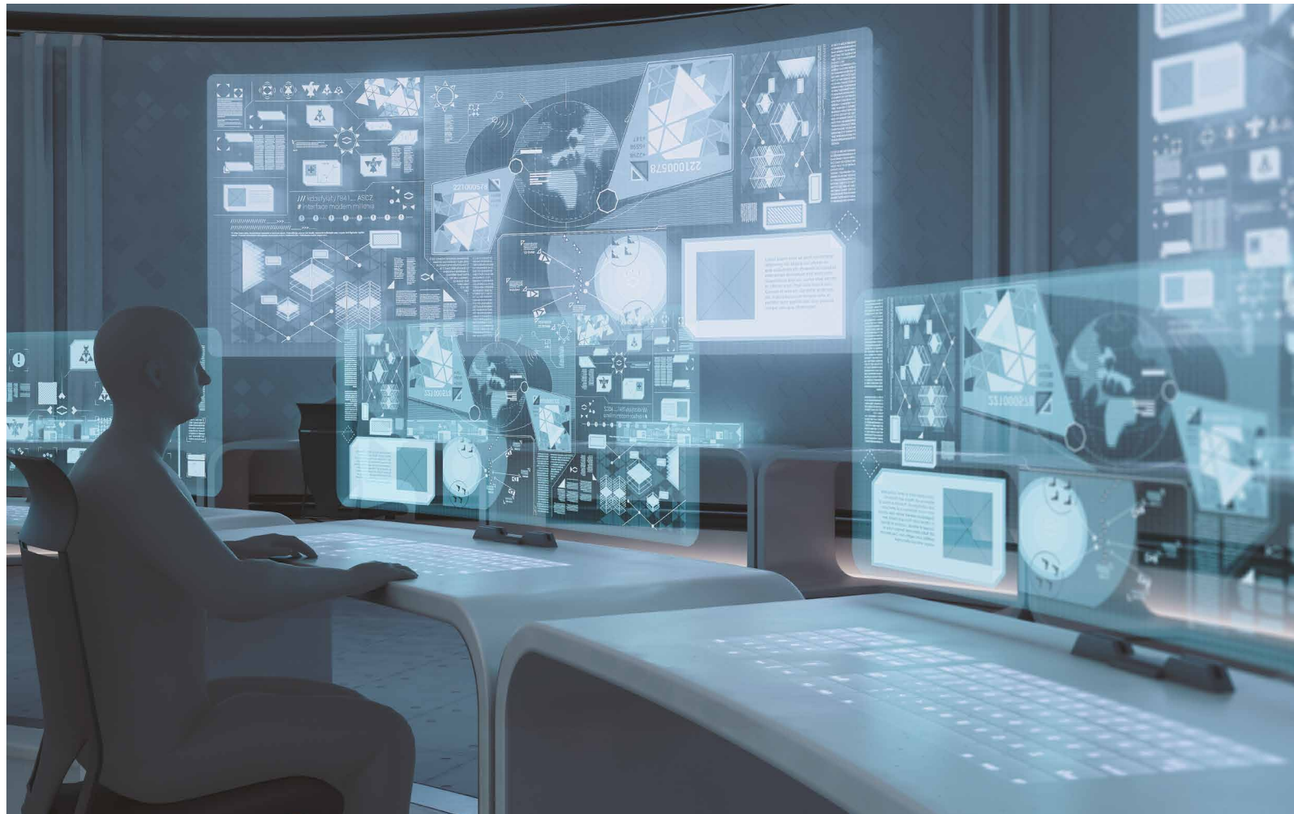
INOVANCE

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Inovance Technology Digital Factory

New Intelligent Manufacturing Ecosystem



Shenzhen Inovance Technology Co., Ltd.
www.inovance.com

Add: Inovance Headquarters Tower, High-tech Industrial Park,
Guanlan Street, Longhua New District, Shenzhen
Tel: (0755) 2979 9595 Fax: (0755) 2961 9897

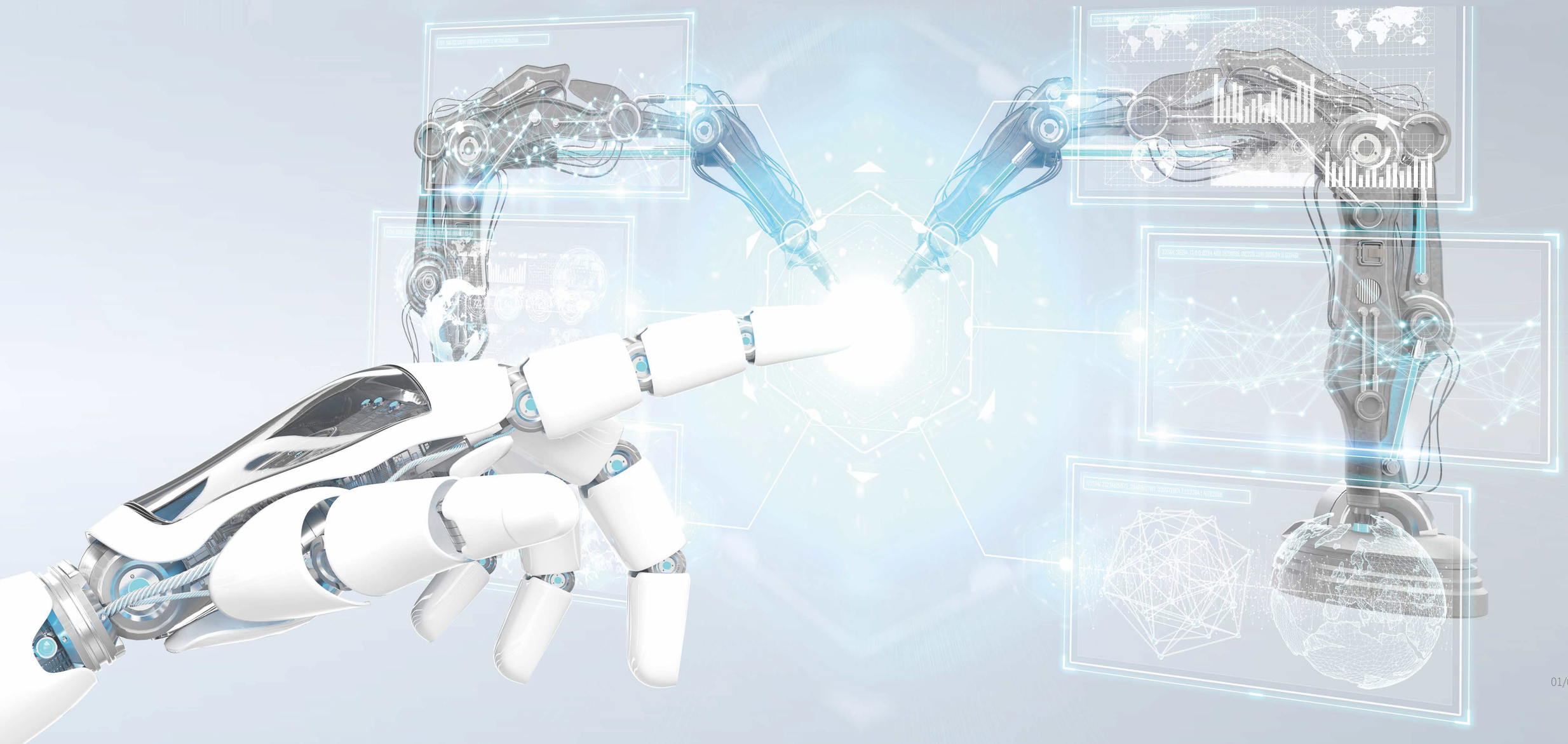
Suzhou Inovance Technology Co., Ltd.
www.inovance.com

Add: No.16 Youxiang Road, Yuexi Town, Wuzhong District, Suzhou
215104, P.R. China
Tel: (0755) 6637 6666 Fax: (0512) 6285 6720

Intelligent Manufacturing, Trend of Global Manufacturing

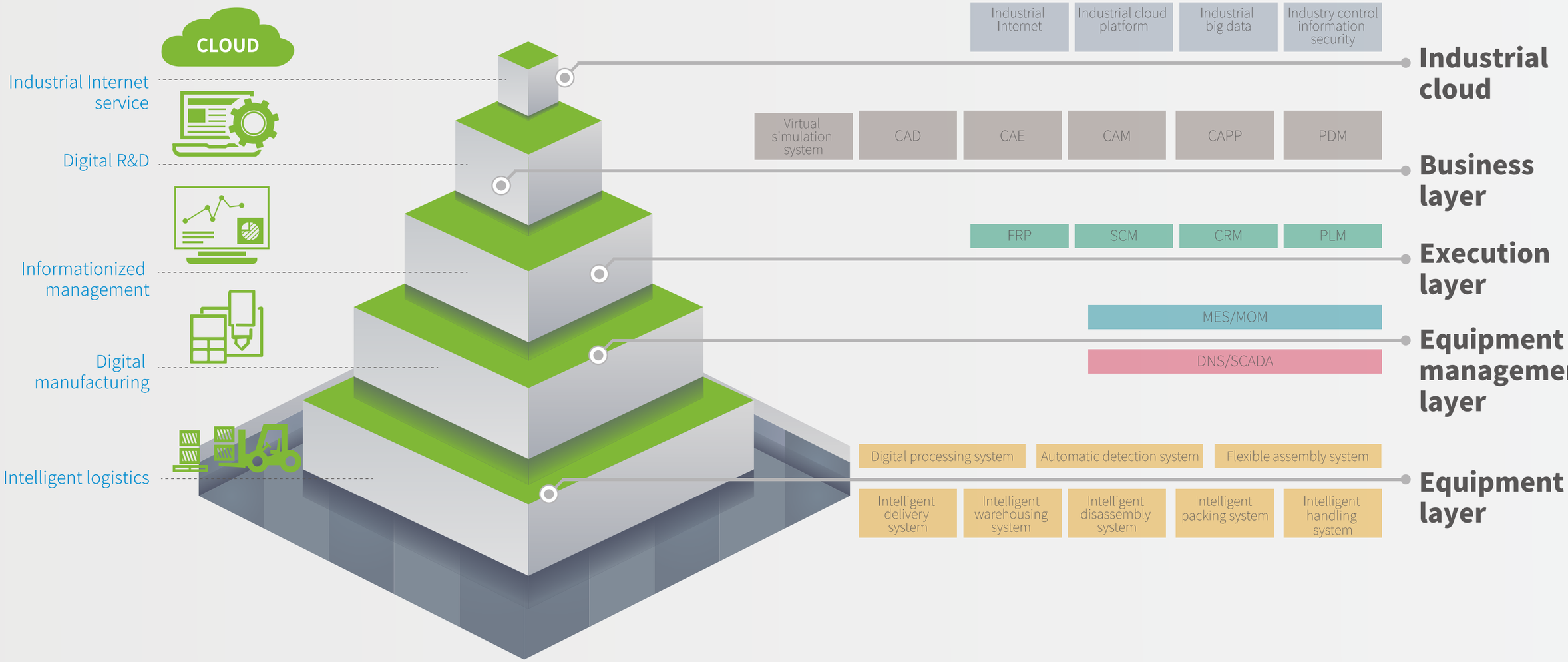
At present, traditional factories are in the big wave of transformation and upgrading due to the development of IoT (internet of things), cloud computing, big-data analysis, artificial intelligent (AI), and industrial robot technologies. Such transformation requires integrating digital technologies into manufacturing to enable data-driven production, helping deliver customized, intelligent and qualified products.

The digital factory era has come!



Overview of Digital Factories

In digital factories, the digital models are updated throughout the whole life cycle, from product R&D, manufacturing planning, manufacturing engineering to production execution and product services. This enables simultaneous interaction between virtual factories and real factories.



Scenario-based, Intelligent Manufacturing Ecosystem

With a deep understanding of various complicated processes and application scenarios, Inovance intelligent manufacturing is designed to help users simplify application procedures and improve the production efficiency based on industrial robots.

In addition, through connecting to devices in control, drive, execution, and sensing layers, Inovance intelligent manufacturing works with MES and industrial internet to form an informationized and automatic ecosystem.



Industrial Internet

PLC

Industrial robot

MES system

Servo system

Robot vision

Flexible Production Line for Mobile Phones

The quick-response design of the modular flexible production line allows quick configuration and commissioning, and enables scenario modularization for the process section. The production line is highly adaptive to the environment. The MES + industrial cloud is a new management mode integrating the internet with industries based on the big data.

AOI Workstation

1. Carry out visual inspection for any defect on the mobile phone frame, greatly improving the product quality substantially.
2. Replace manual inspection with visual inspection device, greatly improving the efficiency of product lines.

Grinding Workstation

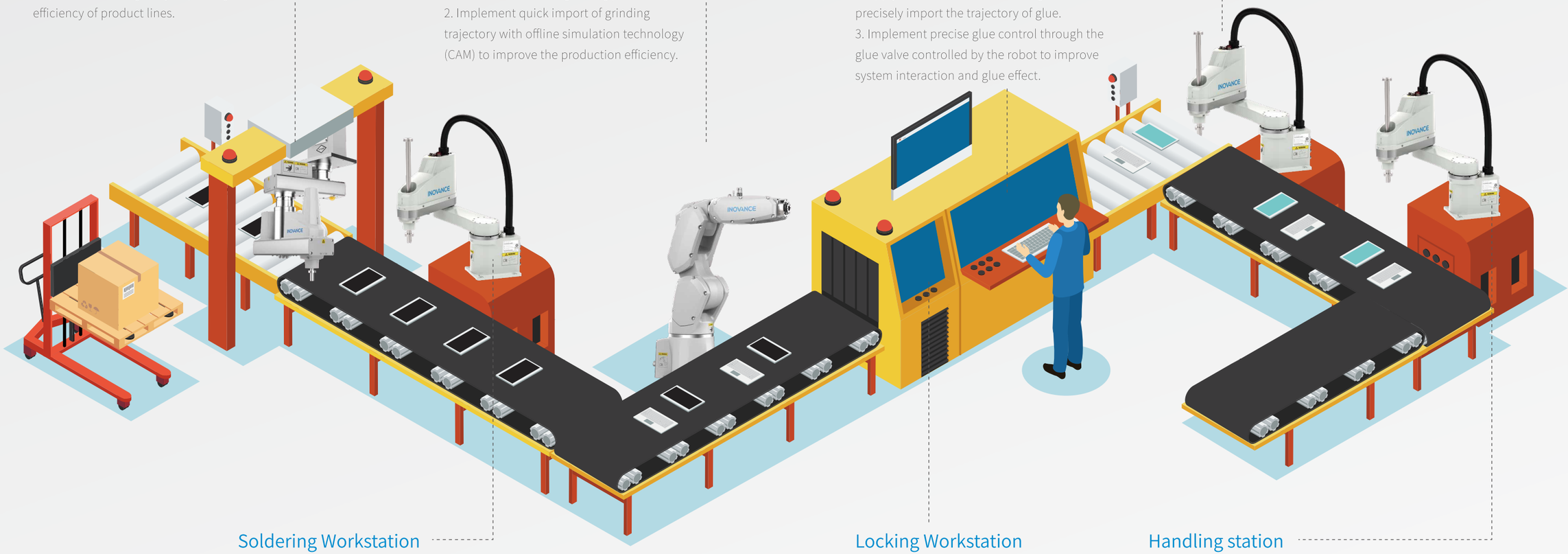
1. Grind the middle frame of the mobile phone through a cooperation between the grinding head and the 6-axis robot. Implement precise control by enhancing the robot motion and the grinding processes.
2. Implement quick import of grinding trajectory with offline simulation technology (CAM) to improve the production efficiency.

Gluing Workstation

1. Perform precise control of the gluing width and thickness through a deep integration between the glue application valve and the robot.
2. Apply the machine vision for alignment to precisely import the trajectory of glue.
3. Implement precise glue control through the glue valve controlled by the robot to improve system interaction and glue effect.

Labeling Workstation

1. Adopt high-precision labeling with upper and lower cameras properly aligned.
2. Adopt high-efficiency assembling application, including photographing a moving process.



Soldering Workstation

1. Carry out complex operations such as spot welding and continuous welding using the robot with the welding gun.
2. Enhance the cooperation between the robot motion and the soldering gun with features of self-diagnosis/repair, independent decision-making, and high adaptability, security and high efficiency.

Locking Workstation

1. Fit for the assembly line, allowing rapid connection of equipment without separate material loading or unloading.
2. Rapidly locate and tighten the equipment through combining the tightening mechanism with the robot.

Handling station

1. Apply convenient material loading and unloading, which is adjustable depending on the manufacturing task and production environment. Fit in the production of diversified products in small or medium batches.
2. Adopt visual identification, tracking and positioning to enable dynamic grabbing or placement.
3. Implement efficient, energy-saving automatic stacking.

MES Solutions

Four major features of the MES

Form a closed, transparent and lean loop in the workshop based on ERP instructions, involving production planning, task execution, data acquisition, work-in-process management and quality management.



Carry out lean production, as the basis of Industry 4.0 through the following actions:
1. Improve quality and efficiency and reduce cost by data analysis.
2. Optimize production plan by automatic production planning.
3. Achieve factory digitalization and transparency by visual management.
4. Support decision-making by timely feedback of production data.

Carry out production dispatch, equipment management **(equipment inter-connection)**, material delivery, production planning and quality monitoring by MES.

Enable an automatic, digital, network-based and intelligent management and control of production through scheduling, process coordination, resource optimization, quality control and decision making.

Positioning of MES

Comprehensive basic functions

Support easy configuration of basic function modules. These modules include those for (a) the management of factory/workshop resources, (b) the management of the workshop/ production line/ sequence, and (c) the management of dispatch and product data. The configurations cover the needs of most of industries.

Openness

Allow customers to develop application functions as needed.

Provide many APIs, which enables quick integration with systems for the third-party' s businesses.

Rich industrial applications

Provide various application modules for the industry.

Scalability

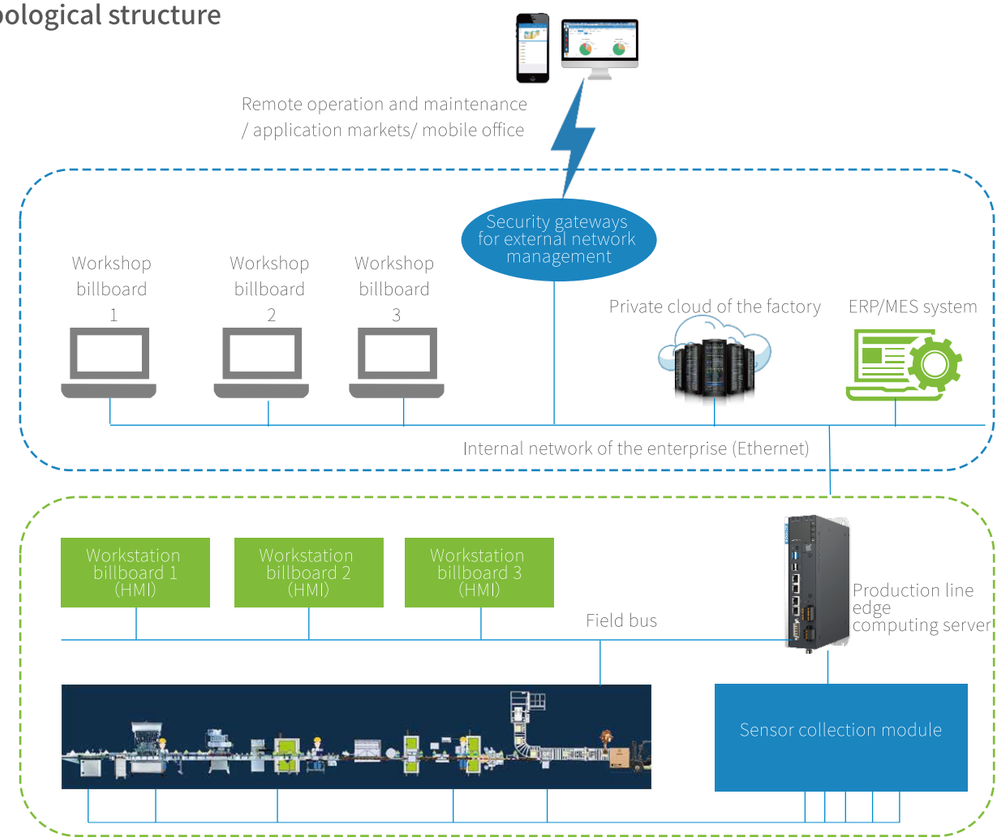
Allow quick deployment via configurations in the same production mode. Supports scalable applications for multiple companies, factories, production lines and processes.

IoT Cloud Platform

Inovance Industrial Cloud + Intelligent Manufacturing

The intelligent manufacturing solution is designed based on Inovance industrial internet platform, network technologies, and modern industrial technologies. It serves to provide enterprises with intelligent networking services for raw materials, equipment, production, transport and sales. "Inovance industrial internet platform + APP" scheme can be used in such processes as R&D design, production management, and operation management to achieve collaboration among the market, R&D, production, management and communication. This helps reduce the operation cost and improve the workmanship level and production efficiency, shorten the production cycle, and minimize power consumption.

Topological structure



Features

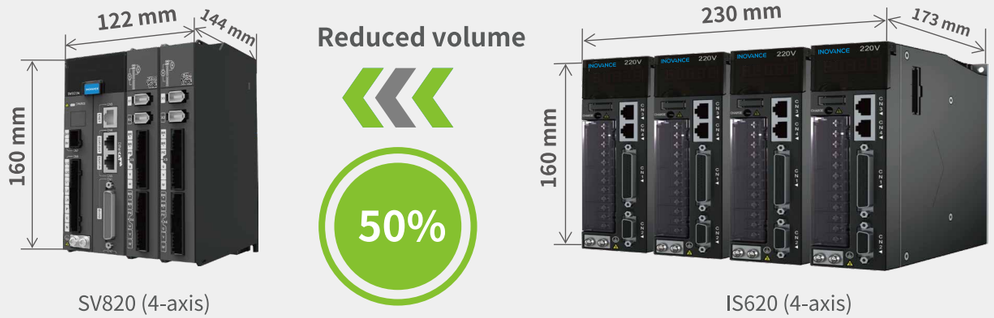
- **Secure and stable:** Customer data security is ensured by multiple security gateways, encrypted networks, and private deployments.
- **Reliable and trustworthy:** Successful applications and long-term support and services are available in such fields as 3C (Computer, Communication, and Consumer electronics), molding, textile, printing, packaging, pharmacy, and food.
- **Efficient and intelligent:** Our "informatization + automation" solution enables enterprises to implement intelligent manufacturing by utilizing industrial big-data.

Main Products in the Drive Layer of Intelligent Production Lines for Mobile Phones

SV820 Servo Drive (Multidrive System)

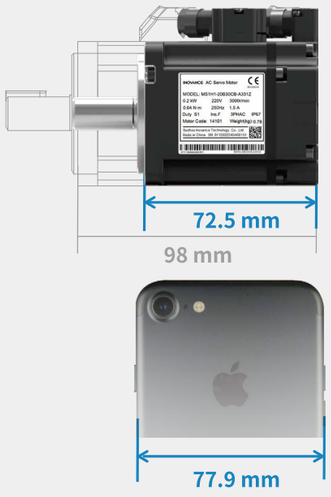
Flexible Drive with Easy Control

Adopt common bus structure to reduce the volume by 50%



SV820 (4-axis)

IS620 (4-axis)



Motor length almost the same as that of an iPhone 7 Plus

Notes: The dimensions are shown with the motor model MS1H1-20B30CB-A331Z as an example.

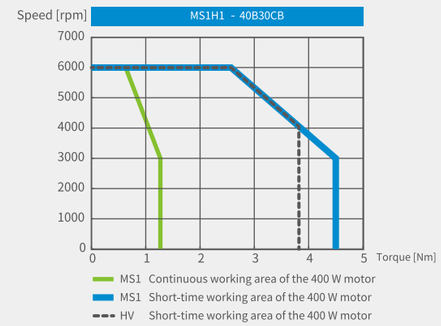
Powerful Performance

Faster response, higher precision, and larger output

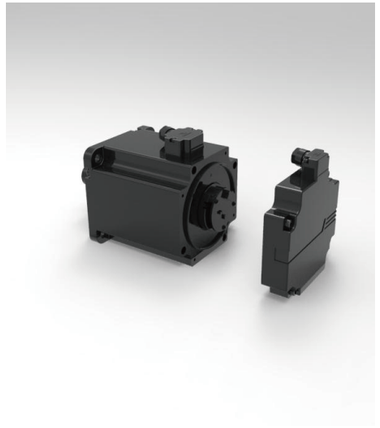
Response frequency of the speed loop: 3.0 kHz



Maximum motor torque: 350%

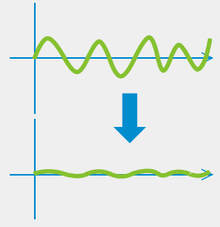


23-bit split type absolute encoder



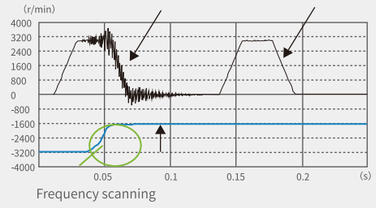
Torque fluctuation compensation and enhanced vibration suppression

Pulsation compensation



The torque fluctuation after compensation is within 0.5%.

Enhanced vibration suppression



Different measures are designed for low, medium and high-frequency vibration suppression.

Main Products in the Drive Layer of Intelligent Production Lines for Mobile Phones

High-performance PLC-H3U Series

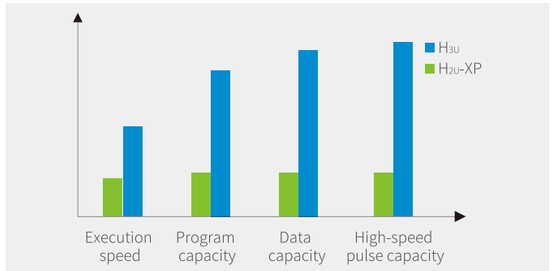
Outstanding Performance, Perfect User Experience



As the 3rd generation high-performance small PLCs developed by Inovance, the H3U is designed with the new-generation state-of-the-art PLC architecture. The design boosts the performance while adding various functions. Rigid software tests shows the H3U is stable, reliable and trustworthy.

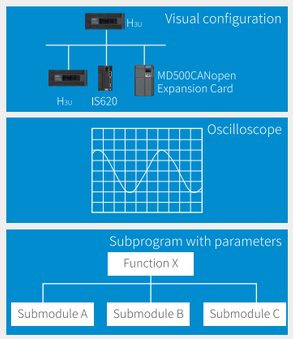
- High performance and large capacity, fulfilling increasingly complex process needs.
- Abundant motion control functions, enabling precise motion of the equipment.
- Flexible network features; support the Ethernet, CANopen, CANlink to allow seamless integration between informatization and automation.
- Easy-to-use software: user-friendly graphic interface, simplifying your applications.

High Capacity

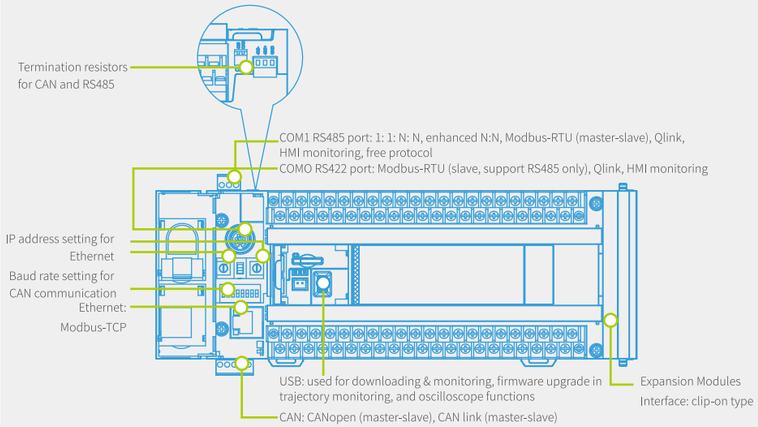


Motion Control

Easy-to-use



Flexible network



AC810 series intelligent controller

Ultra high-speed Computation Brings High-end Control Innovations



Machine Control and Factory Automation
Control Technology Upgrade for Completely New Application Experience

- Intel Core i5 series x86 high-performance processor, and independent of computer control;
- Developed based on LinuxRT + CoDeSys platform;
- Six programming languages supporting the PLCopen specification;
- CoDeSys PLCopen + CAM + CNC + ROBOT motion control components are included in the system software;
- EtherCAT bus-based motion control, supporting multi-axis control system of up to 256 axes;
- I/O extension based on EtherCAT bus, supporting extension of high-speed I/O and common DI/DO, reaching up to 32000 I/Os;
- Designed with several LAN ports to support Ethernet/IP, OPC/UA, and Modbus TCP protocols for building different real-time communication networks;
- Built-in Modbus RTU master station/slave station protocols, two independent communication ports (RS485, RS232), allowing coordination with traditional equipment;
- Allowing the loading of the TargetView component according to user needs.

All Series of Robot Products

Better applicability, Better Performance
Robot Staying Closest to Application Scenarios

Inovance has launched multiple types of new robots such as SCARA robots with an arm length of 800 mm and 1,000 mm, and lightweight 6-axis robots. The former two types of robots are upgraded from SCARA robots with an arm length of 400 mm and 600 mm. The "robot + process" overall system solution is launched for such processes as lamination, glue dispensing and locking.

IRB100 Series SCARA Robots: Normal Installation

IRB100-3

Rated load: 1 kg
Max. load: 3 kg
Models: IRB100-3-30Z15TS3
IRB100-3-40Z15TS3

IRB100-3-30Z15TS3 IRB100-3-40Z15TS3



IRB100-6

Rated load: 2 kg
Max. load: 6 kg
Models: IRB100-6-50Z20TS3
IRB100-6-60Z20TS3
IRB100-6-65Z20TS3
IRB100-6-70Z20TS3

IRB100-6-50Z20TS3 IRB100-6-60Z20TS3 IRB100-6-65Z20TS3 IRB100-6-70Z20TS3



IRB100-10

Rated load: 5 kg
Max. load: 10 kg
Models: IRB100-10-60Z20TS3
IRB100-10-70Z20TS3

IRB100-10-60Z20TS3 IRB100-10-70Z20TS3



IRB100-20

Rated load: 10 kg
Max. load: 20 kg
Models: IRB100-20-60Z18TS3
IRB100-20-70Z18TS3
IRB100-20-80Z42TS3
IRB100-20-100Z42TS3

IRB100-20-60Z18TS3 IRB100-20-70Z18TS3 IRB100-20-80Z42TS3 IRB100-20-100Z42TS3



IRB100 Series SCARA Robots: Reversed Installation

IRB100-3

Rated load: 1 kg
Max. load: 3 kg
Models: IRB100-3-35Z13RS3

IRB100-3-35Z13RS3



IRB100-4

Rated load: 1 kg
Max. load: 4 kg
Models: IRB100-4-55Z13RS3

IRB100-4-55Z13RS3



IRB Series Locking Equipment

IRB10-6

Integrate self-developed electric screw-drives with motion control to provide high-efficiency and high-precision solutions for the locking process.
Applicable to scenarios that require efficient screw assembling, such as 3C electronic devices, electronic toys, communication equipment, household appliances and instruments.

IRB10-6-62Z10TS3 IRB10-6-56Z10TS3



IRB300 Series 6-axis Robots

IRB300-3

Max. load: 3 kg
Models: IRB300-3-60TS5

IRB300-3-60TS5



IRB300-7

Max. load: 7 kg
Models: IRB300-7-70TS5

IRB300-7-70TS5



Core robot parts

Robot controller

IMC100R



Electric control cabinet

IRCB300-B-F



Robot software



Vision software



Industrial Vision Software Platform

IV700 vision controller

Boxer Series

The Boxer series, as a dedicated platform for computer hardware, can be connected to other devices such as PLC, UVW and robots via communication links. The Boxer has two versions, the basic version and the senior version.



SMART Series

Intelligent camera: a mini kit that integrates the computing unit, light sources, lens and cameras. It is a single-camera application.



Functions

Guide

Detection

Measurement

Identification

Functional advantages

Global-leading vision controllers integrated with deep-learning functions

To see and to understand

■ Meets high-precision, high-efficiency application needs such as sub-pixel photographing and moving-process photographing.
■ Meets the needs of unstable and complex scenarios such as those with deformation or interference.

The first controller in China that realizes deep-learning based on integrated graphics cards

Small and cost-effective

■ The small size and low cost enable the deep-learning technology to cover more application scenarios..
■ An integrated chassis enables a card-free, stable and portable design.

Encoders, sensors

High-precision photoelectric absolute encoders (resolution: 23 bits)

- ▶ High absolute positioning precision: within ±15 arc-seconds
- ▶ High repeatability: within ±3 arc-seconds
- ▶ Maximum baud rate: 4 Mbps
- ▶ Maximum IP rating: IP65
- ▶ Long service life (dual-bearing design); Wide range of working temperature: -20 to 105°C



Highly reliable photoelectric incremental encoder

- ▶ Various installation structures: solid shaft, Φ6, Φ8, Φ10, Φ15; hollow shaft: Φ8, Φ15, Φ30
- ▶ Various output interfaces: open-circuit output, push-pull output, low-voltage differential output, and high-voltage differential output
- ▶ High reliability: protections against the following items: vibration (10g), shock (100g), short circuit, reversed connection, surge
- ▶ Various resolutions: 50P/R-10000P/R
- ▶ IP rating: IP54



Highly reliable inductive proximity switches and photoelectric switches

- ▶ Various models of proximity switches: M6.5, M8, M12, M18, M30
- ▶ Various sensing distances of proximity switches: 2 mm, 4 mm, 8 mm, 15 mm, 30 mm
- ▶ Various selections of photoelectric switches: opposite, reflective, diffuse reflection, and background suppression types
- ▶ Compatible with imported substitute products, which is cost effective
- ▶ Highly reliable: with protections against reverse connection, short circuit and surge
- ▶ IP rating: IP67



High-performance capacitive proximity switches, ultrasonic switches

- ▶ Various models of proximity switches: M6.5, M8, M12, M18, M30
- ▶ Various sensing distances of proximity switches are listed below:
  capacitive switches: 2 mm, 4 mm, 8 mm, 15 mm, 30 mm
  Ultrasonic switches: 350 mm, 700 mm, 1200 mm and 3000 mm
- ▶ Highly reliable with protections against reverse connection, short circuit and surge
- ▶ IP rating: IP65 and IP67



Automatic Production Lines

Automatic PCB line



Automatic equipment assembly line



About Inovance

Shenzhen Inovance Technology Co., Ltd., dedicated to R&D, manufacturing and sales of industrial automation control products, is positioned in serving middle and high-end equipment manufacturers. On the basis of owning industrial automation technologies with proprietary intellectual property rights, Inovance perseveres in industry marketing and providing overall solution to customers in segment market and achieves growth of both enterprise value and customer value.

Inovance has developed into a supplier of comprehensive electro-hydraulic products and the solutions in addition to AC drives. Main products include:
1) industrial automation products for intelligent equipment, such as AC drives, servo systems, control systems, industrial vision systems, sensors, high-performance motors and high-precision screws and integrated electro-hydraulic solutions;

2) core parts, overall units and solutions for industrial robots, such as robot-specific control systems, servo systems, vision systems, high-precision screws, SCARA robot and 6-axis robot;

3) powertrain products for new energy vehicles, such as inverters, auxiliary power systems, high-performance motors, DC/DC supply and powertrain systems; and

4) traction and control systems for rail transit, such as traction converters, auxiliary converters, high-voltage boxes, traction motors and TCMS

5) industrial internet solutions for after-market services, such as the industrial clouds, application development platforms, intelligent hardware and informationized management platform.

Our products are widely applied in new energy vehicles, elevators, air compressors, industrial robots/manipulators, manufacturing of 3C (computer, communication and consumer electronics), lithium battery, cranes, machine tool, metal products, wires and cables, plastics, printing and packaging, textile fibers, construction materials, metallurgy, coal mining, municipal construction, and rail transit.

As a high-tech enterprise, Inovance masters core platform technologies such as the high-performance vector frequency conversion technology, PLC technology, servo technology, and permanent magnet synchronous motor (PMSM). As of December 31, 2017, Inovance has obtained 746 certified patents including 229 invention patents, 413 utility model patents, and 104 design patents. Inovance (stock code: 300124) released the IPO on the GEM board of the Shenzhen Stock Exchange in September 2010.

Service Network

Headquartered in Shenzhen, with various subsidiaries in Suzhou, Hong Kong, and other regions

67 offices throughout China
Over 500 sales & service engineers
271 authorized distributors
580 warranty centers
5 regional spare parts centers

Ensuring quick response to customer requirements

Shenzhen
Shenzhen Inovance Technology Co., Ltd.
Shenzhen Inovance Information Technology Co., Ltd.
Shenzhen Inovance Control Technology Co., Ltd.

Suzhou
Suzhou Inovance Technology Co., Ltd.
Suzhou Monarch Control Technology Co., Ltd.
Jiangsu Kingway Rail Transportation Co., Ltd.
Suzhou Inovance Automotive Co., Ltd.

Hong Kong
Inova Automation Co., Limited

Changchun
Changchun Huitong Optoelectronic Co., Ltd. (Weton)

Shanghai
Shanghai MoBst Elevator Technology Co., Ltd.
Shanghai LAIEN Machine Tool Parts Co., Ltd.

Nanjing
Nanjing Inovance Industrial Vision Technology Co., Ltd.

Ningbo
Ningbo EST Technology Co., Ltd.

