DSA
DSAUTOMATION

SCHUNK ® | Official Partner
Clamping Technology
Gripping Systems

ABB
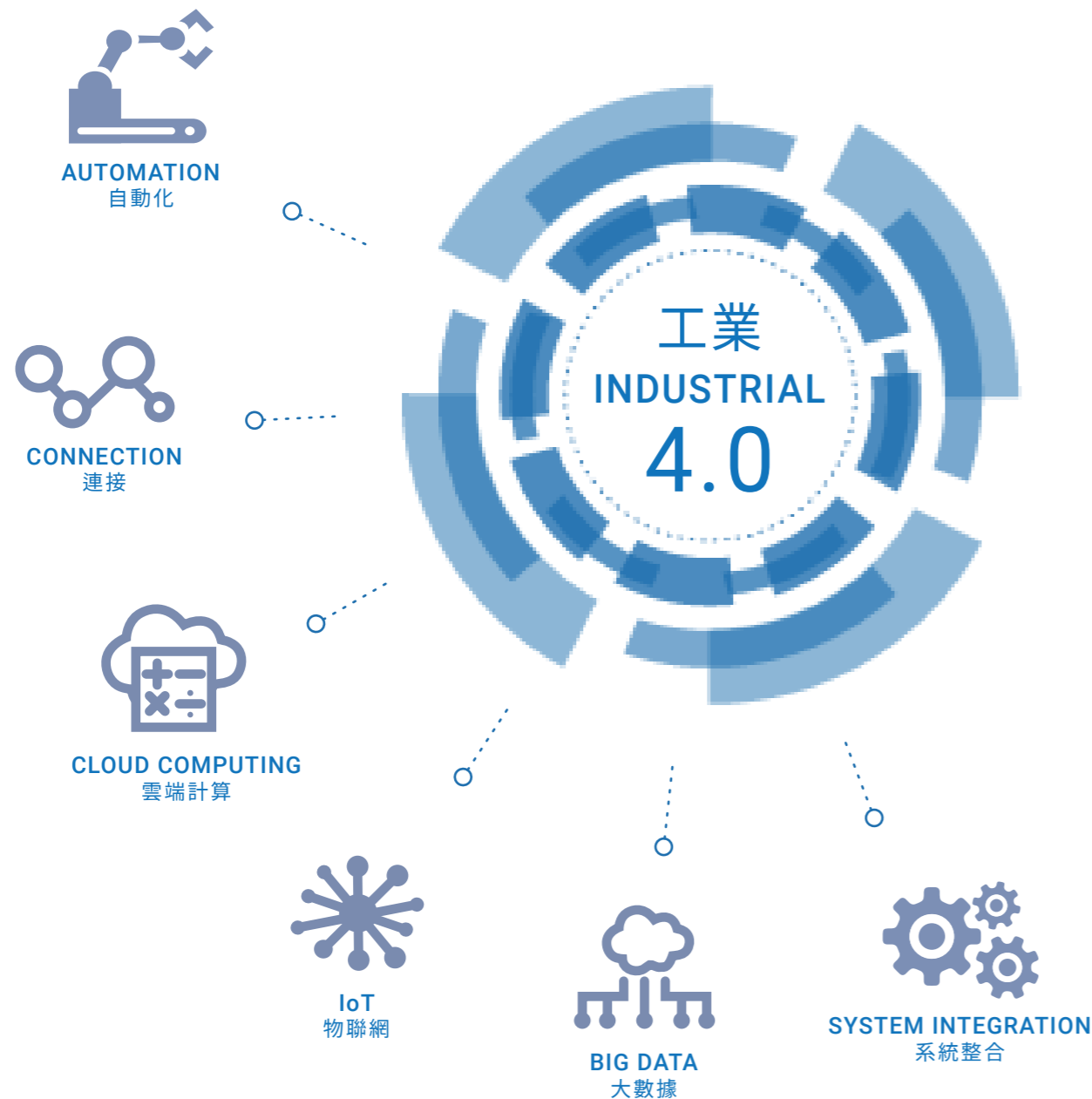—
VALUE
PROVIDER

金屬製造業
智慧製造解決方案

Smart Factory Solutions
for Metal Manufacturin

About DSA

Established in 2013, Da Shiang Automation (DSA) is located in Guishan industrial park, Taoyuan Taiwan. With the Business philosophy of Innovation, Technical, Scientific Spirit to service customer, DSA has been growing continuously.

As a highly skilled system integrator in automation with software and hardware technical skil ls, DSA has more than 10 years experiences in Investment Casting, Sand Casting, Die Casting and Machine Tending…etc..

In order to provide advanced smart automation solution, DSA further integrated industry 4.0 concept to casting and machine tending operation to fulfill customer expectation.

AUTOMATION
自動化

CONNECTION
連接

CLOUD COMPUTING
雲端計算

工業
INDUSTRIAL
4.0

IoT
物聯網

BIG DATA
大數據

SYSTEM INTEGRATION
系統整合

Our Services

Automation Service

▶
Investment Casting Process
精密鑄造製程

▶
Sand Casting Process
砂模鑄造製程

▶
Die Casting Process
壓力鑄造製程

▶
Post-Treatment of Machining & Casting
鑄造後處理製程

▶
Machine Automation Process
機械加工製程

AI & Intelligent Manufacturing Service

▶
Manufacturing Execution System
MES系統

▶
DS Intelligent Tool Management System
DSA智能刀具管理系統

Automated Storage-Retrieval System

▶
Automated Storage-Retrieval System
AS/RS自動倉儲系統

Distribution

▶
ABB - Robotic

▶
SICK Machine Vision / Safety Component

▶
Robotmaster - Robot Off-line Programming

▶
BOOSTER Deburring / Grinding Polishing Tools

▶
SCHUNK - Grippers / Tool Change

▶
DSA Flexible Gripper / Conveyor HA Server

DSA provides turnkey and completed solution for casting process automation.

Wax Mold Process
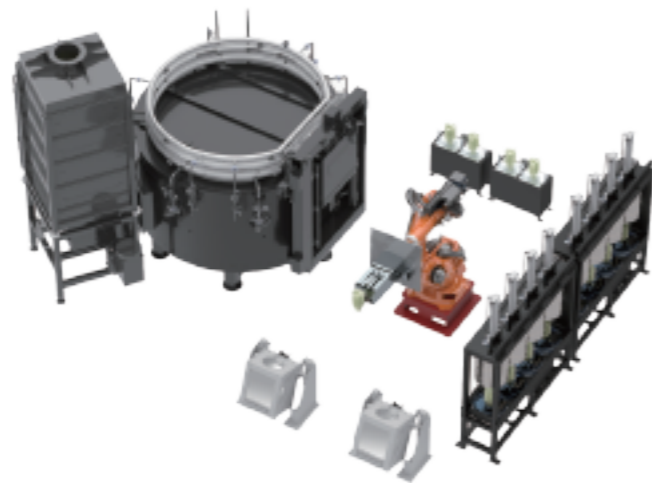· Automatic Wax Tree Assembly System
· Automatic Wax Cleaning System

Shell Mold Process
· Dipping and Coating Automation System
· Flexible Shell Mold Production System
· Rapid Infrared Drying System
· Vertical Conveyor Drying System
· Energy-Saving Constant Temperature and Humidity System

Casting Process

Automatic Wax Tree Assembly System

▶
3D storage and tray feeding design for saving working space

▶
Robot cooperation makes the wax assembly process high efficiency

▶
Tool changing function makes the production flexible

▶
Customized gripper

▶
The soldering iron can be designed according to the wax mold with temperature control automatically

▶
The wax joint surface can be more solid and smooth by controllable soldering iron

Automatic Wax Cleaning System

▶
The robot cleans up the parting agent from wax tree after assembly

▶
Speed up the wax drying process

▶
Fully automatic production from wax molding process to wax tree assembly can save manpower and improve production efficiency


Layout of Automatic Wax Tree Assembly and Cleaning System

1	Cleaning Wax Rack	7	Air Cleaning Box
2	Robot Tool Change	8	Assembly Wax Tree Rack
3	Lifting Feeding Platform	9	Robot for Cleaning Process
4	Wax Injection Machine	10	Mobile Wax Tree Rack
5	Wax Tree Assembly Workbench	11	Blowing Station
6	Robot for Wax Tree Assembly	12	Purge Tank

Dipping and Coating Automation System

▶

We provide the customized integrated system for slurry tanks, float and rainfall sanders, and conveyor...etc.

▶ Customized grippers

▶ More stable and labor saving

▶

Intelligent flexible production system: AI record offers tracking, process parameter setting, analysis and risk protection for various and small amount of products

▶

The integrated robot system combines with external axis to approach production flexible
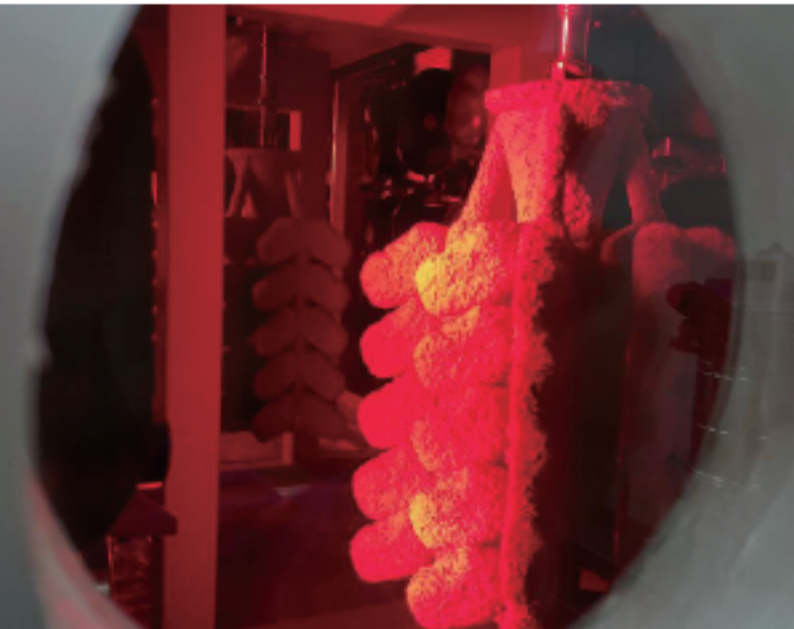
Rapid Infrared Drying System

▶

The speed is 7 times faster than traditional one

▶

Relative humidity able to reach the minimum of 5%

▶

Improve the quality and strength of the shell mold

▶

Equipped with the heat recycling system

▶

Friendly Human-Machine Interface

▶ Temperature error is ±0.5°C and humidity error is ±3%

▶ Small batch production

Layout of Rapid Infrared Drying System

1	Rainfall Sanders
2	Trolley conveyor
3	Rapid Infrared Drying System
4	Robot with Linear Units
5	Feeding Cart
6	Robot Equip with Searching Slurry level System
7	Slurry Tank

Flexible Shell Mold Production System

▶

The system identifies the state of the shell mold through RFID and automatically integrates the dipping, coating, and drying processes.

▶

AI management system offers automatically parameter setting for shell mold process.

▶

Applied the RFID to the different rod, that makes the robot can automatically choose the corresponding program to process the operation to the mold

▶

Friendly HMI system providing operators easy to use

▶

Customized grippers
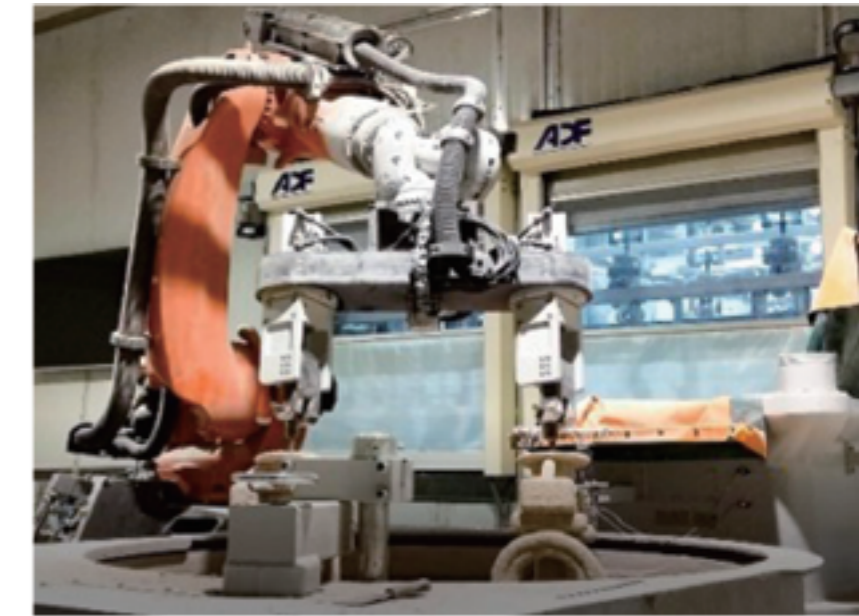
Vertical Conveyor Drying System

▶

Vertical conveyor drying room with flexible production can optimize the procedure of drying and saving space

▶

The shell mold can be dried faster and better quality by the design of the wind field

Layout of Flexible Shell Mold Production System

1	Sand Floating Bucket
2	Tending Rack
3	Robot for Shell Making
4	Vertical Conveyor Drying Room
5	Blower
6	Slurry Tank
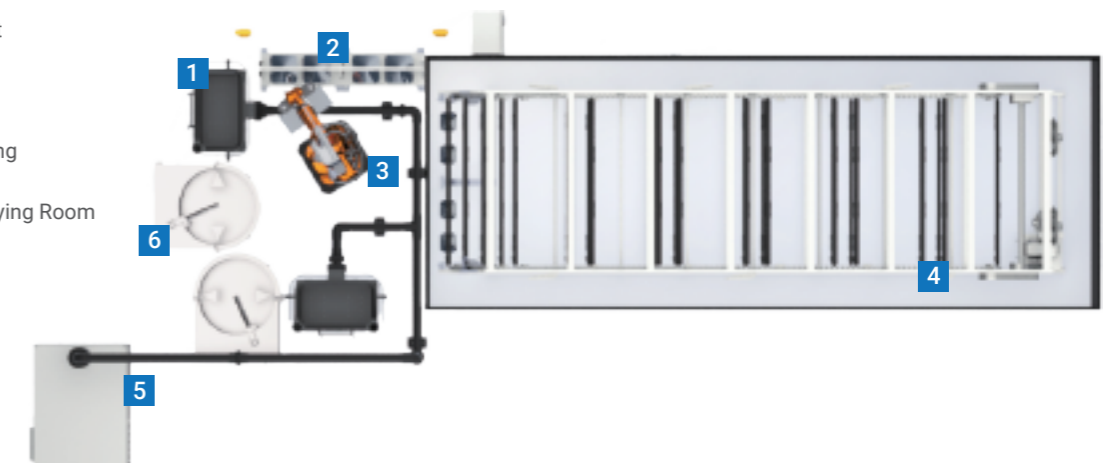
1 ## Cold-Core Coating Automation System for Sand Casting

▶

The robot completes coating process to approach the goal of saving labor cost
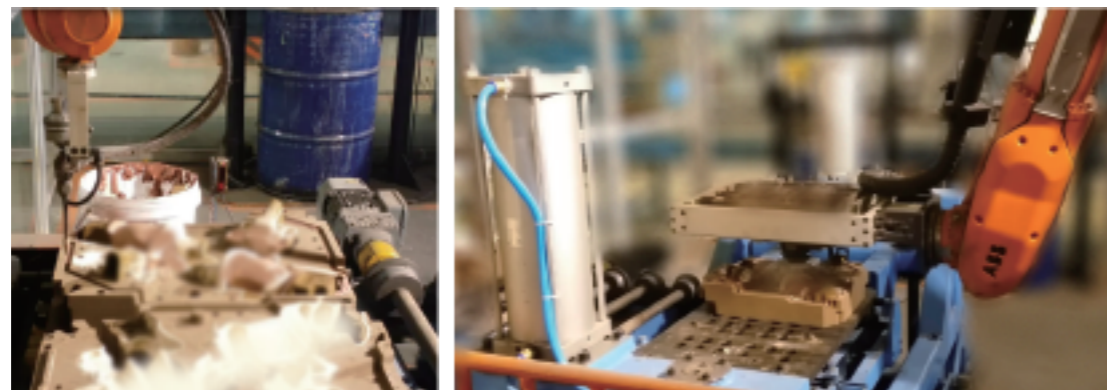

2 ## Laser Marking Automation System for Sand Casting

▶

The robot is working with laser marking machine for marking process automatically

3 ## Dispensing & Molding Assembly System for Sand Casting

▶

Integrated dispensing & molding assembly sand-mold by robot

▶

Handling the sand-mold & deliver to next process

4 ## Screwing System for Sand Casting

▶

The robot can control the screwing toque to complete screwing process.
The screwing automation system includes feeding and detecting sliding teeth function.

5 ## Handling System for Sand Casting

▶

The robot includes tool change function to handle the sand-core.
The sand core can be placed in a sandbox for delivery to the casting area for casting.

Automatic Die Casting System

▶
Instead of labor in high-risk environment

▶
Integrate several die-casting processes with robot

▶
We design a special gripper that can work in the high temperature environment

Mold Release Fluid Spraying for Die-Casting

▶
It sprays release agent in specific areas as requirement

▶
Controlling & cooling the mold temperature

▶
Well-distributed spraying & controlled spraying effect of the release agent level up the casting quality

▶
Saving the storage space of spraying nozzle module

Layout of Automatic Die Casting System

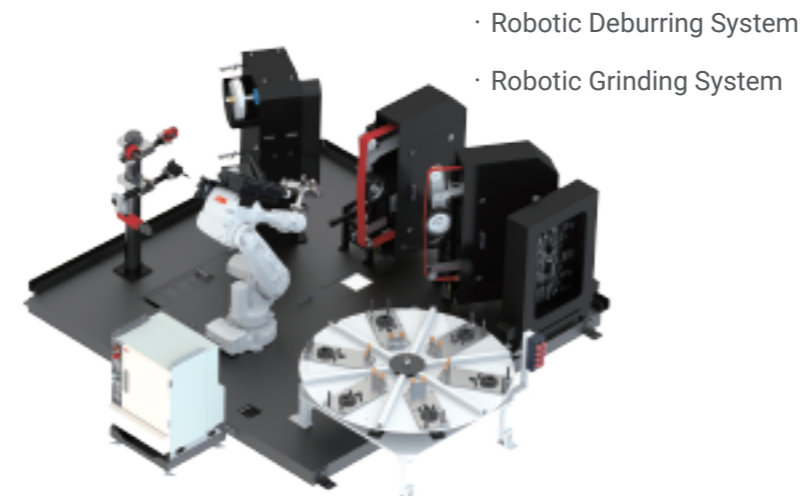|	
1	Spraying Robot
2	Die-Casting Machine
3	Extraction Robot
4	Cooling Tank
5	Cutting Press Machine
6	Unloading Conveyor
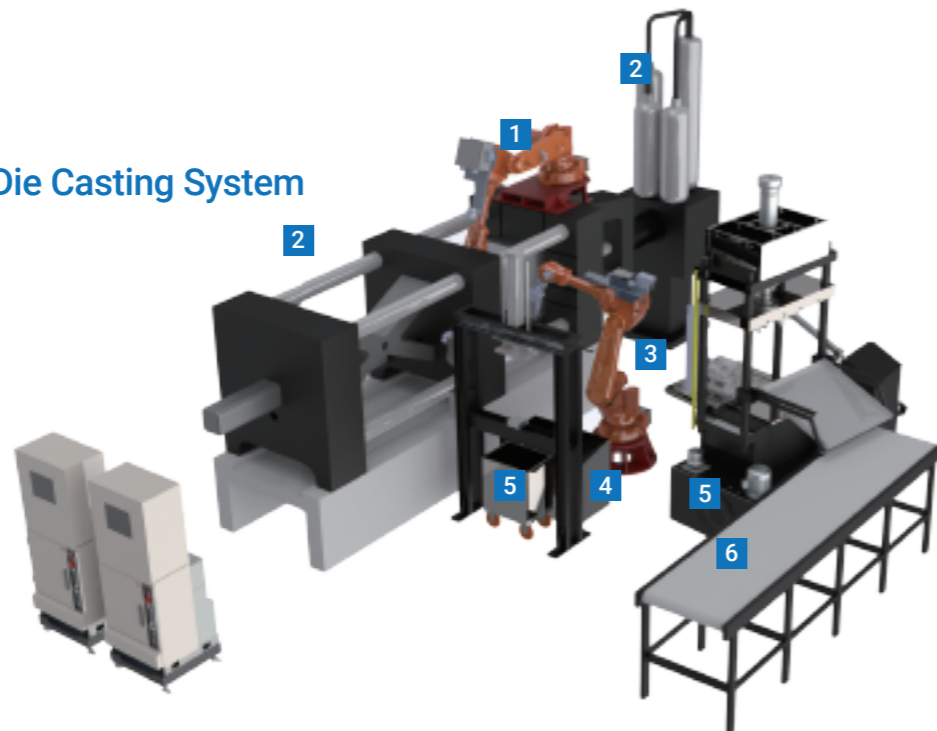
DSA provides turnkey and complete solution for post-treatment of machining & casting
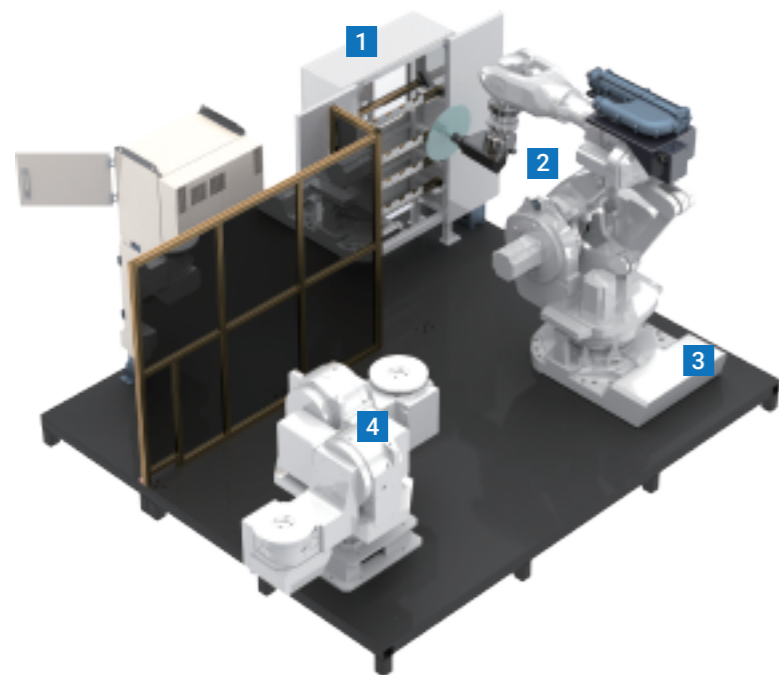
Cutting
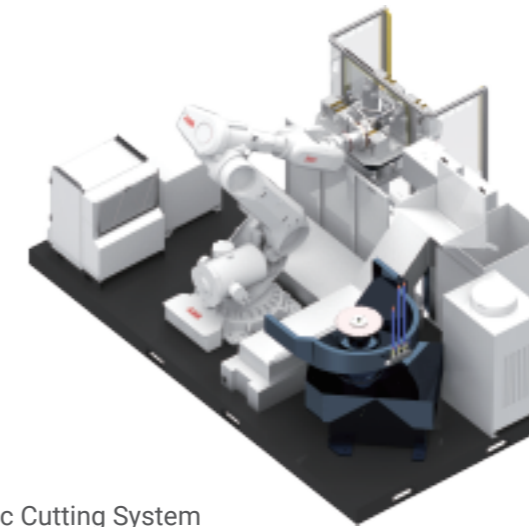
Robotic Cutting System

· Robotic Deburring System

· Robotic Grinding System

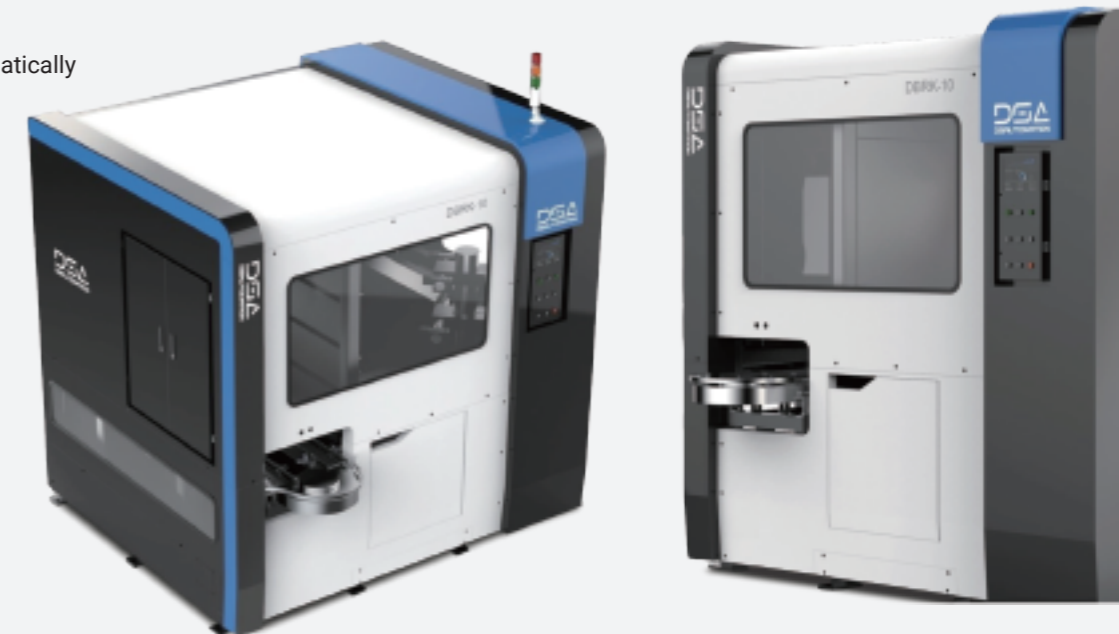Deburring & Grinding

Sandblasting

Robotic Sandblasting System

1 Automatic Tool Magazine Storage
2 Cutting Spindle
3 Robot
4 Duplexed Rotary Positioner

Robotic Cutting, Deburring, Grinding multi-function Machine

▶
Cutting and grinding

▶
With tool magazine, robot can change the tool automatically

▶
Intelligent monitoring system

▶
Increasing productivity, labor saving, safety

▶
With multi-axis positioner, the robot can work with multi-angle to make the processing without a blind spot

▶
With Force Sensor, the robot can control velocity and power accurately
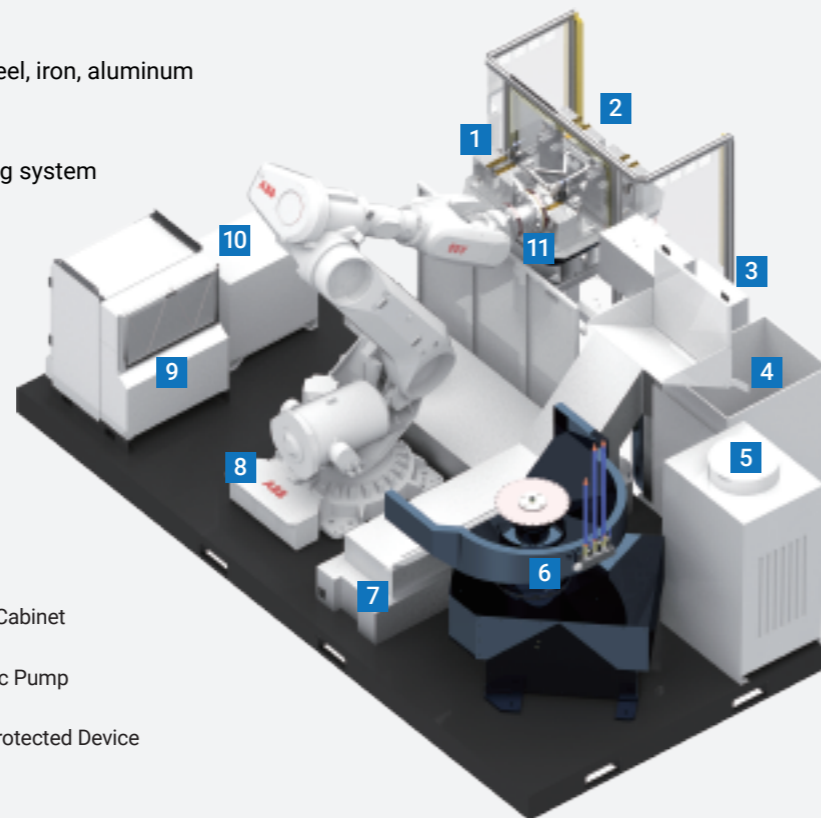
▶
Application Material: Aluminum, Zinc

Gate, Riser & Runner Cutting Machine

▶
Automatic cutting

▶
Double station feeder

▶
Increasing proauctivity, labor saving, safety

▶
Applied Material: Steel, iron, aluminum

▶
Intelligent monitoring system

1 Hydraulic Gripper
2 Rotary Feeder
3 Finished Product Unload Conveyor
4 Waste Tank
5 Oil Cooling Machine
6 Cutting Spindle
7 Cutting Fluid Cycled Sink
8 Robot
9 Control Cabinet
10 Hydraulic Pump
11 Robot Protected Device

Robotic Deburring System

▶
labor saving & increased productivity with industrial design appearance

▶
Upside down robotic application can save more space for work

▶
It can be equipped with the tool change system, which can automatically change the gripper according to different workpiece

▶
Using softmove tools let robot can deal the variation of castings

▶
The robot combines with the debarring floating tool, and conveyor or loading & unloading equipment

Layout of DBRK10 Robotic Deburring System

1 Flexible Conveyor
2 Tool Changing Box
3 Deburring Robot
4 HMI
5 Deburring Tool Set
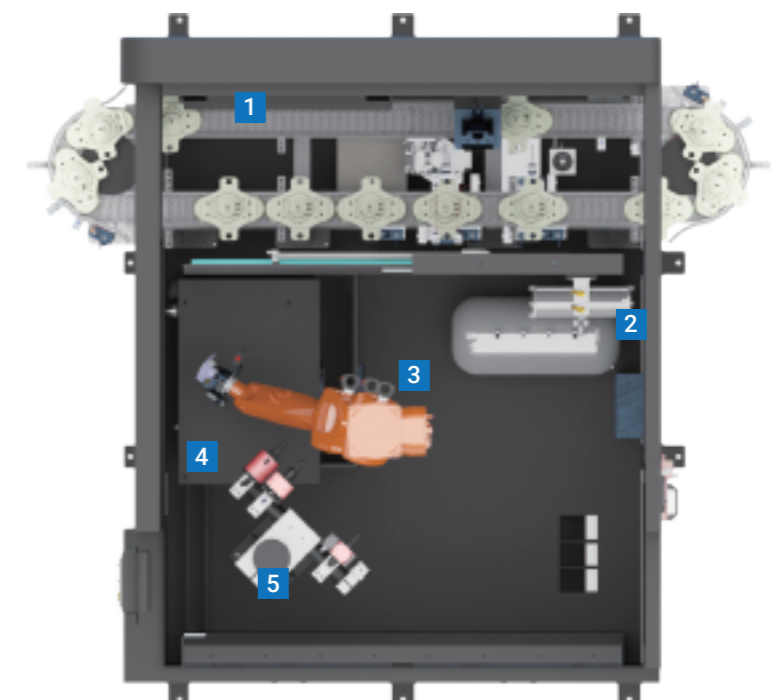
Layout of Robotic Grinding System

1. Deburring Tool Set
2. Double Flap Wheels Grinding Machine
3. Belt Grinder
4. Robot
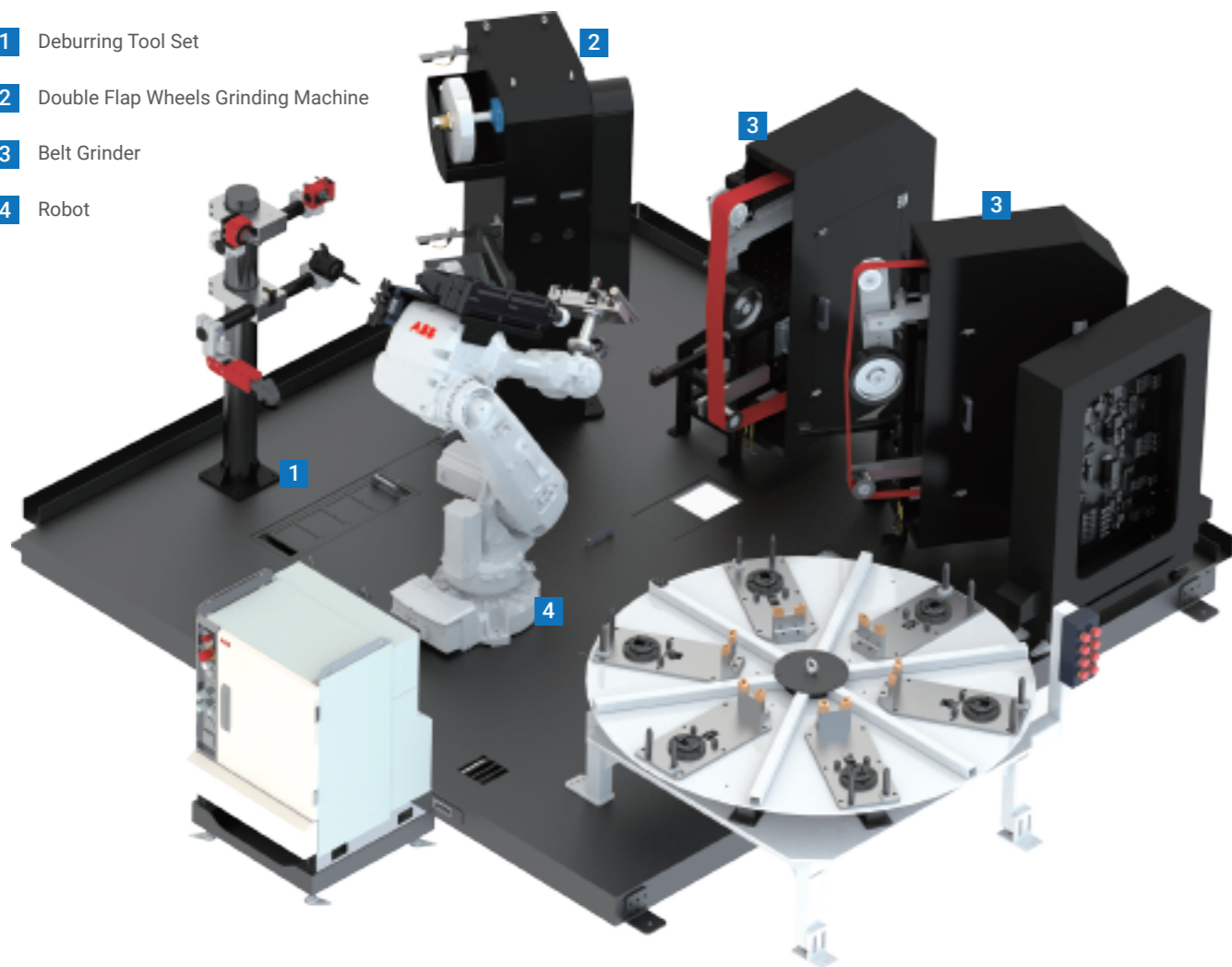
▶ Customized automated feeding system: Customized feeding cart integrated with conveyor and vision system

▶ DSA provides multi-grinding & deburring tools selection by workpiece surface or material

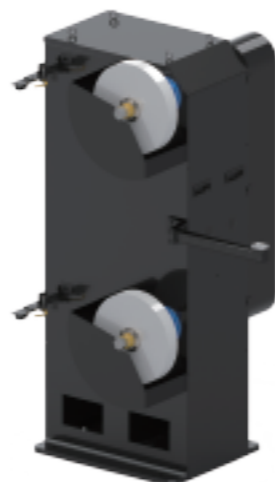▶ Integrate several processes in once: Deburring, grinding, and polishing at once

▶ Force Control Belt Grinder:
Adjustable grinding force & belt tension

▶ Double Flap Wheels Grinding Machine:
It can be installed different grinding wheels, also, the AI system calculates the loss of grinding wheel automatically

▼ **Double Flap Wheels Grinding Machine**

▲ **Belt Grinder**

Deburring tool					
	AC200	AC300	LC100	LC200	LC300
Compliance Type	Angle	Angle	Linear	Linear	Linear
Tool	Pneumatic File	Pneumatic Mini Die Grinder	Air Spindle	Pneumatic Mini Die Grinder	Pneumatic Sander
Collet	5mm	6mm	3"	6mm	
Free Speed	9k bpm / 7-10mm	35k rpm	2500 rpm	35k rpm	
Air pressure for contact force	0.2-0.5MPa	0.2-0.5MPa	0.2-0.5 MPa	0.2-0.5MPa	0.2-0.5MPa
Compliant Stroke	+/-5.5 degrees	5.5 degrees (one-sided)	12mm (one-sided)	10mm (one-sided)	10mm (one-sided)
Air Consumption	170LPM	350LPM	320LPM	340LPM	
Weight	1.9kg	1.5kg	2.4kg	1.9kg	1.5kg (without sander)

Deburring tool					
	LS200	PC100	PC200	RC200	RC250
Compliance Type	Linear	Parallel	Parallel	Radial	Radial
Tool	Pneumatic Sander	Pneumatic Angle Grinder	Electric Angle Grinder	Pneumatic Mini Die Grinder	Air Spindle
Collet		4"	4"	3mm	6mm
Free Speed		12k rpm	10.5k rpm	65k rpm	20000 rpm
Air pressure for contact force	0.2-0.5MPa	0.2-0.5MPa	0.2-0.5MPa	0.2-0.5MPa	0.2-0.5MPa
Compliant Stroke	40mm (one-sided)	8mm (one-sided)	8mm (one-sided)	+/-3.5 degrees	+/-5 degrees
Air Consumption / Power demand		620LPM	AC110V	150LPM	340LPM
Weight	2.4kg (without sander)	3kg	5.8kg	1.5kg	2.7 kg

| Deburring tool			
	RC300	RCF200	RCF250
Compliance Type	Radial	Radial	Radial
Tool	Pneumatic Mini Die Grinder	Pneumatic File	Air File
Collet	6mm	5mm	5mm
Free Speed	25k rpm	9k bpm / 7-10mm	3600 bpm
Air pressure for contact force	0.2-0.5MPa	0.2-0.5MPa	0.2-0.5 MPa
Compliant Stroke	+/-3.5 degrees	+/-3.5 degrees	+/-5 degrees
Air Consumption	350LPM	170LPM	180LPM
Weight	2.3kg	2.8kg	2.3 kg

Robotic Sandblasting System

▶

Robot integrated with sandblasting system enhances the quality and save labor; it can be also integrated with 2nd robot for load / unload to approach automation production

▶

The Robot system unlimited sandblasting working range and enhance the quality

▶

The sandblasting system modulized to approach the goal of moving and adjustment easily

▶

The system adjust the pressure of spraying gun and the spraying rate to position accurately by programing

▶

Friendly Interface, monitor work and error status

Layout of Robotic Sandblasting System

1 Sand filter & recycle System

2 Positioner

3 Dual Rotary Feeder

4 Robot for Sandblasting

5 Air Barrel
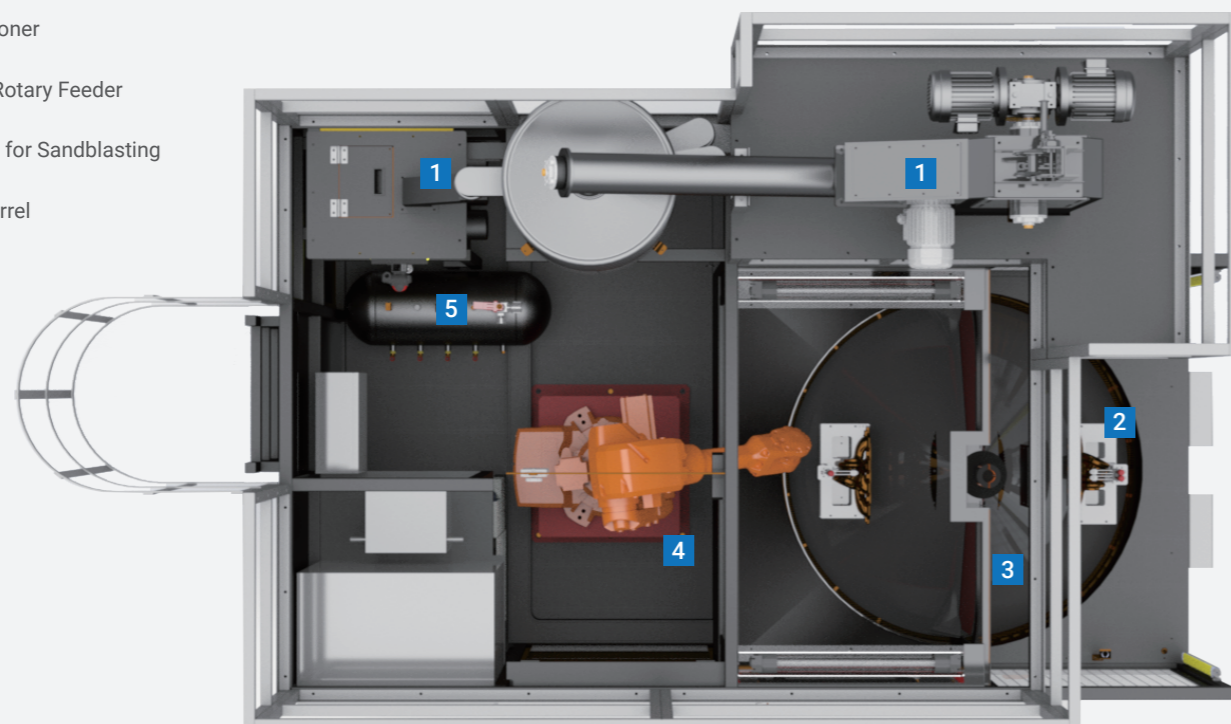
DSA provides turnkey and complete solution for machining automation
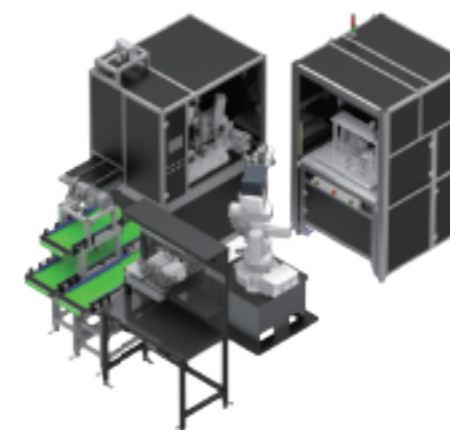
Machine Tending

· CNC Machine Tending System

· Machine Tending System with Linear Units
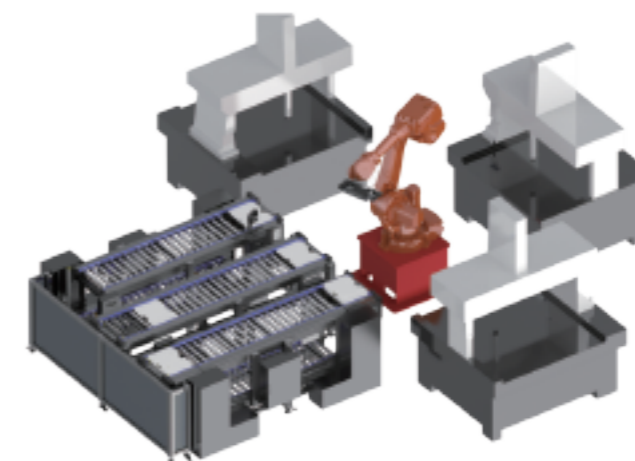
· Modular CNC Machine Tending System

· Gantry Robot

End of Line Machining Automation

Ended-line

Coordinate Measuring   CMM Automation System

CNC Machine Tending System

▶
CNC process automation

▶
Customized gripper

▶
Integrated with storage feeder system makes production flexible

▶
labor & cost saving

▶
Integrated with different robots in machine tending

## Storage Feeder

▶
Saving space

▶
The modulized cart is not only convenient to move but also easy to integrate with AGV

▶
Application: All kinds of medium and small sizes object

▶
Switch lifter, saving feeding time

▶
Function: Customized conveyor of suitable size according to conveying demand

Layout of CNC Machine Tending System

1	Robot
2	CNC Machine
3	Storage Feeder
4	Unloading Belt Conveyor
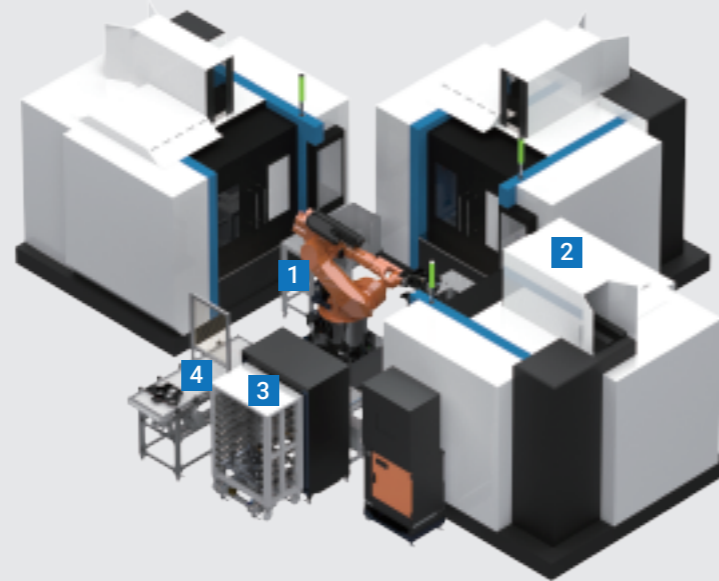
Machine Tending System with Linear Units

▶
Enhance productivity by automation

▶
Automation design and turnkey project

▶
Wide working range with external axis

▶
Providing appropriate automation sulotion

▶
Approaching real-time monitor and equipment status analysis by adding on DSA SCADA SMB system

▶
Introducing automatic production scheduling to achieve the best production efficiency
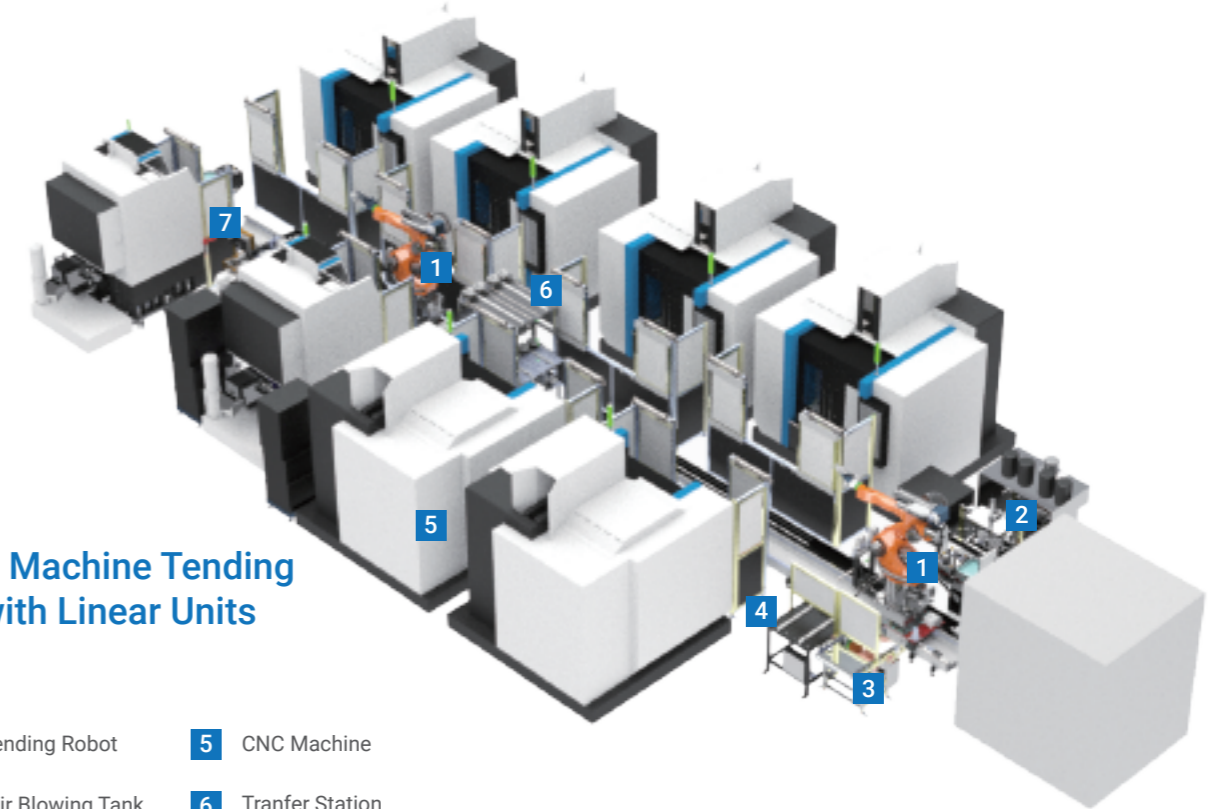
Layout of Machine Tending System with Linear Units

1	Machine Tending Robot	5	CNC Machine
2	Cleaning, Air Blowing Tank	6	Tranfer Station
3	Inspection Station	7	Storage Feeder
4	Unload Belt Conveyer		

The Modular CNC Machine Tending Design

▶

The 2-ton cast base can be set and move flexibly according to the production

▶

Support small quantity and diversified production

▶

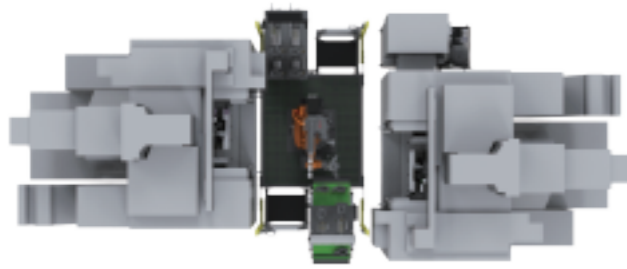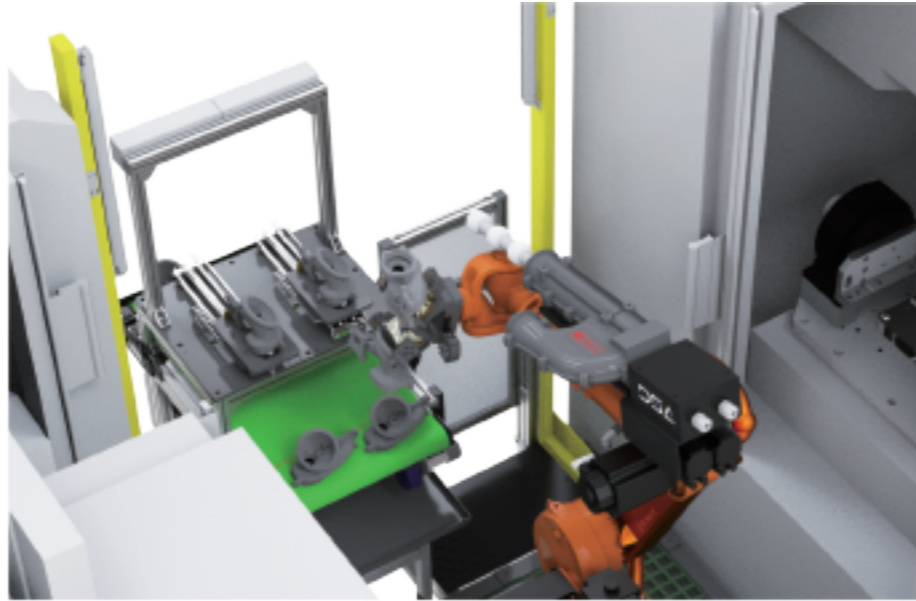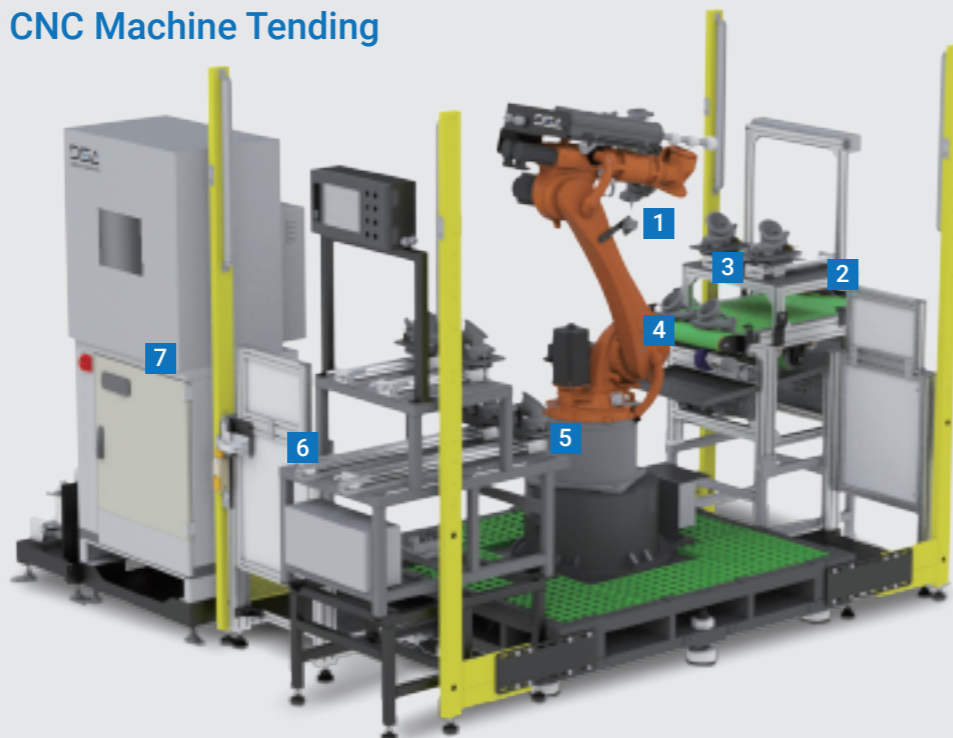The friendly interface makes it easy to use

▶

It is easier to duplicate the production

▶

Gain advantage on pricing

▶

Safety design for robots: Including safety light curtains, fences, switches, and other safety components

▶

Standard :
feeder, inspection station, unload belt conveyor, and safety components.

▶

Optional :
1. Grippers and upload fixtures can be designed by the customer or DSA
2. Automatic machine and customized fixtures

The Modular Machine Tending Design

▶

The 1-ton base can be set and move flexibly according to the production

▶

Support small quantity and diversified production

▶

The friendly interface makes it easy to use

▶

It is easier to duplicate the production

▶

Gain advantages on pricing

▶

Safety design for robots: Including safety fences, Lidar sensors, and other safety components

▶

Standard :
Standard : Inclined feeder (for round workpiece), safety components

▶

Optional:
1. Vision system for faster calibration of the robot position
2. Automatic machine and customized fixtures
3. Gripper can be designed by the customer or DSA

Layout of Modular CNC Machine Tending

1	Gripper
2	Upload feeder
3	fixture
4	Unload belt conveyor
5	Robot
6	Inspection station
7	Electric cabinet

Layout of Modular Machine Tending

1	Gripper	4	Electric cabinet
2	Vision system	5	fixture
3	Robotic	6	Inclined feeder
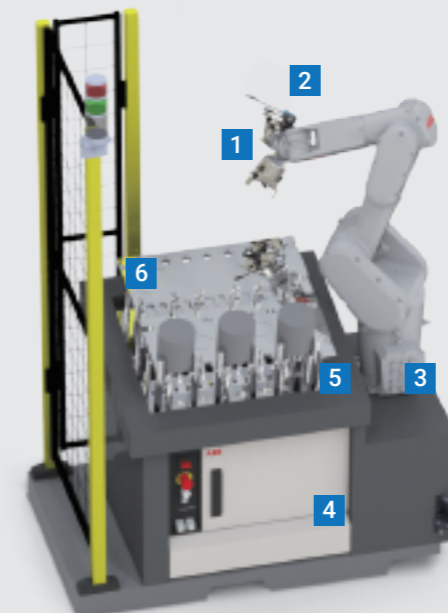
Gantry Robot

▶ Customized X, Y, Z axis work range

▶ Payload 40kg

▶ C-axis is optional

▶ Automatic oil injection system

▶ Mitsubishi servomotor

▶ Teach panel is optional

▶ Mitsubishi PLC

▶ Gantry robot can be integrated with load / unload, storage and transfer modules

End of Line Machine Automation

▶ Integrating after machining process such as deburring, measurement, leak detection, cleaning, assembly, and laser marking

▶ Design and plan ended-line automation

▶ Integrating the vision system to reduce fixture using to approach production flexibility

▶ Deburring system with DSA/Booster tools control the floating force precisely and avoid overcutting

Layout of End of Line Machine Automation

1 Assemble Machine
2 NG Belt Conveyor
3 Unload Belt Conveyor
4 Upload feeder
5 Robot
6 Leak Detector

CMM Machine Tending Automation System

▶ Flexible pallet with RFID, barcode or vision system can apply in mixed lines

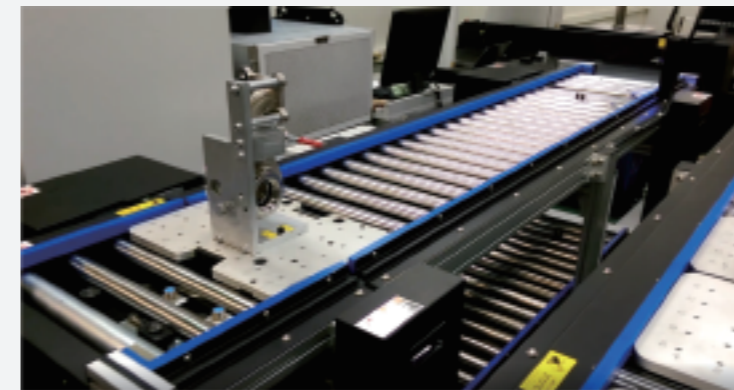▶ Integrating Mitutoyo or Zeiss's CMM and the main PC can receive measurement results from client CMM

▶ PLC system controls the CMM to achieve measurement automatically.

▶ The workpiece can be uploaded via conveyor or storage rack by user request

▶ Intergrating with vision system, QRcode or RFID reader , the system can select corresponding program to measure different types of products and make CMM more flexible
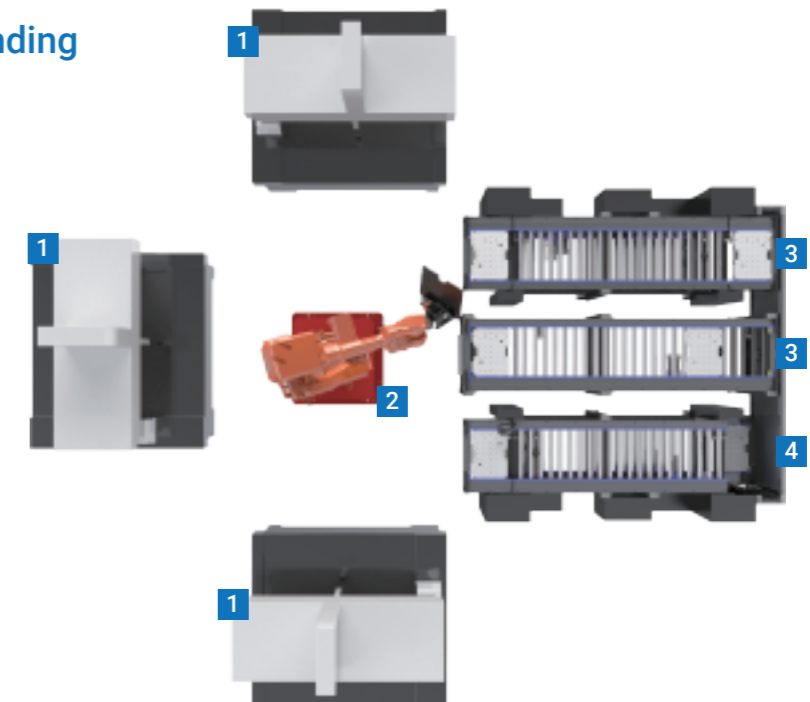
Layout of CMM Machine Tending Automation System

1 Coordinate Measuring Machine
2 Robot
3 Unload Conveyor
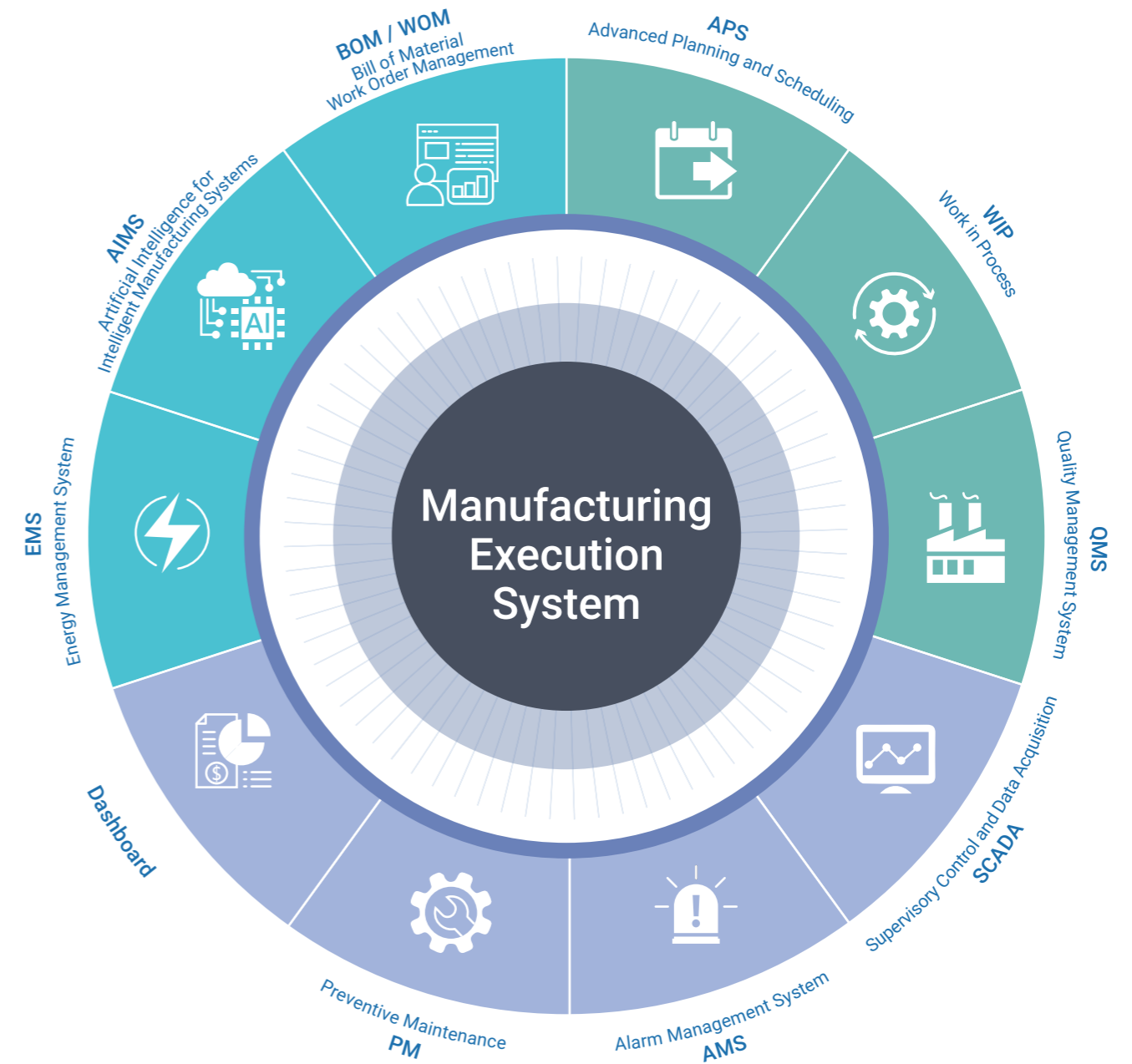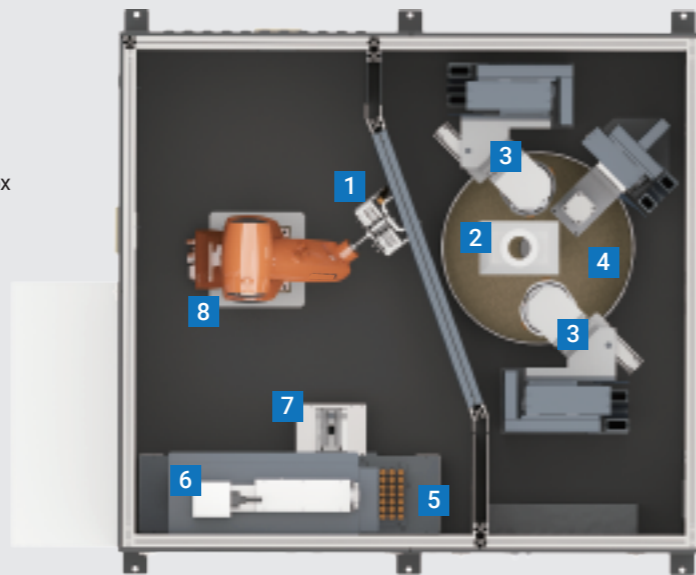4 Upload Conveyor

Automatic Tool Edge Passivation System

▶ Bottom dust collection design in coordination with drawer-type dust collection box to easy the cleaning

▶ Separate design between passivation area and loading area to keep the material loading area clean

▶ Uploading workpiece by robot to reach labor saving and enhance efficiency

▶ Automatic marking the tool completed passivating by laser marking

▶ Passivating 2 tools in the same time. The average rocess time is around 30 seconds
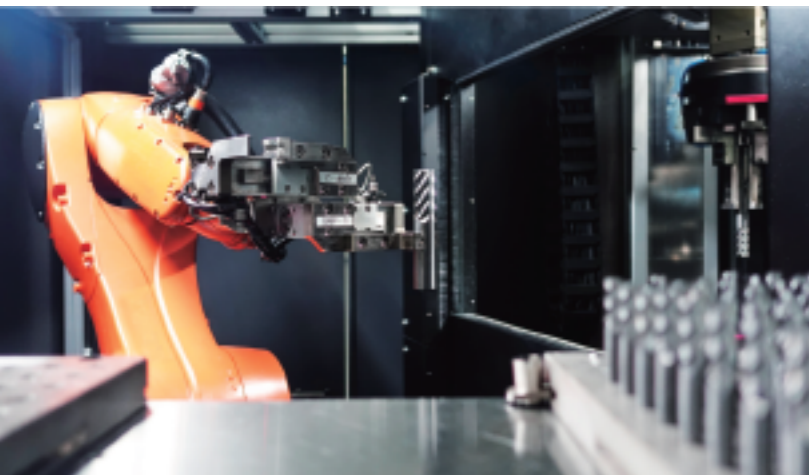
▶ Rotation of sand tank along with the tools rotate in passivation process can enhance the quality and productivity

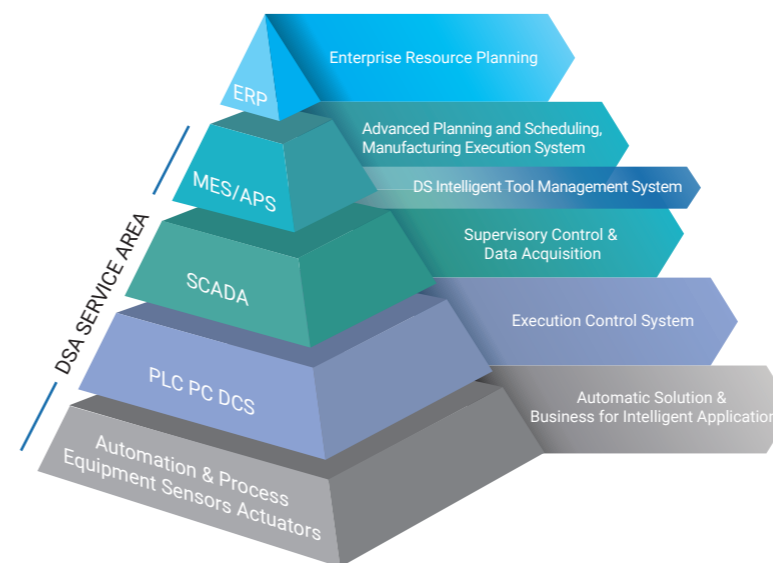▶ High quality modern industrial design with compact integration and simple operation

Layout of Automatic Tool Edge Passivation System

1 Dual Grippers

2 Dust Collection Connector

3 Gripper Mechanism Rotation

4 Sand Tank

5 Tools Feeder

6 Laser Marking Machine

7 Cleaning Box

8 Robot

Manufacturing Execution System

Manufacturing Execution System

Artificial Intelligence for Intelligent Manufacturing Systems — AIMS

BOM / WOM — Bill of Material Work Order Management

APS — Advanced Planning and Scheduling

WIP — Work in Process

QMS — Quality Management System

SCADA — Supervisory Control and Data Acquisition

AMS — Alarm Management System

PM — Preventive Maintenance

Dashboard

EMS — Energy Management System

Manufacturing Execution System

▶ DSA can integrate automated production line and production equipment status via control units such as SMB, PLC, and DCS

▶ HA, High Availability system architecture, offering highly reliable server operation

▶ Enhancing productivity and controlling operation status by optimize scheduling and key process monitoring

▶ Designing and planning the job report system for operation process helps users monitor and control productivity process

▶ Getting important information by real-time monitoring

Enterprise Resource Planning

ERP

Advanced Planning and Scheduling, Manufacturing Execution System

MES/APS

DS Intelligent Tool Management System

Supervisory Control & Data Acquisition

SCADA

Execution Control System

PLC PC DCS

Automatic Solution & Business for Intelligent Application

DSA SERVICE AREA

Automation & Process Equipment Sensors Actuators
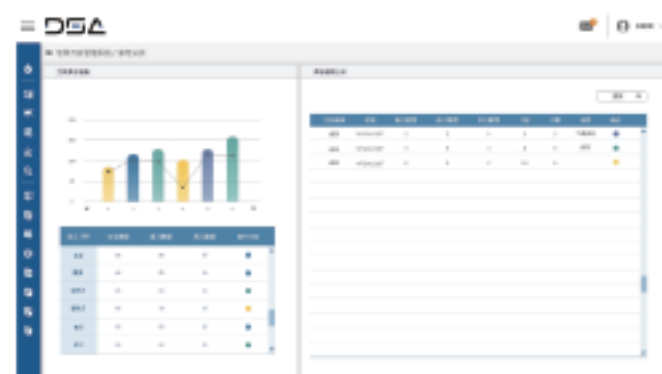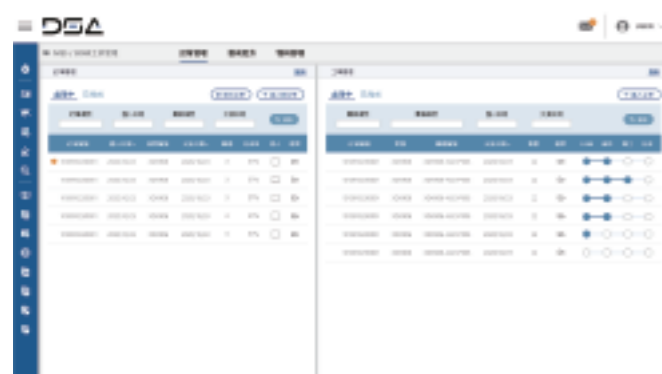
System Functions

▶

Systematic management

◇ Material and warehouse management

◇ Order management

◇ Production recipe management

▶

AI production scheduling

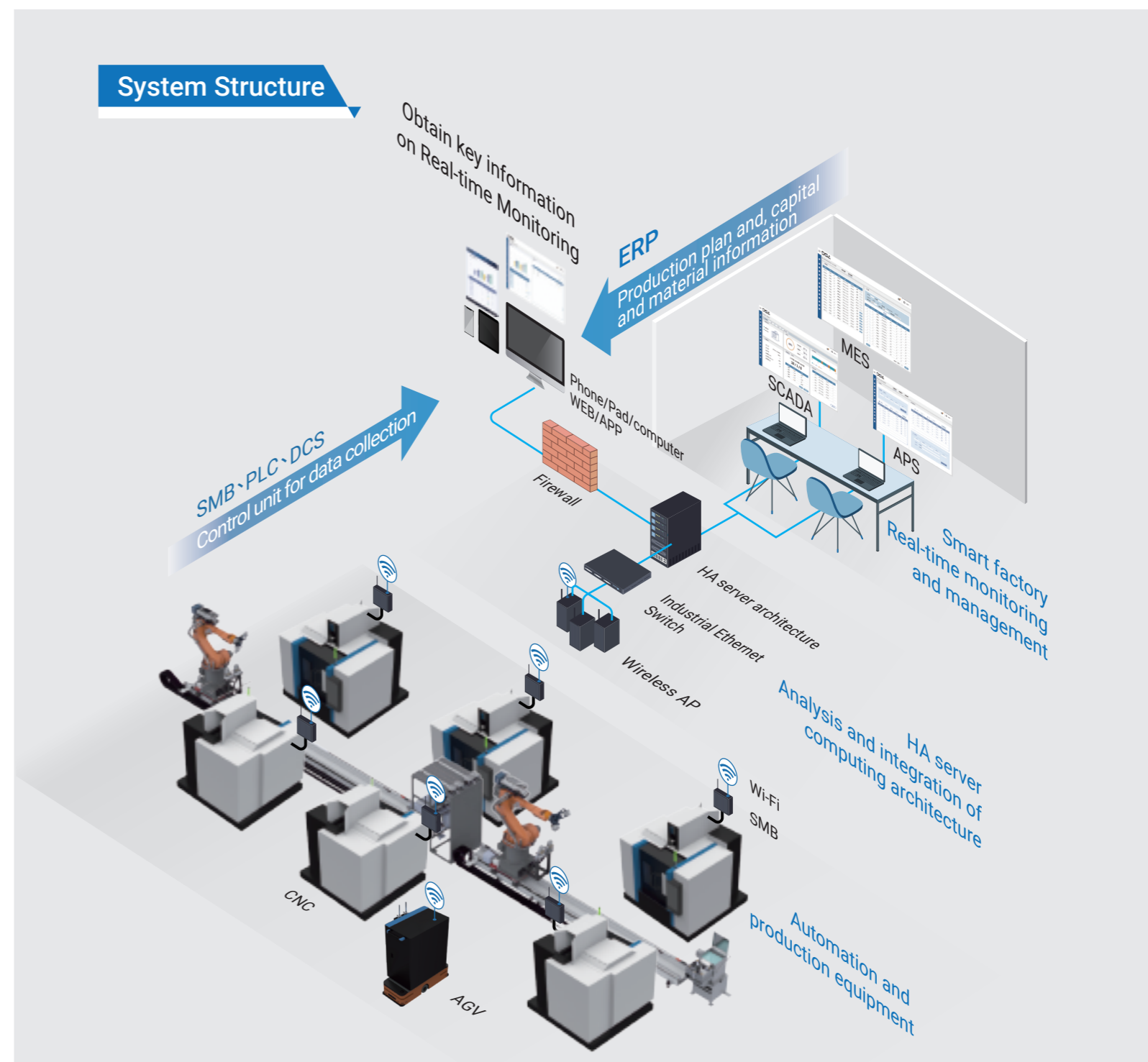◇ Automatic scheduling

◇ Order and production scheduling

▶

Job Report System

◇ Designing job report system by user process

◇ Controlling production status according job report system

▶

Tracking WIP real-time status

◇ Input and output statistics

◇ Progress management

◇ Yield statistics

▶

Customized board with real-time display for factory production status

▶

Real-time monitoring equipment information

◇ Equipment OEE

◇ Health diagnosis

◇ Important real-time information

▶

Maintenance reminder

◇ Maintenance checklist

◇ Maintenance intelligent alarm

▶

Analysis error and feedback

◇ Error alarm and analysis

▶

Power System Monitor

◇ Time period energy analysis

◇ Peak power consumption statistics

◇ Optimal contract capacity suggestion

System Structure

Obtain key information on Real-time Monitoring

ERP
Production plan and, capital and material information

SMB、PLC、DCS
Control unit for data collection

Phone/Pad/computer WEB/APP

Firewall

Industrial Ethernet Switch

HA server architecture

Wireless AP

MES

SCADA

APS

Smart factory Real-time monitoring and management

HA server Analysis and integration of computing architecture

Wi-Fi

SMB

CNC

AGV

Automation and production equipment

DS Intelligent Tool Warehouse

▶
Intelligent production tool configuration:
Planned production based on automatic
configuration of DS Intelligent Tool Warehouse
and DITC Warehouse

▶
Intelligent tool access and classification:
Tools can be automatically classified and stored
according to their types, and automatically
accessed according to requirement

Intelligent system monitoring and management

DS Intelligent Tool Management System

▶
Tool Purchasing Information

▶
Tool Inventory Management

▶
Machine Tool Magazine Information

▶
Configure Tools via Operation Plan

▶
Tool and Machining Process Cost Calculation

▶
Tool Usage Record

▶
Tool Inspection System

▶
Tool Purchase Suggestion

▶
Automatic correction of
machine tools

DITC
Cloud intelligent management for tool change process flow

▶
Cloud system management of tool information

▶
Real-time display and search the data of DITC
and CNC machine status from PAD

▶
Fleet manager for AGV tool cart

▶
Magnetic tool interlock system

▶
Wi-Fi network architecture

System Effects

▶
Effectively manage tool inventory

▶
Improve tool lifecycle and reduce the risks of collision
by correctly controlling and configuring the tools

▶
labor saving for tool management

▶
Configure tools via operation plans and integrate
Production Management System (PMS)

▶
Reduce the movement of people for changing tools
and then achieve the effect for saving the labor cost

▶
Reduce the manual works of tool usage record and
analyze tools lifecycle via tool usage record
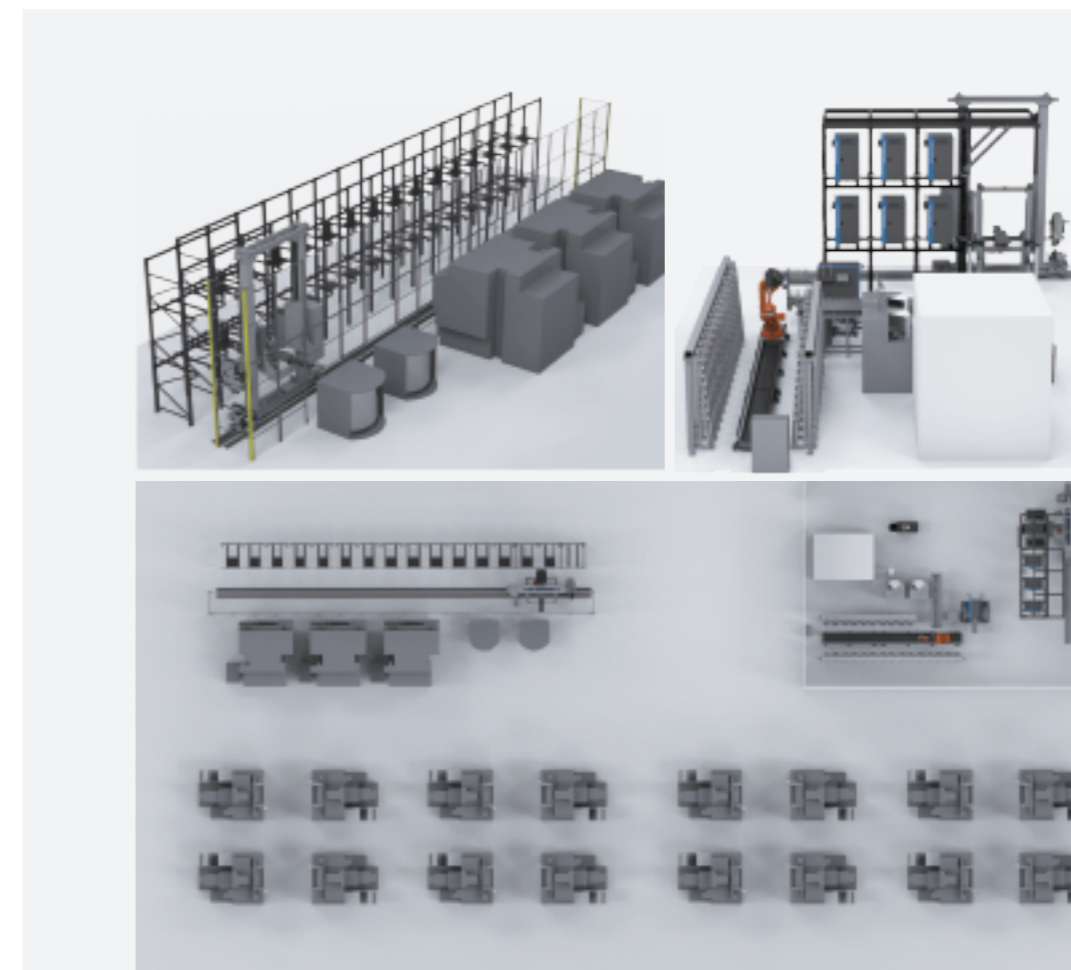
System Flow

▶
1. Tool Assembly
   and Measurement

▶
2. RFID Data Login

▶
3. Tool Storage

▶
4. Configure Tool to DITC

▶
5. DITC Storage

▶
6. Fleet Manager

▶
7. Tool Change

▶
8. Recycle to Storage

Automated Storage-Retrieval System (AS/RS)

▶

Crane and fork mechanism provides smart access to goods

▶

Better convenience through the AGV and reducing manual work

▶

Combined with the warehouse management system (WMS) and control system (WCS), enhancing productivity and efficiency of storage management

▶

Vertical storage minimizes space and improves production rate per space

▶

Integrated all storage management operations, reducing errors and inventory costs, and brings more advantage

▶

Integrated with DSA CNC machine tending system, building flexible manufacturing system (FMS)

Warehouse Control System (WMS)

▶

Monitors the material flow, storage management and dispatcher system with DSA MES, using every last inch of the warehouse

▶

Improves performance through web/ APP programming and RFID/ barcode scanning devices

▶

Combined with APS and SCADA for real-time status and situation reports, avoiding material interruption

Layout of Flexible Manufacturing System, FMS

1	Vertical storage rack	5	Fork
2	Safety fences	6	Crane
3	CNC machine		
4	Feeding conveyor		
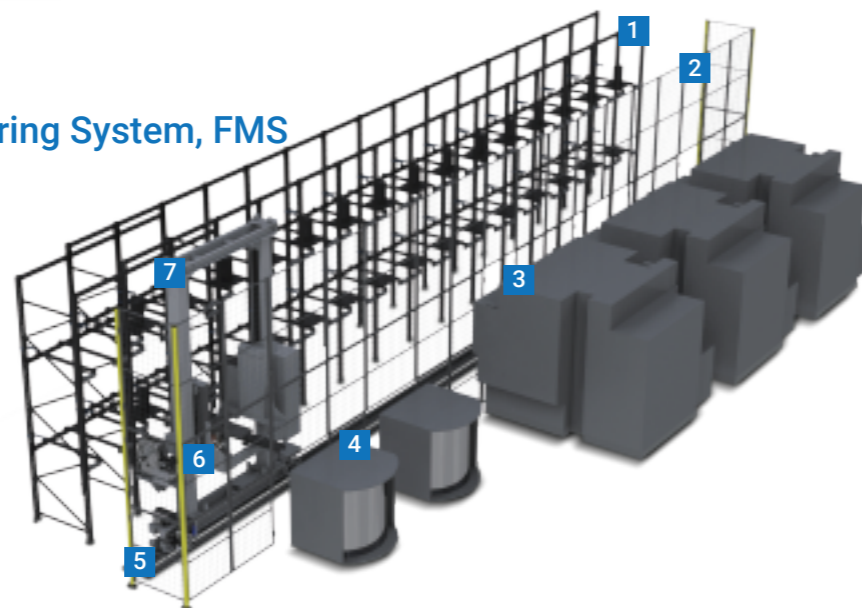
Service Point

▶

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▶

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