



## **HighTorque Robotics & Mini Pi+ Robot:**

### **Your Trusted Partner for RoboCup Humanoid League Small Size**

#### **1、 Company Introduction: HighTorque Robotics**

Founded in 2020, Guangzhou HighTorque Electromechanical Technology Co., Ltd. (HighTorque Robotics) is a high-tech enterprise dedicated to the R&D and application of humanoid robot technology. We focus on providing the global market with cost-effective humanoid robot secondary development platforms, empowering innovation in research, education, and competitions.

With a full-chain R&D capability covering robot ontology, reducers, motors, FOC, drives, and motion control algorithms, HighTorque boasts a complete R&D framework, professional testing laboratories, and an independent manufacturing facility. Our team of nearly 200 professionals includes top experts, doctors, and engineers in robotics, with over 80% engaged in R&D, and more than 70% holding bachelor's degrees or above (13%+ with master's degrees or higher). We have established R&D and sales teams in Guangzhou, Beijing, Shenzhen, Hangzhou, and Shanghai, enabling rapid response to global customer needs.

As a leading player in China's humanoid robot industry (and a market leader in South China), we have formed strategic partnerships with top enterprises (e.g., Li Auto, Xpeng Motors, Hubo Dynamics, China Aerospace, Honor, Boston Dynamics) and world-renowned universities (e.g., Tsinghua University, Beijing Institute of Technology, Zhejiang University, Stanford University, University of British Columbia). Our achievements include awards such as the "Star of Investment and Innovation" at the 2023 World Robot Conference, the "Excellent Performance Award for Humanoid Robots" at LeadeRobot 2024-2025, and the "Excellent Benchmark Award for Integrated Joints" at LeadeRobot 2024. We are also active in international academic events (IROS, ICRA) and are committed to advancing the popularization and industrialization of humanoid robot technology.

## 2、Product Description: Mini Pi+ (Optimized for RoboCup Humanoid League Small Size)

Mini Pi+ is HighTorque's next-generation small humanoid robot, tailor-made for scientific research, educational practice, and robotics competitions—including the RoboCup Humanoid League Small Size. It combines high integration, agility, and full functionality to provide teams with a reliable, low-threshold development platform for competition success.

### Core Specifications

- **Size & Weight:** Height ~65cm, Weight 11kg (compact design fits Small Size requirements, easy to transport and debug)
- **Degrees of Freedom:** 22 DOF, equipped with self-developed integrated servo joint modules for high-precision motion control
- **Battery Life:** 2 hours of stable, heat-free operation (built-in BMS battery, supports hot-swapping for uninterrupted use)
- **High Performance:** Industrial-grade mass production ensures strong load capacity, anti-disturbance, and durability (resistant to falls and adaptable to complex terrains)

### Key Advantages for RoboCup Teams

- **Modular & Open Architecture:** Supports quick disassembly/assembly for easy maintenance and customization. Hardware is expandable via multi-channel CAN, USB 3.0/2.0, HDMI 2.0, and Type-C interfaces, compatible with IMU, depth cameras (D435i/ZED mini optional), microphones, and other sensors.
- **Full-Stack Open-Source Support:** Open SDK (compatible with C++/Python) and access to STEP/URDF/AP files. Seamlessly integrates with ROS1&ROS2, and mainstream simulation platforms (Nvidia IsaacLab, Gazebo, Mujoco) to enable rapid "sim-to-real" iteration.
- **Powerful Algorithm Compatibility:** Supports ZMP, MPC, RL, and WBC algorithms—ideal for complex competition tasks such as fast walking, load-bearing, obstacle avoidance, stair climbing, fall recovery, autonomous recognition, and



multi-agent collaboration.

- **User-Friendly & Cost-Effective:** Designed as a desktop-level platform with a luggage-style package for easy transportation (carry-on compatible). Single-person operable, it lowers development thresholds while offering industrial-grade performance at a competitive price point.

### **Support for RoboCup Community**

HighTorque provides comprehensive support for participating teams, including online tutorials, documents, remote technical assistance, and offline training workshops. Our open ecosystem and responsive technical team ensure you can quickly prototype, test, and optimize your robot to excel in the Humanoid League Small Size competition.

- Company Website: <https://www.hightorquerobotics.com/mini-pi>
- Github Link for RoboCup: <https://github.com/HighTorque-Robotics>
- RoboCup Document: <https://docs.qq.com/doc/DSEnJbnZqVXpraGVn>