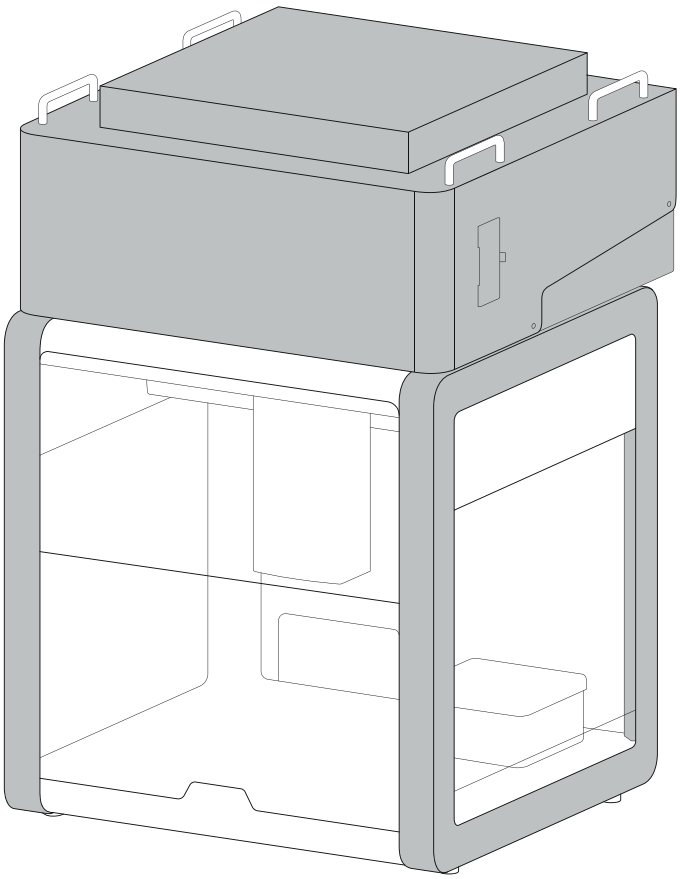
opentrons

# Opentrons HEPA Module



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## Product Description

The Opentrons HEPA (High-Efficiency Particulate Air) Module is a positive pressure clean air system for use with the Opentrons OT-2 liquid handling robot. The HEPA Module introduces a steady stream of filtered air into the OT-2 enclosure, displacing contaminates and providing a positive pressure air boundary to prevent introduction of airborne contaminants.

***NOTE:*** *The HEPA Module is* ***not*** *a biosafety cabinet and should never be used for pathogens. It should not be used for situations where there are volatiles, or any potentially hazardous aerosolized materials..*

## Equipment Ratings

### INTENDED USE OF THE EQUIPMENT

The intended use of the HEPA Module is optional equipment with the Opentrons OT-2. It is designed to clean the air of the OT-2 workspace using a HEPA filter to reduce the amount of particles in the workspace. The filter fan continuously will move air through the workspace and vent through the sides of the OT-2 to maintain a clean workspace.

**Table 1. Technical Specifications**

| SPECIFICATION | DETAIL |
|---|---|
| Air flow | Vertical downflow; 0.5 m/s - 1.0 m/s |
| HEPA filter grade/ efficiency | H14 filter, 99.99% efficiency for 0.3um particles |
| Controls | On/off; Fan speed |
| Fan Lifetime | 3 years of moderate use |
| Filter Lifetime | 1 year of moderate use (8 hours/day, 5 days/week) |
| Input power | 100-130VAC 50/60Hz (145W) or 220-240VAC 50/60Hz (145W) |
| AC MAINS Fluctuations | +/- 10% of Input Voltage |
| Dimensions | 625mm x 599mm x 303mm |
| Weight | 60 lbs / 27 kg |

**Table 2. Equipment Ratings**

| USAGE ASPECT | CONDITIONS FOR SAFE USER |
|---|---|
| Over-voltage category | Class II |
| IEC Cable Rating | 250V 10A |
| Environment | Indoor use |
| Ambient Temperature | Recommended 20-24C |
| Wet Location | Not intended to be used in wet locations |
| Noise Level | 65db Average |
| Relative Humidity | Up to 80% |
| Altitude | Up to 2,000 meters above sea level |
| Ingress Protection | IP50 |
| Pollution degree of intended environment | Pollution Degree 2 |

### MANUFACTURER DESCRIPTION

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

## Safety Information and Regulatory Compliance

The HEPA Module is designed to be used only with Opentrons hardware.

### INSTRUCTIONS FOR LIFTING OR CARRYING

These instructions are critical to prevent injury. Lifting can happen during these steps:

- Unboxing
- Separating the top and bottom of HEPA unit
- Putting the HEPA Module on top of the OT-2
- Replacing the HEPA filter

### SAFETY WARNING LABELS

Warning labels posted on the Opentrons HEPA Module and in this manual warn you about sources of potential injury or harm. A key for each safety warning label is referenced in Table 2.

**Table 2. Warning labels**

| ICON | MEANING |
|---|---|
|  | **CAUTION:** Risk of danger! This symbol identifies instrument components that pose a risk of personal injury or instrument damage if improperly handled. Wherever this symbol appears, please consult the manual for further information on safe handling before proceeding. |

**Table 2. Warning labels continued**

| ICON | MEANING |
|---|---|
|  | **CAUTION**: Risk of electrical shock! This symbol identifies instrument components that pose a risk of electrical shock if handled improperly. |
|  | **CAUTION:** Risk of electrical shock from alternating current! This symbol identifies instrument components that pose a risk of electrical shock from alternating current. |
|  | **CAUTION:** Risk of infection due to aerosols. If you work with the HEPA filter, a continuous air flow is blown from the device workspace to the environment. The airflow can transport aerosols and contaminate the surrounding area.<br>▪ Do not use the HEPA filter when working with biohazardous substances.<br>▪ Disinfect contaminated surfaces in the workspace before switching on the HEPA filter. |
|  <br>  | **CAUTION:** Risk of crushing top and bottom of hands from moving parts. |
|  | **CAUTION:** Risk of body crush due to unit tipping and falling. |
|  | **CAUTION:** Risk of finger cuts. Do not place hand under blade guard. |

**Table 2. Warning labels continued**

| ICON | MEANING |
|---|---|
|  | **CAUTION:** Lifting hazard! Unit is heavy and requires 2 people to safely lift. |

## Unboxing & Installation Instructions

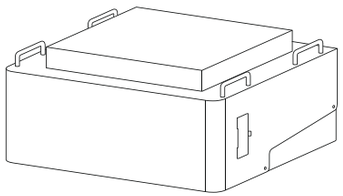
**Required tools:**

- Scissors
- 2.5mm Hex Driver or Allen Key
- Another person to help you lift (the unit is heavy)!

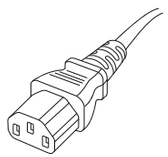
**Included in the box:**

- HEPA Module
- Accessory Kit:
  - 8 screws (4 are spares)
  - 4 spare washers
  - IEC cable

## Box Contents

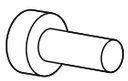


**(1) HEPA Module**



**(1) IEC Cable**

**(4) Spare Washers**

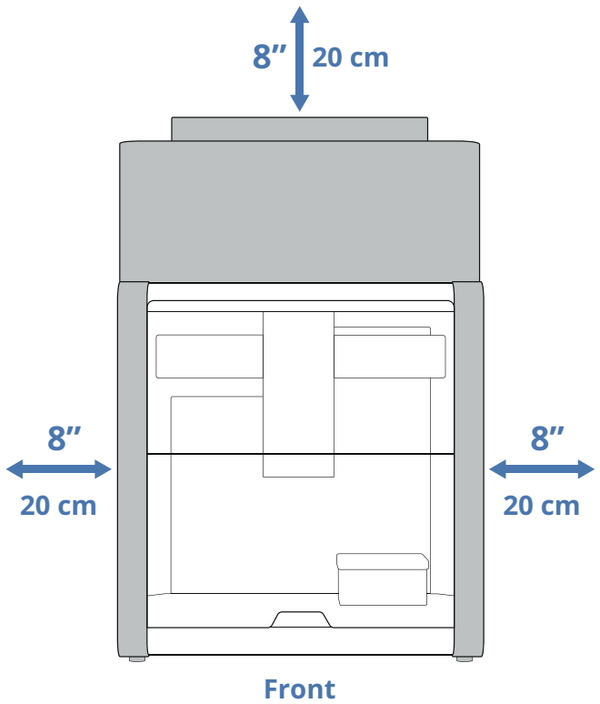


**(8) Screws**
(4 are spares)

## Instructions

**CAUTION: Risk of injury!**
The HEPA module weighs approx 60 lbs. (27 kg). Have two or more people lift and move the unit. Use proper lifting technique to prevent injury.

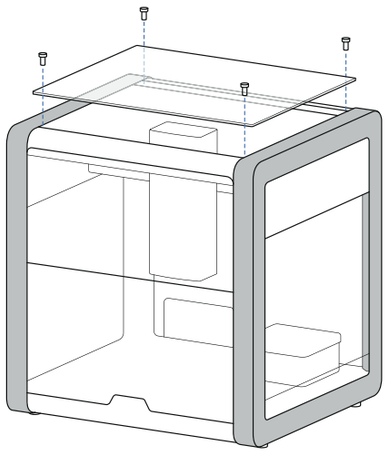
The unit requires 20cm clearance on all sides in order to ensure proper function.



# Instructions

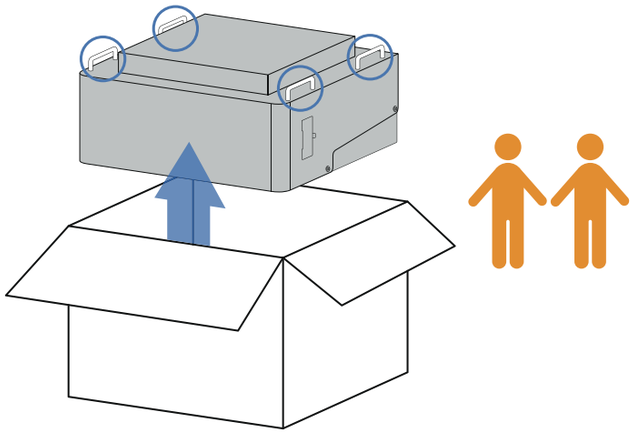
SETUP STEPS

1. Remove the top window on the OT-2, set aside, and store screws somewhere safe.

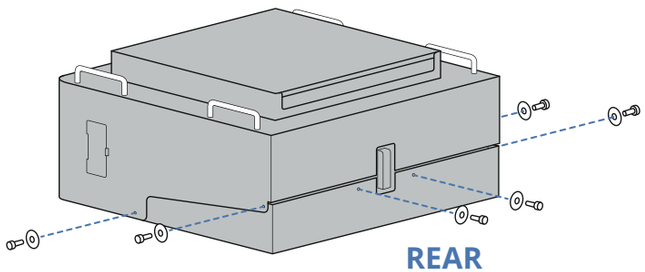


2. Open box. Remove top foam, as well as the Accessory Kit to reveal the HEPA unit. Using scissors, cut the plastic bag around the unit.

3. **With the help of a 2nd person,** using 4 handles on the top surface, remove HEPA Module from bottom foam and box. Place the unit on a clear work table/accessible surface.

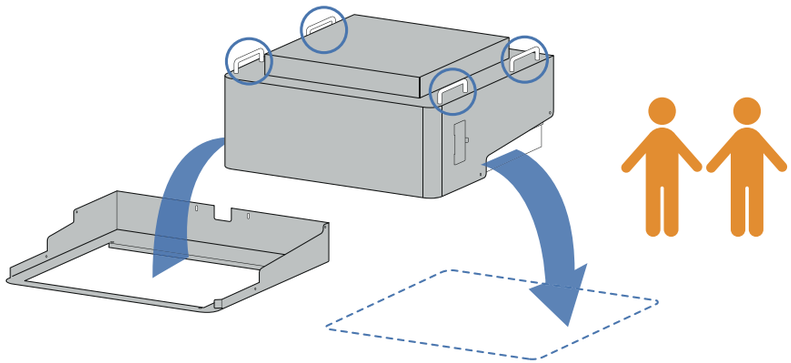


4. The HEPA Module consists of two parts: the **adaptor bracket,** and the main **HEPA unit**. Using a 2.5mm Hex Driver or Allen Key, remove the following 6 screws that have washers holding the adaptor bracket and main HEPA unit together.



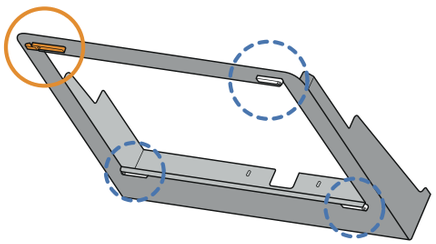
## Instructions

5 **With the help of a 2nd person lift the main HEPA unit, removing it from the adaptor bracket. Set the main HEPA unit aside on an accessible work surface.**

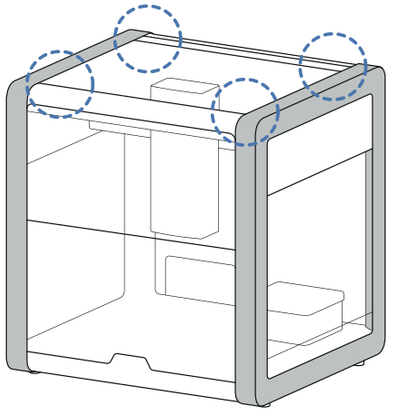


6 **Install the adaptor bracket onto the top of the OT2. This can be done by one person.**

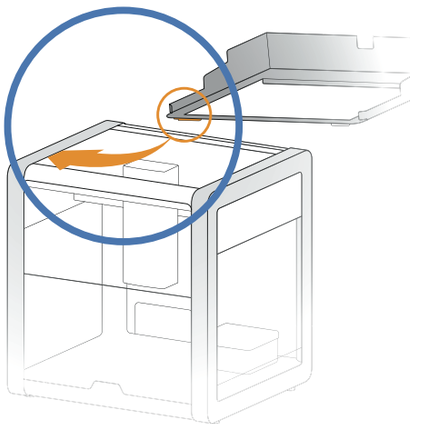
The bottom of the adaptor bracket has 4x “key corners”.



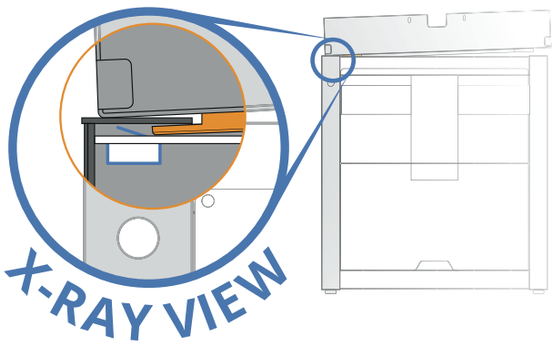
These fit into the surface that would usually support the top window on the OT2.



To install onto the OT-2, **slip the key corners on the <u>left hand side</u> of the adaptor** bracket under the sheet metal of the robot as shown below.

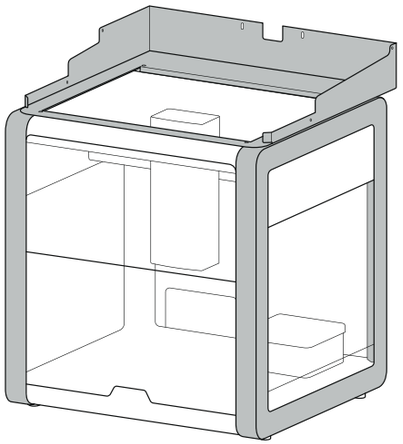


Front view of OT-2

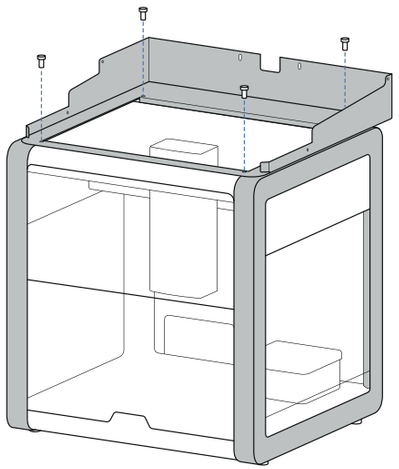


## Instructions

Once the left side key corners are correctly placed, the adaptor bracket should sit flat on top of the robot and not wiggle around.

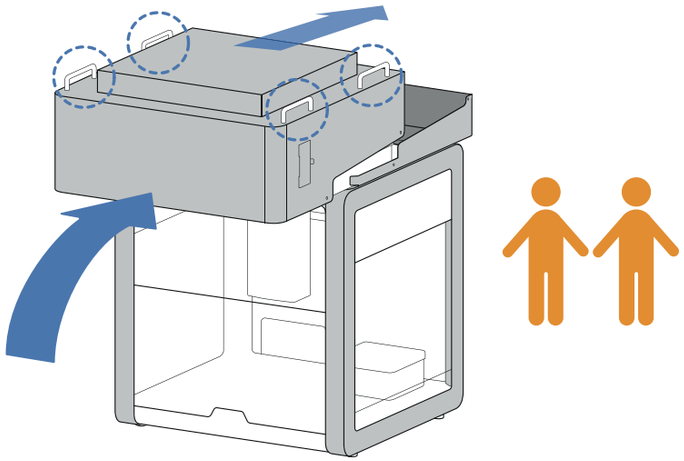


7 Using the 2.5mm Hex Driver or Allen Key, use the 4 screws included in the Accessory Kit to fasten the adaptor bracket on top of the OT-2. They screw in where the top window screws would usually go. **Only use the screws that came with the HEPA module.**



8 **Attention!** At this point you may wish to clean and sterilize any of the higher up surfaces in the OT2, as they will become difficult to reach once we attach the main HEPA unit to the bracket.

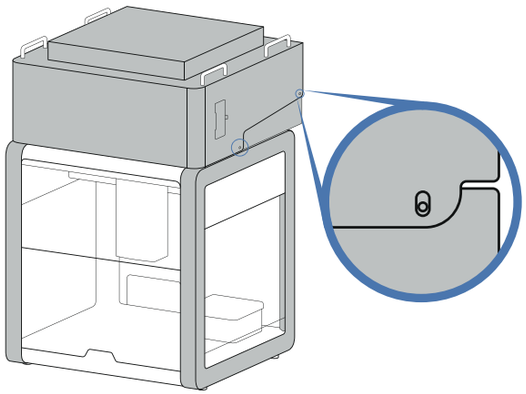
9 **With the help of a 2nd person,** pick up and place the main HEPA unit onto the adaptor bracket (installed on OT2), so that it sits on the resting surface of the adaptor bracket. Then push the main HEPA unit back, sliding it to its furthest rear position.



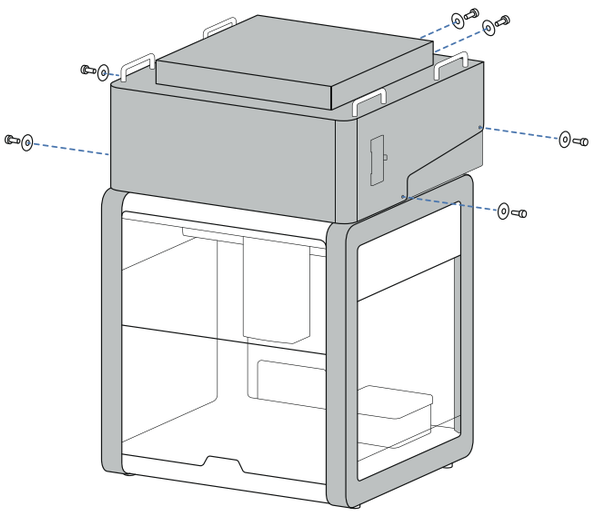
**CAUTION: Risk of Injury**
Please be sure to place your hands on the unit as shown, as you can risk pinching your fingers.

## Instructions

The screw holes should now line up:

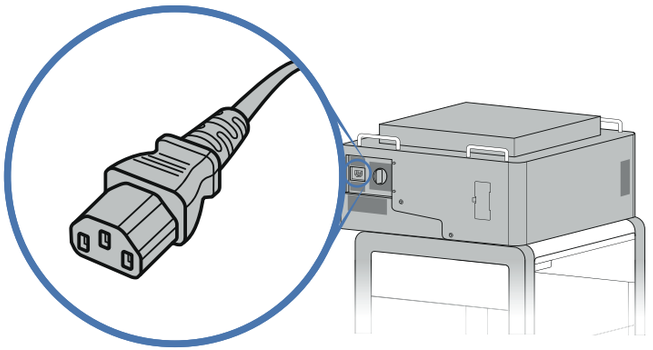


10 Using a 2.5mm Hex Driver or Allen Key, re-install the 6x screws and washers that were previously removed to secure the two parts together.

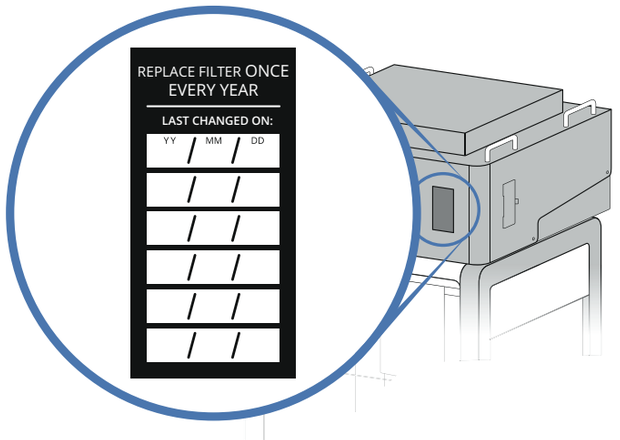


**CAUTION: Trip Hazard**
Cable should be installed so that it is not a trip hazard.

11 Plug in the IEC cable, located adjacent to the power knob. Plug into the grounded wall socket. Ensure the unit is powered off before turning on. Ensure that the IEC plug and control knob are easily accessible and not obstructed.

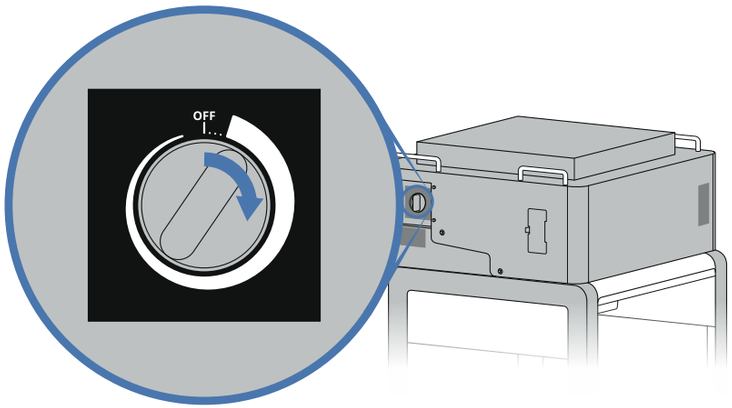


12 Write down the current date to ensure timely filter replacement.



## Instructions

13 **To turn on the HEPA module, rotate the knob clockwise to turn on the fan, initiating airflow through the OT-2. As you turn clockwise, the airflow decreases.**




## Using the HEPA module with the OT-2

**CAUTION: Risk of infection due to aerosols.**
If you work with the HEPA filter, continuous air is blown from the device workspace out into the environment. This airflow can transport aerosols and contaminate the surrounding area.

- Do not use the HEPA filter when working with biohazardous substances.
- Disinfect contaminated surfaces in the workspace before switching on the HEPA filter.

To use the HEPA Module with the OT-2, allow the fan to run for 1 hour at max airflow with the OT-2 closed before starting an experiment to ensure the air inside the OT-2 is filtered.

### USAGE INSTRUCTIONS:

1. Decontaminate labware and any modules being used.
2. Turn on the HEPA Module by rotating the knob clockwise.
3. Set up your labware and reagents on deck and calibrate the labware via the OT-2 App.
4. Close the front door of the OT-2.
5. Let the HEPA filter run for 1 hour to allow all of the air inside the OT-2 workspace to be filtered.
6. Run the protocol.
7. Turn off the HEPA filter upon completion of the experiment.

## Cleaning the HEPA Module

### INSTRUCTIONS:

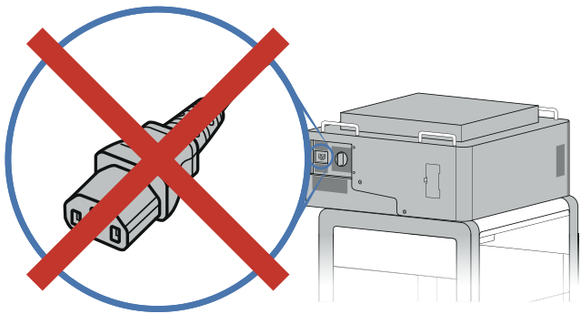
1. Do not douse or spray the HEPA module.
2. Unplug the power cable.
3. Spray a paper towel with alcohol or bleach and wipe down the exterior black sheet metal surfaces of the module.
4. Do not clean the top pre-filter, power input port, or HEPA filter. Do not clean any of the internal surfaces within the module.

## Replacing the HEPA Filter

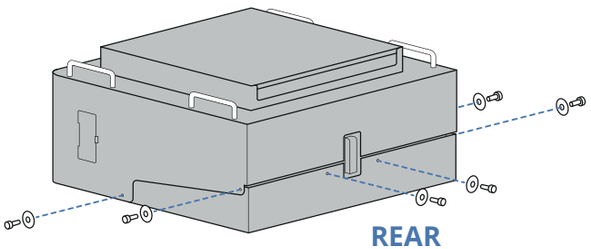
We recommend changing the HEPA filter after one year of moderate usage (8 hours/day, 5 days/week), although depending on laboratory air quality conditions, filters may last up to 3 years. For this step, please refer to the date on the “Last Changed” sticker on your module.

To purchase replacement filters, please visit shop.opentrons.com.

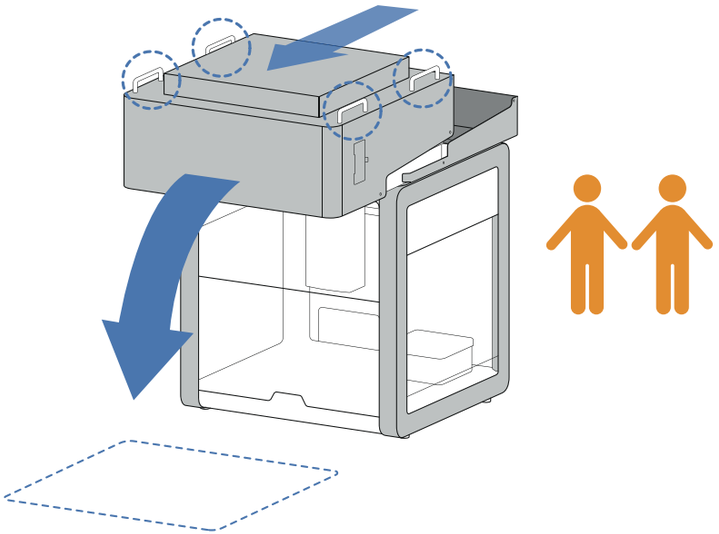
1 **Before replacing the HEPA filter, ensure the HEPA Module is unplugged.**



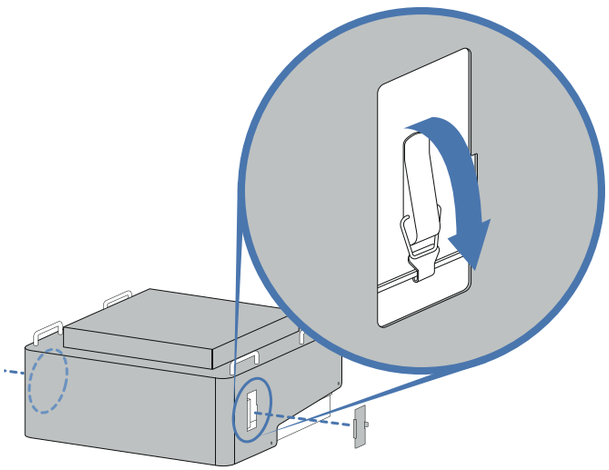
2 **Using a 2.5mm Hex Driver or Allen Key, remove the 6 screws and washers holding the adaptor bracket and full HEPA unit together.**




3 **With the help of a 2nd person,** lift and remove the main HEPA unit.

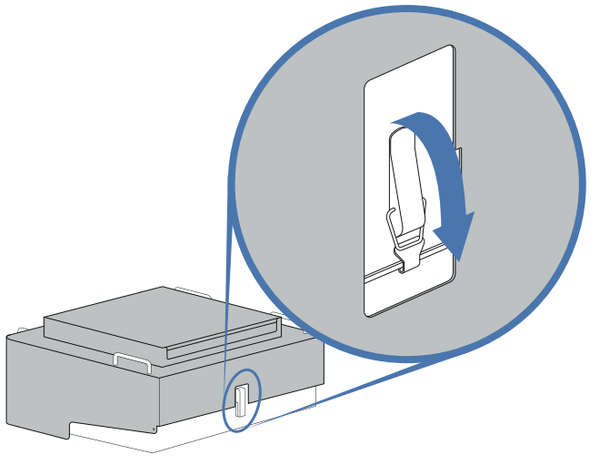


4 **Remove the pop-out covers on either side of the unit, exposing the filter release latches. Unbuckle the latches.**

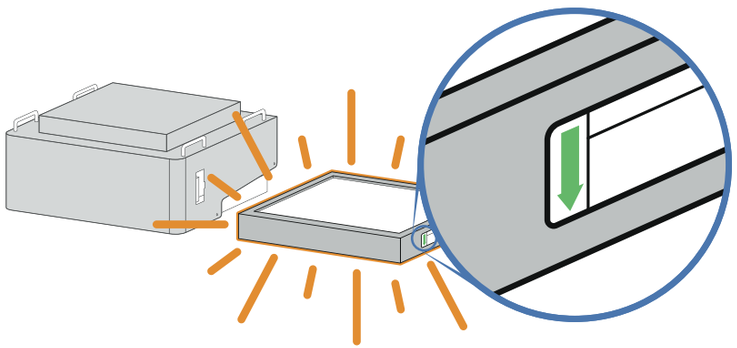


## Instructions

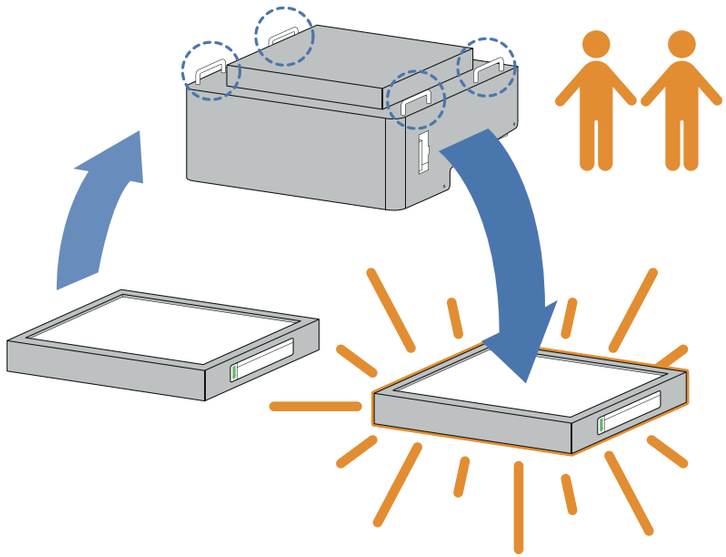
5 Unbuckle the rear filter attachment latch.



6 Place the new filter next to the HEPA unit **ensuring the arrow indicating airflow is pointing down towards the ground.**

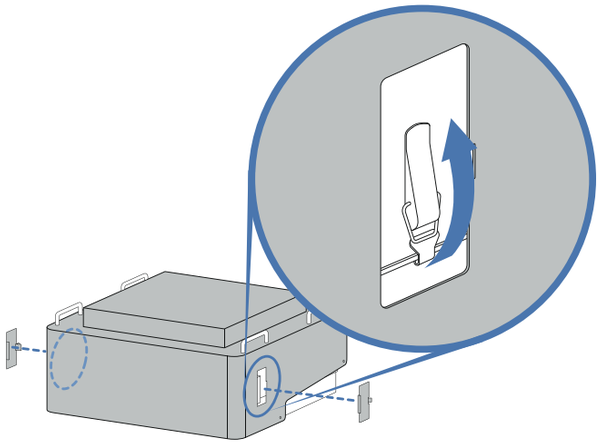


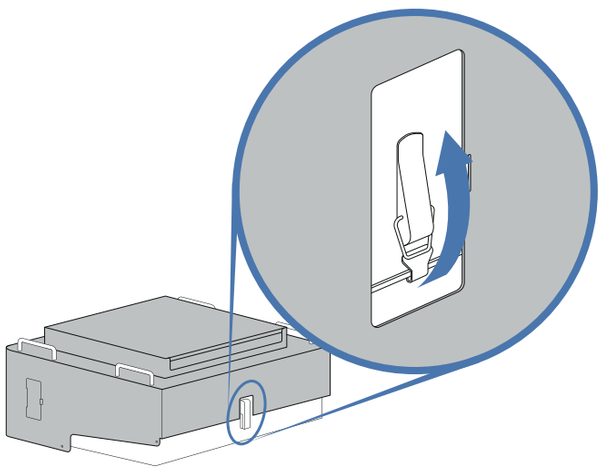
7 **With the help of a 2nd person,** lift the main HEPA unit, and place it back on top of the new HEPA filter.



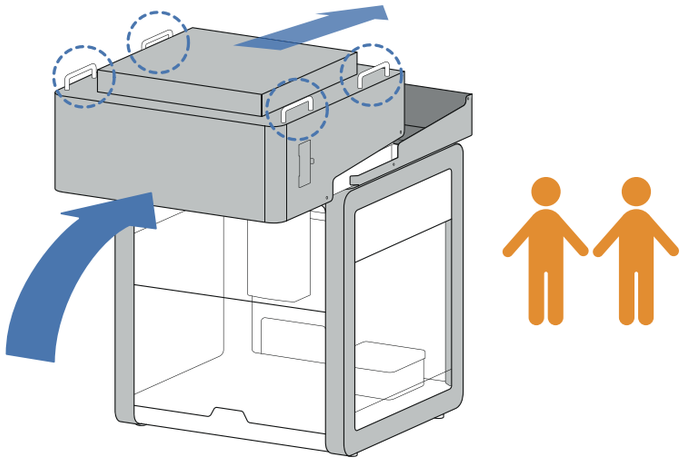
## Instructions

8 Re-buckle the latches and replace the pop-out covers on either side of the unit to cover the filter release latches.





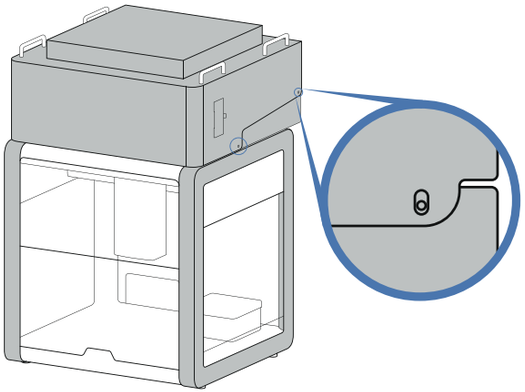
9 **With the help of a 2nd person,** pick up and place the complete HEPA unit onto the adaptor bracket (installed on OT-2), so it sits as indicated in the graphic below. Then slide the main HEPA unit back to its furthest rear position.



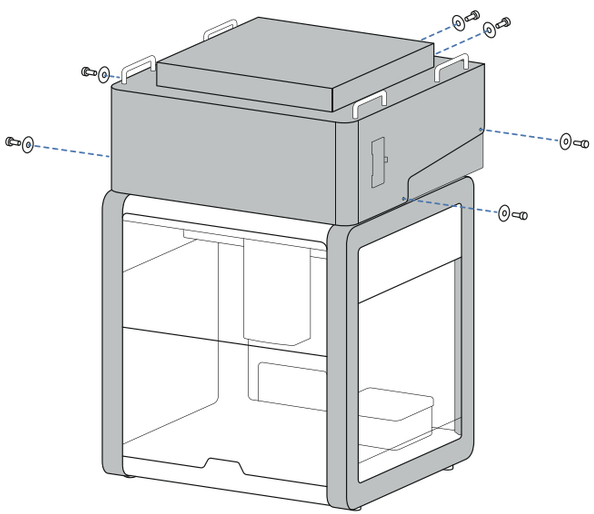
**CAUTION: Risk of Injury**
Please be sure to place your hands on the unit as shown, as you can risk pinching your fingers.

**10** Using a 2.5mm Hex Driver or Allen Key, re-install the 6x screws and washers you previously removed to secure the two parts.

The screw holes should now line up:



**11** And you're done! Flip the switch to turn your HEPA Module on.

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