# Intelligent Multi-functional Composite Robot with Body
(CMR -D2 Pro)

Updated on Oct 2025

The CMR-D2 Pro is based on the DT-01 Pro S1 two-wheel differential chassis and integrates dual 6-axis bionic robotic arms (±0.8mm repeatability), a 1000mm electric lifting platform, and dual RGB-D depth cameras. It is designed for universities and research institutions and focuses on robot collaborative control and intelligent perception research. Its dual robotic arms employ a master-slave force-position hybrid control strategy, supporting 0.5mm-level precision assembly and asynchronous handling of a 1.5kg load with a single arm. Flexible grippers (3—20 cm adaptive opening/closing) combined with electromagnetic suction cups enable multi-modal grasping experiments. The lift table (250 mm/s precision) synchronises with the stereo camera to perform vertical space operations such as layered fruit picking in orchards and 3D palletising in warehouses. In research scenarios, the equipment provides open ROS interfaces and Python/C++ development environments, pre-installed dual-arm collaborative path planning algorithms, visual models, and Gazebo virtual simulation datasets. Combined with high-speed cameras and mechanical analysis tools, it enables research into topics such as grasping damage mechanisms and dynamic obstacle avoidance (response time <0.3 seconds). Single-line laser radar fusion with IMU inertial compensation enables 0.8m narrow-track S-shaped trajectory planning, achieving an 80% efficiency improvement over the single-arm version. This provides universities and research institutions with a full-chain research platform from perception to decision-making to execution, driving innovation and breakthroughs in the field of intelligent robotics.


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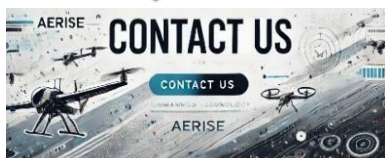
Main Functions:

1. **Laser Mapping and Obstacle Avoidance**
2. **High-Precision Navigation**
3. **Precision control of dual bionic robotic arms**
4. **Multi-Source Data Closed-Loop**
5. **Vertical Electric Lift Expansion**
6. **Standard Protocols and Data Communication**

Robotic Arm Parameters

Parameter	Details
Working Radius	626 mm
Payload	1.5 kg
Material / Body Weight	Aluminum alloy + plastic shell / 4.2 kg
Repeatable Accuracy	±0.1 mm
Terminal Velocity	≤ 2 m/s
Power Consumption	Maximum ≤ 120 W, Total ≤ 40 W
Control Method	Drag teaching / offline trajectory / API / host computer
Noise	< 60 dB
Power Supply	DC 24V (24V–26V)
Protection Rating	IP54
Communication	CAN
Working Environment	-20 – 50°C, humidity 25%–85%, non-condensing

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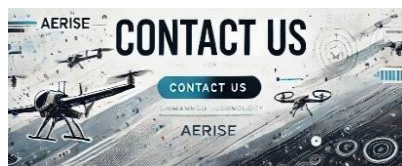
Product Technical Parameter

Parameter	Details
Overall Dimensions (L*W*H)	730* 460* 260 mm
Chassis Weight	46 kg
Materials	Q235
Vertical Load	120 kg
Encoder Line Count	4096 lines
Protection Rating	IP22
Operating Temperature	-10 – 60°C
Charging Time	< 3 h
Motor Power	150 W × 2
Motor Type	Hub motor (brushless DC)
Maximum Speed	1.5 m/s
Theoretical Battery Life	> 4 h
Battery Capacity	24V 40AH (lithium battery, expandable)
External Power Supply	24V / 19V / 12V
Emergency Stop Method	Remote emergency stop / hardware emergency stop / software emergency stop
System Support	ROS / WIN / UBUNTU
Navigation Method	Laser navigation (2D SLAM)
Navigation Accuracy	±30 mm
Navigation Protocol	MQTT
Remote Control Mode	2.4G RC Model Remote Control
Obstacle Avoidance Method	Supports obstacle detection and obstacle avoidance
Navigation Mode	Point-to-point, predetermined route, trajectory, etc.
Turning Radius	Rotate in place (0°)
Auxiliary Positioning Accuracy	±10 mm

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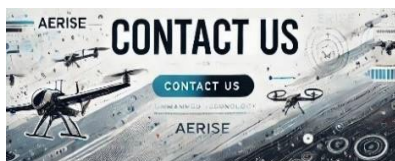
Motorized Jaw Parameters

Parameter	Details
Weight	0.5 kg
Accuracy	±0.5 mm
Opening and Closing Distance	0–70 mm
Rated Clamping Force	40 N
Maximum Clamping Force	50 N
Supply Voltage	DC 24V
Power Consumption	Maximum ≤ 50 W, Total ≤ 30 W
Self-Locking	Not supported
Contact Surface Material	Rubber
External Interface	Power interface ×1, CAN interface ×1