Overview

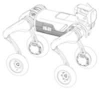
Product SKU

Parameter Item	MagicDog-W Smart Edition	MagicDog-W Cruise Edition
Overall Dimensions	67 cm x 35 cm x 65 cm	67 cm x 35 cm x 65 cm
Overall Weight	23kg (including battery)	Approx. 24.36 kg (including battery, compute backpack, and LDS)
Battery Voltage	29.6V	29.6V
Battery Capacity	8200mAh	8200mAh
Payload	10kg	10kg
Speed Range	0 ~ 3m/s	0 ~ 3m/s
Minimum Obstacle Distance Height	< 60cm	< 60cm
Maximum Incline Angle	40°	40°
Motion Controller	Low-power, high-performance CPU	Low-power, high-performance CPU
Onboard Computing Power	6 TOPS	163 TOPS (Orin NX 16GB)
Maximum Joint Torque (Per Leg)	≈37.5N·m	≈37.5N·m
Tires	7-inch pneumatic tires	7-inch pneumatic tires
4K Camera	●	●
Stereo Camera	●	●
Wide-Angle Camera	●	●
Ultrasonic Sensor	●	●
Touch Sensor	●	●
Depth Camera	●	●
2D LiDAR	●	●
3D LiDAR	○	Mid-360
Smart Recharging Sensor	○	●
APP Control	●	●
Optional Remote Controller (T12/No)	●	●
Voice Control Module	●	●
Voice Commands	●	●
Voice Interaction	●	●
Localization and Mapping	○	●
Navigation and Obstacle Avoidance	○	●

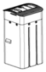
Visual Following	●	●
WiFi Module	WIFI 5.0	WIFI 5.0
BT Module	BT 5.0/4.2/2.1	BT 5.0/4.2/2.1
4G Module	○	●
Secondary Development Interface	○	●
Expansion Module	○	7 TOPS high-performance computing module
Battery Life	2 ~ 4h	2 ~ 4h
Charger	Standard configuration (33.6V 6A)	Standard configuration (33.6V 6A)

Parts List

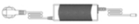
The packaging components are as follows:



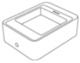
Bionic quadruped robot



Battery



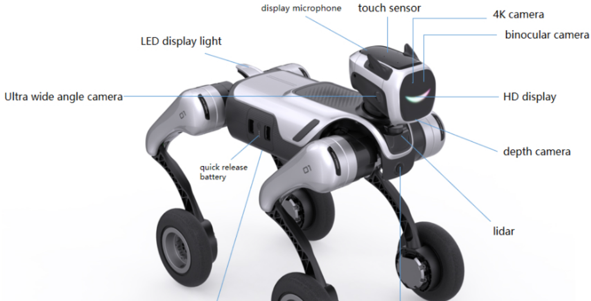
power adapter



battery charging stand

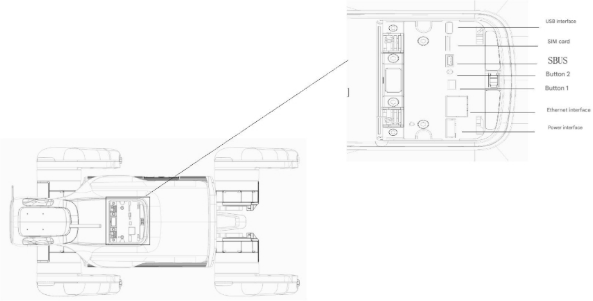
manual

Part Name



speaker
ultrasonic sensor

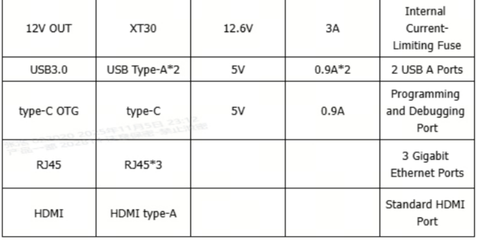
Electrical interface



- **The power interface** has an output range of 22V to 33.6V and is used to power external devices. The interface has a load detection pin for controlling the power output.
- **Ethernet interface** Standard RJ45, connect to PC and other external devices
- **Button 1** group control/single control button
- **Button 2:** Network configuration button
- **SBUS interface** UART communication interface
- **SIM card** SIM card interface, used for 4G networking.
- **USB interface:** Standard Type C interface, supports USB2.0/USB3.0.

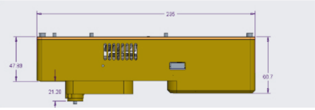
Computing Backpack
Standard Expansion Interface of NX Computing Box

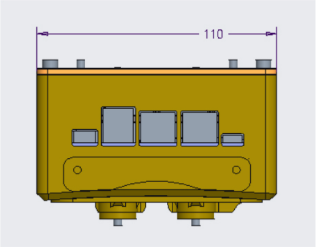
Port Name	Interface Model	Voltage	Current	Description
DC IN	XT30 2+2	24-36V	5A	Box Power Input Interface
DC OUT	XT30	25-33V	3A	Internal Current-Limiting Fuse



12V OUT	XT30	12.6V	3A	Internal Current-Limiting Fuse
USB3.0	USB Type-A*2	5V	0.9A*2	2 USB A Ports
type-C OTG	type-C	5V	0.9A	Programming and Debugging Port
RJ45	RJ45*3			3 Gigabit Ethernet Ports
HDMI	HDMI type-A			Standard HDMI Port

The protection rating of the NX computing box is IP30, with no waterproof capability.





Lidar

The STL-19P laser lidar uses DTOF technology and can perform ranging 5,000 times per second for motion obstacle avoidance.

The technical specifications are as follows:

parameter	Development of computing units
Ranging range	0.03-12 meters (80% reflectivity white target test)
Ranging accuracy	±30mm @ 2-12m (white target), standard deviation 15mm
Scan frequency	Minimum 6 Hz, typical 10 Hz, maximum 13 Hz
Ranging frequency	5000 Hz (fixed frequency)
Pitch angle error	Minimum 0.5°, maximum 2°
Yaw angle error	Min -1°, Typical 0°, Max 1°
Angular resolution	Typical 0.72° @ 10 Hz
Ambient light resistance	Maximum 60 KLux (refer to the ambient light test specification of Ledong)

lidar noise	Typical 45 dB (lidar placed horizontally in the forward direction, 30 cm away, tested with noise meter model AR824)
Machine life	10,000 hours
Operating temperature	-10°C to 45°C
Storage temperature	-30°C to 70°C
Protection level	IP5X (see note "Dust and Waterproof")

The Cruise Edition can be equipped with the Livox Mid-360 LiDAR.
Technical specifications are as follows:

Parameter	Specification
Ranging Distance	40 meters @ 10% reflectivity, 70 meters @ 80% reflectivity
Ranging Accuracy	±2 cm
Ranging Frequency	200,000 points/second (single echo) 480,000 points/second (dual/triple echoes)
Field of View (FOV)	Horizontal: 360° Vertical: 59° (-7° to 52°)
Angular Resolution	Horizontal: 0.18° to 0.36° (@ 10Hz), Vertical: < 2°
Near-Range Blind Spot	0.1 meter
Data Interface	1Gbps Ethernet
Laser Wavelength	905 nm
Eye Safety Level	Class 1 (IEC60825-1:2014)
Anti-Ambient Light Capability	100 klx
Radar Noise	40 dB @ 30 cm
Overall Device Lifespan	> 16,000 hours
Operating Temperature	-20°C to 65°C
Storage Temperature	-40°C to 85°C
Protection Rating (IP)	IP67
Dimensions	75 × 65 × 55 mm
Weight	≈ 265 g
Power Supply Voltage	10V ~ 17V DC
Power Consumption	Typical: 7.5W, Peak: 10W
Time Synchronization	IEEE 1588-2008 (PTP v2)

Indicator Lights

The taillight status meanings are as follows:

Parameters	Development Computing Unit

Red light is solid	Battery level is below 20%, indicating a device abnormality
White light is solid	Device is normal, task completed
White light flashes quickly 3 times	Task processing
White light off	Power off
Blue light flashes 3 times	Mode switch
Red light solid on	Battery low, device abnormality

Camera

Parameters	Development Computing Unit
4K Camera	Human Figure Recognition
Binocular Camera	
Ultra-Wide-Angle Camera	Obstacle Avoidance
Depth Camera	Obstacle Avoidance

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joint

Like animals, quadruped robots have a body (Trunk) and limbs (Legs) that are symmetrical. The four legs are divided into two groups, front and back.

The two groups were identical except for the front-to-back differences in coordinate system and range of motion of joints.

Index of each leg:

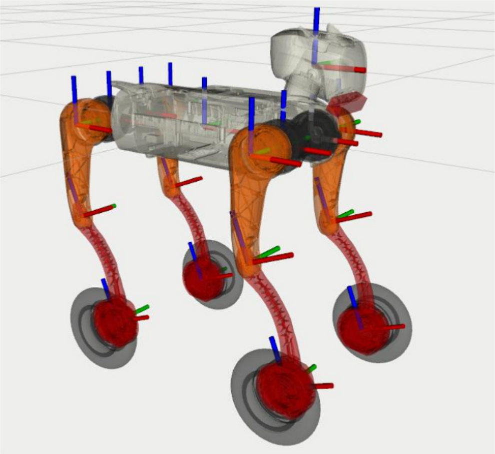
- 0: FR (front right)
- 1: FL (front left)
- 2: RR (rear right)
- 3: RL (rear left)

The specific parameter table is as follows:

Parameters	Joint limiter
FR_hip_joint	-0.65 ~ 0.79 rad
FR_thigh_joint	-1.27 ~ 3.62 rad
FR_calf_joint	-2.37~ -0.39 rad
FL_hip_joint	-0.79 ~ 0.65 rad
FL_thigh_joint	-1.27 ~ 3.62 rad
FL_calf_joint	-2.37~ -0.39 rad
RR_hip_joint	-0.65 ~ 0.79 rad
RR_thigh_joint	-1.27 ~ 3.62 rad

RR_calf_joint	-2.37~ -0.39 rad
RL_hip_joint	-0.79 ~ 0.65 rad
RL_thigh_joint	-1.27 ~ 3.62 rad
RL_calf_joint	-2.37~ -0.39 rad

Coordinate system, joint rotation axis and joint zero point



The rotation axis of the fuselage joint is the x-axis, the rotation axis of the thigh joint and the calf joint is the y-axis, and the positive direction of rotation conforms to the right-hand rule.

Robot specifications

Dimensions

Parameters	Development Computing Unit
Bare Body Length, Width, and Height (Standing)	67cm * 35cm * 56cm
Bare Body Length, Width, and Height (Lying Down)	72cm * 50cm * 29cm
Bare Body Weight (excluding battery)	Approximately 22.5kg
Degrees of Freedom	17
Maximum Speed	3.0m/s

Environment

Parameters	Development Calculation Unit
Operating Temperature	5°C-35°C, operating in good weather conditions
Slope	+/- 30°
Maximum step height	15cm

Internal Related

Parameters	Development Computing Unit
Processing Chip	8-core Processor
4G	SIM Card Insertable
Wi-Fi	WIFI 5.0
Bluetooth	BT 5.0/4.2/2.1
Storage	64GB
Output power	DC 28.8V (battery voltage)
Connectivity	RJ45 Ethernet port

Depth Camera

Parameters	Development Computing Unit
Dimensions	124mm*29mm*26mm
Minimum Depth Distance	0.105m
Depth Image Resolution	1280*720 @ 30fps; 848*480 @ 90fps
Depth Field of View	86° * 57° (±3°)

4K Camera

Project	Parameter Description
Image Sensor	1/3.06-inch CMOS Sensor
Maximum Resolution	3840H×2880V
Pixel Size	1.12um*1.12um
Exposure System	Auto Exposure
Electronic Shutter	Rolling Shutter
Interface Speed	480MB/S (USB 2.0)
Operating Temperature	0°C to 60°C
Storage Temperature	0°C to 65°C

Focal Length	2.22MM
Field of View	D:117° H:94.8° V:76.7°
Distortion	<10.3%
Spectral Characteristics	No IR filter
Aperture	2.2±5%

Binocular Camera

Parameters	Parameter Description
Image Sensor	1/4-inch CMOS Sensor
Maximum Resolution	2560H×720V
Pixel Size	3.0um*3.0um
Signal-to-Noise Ratio	38dB
Dynamic Range	63.9dB
Exposure System	Auto Exposure
Electronic Shutter	Global Shutter
Interface Speed	480MB/S (USB2.0)
Operating Temperature	0°C to 50°C
Storage Temperature	0°C to 60°C
Connection Port	5-pin 1.25mm USB 2.0
Image Display Orientation	Upright
Focal Length	3.15mm
Field of View	D:162° H:135° V:73°
Distortion	<14.3%
Spectral Characteristics	650nm (Optical Filter)
Aperture	2.35

Wide-Angle Camera

Parameters	Parameter Description
Module Model	ZV-A0588-V5.1
Module Dimensions	32.00mm × 32.00mm × 15mm
Operating Temperature	-30°C to 80°C
Storage Temperature	-10°C to 60°C
Camera Board Assembly Technology	SMT (ROHS)
Focal Distance	30cm to infinity
Supply Voltage	USB_5V
Connectivity	USB 2.0 -5P, 1.25mm Pitch, SMD Stick-On

Power	MAX 1W, Current 140mA to 160mA
Operating System	Win XP, Win 7, Linux 2.6.20 or later
Packaging	Anti-electrostatic tray
Sensor Type	(1/2.7”)
Maximum Effective Pixels	2.0 Megapixels (WDR)
Maximum Dynamic Range	85dB
Pixel Size	3.0μm x 3.0μm
Lens Type	1/2.7 inch
Lens Structure	6G+IR
Aperture	2.0
Effective Focal Length	2.0mm
Field of View	D:200° H:200° V:200°
Distortion	110%
Filter	650±10nm
Gain/Exposure/White Balance	Auto