Reachy 2

POLLEN ROBOTICS

Technical specifications

Reachy 2 is a highly modular, open-source humanoid robot designed for research and education. It combines **advanced vision**, **audio**, and **actuator systems** for **cutting-edge AI interaction** and **teleoperation**.

GENERAL FEATURES

- **Hardware :**
  - Height : 136-166cm, Weight : 50kg
  - 7-DoF bio-inspired arms
  - ~3kg/6.6lbs payload per arm
  - Parallel torque controlled gripper
  - Multiple cameras for stereo vision and depth perception
  - High-quality audio system for immersive teleoperation and AI-based interactions
  - Omnidirectional mobile base
- **Software :**
  - Safe Rust-based firmware
  - Low level control loop uses EtherCAT and runs at 500Hz
  - Core software based on ROS2
  - Python SDK
  - OTA software upgrades
  - Intuitive VR teleoperation with 3D vision and spatialized audio

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PERCEPTION

Vision Module (Head)	RGB Cameras	2x IMX296 global shutter cameras Depth FoV: H107° V91°
	ToF Module	Between Reachy's eyes for depth measurement and 3D mapping of reachy's surroundings Luxonis OAK-FFC ToF 33D sensor Depth range: 0.20 to 5m Depth resolution: up to 640x480 @45fps Depth FoV: H90° V65° Depth accuracy: <1%
	Video Encoding	On-chip support for h264/h265 video encoding for real-time streaming
Vision Module (Torso)	RGB-D Camera	Fixed in Reachy's torso for accurate depth sensing in Reachy's manipulation working space Orbecc Gemini 336 RGB-D camera Depth range: 0.26 to 3m Depth resolution: up to 1280x800 @30fps Depth FoV: H90° V65° Depth accuracy: <1.5%
Audio System	Microphones	2x Lavalier Go professional microphones fitted in Reachy's antennas for immersive stereo perception

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INTERACTION

Audio System	Speakers	Custom-built with high-quality amplifier (located in the abdomen)
	Audio Interface	Rode AI-Micro for dual-channel audio
Expressions	Antennas	Reachy's motorised antennas for enhanced human-robot interaction
	Head	Expressive head powered by orbita system allowing the robot to mimick human's expression

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MANIPULATION

Actuators	Orbita 3D	3-DOF parallel mechanisms used in Reachy's neck and wrists - Maxon DC brushless motors (90W) - Nominal speed: 50rpm
	Orbita 2D	2-DOF patented parallel mechanisms used in Reachy's shoulders and elbows - Maxon DC brushless motors (120W) - Nominal speed: 50rpm
Gripper	Parallel gripper	- Dynamixel-based - Torque control
	Alternative end-effector	Alternative grippers can be integrated (e.g. Aloha grippers, Inspire "Dexterous hand")

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CONTROL

Computer system	Processing Unit	Solidrun Bedrock v3000 - fanless, CPU-based industrial PC
	AI Processing	AI processed on external hardware (e.g., cloud, user's GPU/TPU)
Usability	Quick startup Time	The robot becomes fully operational in about 1 minute and 30 seconds after powering on
	Docker	The Docker-based software stack is straighforward to install and use
Python SDK	Easy robot programming	
ROS2 Middleware	- Exposes standard ROS2 interfaces (ROS2 control, TFs, states) - Simple access to kinematics services (DK and symbolic IK)	

VR Teleoperation	Control Reachy 2 via VR headset for immersive teleoperation:
	- PC-Based App
	- Compatible Devices :
	  - Meta Quest 2 and 3 (Recommended)
	  - HTC Vive and Valve Index	

Dashboard	- OTA software upgrades - Service control - Real-time robot monitoring	
Visualization	Rviz *(default)*, also supports FoxGlove *(experimental)* and rerun.io *(experimental)*	
Simulation	Gazebo, MuJoCo *(in progress)*	

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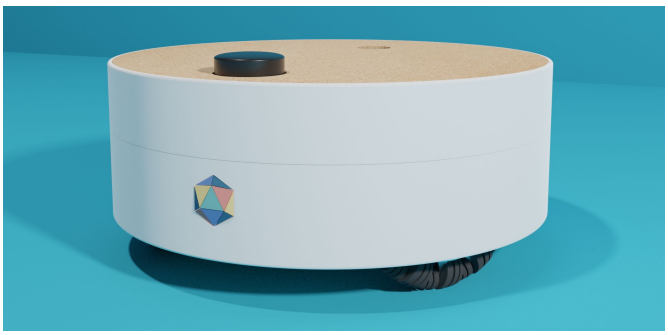
MOBILE BASE



- Dimension: 50*25cm
- Weight: 25kg
- Payload: 80kg

Sensors	Hall sensors & IMU on each wheel
	RP Lidar S2 (30m radius distance, 32k measurments/s, 0.12° angle resolution, resistance to sunlight)
Wheels	3x Omnidirectional wheels
	300W Max power
	No-load speed: 210 rpm
	Stall Torque: 13Nm - 13A
	Rated load, speed and current : 5Nm, 115rpm, 5A
Battery	$LiFePO_4$, OlenBox M : 24V, 35Ah
	19.5 x 17.2 x 13.4cm, 6.5kg
	5 years warranty
	Equipped with a BMS for safety

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