

MARA

Product specification

Modular articulated robotic arm

MARA is the first modular collaborative robot that runs the Robot Operating System (ROS 2) natively. Each of its modules works with the H-ROS robot bus, deployed through a tiny device called SoM. Thanks to the H-ROS robot bus, MARA delivers deterministic communication latencies, time synchronization, security and safety.



Motion characteristics

Degrees of freedom	6 DoF, extensible
Motion range per axis	±360°
Tool speed	1 m/s
Maximum speed	90°/s
Repeatability	±0.1 mm
Rated torque	9.4/30/49 Nm
Payload	3 kg

Mechanical characteristics

Weight	21 Kg
Height	871 mm
Reach	656 mm
Operational temperature	0-50 °C
Materials	Aluminium ABS

Electrical characteristics

Power input	100-230Vac, 50-60Hz
Nominal power consumption	<200W
Communications interface	IEEE 802.3 Gigabit Ethernet
Electrical connector	H-ROS connector A (docs)
Topology	Daisy-chained modules, fully distributed.

Software characteristics


Robotics framework	ROS 2 Dashing Diademata
Information model	Hardware Robot Information Model (HRIM), version 0.3.0, Coliza (docs)
Communications framework	Data Distribution Service (DDS)
Simulation	Gazebo
Operating System	System Embedded real-time Linux
Communication interface	1 Gbps Ethernet Compliant with TSN standards: 802.1 ASrev/AS, IEEE 1588, 802.1Qbv, 802.1Qci, 802.1CB, 802.1Qcc.
Security (module-level)	<ul style="list-style-type: none"> - Dedicated crypto chip (tamper resistance, cryptographic key storage, SHA-256 Hash Algorithm with HMAC, ECDSA sign-verify authentication. - Secure communications (SROS2, IPsec, TLS). - File System encryption IEEE-1735-2014 Version 2. - Secure unique ID storage in cryptochip. - Audited security through continuous penetration tests.
Automatic updates	Over-the-Air (OTA)
Robot controller (not included)	Any ROS 2.0 enabled controller. Recommended: Open Robot Controller (ORC)

Robotics framework

Version	ROS 2 Dashing Diademata
Supported platforms	<ul style="list-style-type: none"> - Ubuntu 18.04 (Bionic) - Ubuntu 16.04 (Xenial) - Mac OS X 10.12 (Sierra) - Windows 10 with Visual Studio 2017
Architectures	<ul style="list-style-type: none"> - x86-64 - armhf - aarch64
Features	<ul style="list-style-type: none"> - Support for multiple DDS implementations, chosen at runtime - Discovery, transport and serialization over DDS - Publish/subscribe over topics - Clients and services - Set/retrieve parameters - Quality of service settings for handling non-ideal networks - Support for nodes with managed lifecycles - Inter- and intra-process communication using the same API - DDS-Security support - C++ and python supported APIs
Tools	<ul style="list-style-type: none"> - MoveIt! - RViz - rqt - rosbag
Third party packages	<ul style="list-style-type: none"> - Gazebo - OpenCV - Point Cloud Library (PCL)
More information	Access MARA's documentation .

Product Identification

Parts are numbered as **MARA-E-S**, where **E** corresponds with the product edition and **S** is the serial number.

	Characteristic	Value	Description	Identifier
 <p>MARA-E-S general identifier</p>	Edition (E)	Research Edition	Robot prepared for research and development purposes	RE
		Industrial Edition	Robot qualified and certified for industrial applications	IE
	Serial number (S)	-	Unique identifier	-

Exemplary part numbers:

- **MARA-RE-2343d32**: MARA Research Edition with serial number 2343d32.
- **MARA-IE-9283489**: MARA Industrial Edition with serial number 9283489.

To obtain more information, please contact Acutronic Robotics' sales representatives at contact@acutronicrobotics.com