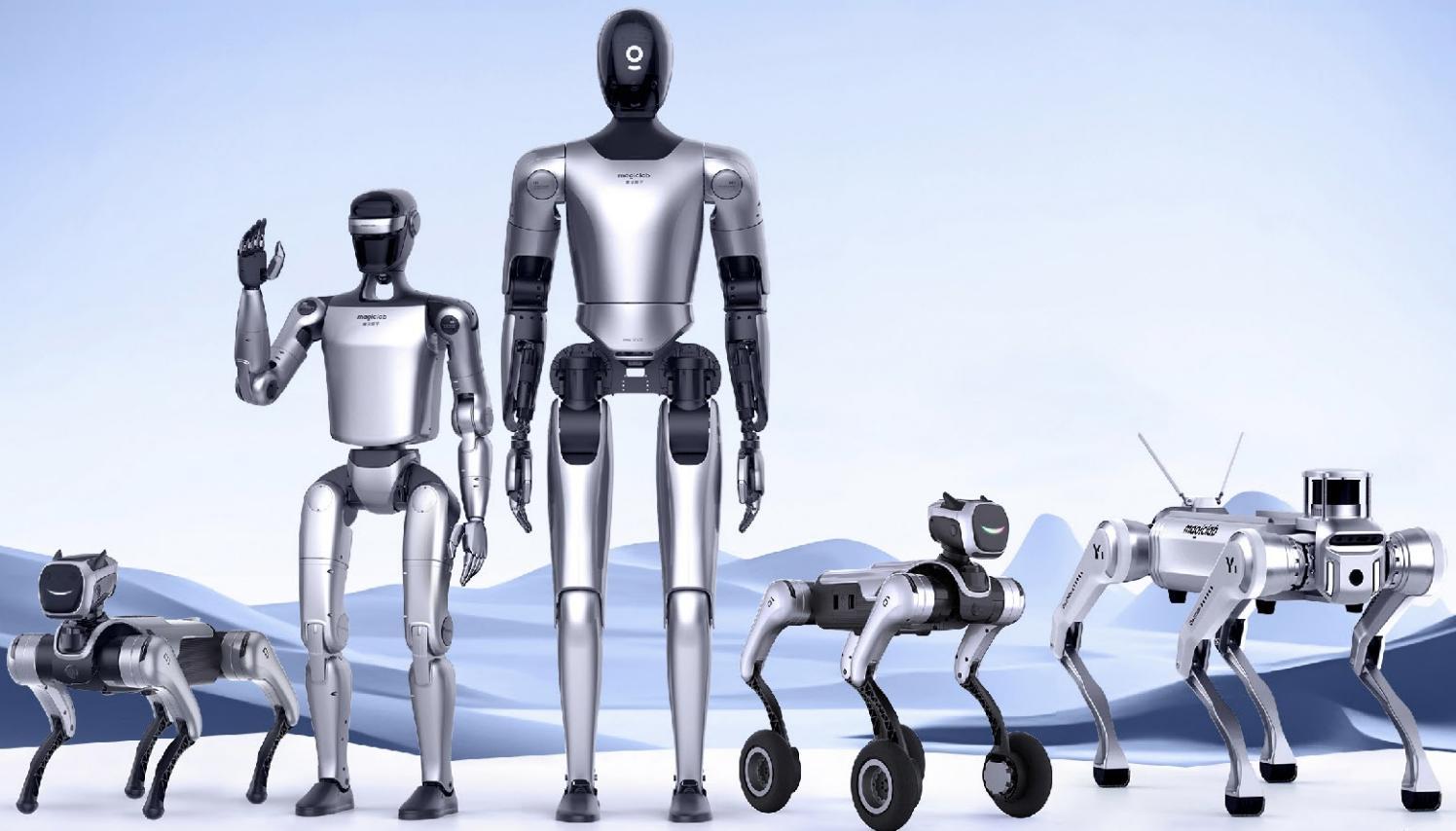


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MagicLab Product Manual

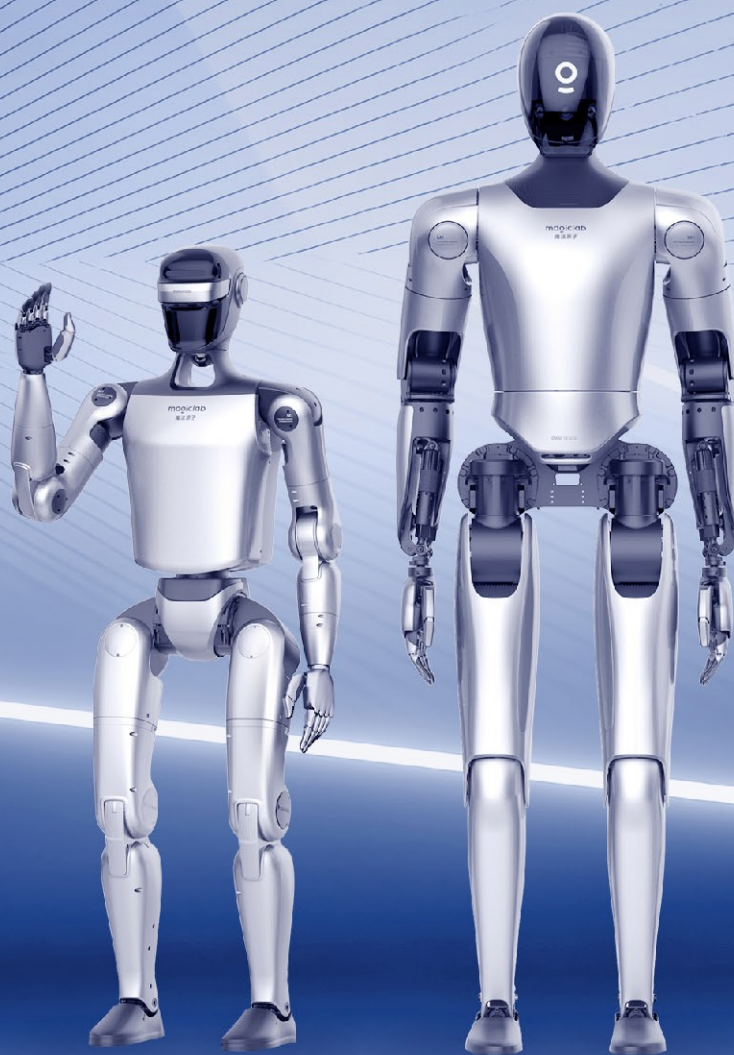
Empowering Every Corner of the Earth with
General-Purpose Robotics



magiclab

Bipedal Humanoid Robot Series

MagicBot Gen1 | MagicBot Z1



MagicBot Gen1

General-Purpose Bipedal Humanoid Robot

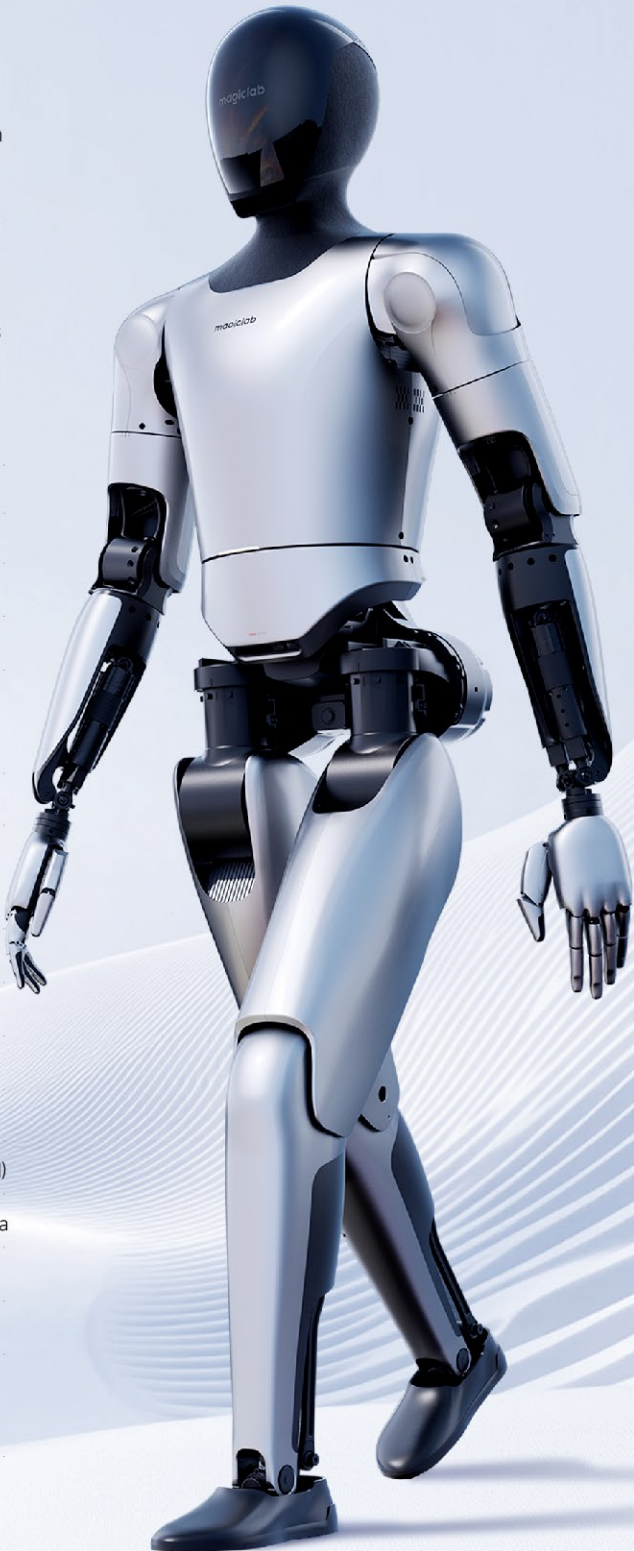
Magiclab Xiaomai: Transforming Industries Everywhere

China's First General-Purpose Humanoid Robot with Multi-Robot Collaboration

- 42 Active Degrees of Freedom for fluid, lifelike movements
- Equipped with in-house developed Magic-Hand (advanced dexterous hand) and joint modules
- Powered by Magic-Mind, our proprietary industry-specialized AI model, empowering businesses across industrial, commercial, and household sectors

Parameter Introduction

Dimensions (Standing)	174 × 58 × 28 cm (H × W × D)
Arm Span	160 cm
Calf + Thigh Length	96 cm (51 cm + 45cm)
Total Weight	Approximately 70 Kg
Battery	25 Ah (1.35 kWh)
	Max Voltage: 62.25 V
Motion Speed	≥2 m/s
Maximum Dual-Arm Load	20 Kg
Maximum Joint Torque	≥350 N·m
Maximum Slope Climbing	>20°
Dexterous Hand	11-DOF Tactile Dexterous Hand (standard)
Degrees of Freedom (Arm)	7 per Arm (Shoulder ×3, Elbow ×1, Wrist ×3)
Degrees of Freedom (Leg)	6 per Leg (Hip ×3, Knee ×1, Ankle ×2)
Computing	High-Performance Computing Module (standard)
Sensors	3D LiDAR, Depth Camera, Triple Fisheye Camera
Audio Module	Circular Microphone Array, Speaker
Communication Module	5G Module, Bluetooth 5.2, Wi-Fi 6
Gear Reducers	Planetary Reducers
	Harmonic Reducers



MagicBot Z1

MagicLab's Bipedal Humanoid Robot

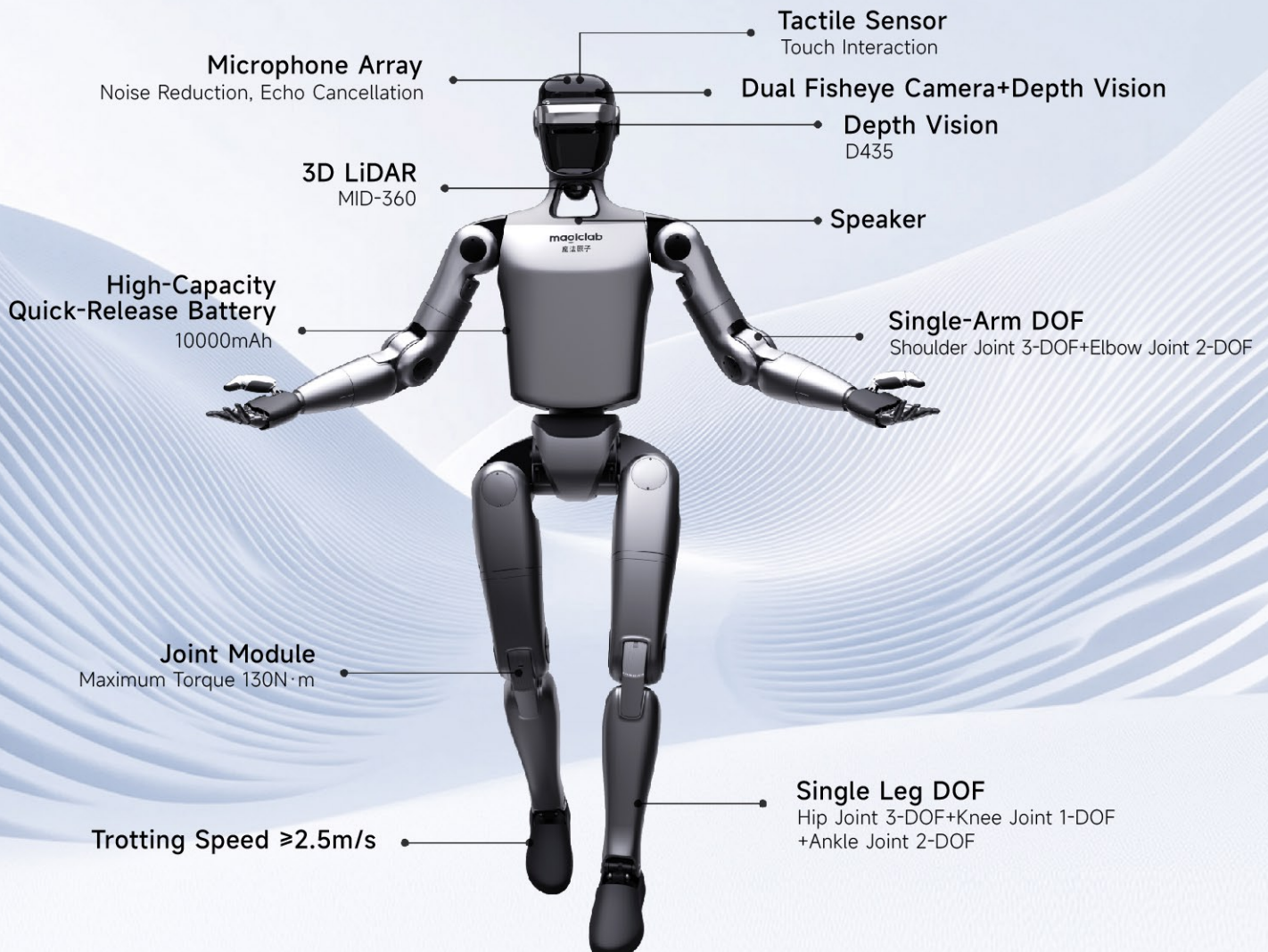
Redefining the Value Dimensions of Humanoid Robots!

High-Performance & High-Reliability Robot

- **Top Mobility Performance:** 50 bio-inspired joints, 320° ultra-wide motion range and 130N·m high joint torque. Z1 is capable of executing difficult maneuvers like consecutive fall-recovery with ease, delivering robust support for high-dynamic R&D and applications.
- **Industrial-Grade Durability:** Aerospace-grade aluminum alloy + engineering plastic body for fall and crash resistance. Intelligent air-cooling system enables sustained high-intensity operation. Minimized maintenance cost to ensure undivided focus on core missions.

Open AI Ecosystem

- **Rapid Development and Human-like Evolution:** Powered by multi-source databases, Z1 can master new movements in 20 minutes with dual enhancements in training efficiency and anthropomorphic performance.
- **Hardcore Expandability and Free Customization:** Optional modules including computing power packs/7-DOF arms/dexterous hands, enabling on-demand configuration to unlock limitless innovation possibilities.



Parameter Introduction

Specifications	Z1 Developer Edition	Head Z-axis range of motion	±40°
Height/Width/Depth (standing)	1369*422*200mm	Waist Z-axis range of motion	±160°
Weight (with battery)	40kg+	Knee joint range of motion	0-152°
Total DOF (joint motors)	24 - 50	Hip joint range of motion	P±160°、R-30~+110°、Y±160°
Head DOF	1	Base Computing Unit	8-Core High-Performance CPU
Waist DOF	1	High-Performance Computing Module	Optional
Single Leg DOF	6	Perception Sensor	3D LiDAR+Depth Vision+Dual Fisheye Camera+Head Tactile Sensor
Single Arm DOF	5+ (Optional 2 Arm DOF)	Smart Battery (Quick-Release)	10000mAh
Dexterous Hand DOF	Optional 11-DOF Tactile Dexterous Hand	OTA	Support
Max Knee Torque*	130N·m	Secondary Development Kit	Support
Max Arm Payload*	3kg	Motion Demonstration	Anthropomorphic Walking, Anthropomorphic Running and Automatic Fall Recovery
Lower Leg+Thigh Length	0.6m	Voice Interaction	Voice Command、Chatbots
Arm Span	0.5m	Advanced Function	Exhibition Guide

*Maximum torque, arm payload, and endurance time are measured under laboratory conditions.
*Specifications may vary across different application scenarios and hardware configurations. Actual performance shall prevail.

Diverse Scenario Applications Deployment

- **Agile Mobility, Universal Scene Compatibility:** With high-dynamic mobility and all-terrain balance,Z1 effortlessly adapts to diverse scenarios from STEM education to commercial performances.
- **Intelligent Interaction and Autonomous Navigation:** With 360° perception and self-navigation capabilities,Z1 features multimodal dialogue for various scenarios including cultural tourism guidance and home companionship.
- **Boundless Scenarios and Infinite Possibilities:** With full support for customer development,we remain your most reliable technological partner.



Bionic Quadruped Robot Series

MagicDog | MagicDog-W | MagicDog Y1



MagicDog

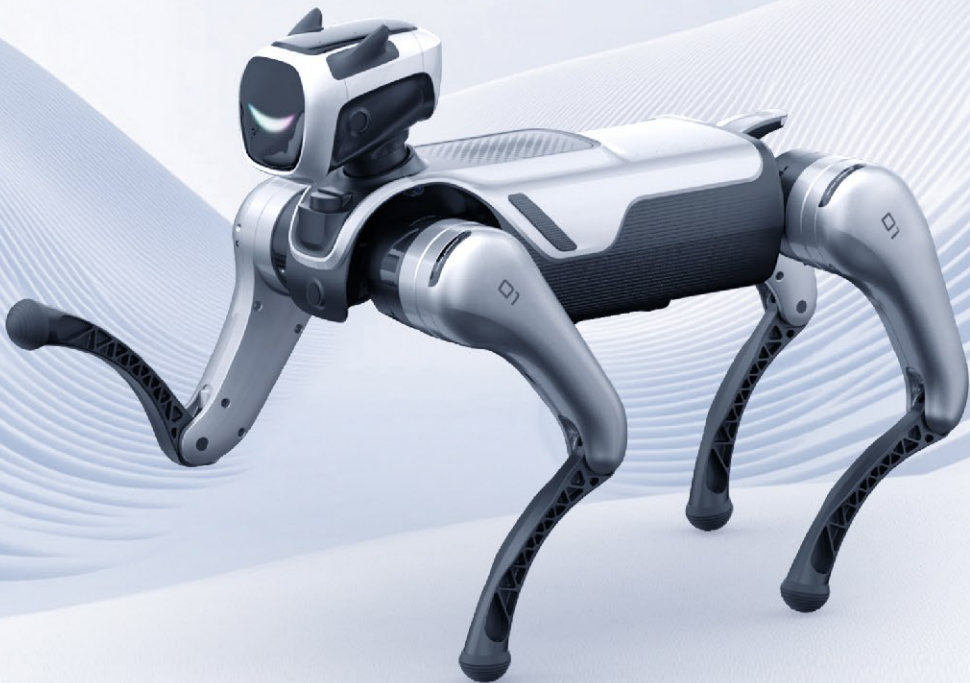
Magiclab Quadruped Robot

Industry’s First Quadruped Robot with Integrated Head Motion

- 13 Degrees of Freedom enabling lifelike, agile motion
- In-house Developed Joint Modules for precision and reliability
- Intelligent Emotion Engine enabling multi-modal interaction through voice, vision, and touch

Parameter Introduction

Dimensions (Standing)	67 × 35 × 56 cm (L × W × H)	Computing	High-performance 8-core CPU
Dimensions (Crouched)	72 × 44 × 29 cm (L × W × H)	Maximum Joint Torque	Approx. 37.5 N·m
Degrees of Freedom	12 + 1 (head movement)		Torso: -37.0° to 45.0°
Weight	Approx. 17 Kg (including battery)	Joint Range of Motion	Thigh: -207.5° to 72.5°
Battery	8200 mAh, Rated Voltage: 29.6 V		Shin: -143.0° to -30.0°
Battery Life	Approx. 2.5 hours continuous operation	Sensors	LiDAR, Binocular Camera, Depth Camera,
Payload	≈5kg (Max. ≈10kg)		4K HD Camera, Fisheye Camera, Ultrasonic Sensors
Movement Speed	0–3.0 m/s	Touch Sensors	Integrated Touch Sensors
Maximum Climb Height	Approx. 18 cm (lab-tested)	Audio Module	Circular Microphone Array, Speaker
Maximum Climbing Slope	40° incline (lab-tested)	Pre-programmed Actions	Over 30 Pre-programmed Maneuvers



MagicDog-W

Wheeled Quadruped Robot

Industry's First Wheeled Quadruped Robot with Integrated Body-Head Motion

- Equipped with 17 motors throughout the body, MagicDog-W achieves agile movement and adapts to various terrains.
- In-house developed joint modules for precision and reliability, lightweight design and efficiency for high performance.
- Intelligent emotion engine enabling multi-modal interaction through voice, vision, and touch.

Application Scenarios

Scientific research, and commercial performance. It can also be used in basic patrol, survey and other operation scenarios in various industries after being equipped with more accessories.

Parameter Introduction

Dimensions (Standing)	67 x 35 x 65 cm (L x W x H)
Dimensions (Crouched)	72 x 50 x 29 cm (L x W x H)
Tyres	7-inch pneumatic tire
Motors	16+1 (head movement)
Weight	Approx. 22.5 Kg (including battery)
Battery	Capacity: 8200 mAh、Rated Voltage: 29.6 V
Battery Life Performance	2-4 h
Payload	Up to 10 Kg
Movement Speed	≥3.0 m/s
Maximum Climbing Height	≥60 cm
Maximum Climbing Slope	≥40°
Computing	High-performance 8-core CPU
Expansion Module	High - Performance Compute Accelerator Module
Maximum Joint Torque	37.5 N·m
Joint Range of Motion	Torso: -37.0°~45.0°、Thigh: -207.5°~72.5°
	Shin: -143.0°~-30.0°、Head: -60.0°~ 60.0°
Sensors	LiDAR, Dual Camera, Depth Vision,
	4K HD Camera, Fisheye Camera, Ultrasonic Sensors
Touch Perception	Touch Sensors
Audio Module	Circular Microphone Array, Speaker
Communication Module	WiFi5, 4G Module, BT5.0
Operating Temperature Range	-5°~40°



MagicDog Y1

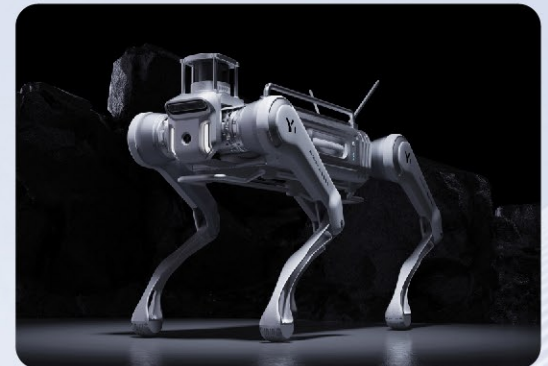
MagicLab's Industrial Quadruped Robot

「 Multi-Engine Robot for All-Round Inspection & Rescue Protection 」

- Aerospace-grade body with IP67 protection, ensuring stable operation from -20°C to 55°C. Ready for all climates, including high/low temperatures, sand, dust, rain, and snow.
- Centimeter-Level Positioning + Dynamic Obstacle Avoidance: Navigating complex environments with precision, stability and safety.
- 24/7 Non-Stop Operation: Instant battery hot-swap with zero downtime; Auto-return recharge at low power.
- Plug-and-Play Open Platform, Second-swap dual-spectrum/gas modules, One-click dispatch integration, Beginner-friendly collaborative operation.

Parameter Introduction

Dimensions (L × W × H)	915mm×458mm×800mm
Total Weight (with Battery)	≤65Kg (with Battery)
Maximum Payload	150kg
Dynamic Payload	45kg
Maximum Speed	6m/s
Maximum Climbing Height	≥60cm
Battery Capacity	45Ah (2400Wh), Voltage 54V
Operating Time	4-6h (>4 h continuous walking with 20 kg load)
Ingress Protection Rating	IP67
Maximum Slope Angle	≥45°
Base Computing Power	8-Core High-Performance CPU
Extended Computing Power	High-Performance Computing Module (157 TOPS)
Communication Module	Wi-Fi 6, BT 5.2, 5G Communication Module (optional for some versions)
Perception Sensors	3D LiDAR ×1 + Depth Cameras ×2 + Optical Cameras ×2 (configurations may vary)
User Expansion Interfaces	(24V+485 output)*4 power supply + power bus, USB3.0*4, (12V output+EthNet)*3 power supply + network; EthCat x 1
Mounting Holes for Expansion Parts	Extension Boards, Sliding Rails, Screw Mounts, Payload Platform
Supported Expansion Devices	Infrared Thermal Imager, Dual-Light PTZ Camera, Gas Sensor, Acoustic Imager, Partial Discharge Sensor, etc.



Industrial Inspection



Industrial Park Security Patrol



Emergency Response



Education and Scientific Research

Self-developed Components Series

MagicHand S01 Dexterous Hand | Joint Module



MagicLab's 11-DOF Tactile Dexterous Hand: Redefining Dexterous Grasping and Manipulation!

Ultimate Dexterity and Perception, Empowering Precision.

- **Human-like Dexterity:** 11-DOF actuation enables smooth motion of pinching, grasping, pressing, lifting, and pushing — perfectly handling complex manipulation tasks
- **Perception Integration:** Featuring ToF proximity sensing and 3D tactile feedback (with 0.1N Resolution), bringing realistic fingertip sensation for fluid autonomous grasping and precise operations.

Powerful Load Capacity and Reliable Durability—Built for Industrial Demands.

- **Powerful Grasp:** 9.1 kg four-finger grip force and 5 kg payload—effortless handling of common industrial and Commercial Objects, Ready for Critical Tasks.
- **Industrial-Grade Reliability:** Aerospace-grade aluminum alloy + integrated die-casting for a strong yet lightweight structure. Proven by 100,000+ rigorous durability tests to ensure long-term stable operation.

Rapid Integration and Development—Accelerating Products Application Deployment

- **Open Connectivity:** Native support for RS485. Adaptable to EtherCAT communication interfaces.
- **Agile Development:** Offering a concise and efficient API command set and enabling quick integration with robots/cobots for instant dexterous control.

Parameter Introduction

Dimensions	200mmx87mmx55mm	Tactile Sensor Resolution*	0.1N
Total Weight	≤650g	Tactile Sensor Range	0.1-10N
Index Finger Count	5	Single-Finger Grip Force*	2.5kg
Total Degrees of Freedom(Joints)	11	Four-Finger Grip Force*	9.1kg
Active Degrees of Freedom(Motors)	6	Full-Hand Payload*	5kg
Drive System	Coreless DC Motor + Reduction Gearbox + T-type Lead Screw	Repeatability at Fingertip*	0.1mm
Transmission Mechanism	Linkage Transmission	Open/Close Time*	1.2s
Supported Motions	Pinching, Grasping, Pressing, Lifting, Pushing, and other Human-like Actions.	Thumb Abduction Speed*	112°/s
Operating Voltage	DC12V	Thumb Flexion Speed*	106°/s
Static Current	0.1A@12V	Four-Finger Flexion Speed*	150°/s
Maximum Current	3A@12V	Communication Interfaces	RS485、EtherCAT
Proximity Sensing	ToF	SDK Language	C++
Tactile Sensor Dimensions	Normal Force and Tangential Force	Durability*	Over 100,000 Times

* Single-finger grip force, four-finger grip force, and full-hand payload are measured under laboratory conditions.

* Actual performance may vary depending on specific application scenarios and configuration. Please refer to real-world usage for final results.



MagicLab's Joint Modules:

An Exquisite Engineered Heart Born for Humanoid Robots

MagicLab's in-house developed joint modules cover a full torque range from $10\text{N}\cdot\text{m}$ to $525\text{N}\cdot\text{m}$, delivering industry-leading peak torque performance. The product line includes harmonic, planetary and linear modules, featuring high motion control precision and exceptional torque density to meet the demands of complex application scenarios. With optimized power consumption management, the modules ensure long-term operation without overheating.

Core Strengths

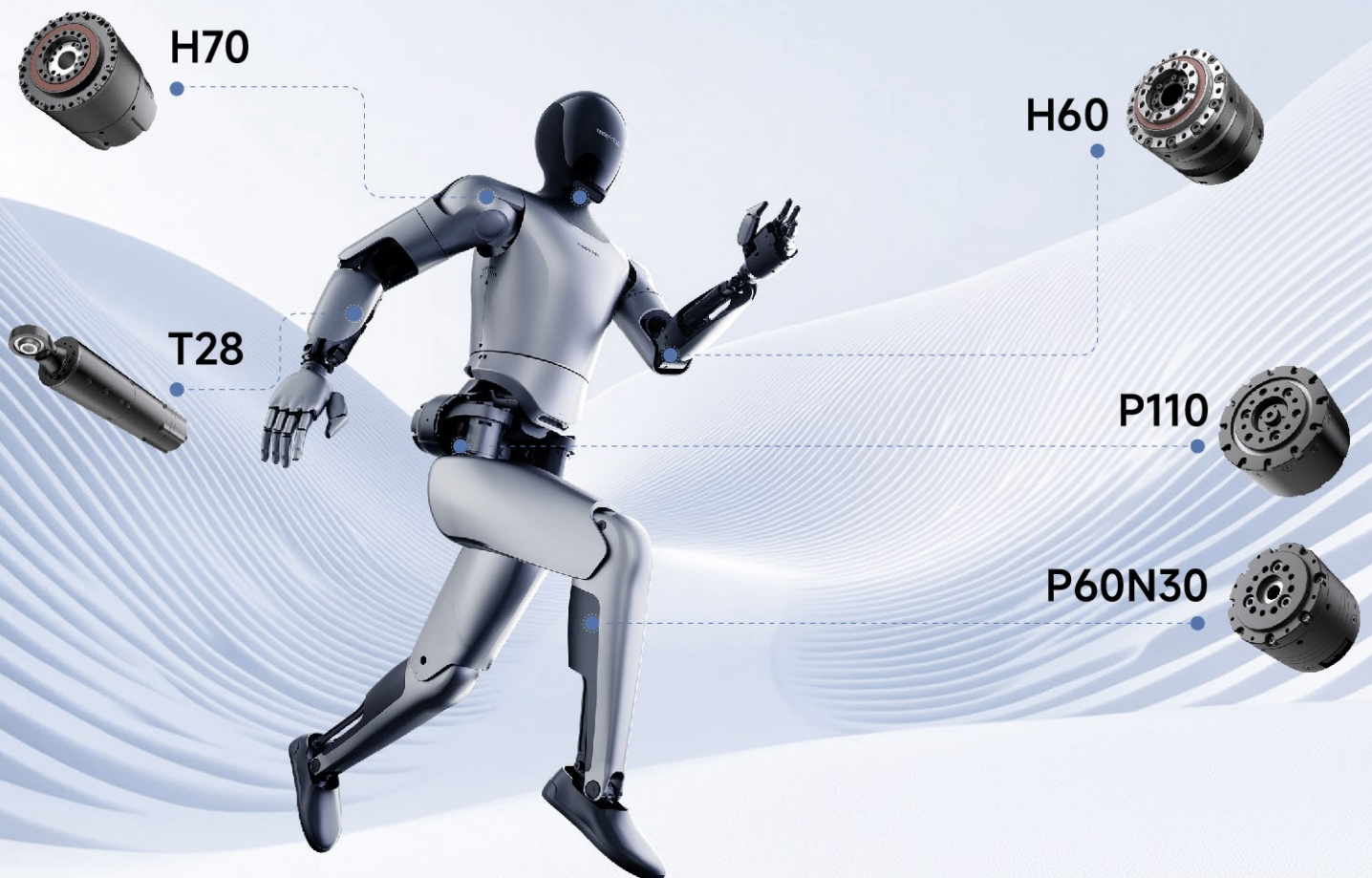
High Explosive Power

Light Weight and Agility

High-Responsiveness Control

Stability and Reliability

Multiple Options, Flexible Configuration and Rapid Product Deployment



Planetary Series Joint Modules

- Designed for use in full-size and mid-size humanoid robot joints (legs, waist or arms), as well as leg joints of consumer- and industrial-grade quadruped robots.

Structure and Appearance				
Model	P110	P90N20	D90	P60N30
Gearbox Type	Planetary Gearbox	Planetary Gearbox	Planetary Gearbox	Planetary Gearbox
Dimensions	$\varphi 112 \times 71.5$	$\varphi 92 \times 63.4$	$\varphi 98 \times 48.5$	$\varphi 64 \times 57.1$
Joint Weight	1900g	1100g	590g	532g
Maximum Torque	360N·m	130N·m	25N·m	60N·m
Rated Torque	90N·m	35N·m	9N·m	20N·m
Maximum Speed	120rpm	300rpm	180rpm	175rpm
Operating Voltage	48V-54V	48V-54V	24V-36V	48V-54V
Encoder	Dual Encoders, 15Bit	Dual Encoders, 18Bit	Dual Encoders, 12Bit	Dual Encoders, 15Bit
Communication Protocol	CAN/EtherCAT	CAN/EtherCAT	CAN	CAN/EtherCAT
Supports internal routing	Optional	Yes	No	No

Harmonic Series Joint Modules

- Designed for high-precision joints in robotic legs, waists, arms and collaborative robotic arms.

Structure and Appearance		
Model	H70	H60
Gearbox Type	Harmonic Gearbox	Harmonic Gearbox
Dimensions	$\varphi 70 \times 96$	$\varphi 64 \times 60$
Joint Weight	900g	590g
Maximum Torque	90N·m	90N·m
Rated Torque	30N·m	33N·m
Maximum Speed	30rpm	39rpm
Operating Voltage	48V-54V	48V-54V
Encoder	Dual Encoders, 19Bit	Dual Encoders, 19Bit
Communication Protocol	CAN/EtherCAT	CAN/EtherCAT
Supports internal routing	Yes	Yes

Linear Joint Modules

- Designed for use in forearms, ankles, and other applications that demand precise linear force output.

Structure and Appearance	
Model	T28
Gearbox Type	Ball Screw
Dimensions	$\varphi 32 \times 155$
Joint Weight	340g
Maximum Thrust	750N
Rated Thrust	300N
Maximum Speed	116mm/s
Maximum Range	40mm
Operating Voltage	48V
Encoder	Dual Encoders, 18Bit
Communication Protocol	RS485

MagicLab Scenario Solutions

Research and Education Solutions | Intelligent Guided Tour Solutions

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Smart Guide Solution
Modern Art Museum

magiclab
Smart Guide Solution
China Unicom

magiclab
Smart Guide Solution
China Unicom

MagicLab's Education Solutions Empowering the Exploration of Embodied AI

A diversified and high-performance robotics platform designed for cutting-edge algorithm validation and innovative education, accelerating the transformation of research into real-world applications and fostering future talent.



Core Strengths

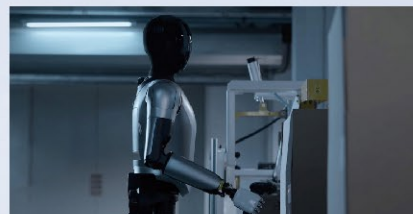
Exceptional Mobility Performance: With ultra-high degrees of freedom, an extended range of motion, and powerful joint torque, the robot enables full-body dynamic motion control research.

Stable and Reliable Hardware: Rigorous tests through millions of motion cycles, reinforced fall protection and robust system operation ensure continuous and high-intensity experimentation.

Comprehensive Environmental Perception: Integrates LiDAR, multi-view cameras, depth vision, and microphone arrays to support advanced multimodal perception and interaction algorithm research.

Open and Innovative Platform: Provides open-source APIs for core modules such as motion control and navigation, along with shared datasets and algorithms — fostering deeper research and broader educational engagement.

Multi-Scenario Application: Supports cutting-edge research including motion control, autonomous navigation, human-robot interaction and manipulation skills — seamlessly bridging research and real-world deployment.



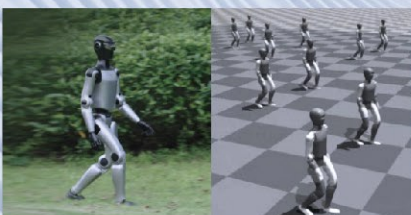
Worry-Free Support

Powerful Simulation Compatibility: Fully compatible with mainstream platforms such as Isaac Sim, offering diverse datasets to accelerate algorithm iteration and pre-verification.

Efficient Out-of-the-Box Experience: Pre-installed with essential systems and bundled with comprehensive documentation and multimedia tutorials, enabling rapid and scenario-based deployment.

Service Commitment: A professional team delivers efficient pre-sales support and rapid post-sales response, ensuring fast, comprehensive, and expert technical service.

Freedom to Create and Expand: Supports in-depth hardware customization and rich sensor expansion to meet specific innovation and research needs.



Humanoid Robot Intelligent Guided Tour Solution

MagicLab's Humanoid Robot, AI-Powered Guided Tour Solution for Multi-Scenario Applications, Providing professional interpretation services across diverse venues, including: Corporate Exhibition Halls、History Museums、Convention & Exhibition Centers、Science & Technology Museums、Tourist Attractions、Art Galleries。

Hyper-Realistic Humanization, Elevated Service Experience:

Humanoid appearance and body language make guided tour services more approachable, quality more consistent, and maintenance easier.

Multimodal interaction brings guided tours to life:

With features like voice conversation and motion recognition, it creates a more engaging experience than static screens or audio-only devices.

Cost-efficiency optimization and data value unlocking:

It aims to achieve long-term cost savings while capturing user behavior data (e.g., frequently asked questions) to continuously enhance guided tour services.

Cutting-edge tech feature makes it an eye-catching marketing tool:

Innovative humanoid robot-guided tours enhance the venue's futuristic vibe and attract more visitors.

Customized Services, Unique Tour Experiences:

Support personalized human-like gestures, tailored Q&A content, and customized video or PPT playback for a distinctive guided tour.

Core Functions:

Professional Tour Narration

Walk-and-Talk Guidance

Human-Like Walking Gait

Precision Obstacle Avoidance

Custom Script Editing and Preview

50+ Custom Gestures

Action Generation Based
on Contextual Intelligence

160+ Voice Options

Multi-Language Support

Custom Facial Expression



Walk-and-Talk Guidance
Human-Like Walking Gait



Professional Tour Narration



Action Generation Based
on Contextual Intelligence



160+ Voice Options

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Empowering Every Corner of the Earth with General-Purpose Robotics

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