



ZHENGZHOU LINGHANG ROBOT CO., LTD.

LH-TC

End-Of-Arm Tooling

Committed to become the world's best robot end-effectors supplier

In Partnership With

KE *Key Kybin*
CORPORATION

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About Us

Company Profile



Production Plant (Zhengzhou)

Zhengzhou Linghang Robot Co.,Ltd was established in 2015, focus on independent R&D, design and produce of robot EOAT, with registered capital ¥24.63 million, is listed in China Stock Exchange market (Stock code 200649). It has been awarded as the national high-tech enterprise, Henan Province specialized and innovative enterprise, etc.

Investment shareholders: State-owned Assets Supervision and Administration Commission of Zhengzhou Municipal People's Government, State-owned Assets Supervision and Administration Commission of Shanghai Municipal People's Government.

As the industry leader in robot EOAT, Linghang adheres to taking the practical requirements as the R&D orientation, keeps on R&D, innovation and improvement, to create value for customers. Now Linghang has four series of products and technologies such as robot auto tool changers, force control deburring and grinding, clamping technology, energy docking combination board, which have been widely used in many industries such as automotive manufacturing, 3C, military, aerospace, general industry and so on.



Domestic service network

- ▶ Shanghai Subsidiary
- ▶ Tianjin Agency
- ▶ Changchun Agency
- ▶ Chongqing Agency
- ▶ Shengyang Agency
- ▶ Hefei Agency
- ▶ Changsha Agency
- ▶ Hangzhou Agency
- ▶ Wuhan Agency
- ▶ Jinan Agency
- ▶ Guangzhou Agency

Overseas service network

- ▶ **Subsidiary in Germany** (Köln/Cologne) : Schillingsrotter Str.29. 50996 Köln
- ▶ **Subsidiary in Thailand** (Rayong) : Soi Sukhumvit 70/5, Sukhumvit Road, Bang Na, Bang Na,Bangkok
- ▶ **Agency in Poland** (Warsaw) : ul. Żyrardowska 1E05-825 Grodzisk Mazowiecki, Poland

About Us - Development History

2012

Start R&D of robot End-of-arm Tooling



2013

The first robot quick change device is launched and applied to the production line



2015

Establish the company and built production plant with area 13,000m²



2017

Technological breakthrough, master the core material processing technology



2018

Awarded as the National high-tech Enterprise



2023

Support intelligent manufacturing, the products have helped Volvo, Volkswagen, Geely, BYD, SERES, etc. to achieve significant improvement in production efficiency.



2022

Promote the overseas business comprehensively



2021

Enrich the products series, launched deburring tools and pneumatic grippers.



2020

Designed patented liquid module without water leakage after million times operation, completed the construction of a new factory.



2019

Technology innovation, create a more stable signal module

About Us - Honors

Awarded as the national high-tech enterprise, specialized and innovative enterprise, with more than 70 patents and 5 software copyrights. The products have obtained ISO9001, CE and SIL certifications.

70+ patents



EU CE safety certification

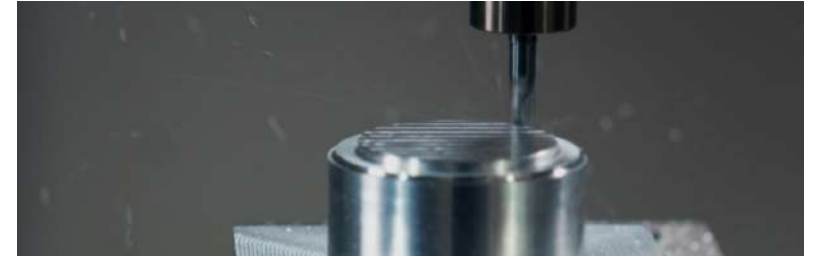
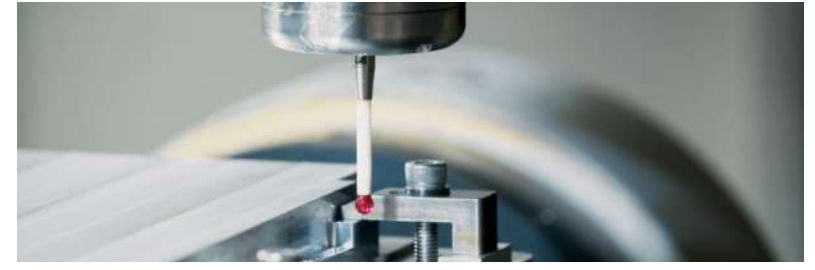
ISO9001

SIL safety certification

5 software copyrights



Manufacturing Capability



Quality Assurance

5 indicators

Full inspection of sales

6 indicators

Full inspection of module solder joints

7 indicators

Probes are fully tested in each batch

11 indicators

Fully functional testing before shipment

12 indicators

Locking mechanism force detection

16 indicators

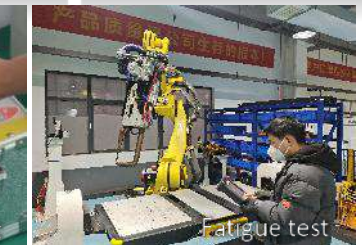
Full inspection of mechanical parts

32 indicators

Production process quality control points

Full traceability

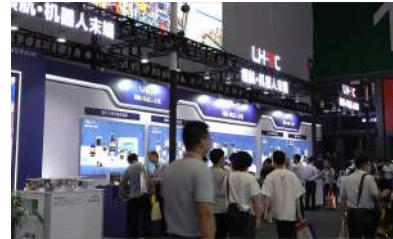
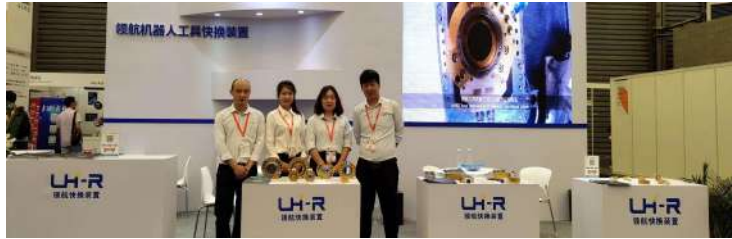
Unique S/N code for each product



About Us - Memories

Government leaders' visiting.

Attend famous industrial exhibitions, such as CIIF, Hannover Messe, Automatica, Manufacturing Expo, etc.



2

Products

Robot Tool Changers



- 1.The special materials and process combine with the inclined structure perfectly, ensure safety locking
- 2.Innovated redundancy signal transmission technology, ensure the transmission of data and signals more stable
- 3.Excellent fluid connection technology, ensure no leakage during millions operations.

Floating Deburring Tools



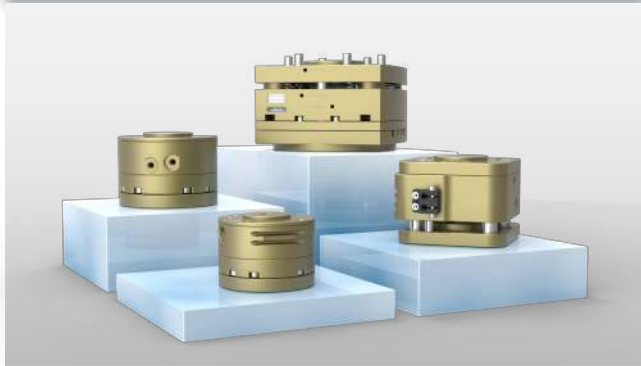
- 1.360-degree radial floating, suitable for deburring various workpieces;
- 2.1000-60000RPM electric spindle with replaceable cutter automatically, meet all kinds of process requirements;
- 3.Axial floating grinding tools: grind complex surfaces adaptively, adjust the work force precisely, compensate work force within $\pm 0.5\text{N}$ in any direction actively.

Pneumatic Grippers



- 1.The perfect combination of multi-tooth guide rail and ladder structure, bear larger moment and torque;
- 2.The unique coating process ensures that the precision is almost undamaged after thousands of times of grinding;
- 3.Unique self-lubricating design, longer maintenance-free service time.

Floating Position Compensate devices



- 1.Support position compensation in X&Y、 Z、 X&Y&Z directions, correct the error in position or angle during assembly and loading precisely.
- 2.Ensure the operation is exact by locking the center point and position storing function.
- 3.ISO9409 interface to simplify assembled process.

Energy Coupling Boards



- 1.Offer energy coupling between the main station and slave station, include power, data, I/O, pneumatic, liquid, ect.
- 2.Ultra-high plug life, high stability and reliability
- 3.With super current carrying capacity, can resistant the strong impact of vibration.

Utility Couplers



- 1.Modular medium and multi-module interfaces make combination more flexiable;
- 2.With floating in X、 Y、 Z direction, eliminate docking errors;
- 3.Optional visible LED lights of locked and unlocked status.

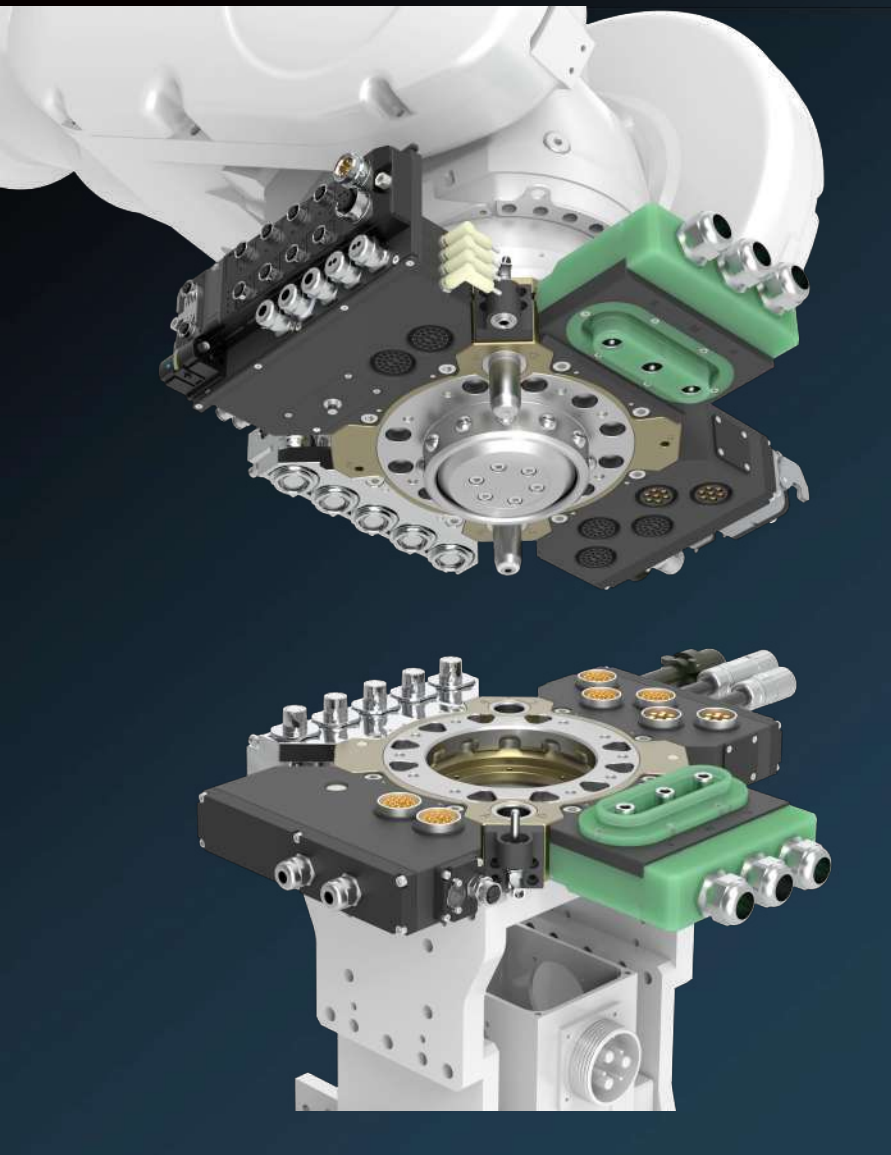
2.1

Tool changer Series

LH-TC Tool Changers

LH-TC

End-Of-Arm Tooling



LH-TC tool changer device is used for the automated switching of different robot end tools. The product supports a payload range of 5kg to 3000kg.

The robot side is mounted on the front arm of the robot, while the tool side is attached to the end-effectors. It can quickly and automatically realize the transmission of electricity, gas and liquid between the robot side and the end-effectors. The flexible use of a single robot side and multiple tool sides improves the flexible manufacturing capability of the robot production line and effectively increases the utilization rate of the robot.



Tool Changer Adaptation Modules



I / O Signal module



Liquid module



Electrical power module



High current module

The LMO series of LH-TC modules utilize low friction pins to establish a quick and stable connection between the robot and tool sides. These modules can be easily installed in the tool changer system, which enhances the system's flexibility. You can choose from thousands of modules that can connect various media such as current, industrial bus, I/O, data, high frequency, and liquid. These modules are applicable in palletizing, handling, vacuum, polishing, deburring, welding, ultrasonic, stamping, glue, Ethernet, data collection, and other similar applications.



Industrial Bus module



High frequency module



Pneumatic module



Servo module

Highlights 1: High strength alloy steel locking

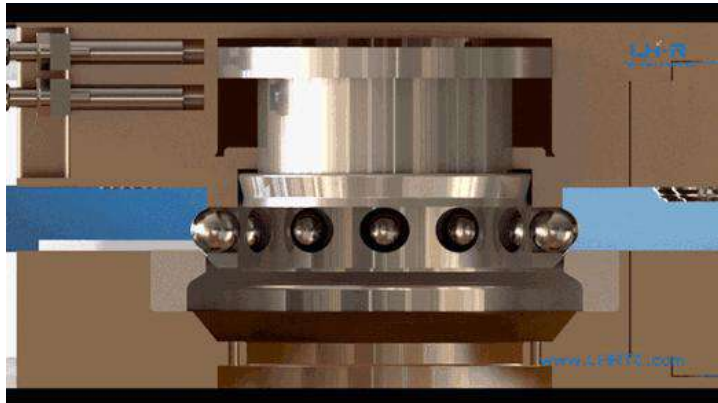
3⁺ million times

Locking force and repeatability
guaranteed

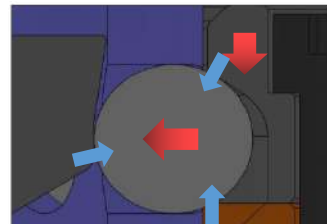
- Rockwell hardness: HRC58
- More stable metal structure
- Excellent anti-corrosion performance
- High chromium steel balls, magnesium aluminum alloy shell,
Grade 12.9 high strength bolts



Mechanical self-locking structure



Locking



Safety reverse tilt surface

When the master plate suddenly loses pressure, the locking mechanism loses the air pressure locking force, and the spring will still keep the master plate cam in the locked position. The tool side is pulled down by gravity, driving the steel column to move from the locking inclined surface to a safe position. The reverse-inclined surface forms an equal neutralizing force to ensure that the tool plate will not fall off.

Unlocking

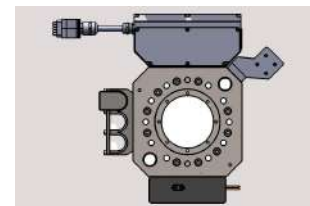
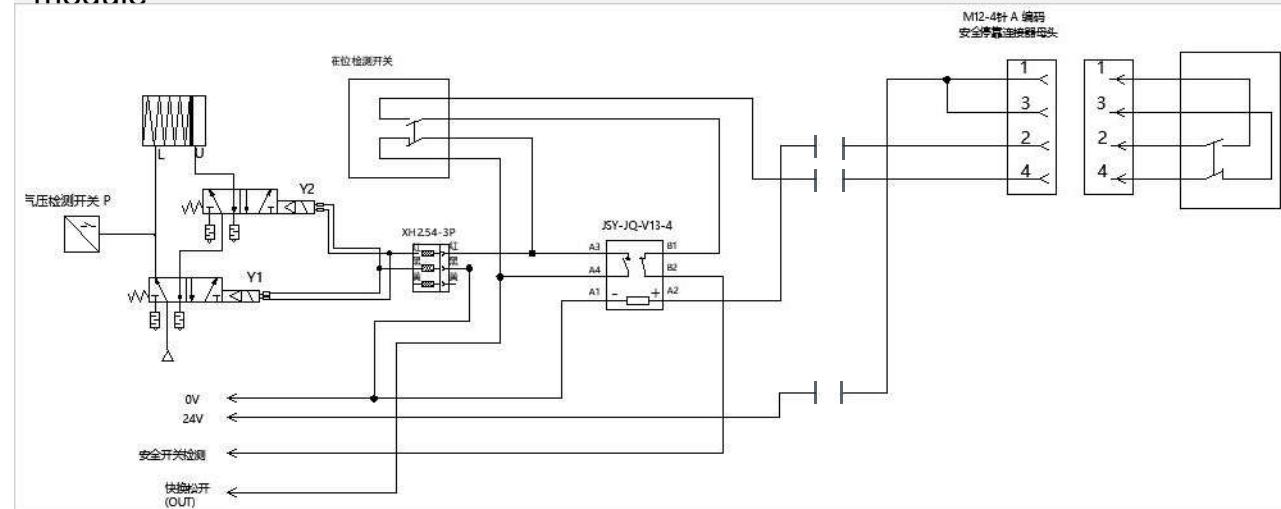


Self-locking without pressure



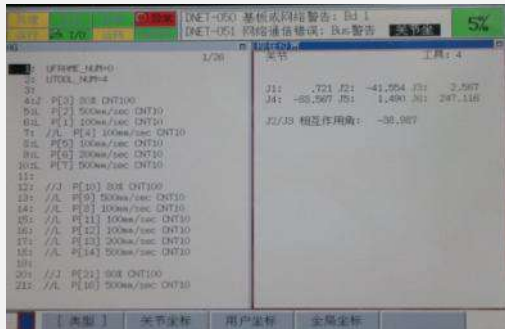
Safe docking system

When the tool changer device is working normally, the tool holder interlocking function ensures that it will not perform the unlocking operation even if the industrial robot mistakenly outputs an unlocking command to the solenoid valve module



Highlights 3: Low friction probes

Communication failure : Signal connection is faulty or intermittent

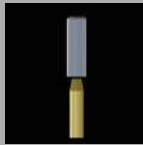


Damage reasons

Damaged parts: Pins

1. Surface oxidation

Usually, the insertion and removal force of a single pin is 3N-5N. Frequent usage can wear off the pin's coating, leading to oxide layer formation on the surface.

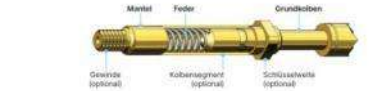


2. Arc ablation

Frequent plugging and unplugging for a long time will cause the gap between the pin and the hole to become larger, resulting in arcing and ablation, which cannot be cleaned.



Other reasons: Welding slag splashes into the pinhole; pins and connectors are loose or poorly soldered; cable problems, etc.



① Low friction spring probe

The maximum friction force of a single probe is less than 0.1N, which minimizes surface wear caused by high-frequency opening and closing and greatly slows down friction.

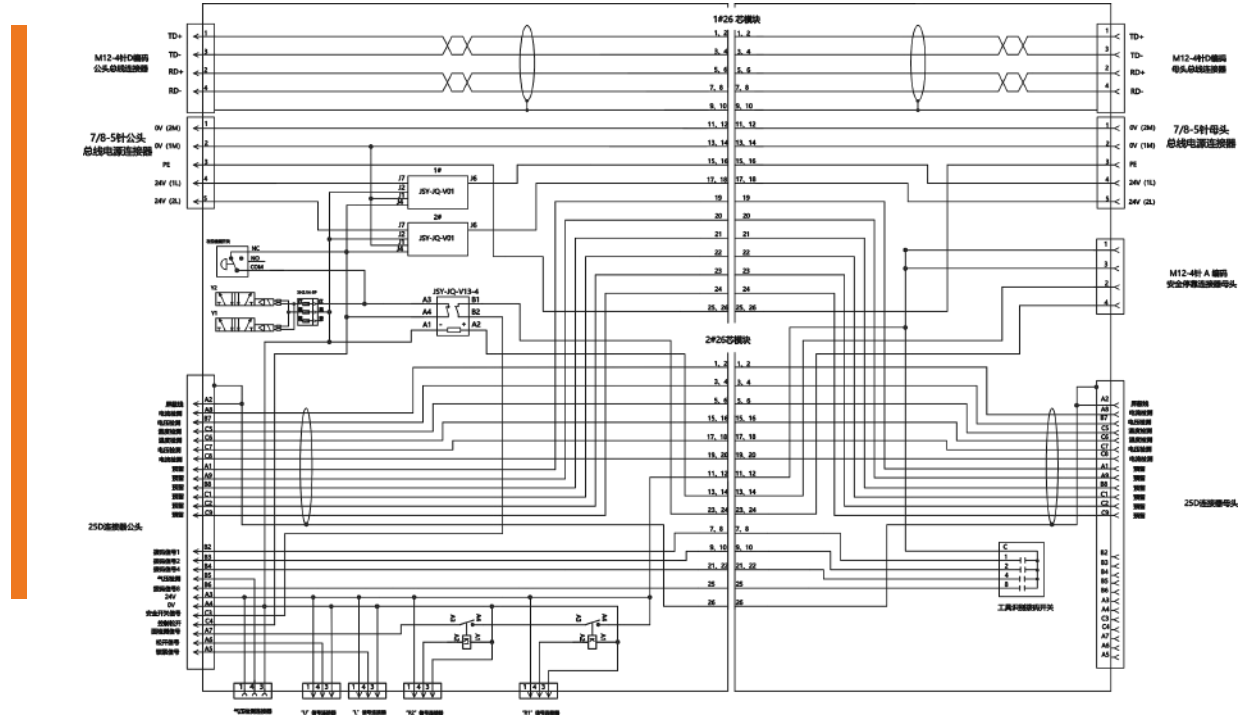
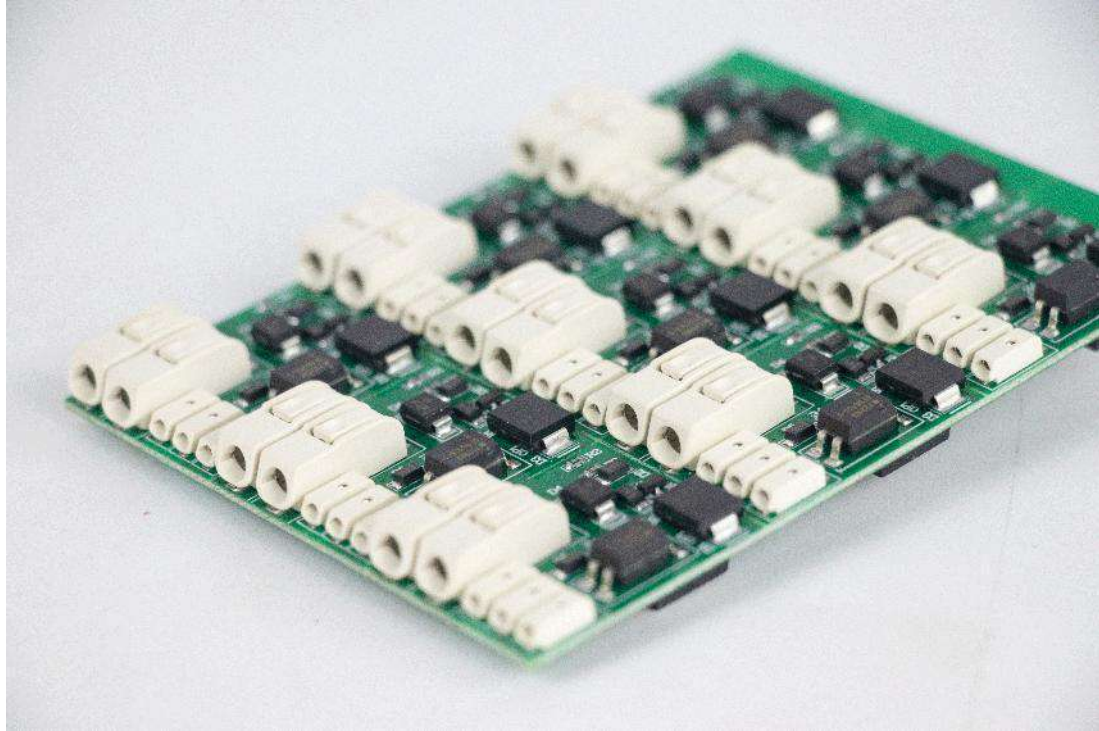
② Multiple points of contact

Each connection can establish multiple points of contact, which results in stable signal transmission.

③ Displacement compensation

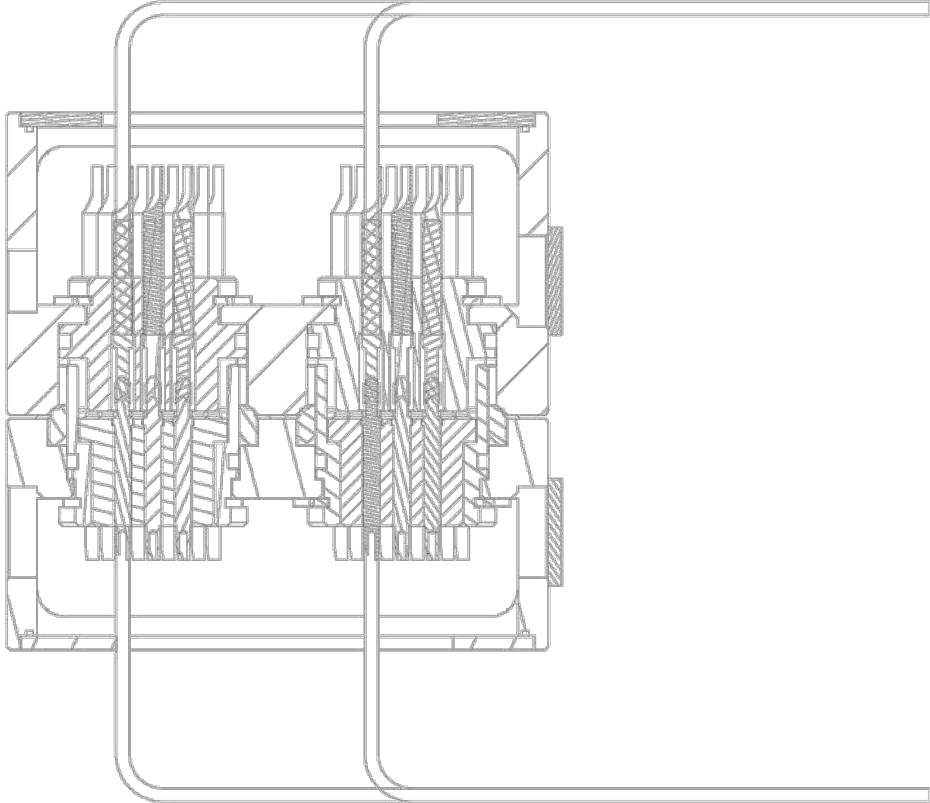
By floating in the Z-axis direction, compensation of 1.5mm in displacement, 0.1mm in the XY direction, and 0.5-degree included angle is achieved. This allows for a reliable connection of signal pins, even when there is a large error between the master side and the tool side.

Hightlights 4: Built-in arc extinguishing module to prevent ablation



The arc extinguishing module integrated in LH-TC is equipped with a high-stability chip and a built-in on-off program. It receives signals from the plate body's unlocking and locking sensor to control the power contact pin. When the lock signal is activated, the module connects the contact pin. On the other hand, when the release signal is given, the module disconnects the power supply and the probe is separated. This mechanism ensures that even under hot-swapping conditions, the probe achieves non-energized contact and separation, therefore effectively protecting the contact point.





Higher reliability

The LH-TC electrical signal module uses an active and static redundant design to ensure the transmission of high-quality and reliable signals, while working in conjunction with the robot's working conditions. Redundant design is an important technique for achieving high reliability in systems or equipment. By adding more functional channels to the product, it is ensured that the system can operate normally even when one channel fails.

Workstations adapted to more complex environments



$$R(t) = 1 - \prod_{i=1}^n (1 - R_i(t))$$

Highlights 6: Self-sealing fluid connector for self-cleaning of scale



Self-sealing fluid connector

The patented mechanical self-sealing system of Linghang can automatically seal fluid media such as water and air after the robot side and tool side of the tool changers are disconnected, thus realizing the rapid connection of water and air between industrial robots, tool changers, welding tongs, fixtures and other execution tools. The water and air module is also divided into the robot side and the tool side.

Scale self-cleaning

All parts are sealed circumferentially, and all sealed parts must slide to achieve automatic scale cleaning without worrying about the influence of water quality

constant micro suspension

The hanging fluid remains constant after each opening and closing.

Convenient Low cost maintenance

Seal replacement takes just seconds

Rated flow rate 25L/min (flow rate 7.5-8L/MIN at 0.55mpa inlet and 0.3mpa outlet pressure conditions)

» SAIC



» Nissan



» The Great Wall





Anti-stuck positioning

- Anti-jamming positioning pin structure
- Locking and separation are smoother and easier to debug.



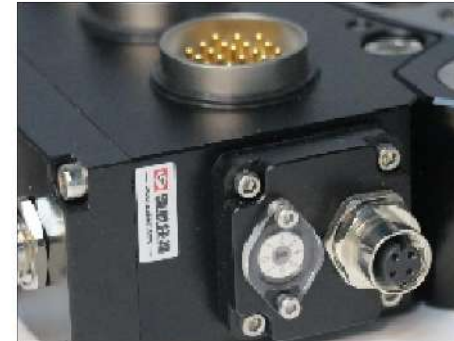
LED status visibility

- LED status display to facilitate debugging personnel.
- External M8 connection, convenient for after-sales personnel to maintain or replace.



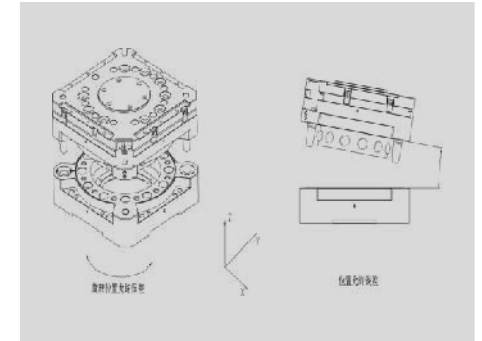
Zero volt pins

- Ensure that the zero-volt pin contacts firstly and separates lastly to protect electrical components.



Tool identification

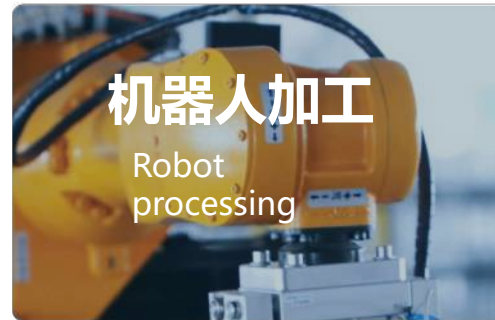
- It is more convenient to automatically identify the tool plate ID and execute the corresponding process.



Convenient installation and debugging

- Non-contact locking
Locking is allowed when the distance is 2.5mm
- ISO9409 standard connecting flange.

Application Cases: Auto Parts



Connect with robot electrical interface directly

FANUC Robot Adapting electrical modules



Perfectly matches with FANUC robot's industrial bus and power connector, supports DeviceNet, and features functions for arc-proofing, heat-resistant insertion and removal, fast connection, and tool ID

Yaskawa Robot Adapting electrical modules



The interface of this product matches perfectly with YASKAWA robots and supports industrial bus and tool ID.

ABB Robot Adapting electrical modules



Supports Profibus, DeviceNet, ProfiNet, servo power, encoder signal, and tool ID, with seamless compatibility to ABB robot's interface.

KUKA Robot Adapting electrical modules



Supports welding torches' servo power, encoder signal, voltage, and temperature feedback signal, matching perfectly with KUKA robot's servo power and encoder interface.

Connect with robot electrical interface directly

ESTUN Robot



NACHI Robot



INOVANCE Robot



Other brands Robot



Electrical modules-----

Compatible with 100% of the robot electrical interfaces on the market

Can be standardized or customized to achieve direct connection effect!

Robot Payload

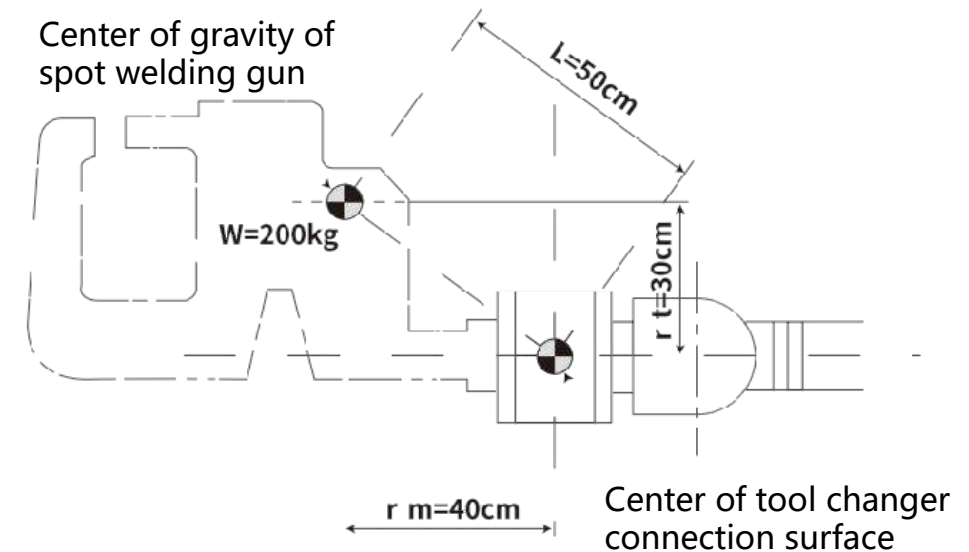
Tool changer payload should **Greater than or equal** to the robot's payload

Torque Check

Calculate the center of gravity of the tool being executed and the distance from the center of gravity to the bottom surface of the tool side to determine the static torque value for this application. The static torque value can be used to select the appropriate tool changer model.

Optional modules

According to the energy medium required by the end tool, select the corresponding electrical, bus, servo, high frequency, water and air modules.



Workpiece weight: $W=200\text{KG}$

Eccentric distance: $L=\sqrt{rm^2 + rt^2}=50\text{cm}$

Moment of force (static): $M=L \times W \times Gr=50 \times 200 \times 1.5=15000\text{kgfcm}$

Torque (static): $M=rt \times W \times Gr=30 \times 200 \times 1.5=9000\text{kgfcm}$

Notes: "Gr" is the acceleration of the robot during stable acceleration and deceleration when it is running automatically. Generally, it is 1.5-2.0G. For detailed values, please refer to the robot parameter description.

1. Hardware protection: Safety docking components



Mechanical safety docking



Inductive safety docking



Gas Safety docking

❑ Without Safety docking components

The robot can directly separate the tool changer through the control program.

❑ With Safety docking components

The robot can only separate the tool changer through the control program after detecting the safe docking signal.

All Linghang tool changers **above** 40KG can be equipped with safety docking components. The default configuration is mechanical safety docking components, and inductive safety docking and gas safety docking components are also optional.

2. Optional protection components:

Protective covers and protective modules

In dusty working conditions, it is recommended to add protective covers and protective modules, such as spot welding and automotive parts workshops. For example, when switching between the gripper and the Spot welding tongs, the servo module is exposed to the air, and dust and welding slag may enter the module, causing damage to the modules.



Protective cover



Protective module

Utility Coupler

Provide more flexible energy supply for trolley and equipment

- Provide energy connection between master and slave stations
- Equipped with all-round floating performance in X, Y, and Z directions, eliminating docking errors



Model	LT-F31	LT-F31C	LT-F41
X&Y Axial	±4mm	±1mm	±4mm
Z Axial	2mm	2mm	2mm
Angle compensation	±3°	±3°	±3°
Binding force requirements	≥1526N	≥1526N	≥1526N
Media	Current, signal Bus, Servo Air	Current, signal Bus, Servo Air, Liquid	Current, signal Bus, Servo

New Energy Connector

Mainly used in the inspection of new energy and electricity systems



High stability
High reliability



Ultra-high plug-life

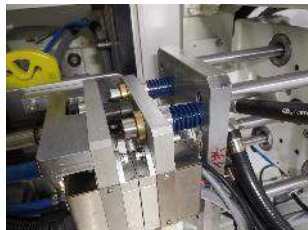
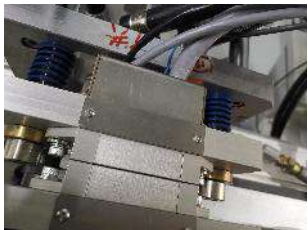


Strong current
carrying capacity



Strong resistance to
vibration
and impact

Application Cases:



LT-FEC
Frame



Φ1.6 Signal
Module



Φ4 Signal
Module



Φ8 Power
supply
Module



Φ14 Power
supply
Module



Gigabit
Network
Module



Φ4 Ground Pin



Hydraulic
Interface



Air & Liquid
Interface

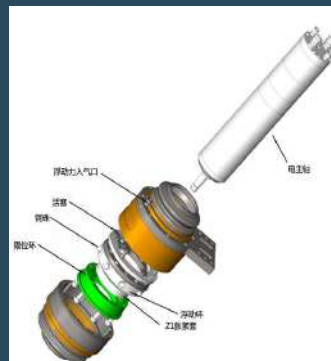
2.2

Floating deburring tools

LH-TC•Working principle of floating deburring tools:

Robot force-controlled floating deburring
Efficient and flexible automated deburring tool

- 360 degree radial floating ($r \leq 5^\circ$);
- Position repeatability is less than 0.001mm;
- Patented high-sensitivity floating mechanism;
- The maximum spindle speed is 60000RPM, and the maximum output torque is 6N·m
- Automatic tool change to meet the deburring needs of complex working conditions;



Floating adjustment using compressed air:

- The buoyancy is adjusted by adjusting the pressure in the air chamber.
- When the floating pressure does not change, the floating force remains unchanged.
- The control of floating force is an important factor in ensuring uniform cutting volume.

LH-TC • Application scope of floating deburring tools:



LT-FR020A-20-S6000



LT-FR030B-3060J



LT-FR030B-3030T-J



LT-FRC030B-3060J



LT-FRC030B-3030T-J



LT-FR040B-S4040



LT-6000

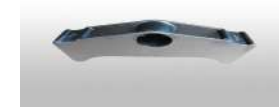


LT-AF100B

Aluminum castings



Steel Castings



Injection molded parts



Force Control Floating Deburring Intelligent System——LT-6000

LT-6000•Deburring of large integrated die-casting structural parts of rear floor of automobile

Advantage 1: Cooperating with many international automobile companies and accumulating rich experience.

Advantage 2: Visual operation, combined with flexible segmented adjustment of feed speed and spindle speed to ensure grinding quality.

Advantage 3: Special grinding technology, integrated with automatic tool changing function.



Force-controlled floating grinding execution tool



Force control floating grinding control system

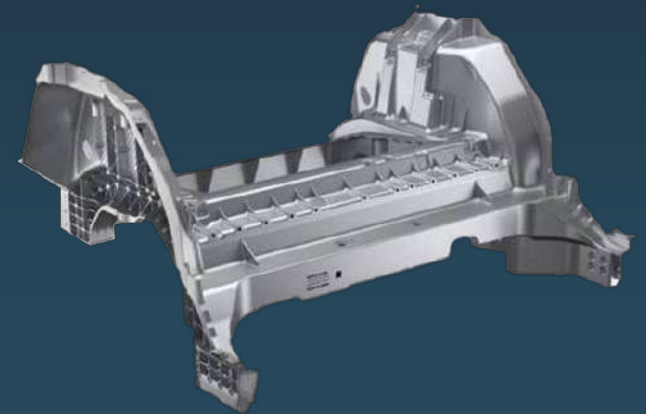
72-in-1 integrated die-cast rear floor

↓ **840**
welding points reduced

↓ **2dB**
Noise reduction in the car

↓ **17%**
Weight reduction

2 million km+
Verified durability



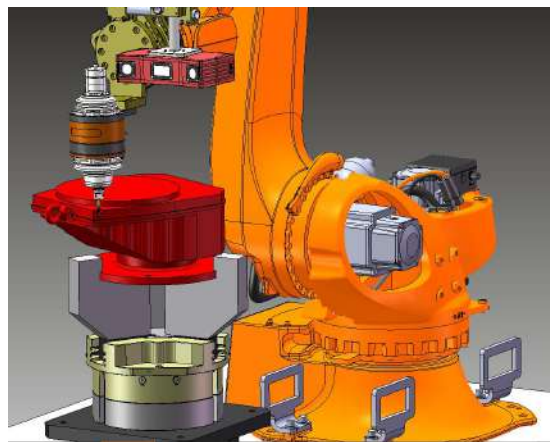
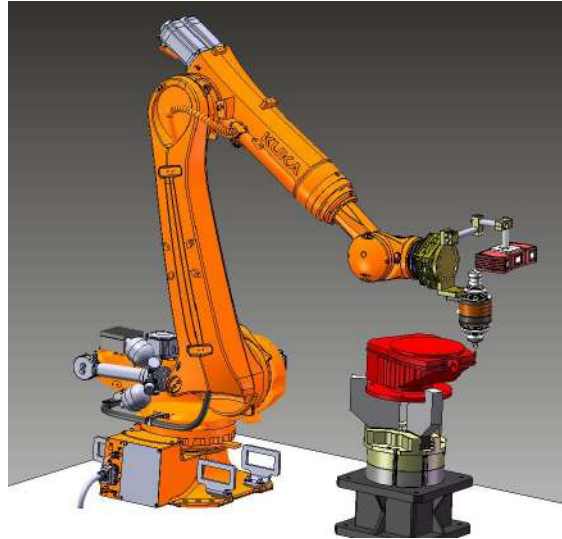
LH-TC radial floating force-controlled deburring tool parameters



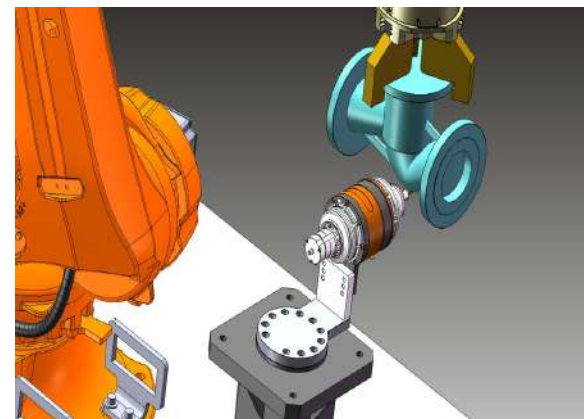
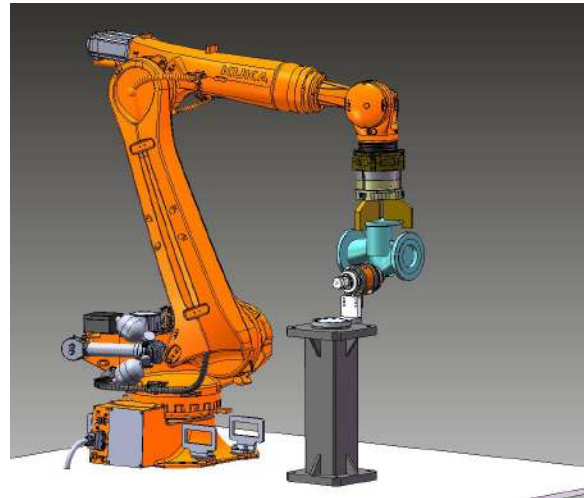
Mode No.	LT-FR020A-20-S6000	LT-FR030B-3060J	LT-FR030B-3030T-J	LT-FRC030B-3060J	LT-FRC030B-3030T-J	LT-FR040B-S4040
Autorotation Rate	60000rpm	60000rpm	30000rpm	60000rpm	30000rpm	3000~20000rpm
Power	250W	350W	350W	350W	350W	400W
Floating Angle (X, Y)	±5°	±5°	±5°	±5°	±5°	±5°
Radial Floating Angle	360°	360°	360°	360°	360°	360°
Axial Compliance	4mm	5mm	5mm	7mm	7mm	6.5mm
Floating Moment	3.3N-13.6N	7.2N-28.8N	7.2N-28.8N	7.2N-28.8N	7.2N-28.8N	7.2N-28.8N
Chatter	1μm	1 μm	1μm	1 μm	1 μm	1.5μm
Diameter of Floating Air Pipes	Φ4	Φ4	Φ4	Φ4	Φ4	Φ4
Dimension	Φ68mm*195mm	Φ82mm*212mm	Φ82mm*208mm	Φ104mm*270mm	Φ104mm*266mm	Φ97mm*202.7mm
Diameter of Spindle Air Pipes	Φ3.0	Φ6.0	Φ6	Φ6.0	Φ6.0	Φ6.0
Weight	1051g	1796.6g	1815.6g	3482.3g	3497.3g	3240.4g
Automatic tool change				Interchangeable tool holder diameter:0.5~6.35mm	Interchangeable tool holder diameter:0.5~6.35mm	
Applicable materials	Copper, aluminum, titanium, carbon, plastic, wood, ceramic, carbon fiber, coconut fiber, etc.	Cast iron, steel, aluminum alloy, resin, etc.	Cast iron, steel, aluminum alloy, resin, etc.	Cast iron, steel, aluminum, titanium, copper, etc.	Cast iron, steel, aluminum, titanium, copper, etc.	Cast iron, steel, aluminum, titanium, copper, etc.

Methods of radial floating force-controlled deburring tool on workstation

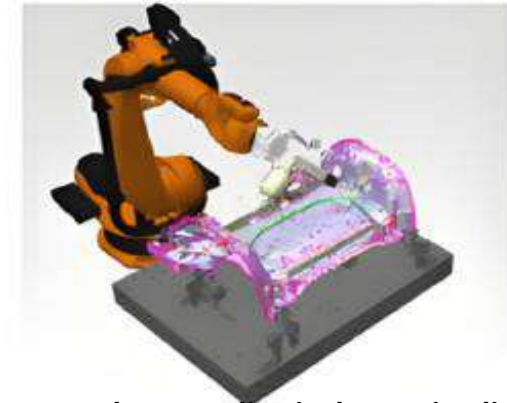
A Robot with grinding tool



B Robot bring grinding workpiece



★Deburring position: **Parting line**



Note: The green line is the parting line

★Deburring position:
Riser



★Deburring position:
Machined surface



Product features of axial active floating constant force grinding tool



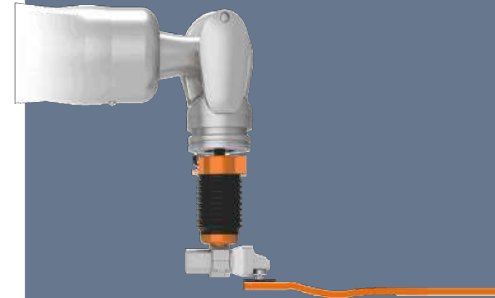
Flexible contact

0-35mm axial floating, flexible grinding.



Constant force and posture compensation

The constant force actuator automatically recognizes the posture and performs output force compensation (the output force is marked in red in the figure above)



Adaptive compensation

Adaptive compensation for constant force encountering concave points.



Adaptive compensation

Adaptive compensation for constant force encountering bumps.

Parameters of axial active floating constant force grinding tool

LH-TC
领航·机器人末端



轴向主动式浮动恒力打磨去毛刺

1. Supports IO and TCP communication modes.
2. Real-time monitoring of equipment status and grinding force.
3. Real-time communication and segmented process route.
4. Open interface can connect to vision and various sensors.

Model	LT-AF100B
Floating force (N)	10-100N
Force control accuracy (N)	±0.5
Stroke (mm)	35
Loading capacity (kg)	3.5
IP level	IP65
Working temperature(°C)	+5~+45
Air supply (Mpa)	0.4~0.7 (Oil-free, water-free, dust-free 0.03mm)
Air consumption (L/min)	5~10
Dimensions (retracted state, mm)	133*150.5*229.5
Dimensions (stretched state, mm)	133*150.5*264.5
Weight (kg)	4.2
Tracheal diameter (mm)	φ8
Applicable materials	Cast iron, steel, aluminum alloy, resin, etc.

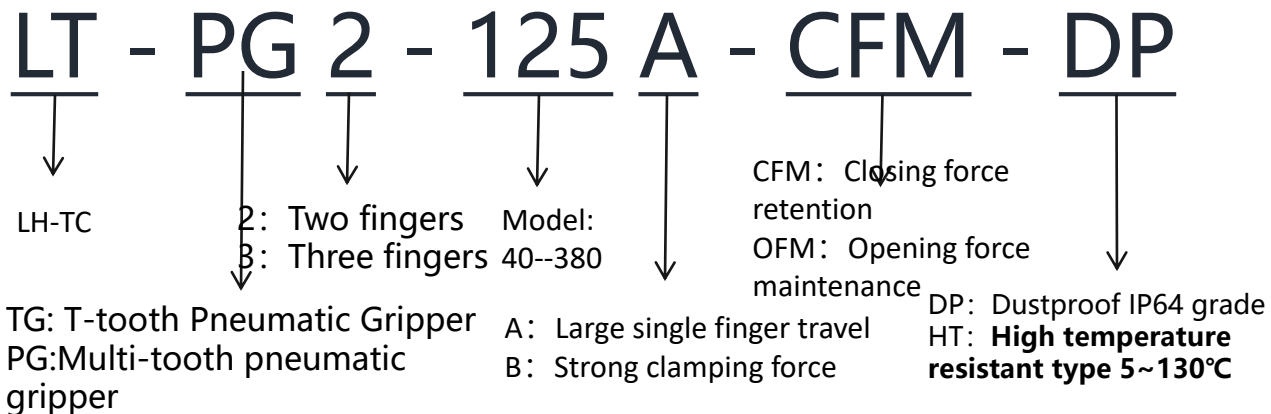


2.3

Gripper Product Series



Naming rules for pneumatic grippers:



Application of pneumatic grippers in the field of new enerav vehicles:



Grab and position battery cells for automated assembly and testing.

Stable gripping force and precise positioning capabilities to ensure accurate assembly and high-quality production of battery cells.

1

Grab and position battery modules for assembly, welding and packaging.

Steadily grasp and hold battery modules to ensure assembly accuracy and consistency.

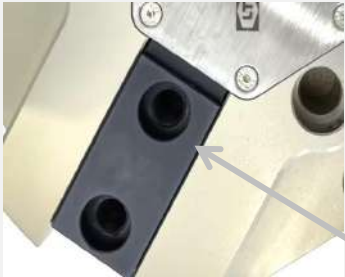
2

Grasping and handling of large battery components during the PACK manufacturing assembly process.

Powerful gripping force and stability ensure safe and efficient handling of battery components.

3

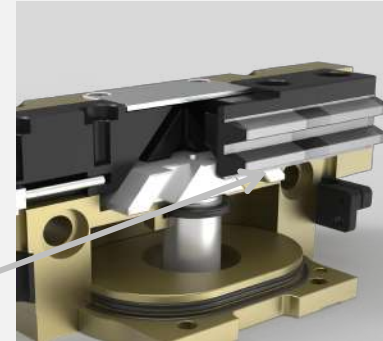
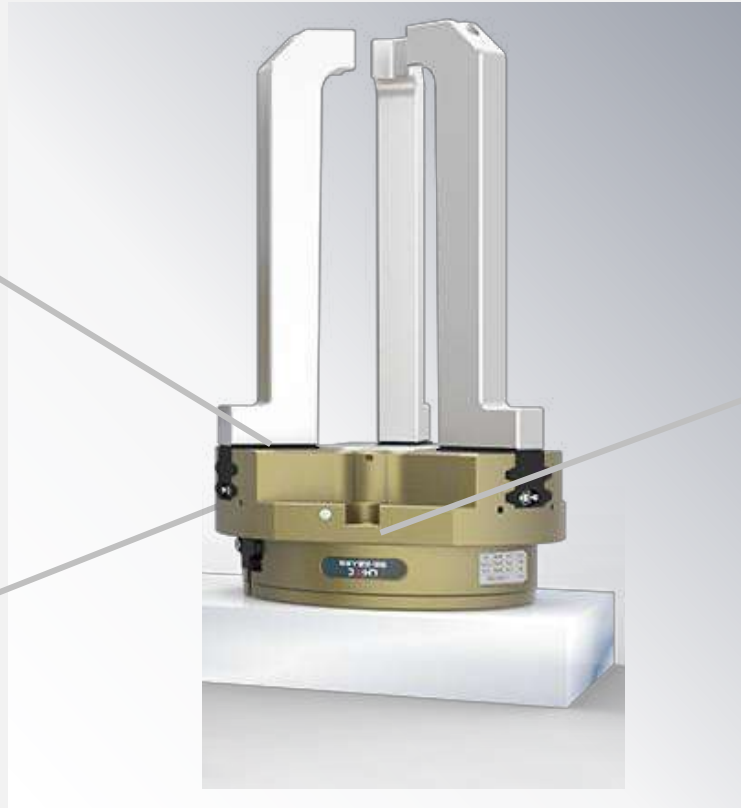
Advantages and features of pneumatic grippers



**Patented
coating**



**Multi-tooth
guide rail**



**Unique self-
lubricating design**

More stable

The multi-tooth guide rail is perfectly combined with the trapezoidal structure to meet the requirements of bearing greater torque and bending moment.

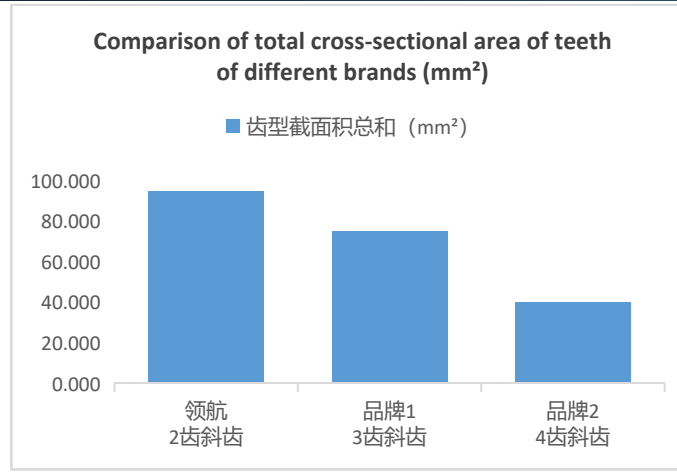
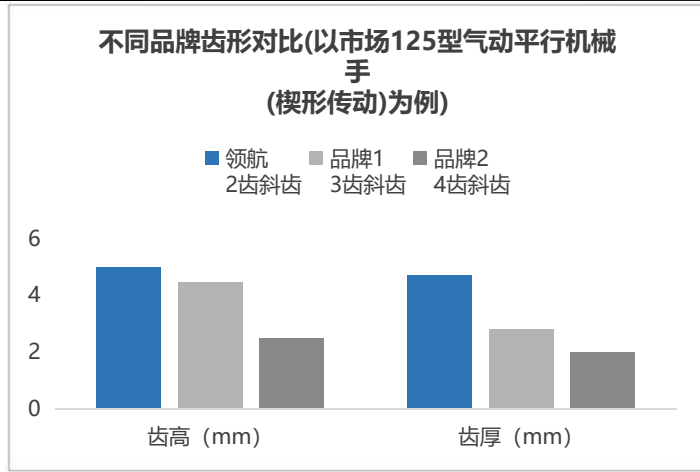
More precise

The patented coating process ensures that the slider remains nearly lossless after tens of millions of displacements.

Longer service life




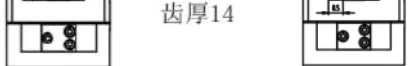
Unique self-lubricating design, longer maintenance-free service life.

Product Advantage 1: More satble, the multi-tooth guide rail and the trapezoidal structure are perfectly combined



Comparison of common tooth shapes (taking the 125-type pneumatic parallel manipulator (wedge-shaped transmission) on the market as an example)



Brand	Tooth shape	Tooth height*tooth thickness	Tooth shape comparison chart	Force-bearing cross-sectional area (mm ²)	Total cross-sectional area of teeth (mm ²)	Analysis Summary
LH-TC	2-tooth helical teeth (angle 20°)	5*4.71	 齿高5 齿厚4.71	42.56*Tooth length	94.676	
Other brands1	3-tooth helical gear (angle 15°)	4.45*2.81	 齿高4.45 齿厚2.81	55.32*Tooth length	75.12	The force-bearing cross-sectional area is moderate, balancing the pressure and friction on the material and being able to withstand greater bending torque.
Other brands 2	4 teeth flat gear	2.5*2	 齿高2.5 齿厚2	40*Tooth length	40	
Other brands 3	T-type teeth	4.75*14	 齿高4.75 齿厚14	26.5*Tooth length	185.5 (No reference value)	

Compared with the same product of SC*K brand, the total cross-sectional area of the tooth profile increases by 20%.

Product advantage 2: Patented coating process, the precision is almost lossless after millions of grindings

The slider surface is strengthened by PVD coating process:

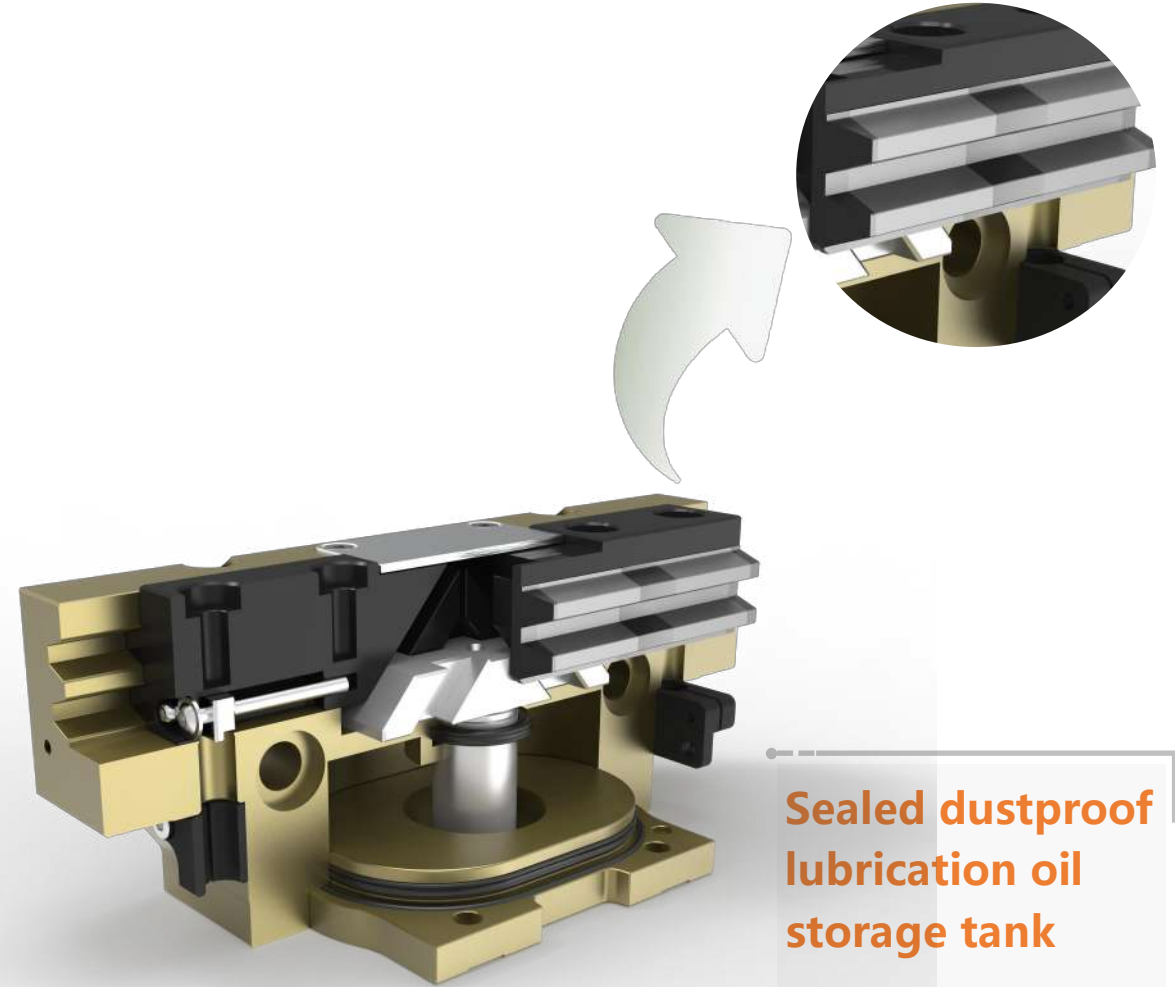
Surface hardness HV2700-3000

- Coating thickness 2-4um
- Can withstand temperatures of at least 500°C
- Greatly improve the wear resistance of the workpiece, ensuring that the accuracy is almost lossless after millions of grinding times.



Product Advantage 3: **Unique self-lubricating design, longer maintenance-free service life**

- ✔ The slider is designed with groove technology, which has self-lubricating function and prolongs the maintenance-free period
- ✔ Lubrication support is provided for each opening and closing, reducing friction and wear and lowering the failure rate
- ✔ Advantages compared with traditional lubrication methods: Reduce manpower and time investment, and lower maintenance costs.
- ✔ Ensure that the equipment can maintain excellent performance and stability under long-term, high-load operation, and provide users with reliable and efficient grasping solutions.



**Sealed dustproof
lubrication oil
storage tank**

The logo consists of the letters 'LH-TC' in a bold, sans-serif font. The 'LH' is white, the hyphen is red, and the 'TC' is white.

End-Of-Arm Tooling

A large, bold, orange number '3' is centered within a white-bordered square box. The background of the box is a dark, semi-transparent image of industrial machinery.

Application cases

Tool Changer Application: Cooperate with Agile Robots

Application scenario:

This project is a collaboration with Agile Robots for semiconductor industry manufacturing. Our LTC-0010E+ servo module solution realizes the automatic switching of different tools at the end of the robot, greatly improving the utilization rate of the robot and increasing the production rhythm.

Product Parameters:

LTC-0010E+ Servo module

Integrator:

Agile Robots



(Station Details)

Tool Changer Application: Used in substation humanoid duty robots

LH-TC

End-Of-Arm Tooling



Application scenario:

Used on the humanoid duty robot of Shanghai 110kV Qiantan Substation in Pudong New District, Shanghai. The robot is used for substation inspection, monitoring and emergency response. It needs to switch different tools to realize intelligent management of substation equipment.

Product Parameters: LTC-0005A +IMO-S08B signal module

Integrator: Piaoma Robot



(Robot details)

Tool Changer Application: 【BYD Automobile】 Welding workshop



Application scenario:

9 major bases in Xi 'an factory of BYD Automobile.

Customers use the LTC-0630F tool changer to meet different welding requirements at the same station, which achieves the purpose of quickly replacing different welding guns according to welding needs, thus greatly improving the efficiency of welding production line.

Product model:

LTC-0630F

Supply quantity:

Over 4500 sets

Tool Switch Types:

Welding gun to Gripper

Welding gun to Welding gun

Gripper to Gripper

Aluminum spot welding

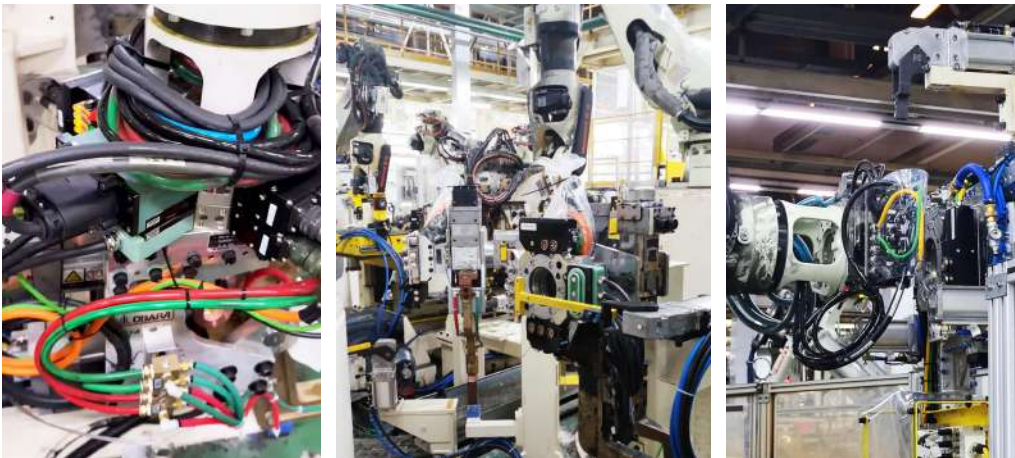
between FDS/SPR



Tool changer application: 【Changan Automobile】 Welding workshop

LH-TC

End-Of-Arm Tooling



Application scenario:

In the Hefei welding workshop, the C589E project of Changan Yubei Factory, LTC-0630F tool changer was used for switching between welding gun and welding gun, welding gun and gripper.

Customers feedback that the product ran stably without signal loss and water leakage.

Customers speak highly of our tool changer, which perfectly guaranteed the production efficiency and quality.

Product model:

LTC-0630F

Supply quantity:

74 sets

Integrator:

STEP



Tool Changer Application: 【SGMW】

LH-TC

End-Of-Arm Tooling

Application scenario:

LH-TC tool changers were used in the welding workshop of Wuling Automobile Liuzhou Factory to realize the switching between welding gun and welding gun, welding gun and gripper. Customers feedback that the product runs stably without signal loss and water leakage. Customers speak highly of our tool changer, which perfectly guarantees the production efficiency and product quality.

Product model:

LTC-0630F



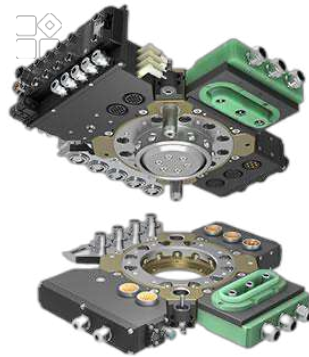
Tool Changer Application: 【Volkswagen】 Stamping workshop

Application scenario:

In view of IPR's high costs on maintenance and spare parts, FAW-Volkswagen decided to seek domestic alternatives. With its deep accumulation and technological innovation in the field of industrial automation, LH-TC perfectly met customer needs. The LTC-0630F demonstrated significant benefits in terms of signal transmission and safe operation, effectively improving the overall efficiency and stability of the production line.

Product model:

LTC-0630F

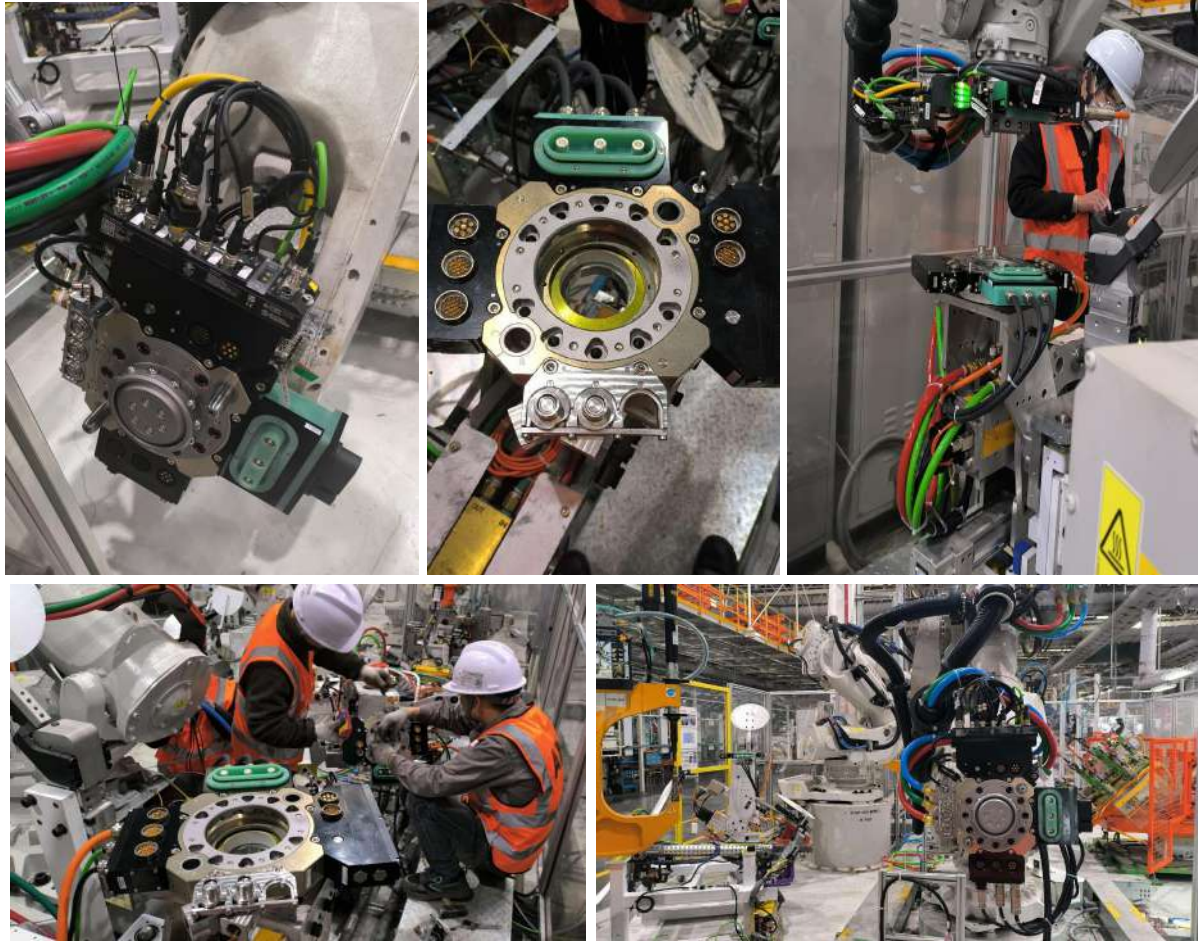


(Installation Site)

Tool Changer Application: 【XPeng Motors】 Luggage welding station in welding workshop

LH-TC

End-Of-Arm Tooling



Application scenario:

The LH-TC tool changers are used in welding station of XPeng Motors for switching between welding gun and welding gun, welding gun and gripper. Customers feedback that the product runs stably, without signal loss and water leakage. Customers speak highly of our tool changer, which perfectly guarantees the production efficiency and quality.

Product Parameters:

LTC-0630F

Integrator:

ABB



Tool Changer Application: 【FAW Hongqi】 Replacement for Stäubli servo module

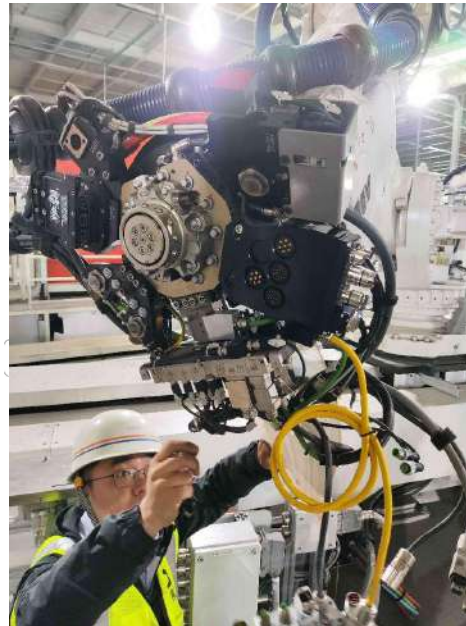


Application scenario:

FAW Hongqi replaced the Stäubli servo module on its production line with LH-TC tool changer servo module. Through precise matching and efficient installation of the servo module, it not only achieves stable signal transmission, but also significantly reduces maintenance costs.

Product Parameters:

LH-TC Servo module



(Production line details)

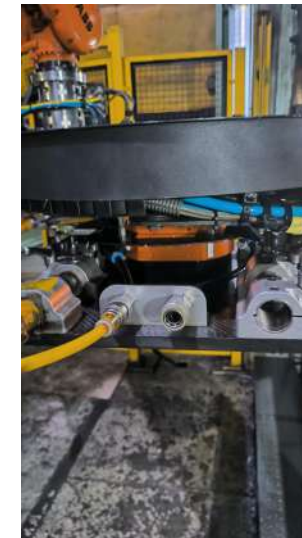
Tool Changer Application: 【GAC Honda】 Stamping workshop



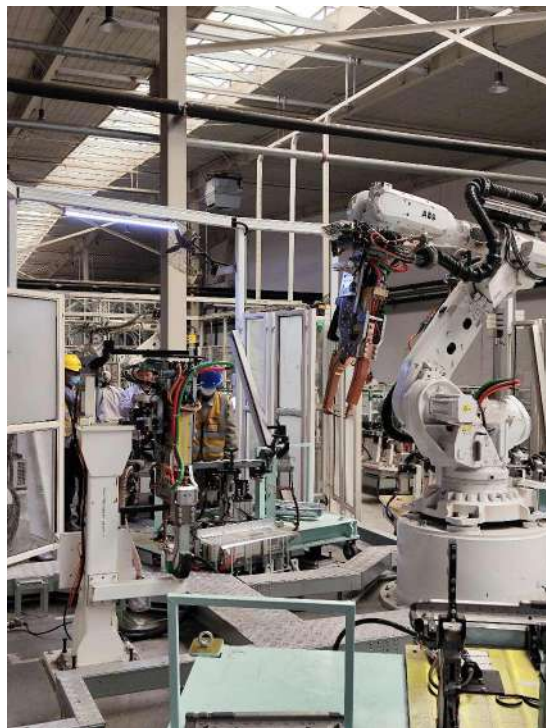
Application scenario:

The project is for Guangqi Honda Zengcheng Factory, stamping workshop Line A. It needs to switch between gripper and gripper. The locking mechanism of tool changers used by customer before are severe wore due to the great shear force on the seventh axis of the robot. After using our tool changers, they run well, effectively solved customer problems and are still in use today.

Product Parameters: LTC-0120F



Tool Changer Application: 【FAW】 Working station renovation



Application scenario:

The workstation of FAW Mould Tengfei Factory originally used one welding gun, but now it needs to add another welding gun to fully utilize the robot. The motor model of the original welding gun is different from the current one. After the modification of the LH-TC tool changer module, the same robot pipeline package can be used to switch between old and new welding guns. Based on this successful application, we won the trust of FAW molding, who gives highly comments on our products quality and services.

Product Parameters:

LTC-0630F

Integrator:

Changchun Dazheng
Bocame Automotive
Equipment Co., Ltd



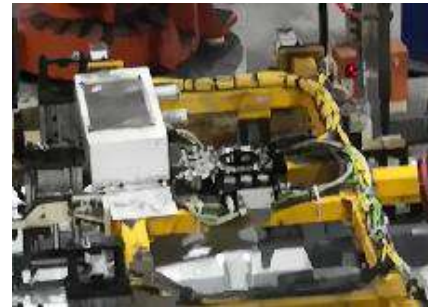
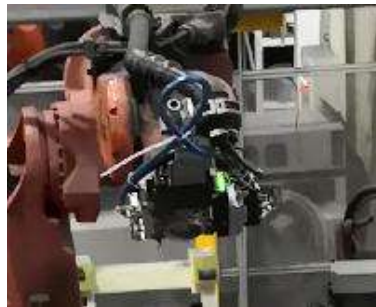
Tool Changer Application: Welding workshop



Application scenario:

This project is the floor welding line of Changan Ford Chongqing Plant 3. The working environment is relatively harsh, and the original imported brand needs to replace the signal module every two weeks. In November 2021, the LTC-0300E tool changers were purchased to effectively solve the problems. After the entire plate was replaced, a total of 250,000+ vehicles production and 500,000+ opening and closing actions were completed without fault, and it is still in use.

Product Parameters: LTC-0300E+bus module+high current module+servo module+liquid module



(Production Line details)



Tool Changer Application: Loading and unloading



Application scenario:

The company is a parts supplier for Geely. It uses high-pressure water to wash the motor housing and grind off the debris, and needs to switch between three different fixtures. It selected the Linghang LTC-0200D+ self-sealing air module, which effectively solved the customer's problem.

Product Parameters: LTC-0200D+Self-sealing module



(Application details)

Tool Changer Application: Assembly application



Application scenario:

The BYD factory in Changsha needs to laser codes for different hybrid engines, which requires handling, flipping, and assembly. The workpieces are heavy, so larger payload tool changer are supplied.

Product Parameters: LTC-0300F+15pins signal module

Integrator: Guangzhou Baosheng



(Station details)



Tool Changer Application: Stamping application

Application scenario:

The project is used for loading and unloading in Wuxi Langxian - thermoforming stamping workshop. The environment is relatively harsh, the temperature reaches more than 1000 °C, the clamping temperature is about 600-800 °C. There are air leakage and tool plate fall off phenomenon when using other brands. LH-TC tool changers effectively solve these problems, whose lighter products' weight enables the production more stable.

Product Parameters: LTC-0200D+15pins signal module



(Production line details)



Tool Changer Application: Ultrasonic welding

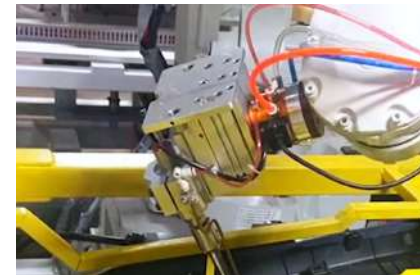
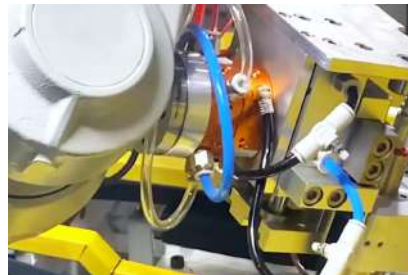


Application scenario:

The project for Chongqing Linghuan ultrasonic welding application, 2 ultrasonic welding equipment, according to different workpieces, switch the corresponding equipment for plastic welding.

Product Parameters:

LTC-0200D+8 pins signal module+high frequency module



(Station details)



Tool Changer Application: Combined with visual recognition applied to 3C Industries

LH-TC

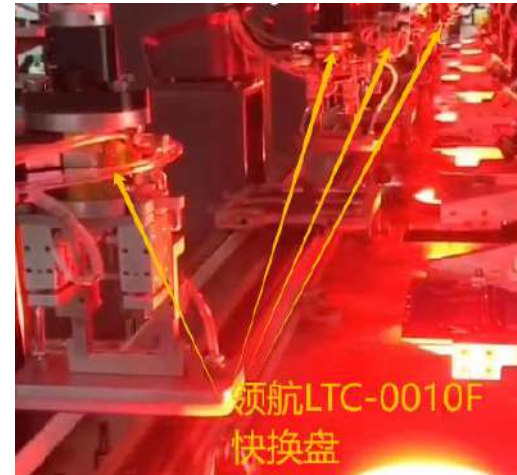
End-Of-Arm Tooling



Application scenario:

Applied to mobile phone labeling and material collection in the 3C industry. Customized solutions help mobile phone production lines to be efficiently automated. Through precision industrial camera recognition, it can achieve accurate positioning and rapid pasting, optimize the material collection process, and improve production efficiency and product consistency.

Product Parameters: LTC-0010F+8 pins signal module



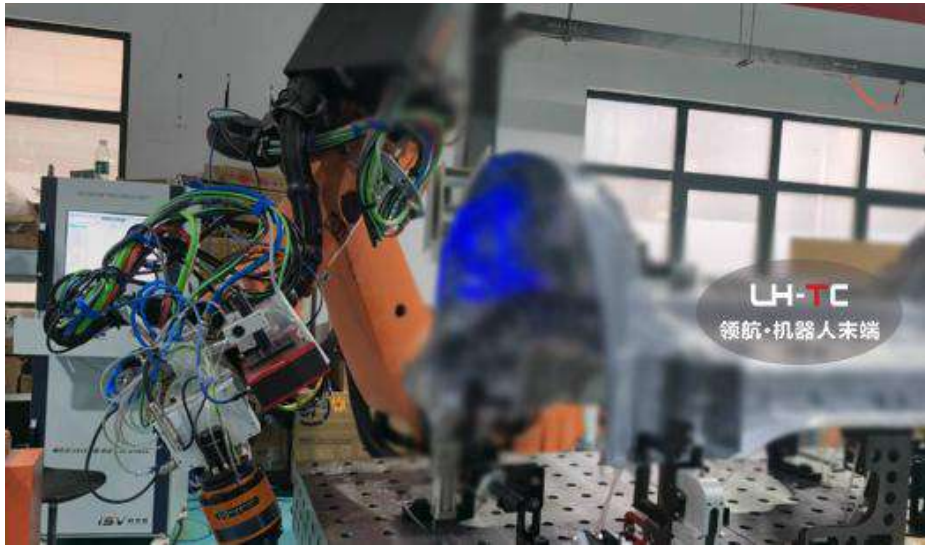
(Production line details)



Radial force control floating grinding tool application: Deburring of integrated die-casting of rear floor of automobile

LH-TC

End-Of-Arm Tooling



Application scenario:

VOL** (Sweden) Integrated die casting deburring project

Product Parameters:

LT-6000

Deburring parameters:

Rotate speed of spindle: 25000rpm

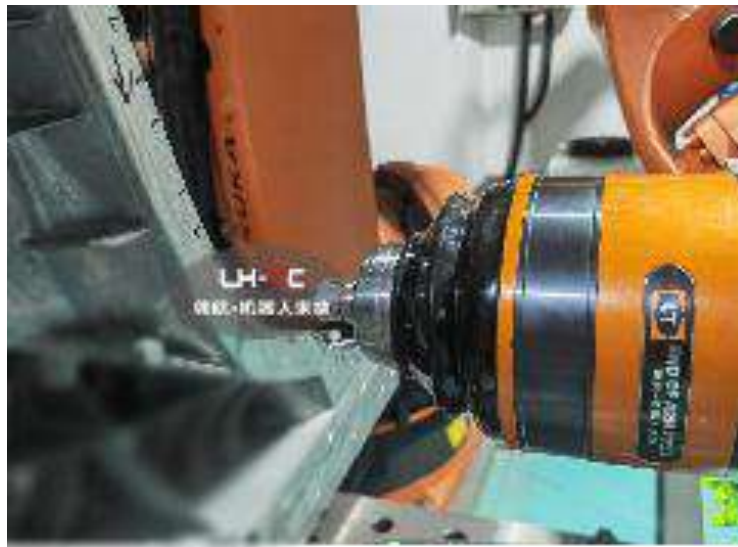
Robot speed: 400MM/S

Air pressure range: Rotary file 0.02MPa

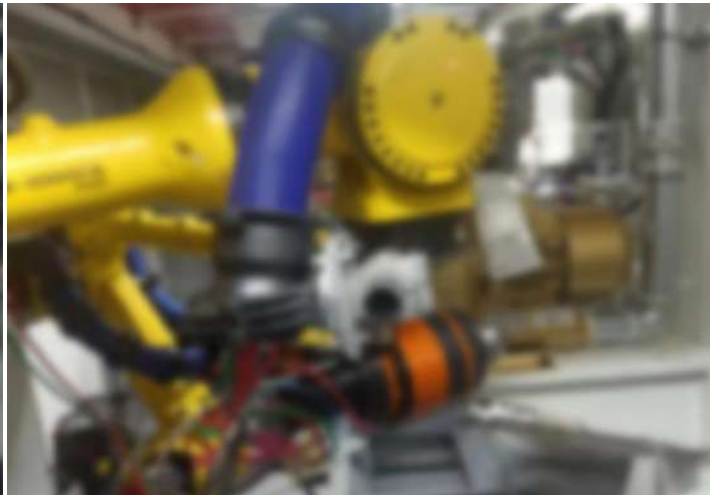
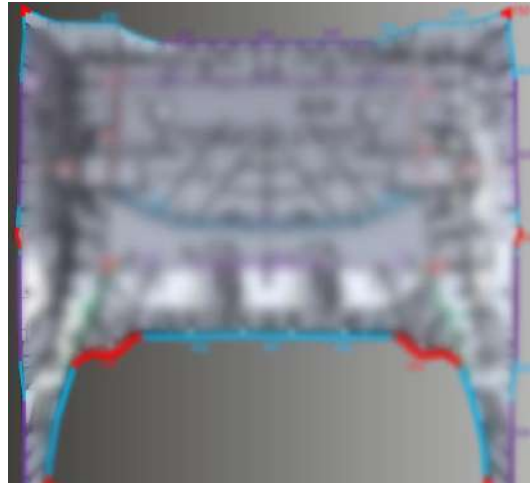
Milling cutter 0.09MPa

Requirements & Solutions:

The LT-6000 floating burring tool shows strong advantages in the process of integrated die casting deburring, such as the spindle speed is flexible and adjustable, and the feed speed and revolution can be changed in segments, effectively improving the grinding quality and efficiency. Customer said it achieved efficient production and quality improvement at the same time reduce costs.



Radial force-controlled floating grinding tool case: Deburring of integrated die-casting of rear floor of automobile



Application scenarios:

Integrated die casting deburring for a new energy vehicle in the United States

Product Parameter:

LT-6000

Customer needs:

The customer uses the Linghang LT-6000 floating deburring tool in integrated die casting deburring. Its segmented floating force controllable and interactive data system enables the rapid completion of die casting parting line - external contour, mold line, ejector boss and extrusion pin grinding. Customer feedback shows that the high-precision operation of the equipment shortens the production cycle and significantly reduces production costs.



Radial force-controlled floating grinding tool case: grinding injection molded parts and the mold line



Customer needs:

This project is to remove burrs from the edges of plastic injection molding tool boxes. The burrs on the edges of the parts are within 5mm, and the process requires a smooth edge. There are irregular shapes such as corners, so a deburring tool with a floating function is required. The selection of Linghang force-controlled floating deburring tool effectively solves these problems, with high efficiency, stability, and good deburring effect.

Workpiece material: Plastic (Hard)

Product model: LT-FR020A-20-S6000

Tools: Alloy rotary file

Grinding parameters:

Spindle speed: 6000-12000rpm

Air pressure range: 0.1-0.15MPa

Feed speed: 50-150mm/s



Polishing effect:



Before



After

Radial force-controlled floating grinding tool case: Steering gear housing edge chamfering



Customer needs:

This project is to chamfer the edge of the steering gear housing. The steering gear housing has a complex structure and is difficult to process. The Linghang Force-controlled floating grinding tool is selected to perfectly and quickly remove burrs and improve production efficiency.

Workpiece material: cast iron

Product model: LT-FR030B-3060J

Tools: Spherical alloy rotary files, diamond grinding heads

Grinding parameters:

Spindle speed: 6000-12000rpm

Air pressure range: 0.08-0.15MPa

Feed speed: 20-100mm/s



Polishing effect:



Radial force-controlled floating grinding tool case: Grinding of gearbox housing



Customer needs:

This project involves the grinding of the gearbox housing. The gearbox housing has many holes and slots, many locations for deburring, and a complex structure. Linghang floating grinding tool is selected, which has good grinding effect, fast deburring, and improves work efficiency and product quality.

Workpiece material: Aluminum Alloy

Product model: LT-FR040B-S4040

Tools: Spherical alloy rotary file

Grinding parameters:

Spindle speed: 8000rpm

Air pressure range: 0.15MPa

Feed speed: 100mm/s



Polishing effect:



Radial force-controlled floating grinding tool case: Grinding residual glue on automobile glass sunroof

Process requirements and challenges

The customer needed to remove the residual glue on the car glass sunroof, facing the challenge of efficiently removing the residual rubber on the glass while avoiding damaging the glass. Traditional rigid grinding could not meet this requirement.

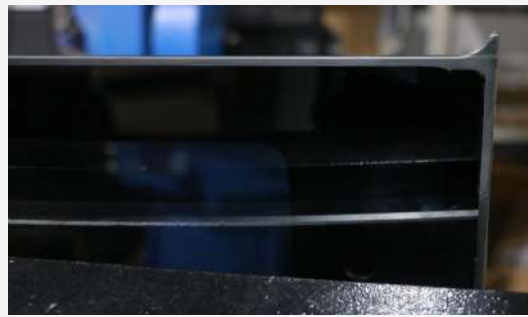
Solution

In response to working conditions, Linghang uses radial force-controlled floating grinding tools to remove excess rubber from the glass in one go while ensuring that the glass remains intact. Accurately control the grinding force to ensure the grinding effect and quality.

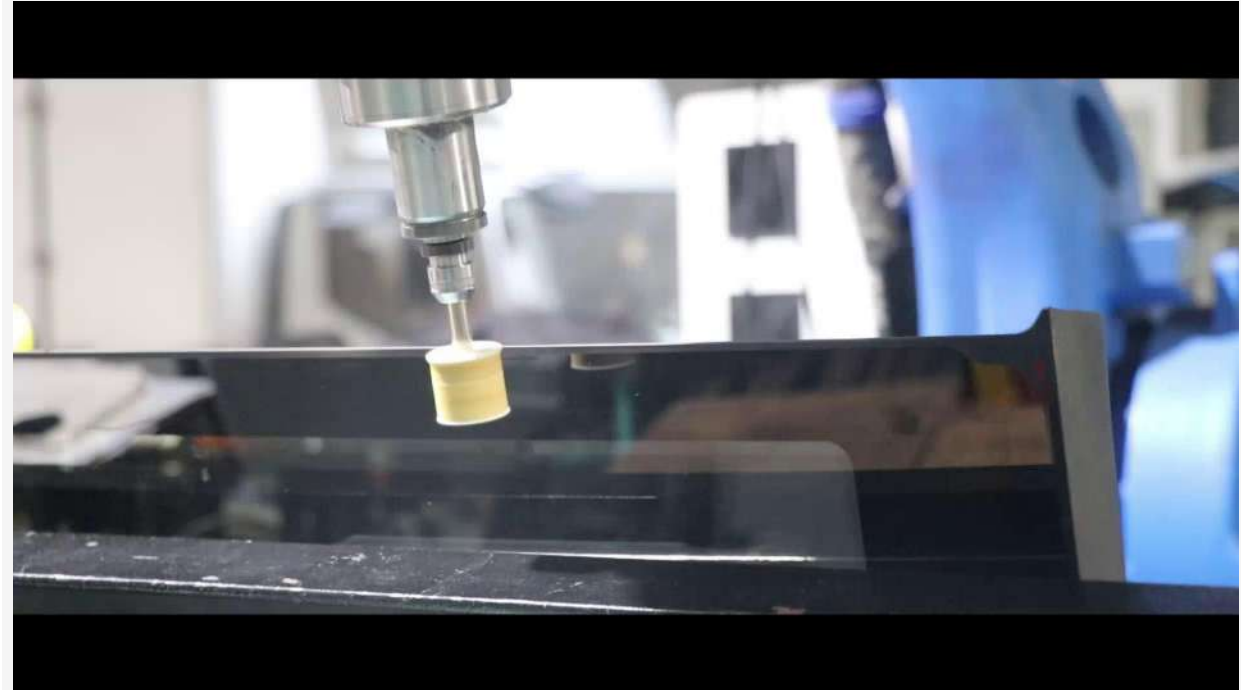
Before grinding

VS

After grinding



Grinding details



Process parameters

Roate speed: 5000rpm

Feed speed: 50MM/S

Tools+ Floating pressure: 6mm handle diameter, 50 linen wheel; 0.4Mpa

Axial active floating constant force grinding tool case: curved glass chamfering

Process requirements and challenges

The customer needed to grind the chamfer of curved glass, and faced two challenges: 1. The curvature of the curved surface is irregular, and traditional equipment is prone to over- or under-grinding; 2. Fixed grinding force is difficult to adapt to glass of different curvatures and thicknesses. Large force is easy to damage, while small force is poor in effect and time-consuming.

Solutions

Linghang uses axial active floating constant force grinding tools for grinding.

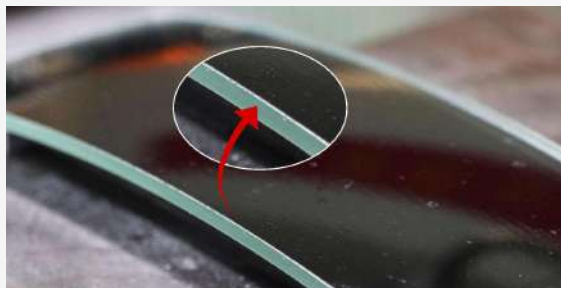
1. Adaptive complex surface grinding, high-precision sensors and intelligent systems ensure fit and precise processing;
2. Constant force control, automatic identification and compensation force within $\pm 0.5\text{N}$;
3. Visual operation, easy parameter setting and real-time feedback of force data. After grinding, customer needs are met.

Before grinding



VS

After grinding



Grinding details



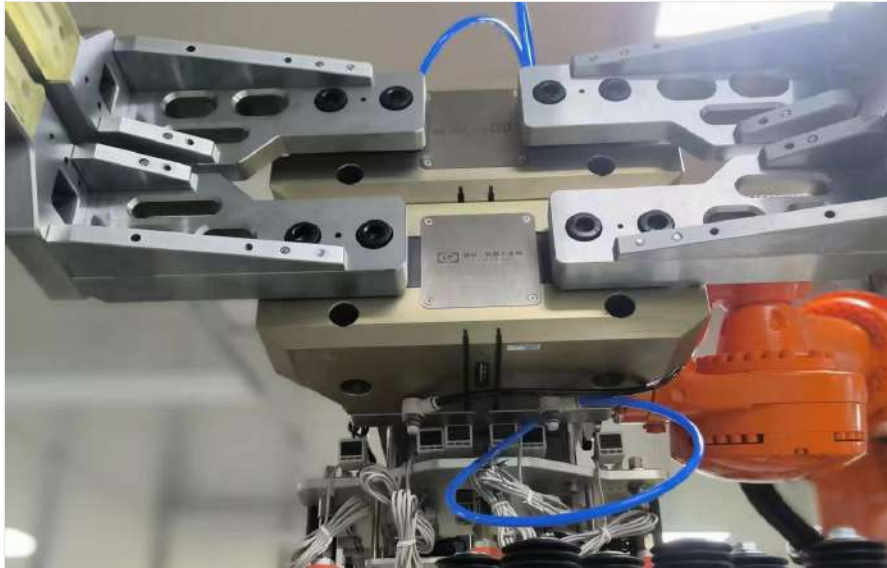
Process parameters

Roate speed: 4000rpm

Feed speed: 60MM/S

Tools+Axial pressure: 4-inch grinding disc + 800-day sandpaper; 15N

Pneumatic Gripper Example: Grasping an Electric Box



Customer needs:

This project is for Shanghai Xuantian, and the end user is Xuchang Xuji Electric Application, which is used to grasp the transformer box. The customer's existing space is compact, the workpiece is heavy, and the gripper is required to be small in size and high in load. The combination of multi-tooth guide rails and trapezoidal structures enables it to carry greater torque and bending moment. After using it, the customer reported that the gripping is efficient.

Application scenarios:

The project is for Shanghai Xuantian, and the end user is Xuchang Xuji Electric Application. Two grippers grab the electric box

Product parameters:

LT-PG2-380A



Pneumatic Gripper Example: Holding Castings



Customer needs:

Linghang LT-PG2-160A-CFM-DP pneumatic gripper has a compact structure, strong clamping force, and the smallest volume under the same clamping force. It is suitable for high-intensity operations and can produce 60,000 workpieces per month. Customers report that it has precise clamping and smooth operation.

Application scenarios:

This project is for Dalian Jiahong Intelligent, which clamps castings and polishes them during the production process of the end customer's workshop.

Product parameters:

LT-PG2-160A-CFM-DP



Pneumatic Gripper Case: Overseas Customer Grasping Batteries



Customer needs:

In response to the battery grasping needs of Russian customers, the pneumatic gripper LT-PG3-200A-PP, with its precise control, quick response and strong gripping advantages, perfectly solves the problem of automatic grasping and transfer of batteries in a small space after charging, significantly improves work efficiency and safety, and wins high satisfaction from customers.

Application scenarios:

The project captures batteries for Russian customers

Product parameters:

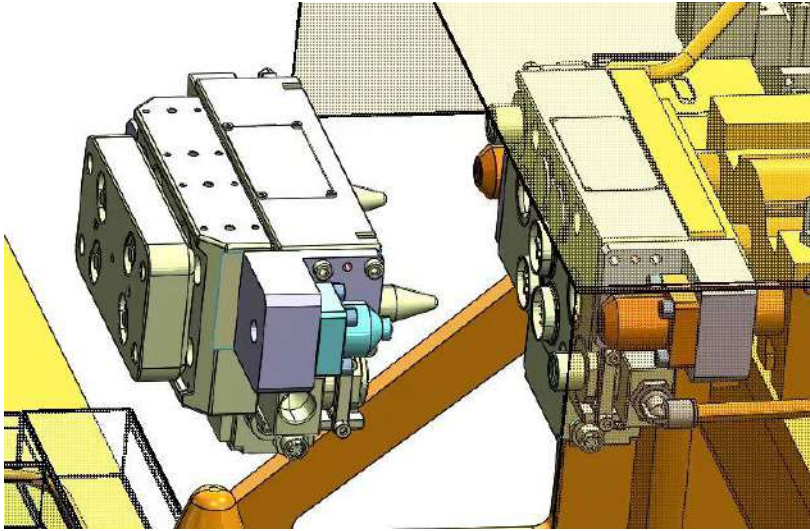
LT-PG3-200A-PP



Energy docking combination board customer use case

LH-TC

End-Of-Arm Tooling



The project was designed by CRRC Rebot for Zoomlion Heavy Industry

The use of LT gas-electric quick-connect products realizes the automatic connection and switching of the equipment's electrical, water, gas, and hydraulic systems.

Electrical parameters:

7/8 bus power supply M12-4D coded connector

Water vapor part parameters:

2-way PT1/2 interface water and gas connector

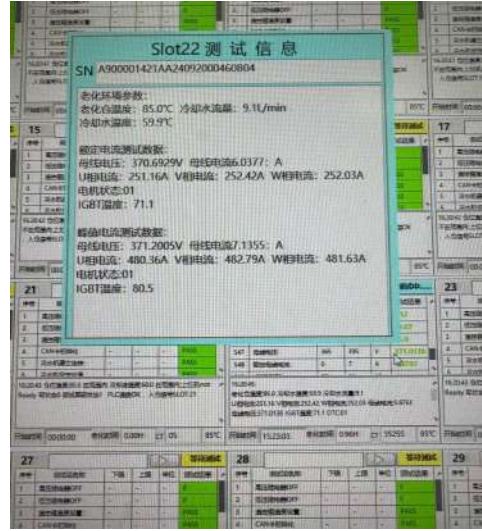
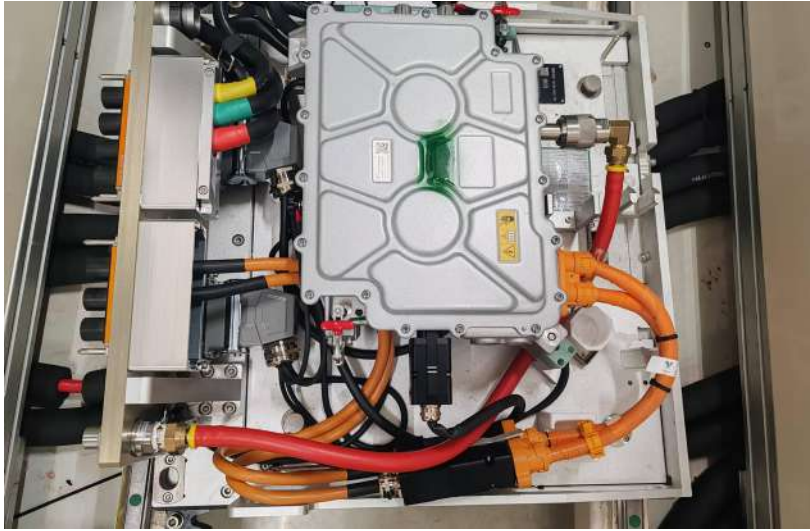
Hydraulic parameters:

2-way 8mm hydraulic assembly

Energy docking combination board customer use case

LH-TC

End-Of-Arm Tooling



The project is the Haozhi electric drive testing project

The LT energy docking combination board is used to carry out the aging experiment and performance test of the electric controller.

Electrical parameters:

Three 120 square bus power supplies, two 50 square bus power supplies

M12-8X temperature transmission coding connector

Water vapor part parameters:

2-way 8mm cooling water inlet and return, PT1/2 interface water and gas connector

Signal module parameters:

6-way E04 grounding, 65-way signal pin



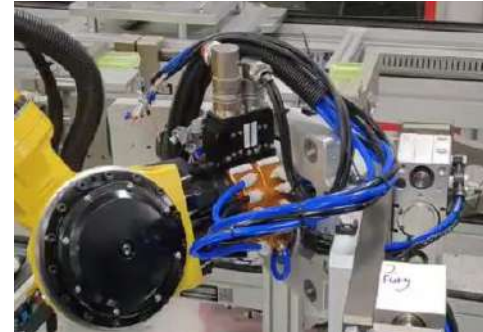
Customers



GWM



BYD



TOYOTA



Ford



HongQi



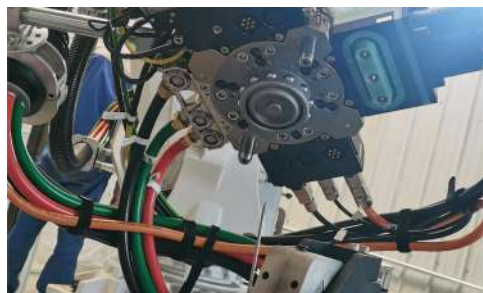
CHANGAN



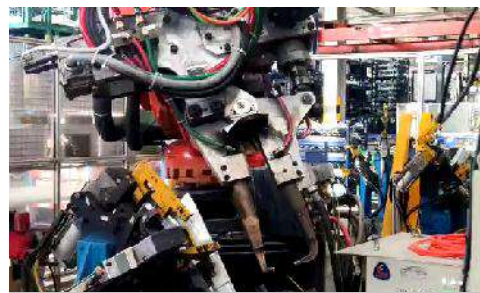
BOX



Dongfeng Nissan



FAW Mold)



ZHIXIN INDUSTRY GROUP



BIW Welding



Honda

Customers

LH-TC

End-Of-Arm Tooling



CHANGAN



Geely



BYD



SANY



Fender Stamping



Great Wall Seiko



Xpeng Motors



Geely Lynk & Co



Auto Parts Spot Welding



FAW Group



HUAWEI



VOLVO

LH-TC

End-Of-Arm Tooling

4

Customer Service

Technical Support

- Provide product 3D models
- Customized services for special working conditions
- Early stage selection and scheme design
- Provide quick debugging of teaching pendant



Quick response



- Provide 7x24 hours technical support services
- 12 service outlets nationwide
- Provide a response plan within 2 work hours

LH-TC


End-Of-Arm Tooling

Thanks



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