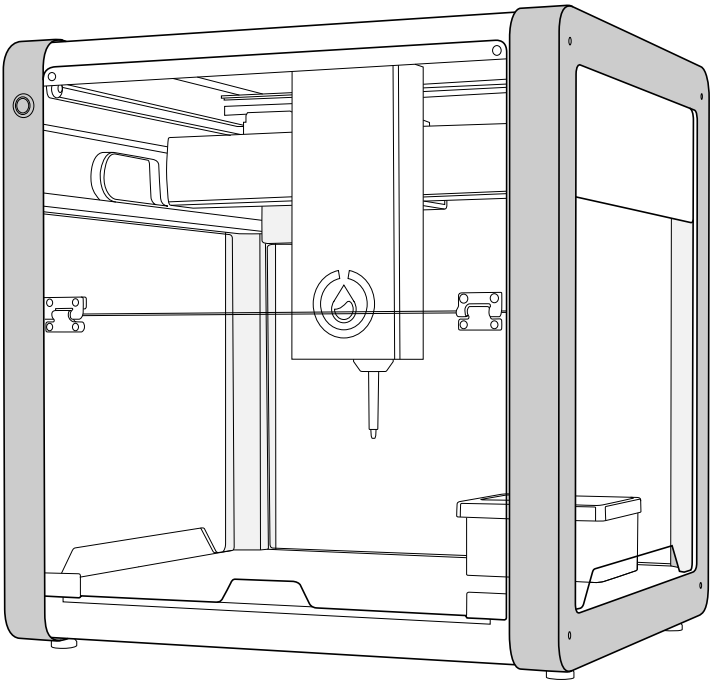
opentrons

OT-2 Liquid Handling Robot

Quickstart Guide



Opentrons Labworks Inc.

Edition

Revision OT-2R, April 2022

Post-sales service & contacting Opentrons

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

Table of Contents

Product and Manufacturer Description 4

Product Elements 5

Instructions for Unboxing and Use 7

- Included Box Contents / Parts & Accessories
- Machine Setup

Instructions 11

Online Resources 22

Cleaning and Maintenance 22

Support 22

Specs 23

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.

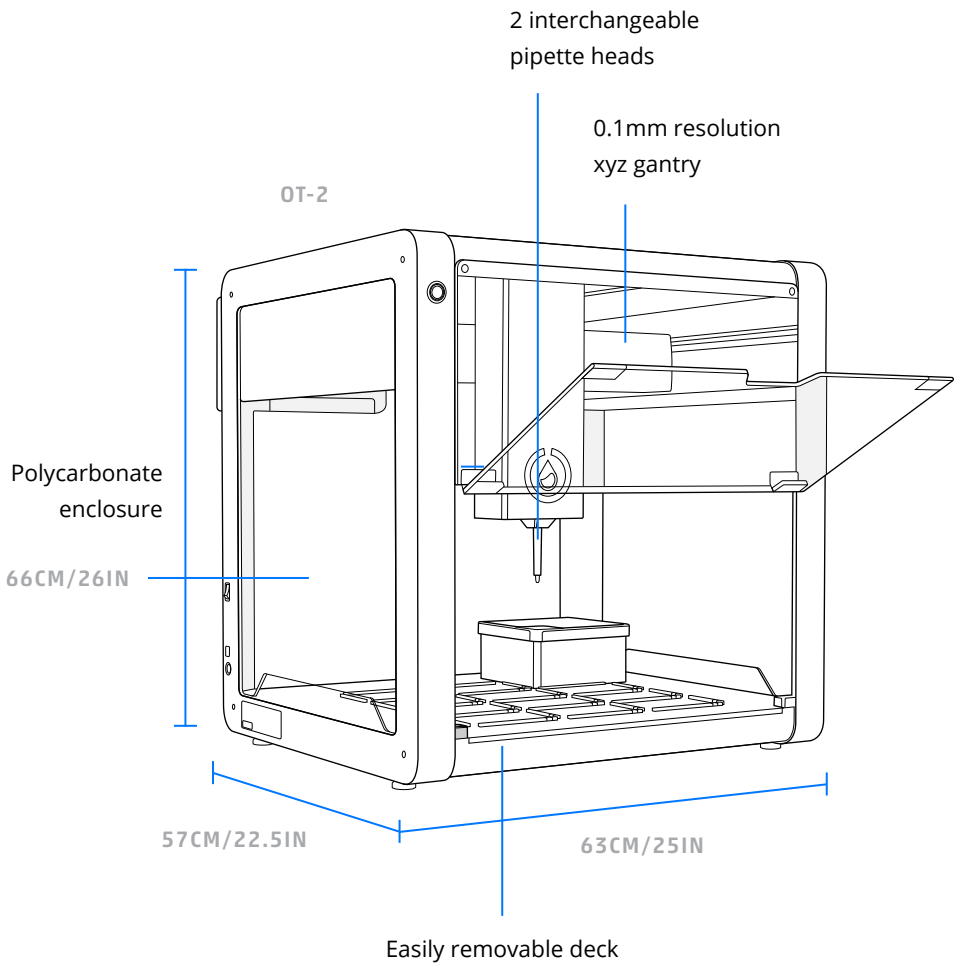
Completed Certifications
CE & FCC, NRTL, CB, & ISO 9001

Not Certified/Validated
IVD & GMP

MANUFACTURER DESCRIPTION

Opentrons Labworks Inc
45-18 Ct Square W
Long Island City, NY 11101

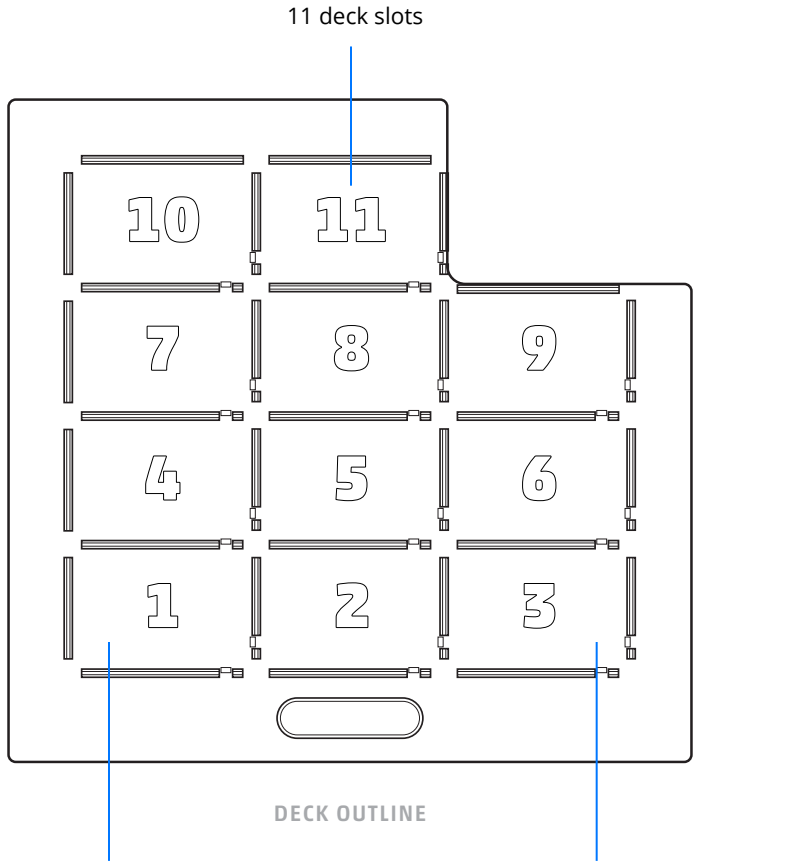
Product Elements



Serial Number

The OT-2 serial number indicates its date of manufacture, in the following format: OT2XXXYYYYMMDDXXX

Product Elements



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

Instructions for Unboxing and Use

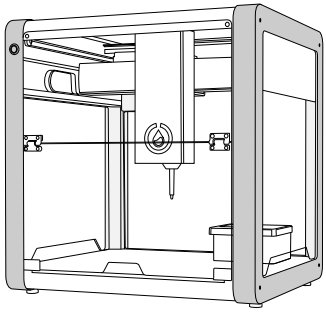
To get started quickly, visit our online resources and follow the step by step instructions to help you go from unboxing your robot to running your first protocol.

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

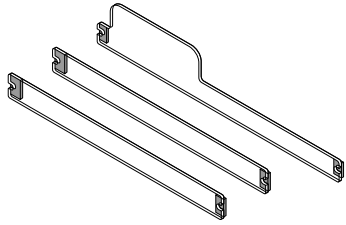
INCLUDED BOX CONTENTS / PARTS & ACCESSORIES

- (1) OT-2
- (3) Window Covers
  - (2) Side Window Covers
  - (1) Rear Window Cover
- (1) Power Supply (36V/6A)
- (1) Regional IEC Power Cable
- (1) Ethernet Cable
- (1) Ethernet-to-USB Dongle (connects the OT-2 to a laptop)
- (1) Toolkit
  - Hand Screwdriver (2.5mm)
  - 14mm Wrench
  - Torx Key (T10)
  - Hex Key Set (1.5mm, 2mm, 2.5mm, 3mm)
  - Super Lube (silicone-based lubricant)
  - (2) M3 Hex Nut
  - (2) M4 Square Nut
  - Window Screws
    - (4) M4x12mm low profile socket screw, M4 thick washer, and rubber O-ring
  - Pipette Screws
    - (4) M3x6mm Socket Head Screws (2 are spares)
- (1) Trash Bin
- (1) Calibration Block
- (1) Top Window

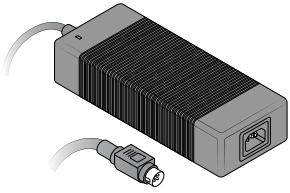
Instructions for Unboxing and Use



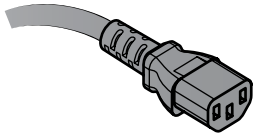
(1) OT-2



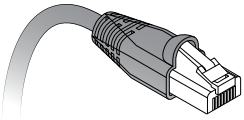
(3) Window Covers
(2 side window covers,
1 rear window cover)



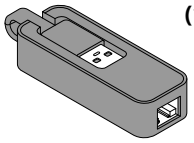
(1) Power Supply (36V/6A)



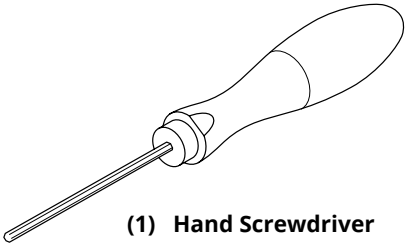
(1) Regional IEC Power Cable



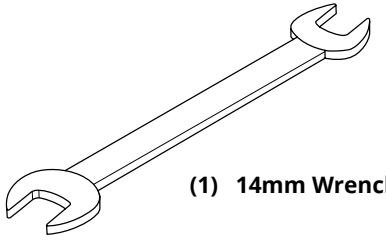
(1) Ethernet Cable



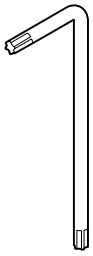
(1) Ethernet-to-USB dongle
(Connects the OT-2 to a laptop)



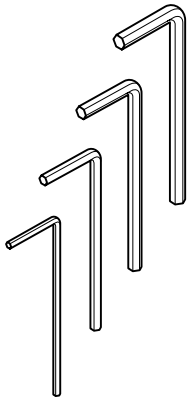
(1) Hand Screwdriver
(2.5mm)



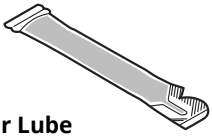
(1) 14mm Wrench



(1) Torx Key (T10)



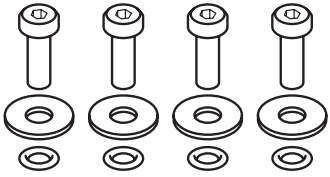
(1) Hex Key Set
(1.5mm, 2mm, 2.5mm, 3mm)



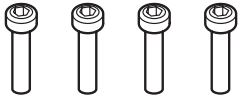
(1) Super Lube
(silicone-based lubricant)

(2) M3 Hex Nut

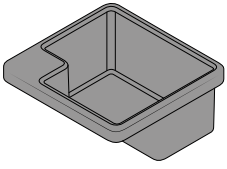
(2) M4 Square Nut



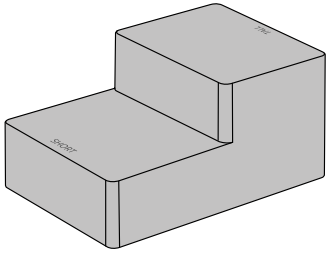
(4) Window Screws
(M4x12mm low profile socket screw, M4 thick washer, and rubber O-ring)



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



(1) Trash Bin



(1) Calibration Block

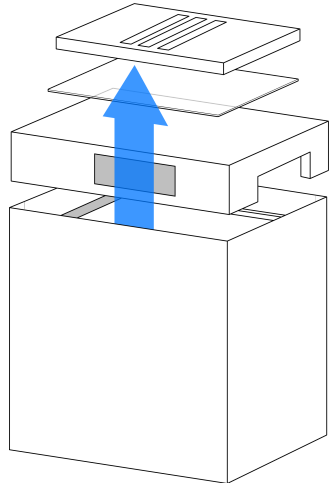
REQUIRED FOR OPERATION

- A computer (self-provided)
- An open-end wrench (included)
- Space larger than 625mm x 570mm x 680mm

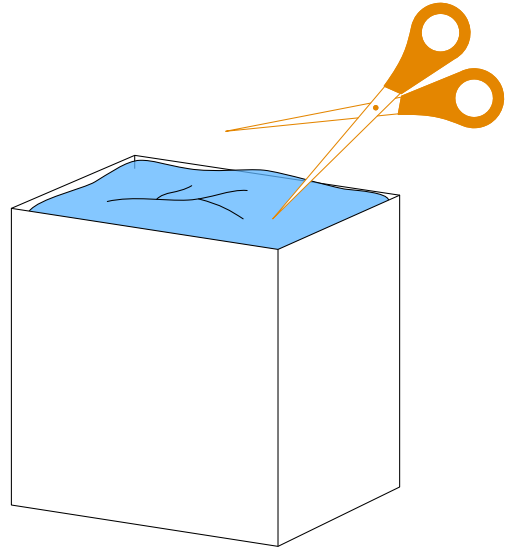
Instructions

MACHINE SETUP

1. Remove the top foam and window and top covers. Remove the power cable box from the foam, if present.

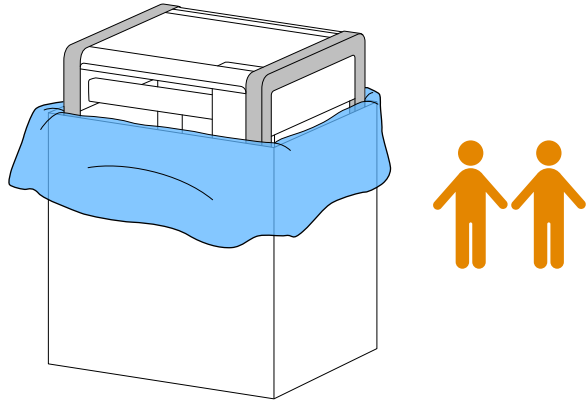


2. Carefully cut open the plastic VCI bag. Be sure to avoid cutting any machine components inside.

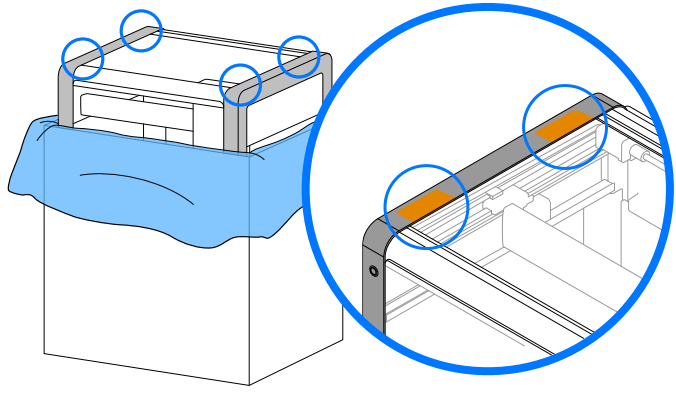


Instructions

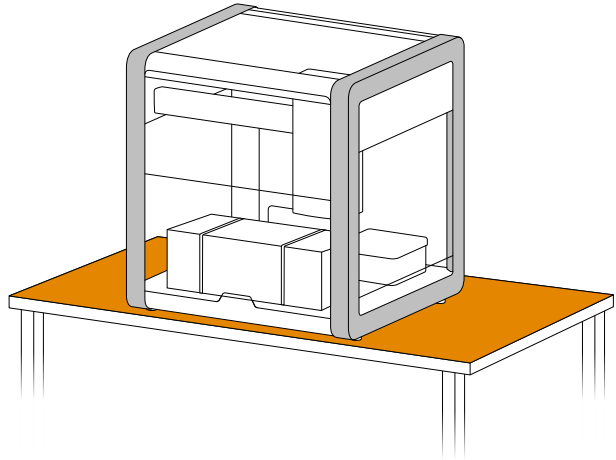
3 The machine requires two people for lifting out of the packaging (the machine weighs over 40kg).



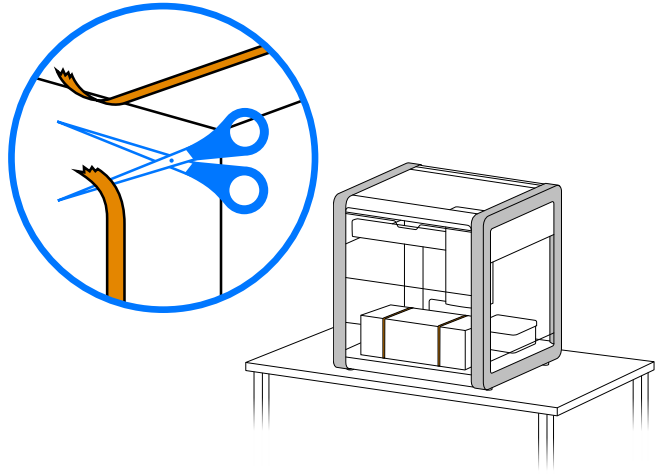
4 Pull upwards using the black steel frame.



5 Place the machine on a secure and stable surface.

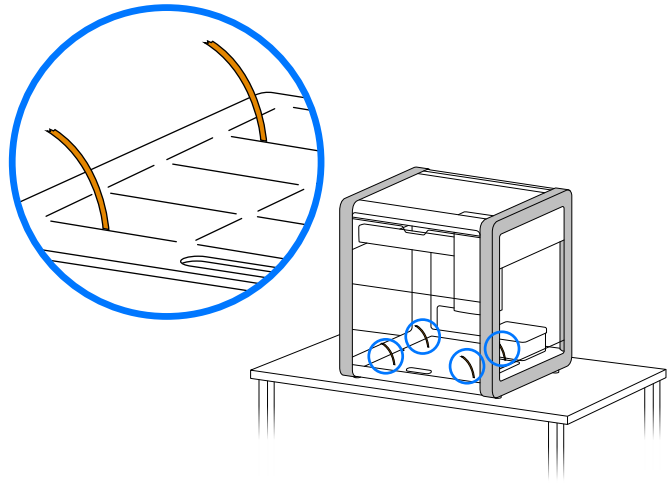


6 Cut the zip ties supporting the customer kit and place the kit aside.

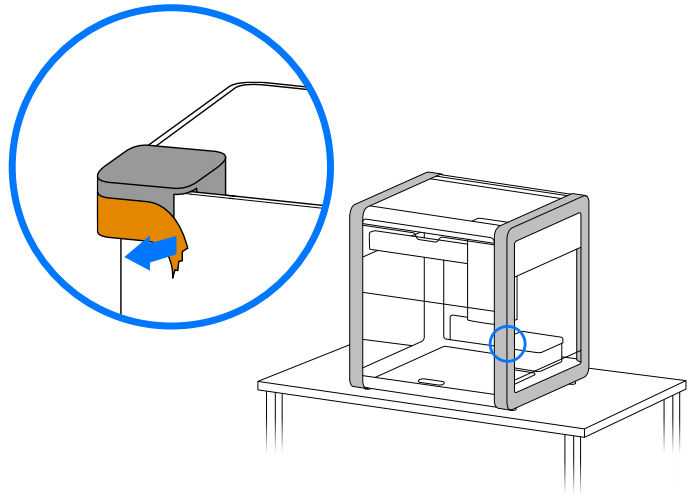


Instructions

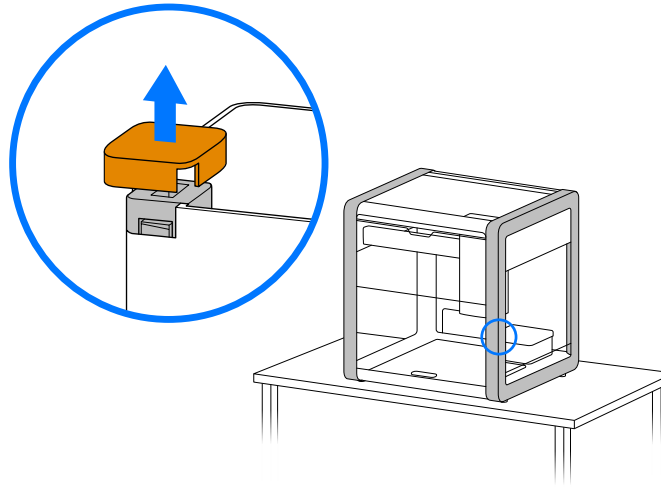
7 Pull the remaining zip tie ends and remove completely from the deck.



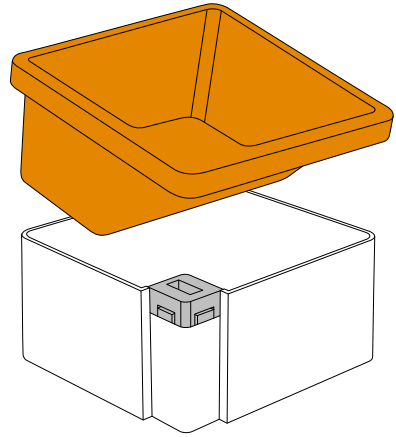
8 Remove tape from the calibration switch cover.



9 Remove the plastic cover completely.

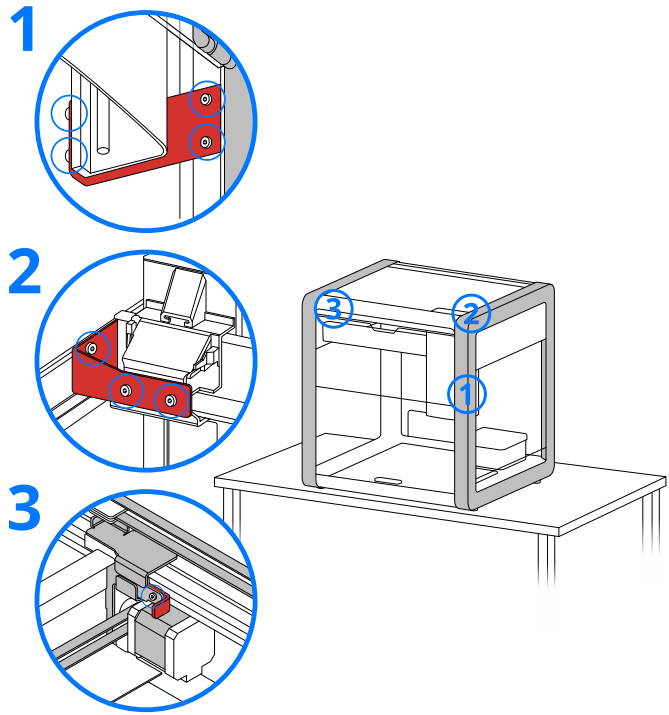


10 Put the trash bin in place.



Instructions

11 **Remove the 3 transport fasteners:**

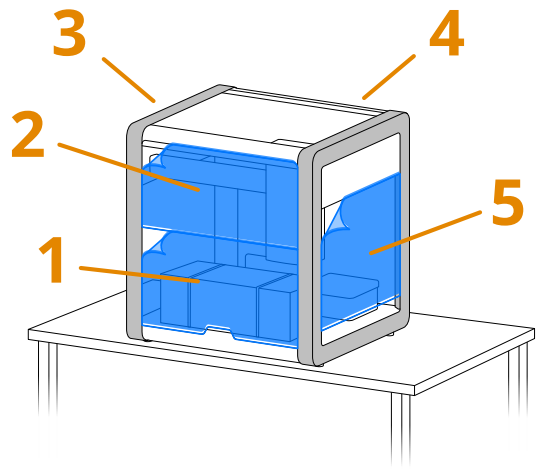


1. Unlock and remove the x-axis locking bracket (red) and 4x locking screws using the 3mm hex key

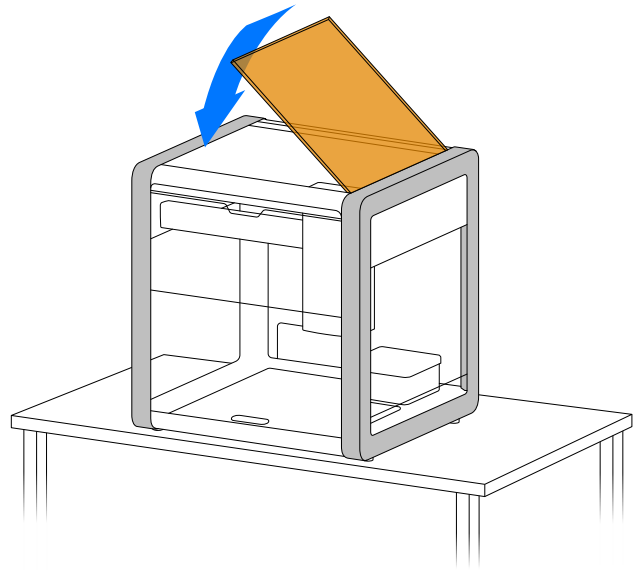
2. Unlock and remove the z-axis locking bracket (red) and 4x locking screws using the 3mm hex key. Note that after removing the rear screws, one can move the z-stage further left by hand, allowing more room for removing the screw.

3. Unlock and remove the y-axis locking bracket (red) and 1x locking screw using the 3mm hex key

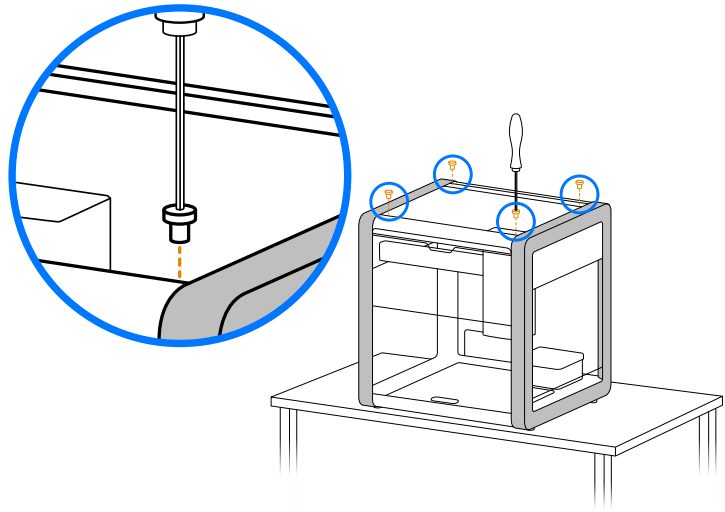
12 Remove the film used to protect the polycarbonate sheets.



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



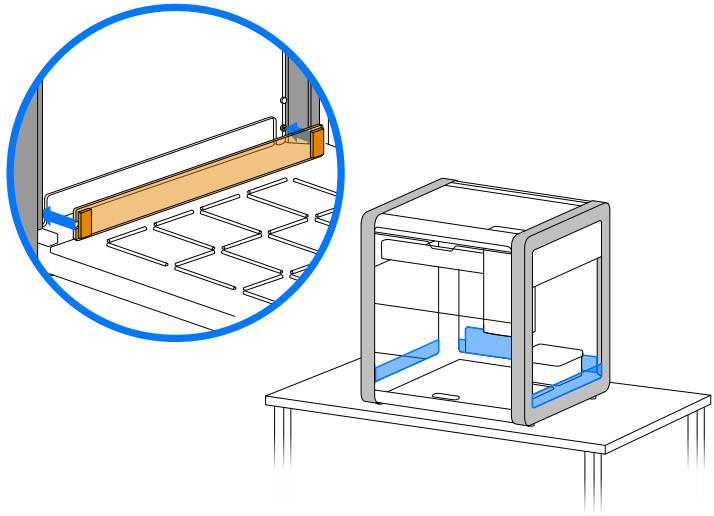
Instructions



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 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

Instructions

17 **Connect power source & USB/Ethernet cable**

POWER AND CONNECTION

Connect Ethernet and connect the power cable.

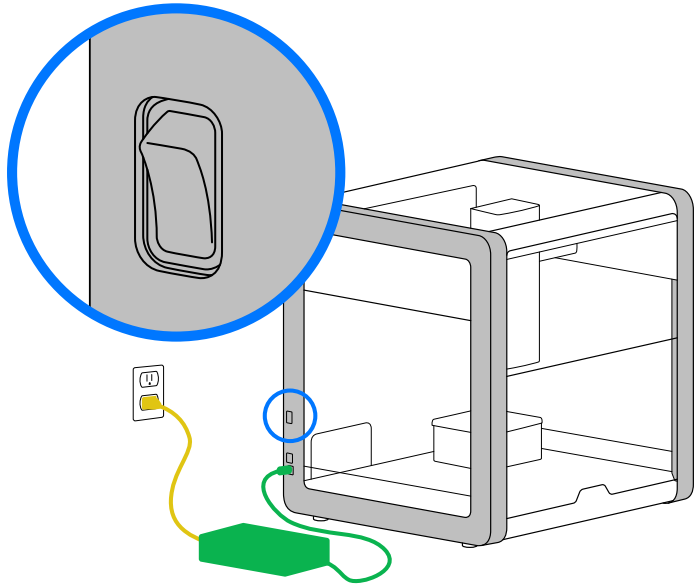
If your computer does not have Ethernet use the Ethernet-to-USB dongle provided.

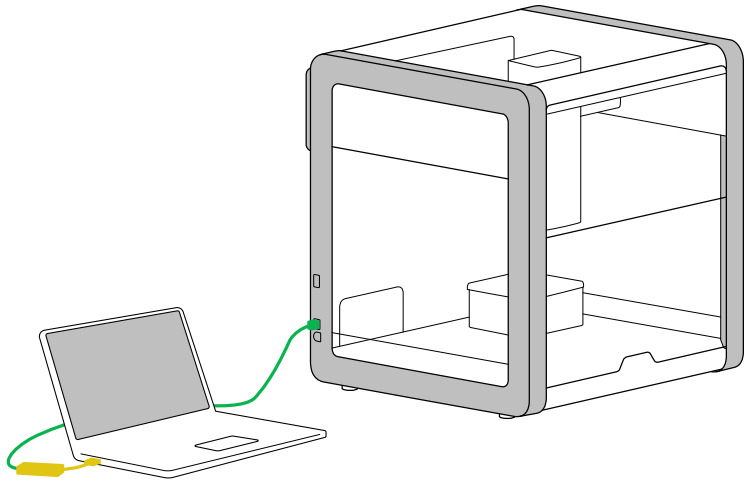
POWER REQUIREMENTS

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

CONNECTIVITY

Wi-Fi 2.4 GHz IEEE 802.11b/g/n, USB 2.0.





18 **Install the Opentrons App**
Download from https://opentrons.com/ot-app/

MIN REQUIREMENTS

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

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!

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.

Cleaning and Maintenance

CLEANING

The OT-2 can be cleaned and disinfected with alcohol, bleach, or 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

Performing routine **preventative maintenance** will ensure that your OT-2 is functioning optimally and can prolong its lifespan. You can also **contact Support** about Opentrons service plans.

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: Opentrons Electronic Pipettes

FRAME COMPOSITION

Rigid steel and CNC aluminum design

OPERATING TEMPERATURE & RELATIVE HUMIDITY

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

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 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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