

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 : 95-130cm, Weight : 20kg
- 7-DoF bio-inspired arm
- ~3kg/6.6lbs payload 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



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



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 patented orbita system allowing the robot to mimick human's expression



MANIPULATION

Actuators	Orbita 3D	3-DOF patented parallel mechanisms used in Reachy's neck and wrists <ul style="list-style-type: none">- Maxon DC brushless motors (90W)- Nominal speed: 50rpm
	Orbita 2D	2-DOF patented parallel mechanisms used in Reachy's shoulders and elbows <ul style="list-style-type: none">- Maxon DC brushless motors (120W)- Nominal speed: 50rpm
Gripper	Parallel gripper	- Dynamixel-based <ul style="list-style-type: none">- Torque control
	Alternative end-effector	Alternative grippers can be integrated (e.g. Aloha grippers, Inspire "Dexterous hand")



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 straightforward to install and use
Python SDK	Easy robot programming	
ROS2 Middleware	<ul style="list-style-type: none">- 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: <ul style="list-style-type: none">- PC-Based App- Compatible Devices :<ul style="list-style-type: none">- Meta Quest 2 and 3 (Recommended)- HTC Vive and Valve Index	
Dashboard	<ul style="list-style-type: none">- OTA software upgrades- Service control- Real-time robot monitoring	
Visualization	Rviz (default), also supports FoxGlove and rerun.io.	
Simulation	Gazebo	

