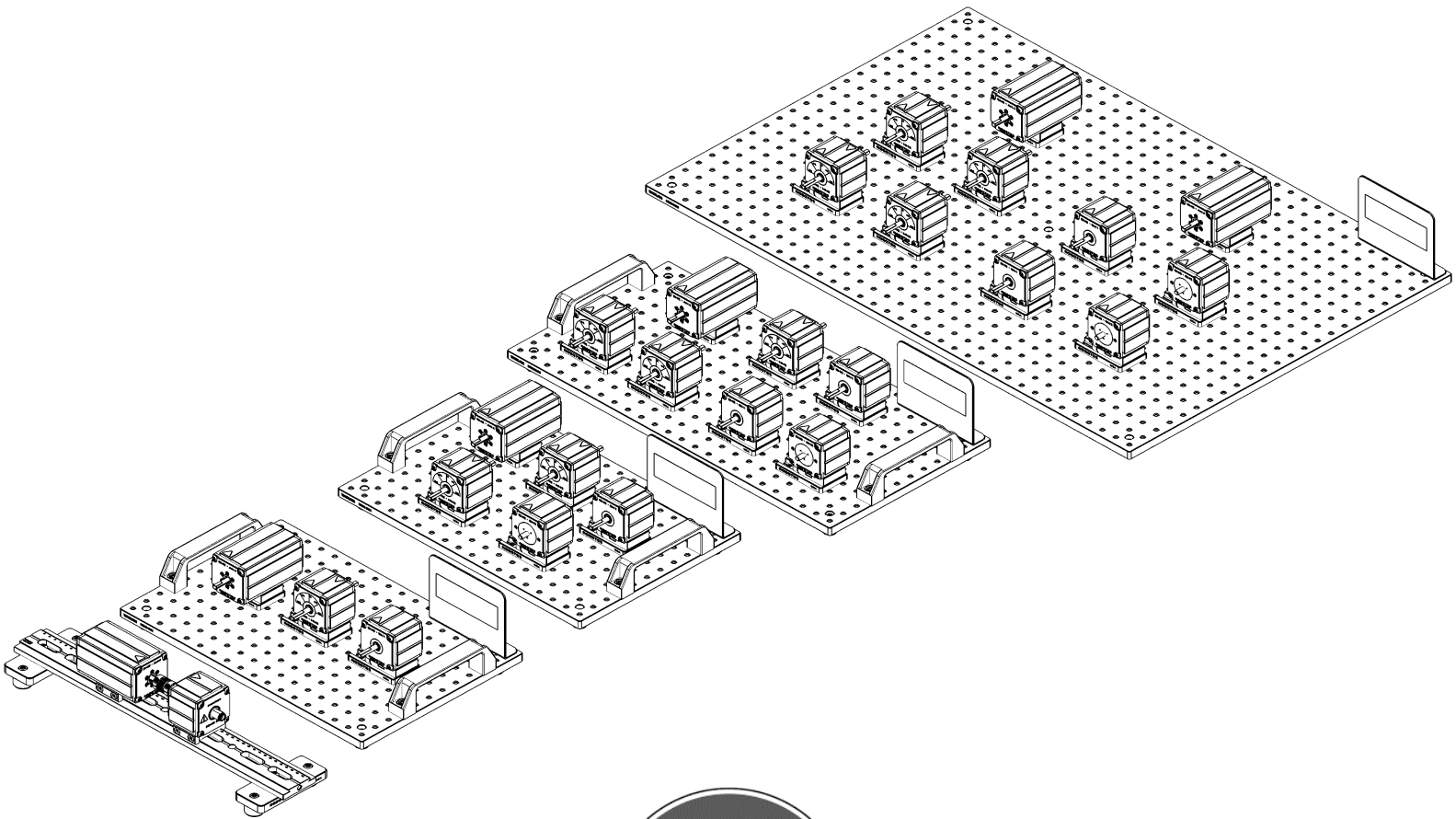


## ELECTRO-MECHANICAL BREADBOARD SAFETY DOCUMENT



Version 2.10 - April. 2024

ROBOTS5 LLC, USA



# Disclaimer

- Be sure to read this document carefully and fully understand it, before using our products
- Robots5 LLC is not responsible for any damage or injury caused by misuse, misunderstanding, or abuse of this product
- The user is solely responsible for the implementation of the controller and safety system used with EMB
- This document was generated and completed to the best ability of Robots5 LLC. The information on this manual are presented in good faith and believed to be correct however, Robots5 LLC makes no warranties as to the completeness or accuracy of the information
- Never use our products in any application where failure of the product could result in personal injury. Failure to comply with these instructions could result in death or serious injury
- Our products should not be used by inexperienced users, unless if they are under close supervision of experienced users
- Robots5 LLC reserves the right to make changes to this document or to the products described herein without further notice
- Make sure to always use the latest version of this document

## **Contact Information:**

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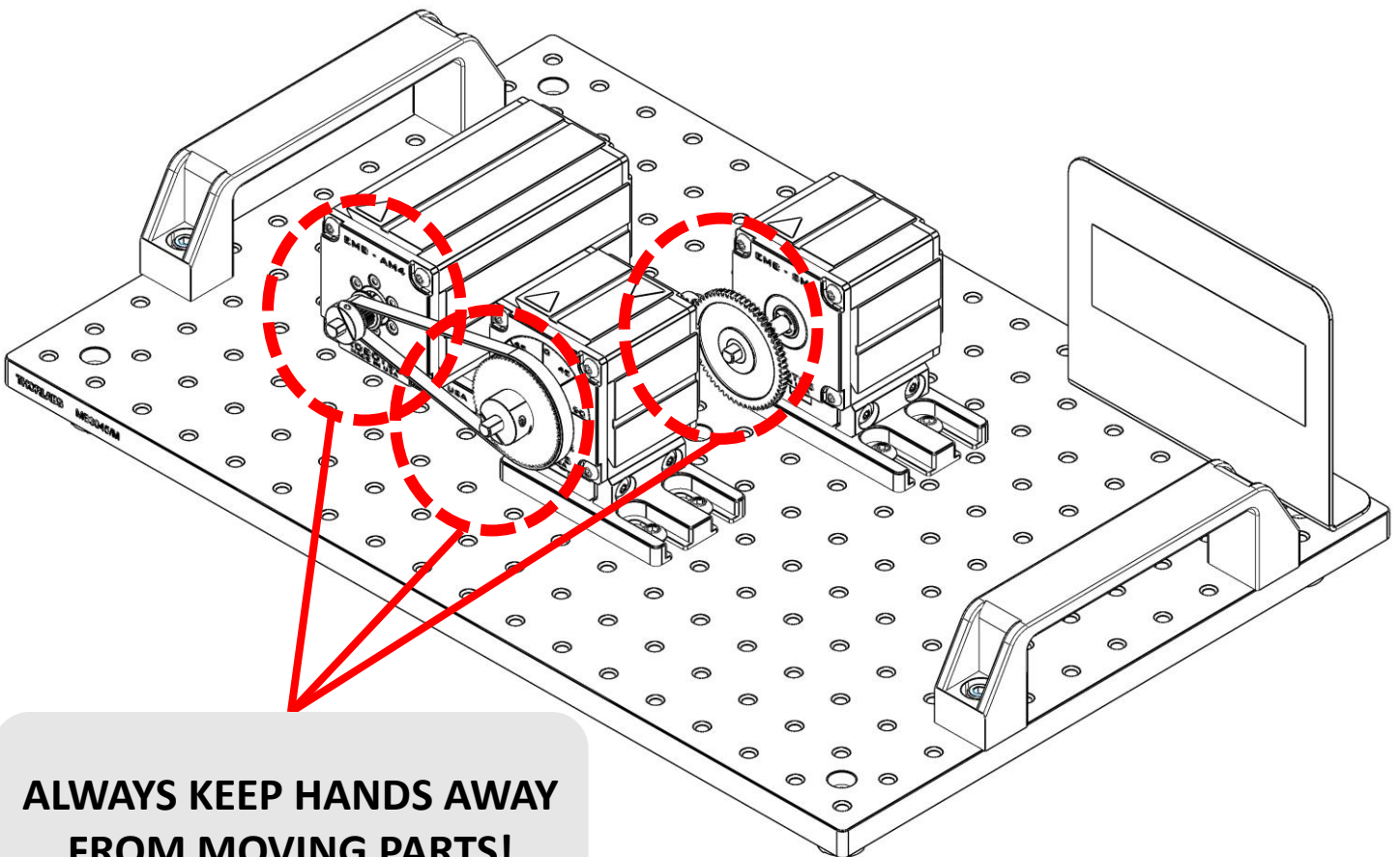
Website: [www.robots5.com](http://www.robots5.com)

Location: Melbourne, FL USA

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**Fingers may break or get amputated if caught in moving parts!**



**ALWAYS KEEP HANDS AWAY FROM MOVING PARTS!**



# Safety

- If improperly used, EMB can cause injury or death
- Never touch any moving parts! Always stay clear from gears, sprockets, belts, chains, linkages, and any components in motion
- Never place fingers, hands, or any object between a moving component and the hard stops, for example, but not limited to, a linear bearing with end hard stops
- Follow all information and recommendations from this document
- Responsible use of EMB is crucial to prevent dangerous conditions
- Only use this device in indoor applications, with no water/oil splash or contact. Never operate EMB near explosive gases or flammable liquids
- Treat this device with care, it is a precision unit. Do not throw, hit, or drop it
- If you notice the unit getting warm or hot or making abnormal noises or vibrations, or sense smoke immediately stop all motion and turn the power completely off. Assess the situation to understand the issue before attempting to resume operation
- Never hot-plug this module, turn off power before plugging it in or off
- Do not operate outside the specifications of the unit
- Powering this device outside the electrical rating will damage it
- Only apply power to the system after ensuring all components are secured



# Dos and Don'ts

- Use less aggressively tuned controllers first, then fine tune your controllers
- Always current limit the actuators to a safe level. Increase current as needed, after ensuring safety of the plant and user
- If using a PID controller, be careful with the Derivative gain. High derivative gain can damage actuators and sensors
- Have an Emergency Button (E-STOP) installed, hardwired to the actuator drive
- Never open or modify any of the EMB modules
- Avoid the use of setscrews. If you are using a component that has setscrews, do not use screws with the following tips: cup, knurl-grip cut, oval, or cone. These will damage the shaft of our modules if tighten!  
Use flat tipped, ideally with soft tip (plastic, felt, or brass).  
Alternatively, the use of a shim between the shaft flat and the tip of the setscrew can be used to reduce shaft damage
- Always align the setscrew to the flat of the shaft. Avoid setting the setscrew tip to the round part of the shaft, as this practice will likely damage the shaft.  
Particular attention is required when using setscrew with the EMB-SM2 module (Potentiometer), as this module shaft doesn't have a flat. Use a soft tipped setscrew and don't over torque it
- Use correct tools while working with EMB. The use of incorrect tools will likely strip fasteners or cause further damage
- Never press fit components to the EMB shafts. Never hammer or use a press to place components to shafts, this will damage the modules. Only use sliding fit
- Our products are precision components, treat our components with care
- Only make electrical connections when the wiring diagram is completely understood and clear



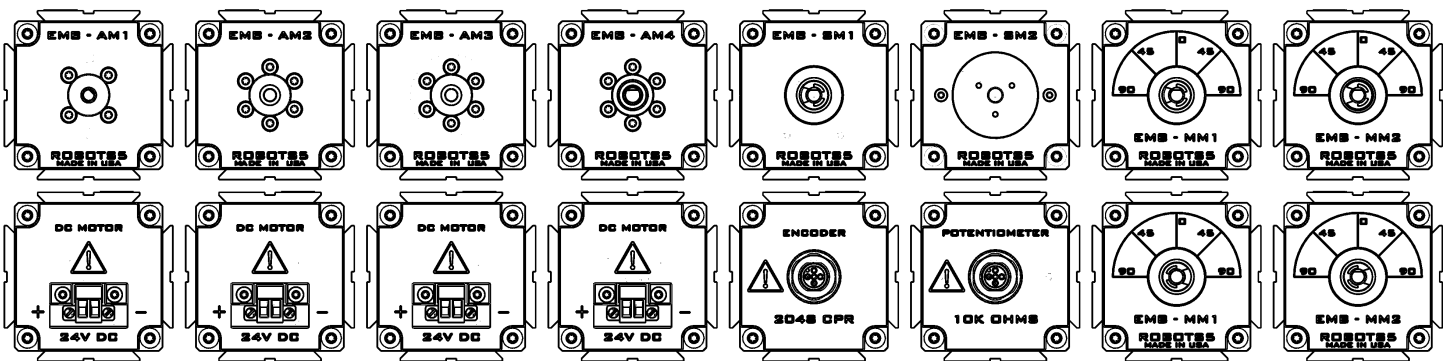
- Follow ESD (Electrostatic Discharge) instructions carefully
- Never use rigid coupling (sleeve coupling), for coaxial shaft connections. Always use compliant couplers, such as Helical, flexible and Love-Joy
- Never overload, mechanically or electrically, a module. Respect each module's specification
- Always try to keep the load closer to the front bearing of each module
- Leave space (around 1mm) between the mounted component and the front of a module to avoid rubbing. Similarly, allow enough clearance around each module so no moving parts interfere with the modules
- Be extremely careful with unbalanced loads. Limit the speed to ensure safety and prevent overloading of the modules
- It is recommended to have anti-windup and saturation in the controller implementation. Monitor the effort variable of your actuator. Don't stall the actuators, it can cause permanent damage to the brushes
- If any EMB module is warm or hot, or if you notice vibration or abnormal sound, stop the system immediately and evaluating loading parameters. Investigate each element to narrow down the cause
- Do not remove safety signs, labels, and stickers
- Never pry between a component and the module. Doing this will damage the bearings

Have questions or need additional support?

Contact us at:

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