



# **LFEF2-US & LFEF2-EU**

## **HEPA Filter Fan and Hardware Assembly Kit for LFE1220W**

Installation Manual



Frame & Strip Curtain Walls Sold Separately

Original Instructions

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## Chapter 1 Introduction

When fitted to the LFE1220W Optical Table Enclosures the LFEF2-US (-EU) HEPA Filter Kits enable the creation of a clean environment around a Nexus Optical Table. The complete system should incorporate an enclosure frame fitted with LFEELSC series soft wall transparent curtain sides, and two top mounted HEPA Fan Filter Units (FFU).

The HEPA filter units shipped with the –US kits require a voltage of 115 V whereas the units shipped with the -EU versions require a voltage of 230 V.

**Caution**

The LFE system has been designed to fit a 1.2 m x 2.0 m (4' x 6') Nexus optical table. Other table makes and sizes may not be compatible.

## Chapter 2 Safety

For the continuing safety of the operators of this equipment, and the protection of the equipment itself, the operator should take note of the Warnings, Cautions and Notes throughout this handbook and, where visible, on the product itself.



**Warning: Risk of Electrical Shock**

Given when there is a risk of electrical shock.



**Warning**

Given when there is a risk of injury to the user.



**Warning: Risk of Finger Trap**

Given when there is a risk of trapping fingers between parts.



**Caution**

Given when there is a possibility of damage to the product.

**Note**

Clarification of an instruction or additional information.

### 2.1. General Warnings and Cautions



**Warning: Risk of Electric Shock**

The Filter Unit is powered by mains voltages. This is hazardous and can cause serious injury. Appropriate care should be taken when using this device.

Cables for wiring the Filter Unit are not supplied. These must be provided by the person responsible for installation and must conform to any applicable local standards.

The unit must be installed only by suitably trained and qualified personnel who understand the hazards associated with using high voltages and the steps necessary to minimize the risk of electrical shock.



**Warning:**


If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. In particular, excessive moisture may impair operation.

The equipment is for indoor use only. The equipment is not designed for use in an explosive atmosphere.


Where a Warning symbol appears on the product (e.g. finger trap warning), users must consult this manual to ascertain the nature of the potential hazard and the means of avoiding them.


## Chapter 3 Installation

### 3.1. Installation Requirements



**Warning**  
 Due to the weight and dimensions of the components, the following procedure must be performed by at least two persons. Other persons may be necessary at certain points in the installation dependent upon the space available. These points are identified by the following symbol next to the relevant text.





**Caution**  
 Before beginning the installation process, ensure that there is sufficient space in the area to install and accommodate the enclosure.


When assembled, the Laminar Flow Enclosure, measures 2.20 m x 1.33 m x 2.36 m (7.22' x 4.36' x 7.74').

A clearance of at least 12" (~ 300 mm) should be maintained between the Fan Filter Unit and the ceiling. This is essential to ensure optimal Fan Filter Unit performance.



**Caution**  
 Ensure that proper airflow is maintained to the Fan Filter Unit. Insufficient air flow will cause overheating and premature failure.

### 3.2. Environmental Conditions



**Warning**  
 Operation outside the following environmental limits may adversely affect operator safety.

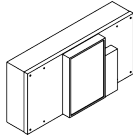



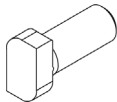


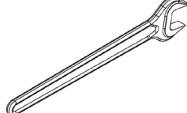

Location	Indoor use only
Maximum Altitude	2000 m
Temperature Range	15°C to 40°C
Maximum Humidity	Less than 80% RH (non-condensing) at 31°C
Line Voltage Fluctuations	Less than ±10% of the line voltage

To ensure reliable operation the unit should not be exposed to corrosive agents, excessive moisture, heat or dust.

If the unit has been stored at a low temperature or in an environment of high humidity, it must be allowed to reach ambient conditions before being powered up.

The unit is not designed to be used in explosive environments.

### 3.3. Parts List

Description	Qty	Image
HEPA FFU (Fan Filter Unit)	2	
Foam Tape (inside HEPA FFU Box)	2	
Filter Flange - Long	4	
Filter Flange - Short	4	
M6 x 1.0 Hammerhead Screw, 14.0 mm Long	32	
M6 Nut	32	
M6 Washer	32	
10 mm Spanner	1	
Cable Gland	2	

### 3.4. Fitting the Filter Flanges

#### 3.4.1. Required Parts:

Description	Qty
Filter Flange - Long	4
Filter Flange - Short	4
M6 x 1.0 Hammerhead Screw, 14.0 mm Long	32
M6 Nut	32
M6 Washer	32
Foam Tape	2
<b>Tools Required</b>	
10 mm Spanner	
Flat Blade Screw Driver (Not Supplied)	

1. Remove the eight rivets (four in each end) securing the center roof panel to the enclosure frame. The push rivets have 2 parts – 1: the lower part that inserts into the hole and 2: the top part which expands the rivet and locks it in place. Using a flat-bladed screwdriver, lift up the top part (2) of the rivet to unlock it, then pull to remove from the panel.

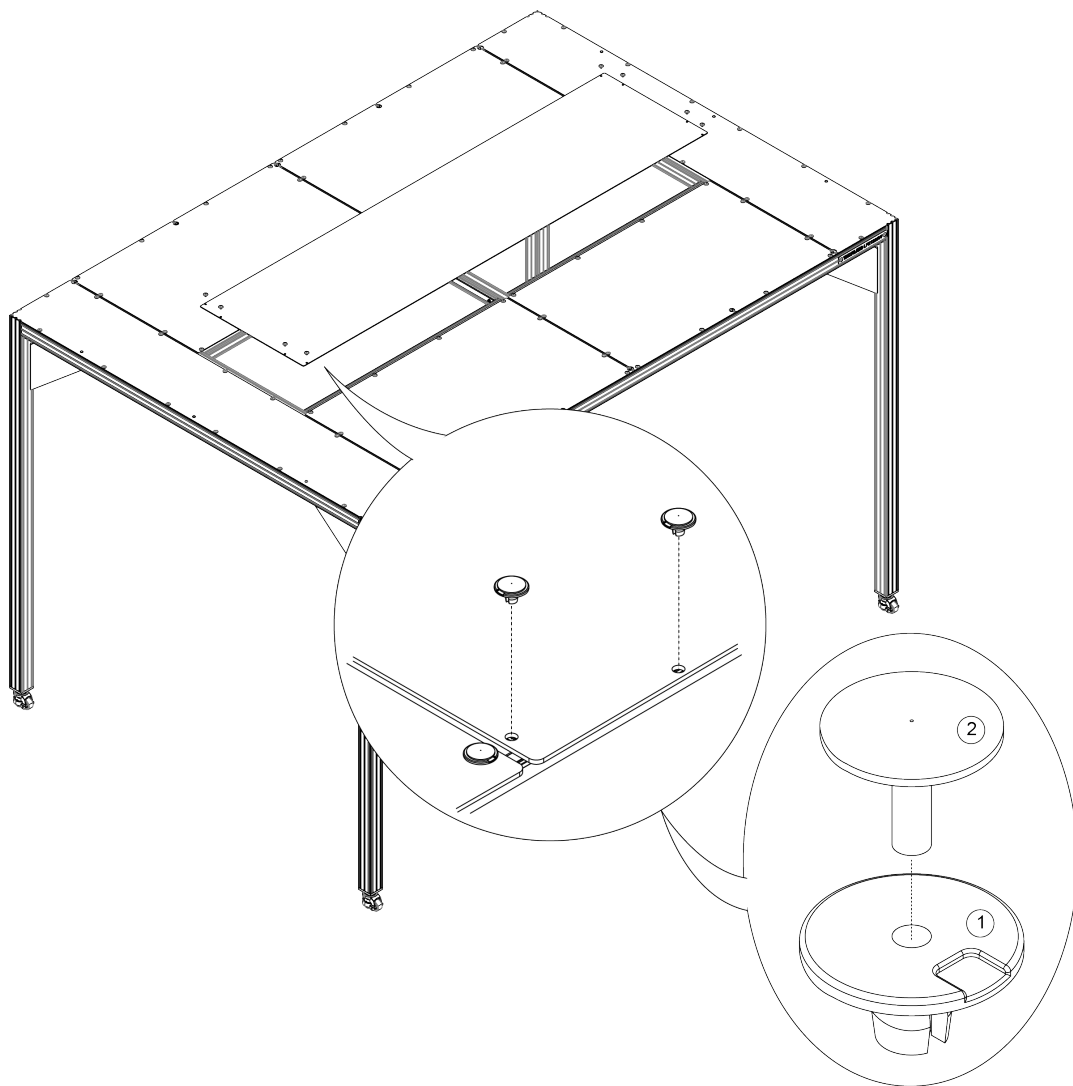
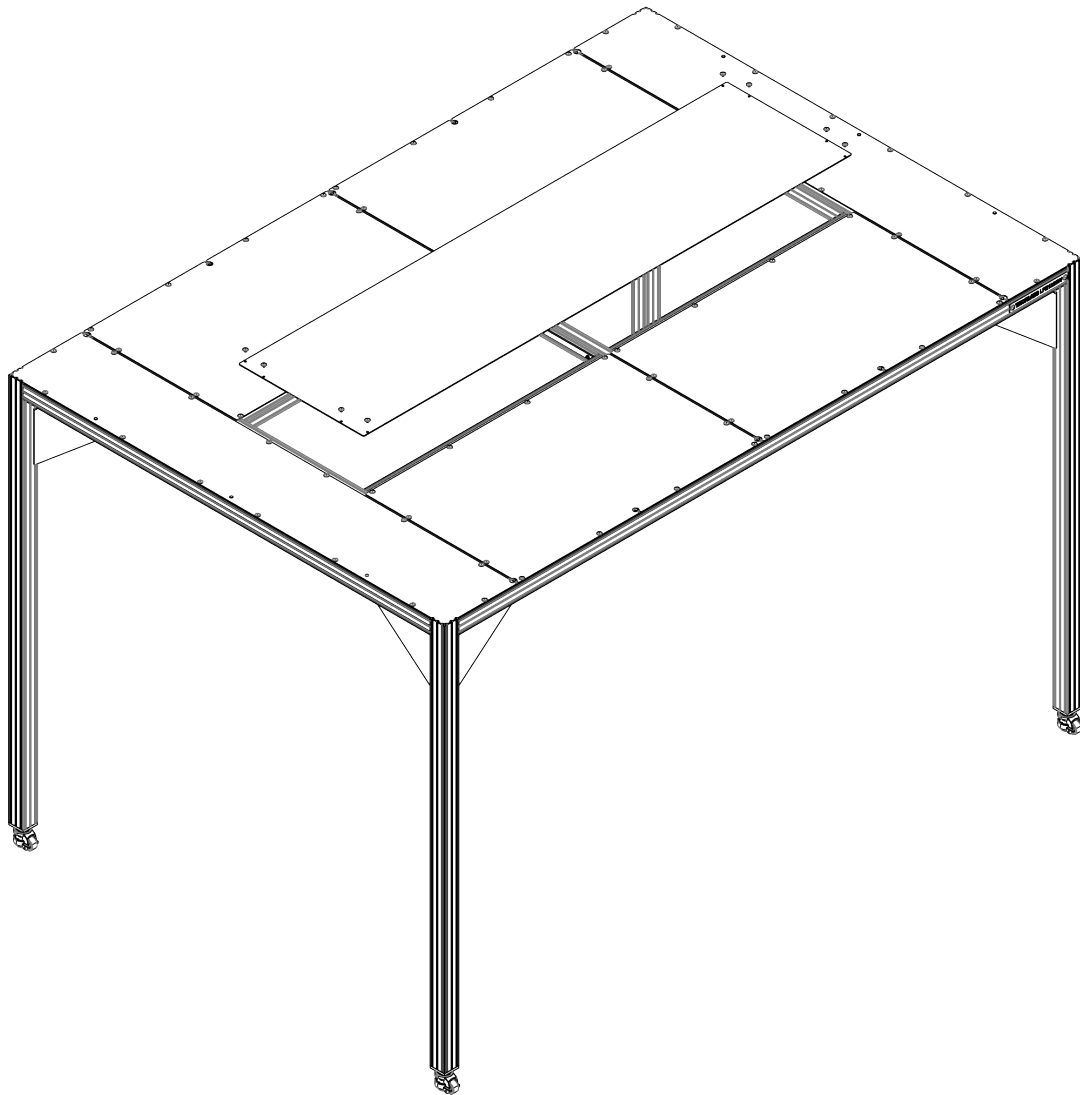


Figure 1 Removing the Rivets

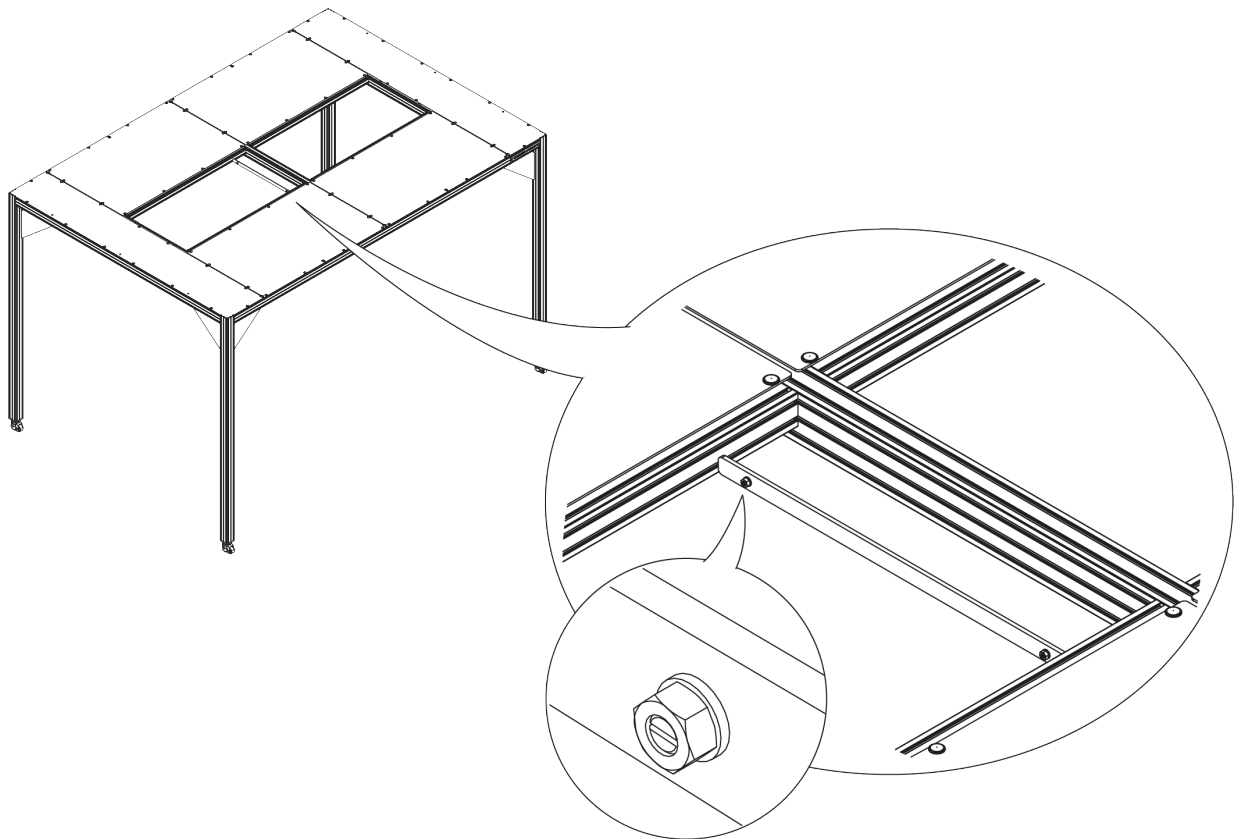
2. Lift off and remove the center roof panel.



**Figure 2 Removing the Center Roof Panel**

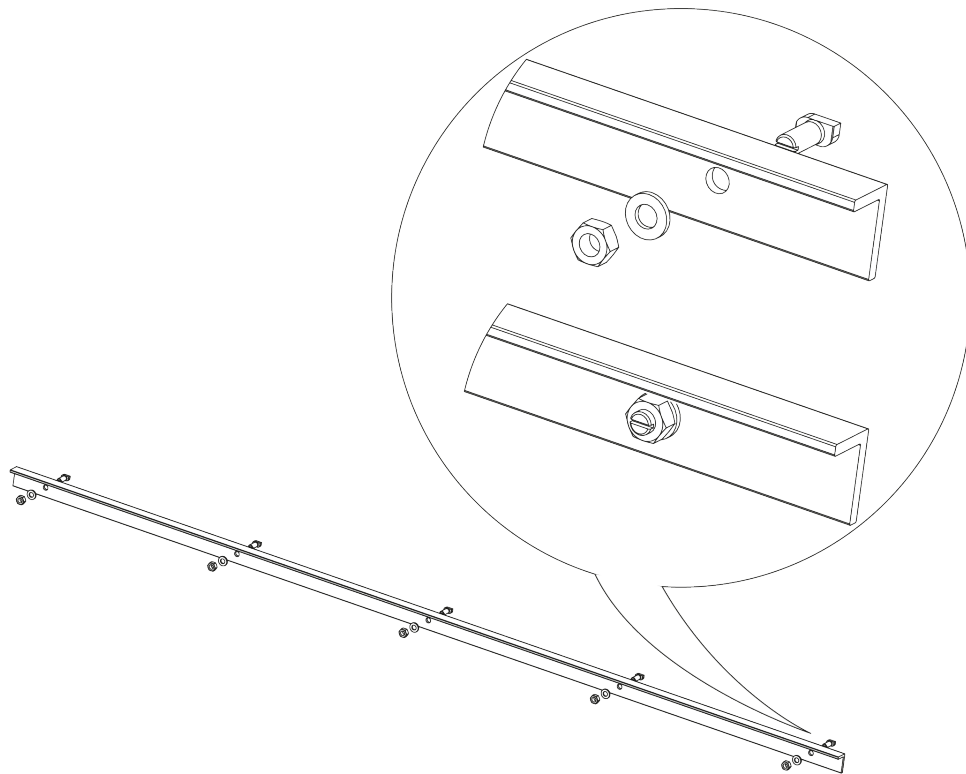


3. There are four alignment bars (two in each filter recess) fitted to the short cross members which must be removed before the filter flanges can be fitted. Loosen the nuts securing the alignment bars to the short cross members, then using a flat-bladed screw driver, turn the slot in the end of each screw such that the slots are parallel with the bar length. Remove the four alignment bars.



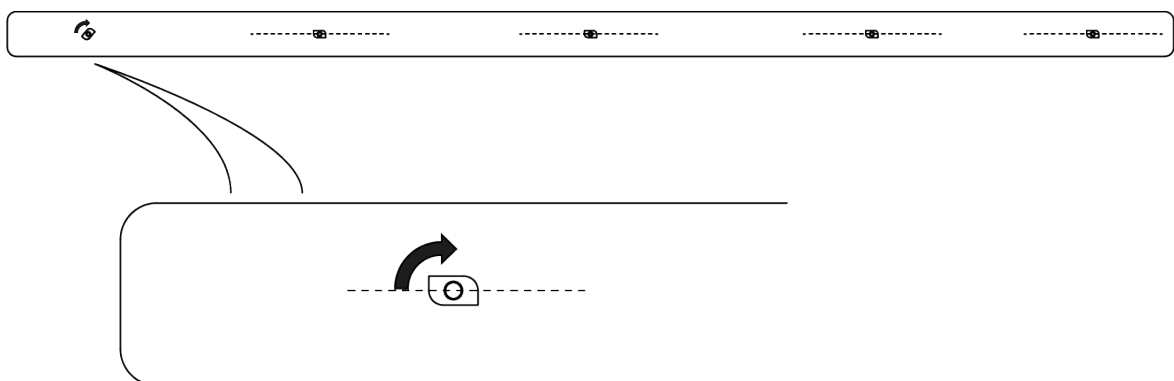
**Figure 3 Removing the Alignment Bars**

4. Fit qty 5 hammerhead screws to one of the long filter flanges as shown below.



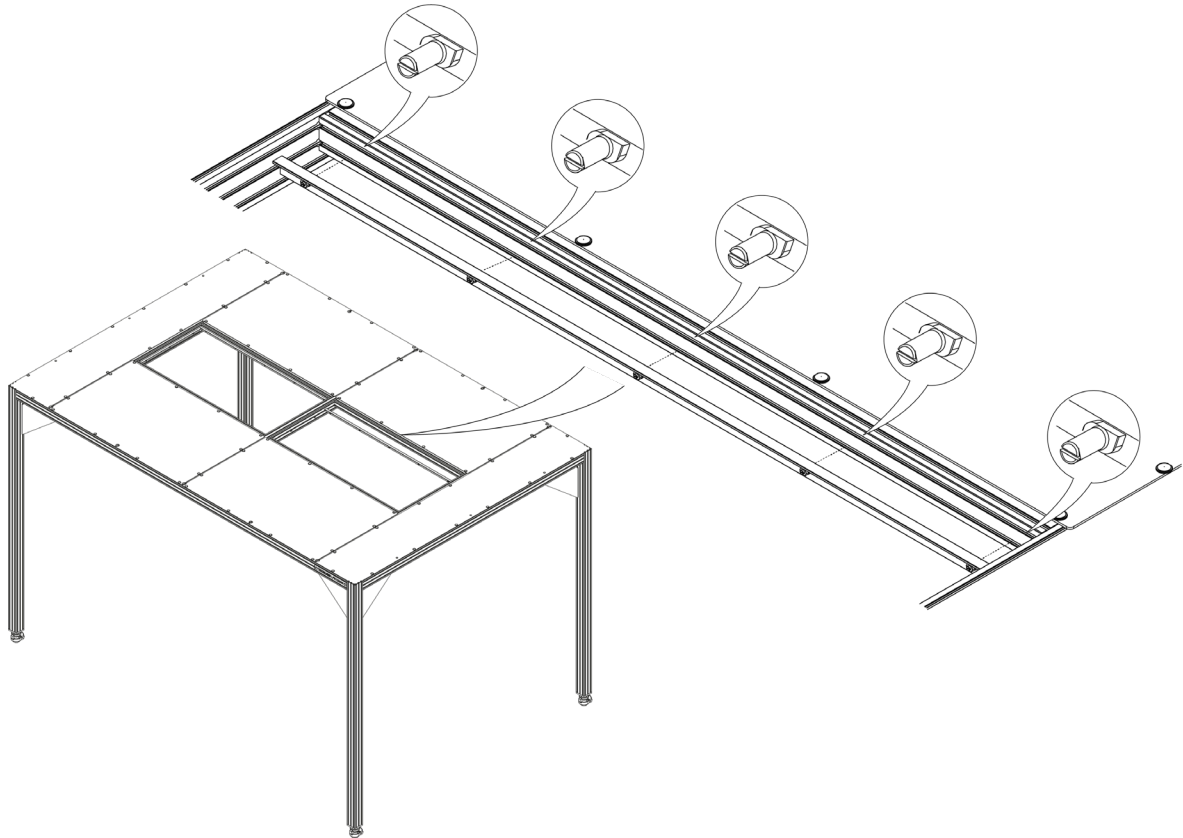
**Figure 4 Fitting the Hammerhead Screws**

5. Repeat step 4 to fit qty 5 hammerhead screws to the remaining three long filter flanges.
6. Repeat step 4 to fit qty 3 hammerhead screws to each of the short filter flanges.
7. Select one of the long filter flanges and turn the hammerhead screws to align them parallel with the flange length.



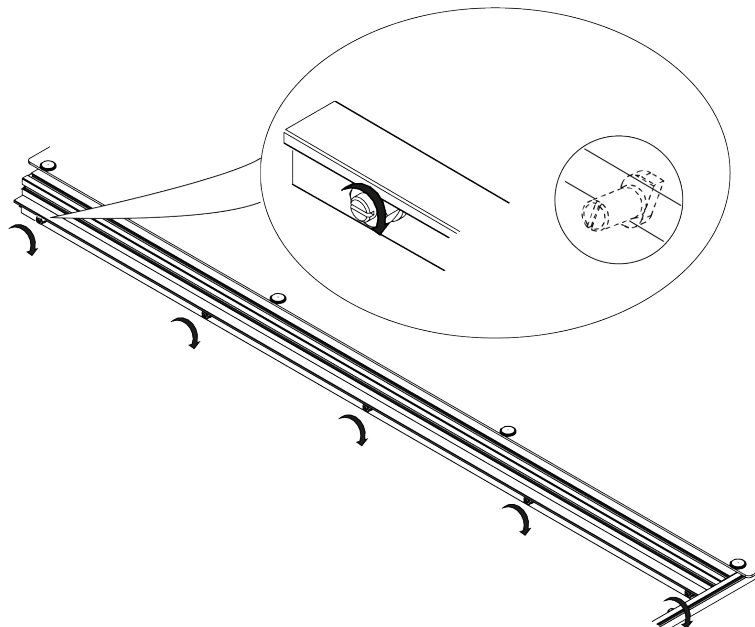
**Figure 5 Aligning the T-nuts**

8. Press the long filter flange against one of the long crossmember extrusions, ensuring that all five of the hammerhead screws are correctly located in the lower extrusion channel as shown in Figure 5.



**Figure 6 Fitting the Long Filter Flange**

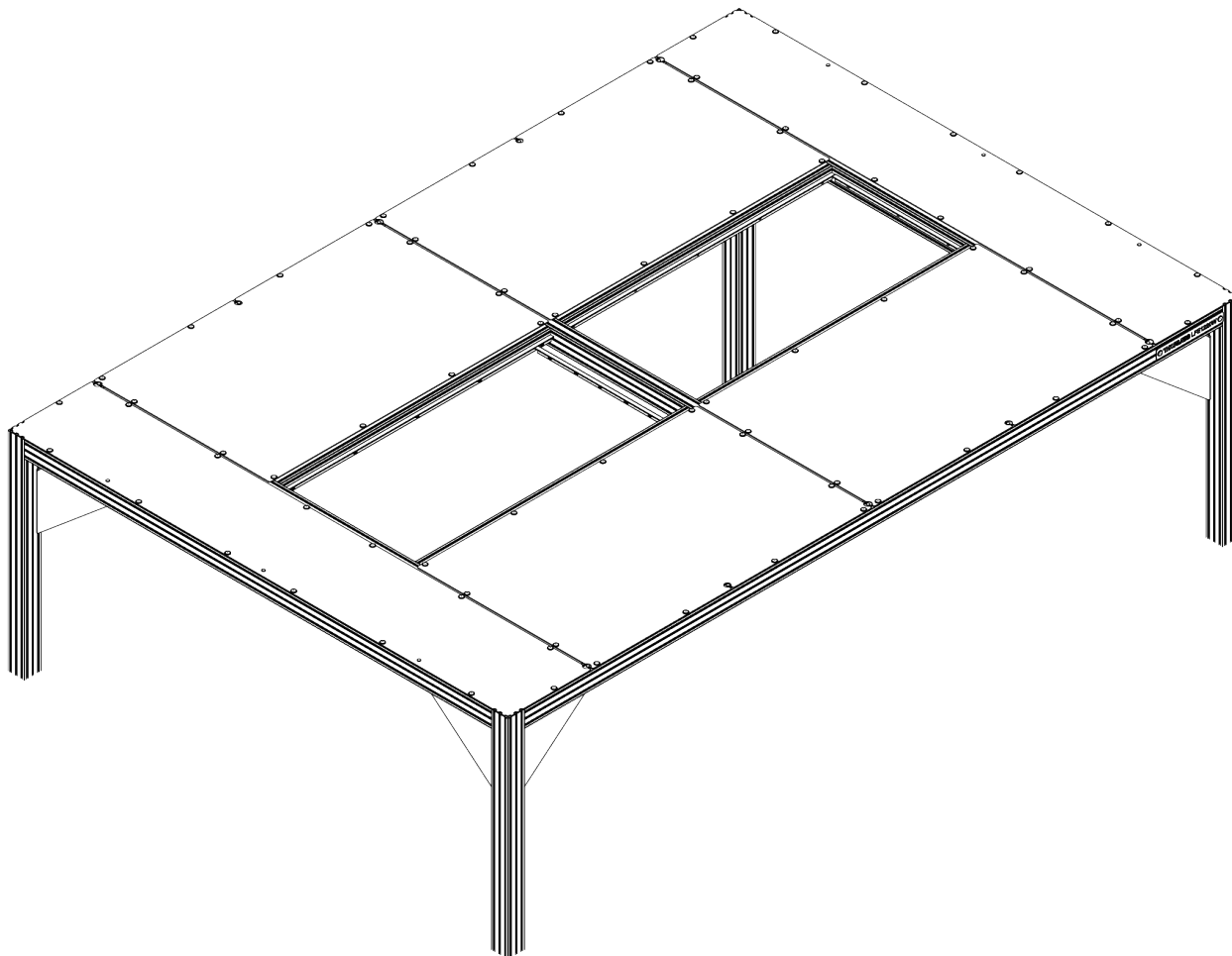
9. Ensure the alignment of the filter flange is correct as detailed in step 8. Press against the flange with one hand to hold it in place, then press a flat-bladed screwdriver into the slotted end of a hammerhead screw. Continue to apply pressure while turning the hammerhead screw by ¼ turn. Check that the screw head has engaged correctly in the extrusion.



**Figure 7 Turning the Hammerhead Screws**

10. Repeat step 9 for the remaining hammerhead screws. Check that all screws are properly engaged.

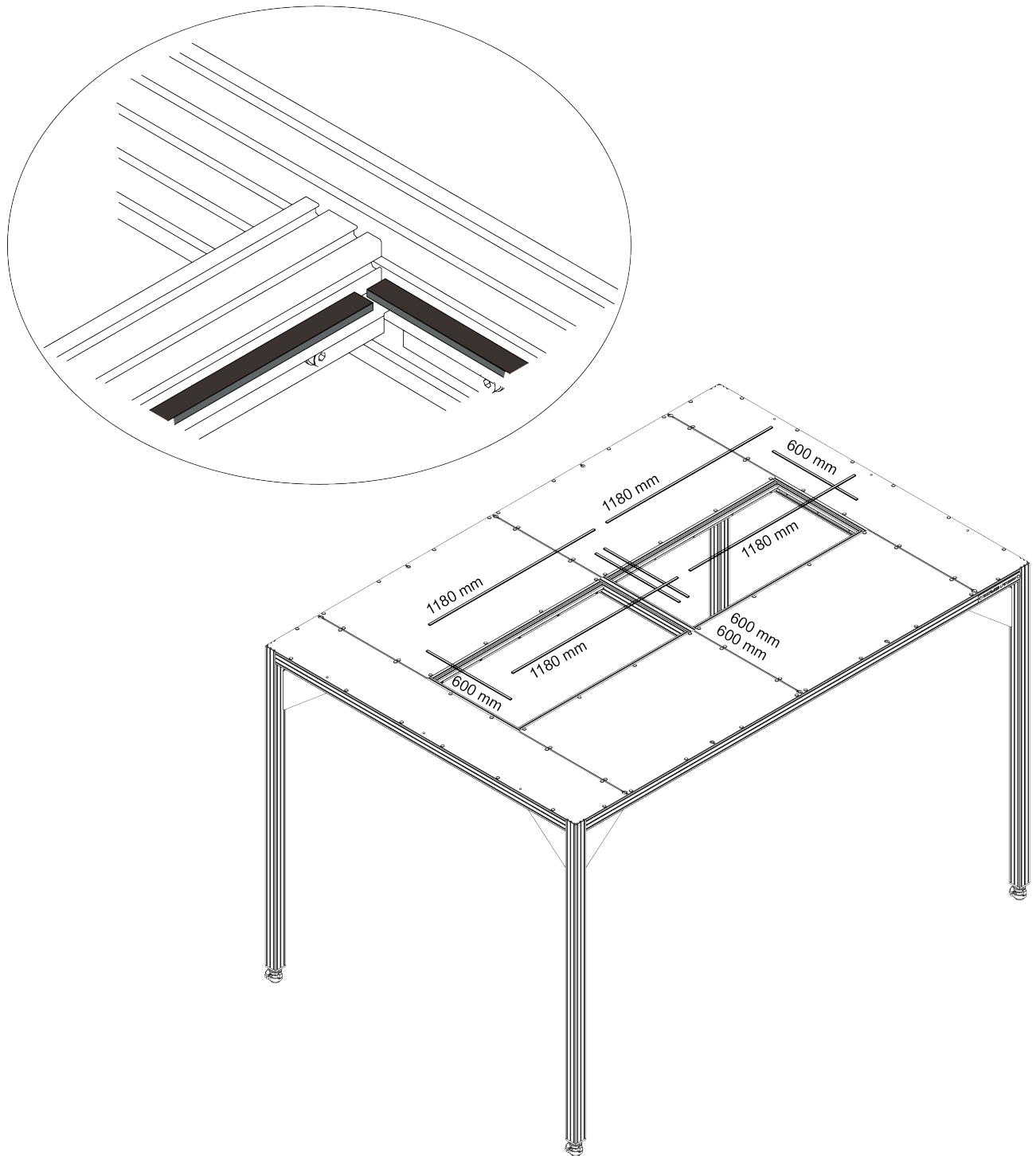
11. Tighten the attachment nuts to fix the flange to the long cross member. Check that the filter flange is securely fitted.
12. Repeat steps 7 to 11 to fit the remaining three long filter flanges to the other long cross members.
13. Follow steps 7 to 11 to fit the four short filter flanges to the short cross members.



**Figure 8 Fitting the Short Filter Flanges**

14. Two reels of foam tape are provided (one per HEPA FFU). Cut each reel into two 600 mm (23.6") lengths and two 1180 mm (46.5") lengths, giving a total of four of each length.

15. Taking each strip of foam tape in turn, remove the adhesive backing and stick the lengths of tape to the top of the flanges. First, stick the 600mm lengths first on top of the short flanges, then stick the 1180mm lengths on top of the long flanges. Do not overlap the foam.



**Figure 9 Fitting the Foam Tape**

### 3.5. Fitting the HEPA Fan Filter Unit (FFU)

**Note**

The following procedure assumes that the LFE1220W optical table enclosure is already fully assembled. For further details on this process please consult the manual supplied with the enclosure.

#### 3.5.1. Required Parts:

Description	Qty
HEPA FFU (Fan Filter Unit)	2
Cable Gland	2

#### 3.5.2. Fitting the HEPA FFU

**Risk of Electrical Shock**



Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards.

Cables for wiring the Filter Unit are not supplied. These must be provided by the person responsible for installation and must conform to any applicable local standards.

The unit must be installed only by qualified personnel who understand the hazards associated with using high voltages and the steps necessary to minimize the risk of electrical shock.

**Caution**

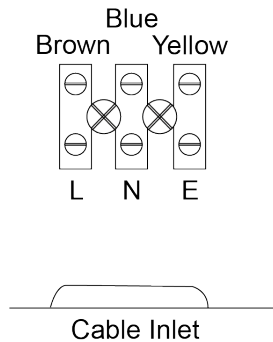


Touching of the HEPA filter could damage it.

Never place a hand or tool on the filter.

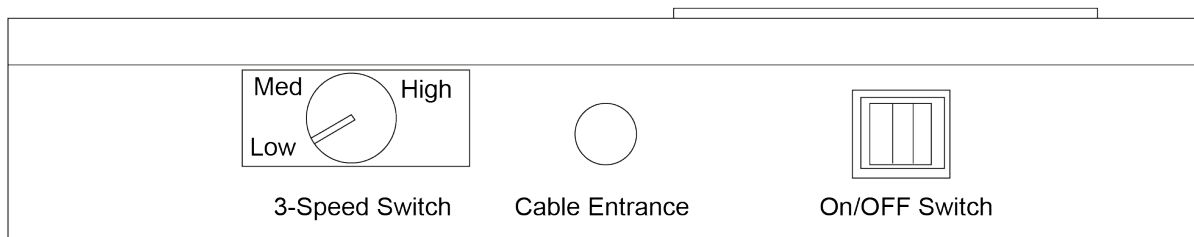
Never lay the filter facing flat down on a surface. Always have filter on its side or back to protect it from damage.

- Wire up the HEPA FFU. Please refer to Figure 10 for wiring details. To protect the electrical cable against chaffing, a cable gland has been provided for installation in the electrical entrance.



**Figure 10 Mains Power Wiring Details**

17. Set the FFU to a desired speed.



**Figure 11 FFU Speed Control**

**IMPORTANT**

The speed switch will be difficult to access once the FFU has already been mounted on top of the enclosure. For ease of operation, select your desired speed before moving onto the next step.

18. Lift the HEPA FFU into the aperture in the centre of the roof where it will be supported by the flanges assembled in step 3 to step 15. Avoid sliding it into place to prevent damage to the foam tape.

**Warning**



You should ensure that the installers are capable of lifting and supporting the weight of the FFU prior to lifting it onto the top of the frame.



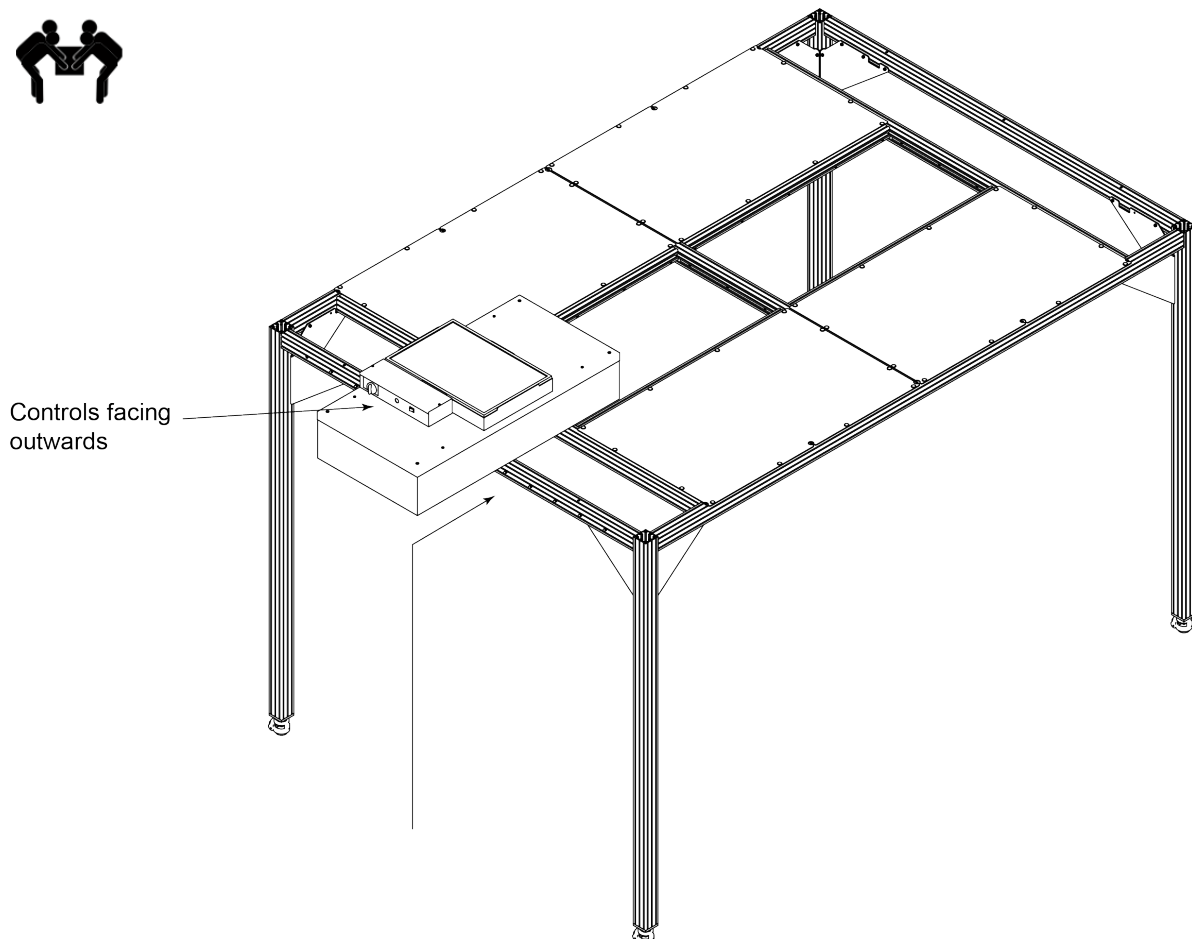
Lifting the FFU will require the use of 2 stepladders or stepstools. These must be positioned as close to the frame as possible to prevent overreaching.

19. **It is recommended that 2 people perform this step.** Lift one of the HEPA Filter Units up and onto the outer cross members of the frame. It is recommended that the controls are facing outwards for ease of access.



**Warning**

This step will require the use of stepladders or step stools. These should be positioned close to the frame to prevent overreaching.



**Figure 12 Fitting the First HEPA Filter Unit – Step 19**



20. **It is recommended that 2 people perform this step.** With one person supporting from inside the roof aperture, and the other from outside, lift the HEPA FFU along and into place on the foam-topped flanges.



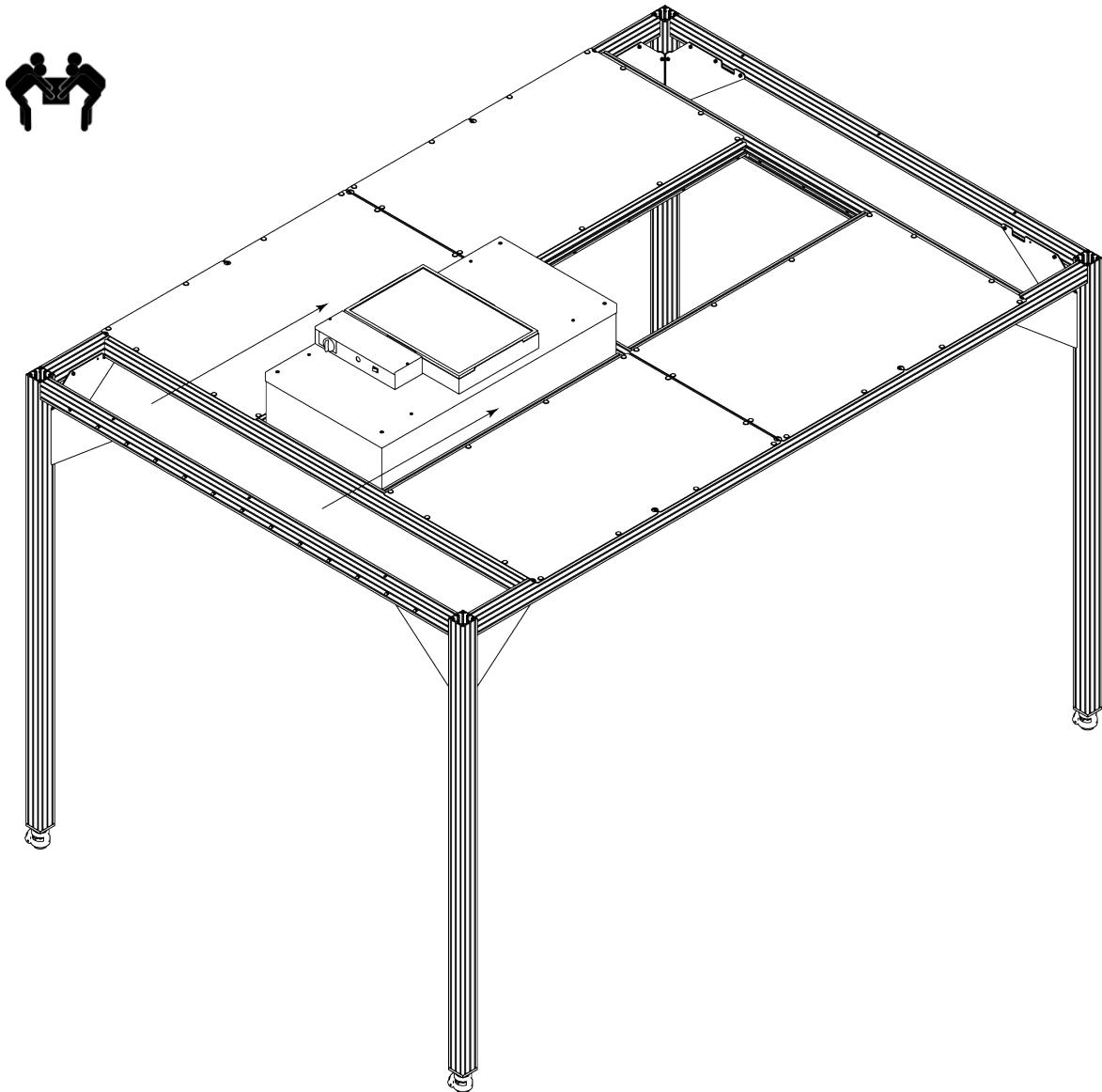
**Caution.**

When positioning the HEPA filter unit make sure to lift into position. **DO NOT** slide the unit as this will damage the foam padding on the filter supports.



**Warning: Risk of Finger Trap**

Take care when moving the filter unit into position. There is a risk of trapping fingers between parts.



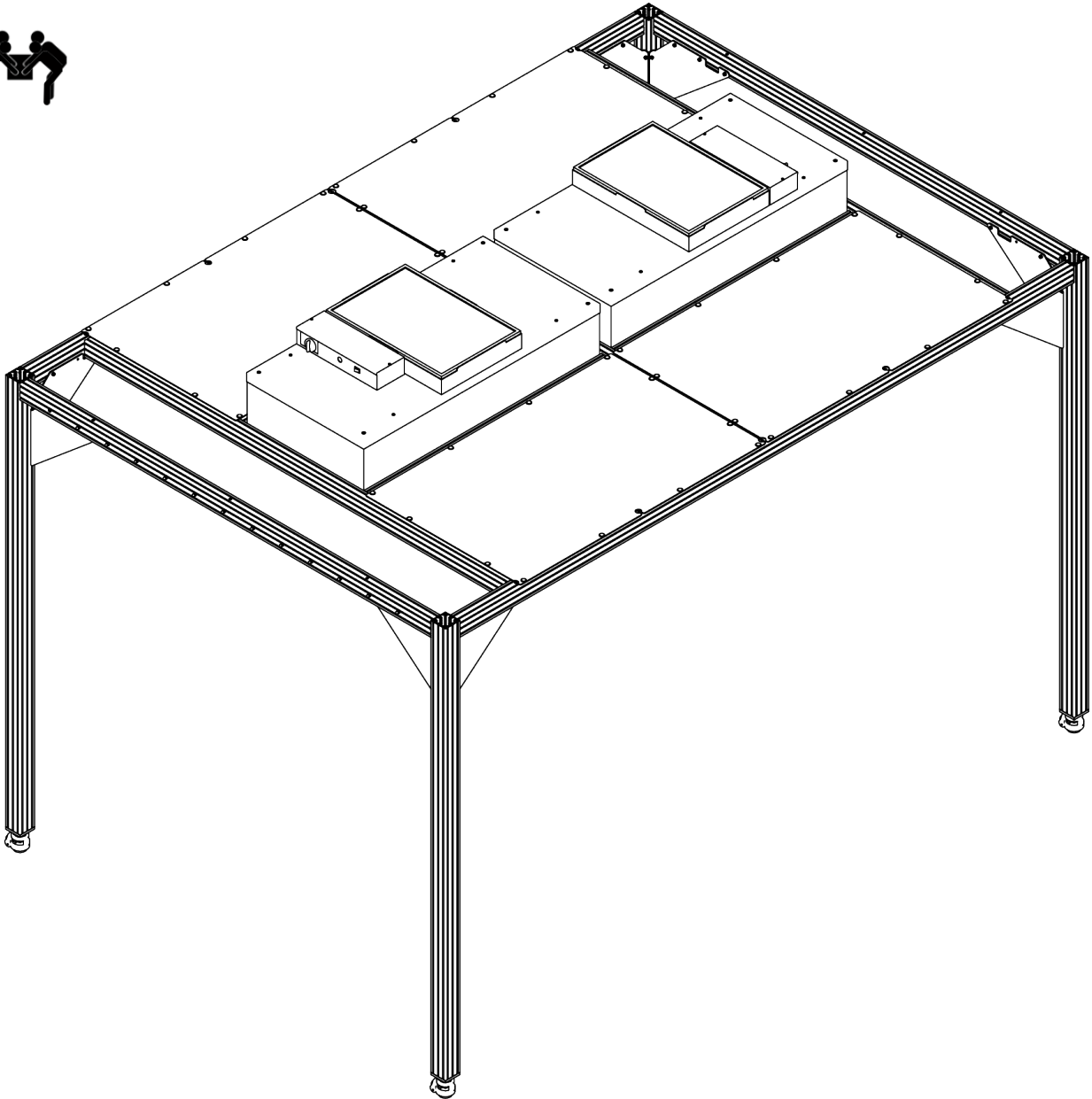
**Figure 13 Fitting the First HEPA Filter Unit – Step 20**

21. **It is recommended that 2 people perform this step.** Repeat steps 20 and 21 to position the second HEPA FFU.



**Caution.**

When positioning the HEPA filter unit makes sure to lift into position. **DO NOT** slide the unit as this will damage the foam padding on the filter supports.



**Figure 14 Fitting the Second HEPA Filter Unit**

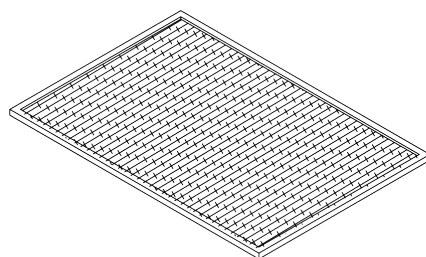
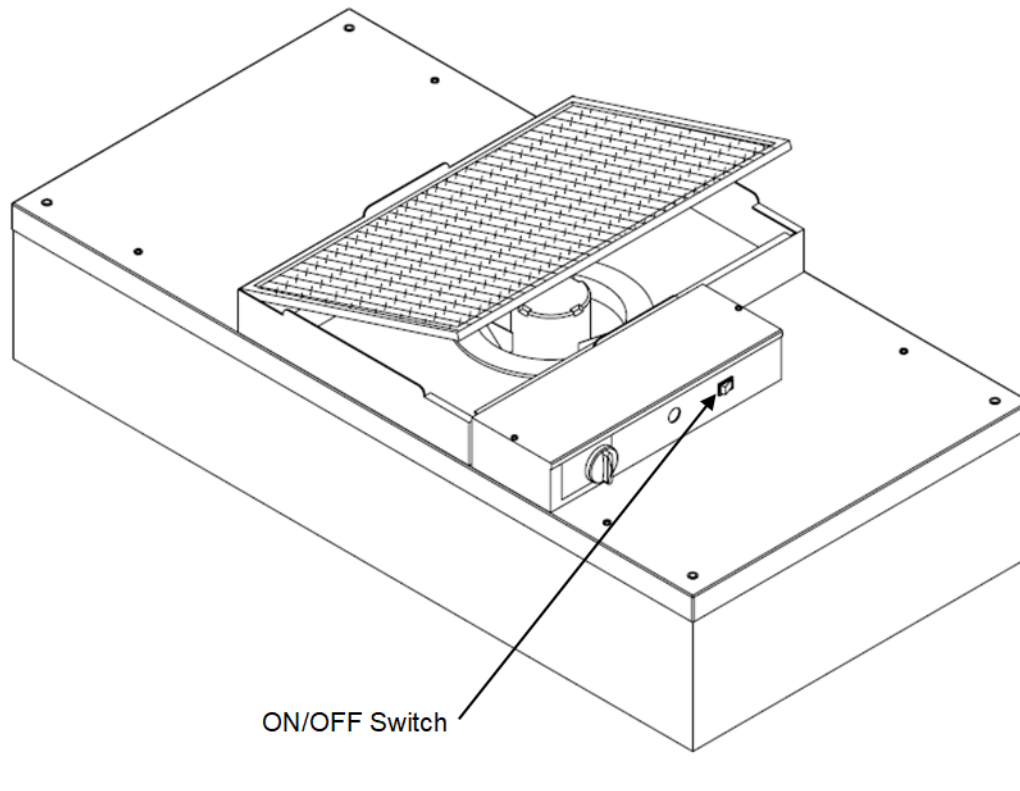
## Chapter 4 Maintenance

**Warning**

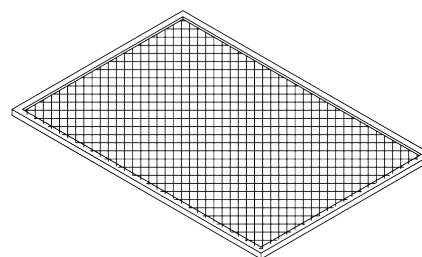
Disconnect the filter unit from the electrical power source before attempting and maintenance.

### 4.1. Cleaning the Prefilter

1. Ensure that there is sufficient space above the HEPA filter unit to allow access to the prefilter. Remove any ceiling panels as necessary.
2. Ensure that the unit is switched OFF.
3. Remove the prefilter from the snap-in frame. See Figure 15 below.



Prefilter Surface Top Side



Support Screen Bottom Side

**Figure 15 Removing the Prefilter**

4. Clean the prefilter by hand washing in water and mild detergent or by using a vacuum cleaner.
5. Allow the prefilter to dry out completely.
6. Refit the prefilter into the snap-in frame.
7. If required, refit any ceiling panels that were previously removed.

## 4.2. Replacing the HEPA filter

**Warning:**

Disconnect the unit from the electrical power source before attempting any maintenance.

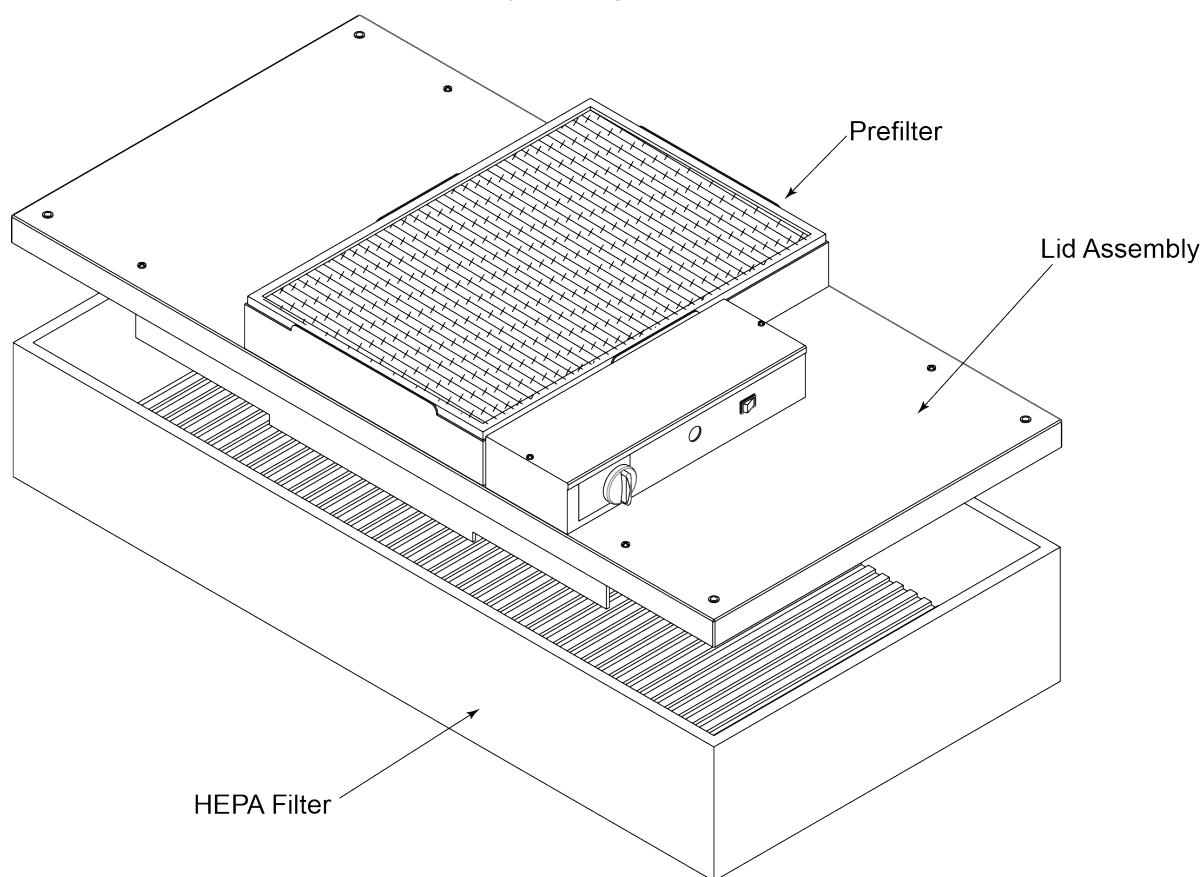
The HEPA Filter is protected by an expanded metal face screen. This is never to be used to handle the filter. It is only for protection against an accidental touch of the filter. Only handle the filter by the frame.

**Note**

The frequency of filter replacement is dependent upon air quality and usage rate.

To purchase a replacement filter, please contact your local Tech Support Office.

1. If necessary, remove the unit from the roof of the enclosure.
2. Using a Phillips-head screwdriver, remove the 10 screws holding the HEPA Filter to the lid assembly.
3. Lift off the lid assembly and discard the used filter.
4. Fit a new HEPA filter and reassemble the unit by reversing the above steps.



**Figure 16 Replacing the HEPA Filter**


## Chapter 5 Specifications

General Specifications	
Total Weight	66.9 kg
HEPA Filter Efficiency	99.95%
External Dimensions of one Fan Unit	1210 mm x 600 mm x 318 mm

# Chapter 6 Regulatory

## 6.1. Declarations of Compliance

### 6.1.1. For Customers in Europe



# THORLABS

www.thorlabs.com

## EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

**We:** Thorlabs Ltd.

**Of:** 204 Lancaster Way Business Park, Ely, CB6 3NX, UK

*in accordance with the following Directive(s):*

2014/35/EU	Low Voltage Directive (LVD)	
2014/30/EU	Electromagnetic Compatibility (EMC) Directive	
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)	

*hereby declare that:*

**Model: LFEF2-EU, LFEF2-US**

**Equipment: HEPA filter fan and hardware assembly kit for LFE1220W**


*is/are in conformity with the applicable requirements of the following documents:*

EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010
EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

*and which, issued under the sole responsibility of Thorlabs, is/are in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:*

contains no substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive


*I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.*

**Signed:**  **On:** 28 January 2022

**Name:** Keith Dhese

**Position:** General Manager

EDC - LFEF2-EU, LFEF2-US -2022-01-28



### 6.1.2. For Customers In The USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the company could void the user's authority to operate the equipment.

### 6.1.3. REACH SVHC Declaration

This product contains the chemical Benzene-1,2,4-tricarboxylic acid 1,2 anhydride (trimellitic anhydride) (TMA) (EC No 209-008-0, CAS No 552-30-7) which is identified as a substance of very high concern according to Article 57 (f) of Regulation (EC) No 1907/2006 due to its respiratory sensitising properties . The Concentration is 0.17%.

An MSDS data sheet is available on request.

## Chapter 7 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at [www.thorlabs.com/contact](http://www.thorlabs.com/contact) for our most up-to-date contact information.



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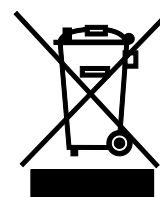
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Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC, and are not disassembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.



Annex I





**THORLABS**

[www.thorlabs.com](http://www.thorlabs.com)

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