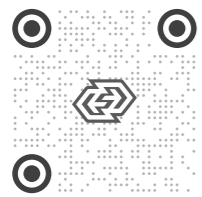
# 斯坦德机器人 Standard Robots



LEAD FLEXIBLE INDUSTRIAL  
**REVOLUTION**

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Wechat

SECOND EDITION, 2022

East China  
Digital Logistics  
Demonstration Plant  
14000m<sup>2</sup> | 5000units/year

Consistent Strict Quality Control  
and Fast Product Delivery



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### Solution & Product

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# ABOUT US

Lead Flexible Industrial Revolution

Standard Robots (Shenzhen) Co., Ltd. focuses on AMR (Autonomous Mobile Robot) R&D and manufacturing, applying broad and self-developed technologies including robot positioning algorithm, operation system and robot controller. Our main business involves laser SLAM navigation AMR and flexible industrial logistics solution.

Founded in 2016, Standard Robots is committed to develop standardized and practical robot application for outstanding system integrator and end users, helping achieve agile and flexible logistics in factory. Featuring in less investment and quicker return, Standard Robots provides laser SLAM AMR to manufacturers worldwide to aid on both logistics automation and intelligent manufacturing.

## 350+ Projects Completed & 4000 AMRs Delivered

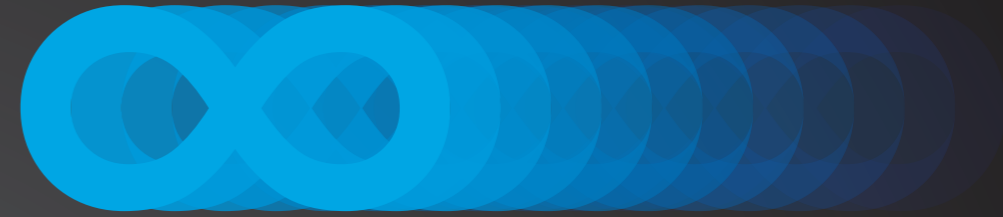


Broad range of industry application including 3C Electronics, Semiconductor, Photovoltaic, Lithium Battery, Display, Automobile & Auto Parts, Medical & Pharmaceutical and etc.

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# 1 + N + X =



1 set of core technology platforms for mobile robots

Numerous mobile robots developed based on the technology platform

Provide X sets of industry-level solutions according to the needs of various industries

∞ stands for industry-level standard solutions for various industries through a 1+N+X approach, to create consistent value in the digitization and intelligentization of industrial logistics.



# SOLUTION & PRODUCT

Lead Flexible Industrial Revolution

## Automated Storage and Picking

Raw material picking & finished goods storage  
Accurate material identification  
Automatic high rack storage

## Automatic loading and unloading

Execution accuracy around  $\pm 0.3\text{mm}$   
Multi-module docking for diversified production equipment

## Flexible Operation and Rapid Deployment

Laser SLAM navigation integrated with multiple sensors  
No infrastructure modification is needed, and the system can be rapidly deployed  
Flexible adaptations to production line changes

## Smart Goods-to-Person Picking

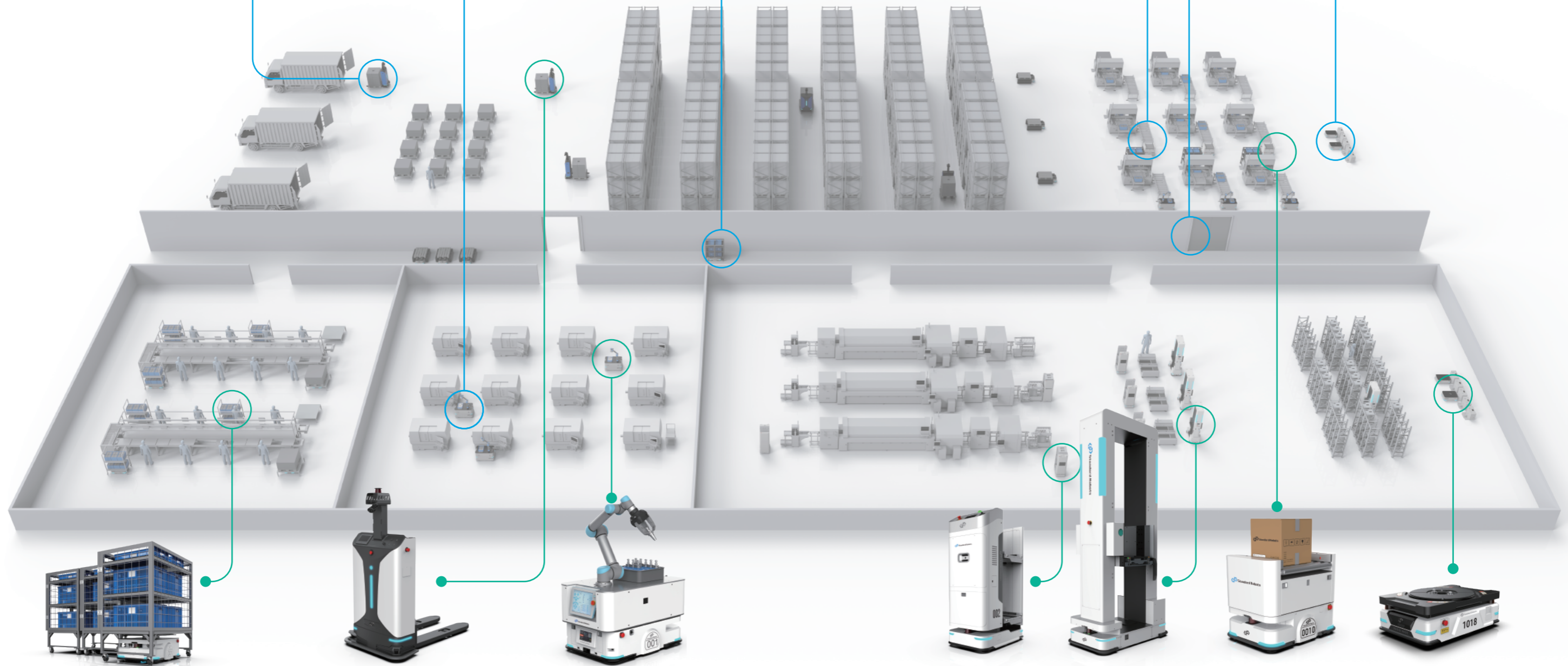
Multi-vehicle adaptation, one-key feeding call

## Cross-scenario Transportation

Automatic entry and exit of auto-door/elevator

## Automatic Charging

One-hour charge for 8 hours of operation



# Flexible Industrial Logistics Solution

Based on self-developed laser SLAM AMR and Fleet Management System (FMS), Standard Robots developed multiple industry targeted logistics solution which enables automated material warehousing, production line feeding, processing material transportation and goods storage. Data visualization is also supported, production and logistics data are recorded, by which users could export report any time for further optimization.

## Solution Features /

<p><b>Standardized Implementation</b></p> <p>Numerous project practiced, the standardized implementation process meet diversified industries' needs. Along with a one-on-one service, Standard Robots could better understand clients' requirements with quicker response.</p>	<p><b>Outstanding Performance</b></p> <p>Edge research and development on laser SLAM technology and algorithm ensures higher reliability and broad adaptability on complex environments and diversified industries.</p>	<p><b>High Flexibility</b></p> <p>Simple and fast in both installation and operation - the solution adapts to dynamic production mode and high takt time; both software and hardware are customization available to fit with clients' reality.</p>
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## Impacts & Benefits /

- 1 Labor Saving and Efficiency Increase**  
One AMR equals to 1-2 labors and supports 24/7 operation. Visualized data management helps consistent logistics & production process optimization and efficiency improvement.
- 2 Quick Returns**  
The average return period is within 24 months with lower operation and maintenance costs. Along with a long after-sales guarantee and product life-cycle, the ROI keeps growing though project completed.
- 3 Light Asset Investment**  
No facility or workspace reconstruction is needed which reduces operation and maintenance input. Average deployment time is within one week, leading to less influences to existing production plan.
- 4 Digital Logistics**  
Industry-leading software and hardware performance and system construction service aid clients on both automation and digitalization revolution.

# Laser SLAM Navigation Technology Advantages

AGV VS AMR	 Magnetic Tape Navigation AGV	 QR-Code Navigation AGV	 Laser SLAM Navigation AMR
Field Requirement	Magnetic Tapes Required	QR-Code Required	Non/Few Reconstruction
Environment Adjustability	×	×	Fit with Complex/Dynamic Environment
Map Generating	×	×	○
Navigation Accuracy	×	mm	mm
Obstacle Avoidance	×	×	○
Deployment Time Cost	> 4 Weeks	2-3 Weeks	<1 Week
Maintenance Cost	High	Medium	Low
Application Scenario	Fixed Path Transportation	Closed&Man-cleared Environment	Workshop/Warehouse/Cross-Scenarios

- 
**Flexible Operation**  
 Complex operation paths and modes, such as "single-location to multi-location," "multi-location to multi-location," "autonomous path planning" and "autonomous obstacle avoidance" can be achieved without magnetic tapes or QR-codes.
- 
**Strong Environmental Adaptability**  
 Strong adaptability to complex environments, such as narrow passages and compact workspace.
- 
**Robust Expandability**  
 Operation path and process can be easily programmed, according to actual production environments and requirements.
- 
**High and Stable Positioning Accuracy**  
 Standard positioning accuracy is  $\pm 10$  mm, positioning success rate exceeding 99.99%. Higher accuracy is supported based on multi-sensor options.
- 
**Lower Operation and Maintenance Cost**  
 Without magnetic tapes or QR codes, maintenance manpower and costs are perfectly saved. Regular maintenance is only required for the robot itself.



# RIoT Flexible Logistics Platform

The RIoT (Robot Internet of Things) is a flexible logistics platform built by Standard Robots, which places AMR at its core to achieve seamless hardware interconnection; uses FMS (Fleet Management System) as its main control to achieve a high degree of software integration; and combines plant layouts, production business scenarios, and human/machine/material/line/warehouse interactions to create a hybrid flexible logistics operation mechanisms.

RIoT empowers industrial production through cutting-edge technologies, such as 5G communication, cloud computing, AI deep learning, edge computing, distributed storage, and big data analysis. Based on a massive amount of circulating data, RIoT can thoroughly explore production laws, independently iterate AI algorithm models, and continuously optimize production models to help smart factories achieve even more efficient production.



**100000+**  
m<sup>2</sup>  
**1000+**  
Devices Interconnection Ability

## Massive devices interconnection and collaboration

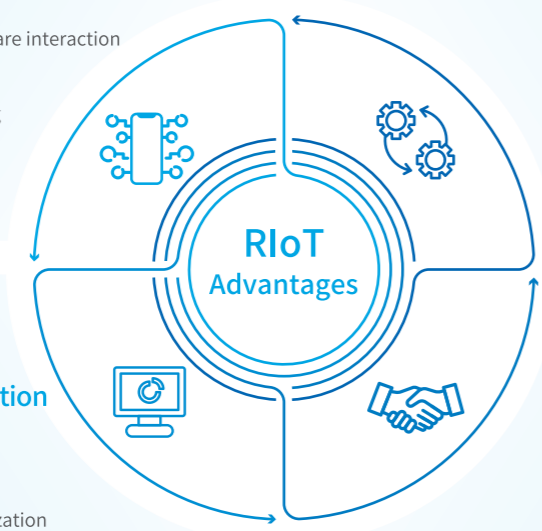
- Intelligent software and hardware interaction
- Instant device status indication
- Efficient robot fleet dispatching and configuration

## Industrial Digital Twin

- Data based hierarchy planning
- Equipment digital placement
- Scientific planning & efficient implementation

## Solution Simulation, Optimization and Validation

- Friendly solution design
- Risk insight and avoidance
- Solution simulation and optimization



## Eco-partnerships

- Open software design
- Various systems connection available
- 5G network supported

## FMS - Fleet Management System /

The FMS (Fleet Management System), or Standard Robots dispatching system, is responsible for task allocation, scheduling and logistics data statistics. It is equipped with a multi-task scheduling algorithm and is flexibly configured according to clients' requirements to realize optimal task allocation. Along with multi-robot path planning and traffic control algorithms, FMS enables robot fleet collaboration for overall efficiency improvement.

FMS monitors, analyze and records robot operation status instantly, such as mileage, abnormal events and etc. Order data can be processed to calculate efficiency indexes such as the utilization rate and robot average response time. The system also enables data visualization and report exporting for overall logistics optimization in the future.



## Rapid Deployment

Supports a variety of operation systems to realize one-key installation. User can access to system through browser directly, with no software installation needed.



## Intelligent Task Assignment

The intelligent task allocation algorithm ensures efficient robot fleet collaboration.



## Efficient Path Planning

Real-time path planning and optimization to realize dynamic traffic control while avoiding bottlenecks and congestion.



## Data Visualization and Management

Instant data tracking on robot operation and data import/export function aid on and overall process optimization.



## Solid Expandability

Open and HTTP-based interface allow FMS to connect with clients' upper system, MES, WMS and ERP, seamlessly.



## Friendly and Interactive Operation

The operation interface fits with the production process and logic, while providing a friendly visual and interactive experience.



## Oasis & AMR Series • Mobile Robot Chassis

The Oasis and AMR series mobile robot can be deployed and operated without workspace reconstruction. Intelligent obstacle avoidance is realized through multiple sensors integration. It can be widely applied to manufacturing scenarios or other complex environments to aid on automation transformation. With diversified add-on modules and carries, it can meet different logistics needs. Along with FMS, the robot connect with MES/WMS/ERP seamlessly to achieve both logistics automation and information visualization.



### Rapid Deployment

Self-developed laser SLAM navigation can be utilized for automatic mapping and rapid deployment without modifying the infrastructure.



### Precise Positioning

The new generation of positioning algorithms support long corridor positioning and dynamic map update, to ensure continuous and stable operations and consistent client value implementation.



### High Expandability

Multi-interface controller and industrial designs realize diversified customization of functional modules to meet logistics needs for different manufacturing industries and production processes.



### Safety and Reliability

LIDAR, 3D vision sensors, safety bumpers, and proximity sensors have been installed to detect near-ground objects or ground obstacles, enhancing overall safety performance.



	Oasis 180D	Oasis 300UL	Oasis 300C	Oasis 600UL	Oasis 600C	AMR 600	Oasis 1200D		
<b>Basic Specification</b>	Radar Layout	Single, Front	Single, Front	Single, Front	Single, Front	Double, Diagonal	Double, Diagonal	Double, Diagonal	
	Navigation Mode	Laser SLAM	Laser SLAM	Laser SLAM	Laser SLAM	Laser SLAM	Laser SLAM	Laser SLAM	
	Dimensions (L*W*H mm)	650*500*260	850*605*290	760*545*260	995*690*290	950*630*260	1000*770*310	1200*800*265	Module Excluded
	Weight (kg)	80	128	93	161	155	160	200	Module Excluded
	Lifting Module Type	NA	Lifting & Rotation	Lifting & Rotation	Lifting & Rotation	Lifting & Rotation	Lifting	Lifting & Rotation	
	Height with Lifting Module (mm)	—	310	300	315	280	365	300	
	Weight with Lifting Module (kg)	—	173	150	219	187	230	310	Carrier Included
	Payload (kg)	180	300	300	600	600	600	1200	
	Visual Camera for Higher Accuracy	Optional	Optional	Optional	Optional	Optional	Optional	Optional	
Network	5G, Optional	5G, Optional	5G, Optional	5G, Optional	5G, Optional	5G, Optional	5G, Optional	5G, Optional	
	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	Wi-Fi (2.4Ghz/5.8Ghz), Standard Config	802.11b/g/n 802.11a/n/ac
<b>Operation Performance</b>	Max. Speed (m/s)	1.5	1.5	1.5	1.5	1.6	1.5	1	
	Turning Radius (mm)	0	0	0	0	0	0	0	
	Rotating Radius (mm)	325	485	400	568	550	590	700	
	Gradeability	3°/5%	3°/5%	3°/5%	3°/5%	3°/5%	3°/5%	3°/5%	
	Obstacle Climbing Ability (mm)	10	10	10	10	10	10	10	
	Floor Gap Tolerance (mm)	20	30	30	30	30	30	30	
	Running Corridor Width (mm)	Min 700	Min 800	Min 750	Min 890	Min 850	Min 950	Min 1000	
	Rotating Corridor Width (mm)	Min 850	Min 1200	Min 1000	Min 1300	Min 1300	Min 1400	Min 1650	
	Positioning Accuracy (mm)	±10	±10	±10	±10	±10	±10	±10	
	Angle Positioning Accuracy (°)	±1	±1	±1	±1	±1	±1	±1	
Accurate Positioning Accuracy (mm)	±5	±5	±5	±5	±5	±5	±5	Optional with QR-Code Positioning	
<b>Battery Performance</b>	Capacity	51.2V 23Ah	51.2V 30Ah	51.2V 25Ah	51.2V 40Ah	51.2V 30Ah	51.2V 30Ah	51.2V 67Ah	LFP Battery
	Duration (h)	8	8	8	8	8	8	8	In Full Load Condition
	Lifecycle (times)	2000(DOD≥80%)	2000(DOD≥80%)	2000(DOD≥80%)	2000(DOD≥80%)	2000(DOD≥80%)	2000(DOD≥80%)	2000(DOD≥80%)	0.5C, Charging; 1C, Discharging (Room-TEMP)
	Charging Mode	Automatic; Manual; Switching	Automatic; Manual; Switching	Automatic; Manual; Switching	Automatic; Manual; Switching	Automatic; Manual; Switching	Automatic; Manual; Switching	Automatic; Manual; Switching	Max. Current = 10A, Manual Mode Max. Current = 30A, Automatic Mode
	Charging Time (h)	1	1	1	1.3	1	1	2	To 95%

<b>Interactive Function</b>	Light, Speaker, Display	Standard Configuration	<b>External Interface</b>	Power Output	2 Way DC 51.2V 1000W(40~57.6) 2 Way*2DC 24V 20W (Stabilized Voltage Supply)	<b>Safety Control</b>	Front Radar	Standard Configuration
	<b>Operation Environment</b>	Temperature (°C)		0~50	Communication		1 Way RS232 1 Way CAN	Rear Radar
Humidity (%)		5~95		I/O	Extended CAN communication Supported		Visual Camera	Front, for Low Obstacle Detection
Air Condition		No Dusty, Flammable, Explosive or Corrosive Gases					Proximity Sensor	Back, 4 Units (AMR600, Oasis 600C and Oasis 1200D Excluded)
Indoor/Outdoor		Indoor					Safety Rim	Standard Configuration (AMR 600 Excluded)
					Kill Switch	2 Units, Standard Configuration (4 Units for AMR 600 and Oasis 1200D)		

\*For more specifications please contact us at [overseas@standard-robots.com](mailto:overseas@standard-robots.com)

# Add-on Module

## Customization Supported

### Standard Robots Arm Module /



#### ARM Module / ARM + Roller Module

The robot surface is integrated with a collaborative robot, to realize both automated transportation and collaborative processing. It is also adaptable to integrate both arm and roller module for even diversified automation, including picking and placing, material stacking or sorting and distribution.

Adaptable Collaborative Robot	UR, Elite, JAKA and etc.
Options	Collaborative Robot; Collaborative Robots + Roller
AMR Accuracy	±5mm
Collaborative Robot Accuracy	±0.3mm



### Lifting Module SRL / Standard Robots Lift Module

The robot operates under the carrier, lifts the whole material/carrier and move. The total weight of the material and the carrier will not exceed the robot payload.

The lift module provides more flexible handling ability. It has great advantages in terms of narrow path traffic, small-space turning and other scenarios. The module size can be customized to suit different types of pallets, material frames and shelves, etc.

### Drawing Module SRD / Standard Robots Draw Module

The robot moves under the carrier, then uses the external interface (normally a towbar) to automatically dock with the carrier and draws single or multiple carriers. The total weight of the materials/carriers will not exceed the robot payload.

Lifting and drawing allows the transportation of larger-size carts or trolleys.



### Transport Module SRT / Standard Robots Transport Module

The robot carries rollers or conveyor belts, allowing robot to transport materials or goods to production lines or machine tools directly. It realizes automatic loading and unloading without manual operation. It solves the problem of overweight materials/goods transportation, while the number and surface size of roller/belt is customization available.



# Typical Application for 3C Industry

Oasis-SMT and Oasis-ATS provide a complete logistics solution among warehouse, production line and line-side warehouse for SMT workshops.

## Oasis-SMT-A2-R01 Mobile Robot /

Oasis-SMT-A2-R01 is a transfer robot specifically for SMT production line, meeting the need for automatically transferring magazine bins in the circuit board loading and unloading machines in surface mounted production lines.

For different bins sizes, line heights and layers, the robot applies modular design to meet diverse requirements, avoid or release site reconstruction necessity, reduce preliminary investments, provide a one-stop solution for full bin loading and empty bins recycling and improve the overall operation efficiency.



Overall dimension (L × W × H (mm))	1056*641*1443	No. of layer/roller	2
Single roller max. payload (kg)	50	Lower roller min. docking height (mm)	215
Corridor width (mm)	Min 1050	Upper roller docking height (mm)	930(Adjustable according to client needs)
Pivoting width (mm)	Min 1150	Roller surface width (mm)	320
Precise docking accuracy (mm)	±5/±1°	Magazine max. height (mm)	580

## Oasis-ATS-A1 Warehouse Robot /

The Oasis-ATS-A1 warehouse robot combines lifting and picking modules, specifically for line-side warehouse in SMT workshops, to meet demands for magazine bin loading and unloading.

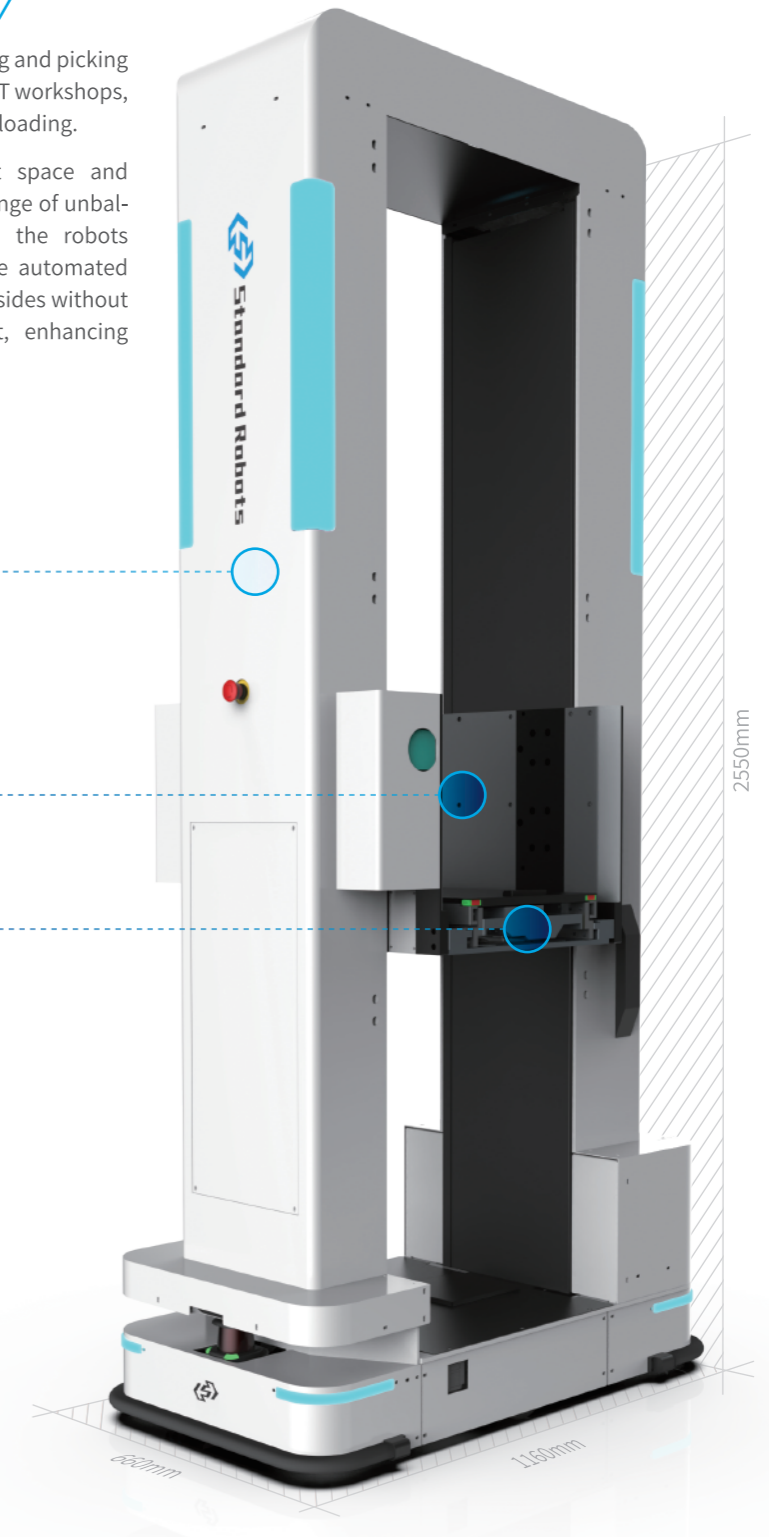
As line-side warehousing features in compact space and multiple operation location, also facing the challenge of unbalanced productivity among different processes, the robots applies bilateral telescopic mechanism to realize automated lifting and picking, which can access bins on both sides without rotating, improving workshop 5S management, enhancing operation efficiency and reducing error rates.

Bin picking height: 300-1800mm

Bin width: 460mm  
Customization available to suit bin width at 320mm, 400mm or 530mm

Max. payload: 50kg

Overall dimension (L × W × H (mm))	1160*660*2550	Max. Speed (m/s)	1.67
Single roller max. payload (kg)	50	Storage Capacity	1
Corridor width (mm)	Min 800	Magazine Dimensions (mm)	530*460(L*W)
Pivoting width (mm)	Min 1400	Picking Height Range (mm)	300-1800
Precise docking accuracy (mm)	±5/±0.5°	Extending Distance (mm)	720





## Gulf Series • Smart Unmanned Forklift

Gulf series applies laser SLAM navigation technology to enable deployment and operation without modifying existing infrastructure. Multiple safety functions, such as 360° full-area obstacle avoidance, spatial 3D obstacle avoidance, emergency stop buttons, and sounds and light alarms are integrated. In addition, the pallet detection sensors, obstacle avoidance sensors, 3D vision cameras, RFIDs and other multi-sensor integration technologies are installed to intelligently achieve safe and efficient loading/unloading operations. High-current automatic charging technology ensures 24/7 operations. The robots are widely used in intelligent manufacturing and warehousing logistics, with an FMS scheduling management system, seamless docking to enterprise MES/WMS/ERP, and other management systems to achieve synchronous upgrades of enterprise logistics automation and production data informationization.



### Quick Deployment

Self-developed laser SLAM navigation can be utilized for rapid deployment without modifying existing infrastructure.



### Self-detection

Real-time hardware and operation status acquisition enables self-detection and troubleshooting.



### Efficient Handling

3D visual camera ensures pallet position identification to avoid pallet misalignment.



### Safety and Reliability

360° omnidirectional obstacle avoidance radar, audible and visual alarms, and bumpers are equipped for better safety control.



<b>Basic Specification</b>	Radar Layout	Multiple, Front and Rear	Multiple, Front and Rear	Multiple, Front and Rear	3 Units, Omnidirectional Obstacle Avoidance
	Navigation Mode	Laser SLAM	Laser SLAM	Laser SLAM	
	Dimensions (L*W*H mm)	1060*715*1623	2728*1166*2330	1706*990*1863	
	Weight (kg)	400	2325	720	Battery Included
	Payload (kg)	600	1500	1400	
	Load Centre Distance (mm)	300	500	600	
	Standard Lifting Height (mm)	400	3000	1600	Customization Supported and will Influence Loading Ability; Gulf-1500-CPD Max. Lifting Height = 4.5m, Gulf-1400-CDD Max. Lifting Height = 3m
	Min. Fork Ground Clearance (mm)	100	50	85	
	Fork Dimensions (mm)	55/105/495	40/120/1070	55/180/1150	Customization Supported
	Fork Outer Width (mm)	400	350-740	680	Customization Supported
<b>Operation Performance</b>	Running Speed (m/s)	1.5/1.5	1.5/1.5	1.5/1.5	Full Load / Empty Load
	Lifting Speed (mm/s)	-	95/120	115/175	Full Load / Empty Load
	Lowering Speed (mm/s)	-	120/85	-	
	Gradeability	5%/8%	5%/8%	5%/8%	Full Load / Empty Load
	Positioning Accuracy (mm)	±10/±1°	±10/±1°	±10/±1°	
	Right-angle Stacking Width (mm)	1050 for Trolley in 600*600 (L*W)	2994 for Pallet in 1000*1000 (1000 Across the Fork)	2070 for Pallet in 1000*1200 (1200 Across the Fork) 2130 for Pallet in 800*1200 (1200 Along the Fork)	
	Min. Turning Radius (mm)	970	1536	1180	
	Capacity	48V 60Ah	24V 270Ah	24V 180Ah	LFP Battery
	Duration (h)	6-8	6-8	6-8	Depended by Operation Condition
	Lifecycle (times)	DOD≥80% 2000	DOD≥80% 3500	DOD≥80% 3500	0.5C, Charging; 1C, Discharging (Room-TEMP)
<b>Battery Performance</b>	Charging Mode	Automatic; Manual	Automatic; Manual	Automatic; Manual	80A, Automatic Mode; 60A, Manual Mode
	Charging Time (h)	2	2.5	2.5	To 95%

<b>Interactive Function</b>	Light, Speaker, Display	Standard Config
<b>Accessibility</b>	Pallet In Place Recognition	Standard Config
	Goods Recognition	Standard Config
	Pallet Posture Recognition	Standard Config
	RFID	Optional

<b>Safety Control</b>	Front Radar	2 Units
	Rear Radar	1 Unit
	Visual Camera	Optional
	Optoelectronic switch	Standard Config
	Front Safety Rim	Standard Config
	Kill Switch	3 Units



<b>Basic Specification</b>	Radar Layout	Multiple, Front and Rear	3 Units, Omnidirectional Obstacle Avoidance
	Navigation Mode	Laser SLAM	
	Dimensions (L*W*H mm)	1754*976*1835	
	Weight (kg)	1030	Battery Included
	Towing Ability (kg)	3000	
	Standard Towing Strength (N)	600	
	Driving Platform Height (mm)	159	
	Network	5G, Optional Wi-Fi (2.4Ghz/5Ghz), Standard Config	802.11b/g/n 802.11a/n/ac
<b>Operation Performance</b>	Running Speed (m/s)	1.9/2.7	Full Load / Empty Load
	Gradeability	6%/15%	Full Load / Empty Load
	Positioning Accuracy (mm)	±10/±1°	
	Max. Towing Strength (N)	2400	
	Min. Turning Radius (mm)	1288	
<b>Towbar Connection/Disconnection</b>	Towbar Height Range (mm)	150-400	Automatically
<b>Battery Performance</b>	Capacity	24V 270Ah	LFP Battery
	Duration (h)	6-8	Depended by Operation Condition
	Charging Mode	Automatic; Manual	120A, Automatic Mode; 60A, Manual Mode
	Charging Time (h)	2.2	To 95%
<b>Safety Control</b>	Front Radar	2 Units	
	Rear Radar	1 Unit	
	Front Safety Rim	Standard Config	
	Kill Switch	3 Units	
	Horizontal and Vertical Obstacle Avoidance	Standard Config	
	Automatic Docking Correcting	Standard Config	
	Alarm and Indicator	Standard Config	

<b>Operation Environment</b>	Temperature (°C)	0-50
	Humidity (%)	5-95
	Noise	≤70dB (A)
	Air Condition	No Dusty, Flammable, Explosive or Corrosive Gases
	Indoor/Outdoor	Indoor

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# CASE STUDY

## Semiconductor

### Wafer Manufacturing

#### Requirements

Automate wafer distribution through AMR (Autonomous Mobile Robot): complete wafer sorting manually and issue delivery mission through PAD, then AMRs will transport wafer from warehouse to different plants.

#### Challenges

- Wafers are extremely expensive and fragile, and shaking is prohibited during long-distance transportation;
- For cross-floor and cross-scene transportation, AMRs are required to docking with elevators, auto-doors and air-showering rooms automatically;
- There is a 800m long corridor with few characteristic differences, which improves positioning difficulty.

#### Solutions


34 units of Oasis 300UL-SRL AMRs are used for automatic cross-plant wafer transportation.

**Hardware:** 34 Units of Oasis 300UL-SRLs, 8 PADs, 10 Automatic Charging Piles, 4 Manual Chargers, and 1 Server.

**Software:** FMS (Fleet Management System), Standard Robots Center Control System, Matrix System, and Customized Material Calling System.

  
Accuracy Requirements  
**±10mm**

  
Maximum Speed  
**1.5m/s**

  
AMR Usage  
**34 units**

## 3C Electronics

### SMT Workshop of a Renowned Electronics Factory

#### Requirements

Looking for AMR to send full magazine to production line-end and recycle the empty magazine; pick the finished product at line-end and transfer empty magazine to the line simultaneously. There were 16 SMT production lines in the workshop which applied manual transportation, where large quantity of materials were transported to lines at a time and taking up lost of space. In addition, manual transportation raised the risk of misdelivery.

#### Challenges

- There are different feeding machines in workshop with different docking height requirement;
- Docking accuracy shall be ±5mm;
- Strict reliability requirement that the operation success rate must be higher than 99.5%.

#### Solutions


Oasis-SMT-A2 was applied to achieve simultaneous magazine delivery and recycling which automate the entire material and goods transportation process in workshop.

**Hardware:** 8 Oasis-SMT-A2, 2 Automatic Loaders, 3 Automatic Charging Piles, 1 Network Device

**Software:** Matrix System, FMS.

  
Accuracy Requirements  
**±5mm**

  
Maximum Speed  
**1.2m/s**

  
AMR Usage  
**8 units**

#### Impacts & Benefits

- **Labor Cost Reduction and Efficiency Increase:** Automated wafer cross-plant transportation saved 51 logistics operators.
- **Enhanced Automation Level:** Reduced workloads and fatigue.
- **Digitalized Equipment Management:** Real-time monitoring on AMR status.

saved **51** logistics operators



#### Impacts & Benefits

- **Labor Cost Reduction and Efficiency Increase:** Saved 6 material distributors on 2 shifts; max.delivery takt time: 1500+/shift.
- **Error Rate Reduction:** 12,000 tasks were completed in 30-days trial operation with a success rate of 99.87%, and the entire project was accomplished on schedule.
- **Space Saved:** Solved the problem of crate disordered accumulation at line-end, and workshop 5S management improved.
- **Return Estimation:** Labor saving and productivity increase lead to a return of CNY 600,000/year.



# Automobile & Auto Parts

Benchmark Automation Project of a Renowned Auto Parts Manufacturer

## Requirements

A comprehensive project involving automation among stereoscopic warehouse, assembly line, production line, AMR system, WMS and MES. The factory was poorly automated at first and is looking for logistics automation solution, and Standard Robots was involved for AMR system construction and business systems connection.

## Challenges

- Challenges in complex systems connection and multiple robot and system suppliers cooperation;
- Multi-model and brands of AGV/AMR collaboration under high takt demand;
- Traditional forklift is not adaptable as some aisles width is only 2m.

## Solutions

Multiple models of AMRs were used for the whole logistics process automatoin.

**Hardware:** 14 Oasis 600, 11 Automatic Conveyors, 3 Customized Forklift AMRs, 14 Automatic Charging Piles

**Software:** Matrix System, FMS.



Accuracy Requirements

±5mm



Maximum Speed

1.2m/s



AMR Usage

14 units

# Photovoltaic

Automated Logistics of a PV Cell Processing workshop

## Requirements

Connect AMR with upper layer system to achieve a fully automated handling process for the entire plant from dispenser to linting, diffusion, laser engraving, etching, annealing, passivation, coating and to laser slotting.

## Challenges

- Since the rack belt is unpowered, power shall be supplied from the AMRs' up modules while an accurate rack-docking is a must;
- The high takt time requires AMR of efficient operation, while the workspace environment is complex and safety standard is strict in PV manufacturing;
- Less dust shall be produced during AMR operation to meet high cleanliness requirement in PV workshops.

## Solutions

Oasis 600C along with lifting module is applied to achieve the entire factory logistics automation.

**Hardware:** 63 Units of Oasis 600C, 15 Automatic Charging Piles, and 1 Manual Charger.

**Software:** Matrix System, FMS, and Standard Robots Center Control System.



Accuracy Requirements

±10mm



Maximum Speed

1.2m/s



AMR Usage

63 units

## Impacts & Benefits

- **Labor Cost Reduction and Efficiency Increase:** Saved 78% of manpower and improved 60% of efficiency.
- **Automation Upgrade:** Entire logistics automation from zero to one.
- **Reputation Improvement:** Production transparency and quality improvement, leading to better reputation for client.
- **Return Estimation:** Labor saving and productivity increase lead to a return of CNY 500,000/year.

manpower saved about **78%**



## Impacts & Benefits

- **Logistics Automation:** Automated parts transportation and materials loading and unloading to reduced workloads.
- **Benefit Improvement:** Direct machine-to-machine docking reduced possibility of damage on silicon wafers.
- **Digitalized Equipment Management:** Comprehensive digital management enabled AMR real-time monitoring;
- **Factory Digitalization:** Digital management of line-side warehouse inventory enabled material turnover rate improvement.



# Printed Circuit Board

PCB Workshop of a Large Electronics Manufacturer

**Requirements**

Long-distance transportation was eager to be automated: goods were loaded on pallets and transported to warehouse by manpower, which is inefficient and lead to goods disordered accumulation along production line; workers were dissatisfied with the heavy workload.

**Challenges**


- Cardboard was stacked in warehouse and packaging station, leading to dynamic change on spatial characteristics;
- AMR was required to take elevator automatically for cross-floor transportation.


**Solutions**


Oasis 600UL + lifting module, along with pallet racks, was applied to transport goods from production line to warehouse.

**Hardware:** 12 Oasis 600UL + Transmitting Module, 9 Oasis 600UL + Pallet Lifting Module, 1 Set of Rolling Door Control Program.

**Software:** Matrix System, FMS and Standard Robots Center Control System.

 Accuracy Requirements  
**±10mm**

 Maximum Speed  
**1.2m/s**

 AMR Usage  
**21 units**

**Impacts & Benefits**

- **Labor Cost Reduction and Efficiency Increase:** Saved 40 material distributors of 2 shifts; max. delivery takt time: 2000+/shift; 60% efficiency increase compared to human delivery.
- **Production Line 5S Management:** Achieved finished goods automatic transportation and avoided disordered goods accumulations at line-end.
- **Automation Upgrade:** Achieved automatic goods transportation, making it possible to introduce automated palletization.
- **Return Estimation:** Labor cost saving and productivity increase lead to a return of CNY 2,200,000/year.



# Mechanical Processing

Automation Project of a Large CNC Machining Workshop

**Requirements**

The CNC workshop requires collaborative processing by Compound Mobile Robot ( a combination of AMR and collaborative robot), to achieve automatic loading and unloading on CNC tooling machines, reduce labor force, ensure stable productivity, and improve the factory informationization level.

**Challenges**


- AMR and network shall be deployed at the same time, including CNC machine re-programming and testing;
- Accurate AMR positioning is required to enable the cobot (collaborative robot) to open CNC machine doors automatically;
- Center control system shall be developed that CNC machines could generate orders directly;
- 20 compound mobile robots are needed for materials handling and transportation among 100 CNC machines in 4 production lines.


**Solutions**


AMRs along with cobots are applied to automate materials loading and unloading in CNC workshop.

**Hardware:** 20 Compound Mobile Robots, 10 Automatic Charging Piles, 4 Manual Chargers, and 2 Servers.

**Software:** FMS and Standard Robots Center Control System.

 Accuracy Requirements  
**±10mm**

 Maximum Speed  
**1.0m/s**

 AMR Usage  
**20 units**

**Impacts & Benefits**

- **Labor Cost Reduction and Efficiency increase:** Robot driven logistics saved labor cost and improved productivity.
- **Model Project:** Created a model workshop which strengthened client' s reputation among its industry and local industrial community.
- **Automation Upgrade:** Initially realized intelligence interaction among production machines and laid the foundation for further automation plan.



# Forklift Application

Smart Warehouse of a Renowned Cable Manufacturer

## Requirements

To realize fully automatic cable transportation and storage with smart forklifts, while reducing labor input and improving information transparency.

## Challenges

- The cylindrical material requires deep customization on forklift mechanism;
- The operational aisles are narrow which requires high performance on right-angle stacking;
- RFID data validation of products is needed;
- The warehouse stacking height is up to 4.5m.

## Solutions

Gulf-1400-CDD forklift robots are used to deliver materials from the production line to the warehouse, and Gulf-1000-CPD forklifts are used for storage on tall racks.

**Hardware:** 6 Gulf-1400-CDD Forklifts, 4 Gulf-1000-CPD Forklifts, 1 Server, and 1 Set of Network Devices.

**Software:** Matrix System, FMS and Standard Robots Center Control System.



Accuracy Requirements

±10mm



Maximum Speed

1.0m/s



AMR Usage

10 units

## Impacts & Benefits

- **Labor Cost Reduction and Efficiency Increase:** Saved 18 material distributors on 2 shifts; the max. delivery takt time: 1,000+/shift.
- **5S Management:** Resolved the problem of material accumulation along production line.
- **Automatic Upgrade:** Realized smart warehousing and material distribution.

the max. delivery takt time **1000+** / shift



# Overseas Project

Automation Project of A Large-Scale Cabinet Workshop in the United States

## Requirements

This project is a fully automated material handling project for a cabinet workshop in Wisconsin, USA. Consisting of three process sections, bending, welding and assembling, it requires AMR to achieve dozens of raw materials automatic transportation.

## Challenges

- The plant is based in the US, which requires a series of localization and synchronization among system and software;
- AMR shall adapt to 3 different carts, requiring AMR of recognition function based on AI algorithms;
- The materials shall be placed precisely in target areas, where the positioning accuracy shall be within ±5mm.

## Solutions

AMR equipped with lifting and rotating module is used to achieve automatic transportation.

**Hardware:** 8 Oasis 600UL with Lifting & Rotating Module, 3 Automatic Charging Piles, 1 Manual Charger, 15 Large Carts, 60 Small Carts and 1 Server.

**Software:** FMS, WMS and Matrix System.



Accuracy Requirements

±5mm



Maximum Speed

1.2m/s



AMR Usage

8 units

## Impacts & Benefits

- **Improving Efficiency:** 70% Efficiency improvement compared to manual transportation;
- **Labor Cost Reduction:** Saved 12 material distributors on 2 shifts.
- **Quick Return:** Investment on robot are returned within 15 months.
- **Automation Upgrade:** Completely replaced manual transportation and built a model of flexible logistics and production line.

5G communication is used throughout the factory.

