



# Intelligent material warehouse system

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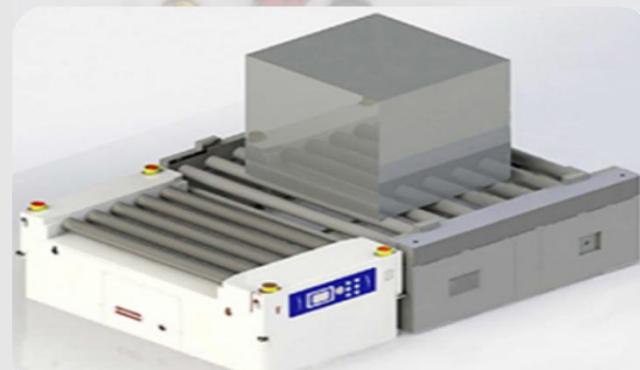


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## ▶ 1-1. Product display - Warehouse and load shifting robot

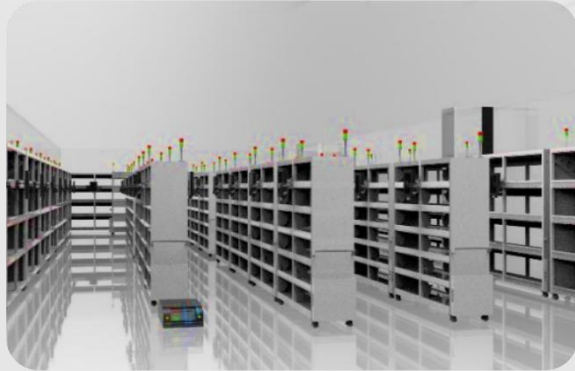
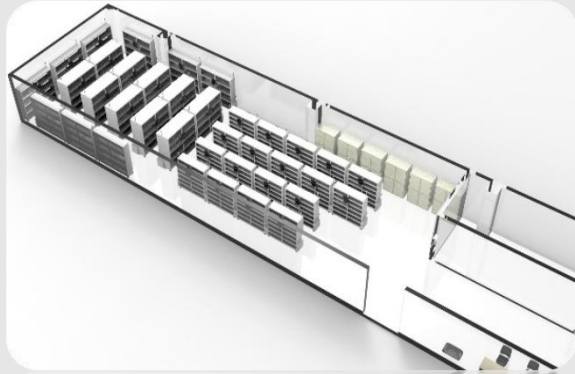


Automated stereoscopic warehouse

Load shifting robot



▶ 1-2. Product display - matrix arrangement workshop warehouse



Customer  
site  
actual  
Application  
picture



## ▶ 2-1. Single machine series - specifications and models

7 "disc stock bin  
model : IMS-S960



13 " disc stock bin  
model : IMS-B200



15 " disc stock bin  
model : IMS-L150



Mixing stock bin  
model : IMS-  
S180B30L20T4



IC special stock bin  
model : IMS-T40





## ► 2-2.Single-machine series - Configuration parameters

Project		7 "disc stock bin	13"disc stock bin	15 "disc stock bin	Mixing stock bin	IC special stock bin
Material Type	Tray	NO	NO	NO	YES	YES
	Roll	YES				
Feed tray specification	7 "	YES	NO	NO	YES	YES
	13 "	NO	YES	NO	YES	YES
	15 "	NO	NO	YES	YES	YES
	Thickness of roll	Within 12mm	Within 24mm	Within 24mm	No limits	No limits
Storage capacity	Single unit capacity	960 rolls (6 layers)	200 rolls (4 layers)	150 rolls (3 layers)	/	40 kinds (5 layers)
Code	Mode of identification	Wireless PDA				
	One dimensional code	YES				
	Two dimensional code	YES				
In and out of storage	In and out time	Less than 2 seconds/roll				
	Method of deposit	manual				
	Method of extraction	manual				
	Batch processing	YES				
Interconnection	system	option				
	equipment	option				
	AGV	option				
equipment Information	Anti-static rating	$10^6-10^8\Omega$				
	Mistake proofing	Hardware + Software				
	communication	Wireless or Wired				
	Overall dimensions (mm)	2280*460*1983	2280*460*2095	2280*460*1845	2280*460*1870	2280*460*1750
	power supply	AC220				
	Maximum power	350W	350W	350W	350W	1KW



### ▶ 3-1. Principle Description - Locking principle (invention patent)



7" hopper

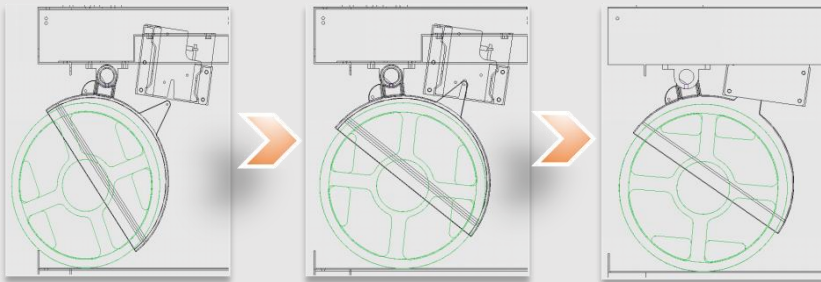
High specification  
ABS Anti-static material  
Surface impedance :  
 $10^6 - 10^8 \Omega$   
Independent open die  
One piece molding



13/15" hopper



Material plate locking principle, hardware error prevention, 1 second to complete the feeding and discharging



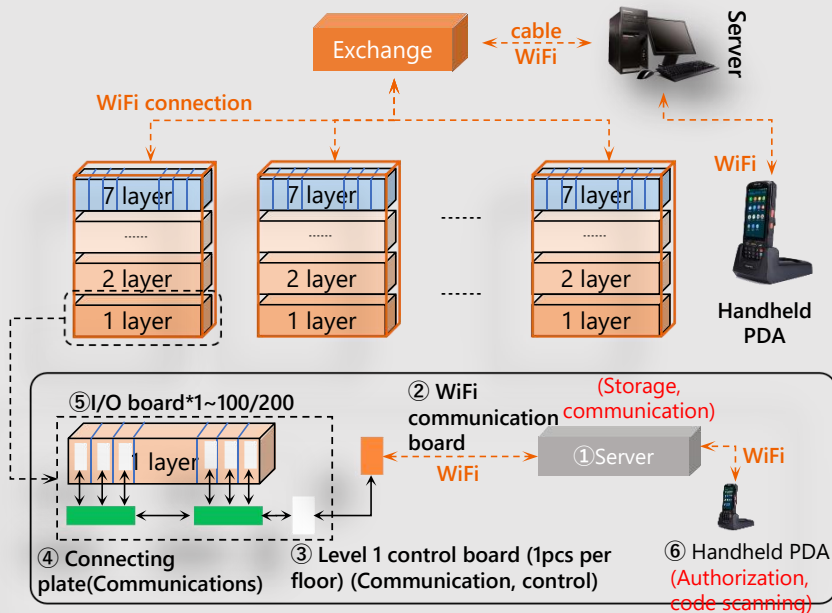
Feed in roll → nudge → locking

ABS Anti-static hopper  
The material is locked independently, and the hardware is error-proof  
Each material level is equipped with an independent sensor and indicator light



## ▶ 3-2.Principle Description - Principle of communication

### Mode of communication



- 1、 Cloud storage, cloud instruction, end execution 。
- 2、 The cloud and the terminal constantly feedback mechanism has low requirements on network stability and prevents data errors 。
- 3、 Local area wireless, PDA directly connected to the cloud, rights management, all operation history can be traced 。
- 4、 Three level parallel communication, each of their own duties, polling time is short, high efficiency, no error 。



# 4. Application Case -- Flow chart of materials



The stereo warehouse sends materials to the workshop warehouse  
The server reports the material information and records it



Workshop warehouse reports material information to WMS system

Send the first set of material: WMS calculation and issue the material instruction  
After discharge, report the discharge information to WMS and record it

Workshop warehouse replenishment to line warehouse  
Report the discharge information to WMS, record and verify



AGV is responsible for process transportation  
Count the quantity and return it to the warehouse



Return material group

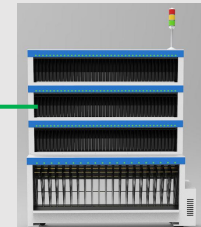
Return the remaining material of production line

Production line side small warehouse discharge

Report the output information to WMS, record and verify



SMT production line



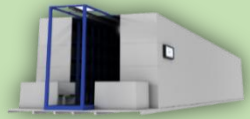


Material preparation section

First set material



## ► 5. Comparison of advantages

SN	project	Matrix intelligent storage	Material tower intelligent storage	Square-cabin intelligent storage
1	appearance			
2	configuration	One machine multi-purpose (warehouse/line side), can be online networking, single storage quantity can be customized	One machine multi-purpose (warehouse/line side), can be online networking, single storage quantity fixed number	Can only be used for workshop storage, single storage number fixed
3	structure	Maximum 2.1 meters, high utilization of horizontal site, no need to maintain the area, only leave the corridor	The utilization rate in the height direction is high, and the maintenance area should be reserved around. The utilization rate in the horizontal direction is low	The utilization rate in the height direction is high, and the maintenance area should be reserved around. The utilization rate in the horizontal direction is low
4	extension	High flexibility, mobile at any time, only need to increase the number of smart warehouse during production expansion, network configuration can be used	It can be moved and cannot increase the quantity of storage by a small amount during expansion	It is not movable and cannot increase the quantity of storage by a small amount during expansion
5	Efficiency staff	Manual feeding, the average single plate of materials in and out of the warehouse <b>within 2 seconds.</b> <b>The warehouse saves 80% of staff</b>	Mechanical hand to take material, the average single plate material in and out of the warehouse 3-5 seconds. <b>The warehouse saves 90% of staff</b>	Mechanical hand to take material, the average single plate material in and out of the warehouse 10-15 seconds. <b>The warehouse saves 90% of staff</b>
6	installation	Small single machine, debugging before delivery is OK, with casters cup, to the customer site can be used	The single machine is smaller, debugging is OK before leaving the factory, and can be used on the customer site	The volume is too large to transport, a large number of accessories, on-site assembly and debugging
7	fault	<b>Simple structure, not easy to malfunction.</b> After a fault occurs, the software skips the fault bit and does not affect production	Complex structure, mechanical failure can not take material, can not meet the production line production	Complex structure, mechanical failure can not take material, can not meet the production line production
8	Maintenance and maintenance	<b>Maintenance cost is low,</b> simple and convenient, without professional personnel	Maintenance is costly, time-consuming and requires professional personnel	Maintenance is costly, time-consuming and requires professional personnel



## ▶ 6-1. Case sharing-Sales Performance

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Global sales volume of smart material silo: more than 1700 sets

The names of the top 3 customers by sales volume and their sales volume :

- 1、Huizhou Desay SV Automotive Co., Ltd : 246 sets ;
- 2、ACACUS Computer Software House LL ( French ) : 155 sets
- 3、Dongguan Hitachi Astamo (formerly jingbin Electric Spray) 155 sets



## ▶ 6-2. Case sharing- Customer Requirements

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1. Intelligent storage and material flow information constantly interact with existing MES and WMS ;
2. Use AGV transport car instead of personnel for material transfer work ;
3. Use the X-ray counting machine to count the quantity of materials and report the material information to the system ;
4. Through the use of intelligent storage and system docking, it realizes the calling, sending and management of materials ;
5. Realize the first-in, first-out control of materials through intelligent storage and system docking ;
6. Rationally plan the layout of material silo and logistics path to realize the synchronization of material flow and information flow.





## ▶ 6-4. Case sharing- Process Description

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### 1. Send material to workshop warehouse:

The material warehouse management system receives the outbound task issued by WMS, at the same time receives the material, completes the outbound operation, generates the local outbound data form, notifies WMS to confirm whether the form is consistent with the task data, if yes, the process ends, if inconsistent, WMS issues an alarm, the material warehouse system receives the alarm and locates, the material warehouse and PDA issue an alarm at the same time. After the processing is completed, report to WMS for reconfirmation, and finish the delivery process;

### 2, the first set of materials out of storage (send materials to the material preparation team) :

WMS calculates the material information of the first set of materials, and sends the material information and instructions to the system. The workshop warehouse system generates the plan and executes it. After the personnel operation is completed, the local outbound information form is generated to notify WMS for confirmation.

### 3. The workshop warehouse sends materials to the production line:

The WMS system calculates the material consumption of SMT production line within 2~4 hours, and issues the material delivery information. The workshop warehouse system generates and executes the material delivery plan, and the production line receives the materials. After the completion of personnel operation, generate the material delivery information form and notify WMS for confirmation;

### 4. The small warehouse near the production line sends out materials:

MES obtains the material shortage information of the mounter, notifies WMS, WMS calculates and issues the material plan, instructs the small warehouse near the production line to execute it, and after the personnel operation is completed, generates the local material information form and notifies WMS for confirmation.

### 5. Return materials from production line :

After SMT production line returns the materials, the X-RAY counting machine will automatically count the materials, and the information will be directly reported to WMS. WMS will generate the task of returning the materials to the warehouse and send the information to the material warehouse system. After the operation is completed, the local information form will be generated to inform WMS for confirmation.



## ▶ 6-5. Case sharing - Storage method

Type of material	Storage method	Method of transport
PCB	<b>Micro three-dimensional warehouse</b> (Due to the weight of the material and the way of packaging, it cannot be stored in the general material warehouse)	AGV+ plastic box
MI material	<b>Micro three-dimensional warehouse</b> (Due to the weight of the material and the way of packaging, it cannot be stored in the general material warehouse)	AGV+ plastic box
Humidity sensitive element Class A material	<b>IC special intelligent material warehouse</b> (With moisture-proof function, each warehouse location with independent hardware lock)	AGV+ lock plate small material warehouse
B, C class materials	<b>Locked version of intelligent material warehouse</b>	AGV+ lock plate small material warehouse
Replenishing material for production line	<b>Locked version of intelligent material warehouse</b>	AGV+ lock plate small material warehouse

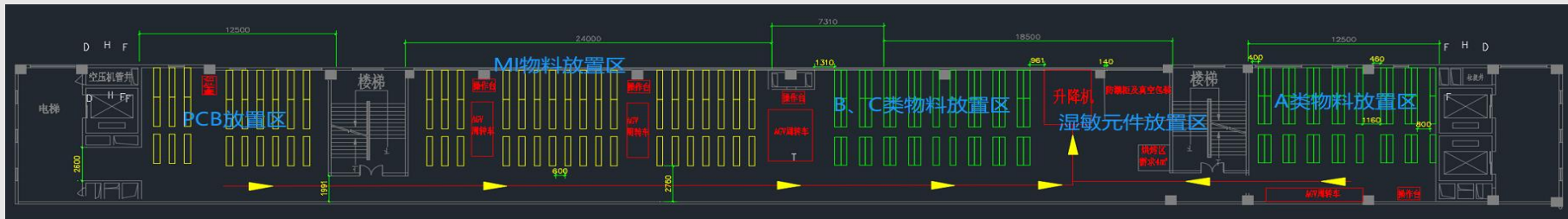


## ▶ 6-6. Case sharing - lock plate material warehouse quantity calculation

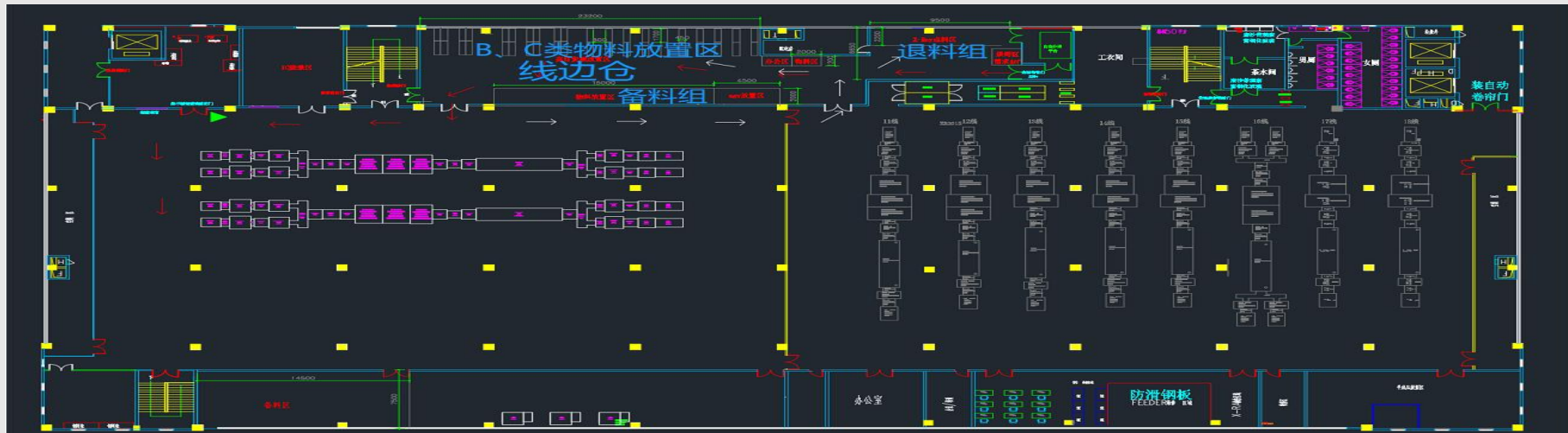
Customer Data		Lock plate material warehouse (7-inch roll on both sides of material warehouse, 13/15-inch roll on one side of material warehouse)						
Diameter of material tray & thickness of material belt	Inventory quantity (roll)	Capacity per layer (roll)	layer number	Single machine capacity (roll)	Quantity of material warehouse (set)	Total Material warehouse capacity (roll)	Differences (roll)	Material warehouse Dimensions (mm)
7寸8mm	14179	160	6	960	15	14400	221	L2300*W460*H2000
7寸10mm	514	160	6	960	1	960	446	
7寸12mm	785	160	6	960	1	960	175	
7寸24mm	200	160	6	960	0	0	-200	
13寸8mm	1237	65	4	260	5	1300	63	L2300*W460*H2000
13寸12mm	1462	65	4	260	6	1560	98	
13寸16mm	1350	65	4	260	5	1300	-50	
13寸24mm	568	50	4	200	3	600	32	
15寸8mm	600	65	3	195	3	585	-15	L2300*W460*H2000
15寸12mm	600	65	3	195	3	585	-15	
15寸16mm	600	65	3	195	3	585	-15	
15寸24mm	600	50	3	150	4	600	0	
合计	22695				49	23435	740	



## 6-7. Case sharing - various materials storage area



third floor Mezzanine



second floor SMT workshop



## ▶ 6-8. Case Sharing - Humidity sensitive element Class A material storage

Storage method: The tray IC and other expensive class A materials are stored in the IC special intelligent material warehouse with lock and moisture-proof function.

Management mode: The built-in management software is used to realize the binding relationship between the warehouse and the material by scanning the material bar code, and real-time interaction with the on-site WMS for material information in and out;

Hardware configuration: IC special intelligent material warehouse, with hardware locking, moisture-proof function.

**IC special locking version  
intelligent material warehouse**



**Advantages:**  
With drying function, effective long-term storage of humidity sensitive components, hardware lock, through the system (wireless, wired access can be), to achieve fast material search, improve the efficiency of material transportation; Authorized personnel management, material in and out of the whole process can be traced.

**IC special locking version  
intelligent material warehouse**





## ▶ 6-9. Case Sharing -PCB, MI plug-in material storage

Storage method: PCB and MI plug-in incoming materials that have not been unpacked need to be stored in miniature three-dimensional warehouse due to packaging method and weight factors.

Management mode: Use the management software of the three-dimensional warehouse to realize the binding relationship between the warehouse and the material, and real-time interaction with the on-site WMS for incoming and outgoing material information;

Hardware configuration: micro stereo warehouse, micro stacker, transmission mechanism, etc.

### Miniature stereo warehouse



Advantages:  
Three-dimensional storage, high space utilization; Due to the heavy weight of materials such as PCB, the use of automatic stackers can greatly reduce the workload of operators and reduce safety risks.

### Pile stacking machine





## ► 6-10. Case sharing - Class B, Class C and other material storage

Storage method: the unpacked roll materials are stored in the locked version intelligent material warehouse;

Management mode: Use the built-in management software to realize the binding relationship between the warehouse and the material by scanning the material bar code, and conduct real-time interaction with the on-site WMS for incoming and outgoing material information;

Hardware configuration: lock version intelligent silo, hardware lock material, error prevention

Locked version of intelligent material warehouse



Advantages :  
ABS anti-static hopper, independent mold opening, integrated forming.  
Hardware and software error prevention can be achieved, unauthorized personnel can not take out the material. Can effectively avoid the flow of production line personnel, which may lead to material errors. Through the system (can be wireless, can be wired access), to achieve fast material search, improve the efficiency of material distribution;  
Authorized personnel management, the whole process of material entry and exit can be traced.

Locked version of intelligent material warehouse





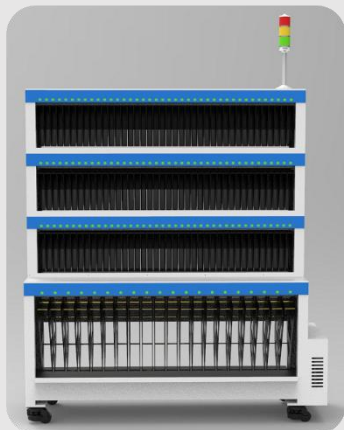
## ▶ 6-11. Case sharing - Product supplement PCB, Class A, B, C material storage

Storage method: PCB, A, B and C materials that need to be supplemented shall be stored near the SMT production line in a lock-plate intelligent small material warehouse.

Management mode: Use the built-in management software to realize the binding relationship between the warehouse and the material by scanning the material bar code, and conduct real-time interaction with the on-site WMS for incoming and outgoing material information;

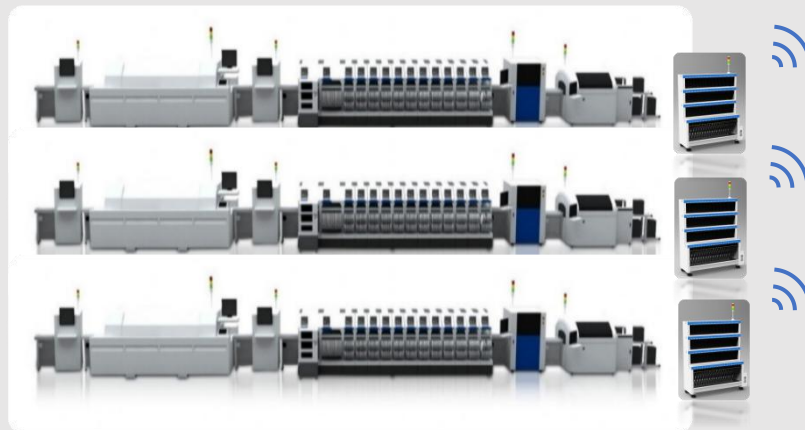
Hardware configuration: locked version intelligent small material warehouse

### locked version intelligent small material warehouse



Advantages :  
ABS anti-static hopper, independent mold opening, integrated forming. Unauthorized personnel can not take out the material, can effectively avoid the production line personnel flow, may appear the wrong material. Through the system (wireless, wired access can be), can realize fast material retrieval, improve the material efficiency; Authorized personnel management, material in and out of the whole process can be traced.

### SMT production line





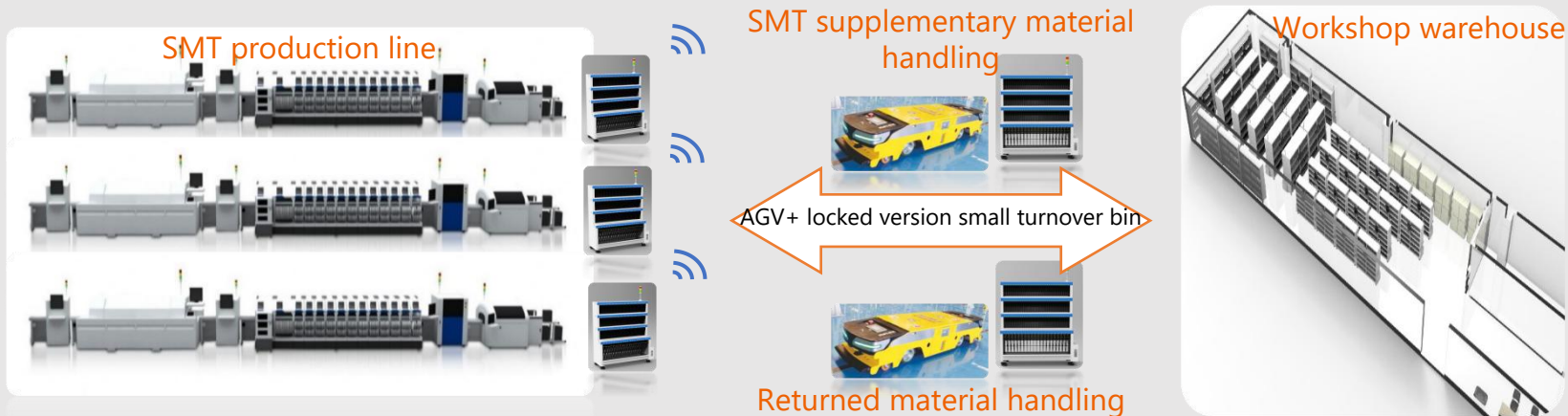
## ▶ 6-12. Case sharing - small material transfer warehouse

Storage method: PCB, A, B, C materials to be supplemented are temporarily stored in the small transfer warehouse of the lock plate

Management mode: The built-in management software is used to realize the binding relationship between the warehouse and materials by scanning the bar code of materials, and real-time interaction with the on-site WMS can obtain the information of incoming and outgoing materials;

Workflow :PDA select "reprint" function, no need to scan code. Unlock and remove the materials that need to be released one by one and put them in the lock version turnover warehouse. By retrieving the material information, the server binds the material information to the replication repository. The process of material transfer from the small turnover warehouse to the production line parts warehouse is the same

Hardware configuration: AGV+ locked version small turnover bin.





# Thanks for watching !

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