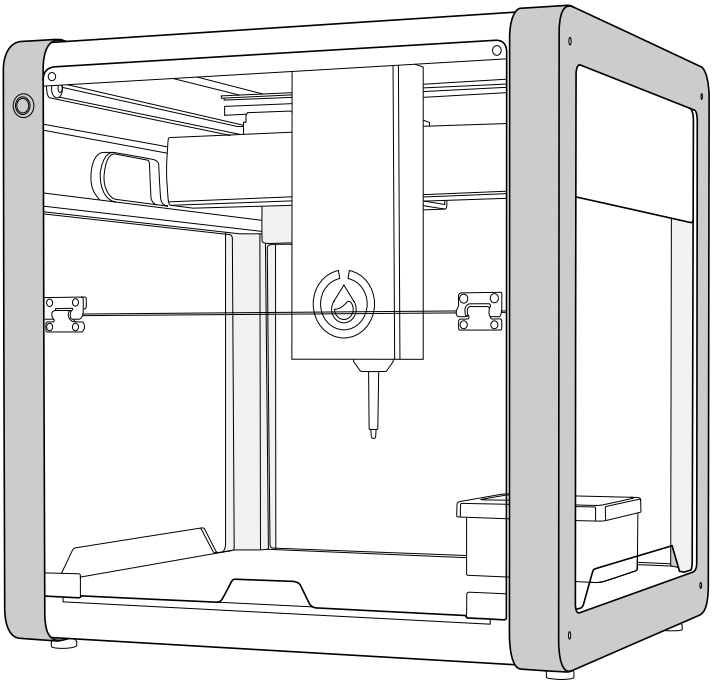
opentrons

OT-2 Liquid Handling Robot

User Manual / Quickstart Guide



Opentrons Labworks Inc.

Edition

Revision OT-2R, June 2021

Post sales service & contacting Opentrons

If you have any questions about the use of the system, abnormal phenomena, special needs, please contact: support@opentrons.com. Also visit www.opentrons.com.

Table of Contents

Product and Manufacturer Description

PRODUCT DESCRIPTION

The OT-2 is a liquid handling lab robot. It is open-source, highly customizable, kit and reagent agnostic, and takes up half a lab bench. Its software and hardware modules are built by scientists for scientists and don't require coding knowledge to use.

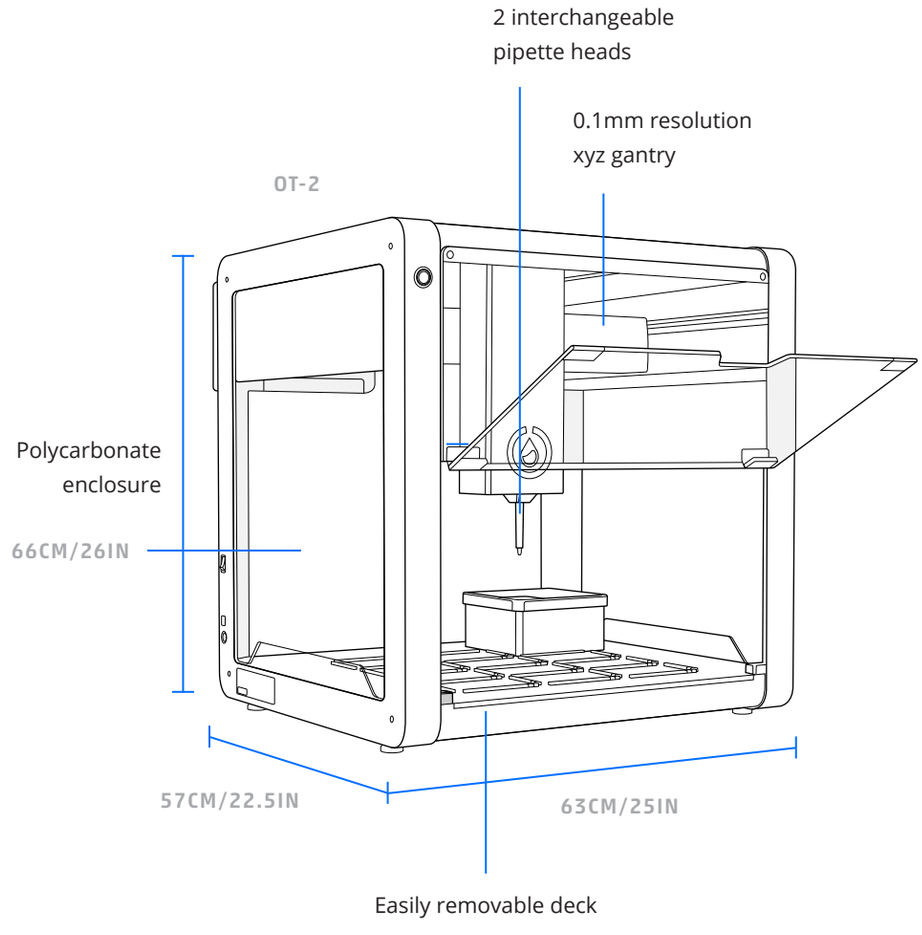
Completed Certifications
CE & FCC, NRTL, & CB

Not Certified/Validated
IVD, GMP & ISO

MANUFACTURER DESCRIPTION

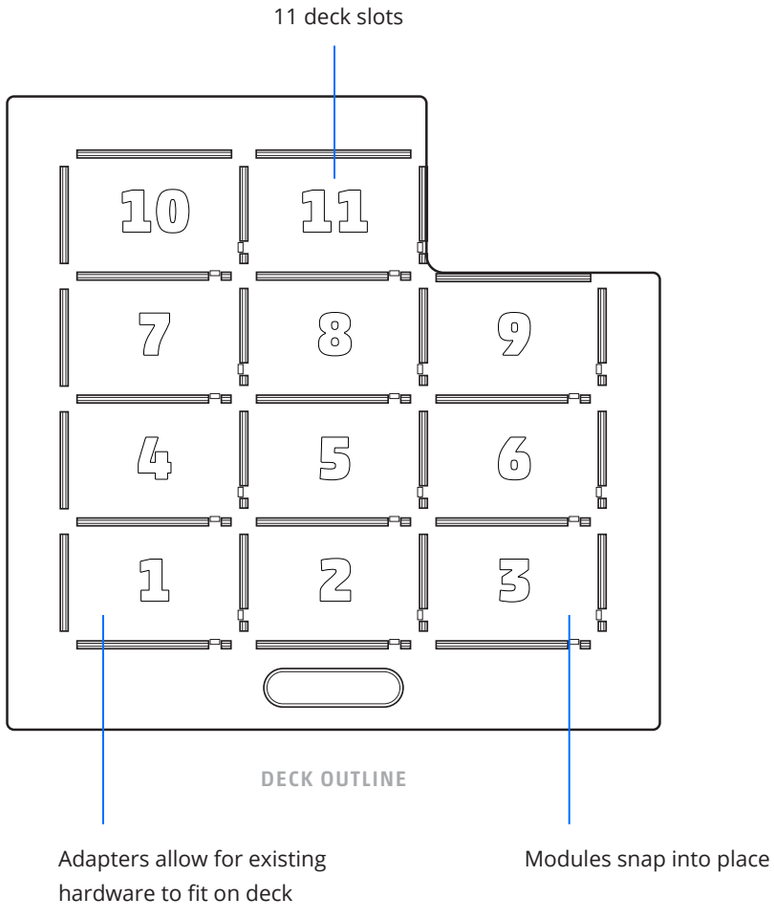
Opentrons Labworks Inc
20 Jay Street, #528
Brooklyn, New York
NY 11201

Product Elements



Serial Number
OT2XXX2021XXXXRXX

Product Elements



Deck slots are compatible with standard SBS dimensions. Deck also includes a removable trash bin.

Instructions for Unboxing and Use

To get started quickly, visit our online resources and follow the step by step instructions to help you go from unboxing your robot to running your first protocol.

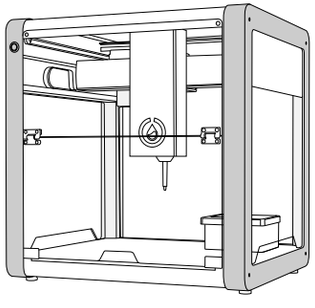
Visit **https://support.opentrons.com/** for more information.

INCLUDED BOX CONTENTS / PARTS & ACCESSORIES

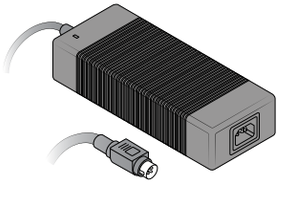
- (1) OT-2
- (3) Window Covers
  - (2) Side Window Covers
  - (1) Rear Window Cover
- (1) Power supply (36V/6A)
- (4) IEC Power cable (Connects the power supply bar to a wall socket)
  - IEC Cable US
  - IEC Cable UK
  - IEC Cable EU
  - IEC Cable Italy
- (1) Ethernet Cable
- (1) Ethernet-to-USB dongle (connects the OT-2 to a laptop)
- (1) Tool Kit
  - Hand Screwdriver (2.5mm)
  - 14mm Wrench
  - Torx Key (T10)
  - Allen key set (1.5mm, 2mm, 2.5mm, 3mm)
  - Super Lube (silicone based lubricant)
  - 2pcs M3 hex nut
  - 2pcs M4 square nut

Box C Included Box Contents / Parts & Accessories

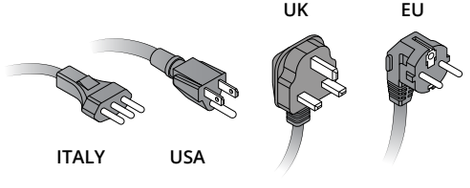
- Pipette Screws
  - 4 pieces of M3x6mm socket head screws (2 are spares)
- Window Screws
  - 4x top window screws (M4x12mm low profile socket screw, M4 thick washer, and rubber O-ring)
- (1) Trash Bin
- (1) Calibration Block



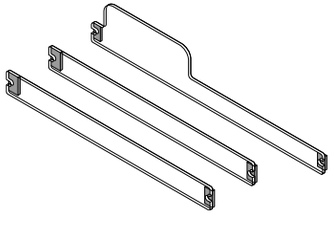
(1) OT-2



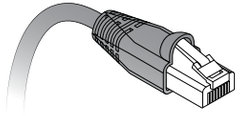
(1) Power supply (36V/6A)



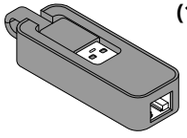
(4) IEC Power Cable
(Connects power supply bar to a wall socket)
- IEC Cable US
- IEC Cable UK
- IEC Cable EU
- IEC Cable Italy



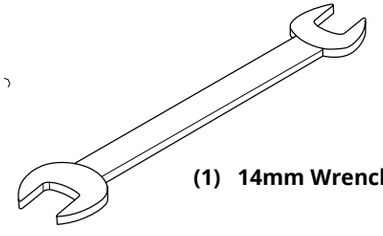
(4) Window Covers
(2 side window covers, 1 rear window cover)



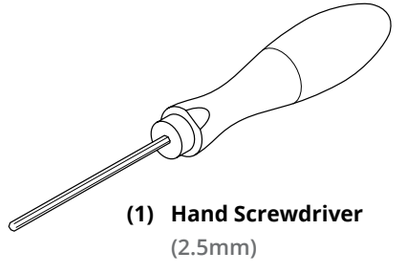
(1) Ethernet Cable



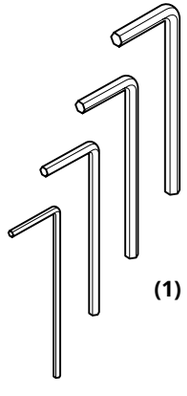
(1) Ethernet-to-USB dongle
(Connects the OT-2 to a laptop)



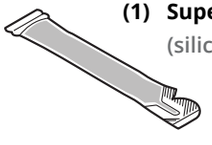
(1) 14mm Wrench



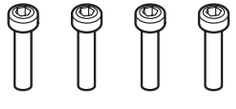
(1) Hand Screwdriver
(2.5mm)



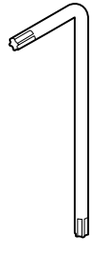
(1) Allen Key Set
(1.5mm, 2mm, 2.5mm, 3mm)



(1) Super Lube
(silicone based lubricant)



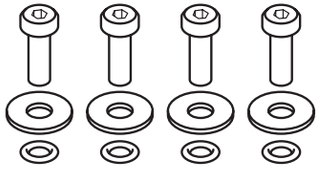
(4) Pipette Screws
(4 pieces of M3x6mm socket head screws, 2 are spares)



(1) Torx Key (T10)

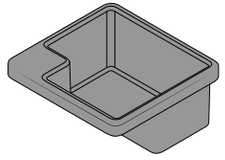
(2) 2pcs M3 hex nut

(2) 2pcs M4 square nut

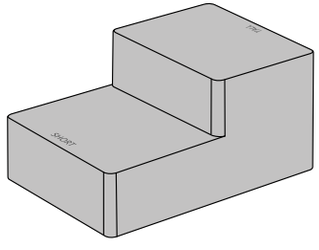


(4) Window Screws

(4x top window screws (M4x12mm low profile socket screw, M4 thick washer, and rubber O-ring)



(1) Trash Bin



(1) Calibration Block

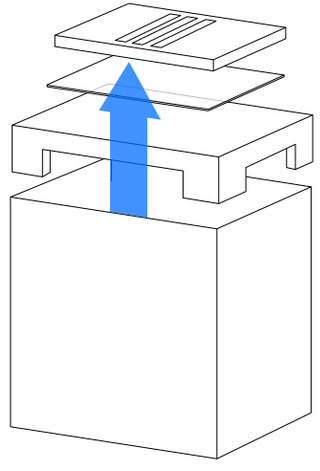
REQUIRED FOR OPERATION:

- A computer (self-provided), an open-end wrench (included)
- Space required by the machine: Space larger than 625mm*570mm*680mm

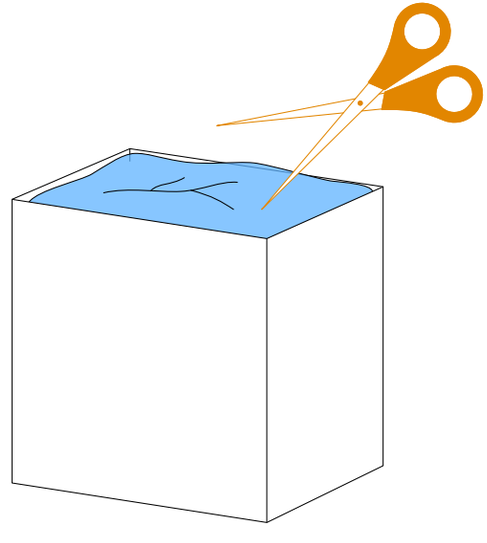
Instructions

MACHINE SETUP

1 Remove the top foam and window and top covers.

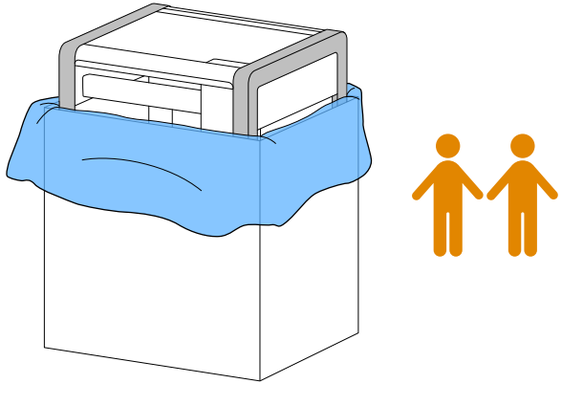


2 Carefully cut open the plastic VCI bag. Be sure to avoid cutting any machine components inside.

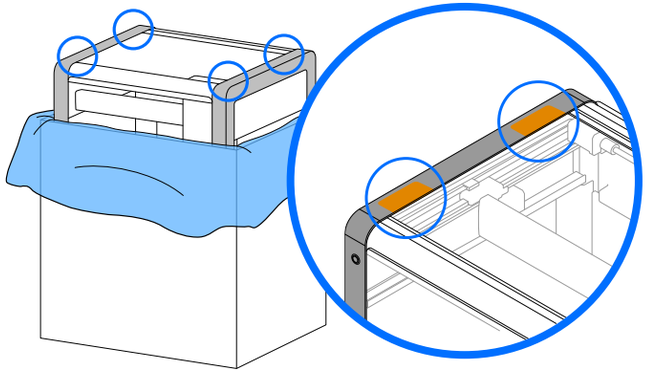


Instructions

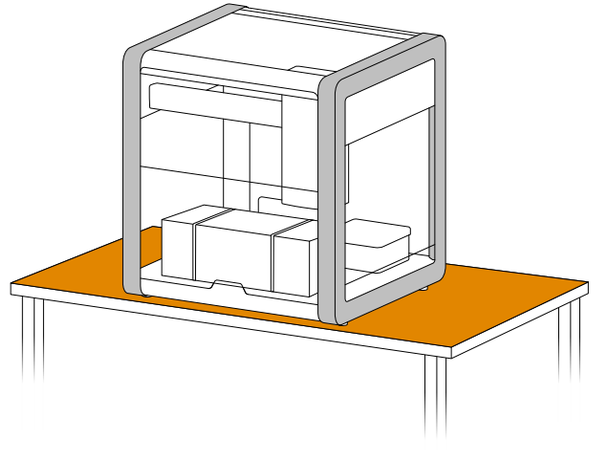
3 The machine requires two people for lifting out of the packaging (the machine is over 30kg).



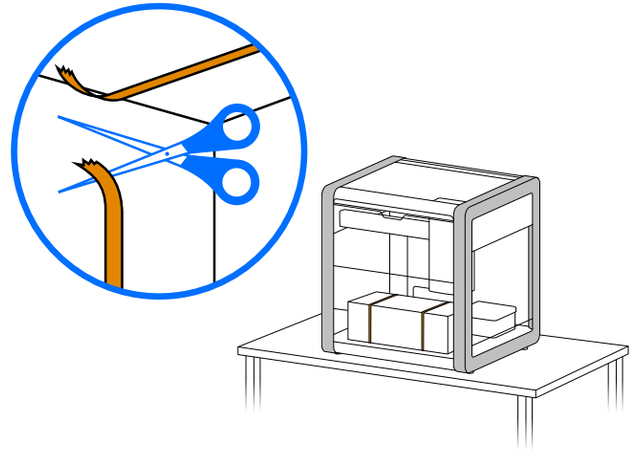
4 Pull upwards using the black steel frame.



5 Place the machine on a secure and stable surface.

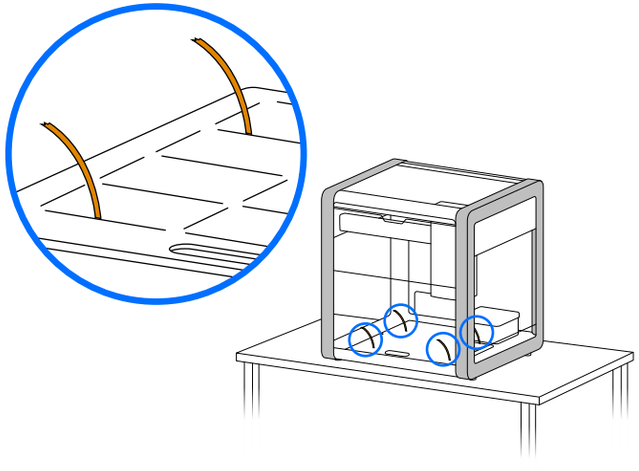


6 Cut the zip ties supporting the customer kit and place aside.

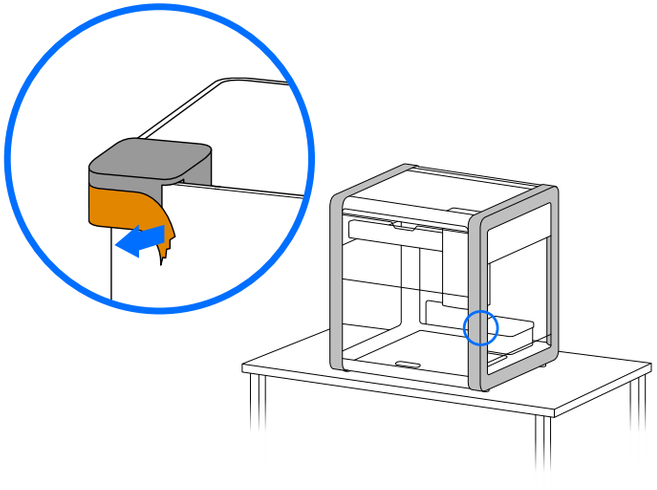


Instructions

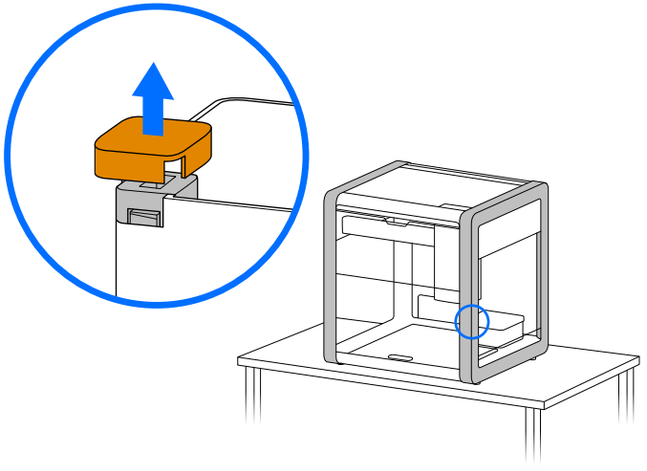
7 Pull the remaining zip tie ends and remove completely from the deck.



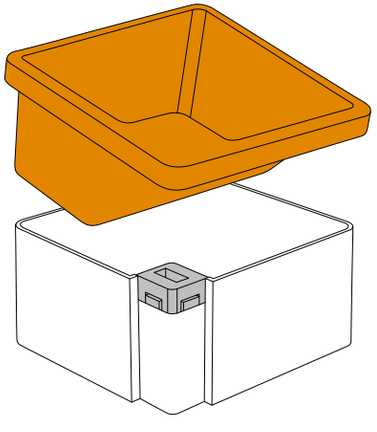
8 Remove tape from the calibration switch cover.



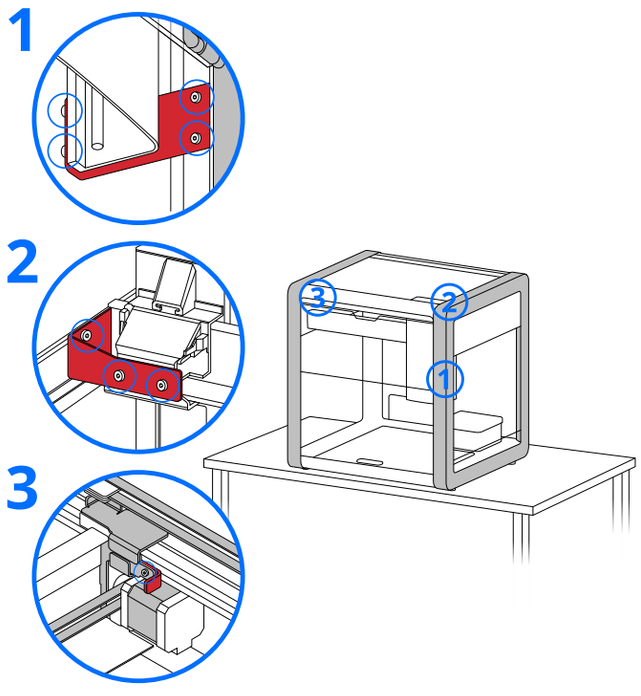
9 Remove the plastic cover completely.



10 Place the trash bin in place.



11 Remove the 3 transport fasteners:

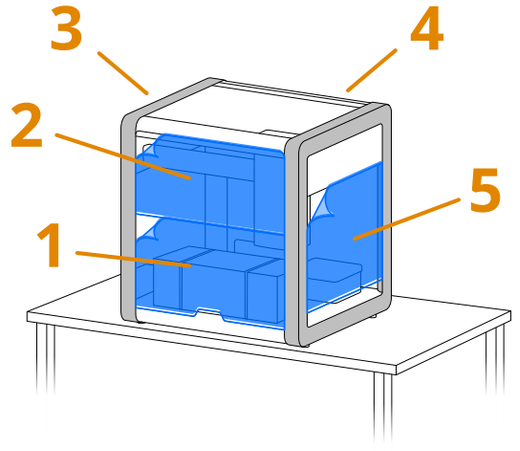


1. Unlock and remove the X-axis locking bracket (red) and 4x locking screws using the 3mm allen key

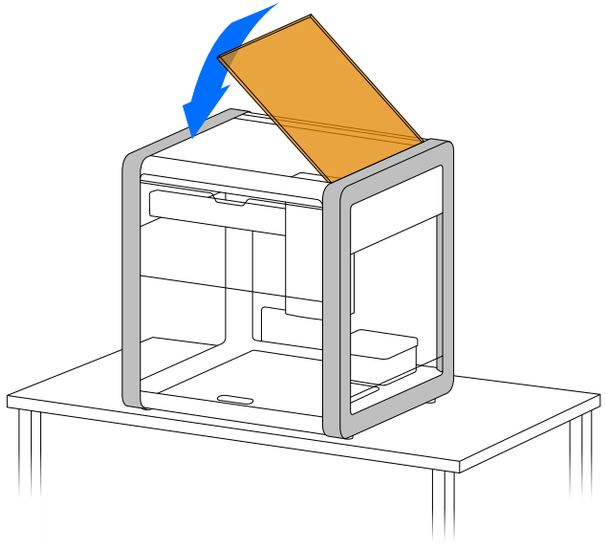
2. Unlock and remove the Y-axis locking bracket (red) and 1x locking screw using the 3mm allen key

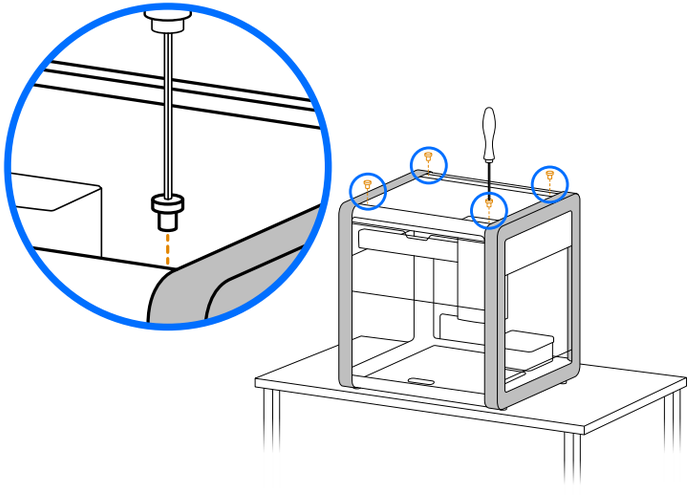
3. Unlock and remove the Z-axis locking bracket (red) and 4x locking screws using the 3mm Allen key. Note that after removing the rear screws, one can move the z-stage further left by hand, allowing more room for removing the screw.

12 Remove the film used to protect the polycarbonate sheets



13 Install the top polycarbonate sheet and fasten the four corner screws using the 2.5mm hex driver and 4x top window screws

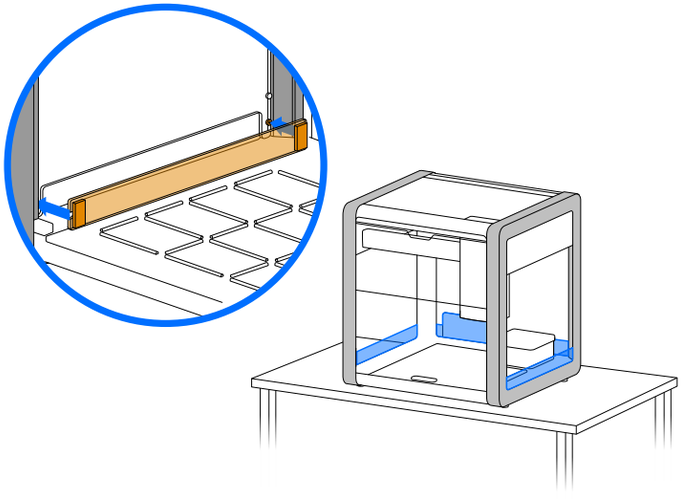




14 Check the Machine:

- ☐ Confirm that 3 brackets have been removed, as powering on the robot with brackets may cause damage.
- ☐ Confirm that you are not missing any required cables and/or parts. If you are missing components, contact Customer Support.
- ☐ Visually check the deck and windows, if there are any significantly scratched, broken, or bent components, contact Customer Support.
- ☐ Visually check the gantry, if it is uneven or slanted, contact Customer Support.
- ☐ Move the pipette head in the x and y direction, if it makes any loud/abnormal noises or requires a large thrust to move, contact Customer Support.

15 Install window covers



16 Clean & Sterilize Robot

Note: When cleaning and maintaining the machine, be sure to turn off the machine and disconnect the power before proceeding. Also pay attention to warning labels

17 **Connect Power Source + USB/Ethernet Cable**

POWER AND CONNECTION

Connect ethernet and connect the power cable.

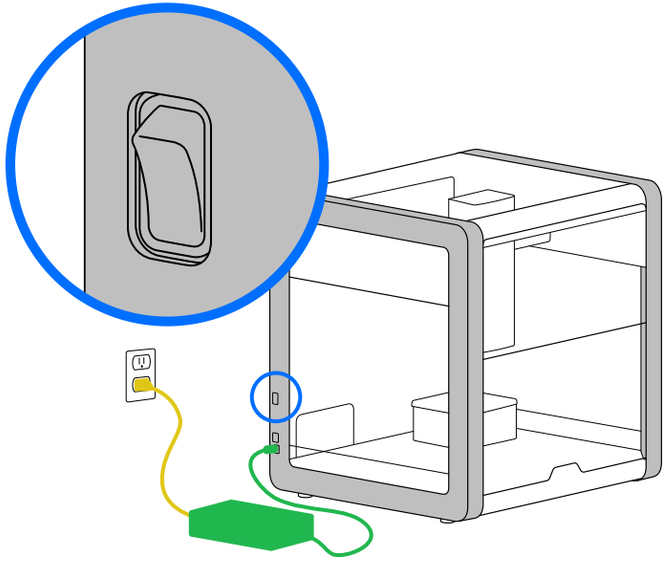
If your computer does not have ethernet use the USB to ethernet dongle provided.

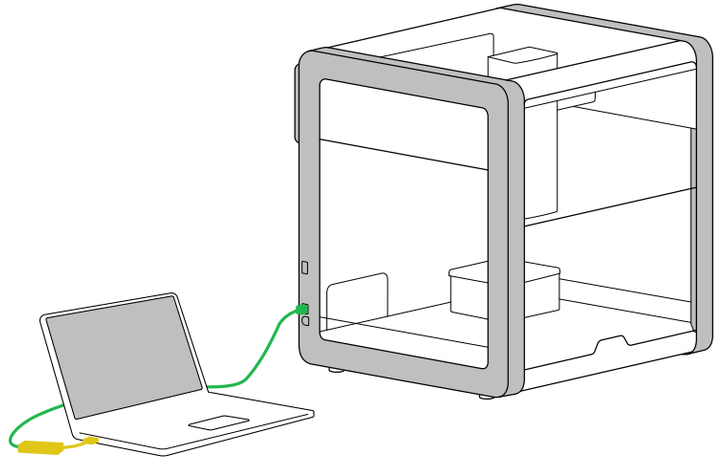
POWER REQUIREMENTS

100-240 VAC / 50-60 Hz
220 W MAX

CONNECTIVITY

WiFi 2.4 GHz IEEE 802.11b/g/n, USB 2.0.





18 **Install the Opentrons App**

MIN REQUIREMENTS:

Windows 10, macOS 10.10 or later, Ubuntu 12.04 or later.

19 **Congratulations! Now your OT-2 robot has been successfully unlocked and set up!**

When everything is ready, power on the machine by pressing the power button and wait for about 45 seconds before the machine starts running and the X, Y, and Z axes each return to the origin.

Once the robot is turned on, follow instructions in the Opentrons App to connect to the OT-2, attach pipettes, and calibrate the robot.

Online Resources

Now that you have your robot connected, it's time to start using it! This section will breakdown all of our online resources so you can figure out where to get the info you need, how to download protocols, and check out new features!

www.opentrons.com

For consumable materials visit opentrons.com where you find tips, labware, and reagents.

Protocol Library - https://protocols.opentrons.com/
The Protocol Library is home to our shared protocols. The "Browse" tab will take you to all of the protocol json files that you can download and run on the robot, (along with handy diagrams of how to set up and

Cleaning and Maintenance

CLEANING

The OT-2 can be cleaned and disinfected with alcohol, bleach, and any standard household cleaner using a rag or paper towel. Avoid contact with any electronics.

The OT-2 is *not* a sterile environment. Add your own UV lights, or the Opentrons HEPA Module

Note: When cleaning and maintaining the machine, be sure to turn off the machine and disconnect the power before proceeding. Also pay attention to warning labels.

Maintenance

The OT-2 has been tested for years of normal use without maintenance. If there are any concerns about the OT-2 or maintenance please contact Opentrons support.

Support

In case of any issues or questions, contact: support@opentrons.com
Please note your OT-2's serial number is located on the bottom right side of the machine.

WARRANTY

One year warranty against manufacturer defects. Stress tested to last a minimum of 3 years of full-time use.

Specs

PIPETTE CONFIGURATIONS

Single and multi-channel pipetting. 2-pipette mounts, for a configuration of 1 or 2 single or 8-channel pipettes. Pipettes are easily interchangeable.

PIPETTE VOLUMES AND SPECS

Single channel: 1-1000 µl
8-channel: 1-300 µl
Whitepaper: OT-2 GEN2 Single Pipettes
Whitepaper: OT-2 GEN1 Multichannel Pipettes

FRAME COMPOSITION

Rigid steel and CNC aluminum design

OPERATING TEMPERATURE & RELATIVE HUMIDITY

Recommended 20-24C. Recommended 40-60% RH. Learn more.

Specs

PLATE TYPE COMPATIBILITY

Use 96 or 384 well plates. Use 96-well plates for optimal deck compatibility & touch tips. Compatible with up to 384-well plates.

Use common labware already in our Labware Library, or add your own. If your labware fits on the OT-2 but is not in the Labware Library, it can be added by you using our Labware Creator, or by our team. **Learn more.**

API COMPATIBILITY

Interfaces with any product that has an API. Opentrons software is open-source and users can make adjustments to the software as needed to interface with other products. While all integrations are possible, they all require custom code work i.e. most customers will need to write custom libraries and install software packages that aren't shipped with the robot. **Learn more.**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