

产品手册

PRODUCT MANUAL



**YUE
QUAN
BIONICS**

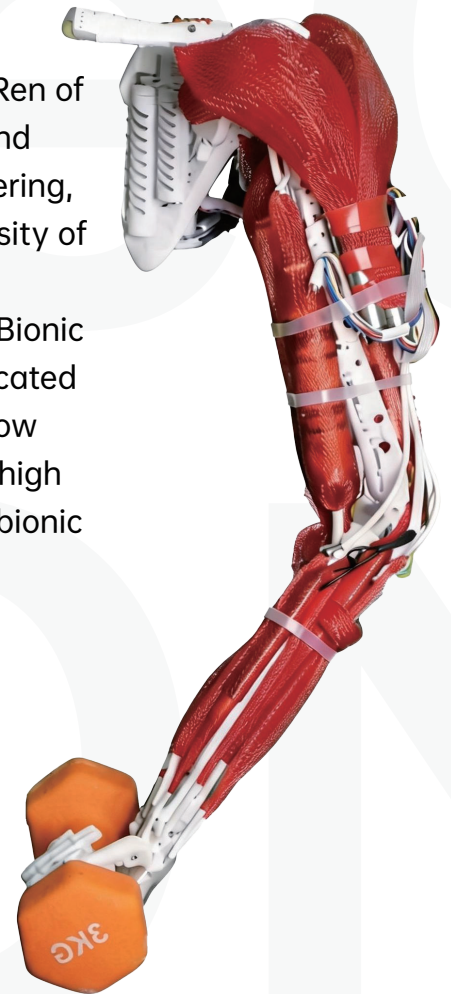
北京达奇月泉仿生科技有限公司
Yue Quan Bionics Ltd.



月泉仿生
Yue Quan Bionics Ltd.

Yue Quan Bionics Ltd. was co-founded by Academician Luquan Ren of the Chinese Academy of Sciences, Professor at Jilin University and Honorary President of the International Society of Bionic Engineering, together with Professor Lei Ren, Tenured Professor at the University of Manchester, National Distinguished Expert, and Yangtze River Scholar. Rooted in Professor Lei Ren's internationally pioneering Bionic Layagrity Robotics Theory and Technology, the company is dedicated to the development of highly bionic humanoid robots featuring low energy consumption, strong arm manipulation capability, and a high level of safety in physical human-robot interaction. Focusing on bionic humanoid robots, embodied intelligent robotics, and bionic intelligence,

Yue Quan Bionics Ltd. is committed to advancing technological innovation and industrial breakthroughs while providing novel bionic solutions for the embodied intelligence industry. Its flagship products, including X-Hand, Y-Hand, X-Bot, and W-Bot, demonstrate leading performance in structural design, operational capability, and scenario adaptability, positioning the company at the forefront of the bionic robotics field.



Y-Hand M2 Dexterous Human-like Manipulation

*Serving Humanity
Inspired by Nature,*

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Series

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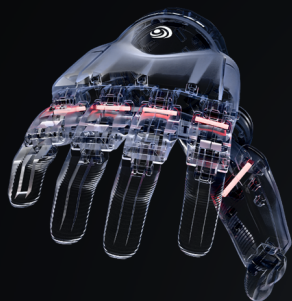


P13-P16

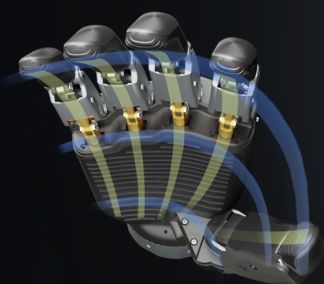
信手 X-Hand M1

11-DoF Bionic Hand With Sensitive Tactile Perception

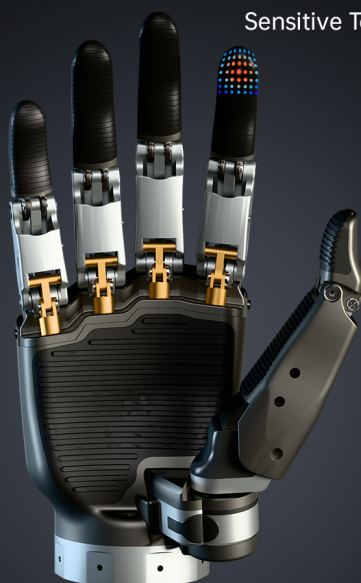
The X-Hand M1 series, independently developed by Yue Quan Bionics Ltd., is an 11-degree-of-freedom rigid bionic dexterous hand designed to deliver highly human-like manipulation capability. Featuring a highly anthropomorphic structural design, it integrates efficient actuation and intelligent perception technologies to support a wide range of dexterous operations, including grasping, holding, pinching, supporting, and carrying.



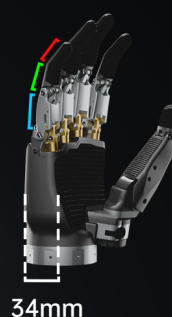
Bionic Annular Oblique Axes



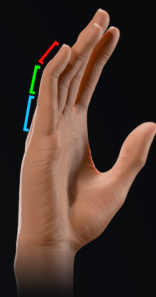
Bionic Arches of Hand



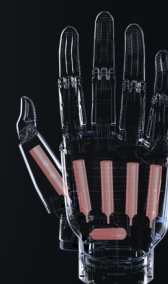
Sensitive Tactile Perception



34mm



Anthropomorphic Hand Dimensions and Segment Proportions



High Power-to-Weight Ratio Motors

Velocity
Closing Time **0.4s**

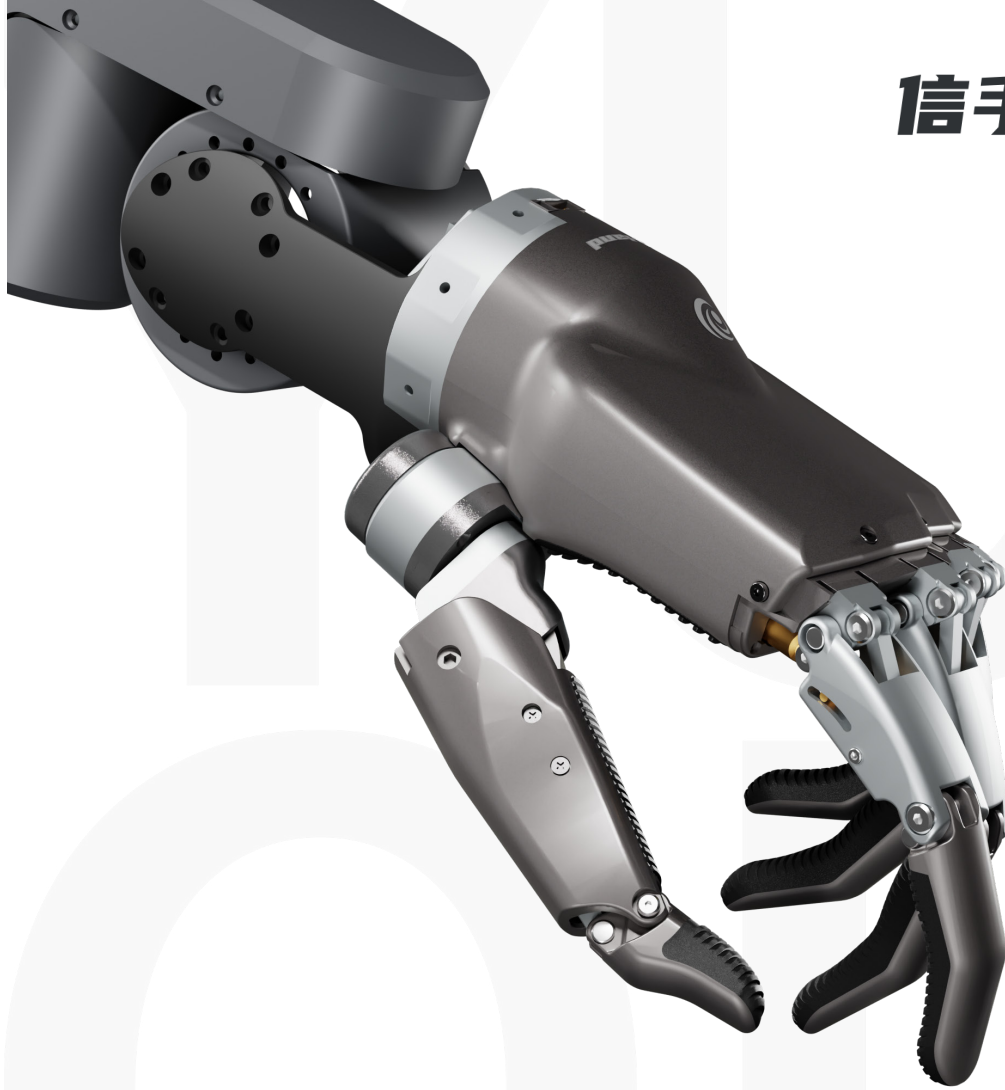
Strength
Grasping Force **100N**

Accuracy
Repeatability
(at fingertip)

±0.1mm

Sensitive Perception
Sensing Units **472**

信手 X-Hand M1



Performance

Joints	11
Fingertip Force	30N
Grasping Force	100N
Fingertip Repeatability	$\pm 0.1\text{mm}$
Weight	630g
Lifting Load	40kg
Closing Time	0.4s
Service Voltage	24V
Control Frequency	MAX.2kHz
Interface Protocol	Ethernet, CAN/RS485 (Customizable)
Tactile Sensor Units	472

应手 Y-Hand M2

The World's Highest-Degrees-of-Freedom Bionic Dexterous Hand

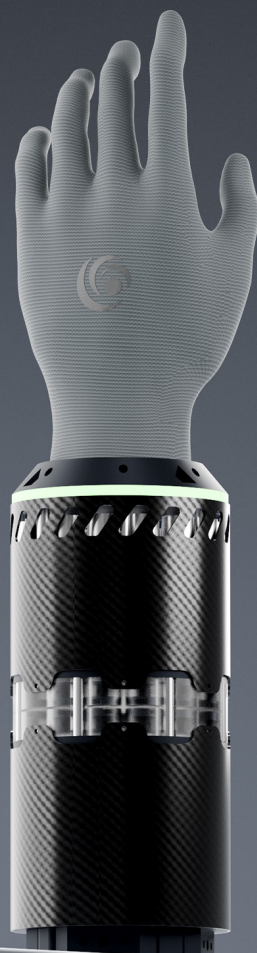
38 DoF

The Y-Hand M2 series, independently developed by Yue Quan Bionics Ltd., is a bionic dexterous hand built on the Bionic Layagrity Robotics Theory and Technology proposed by its founder, Prof. Lei Ren. This internationally pioneering theory and technology delivers three disruptive innovations at both the theoretical and technical levels.

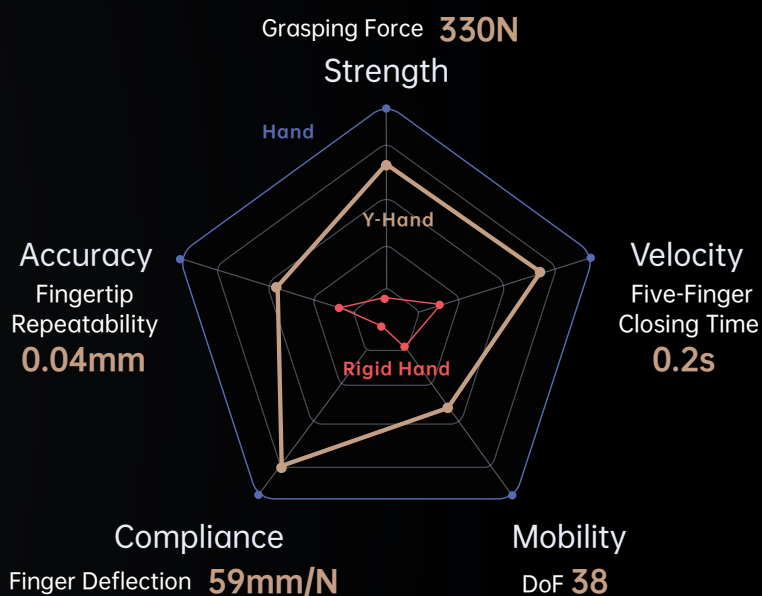
First, it replaces conventional rigid-hinge joints with biomimetic three-dimensional 6-DoF joints, significantly enhancing joint flexibility and compliance.

Second, the company's self-developed magnet-integrated soft-actuator artificial muscles replicate the biomechanics of the human musculoskeletal system, providing a high power-to-weight ratio while integrating actuation, transmission, and speed modulation.

Third, it adopts a bioinspired multi-layer rigid-flex coupling architecture modeled on the human musculoskeletal system, enabling system-level power transmission, energy management, and interaction with the environment.



38 DoF



Strength, Velocity, Accuracy, Mobility, Compliance

5 in 1

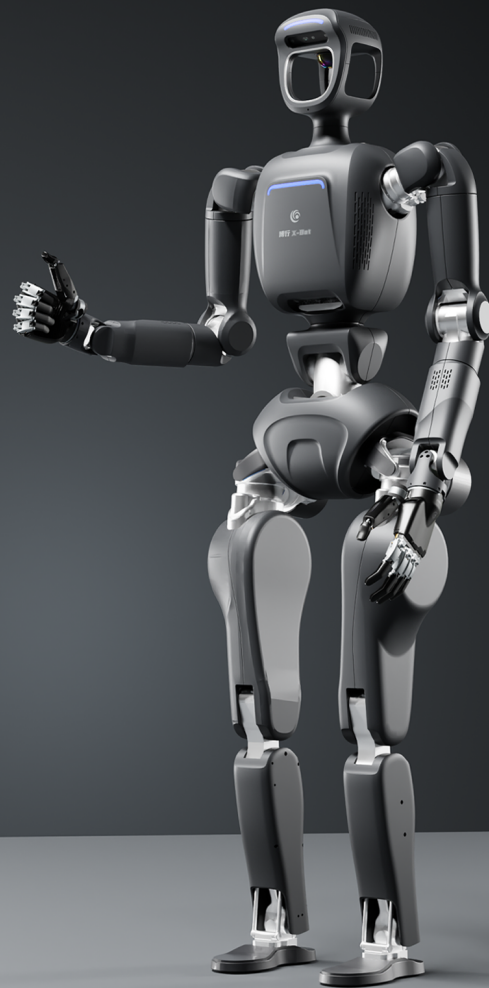
Performance

Parameter Name		Basic Specifications
Degrees of Freedom (DoF)		38
Tip Force		180N
Five-Finger Grip Force		330N
Repeat Positioning Accuracy		0.04mm
Weight		299.7g (Palm) + 2215g (Forearm)
Service Life		300,000 Cycles
Five-Finger closing Time		0.2s
Supply Voltage		48V
Four-Finger Motion Range	MCP Flexion	-10°~65°
	MCP Abduction	-8°~13°
	PIP Flexion	-4°~80°
	DIP Flexion	-8°~60°
Thumb Motion Range	CMC Axial Rotation	-4°~9°
	CMC Flexion	0°~40°
	CMC Abduction	0°~-30°
	MCP Flexion	-4°~30°
	MCP Abduction	0°~6°
	IP Flexion	0°~70°
Control Frequency		MAX.2kHz
Interface Protocol		Ethernet, CAN/RS485 (Customizable)
Finger Deflection		59mm/N

博行 X-Bot

Full-size General-purpose Humanoid Robot

The X-Bot is a highly bionic humanoid robot standing 1.67 m tall and weighing 65 kg, featuring a torso-inspired configuration. Its body is driven by up to 51 quasi-direct-drive flexible force-controlled actuators. The legs are equipped with four industry-leading, high-sensitivity quasi-direct-drive force-controlled joints with a 7:1 gear ratio and the highest torque density in the field, enabling human-like motion control



Mechanical Structure

6 Degree-of-freedom Leg

7 Degree-of-freedom Arm

X-Hand M1

Whole body 51 degree-of-freedom

Actuation System

High power-to-weight ratio motor

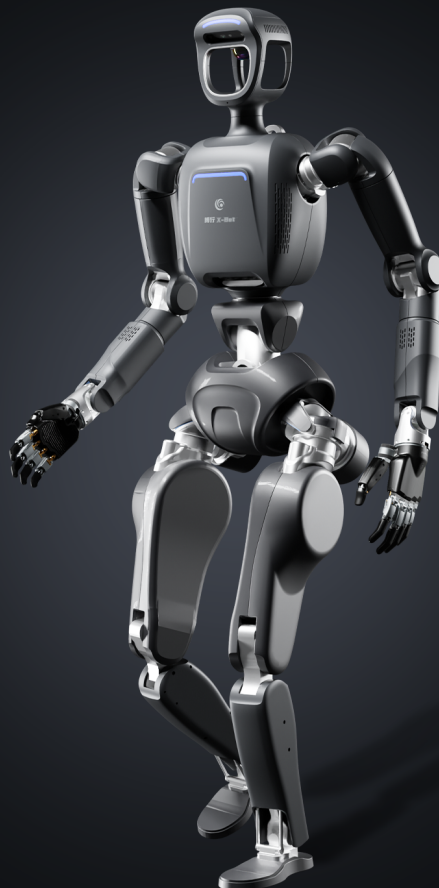
High integration module

Joint 340N · m

Power System

Battery capacity 1188W · h

Endurance 3h



Multi-source Sensing

Depth Camera and 360° LiDAR

Mounted on head

1060 Tactile Sensing Units mounted on hands

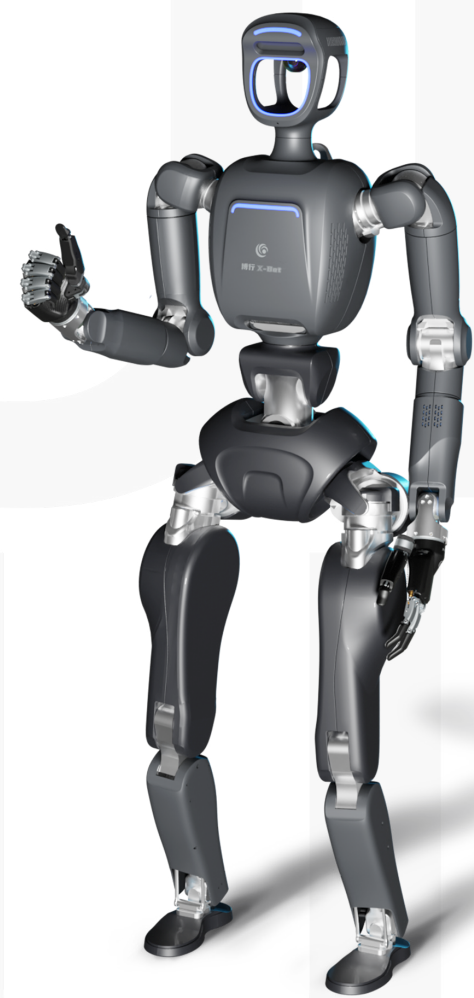
Motion Control System

Brain NVIDIA Jetson Orin NX 16GB

Cerebellar NUC12WSKi7

High robustness self-developed WBC (Whole body dynamics control) MPC (Model predictive control)

Locomotion Speed 1.5m/s



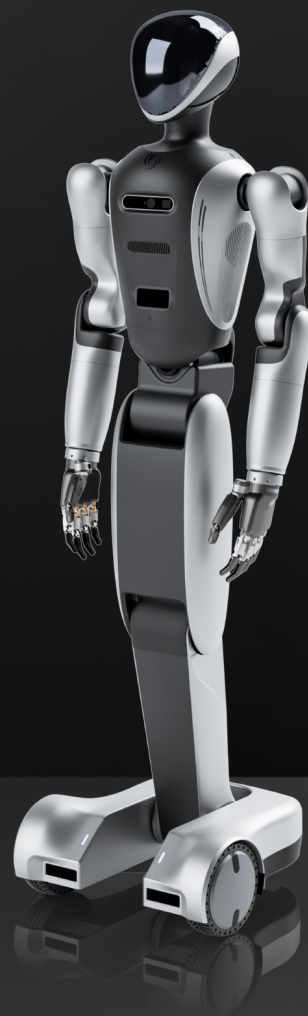
Technical Specifications

Full Body Size	1670 mm	Overall Weight	65 kg
Whole Body Degrees of Freedom	51 DoF	Walking speed	max. 1.5 m/s
Single Leg Degrees of Freedom	Hip x3 + Knee x 1 + Ankle x 2 = 6		
Single Arm Degrees of Freedom	Shoulder x 3 + Elbow x 1 + Arm x 1 + Wrist x 2 = 7		
Waist Degrees of Freedom	3		
Joint Torque	Knee Joint: 340 N·m, Hip Joint: 340 N · m, Ankle Joint: 46 N·m, Arm Joint: 60 N · m		
Battery	Battery capacity 1188W·h, Maximum voltage 48 V, Maximum output current 25 A		
Communication Connection	Wi-Fi 6, Bluetooth 5.0, Easy remote real-time control and debugging		
Control and Sensing Computing	High robustness self-developed WBC (whole body dynamics control) MPC (model predictive) control algorithm.		
Cerebellum	NUC12WSKi7 for robot motion control		
Brain	NVIDIA Jetson Orin NX 16GB Embedded PC for AI Computing, Vision Processing, Upper Decisions		
Perception Sensors	Intel Realsense D435 Depth Camera livox 360 Radar		

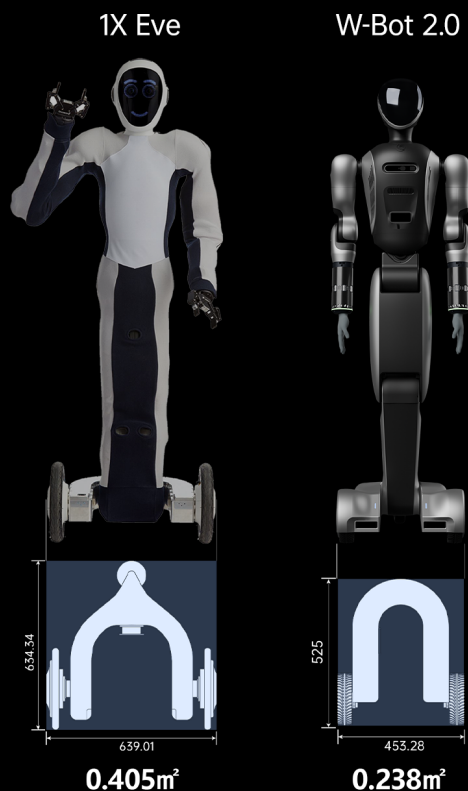
博文 W-Bot 2.0

The World's Smallest Wheeled Humanoid Robot

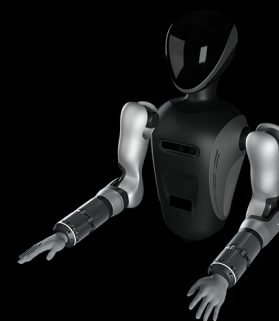
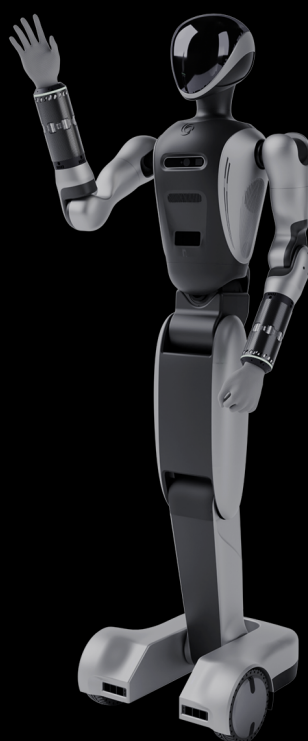
W-Bot is a wheeled humanoid robot with a chassis footprint of only 0.2 m². Featuring a bionic structural design based on human-like joint proportions, it achieves an engineering breakthrough with an operating range from ground level up to 2.2 meters and a single-arm operating radius of no less than 75 centimeters. The robot is equipped with 43 degrees of freedom across the body, enabling the precise execution of complex movements such as torso twisting and lateral bending. With LiDAR and dual depth cameras, W-Bot establishes a full-domain perception system for precise environmental sensing and intelligent prediction. With a maximum speed of 3 m/s, it provides efficient and intelligent solutions for a wide range of application scenarios.



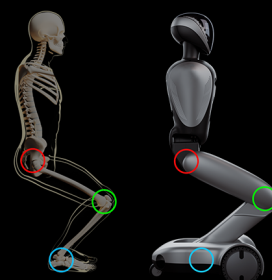
World's Smallest AGV Chassis



High mobility and capability to operate in confined spaces



Dual-Arm payload capacity up to 20 kg
7 DOF Humanoid Robotic Arm



Full-body hierarchical neural network motion balance control Operating height: 0-2.2 meters

Humanoid Hip-Knee-Ankle
Triple-folding Design

Product Parameters

1755mm

Full Body Size

70kg

Overall Weight

45

Whole-Body DoF

MAX.3m/s

Walking speed

808mm

Single-Arm Reach

Whole-Body DoF	45 degrees of freedom
Single-Arm DoF	Shoulder joint x 3 Elbow joint x 1 Arm joint x 1 Wrist joint x 2 = 7
Torso DoF	Hip joint x3 + knee joint x1 + ankle joint x1 + chassis x2 + head x2 = 9
Joint Module Torque Limit	Max. knee joint torque: 207 N·m; max. ankle joint torque: 207 N·m; arm joint torque: approx. 60 N·m
Single-Arm Payload Capacity	10 kg, With a 6-axis force sensor, the robot can accurately estimate the actual weight of grasped objects.
Dexterous Hand	X-Hand M1 or Y-Hand M2, meeting the needs of various application scenarios.
Battery	Battery capacity: 28 Ah; maximum voltage: 48 V; maximum output current: 30 A
Communication Connection	CAN, Ethernet

Comprehensively Optimized Structure - Integrating Bionic Design with Engineering Reliability



Rich Facial Expressions



Unleashed Athletic Power



Larger Caster Wheels & Optimized Ankle Structure



Upgraded Hardware System: Greater Stability and Safety

The core hardware architecture has been upgraded to provide stronger underlying support for complex tasks.

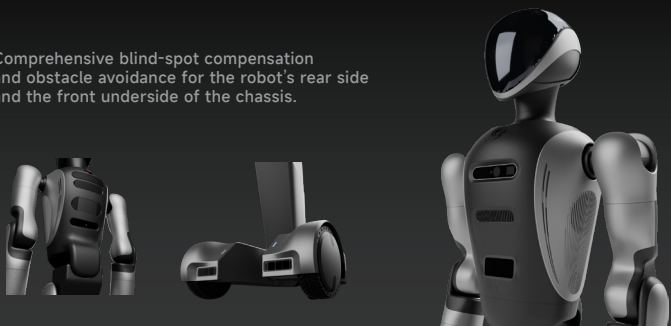
Optimized battery energy density delivers more stable and efficient system operation.

The upgraded remote emergency-stop solution features heartbeat and disconnection detection, significantly improving the overall safety level.



Expanded Perception Dimensions - Building a Full-Coverage Perception Network

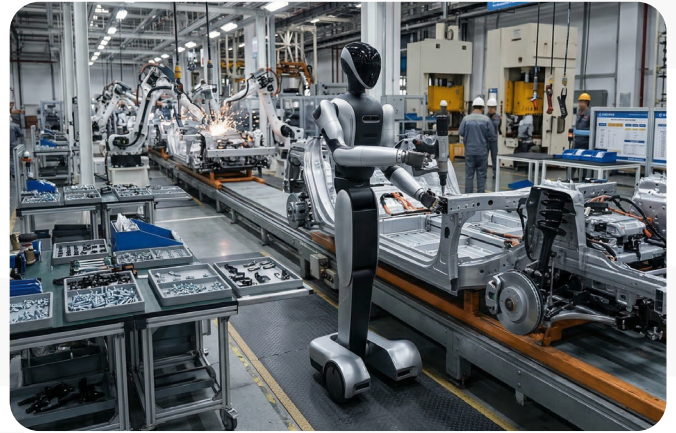
Comprehensive blind-spot compensation and obstacle avoidance for the robot's rear side and the front underside of the chassis.



应用场景



Warehousing & Logistics



Intelligent Manufacturing



Inspection & O&M



Healthcare



Social Services



Housekeeping & Elderly Care

YQ Motors 系列电机

The YQ Motors series, independently designed and developed by Yue Quan Bionics Ltd., is a series of coreless motors engineered for high-performance robotic actuation. Featuring a coreless winding structure, the motors offer outstanding advantages, including high speed, high torque, high power density, and low noise. By eliminating cogging torque, the series delivers smoother operation at both high and low speeds, enabling more precise and stable control.

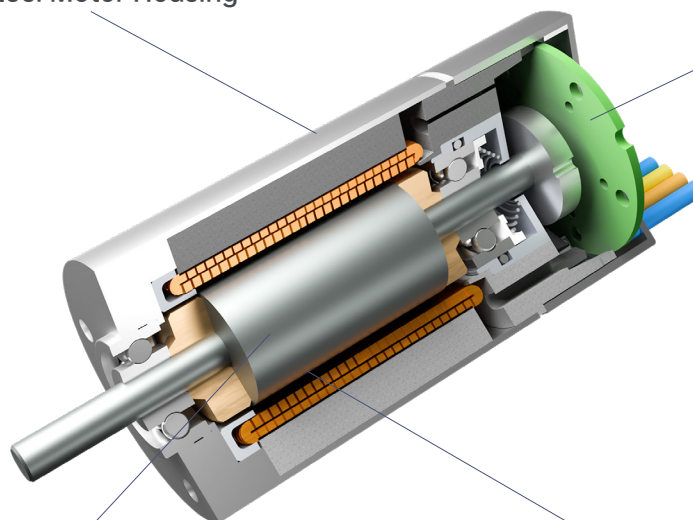


Features of YQ Motors with Coreless Winding:



- ① Brushless DC motor
- ② Long service life
- ③ High efficiency
- ④ Linear motor characteristics
- ⑤ No cogging torque
- ⑥ Strong overload capacity
- ⑦ Rotor equipped with high-performance NdFeB permanent magnets

Integrated Stainless Steel Motor Housing

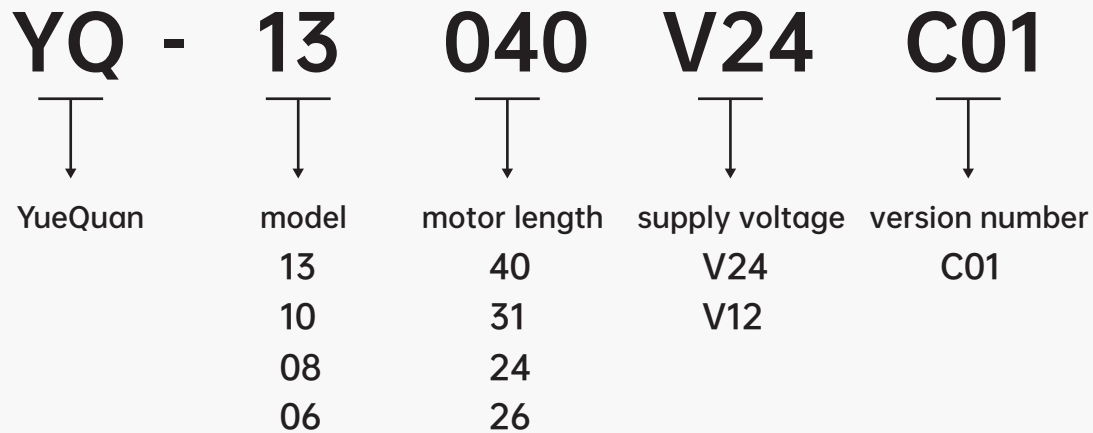


Multiple Sensor
Options Available:
Temperature Sensor
Hall Element
Magnetic Encoder

Rotor Equipped with High-performance
NdFeB Permanent Magnets and Balanced

High-efficiency Coreless Winding

naming convention



model

YQ-13040V24-C01

YQ Motor 13 mm diameter,
40 mm length, 24 V power supply, version C01

Product specifications

	YQ-22044V24	YQ-16039V24	YQ-13040V24	YQ-10024V12	YQ-08026V12	YQ-06022V12	YQ-04031V12
Rated Voltage (V)	24	24	24	24	12	12	12
No-load Speed (RPM)	35000	33000	20000	33000	50000	56000	62000
No-load Current (A)	0.19	0.12	0.09	0.1	0.1	0.08	0.07
Rated Speed(RPM)	29000	29000	22100	41500	35000	44500	25500
Rated Current (A)	3.75	1.7	0.65	0.6	0.4	0.3	0.1
Rated Torque (mN·m)	20	9.5	6	1.75	1	0.4	0.17
Stall Torque (mN·m)	200	90	30	11.3	3	1.2	0.35
Efficiency (%)	70.00	73.14	73.00	75.00	60.00	51.77	37.83
Phase-to-phase Resistance (Ω)	0.56	1.60	4.60	3.40	3.30	21.00	31.00
Phase-to-phase Inductance (mH)	0.062	0.046	0.140	0.070	0.020	0.075	0.102
Motor Length (mm)	43	39	40	24	26	22	31
Weight (g)	74	48	35	11	8	3	1.5
Number of Pole Pairs	1	1	1	1	1	1	1



YQ-04031V12



YQ-06022V12



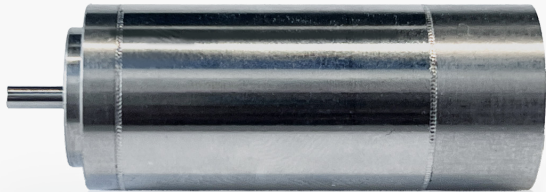
YQ-08026V12



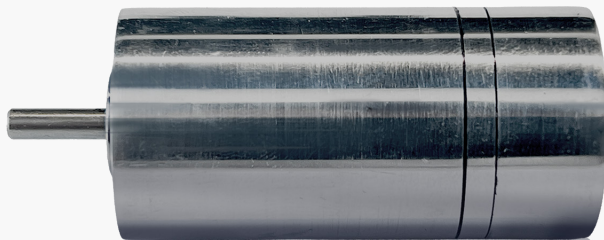
YQ-10024V12



YQ-13040V24



YQ-16039V24



YQ-22044V24

源于自然 服务人类

Inspired by Nature Serving Humanity



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