

# Practical tips for working with HW

24/3 2021, Michael K. Schmidt

# General tips

- Always power off equipment before connecting/disconnecting anything.
- Check polarity/voltage/current requirements before connecting equipment.
- Doublecheck polarity/voltage/current requirements before connecting equipment.
- Check if digital I/Os are PNP or NPN before using.
- Don't leave loose wires components around close to a bare PCB. Somethings gonna slide!
- Break inexpensive stuff first, ie. Fuses and external PSUs.

# Robot tips

- Always test programs at low speed first.
- Always keep hand on E-stop when running a program with "unknown" positions (ie. Found using a camera).
- Robot should be E-stopped or turned off when changing gripper.
- Don't use E-stop to just pause the robot (wears robot down quickly).
- Most things can (and probably should) be done in simulation.
- Limit the robots speed+acceleration as much as possible for given application.

# "Cobot is just a marketing term"

- Safety of a robot depends on much more than buying a "cobot".
- Depends on its configuration, tool choice etc.
- Homework: read 1.5.6 (Intended use) and 1.5.7 (risk assessment) from UR5 CB3 manual.
- <https://www.universal-robots.com/download/manuals-cb-series/user/ur5/315/user-manual-ur5-cb-series-sw315-english-international-en/>