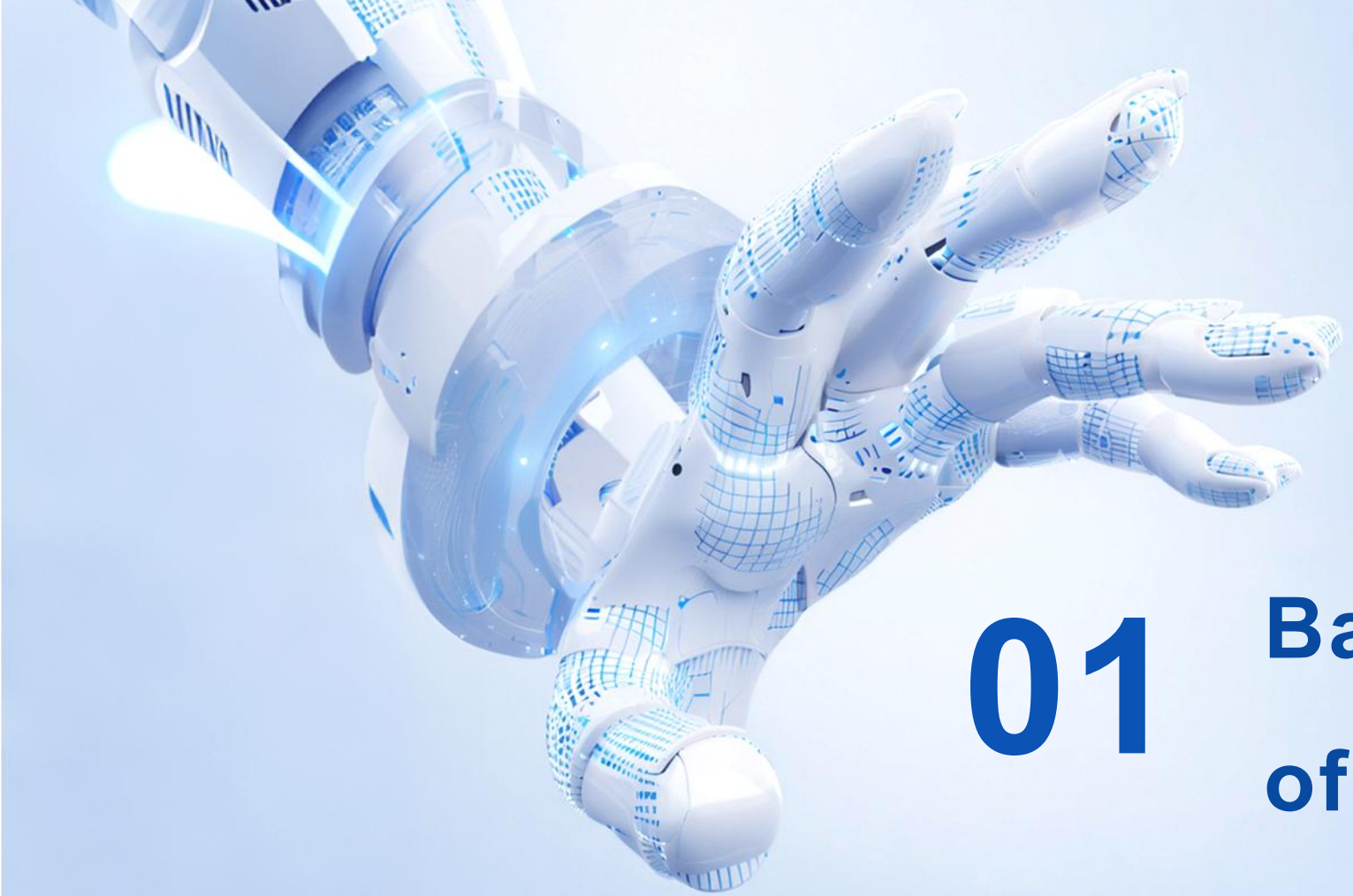
Development and Application of Connectors for Embodied Robots

Technology Connects to the Future

Sichuan Yonggui Science and Technology Co., Ltd

Contents

Embodied Robots



01 Basic information of the company

Basic information of the company

- Sichuan Yonggui Technology Co., Ltd. was established in March 2008 with a registered capital of 150 million yuan and a total asset value of more than 1.8 billion yuan. It is a wholly-owned subsidiary of Zhejiang Yonggui Electric Co., Ltd. (stock code: 300351).
- The company covers an area of more than 200 acres, with a plant and office area of more than 200,000 square meters; it has more than 5,500 sets of various R&D and production equipment.
- The company is a national high-tech enterprise, a national intellectual property demonstration enterprise, and a national specialized and innovative small giant enterprise, capable of providing overall interconnection system solutions for key national equipment industries.
- The company's products are mainly applied in rail transit, industrial equipment, special equipment, new energy vehicles, energy storage devices, low-altitude aircraft, and embodied robots.
- In the field of embodied robots, the company mainly provides services such as connector and wire harness integration, structural component processing, and robot contract assembly.
- As of the end of 2024, the company's sales revenue reached 1.78 billion yuan.

700+ Staff
Professional technical team

17 years
Specialize in connector Industry

580+ PCS
Patent application

Three Major Business Segments

★ Rail transit and industrial sector

★ Special equipment sector

★ Vehicle and energy sector

Company quality system

Leveraging the multi-field applicability of its products, the company has obtained a number of quality management system certifications covering the automotive, rail transit, special equipment, commercial aviation and other sectors. These certifications help the company continuously improve and standardize its management, comprehensively enhance its overall competitiveness, and consistently deliver high-quality products suitable for multi-field applications.

ISO14001
Environmental Management System

ISO45001
Occupational Health and Safety Management System

ISO9001
Quality Management System

IATF16949
Quality Management System

ISO/IEC17025
Laboratory Management System

GB/T29490
Intellectual Property Management System (IPMS)

EN15085
Welding Quality Management System

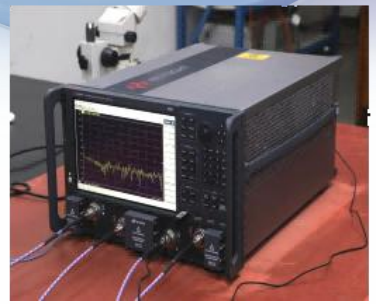
QC080000
Hazardous Substances Management System

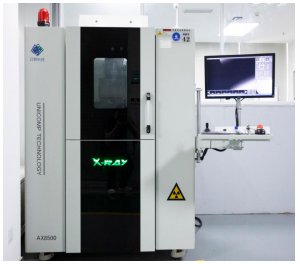
ISO22163
Quality Management System

AS9100D
Quality Management System

Product testing

The company has established a dedicated testing center, which is CNAS-certified. Covering an area of over 2,000 square meters, the center is equipped with more than 200 sets of various testing and experimental equipment, capable of conducting mechanical, electrical, environmental and physical-chemical verification tests on all types of products, components and materials.





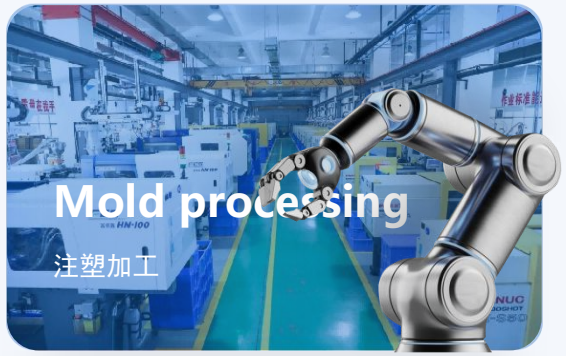
Parts processing

Machining operation

It is equipped with over 150 sets of various precision machining equipment and has an annual production capacity of 70 million components.

Stamping processing

It is equipped with more than 50 sets of various production equipment and has an annual production capacity of 1 million sets of enclosures/cabinets.



Mold processing

It is equipped with more than 50 sets of various injection molding machines and has an annual production capacity of 80 million injection-molded parts.

Surface treatment

It has 11 production lines covering processes such as gold plating, silver plating, tin plating, zinc plating, phosphating, nickel plating and oxidation coloring.

Connector application

Rail Transit

Electric Coupler

Under-vehicle Integrated Cabinet

AC connection

Vehicle-end Jumper Connection

In-vehicle Control, Network and Driver's Console Connections

Under-vehicle Connections for Ground Power Supplies, Motors, Sensors, etc.

Vehicle

HVHC Connector for Batteries and Motors

Vehicle-mounted External Discharge Panel

High-Voltage and Low-Current Connector for Chargers

High-Voltage Connector for Batteries/Motor

Vehicle High-Voltage Wiring Harness (VHWH)

High-Voltage Junction Box / PDU / BDU

High-Voltage Connector for AC Compressor / PTC Heater

Mini-FAKRA Auto High-Speed Connector

Charging

AC/DC Charging Inlet

Discharge Connector Series

AC/DC Charging Connector

Megawatt Charging Connector Series

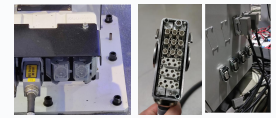
Integrated Liquid Cooling System

Megawatt Charging Inlet Series

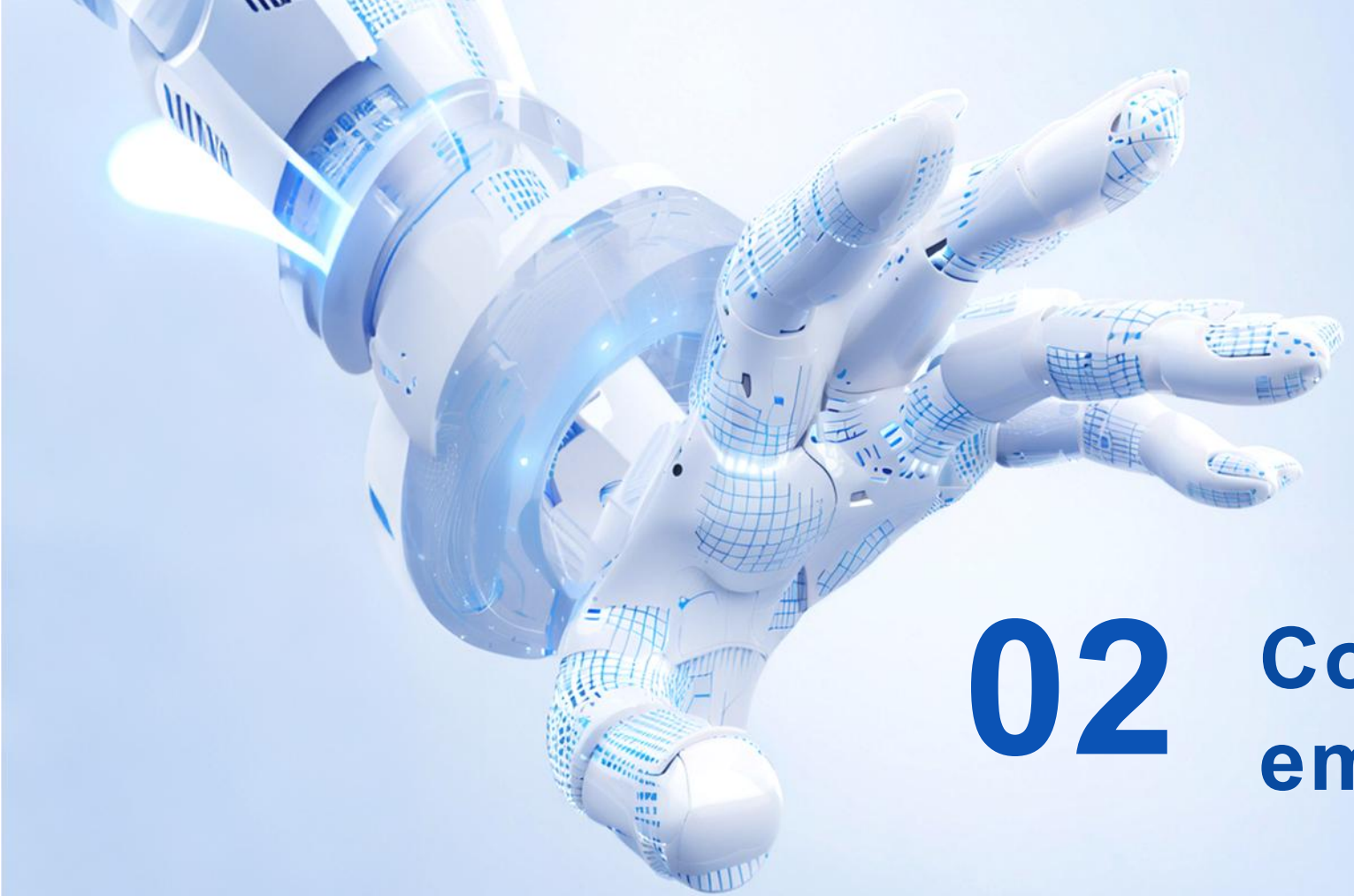
Industry

Connectors for Construction Machinery

Connectors for the Wind Power Industry

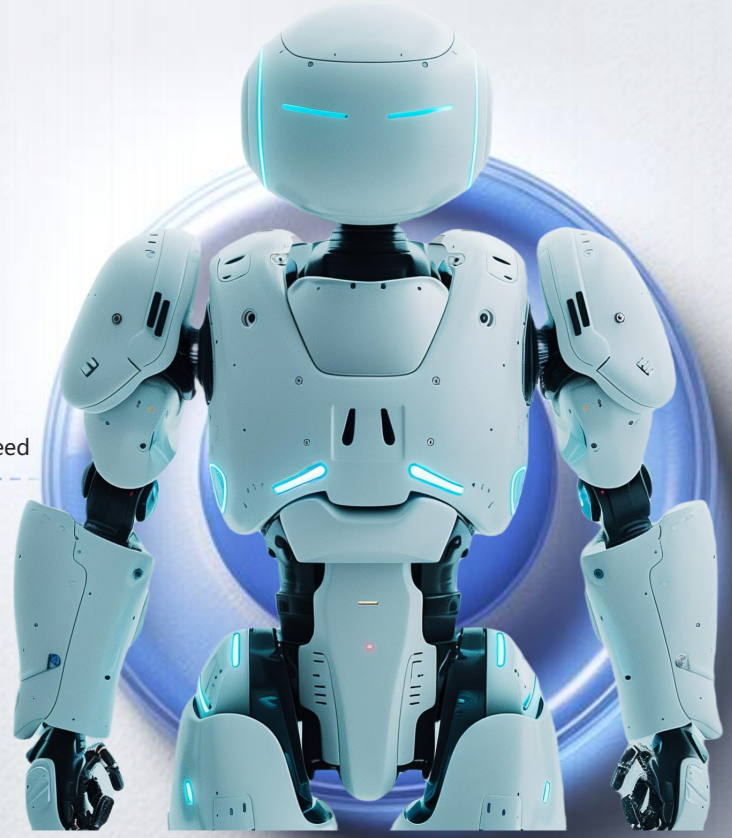


Connectors for Industrial Robots

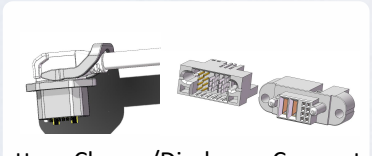


02 Connectors for embodied robots

Embodied robot products

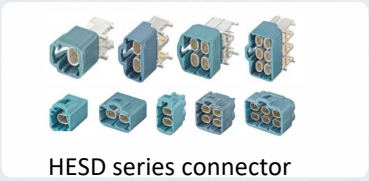


Battery Charging/Discharging Connectors



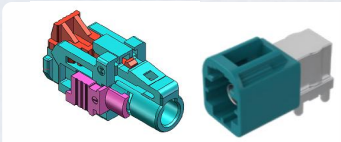
Battery Charge/Discharge Connector

Ethernet Communication Connectors



HESD series connector

Camera Module Connectors



Minifakra series connector

Joint Breakpoint Connectors

XT / RF Series 2+2 Joint Motor Connector

Controller Connectors

M12 / Push-Pull Series

Hardness Integration Services

Harness Integration

High-speed

High-speed

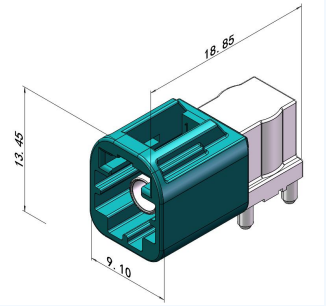
Camera Module Connector

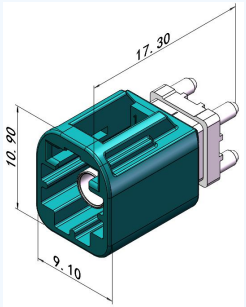
The Minifakra connector system is a compact coaxial connector specially designed for radio frequency (RF) and high-speed data transmission applications. It supports frequencies up to 15–20 GHz and data transmission rates of 20–28 Gbps, incorporates a secondary anti-disconnection CAP structure, and delivers a locking retention force of ≥ 80N.

Primary Technical Specifications

Characteristic impedance：	50Ω
Return loss ：	≥ 25dB,DC to 3GHz
	≥ 20dB,3GHz to 6GHz
	≥ 15dB,6GHz to 12GHz
	≥ 12dB,12GHz to 15GHz

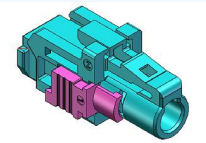
Typical Product Dimension



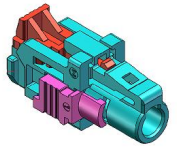


Product type

Crimping plug connector

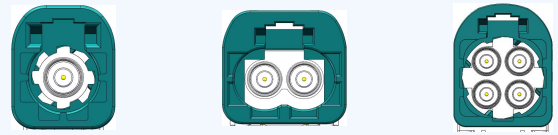


Without CAP

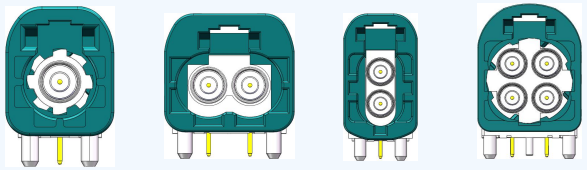


CAP Enhancement

Vertical PCB receptacle



Right-angle PCB receptacle



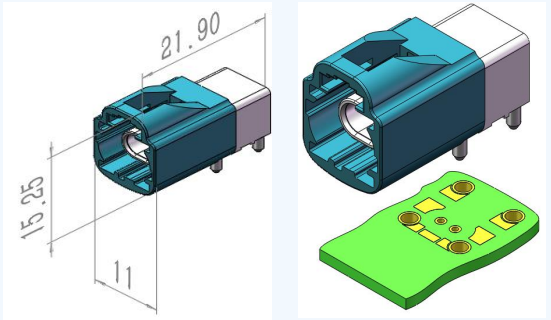
Ethernet Communication Connector

The HESD Ethernet product line features a single-pair Ethernet (SPE) architecture, which effectively reduces cable diameter and connector size while supporting data transmission at frequencies up to 20 GHz. It is primarily designed for connecting cables to printed circuit boards (PCBs).

Primary Technical Specifications

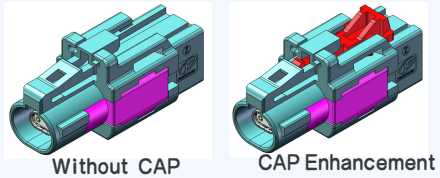
Characteristic impedance：	100Ω
Return loss ：	≥ 30dB，0.01 GHz to 3 GHz
	≥ 25dB，3GHz to 6GHz
	≥ 20dB，6GHz to 10GHz

Typical Product Dimension

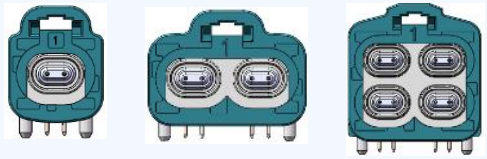


Product type

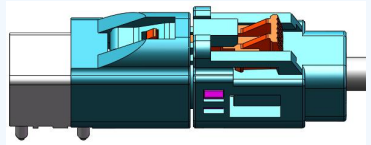
Crimping plug connector



Right- angle soldering

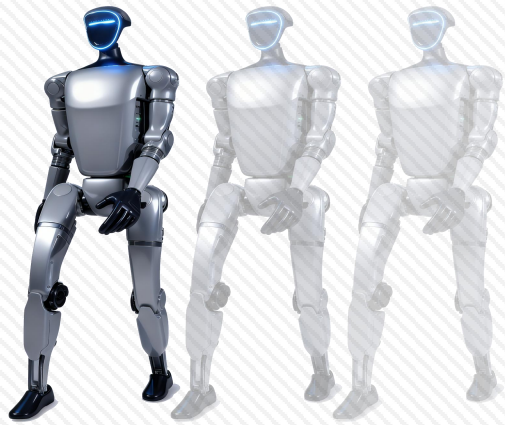


Retention force ≥110N



Battery Charging/Discharging Connector

TThe 2+6 connector is used as the power charging interface for embodied robots. It adopts a handle-locking connection mode, featuring fast insertion and withdrawal as well as anti-disconnection locking functions. It reaches IP67 which supports standalone receptacle waterproofing. Its receptacle-side power module has a quick-change structure for partial replacement, and the long-short power pin design enables sequential positive-negative pole conduction.



Primary Technical Specifications

Number of pins: 2 + 6

Rated current: power - 40A, signal - 1A

Rated voltage: power - 100V, signal - 5V

Withstandvoltage: 500V

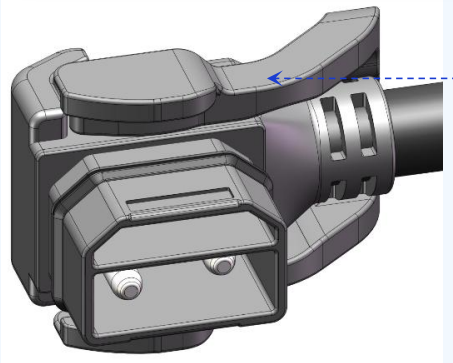
Insulation resistance: ≥ 500MΩ

Mechanical life: 5000 cycles

Locking method: handle connection

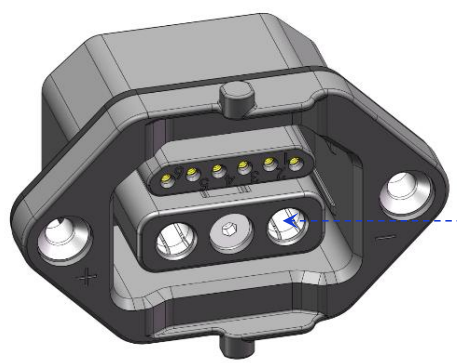
Termination method: wire soldering

Typical Product Dimension



Handle connection with quick connect-disconnect functionality and anti-loosening locking feature

Product Presentation



Supports partial quick replacement

Battery Charging/Discharging Connector

The RF circular connector series serves as the power charging interface for embodied robots. It adopts a bayonet locking mechanism for fast insertion and withdrawal,features an IP67 with standalone receptacle waterproofing, and its long-short pin design enables sequential positive-negative pole conduction.

Primary Technical Specifications

Number of pins: 2, 3

Rated current: 20A / 30A

Rated voltage: 220V

Withstand voltage: 1500V

Insulation resistance: ≥ 500MΩ

Mechanical life: 5000 Cycles

Locking method: bayonet connection

Termination method: wire soldering

Product Presentation

2pins

3pins

Battery Charging/Discharging Connector

The RF wire-to-board connector series is a straight-plug floating-mount type designed for battery discharge interfaces of embodied robots. It accommodates certain mounting tolerances, enables integrated signal and power transmission, and meets the requirements for quick battery replacement.

Primary Technical Specifications

Number of pins: 2+8, 3+12, 4+16

Rated current: power - 30A, signal - 1.5A

Rated voltage: power - 110V, signal - 48V

Withstand voltage: power - 1500V, signal - 500V

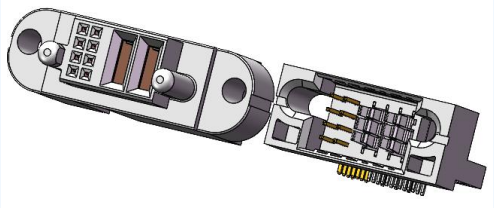
Insulation resistance: ≥ 500MΩ

Mechanical life: 3000 cycles

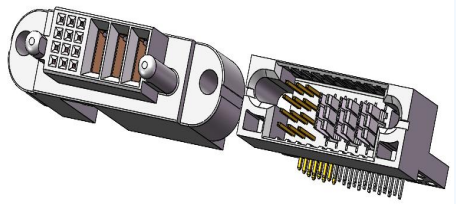
Product structure: straight plug-in floating mounting

Termination methods: crimping type, right-angle soldering, straight soldering (optional)

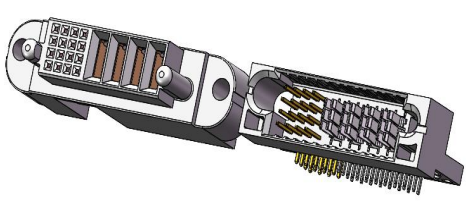
Product Presentation



2+8pins



3+12pins



4+16pins

Joint Breakpoint Connector

The XT connector series is engineered for demanding portable electronics, delivering user-friendly, compact, and robust performance with high current capacity and low resistance.

Primary Technical Specifications

Rated current: 20–45A

Withstand voltage: 500V DC

Mechanical life: 100 Cycles

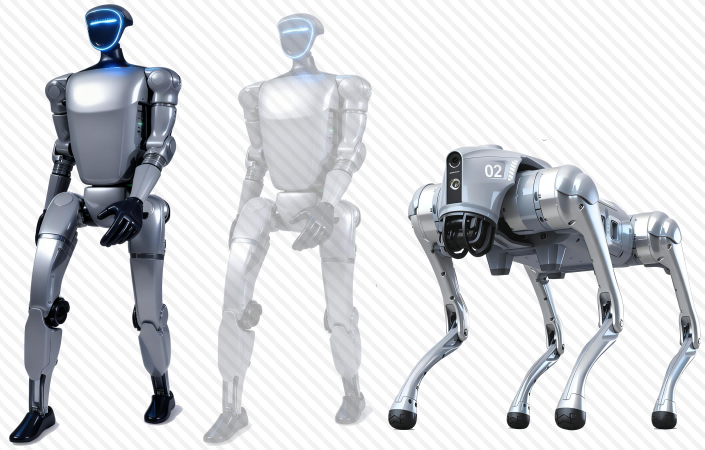
Ambient temperature: -20℃–120℃

IP rating: IP40

Product Presentation

Full range of product models available

Joint Breakpoint Connector



The RF Series 2+2 joint motor connector is a customized variant of the XT Series, engineered specifically for robotic joint motors. Its integrated power-and-signal design further minimizes the connector footprint in joint motors, making it ideal for space-constrained equipment.

Primary Technical Specifications

Rated current (power pin): 20–45A

Rated current (signal pin): 1A

Withstand voltage: 1500V AC 50Hz

Mechanical life: 100 cycles

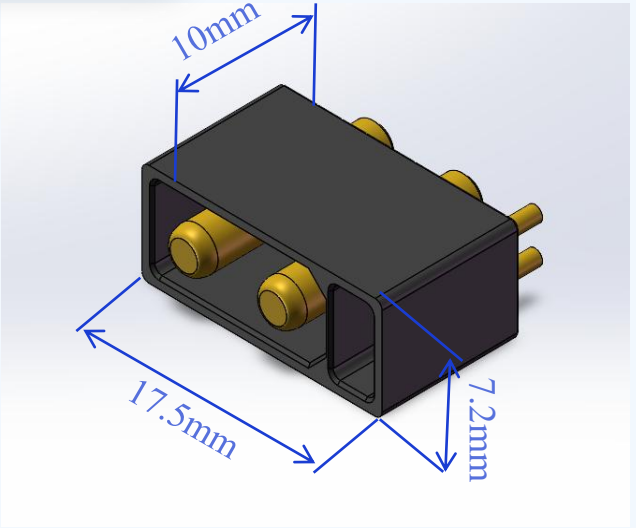
Ambient temperature: -20℃–120℃

IP rating: IP40

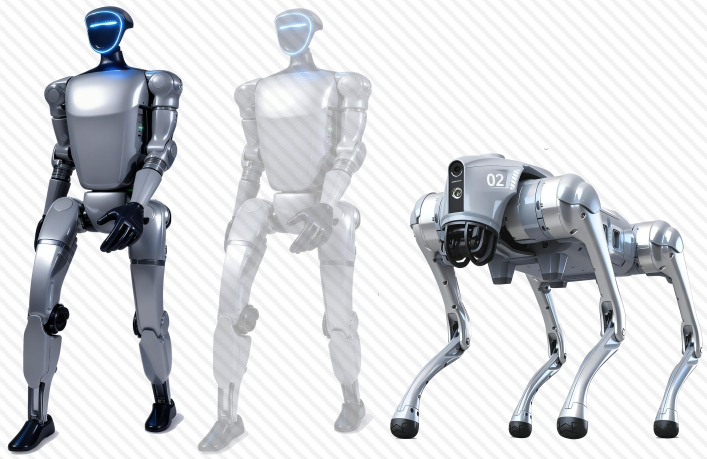
Product Presentation

Full range of product models available

RF-P0202Z-P plug (30A)



Joint Breakpoint Connector



The RF Series 2+2 joint motor connector is a customized derivative of the XT Series, developed specifically for robotic joint motors. Its integrated power-and-signal design further reduces the connector footprint in joint motors, making it ideal for space-constrained equipment.

Primary Technical Specifications

Rated current (power Pin): 20–45A

Rated current (signal Pin): 1A

Withstand voltage: 1500V AC 50Hz

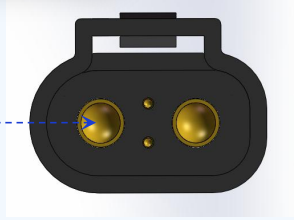
Mechanical life: 100 cycles

Ambient temperature: -20℃–120℃

IP rating: IP67

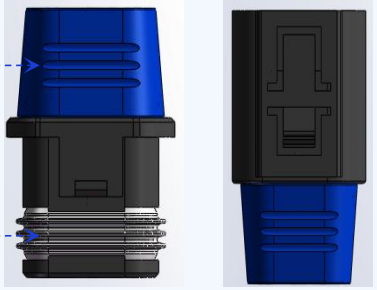
Product Presentation

Power + Signal



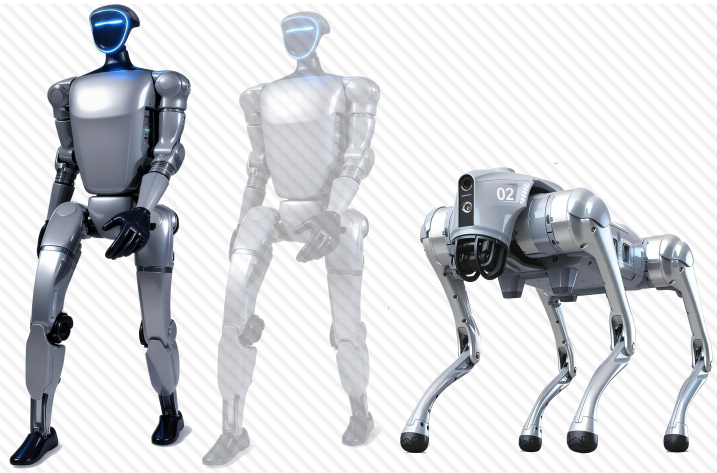
Locking Device

Waterproof Design



Controller Connector

The M12 connector series complies with the IEC 61076-2 standard. It offers excellent electrical performance, electromagnetic compatibility (EMC), and environmental resistance, features multiple termination types and flexible mounting methods, and is mainly used for power and network signal transmission between electrical control systems.



Primary Technical Specifications

Part number series: Acode, Dcode, Xcode, Scode

Numbers of pins: 4, 5, 8, 12

Insulation resistance: ≥100MΩ

Network transmission rate: 100, 1000, 10000 Mbps

Termination methods:

Mobile side: straight crimping, rght-angle crimping, pre-fabricated cables, etc.

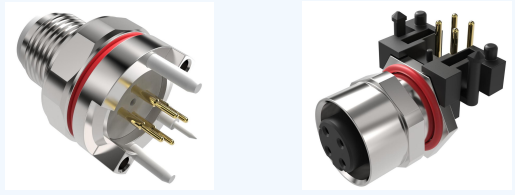
Fixed side: Straight soldering, right-angle soldering, pre-fabricated cables, etc.

Mechanical life: ≥100 Cycles

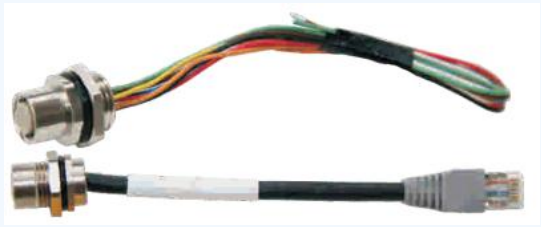
IP rating: IP67

Product Presentation

Mobile side



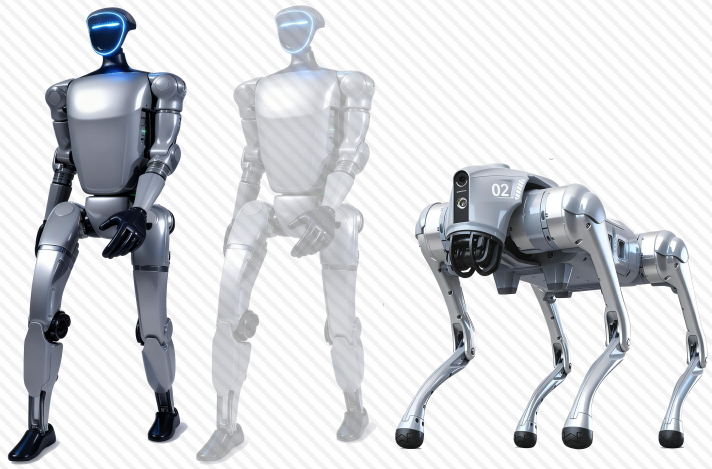
Fixing side



Pre-fabricated cables

Controller Connector

The Push-Pull Series connectors are compact, quick-insertion and withdrawal connectors available in five variants: B, K, C, F and FX. They enable easy and fast insertion and withdrawal, prevent disconnection caused by cable pulling, ensure safe and reliable operation, and are ideal for high-density installations, space-constrained environments and applications where rotary mating and separation is impractical.



Key Features of the Product

Miniaturization: minimum housing size FX101 with a maximum outer diameter of only 12.4 mm

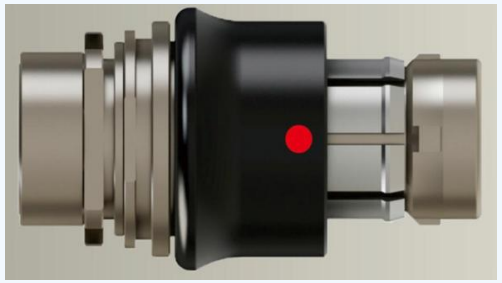
IP Rating: IP68

Ambient temperature: -55℃ ~ +145℃

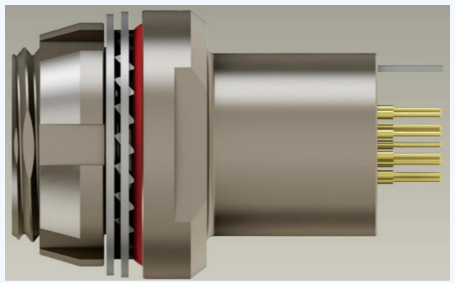
Shielding effectiveness: 360° shielding provides full-range EMC protection

High-speed transmission: Capable of transmitting high-speed signals compliant with multiple standard protocols (USB2.0, USB3.0, HDMI, SATA, DP, Gigabit Ethernet, 10 gigabit ethernet, etc.)

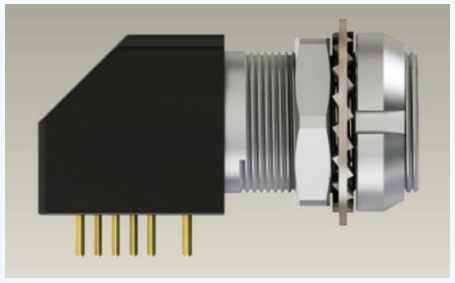
Product Presentation



Crimping Plug Connector



Vertical PCB Receptacle



Right-angle PCB Receptacle

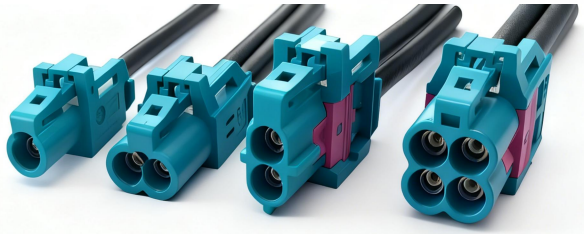
Cable Integration Services

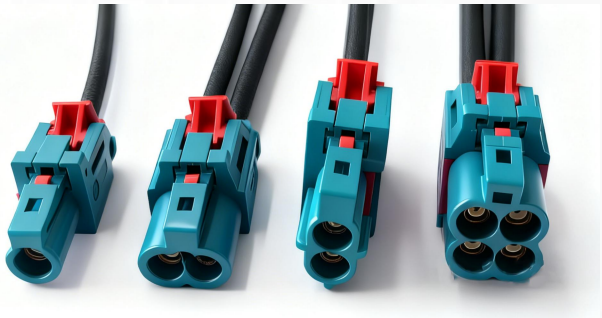
Cable type

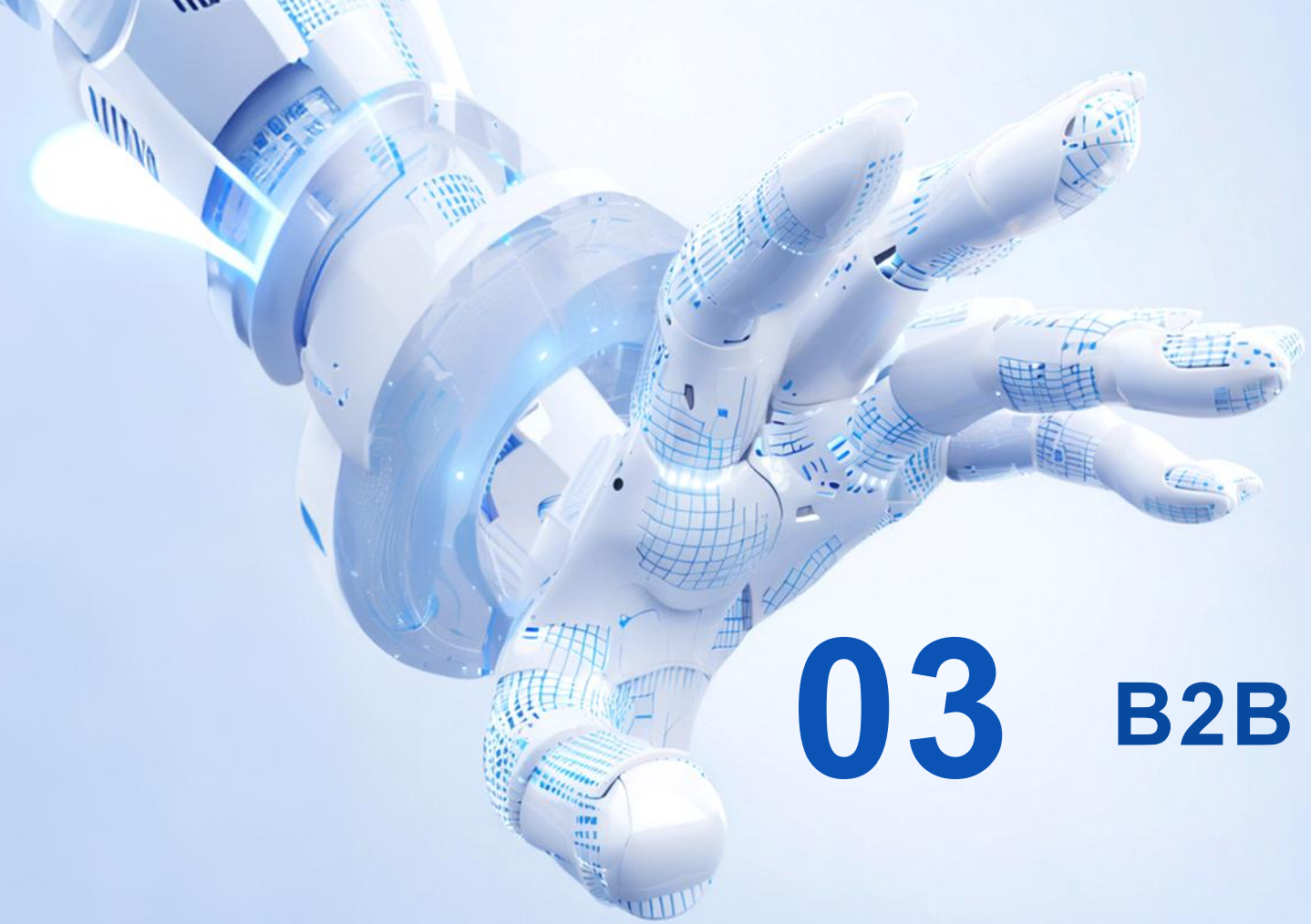
Cables can be customized according to requirements

1 Data Transmission Cables

2 Camera Module Cables







03 B2B Industrial Services

OEM and Assembly Services

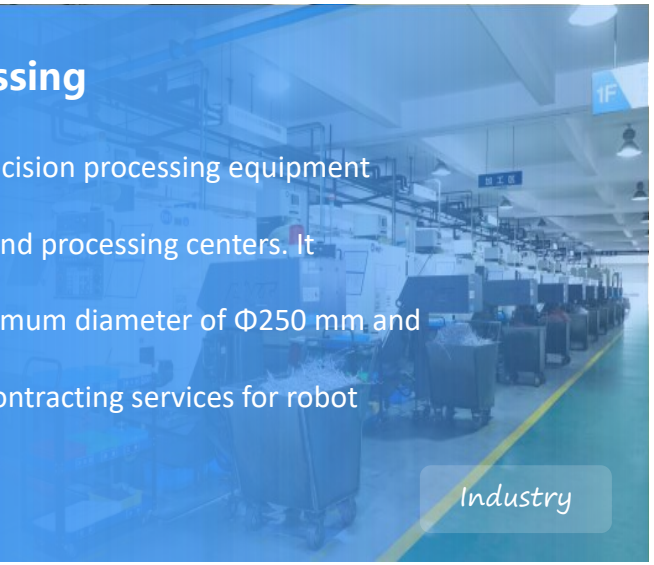
Component Processing

Robot-Assisted Assembly

Robot Commissioning

Robot Component Processing

The company has over 160 sets of precision processing equipment including turn-mill composite lathes and processing centers. It supports shaft processing with a maximum diameter of Φ250 mm and length of 450 mm, and provides subcontracting services for robot component processing.



Robot Subcontracting Assembly Services

The company has established a Manufacturing Research Institute, capable of automation production line planning, design and manufacturing. It currently covers a plant area of 200,000 square meters with manufacturing bases in Taizhou (Zhejiang) and Sichuan, and provides robot subcontracting assembly services.

Embodied Robotics Training & Application Services

Foundational Capability Enablement

Embodied Robotics Application Dept.

YG is establishing an Embodied Robotics Application Development Team to build an integrated capability covering scenario adaptation, solution development and application deployment.

Core Service Offering

Robotics Reinforcement Training

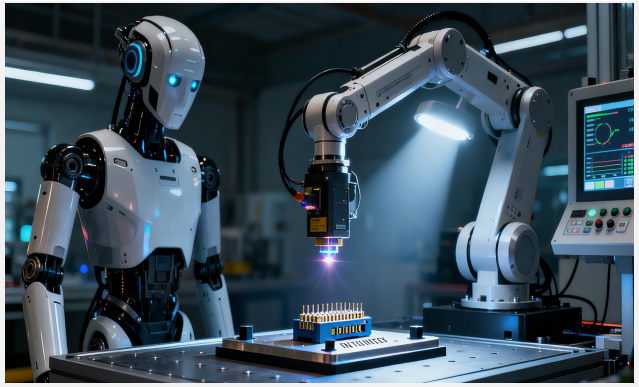
YG will launch reinforcement training services for robotics in connector manufacturing scenarios, integrating precision operation, environmental perception and autonomous decision-making with real manufacturing environments.

Scenario-Based Deployment

Three Core Training Scenarios

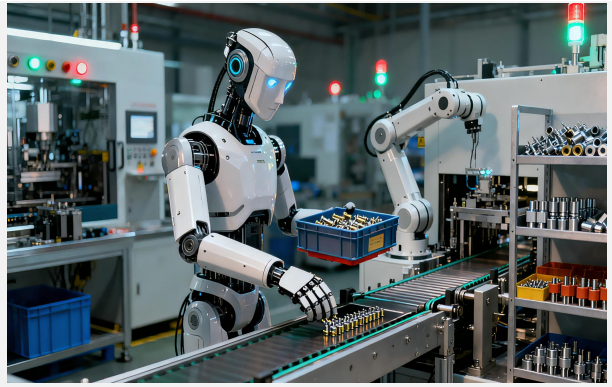
Focused on connector manufacturing processes, the company is currently developing three core training scenarios:

- Laser Printing Scenario
- Production Inspection Scenario
- Flexible Material Feeding Scenario



Laser Printing Scenario

Production Inspection Scenario



Flexible Material Feeding Scenario

YONGGUI

Sichuan Yonggui Science and Technology Co., Ltd

Thanks

If you have product or business requirements, please feel free to contact us. Thank you for your attention.

Contact us

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