国机智能科技有限公司
SINOMACH Intelligence Technology Co., Ltd.

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Smart Manufacturing Related Practices of Sinomach-IT

Xiangjun Kong

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Work Together Win Together

— 01 —

About Sinomach-IT

国机智能技术研究院
SINOMACH Intelligence Technology Research Institute

About Sinomach

中国机械工业集团有限公司
China National Machinery Industry Corporation

China National Machinery Industry Corporation (SINOMACH)-An international, diversified, comprehensive equipment industrial group

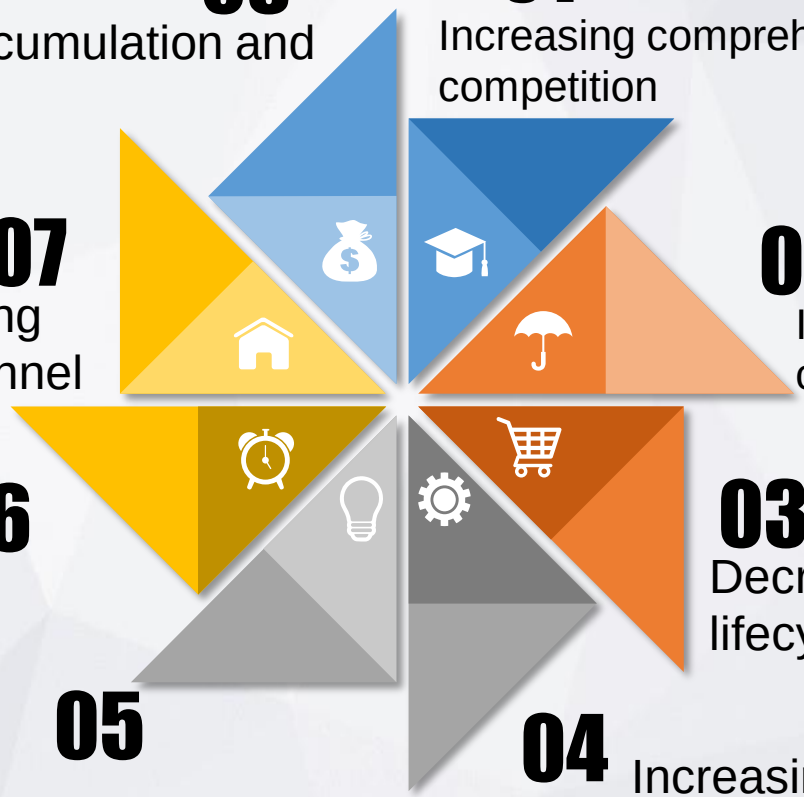
- State-owned backbone enterprise directly managed by the central government;
- Ranked as 281 of Fortune Global 500 Enterprises with turnover $ 40Billion in 2020;
- 110,000 employees, over 40 wholly-owned or majority-owned subsidiaries;
- Three main areas of R&D and manufacturing: mechanical equipment R&D, project contracting, and trade and services

About Sinomach-IT

- In 2012, founded as Central Research Institute, dedicated to a high-end R&D platform for smart manufacturing.
- In 2015, as SINOMACH Group concentrated its strengths on the development of intelligent manufacturing, Sinomach Intelligent Technology Corporation (Sinomach-IT) was founded.
- After several years of development and tempering, we have become a well-known intelligent manufacturing system solution provider in China, centered on independent and controllable industrial software and intelligent equipment.

Target Industries

To relieve development bottlenecks of manufacturing enterprises (mainly for machinery equipment)



01 Increasing comprehensive competition

02 Increasing needs for customized products

03 Decreasing product lifecycle

04 Increasing remote collaboration

05 Increasing labor price

06 Product quality relies on human factors

07 Difficulty in finding and keeping production management personnel

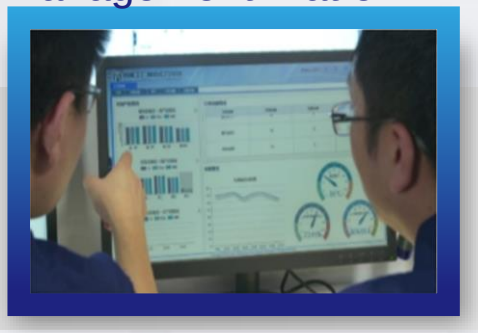
08 Difficulty in know-how accumulation and transfer

Main Products

Industrial Software

iMOM/iMES

Manufacturing Operation Management Platform



Equipment

iSNM Series

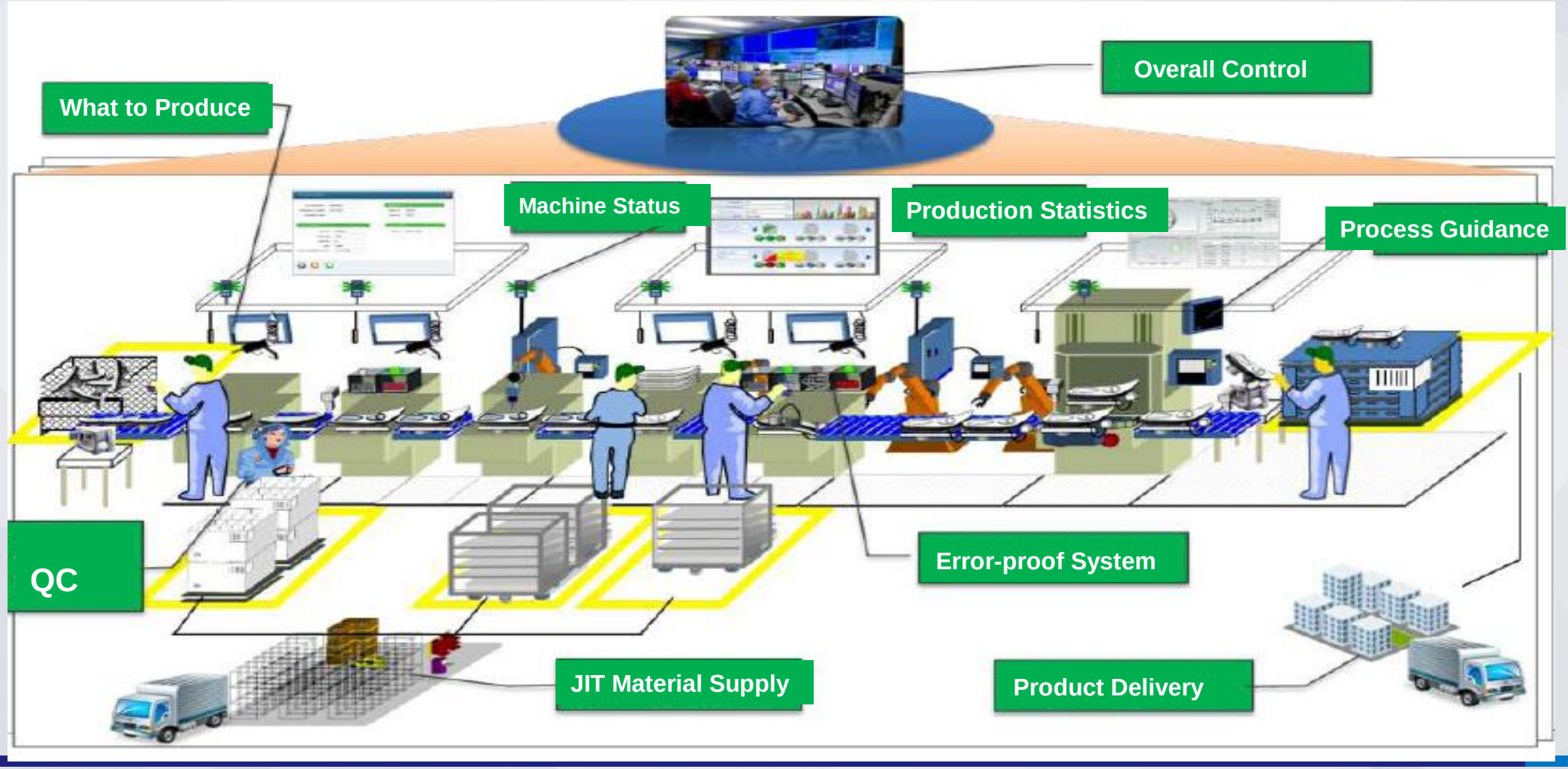
Industrial Robot Platform

Smart Manufacturing Solution

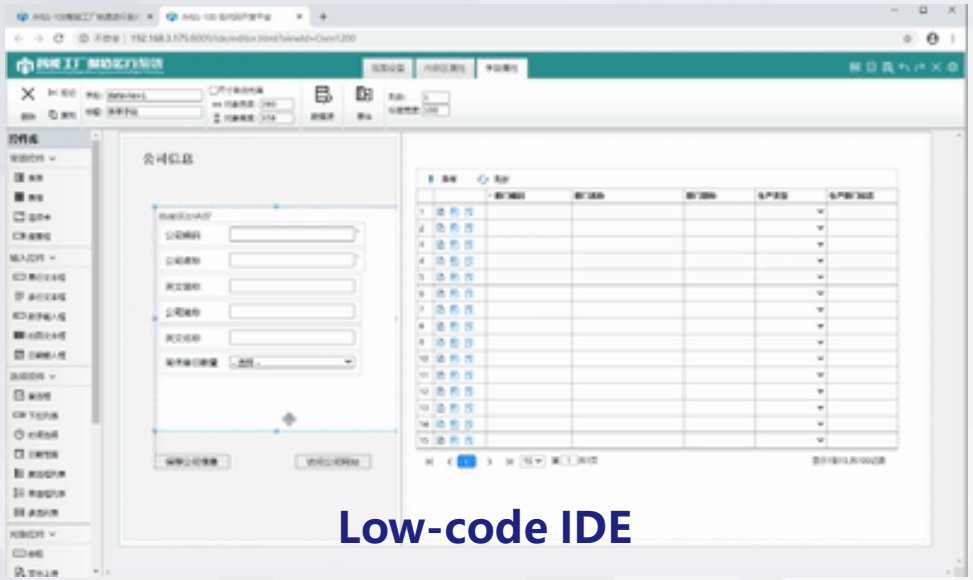
Platform + Industrial Application	Industry Platform	Customer- & Market-Oriented
Platform + Function Extension	Product Platform	Product- & System-Resulted
Platform + Technological Application	Technology Platform	New Technology & New Techniques
Platform + Innovation	Fundamental Platform	Industrial Standards & Patents

iMOM for Smart Factory

To set up “the brain and central nerve system” of smart factory

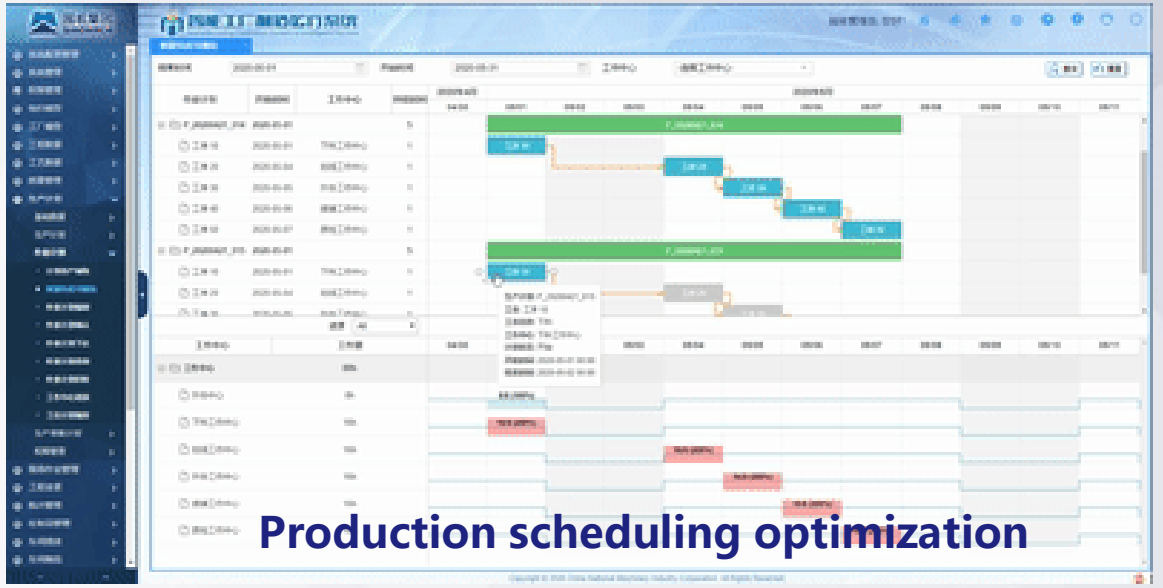


Main iMOM Functionalities



Low-code IDE

Nesting integration optimization

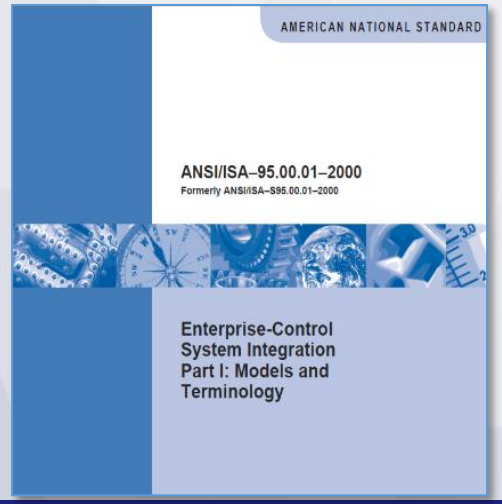


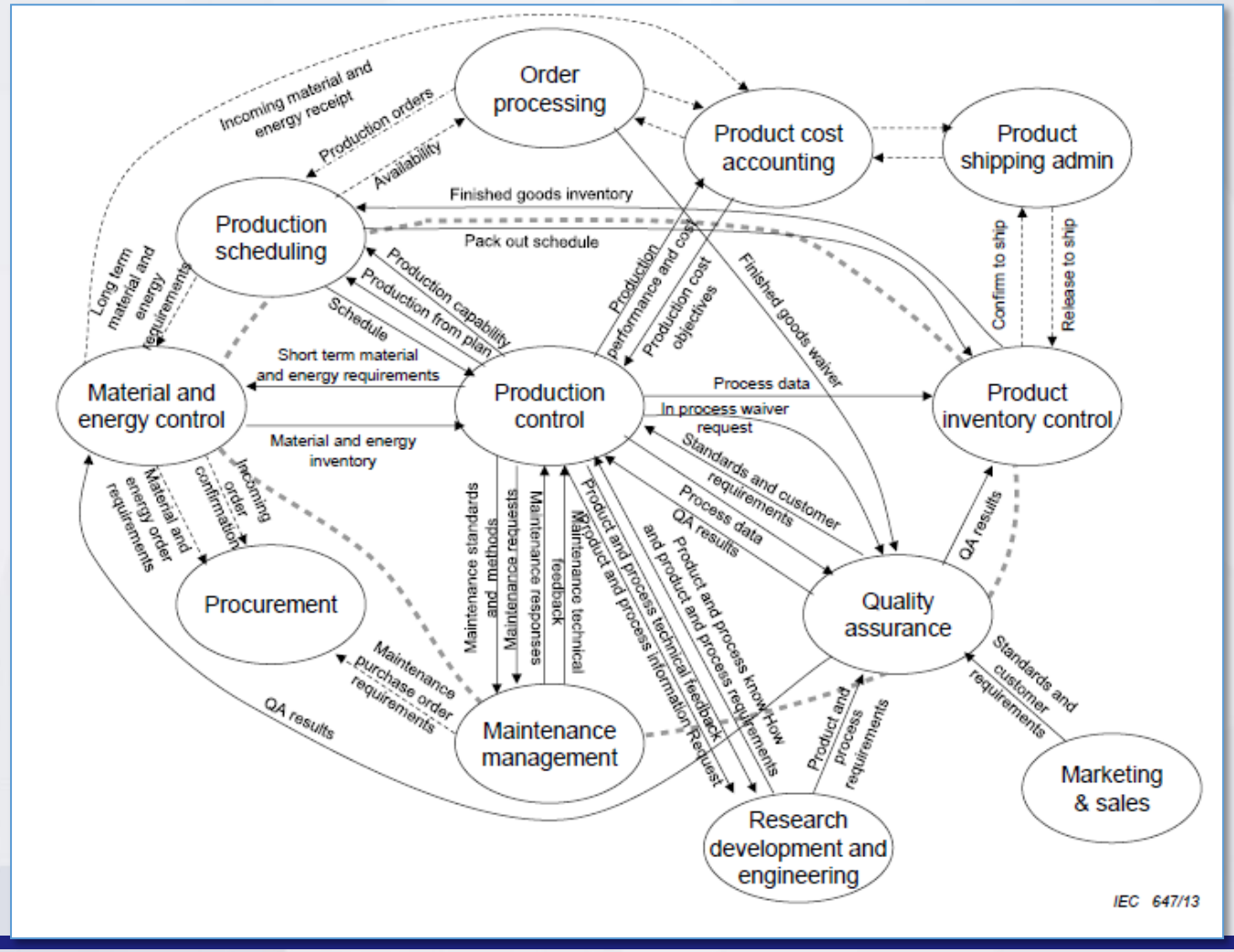
Production scheduling optimization

OEE real-time analysis

iMOM for Smart Factory

- **Based on latest IEC/ANSI/MESA standard**





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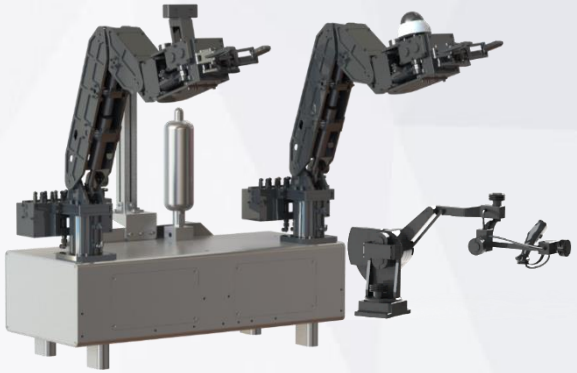
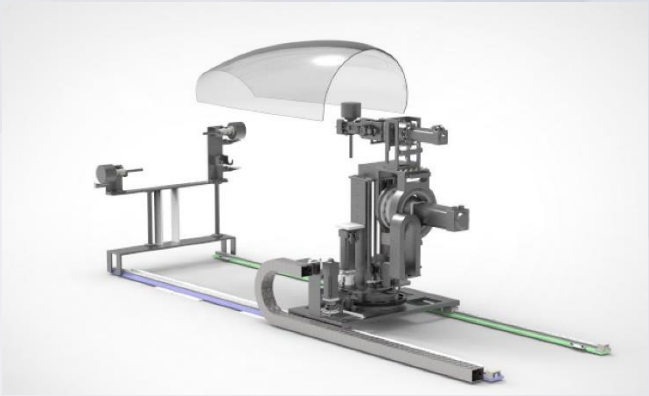
Main Products- industrial robots

iSNM series industrial robots

Special robot



Live working robot



Vacuum robot

Robot core components and systems

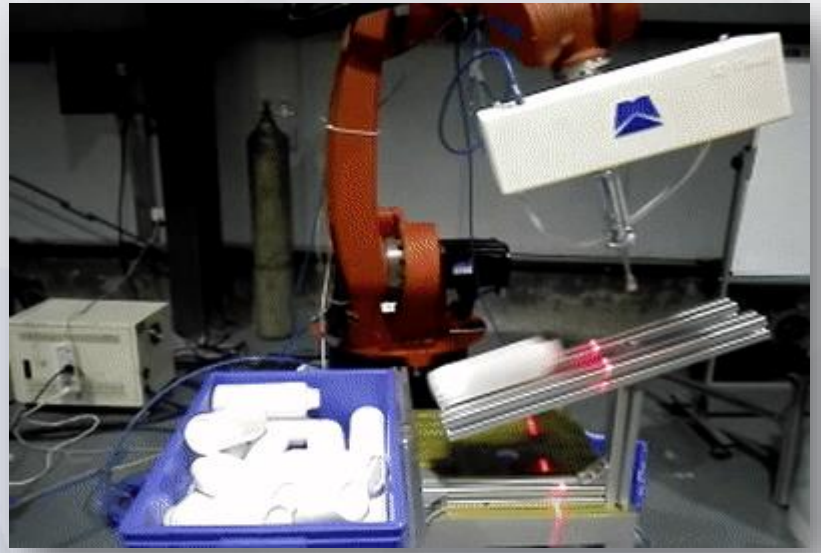
Control System

3D vision system

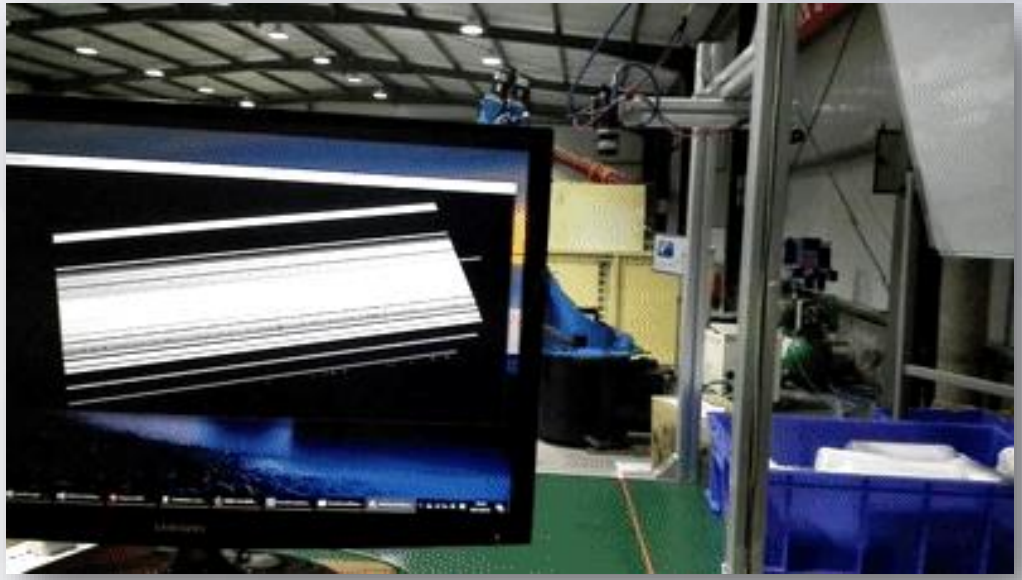
Server Driver

Precision Reducer

Main Products- Robot 3D Vision



- Line laser scanning
- 3D positioning
- Precise picking



- 3D reconstruction

Standard Establishment

Based on the smart factory/digital workshop

- GB/T 37393-2019 《Digital workshop General technical requirements》
- GB/T 37413-2019 《Digital workshop Terms and definitions》

Based on MOM products

- 《Standard for Platform-based Manufacturing Operation Management System of Agricultural Machinery Equipment Intelligent Factory》
- 《General integration model standard for agricultural machinery equipment smart factory》
- 《Information Integration Standard for Digital Workshop of Medium and Low Voltage Switchgear》
- 《Design and implementation of integrated safety for smart factories/digital workshops》
- 《Guidelines and Standards for Smart Factory Construction》
- 《Agricultural machinery design process simulation and information integration standards》

Based on the core technology of robots,

- CRIA 0001-2019 《Industrial robot control system》

Condensing the industrial knowledge of SINOMACH

- 《Research on the Planning and Technical Standards of SINOMACH Smart Factory》 (1 Overall + 5 Industries)

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02

Use Cases

Application Areas and Industries

Representative Use Cases - Rail transit industry

- Automated production line with robotic for beam sleeper manufacturing（The first set in China, the top ten annual cases of Chinese smart manufacturing 2019）

- Robot type：iSNM0600-16
- Product：Sleeper for railway
- Application：Assembly, welding, loading and unloading
- Advantages：The efficiency is increased by 5 times, and the pass rate is more than 95%.

Representative Use Cases – Environmental protection industry

- Environmentally friendly refrigerant filling production line (first set in China)

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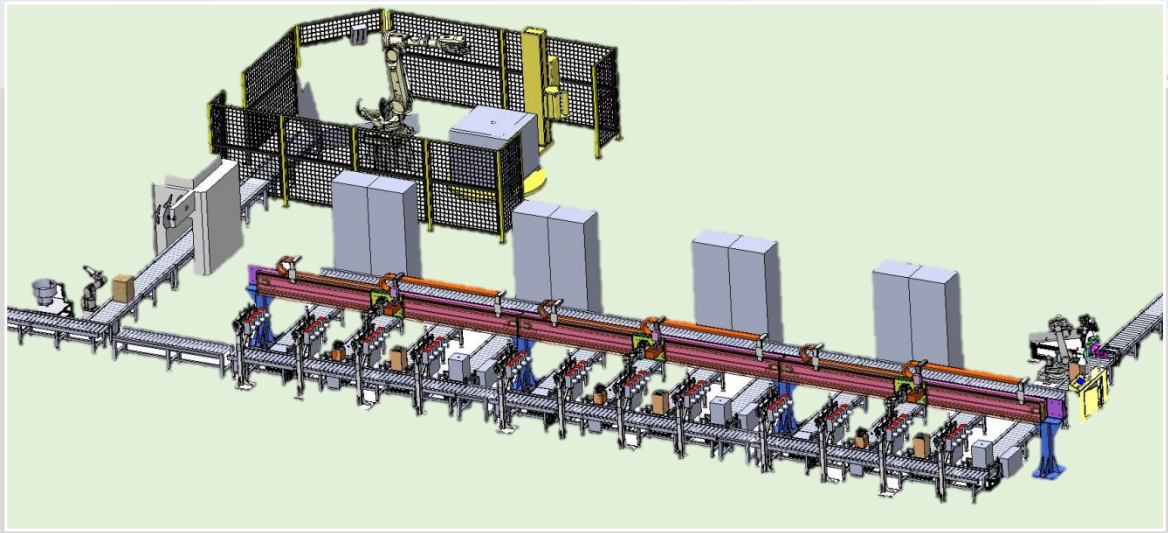


Capacities: 1500 bottles/8 hours, continuously in 24 hours

- Improve production capacity based on the modular combination of smart units
- Realize unmanned automatic production based on robot continuous operation
- Realize flexible production based on machine vision dynamic recognition
- Realize system security guarantee based on automatic perception technology

Representative Use Cases – Robotic production line

- **Service robot intelligent manufacturing production line (first set in China)**

Representative Use Cases– Robotic production line

- **Service robot intelligent manufacturing production line (first set in China)**

- 3D vision inspection technology
- Robotic gripper quick change technology
- Automatic screw tightening technology
- Service robot detection technology
- Intelligent warehousing and logistics technology
- MOM system integration application

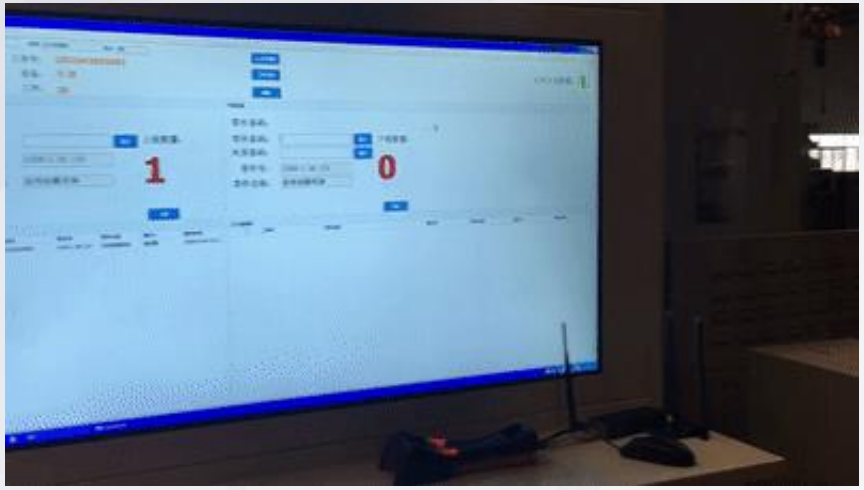
List of Use Cases -Industrial robots & machine vision

NO.	Industry	Project	Clients
1	Electricity	Collaborative robotic arm and power supply	Xu Ji Group
2		Master-slave (same configuration) robotic arm components and accessories	Xu Ji Group
3		10kV live working robot vision module	Xu Ji Group
4		Electric tools for live working on distribution network	Guangzhou Power Supply Bureau Co., Ltd.
5	Machinery Equipment	Sleeper size 3D measuring equipment system	China Railway No. 3 Engineering Group Co., Ltd.
6	Textile	The development of spinning frame robot static yarn breaking and continuous splicing technology	JINGWEI Textile Machinery
7		Intelligent cotton spinning complete set of spinning equipment, automatic cotton matching robot	JINGWEI Textile Machinery
8	Defense	Research and development of intelligent plug-in robot system	Beijing Jiutian Discovery Technology
9		Application development of iSNM1500-160 custom six-axis industrial robot in complex environment	CASIC

List of Use Cases -- Industrial robots & machine vision

NO.	Industry	Project	Clients
1	Mechanical	Intelligent manufacturing robot production line for the key components of rail transit	China Railway No. 3 Engineering Group
2		Intelligent production line of high-performance resin bond super-hard abrasive tools	Zhengzhou Abrasives Grinding Research Institute
3		Application of industrial robots in automatic drill pipe sorting system	China University of Geosciences
4		Automatic filling production line for environmentally friendly refrigerant cylinders	Sinochem Engineering Group Environmental Protection
5		Eight-station automatic production line for intelligent manufacturing of Xiaozhi service robots	Kangli Youlan Robot Technology
6	Defense	Multi-dimensional loading test bench for intelligent walking equipment	Inner Mongolia First Machinery Group
7		Magnetron sputtering coating machine coating robot	AVIC Chengdu Aircraft Industrial (Group)
8	Education	Intelligent manufacturing production line integrating demonstration and training	National Machine Intelligence (Suzhou)
9		Intelligent manufacturing experimental teaching platform	Beihang University

Representative Use Cases– iMOM



Workshop Job Management

Logistics

Equipment Monitoring

Workshop Roaming

Representative Use Cases– iMOM

Final assembly workshop

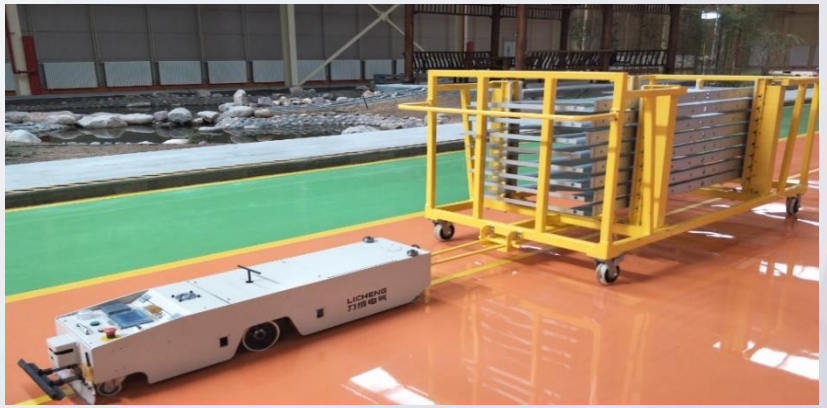
Sheet metal workshop

Welding workshop

Part assembly workshop

Busbar workshop

Stereoscopic Warehouse



Workshop logistics

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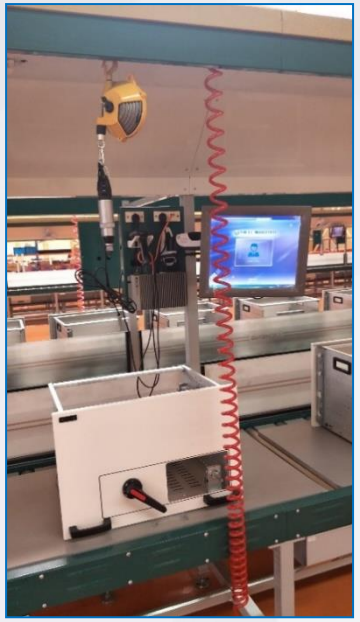
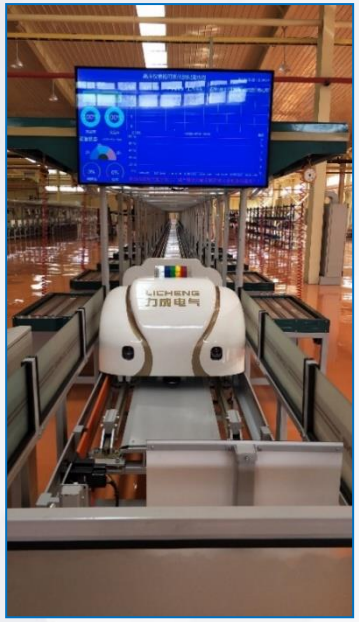
Representative Use Cases– iMOM

Component assembly MES workstation

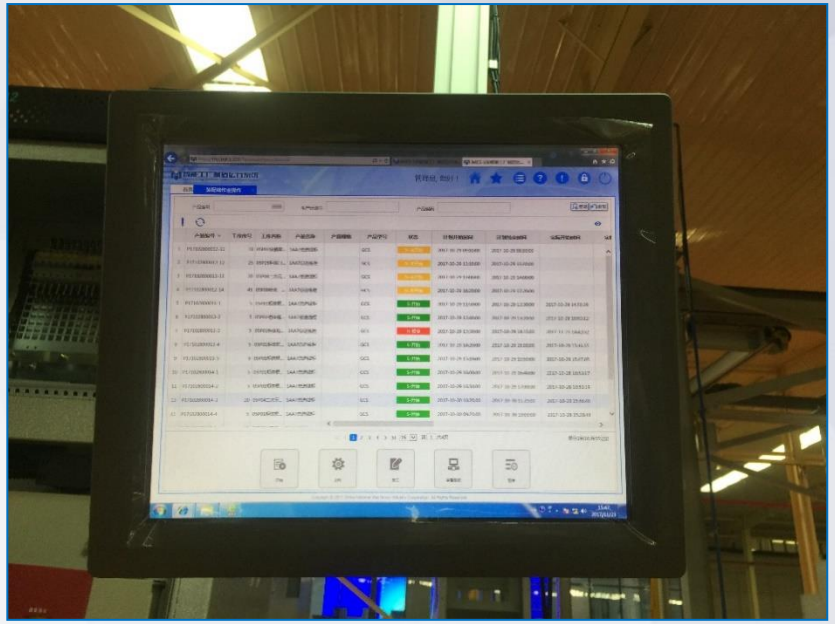


Drawer assembly MES workstation



Instrument box production line kanb

Vertical MES touch terminal



Hanging MES touch terminal

Workshop electronic kanban

Factory Control Center

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List of Use Cases — iMOM

NO.	Industry	Project	Clients
1	Machinery Equipment Manufacturing	New-type wheeled tractor intelligent manufacturing machine processing digital workshop MES	YTO Group Corporation
2		Large-scale injection molding equipment manufacturing intelligent factory manufacturing operation system	Borch Intelligent Equipment
3		Intelligent manufacturing operation management system for high-performance super-hard material abrasive tools	Zhengzhou Abrasives Grinding Research Institute
4		MES platform of Jingwei Textile Machinery Co., Ltd.	JINGWEI Textile Machinery
5		Implementation of Qingdao Hongda Intelligent Manufacturing MES System	Qingdao Hongda Textile Machinery
6		MES/DNC system for processing and manufacturing digital factory	CNOOC Offshore Energy Development
7	Electricity Equipment Manufacturing	Construction of Digital Factory for Complete Switchgear of Intelligent Distribution Network	Ningxia Licheng Electric Group
8		New base construction of Wuhan Wuguo Energy Engineering Co., Ltd.	Wuhan Wuguo Energy Engineering
9		Machine plus digital workshop MES for key parts of large hydropower and gas turbine equipment	China Second Heavy Machinery Group
10		Intelligent factory information management system for dual-equipment flywheel energy storage device	China Second Heavy Machinery Group
11	Automobile automobile parts Manufacturing	The overall solution of intelligent automobile manufacturing engineering	China Automotive Industry Engineering
12		Digital workshop solutions and demonstration applications for seals	Guangzhou Institute of Mechanical Science Co., Ltd.
13		Vulcanization equipment networking transformation and remote operation and maintenance management system development project	Guangzhou Guoji Sealing Technology Co., Ltd.
14		Shandong Liancheng Precision Manufacturing Co., Ltd. MES platform software implementation	Shandong Liancheng Precision Manufacturing Co., Ltd.
15	Pharmaceutical	High-end medical equipment intelligent new mode application manufacturing operation management system	Chutian Technology Co., Ltd.
16		Digitization and Information Construction Project of Diwan Intelligent Manufacturing Base	Tianjin Zhongxin Pharmaceutical Group Co., Ltd.

List of Use Cases — Overall Design

NO.	Industry	Project	Clients
1	Machinery Equipment Manufacturing	Intelligent Manufacturing Master Plan of New Wheel Tractor	YTO Group Corporation
2		CNOOC Offshore Energy's 14th Five-Year Plan for Intelligent Manufacturing	CNOOC Offshore Energy Development
3		PDM, CAPP, DNC, MES and automation system design	CNOOC Offshore Energy Development
4		Equipment intelligent manufacturing consulting planning	PMJ Coal Mine Machinery Equipment
5		Intelligent manufacturing consulting planning	China Railway Engineering Equipment Group
6		Intelligent manufacturing consulting planning	CITIC Heavy Industry Machinery Co., Ltd.
7		Application of the new mode of intelligent spinning in the whole process	Wuhan Yudahua Textile & Garment Group
8		High-end knitting yarn whole-process smart factory	Hunan Kelijia Textile
9	Electricity Equipment Manufacturing	Construction consultation and planning of transformer intelligent manufacturing plant	Pearl Electric
10		Application of new mode of intelligent manufacturing of power distribution equipment based on full life cycle management	Baiyun Electric Equipment
11	Pharmaceutical	Consulting and planning of Diwan Intelligent Manufacturing Base Project	Tianjin Zhongxin Pharmaceutical Group

THANKS

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