TERRA UNIVERSAL
Critical Environment Solutions

*Installation and Operating Guide* *Document No. 1788-42*

# Cleanroom Airlock



*Installation and Operating Guide*

# Cleanroom Airlock

 *• Revised February 2018 • Document No. 1788-42*

## Table of Contents

*Installation and Operating Guide*

# Cleanroom Airlock

 *• Revised February 2018 • Document No. 1788-42*

## Proprietary Notice

This manual pertains to proprietary devices manufactured by Terra Universal, Inc. Neither this document nor any portion of it may be reproduced in any way without prior written permission from Terra Universal.

Terra Universal makes no warranties applying to information contained in this manual or its suitability for any implied or inferred purpose. Terra Universal shall not be held liable for any errors this manual contains or for any damages that result from its use.

## Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death.

The following symbols are intended to call your attention to two levels of hazard involved in operation:

The information presented here is subject to change without notice.

CAUTION — **Cautions are used when failure to observe instructions could result in significant damage to equipment.**

WARNING — **Warnings are used when failure to observe instructions or precautions could result in injury or death.**

## 1.0 Introduction

This manual provides information on installing and operating your Terra Universal Cleanroom Airlock.

**IMPORTANT NOTICE**

Cleanroom airlocks are not hermetically sealed and should not be used for the containment of environmental hazards.

Cleanroom airlocks do not function as emergency exits. Consult with your jurisdiction's building or planning department for applicable regulations.

## 2.0 Description

The Cleanroom Airlock minimizes the impact of personnel entry into the controlled environment by providing a neutral-air buffer zone. The doors are electronically interlocked, which means that only one door can be open at any time. This automatic system prevents sudden pressure changes and influxes of outside air that would disturb and potentially contaminate the controlled environment. The interlock can be disabled using either one of the keyed override switches or the Emergency Exit button, which cuts power to the locking mechanism.

The Pressurized-version of the Cleanroom Airlock incorporates a fan/filter unit that provides a steady flow of HEPA-filtered air from the ceiling. Return vents along the walls allow the air to recirculate through the filter while slightly pressurizing the airlock. The volume of airflow adjusts using a continuously variable speed dial located next to the Magnehelic™ pressure gauge, which measures backpressure for the purpose of monitoring filter load. The pressure gauge can be modified to measure pressure within the airlock (see **Section 4.4**).

# 3.0 Installation

## 3.1 Site Preparation

A. Make sure that the airlock will be placed on a level, stable surface, away from heat or chemicals that could damage it.

B. Make a wall cut-out that will be ¼" wider and ¼" taller than the body of the airlock. It is recommended that the cut-out be finished with the same materials as the cleanroom.

## 3.2 Unpacking


NOTE

**The airlock is mounted on a pallet that can be used to maneuver the airlock to the installation location. Do not remove the pallet until the airlock is ready to be inserted into the wall cut-out.**

Carefully remove the crating from around the airlock and visually inspect for damage, both inside and out. Be sure not to throw away any accessories or other important items with the packing material. Any damage should be reported according to the terms in the shipping agreement.

## 3.3 Airlock Installation


WARNING

**Do not turn on the power source until all installation steps are complete and the unit has been carefully inspected for improper installation or damage to any of the components.**

A. Using a forklift, carefully maneuver the airlock (still attached to the pallet) over to the installation location.

B. Take note of the power cord emerging from the top of the airlock. Be careful not to damage the cable or cord-grip during installation. The power cord assembly may need to be removed to complete installation.

C. Remove the airlock from the pallet and insert the airlock into the prepared wall cut-out. In general, the face of the airlock should be flush with the wall surface of the cleanroom.

D. Check the entire unit for squareness by measuring diagonally across both faces of the unit and across the interior walls, floor, and ceiling. Compare diagonal measurements and ensure that they are equal. Be sure to check the chamber interior for squareness by measuring diagonally from the ceiling corner to the opposite floor corner, in both directions.

E. Apply trimming and sealant along any seams or significant gaps as needed. Trimming and sealant should be the same grade of material as used on the cleanroom walls.

F. Connect the unit to the power source, but do not turn on the power supply at this time.

# 4.0 Operation

## 4.1 Initial Start-Up

A. Prior to turning on the power source, make sure that both override key-switches are turned to the NORMAL position (counter-clockwise).

B. If the interior Emergency Stop button has been depressed, turn the red button clock-wise (as indicated by the arrows) to release the mechanism.

C. If equipped with an FFU (Pressurized Airlocks), turn the speed dial clockwise until the knob reaches its maximum and then back it off slightly.

D. Turn on the power source.

The TUI logo should glow solid, indicating that the unit is ready for use. If the TUI logo does not light up, the unit is not receiving power. Check the power source for any malfunctioning; if the problem persists, check the circuit breakers and fuses inside the unit's electrical box (See **Section 5.2** for access instructions).

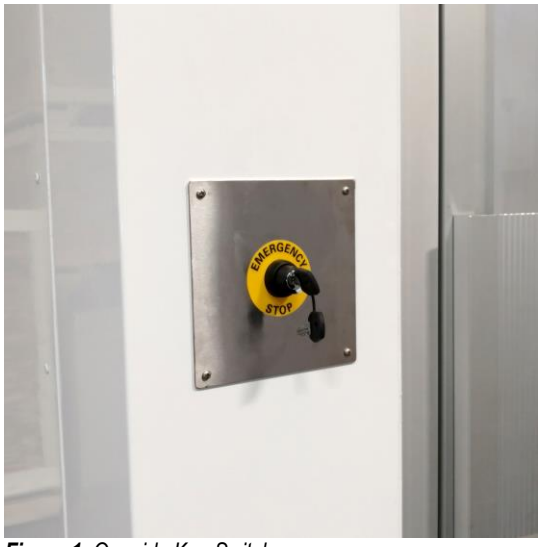

***Figure 1.*** *Override Key-Switch*

***Figure 2.*** *Emergency Stop Button (twist to reset)*

NOTE

**For Pressurized Cleanroom Airlocks:**
**If the TUI logo is flashing, this means that the unit is receiving power, but the FFU is turned off.**

### 4.2 Basic Operation (Standard Cleanroom Airlocks)

**CAUTION**

**Disabling the electronic interlock system will put the cleanroom at risk of contamination. This mode should only be used for maintenance purposes and should be followed by decontamination of the cleanroom.**

During normal operation, the two override key-switches should remain in the NORMAL position (counter-clockwise turn) with the keys removed, stored in a secure location.

In this mode, the electronic interlock is automatically activated whenever one of the doors is opened, locking the opposite-side door. In this way, only one door can be open at a time, which protects the controlled environment from sudden influxes of outside air.

The LED lights turn on automatically via the motion sensor located inside the airlock. There are no adjustable settings available to the user for these functions.

***Figure 3.*** *Motion sensor next to the LED light strip*

### 4.3 Pressurized Cleanroom Airlocks

In addition to the features outline above, the following instructions apply to airlocks equipped with a HEPA-filtered fan unit (FFU)
.
The speed of the ceiling-mounted blower can be adjusted by turning the dial located beneath the pressure gauge.

Following initial start-up:

A. Use a vane-type anemometer to measure the air velocity 6" from the face of the stainless steel screen. Ensure that the average velocity is at least 90 fpm.

B. Record the reading on the pressure gauge (inches of water column). This will serve as the baseline reading for determining HEPA filter saturation.

The factory-installed pressure gauge is connected to a fitting located on the Fan/Filter Unit. The pressure gauge measures the backpressure between the blower and the filter. When the backpressure reading is roughly double the starting value, the HEPA filter needs replacement.

The external air fitting (shown in **Figure 4**) is a reference point and should not be obstructed or used for any other purpose.


***Figure 4.*** *Magnehelic pressure gauge (with reference fitting) and speed dial as seen on a Pressurized Cleanroom Airlock*

 *• Revised February 2018 • Document No. 1788-42*

### 4.4 Measuring Pressure Inside the Airlock

As an alternative, the pressure gauge system can be modified by the user to monitor the pressure inside of the airlock.

A. Drill a hole in the chamber ceiling/wall and install a ¼" OD push-to-connect fitting, similar to the factory fittings.

B. Disconnect the tubing from the elbow fitting on the FFU (see **Figure 5**) and insert the tubing into the new fitting.

The pressure gauge will now display the pressure differential between the airlock and the exterior reference point (in "WC).

Users will have to manually reassess HEPA filter saturation periodically or determine an appropriate filter replacement timeline.

***Figure 5.*** *FFU push-to-connect fitting for pressure gauge*

## 5.0 Maintenance

In general, Terra Universal's Cleanroom Airlock features no user-serviceable parts and requires no maintenance aside from periodic cleaning and filter replacement (if equipped with an FFU). Operators are responsible for inspecting the general condition of the unit before each use. Any worn or damaged component should be thoroughly examined and a safety evaluation should be performed before placing the unit back into service.

NOTE

**Always check material compatibility before selecting a cleaning agent.**

### 5.1 Cleaning

Stainless steel should be cleaned with alcohol (or similar cleaning agent), used to dampen a non-shedding wiper.

When the pass-through is used in a cleanroom environment, Terra recommends use of knitted polyester wipers or spun-lace, non-woven blends of cellulose and polyester manufactured and packaged specifically for cleanroom use. These products are manufactured under tightly controlled conditions that restrict the use of binders or chemical treatments that can outgas, and cleanroom packaging and strict lot control ensure optimal cleanliness.

Less critical environments (ISO 6 – 8 / Class 1000 – 100,000) generally tolerate more absorbent materials made of 100% cotton twill or cellulose.

Clean surfaces with clean, lukewarm water with or without a mild, non-abrasive detergent. In critical cleanroom applications, DI water may be required.

For thorough, repeatable results, avoid cleaning with a circular motion, which rubs dirt or grit into the surface. Using mild pressure, wipe in one direction, from top to bottom or side to side, in slightly overlapping stokes. Fold the wiper between strokes, and replace with a clean wiper often.

 

### 5.2 Pre-Filter Access and Replacement

***Figure 6.*** *Open the front access door of the upper housing by quarter-turning the cam latches with a flat screwdriver*

***Figure 7.*** *The blue MERV 7 pre-filter can be lifted out and replaced with a new one*

### 5.3 HEPA Filter Access and Replacement

As a general rule, the HEPA filter should be replaced every three (3) years. Filter life will vary depending on the concentration of particulates in the surrounding air. If the airflow from the FFU becomes noticeably weaker over time, the HEPA filter has likely become saturated and needs replacement.

To replace the HEPA filter:

A. Remove the stainless steel screen from the ceiling by carefully prying along the edges.

B. Rotate the tabs to allow the filter to drop out of the housing.

C. Carefully position the new HEPA filter so that the knife-edge is centered within the gel seal.

D. Press up along the aluminum edge of the filter (not on the screen) and rotate the tabs back into place.

E. Reinstall the stainless steel screen by pressing up on the double-roller tension catches.

See **Section 6.0** for replacement filter part number.

***Figure 8.*** *HEPA filter visible after removing stainless steel screen*

 *• Revised February 2018 • Document No. 1788-42*

## 6.0 Specifications

| Cleanroom Airlocks | |
|---|---|
| Body Material | Cold-rolled steel, powder-coated white (Stainless steel finish optional) |
| Window Material | Static-dissipative PVC |
| Door Material | Anodized Aluminum |

| Fan/Filter Unit (if equipped) | |
|---|---|
| Filter Efficiency (HEPA) | 99.99% for particles over 0.3 microns |
| Sound Level | Approximately 49 dBA at 90 fpm |
| Airflow Rate | 110 to 1117 CFM |
| Blower | EC motor, forward-curved centrifugal fan |

| Replacement Parts | |
|---|---|
| HEPA Filter | 6601-25-R |
| MERV7 Pre-filter | PA04599 |
| Key-switch | EL03196 |

| Accessories | |
|---|---|
| Filter Replacement Alarm System | 2625-54A-SS |

## 7.0 Warranty

**Products Manufactured by Terra:** Terra Universal, Inc., warrants products that it manufactures to be free from defects for a period of 12 months for parts and 90 days for labor, commencing from the date of shipment. Terra's sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. In some cases, components incorporated in Terra Universal products are covered by additional warranties from component manufacturers; obtain specific information from Terra sales representatives. This warranty is void if the equipment is abused or modified by the customer, is operated outside Terra's operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, breakage of quartz baths after 60 days, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

**Products Manufactured by Others:** Terra Universal, Inc., warrants that, to the best of its ability, Terra's representations of products that are manufactured by others reflect the manufacturer's representations, subject to change without notice. Sole warranty for these products is the original manufacturer's warranty that is passed forward to the purchaser and constitutes the customer's sole remedy for these products. Detailed warranties for distributed products are available through Terra sales representatives.

**Freight Shortage or Damage:** Upon receipt of any equipment from Terra Universal, Inc., customer shall immediately unpack and inspect for damage or shortage. The customer shall not accept a damaged package or a short shipment until the carrier makes a "damage or shortage" notation on both the carrier's and customer's copy of the freight bill or delivery receipt. Service title passes when the shipment is loaded, so customer is responsible for filing and collecting a freight claim. Any replacement products must be ordered and paid for separately. For Terra's "Policy and Procedures for Returning Goods," see Terra's Internet site: www.TerraUniversal.com.

Generally, customers can improve the chance of collecting on a freight claim by following these procedures: 1) formally requesting that the carrier inspect the shipment immediately upon suspecting damage or shortage to verify condition; 2) notifying the carrier upon discovery of concealed damage and requesting an inspection within 15 days of receipt, both in person or phone and following up via mail; 3) keeping the shipment as intact as possible, including retaining original packaging materials and keeping the product as close to the original receiving location as possible; 4) holding salvage for disposition by the carrier.

**All Claims:** Terra Universal expressly disclaims all other warranties, expressed or implied or implied by statute, including the warranties of merchantability or fitness for intended use. Terra Universal is not responsible for consequential or incidental damages arising out of the purchase or use of the products supplied by Terra Universal. Terra Universal is not liable for damage to facilities, other equipment, products, property or personnel of others, or of their agents, suppliers, or affiliated parties, which is caused or alleged to have been caused by products supplied by Terra Universal. In any event or series of events, Terra Universal's total liability for any and all damages whatsoever is limited to the lesser of the actual damages or the original invoice cost of the items alleged to have caused the damage. The customer's sole and exclusive remedy for any cause of action whatsoever is repair or replacement of the non-conforming products or refund of the actual purchase price, at the sole option of Terra Universal. All claims must be made in writing within 90 days of the date the product was shipped. Any claims not made within this time limit shall be deemed waived by the customer. Terra Universal is not responsible for any additional costs of repair caused by poor packaging or in-shipment damage during return.

**Warranty Returns:** All warranty returns must be authorized in advance by Terra Universal and approved under an RMA. Unless approved in advance for good reason, all returns must be in original condition, including all manuals, and must be packaged in original packaging materials. All returned goods are to be shipped to Terra Universal, freight prepaid at customer's expense. See Terra's "Policy and Procedure for Returned Goods."

***Thank you for ordering from***
***Terra Universal!***