Core Technology

Joint Torque Sensor

Pioneering self-developed joint torque sensors, the first robotics company to integrate MEMSsensing technology into robotic arm joints.

10x Sensitivity
MEMS sensor for ultra-precise force detection

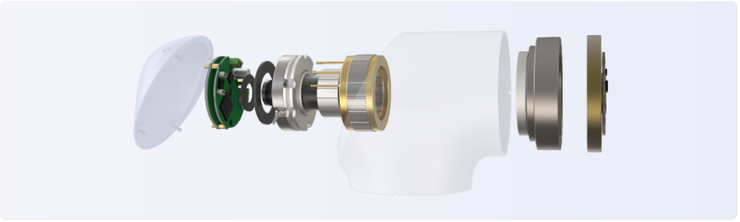
4x Stability
Silicon micromelting technology for superior performance

2x Rigidity
Special steel structure design for enhanced durability

Lightweight Integrated Joint Module

Modular design enables rapid and efficient arm assembly.

Lightweight structure makes it the lightest force-controlled module in its payload class.
Built-in EtherCAT communication driver with four-loop control(position, velocity, torque, and current loops), supporting 8kHztorque closed-loop control directly on the driver.
Integrated dual absolute encoders for full closed-loop control, supporting battery-free zero-point recording.
Built-in friction brake holder ensures no drift when powered off and no jitter when powered on.



Impedance Control DynamicTracking Algorithm

With full-body force control and impedance technology, the robot explores the world like a human.

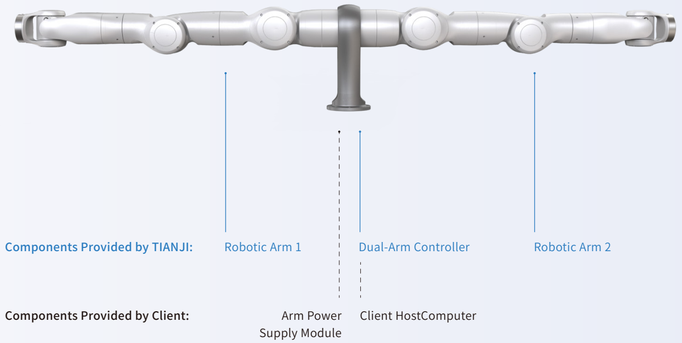
In human-robot interaction scenarios: The robot exhibits natural compliance when interacting with humansreducing impact forces and enhancing both comfort and safety during use.

In operations within unknown environments:Impedance control helps the robot better adapt to environmental changesminimizing oscillations and instability caused by external disturbances. This improves task execution efficiency and reliability.

In scenarios requiring precise force and position control (e.g., precision flexible assembly):Impedance controlensures the robot can adjust flexibly upon encountering obstacles, preventing damage to the object beinghandled or to the robot itself.

Recommended Solution

TIANJI Dual-Arm Controller:



- A single controller operates both arms, featuring a compact design for easy deployment.
- It offers secondary development interfaces that encapsulate complex arm functionalities into APIsenabling users to quickly utilize control features without delving into low-level development. Thissignificantly lowers the development threshold for the Tianji robotic arm and facilitates efficientapplication development.
- Marvin.SDK provides demo examples for typical arm applications, including environment setup, keyfunctions, and code explanations. These resources serve as valuable references to assist developersin building their applications.

SHENZHEN TIANJI INTELLIGENT SYSTEM CO.,LTD.
ADD：78 Xiangshan Avenue, Bao' an District, Shenzhen, China
TEL：0769-22892095-3115
WEB：www.tianjizn.com
E-MAIL：sales@tianjizn.com

MARVIN

Humanoid Dual-Arm Robot

Anthropomorphic Design · Lightweight · Compliant Force Control

Industrial-grade · User-friendly

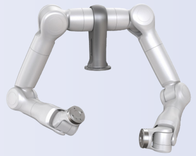
——Premier Platform for Embodied Intelligence

SHENZHEN TIANJI INTELLIGENCE SYSTEM CO.,LTD.

Body specification





Model		Marvin M6S SRS-686	Marvin M6S CCS-696	Marvin M6S Lite CCS-615	Marvin M6S CCS-809	Marvin M3S Long CCS-920	Marvin M20S CCS-1050
Number of Joints (Per Arm)				7			
Rated Payload (Per Arm)		6KG	6KG	5KG	5KG	3KG	20KG
Wrist Configuration		Traditional collaborative wrist	Crossed-axis design	Crossed-axis design	Crossed-axis design	Crossed-axis design	Crossed-axis design
Working Reach (J2 Axis to End Flange)		686mm	696mm	615mm	809mm	920mm	1050mm
Weight (Per Arm)		11.45KG	12KG	8KG	12.7KG	13.1KG	30KG
Maximum TCP Speed		2m/s	2m/s	1.5m/s	2m/s	2m/s	2m/s
Repeatability		±0.03	±0.03	±0.03	±0.04	±0.04	±0.1
Joint Torque Sensors				Standard on all axes			
Camera Cable				Embeddable in end-effector			
Force Control Accuracy				≤0.15N，≤0.05N.m			
End-Effector 6-Axis Force Sensor				Optional			
Motion range	J1	±178°	±178°	±173°	±178°	±178°	±170°
	J2	±120°	±120°	±120°	±120°	±120°	±120°
	J3	±178°	±178°	±173°	±178°	±178°	±170°
	J4	+60°/-145°	+60°/-145°	+45°/-145°	+60°/-145°	+60°/-145°	+60°/-145°
	J5	±178°	±178°	±173°	±178°	±178°	±170°
	J6	±110°	±60°	±60°	±60°	±60°	±60°
	J7	±178°	±90°	±90°	±90°	±90°	±90°
Max speed	J1			180°/s			120°/s
	J2			180°/s			120°/s
	J3			180°/s			
	J4			180°/s			
	J5			180°/s			
	J6			180°/s			
	J7			180°/s			
Ingress Protection Rating				IP50			IP65
Brake Control (braking method)		all joints with brakes	all joints with brakes	J1-J4 with brakes	all joints with brakes	all joints with brakes	all joints with brakes
Electrical Specification(power consumption)		400W（average），600W（peak）	400W（average），600W（peak）	200W（average），400W（peak）	400W（average），600W（peak）	400W（average），600W（peak）	1000W（average），3800W（peak）
Communication Method				EtherCAT			
Communication Cycle				≤1ms			
Debugging Software				PC-based setup & visualization software for 7axes			
Encoder				Dual absolute encoders			
On-board Interface (end-effector)				Drag-teach enabling button			
On-board Interface (power)				24 VDC (rated current 3 A)			
On-board Interface (communication)				RS485、CAN FD、EtherCAT			
Electrical Specification(operating voltage range)				48V（±10%）			
Certifications				CE认证、ISO/TS 15066，13849-1PLd（Cat.3），EN 60204-1-2018，EN IEC EN IEC 61000-6-2，EN IEC 61000-6-4，EN ISO 12100:2010			

Product features

Marvin features an innovative cross-axis wrist design that enables highly human-like and flexible motion. This structure eliminates the degree-of-freedom degradation seen in traditional designs, achieving biomechanical equivalence to the human wrist. With a smaller rotation radius, Marvin performs grasping and adjustment movements more naturally, delivering smoother remote teleoperation and greater adaptability across diverse scenarios.

crossed-axis wrist

Humanoid Design & Intelligent Interaction

- **Human-Like Dexterity**

The 7-degree-of-freedom symmetrical design allows the robotic arms to move as flexibly and naturally as human arms.

- **Flexible & Safe Interaction**

Each joint is equipped with a built-in torque sensor, ensuring soft and safe interaction to protect users and their surroundings.

- **Industrial-Grade Performance, Reliable and Worry-Free**

Innovative compliance compensation technology significantly enhances absolute accuracy.Combined with industrial-grade precision and rigidity,the robot delivers outstanding performance in both commercial and industrial applications.

- **Lightweight & Integrated Design**

Featuring a lightweight, integrated jointmodule design, the system offers modularflexibility, easy maintenance,and anoverall effortless user experience.

- **Unrestricted Mobility for AnyEnvironment**

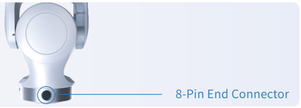
Compatible with various mobilit platforms, seamlessly adapting todifferent work scenarios.

- **Comprehensive SDK Capabilities**

The SDK offers rich functionality, including real-time force control and position control interfaces,supporting control frequencies up to 1 kHz.llt provides access to advanced algorithms such as dynamics, kinematics, impedance control, payload identification, hybrid force-position control,collision detection, drag-to-teach, and dual-arm coordination.

Multiple ExpansionOptions and FlexibleConfiguration

The dual-arm end-effectors are equipped with a wide range of communicationinterfaces (EtherCAT, CAN FD, RS485, etc.), making it easy to integrate dexteroushands, 6-axis force sensors, and various actuators. High-current power output interfaces are provided for convenient power supply to end-effectors.



8-Pin End Connector

Internal Cabling

The robot features a large hollow structure, allowing internal routingof camera cables and quick integration of stereo vision systems, whileavoiding cable damage from environmental contact.