AR4-MK5 · OPEN-SOURCE 6-AXIS ROBOT ARM

The robot anyone can build.

An open-source, industrial-style 6-axis arm that fits on a desk. Students assemble the aluminum structure and electronics themselves, then program it in Python or ROS 2. Built for schools, shops, and makers who want industrial motion without the industrial price.

For schools, makers & industry



AXES	REACH	PAYLOAD	REPEATABILITY	MASS	POWER
6 DOF	24.75 in	4.15 lb	0.25 mm	27 lb	198 W
Articulated industrial kinematics	62.9 cm, J1 center to flange	1.9 kg rated	Closed-loop encoder feedback	12.25 kg, aluminum structure	8.25 A max at 24 VDC

WHAT IT IS

A real industrial arm, sized for a classroom

The AR4-MK5 is the latest generation of the Annin Robotics arm, developed in public from the AR2 through the AR4-MK5 by Chris Annin, an automation veteran. The goal is a 6-axis industrial arm affordable enough for a classroom. The design stays open, motors are bought factory-direct, and covers can be 3D printed instead of paying for injection-molded parts.

Universities, colleges and high schools around the world use the AR4 to teach robotics hands-on.



AR4-MK5 Robot Combo Kit: 26 machined aluminum parts, hardware, and primary electronics

HOW IT'S BUILT

Four groups of parts make one robot

01
Combo kit
Aluminum structure, bearings, belts, pulleys, shafts, hardware, and primary electrical components.

02
Motors & drivers
Stepper motors, drivers, and power supply, bought factory direct from StepperOnline.

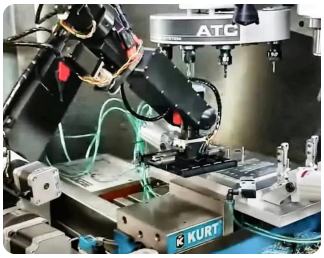
03
Gripper or tool
Pneumatic or servo gripper kits, or any gripper or tool holder you need.

04
Covers
3D print covers and spacers in any color, or buy a ready-made set.

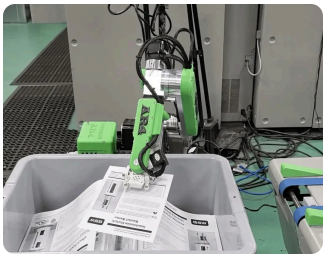
Under the covers: closed-loop motor encoders, Hall-effect homing on joints 1 to 3, an HTD belt drive on joint 3, and motion math on a 600 MHz Teensy 4.1. An Arduino Nano or Mega handles 5 V grippers and solenoids in parallel. The free build manual includes the bill of materials, specifications, wiring, and full DH kinematic sheets.

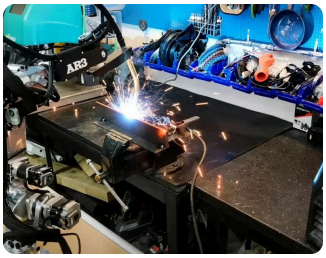
WHAT IT CAN DO

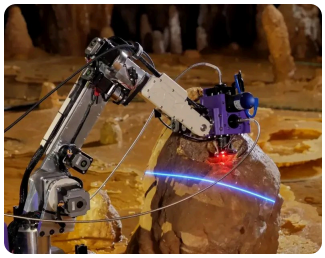
Same arm, many applications



Pick and place


Document sorting


Weld


Scanning

Pick and place · Machine tending · Sorting · Weld · Document sorting · Assembly · Scanning · Agriculture · Camera · Dishwasher · Sort and stack · Chess

Builders have also used the AR4 for vision-guided picking, a slide-to-cassette loader, an automated 3D print cell, and a Python chess robot. In industry it is used for light assembly, prototyping, CNC tending, packaging, and R&D.

SOFTWARE & PROGRAMMING

Free software, from first jog to ROS 2


AR4 HMI control software

Python HMI

Teach positions, jog in joint or Cartesian space, run programs. Native Linux in 6.3+.

Digital twin

Offline mode mirrors the real arm in 3D. Import STL workpieces and debug programs with no hardware attached.

Python API & SDK

Added in software version 7.0. Version 8.0 adds offline programming with Python and ROS 2 simulation.

Xbox jogging

Controller jogging and teaching, plus Tool-Z jogging for precise flange work.

ROS 2

Community drivers from Chris Annin & Yifei Cheng (ar4_ros_driver, tested with ROS 2 Jazzy on Ubuntu 24.04) and Ekumen Labs. MoveIt 2, ros2_control, Docker, and simulation in Gazebo, NVIDIA Isaac Sim and MuJoCo.

Modbus, G-code, vision

Talk to PLCs over Modbus, stream G-code, and calibrate a standard webcam to pick taught objects with OpenCV, with no proprietary license.

JOINT DETAIL

JOINT	ROLE	MOTOR	DRIVER	HOME	RANGE
J1	Base	17HS15-1684D-EG10	DM332T	Hall effect	±170°
J2	Shoulder	23HS22-2804D-YGS50	DM332T	Hall effect	±90°
J3	Elbow	17HS15-1684D-EG50	DM332T	Hall effect	-10° to +150°
J4	Wrist roll	11HS20-0674D-EGS16	DM320T	Microswitch	±180°
J5	Wrist pitch	17E19S1684MB4-200RS	DM320T	Microswitch	±120°
J6	Tool roll	14HS11-1004D-EGS20	DM320T	Microswitch	±180°

KIT OPTIONS & PRICING

What a build includes

CORE ROBOT	
AR4 MK5 Robot Combo Kit 26 machined aluminum parts, bearings, belts, pulleys, hardware, and primary electrical components	from $1,189
Motor, driver & power supply package Purchased factory direct from StepperOnline. Annin Robotics does not resell or mark these up.	$699
Covers and spacers Print your own in any color, or buy a ready-printed set from C.I. Printing	$299.98 (printed set)
OPTIONS	
AR4 MK5 CAD Models SOLIDWORKS and STEP files for the Mark 5	$99
AR4 Robot Clear Arm Covers Two clear acrylic side panels to watch the joints move (C.I. Printing)	$29.99
SPARE PARTS KITS (SOLD SEPARATELY)	
Aluminum Parts Kit / Hardware Kit / Electrical Parts Kit	$699 / $319 / $229

GRIPPERS & ADD-ONS

Grippers and PLC option



Pneumatic gripper
SMC-style parallel jaw kit for light pick-and-place.
$139



Servo gripper
Servo, Nano, current sensor, and hardware. Print the fingers yourself.
$74.50



Modbus PLC upgrade
RS-485 TTL board, wiring, and RJ45 keystone for PLC communication.
$16



Printed covers in the color of your choice

Prices as listed on anninrobotics.com in October 2026 and subject to change. Schools can request a quote: add your address to get an invoice with prices and shipping.

WHO IT FITS

Ideas for classes, labs and teams

Engineering
Students assemble the arm from machined parts, wiring, and printed covers, and learn how a real industrial robot is built.

Computer science
Progress from HMI teach-and-run programs to the Python API, kinematics, and vision-guided picking.

Networking & systems
Explore Modbus PLC communication, ROS 2 nodes on Linux, and Docker-based ROS 2 setups.

Robotics teams
Prototype in the digital twin or ROS 2 simulation, then run on hardware. Enter builds in AR4 Build of the Year.

Using anninrobotics.com

- **Downloads:** free build manual, software, STL print files
- **Tutorials:** setup, programming, vision, ROS 2
- **AR4 Build Guide:** step-by-step online build course
- **Docs & FAQ:** knowledge base, troubleshooting wizard
- **ROS 2:** both community ROS 2 drivers with videos
- **Community & User Builds:** forum and real projects
- **Education:** curriculum sample, school quote request

NEXT STEPS

Let's talk about the AR4.

Questions about kits, a quote, or planning a build? Reach out directly.

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