

TORMACH ZA6 CNC INDUSTRIAL ROBOT

Currently in Beta Program

AN AUTOMATION-READY ROBOT WITH A 6 KG PAYLOAD. INTERESTED?

Tormach is developing the ZA6, an industrial robot arm, as a companion to our line of CNC mills and lathes. It's controlled by PathPilot, Tormach's award-winning CNC user interface, and communicates seamlessly with other PathPilot-controlled CNC machines. The underlying trajectory planning and motion control is handled by ROS, an open-source robot operating system with tens of thousands of active developers worldwide. Access to the underlying code is provided to all customers, allowing participation in the range of research opportunities offered by the ROS ecosystem.

Tormach's robot is now in active beta testing, with individuals from:

- Academia / ROS Programming
- Film Industry / YouTube Engineering Influencers
- Large-Scale Manufacturing Partners
- Small-Scale Manufacturing Partners

Sign up for updates on our website and stay tuned for more information as it becomes available!



KEY FEATURES

PathPilot user interface

- Identical layout to the PathPilot interface on Tormach CNC machines. Users and businesses familiar with Tormach mill or lathe operation will be able to learn how to create robot programs with minimal effort.

Powered by ROS (Robot Operating System)

- The most popular platform for robotics research (over 4,000 academic papers cite "ROS: an open-source Robot Operating System" [Quigley et al., 2009]).
- Vibrant community development effort — see <http://download.ros.org/downloads/metrics/metrics-report-2020-07.pdf> for detailed statistics.

Robot programs are written in Python

- Programs are easily created in 'conversational' fashion via the user interface.
- For users familiar with Python, robot programs are easy to understand and modify.
- Python users can easily extend robot programs to interact with the file system or the outside world.
- Examples:
 - `Import time, time.sleep(.5)` to delay an action 0.5 seconds.
 - `Import csv, with open('eggs.csv', 'rb')` as csvfile to read in position values from a csv file, or write out values to a csv file.
 - `Import usb.core, usb.util, more complex python code here` to read data from a USB scale to used the robot to measure the weight of an object.

TECHNICAL SUPPORT

Tormach offers remote technical support via email, phone, and video chat. All robot control systems come with TeamViewer pre-installed, making it easy for a Tormach developer to take remote control of the system.

Support is limited to mechanical issues and software issues when the machine is controlled via the default software installation. Customers are free to modify the source code in a sandbox, but ROS research and code modification is outside the scope of Tormach's free technical support. We are happy to consult with customers that require ROS support or training.

©2021 Tormach.

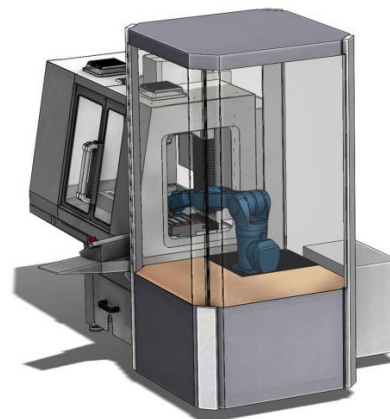
Specifications subject to change without notice.

Robot control system is designed to work with other PathPilot-controlled equipment

- If you own a Tormach mill or lathe, the Tormach robot will cooperate with that CNC machine with minimal setup. A simple network connection (ethernet cable) allows the robot to control which programs the CNC machine runs, when it runs them, and even allow the robot to tell the CNC machine to execute arbitrary G-code commands.

Tormach robot uses robust industrial hardware

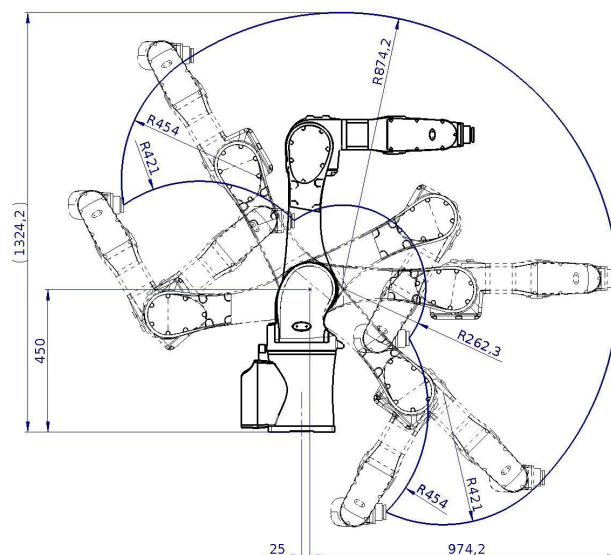
- The Tormach robot is an industrial tool that's been made exceptionally easy to use. It utilizes solid metal casting, servo motors and drives, and harmonic gear reducers.



*Machine tending functions not ready at time of robot launch.

SPECIFICATIONS

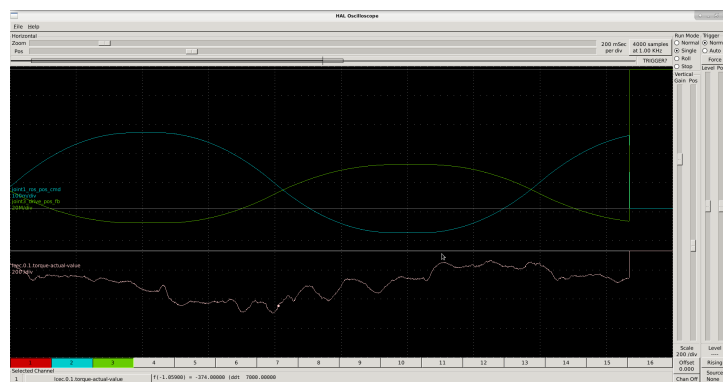
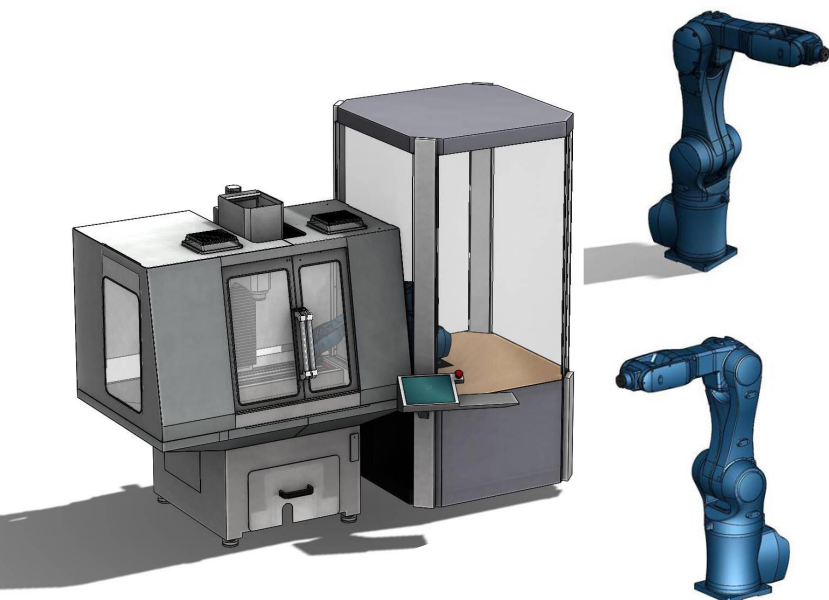
WEIGHT	146 lbs. (65 kg)		
PAYLOAD	13 lbs. (6 kg)		
REACH	38 in. (975 mm)		
JOINT RANGES		JOINT SPEEDS	
JOINT 1	$\pm 148^\circ$	JOINT 1	150° s-1
JOINT 2	+135° to -100°	JOINT 2	112.5° s-1
JOINT 3	+65° to -210°	JOINT 3	150° s-1
JOINT 4	$\pm 149^\circ$	JOINT 4	204.5° s-1
JOINT 5	$\pm 143^\circ$	JOINT 5	225° s-1
JOINT 6	$\pm 360^\circ$	JOINT 6	360° s-1
REPEATABILITY	± 0.020 in (0.5 mm)		
DEGREES OF FREEDOM	6 rotating joints		
CONTROL BOX SIZE (W × H × D)	26 in. × 32 in. × 14 in. (650 mm × 820 mm × 360 mm)		
DIGITAL INPUTS	16		
DIGITAL OUTPUTS	16		
I/O POWER SUPPLY	24 Volt 2 Amp		
PROGRAMMING	Teachmode programming through PathPilot GUI, Python		
NOISE	Comparatively noiseless		
IP CLASSIFICATION	IP65		
POWER SUPPLY	200 - 240 Vac, 50 - 60 Hz, Single-Phase Power		



FUTURE WORK

Tormach has historically offered software upgrades at no cost when they become available. While there is not a formal completion date on the calendar, we are currently working on the following items and will make them available after the initial product release:

- Computer vision/visual servoing
- Integration with Mimic/Maya/Blender animation software for robot programming
- Small trainer robots for ~\$5,000 that will work on the same user interface/operating system
- A web-based user interface simulator like PathPilot HUB (hub.pathpilot.com), but for the robot user interface



1kHz control loop provides tight integration between ROS, the hardware abstraction layer, and the physical hardware itself. Access to hundreds of system variables is available to the robot program in realtime. The hardware abstraction layer, based on the open source MachineKit project, makes extending the application relatively easy.