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OPERATING MANUAL

Terra Universal, Inc.
(714) 526-0100 Fax (714) 992-2179

Terra Universal
Vertical Laminar Flow Station



Terra Universal, Inc.

Operating Manual No. 1800-20 $38.00

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Terra Universal, Inc.

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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 hazards involved in operation:

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

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

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1.0 Introduction

This manual provides information on installing and operating your Terra Vertical Laminar Flow Station. By studying it carefully, you can be assured of a long, efficient service life from the unit. Be sure to read carefully the manuals for any additional equipment you have incorporated into your system, such as Terra's ionizing equipment.

To ensure delivery of a complete turnkey system, a Terra Universal applications engineer reviews each order. Please refer to the Appendix for ordering information on options that may enhance system performance in your application.

Terra Universal's Vertical Laminar Flow Station combines several of our most advanced products in a state-of-the-art work station that removes particulate airborne contamination to ensure a clean work surface.

Operation with TUI Wet Processing Station
The Vertical Laminar Flow Station is completely compatible with Terra's Wet Processing Station. When operated together, these stations form an integrated processing system that accepts a host of wet processing modules to accommodate your applications. See Terra Catalog No. 105 for a complete description of TUI's Wet Processing Station and accessories.

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2.0 Equipment Description

The backbone of the system is a filter/fan unit that incorporates a 2-speed, direct-drive 1/3 HP electric motor that forces air through a HEPA filter. In conjunction with the system's prefilters, the HEPA filter removes 99.99% of all particles 0.3 microns and larger from a large volume air stream, and the vertical laminar flow of air to the work surface effectively blocks the inrush of contaminants. Each 2' x 4' filter/fan unit provides 650 CFM of filtered air @ 90 FPM, and tests show that the work station exceeds Federal Standard 209E for a Class 100 environment. For more stringent requirements, ULPA-filtered units are available that remove all particles down to 0.12 microns with 99.999% efficiency.

Automatic Filter Monitoring System
The Terra Laminar Flow Station also incorporates an Automatic Filter Monitoring System that eliminates the need for frequent, tedious inspection of the HEPA filter. This system signals the need to replace the filter and thus eliminates the possibility of product contamination that results when the filter becomes dirty.

A differential pressure gauge displays the filter back pressure and automatically activates an audible alarm when the filter has to be replaced. The minute the pressure climbs above this set point (factory set at 0.8" Water Gauge), the alarm will signal the need to change the Filter/Fan Unit. Once activated, the audio signal can be turned off by pressing the Alarm Silence button that appears on the control panel, but a "Service Filter" message continues to flash until the filter is replaced and the back pressure falls below the set point.

The Vertical Laminar Flow Station also features fluorescent lighting that is completely noncontaminating and imposes no clearance requirements.

Static-Dissipative PVC Sliding Shield
The Vertical Laminar Flow Station comes complete with transparent acrylic side panels that restrict the laminar flow and ensure an effective wash of HEPA-filtered air over the entire work surface.

For additional control of the laminar flow, select the Sliding Shield, which can be adjusted up or down along the front of the access area to the level you require. This feature allows you to control the force of the laminar flow to accommodate your application: stronger flows ensure optimal cleanliness; and weaker flows reduce turbulence that might disturb small parts.

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The Sliding Shield is made of static-dissipative PVC, a transparent material that features a surface resistivity of about 10^7 ohms/square. This static-dissipating characteristic helps eliminate not only static charges that can damage sensitive components, but also the particles that static charges attract. As a result, the sliding shield remains clean—inside and out.

NOTE: To ensure optimal static and contamination protection, Terra recommends that you select side panels made of static-dissipative PVC if you select the sliding shield option; see Terra Catalog No. 105 for ordering information.

Other Optional Features
Optional features include a Cleanroom Work Station, Vibration-Free Work Station, static-neutralizing Ionizers, a Vaneometer, a Thermo Anemometer, and Cleanroom Drawers. See the Appendix for information on these products.

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3.0 Check-Out and Installation

Upon delivery, carefully inspect the system for visible damage. (Report any damage according to the procedures specified on the shipping claims form.) Check to make sure that you have received all optional equipment, as indicated on the packing list.

Select a level surface for the station with at least 100" of vertical clearance.

The Vertical Laminar Flow Station is delivered in two sections: the Main Control Housing, which contains the Filter/Fan Units and controls, and the frame.

Because the Main Control Housing is very heavy, it should be forklifted onto the frame. To facilitate installation, Terra has designed the frame with an insert to allow the Control Unit to be lowered (while still on the forklift pallet) onto the frame. See Figure 1.

Before installing, remove the rear panel (which covers the insert) from the frame. Once the two units are properly positioned, the shafts mounted on the frame will interlock with the holes on the bottom of the Control Housing, and the pallet can be removed. Reattach the rear panel.

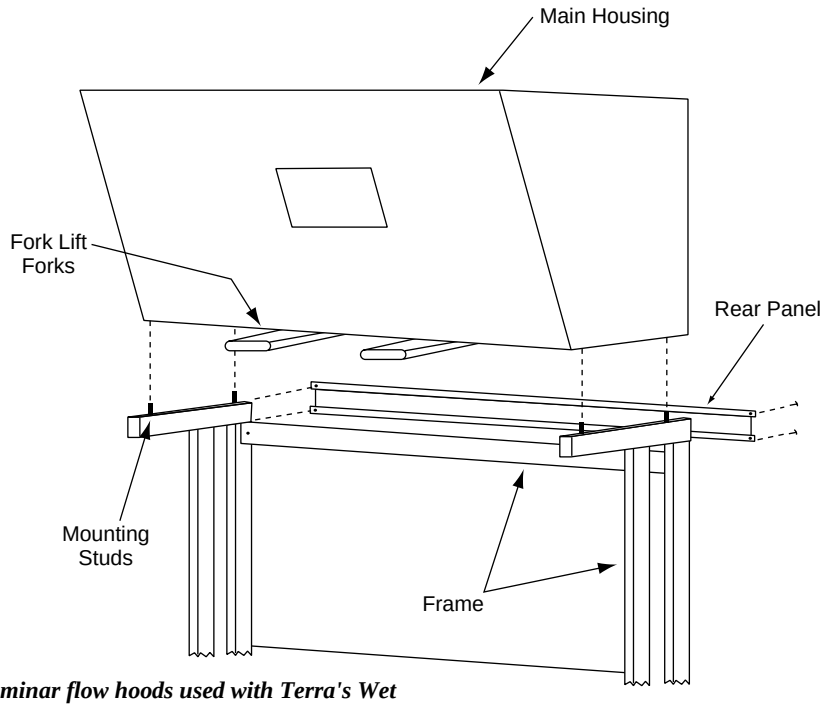


Figure 1
Installing the Vertical Laminar Flow Station

Laminar flow hoods used with Terra's Wet Processing Stations feature cut-outs on rear panel to accommodate an exhaust flange.

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To operate the system,

1. Plug in the power cord to a grounded 115VAC/60Hz or 230VAC/50Hz receptacle.

2. Press F1 to turn on the Filter/Fan Units (see Figure 2 below). Note: FFU motors are factory set in the "High" position and should not be modified.

3. Press F3 to turn on the system's fluorescent illuminators.

4. With Filter/Fan Units “ON”, the differential pressure gauge should read between “3” and “4” (corresponding to 0.3" and 0.4" water gauge). If backpressure exceeds “8” (0.8" water gauge), the backpressure alarm will sound, indicating the need to change the Filter/Fan Units.

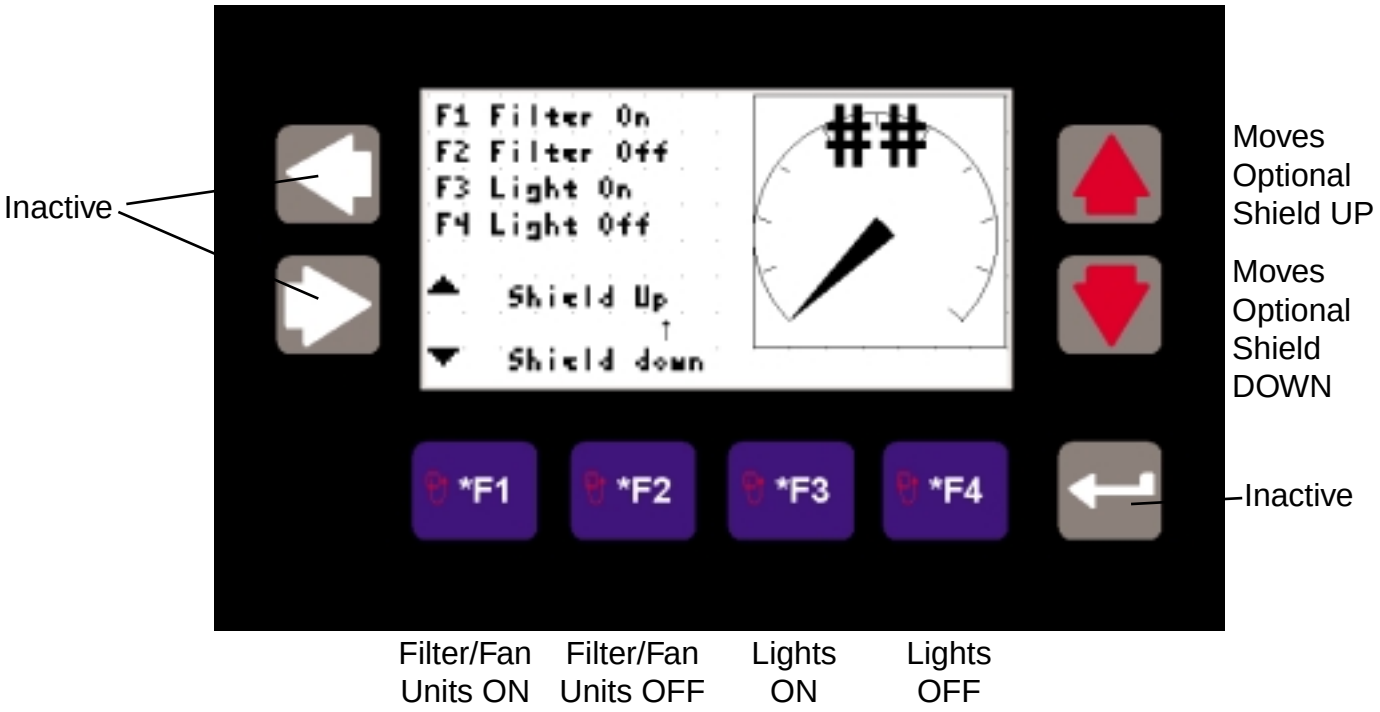


Figure 2
Control Panel

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4.0 Maintenance

Replacing the Filters
When the Automatic Filter Monitoring System indicates the need to replace your filters, you should first check the washable polyurethane prefilters located on top of Filter/Fan Units located inside the Vertical Laminar Flow Station.

To access these pre-filters, remove the top panel of the filter housing and then remove the top panels of the FFUs located inside. Prefilters can then be removed, washed, allowed to dry, and then reinserted inside the FFUs.

If the monitoring alarm is activated only when the prefilters are in place, then the HEPA filter is probably still clean enough to maintain your requirements.

If the monitoring system continues to indicate a clogged filter after the prefilters are washed, you should replace the Filter/Fan Units located inside the filter housing.

To replace a Filter/Fan Unit, first remove the top of the filter housing. Then, disconnect the yellow quick connect fittings to the individual FFUs located inside (labeled "Blower 1" and "Blower 2"). You can now remove the old unit and install a new one. Order according to the chart below:

Replacement Filter/Fan Units

For Vertical Laminar Flow Station (Working Surface Dimensions)	(Quantity) HEPA Filter/Fan Unit(s) (110VAC; add "-220" for 220VAC models)
No. 2001-30 (48" x 30")	**(1) No. 6701-99** (24" x 48")
No. 2001-31 (60" x 30")	**(1) No. 6702-08)** (24" x 36") and **(1) No. 6702-10** (24" x 24")
No. 2001-32 (72" x 30")	**(2) No. 6702-08** (24" x 36")
No. 2001-33 (96" x 30")	**(2) No. 6701-99** (24" x 48")

Cleaning the Vertical Laminar Flow Station
The metal surfaces of the Vertical Laminar Flow Station should be periodically cleaned to ensure that sensitive materials are not exposed to contaminants that may accumulate over time. Use only lukewarm water, a mild detergent, and a clean, noncontaminating cloth. Allow surfaces to dry adequately before using them.

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Special Care of Static-Dissipative Plating
If your work station includes static-dissipative side panels, you should take extra care when cleaning them to avoid damaging their static-dissipative properties:

1. Do not use alcohol or other strong cleaning agents on static-dissipative materials.

2. Do not expose static-dissipative materials to extreme heat or direct sunlight.

3. Avoid scratching this material.

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5.0 Specifications

Vertical Laminar Flow Station

General Construction:	The station is fabricated from welded 16 gauge stainless steel or powder-coated C.R. steel 1 1/2" x 3" tubing.
Side Panels:	Acrylic (static-dissipative PVC optional).
Prefilters:	Washable polyurethane foam, located at top of FFUs.
Final Filters:	99.99% efficient HEPA (99.999% efficient ULPA available)
Blower Motor:	Direct drive, forward curve, centrifugal-type with sealed bearings; rated for continuous duty; furnished with overload protection and a two-speed switch. Rated 1/4 HP @ low speed; 1/3 HP @ high speed (2' x 4' model).
Average Air Velocity:	90 (± 10) FPM (.45 m/sec) at low speed, measured 6" below filter face.
FFU Air Flow:	650 (2' x 4'), 480 (2' x 3'), 360 (2' x 2') - all models rated @ 90 FPM under HEPA filter load.
Sound Level:	50 dBA, measured no more than 30" from filter face @ 90 FPM
Vibration Level:	0.09 MILS
Lighting:	Fluorescent type, 100-foot candles; does not disturb the air flow.
Electrical:	115VAC, 60Hz or 220VAC, 50Hz, single phase. Meets the requirements of the National Electrical Code and applicable local codes. All components UL listed and CE marked.
Performance:	Dust count exceeds Class 10 requirements. Exceeds Federal Standard 209E for Class 100 work environment.
Controls:	Instrument panel provides back-pressure audible alarm, visible alarm, silencer and W.C. gauge.
Options:	Special voltage and frequency, duplex electrical outlets, ionizers for static control, Sliding Shield and static-dissipative side panels, Cleanroom Work Station, Vibration-Free Work Station, Modular Cleanroom Drawers, Vaneometer and Thermo Anemometer.

5.0 Specifications

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Installation: To facilitate transportation and installation, the head case containing filters is designed to mount simply on top of the frame, automatically locking in place, and is easily removed for transport.

HEPA Filters
The filtration medium consists of highly efficient microfiberglass paper folded over corrugated separators of aluminum which prevent the media from nesting. This design channels air flow with optimal efficiency to reduce resistance.

All filters are tested for air flow resistance and DOP (dioctylphthalate) smoke penetration (with a mean particle diameter of 0.3 microns) by measuring upstream and downstream smoke concentrations with a photometer.

Static-Dissipative PVC Side Panels and Front Panel Sliding Shield

Static-dissipative PVC features resistance between 10^6 and 10^8 ohms/square—much less than that of other treated plastics. Tests show that when 10KV is applied to the surface, electrostatic potential remains less than 15V, and static decay time is less than 1 second. And because this plating offers such effective static dissipation, it will not attract dust or other contaminating particles that could damage sensitive microelectronic components.

NOTE: For specifications and care of plastics, see TUI Catalog No. 105.

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6.0 Warranty

Terra Universal warrants all of its Vertical Laminar Flow Stations for a period of 90 days from the date of shipment and will, at the discretion of the Seller, either replace or repair without charge, F.O.B. Anaheim, any part of the equipment that, within the above stated time, is proved to have been defective at the time it was sold.

All equipment claimed defective must be returned, in its original packaging, properly identified to the Seller (or presented to one of its agents for inspection). All Terra products bear a name plate that features both catalog and serial numbers. To facilitate claims processing, the Buyer should identify any damaged or defective equipment by this serial number. Terra disclaims any product that does not bear this serial number.

Terra Universal must be notified before any equipment is shipped for repair.

This warranty only applies to equipment operated in accordance with the Seller's operating instructions. This warranty becomes null and void should the equipment be abused or modified by the customer or if used in any application other than that for which it is specified.

Terra Universal, Inc., will not assume responsibility for additional cost of repair due to damage incurred during shipping as a result of poor packaging.

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Appendix: System Options

Cleanroom Work Station (for Vertical Laminar Flow Stations)

This work station comes complete with laminate top, adjustable legs, and right/left drawer unit mounting brackets (see separate description for Cleanroom Drawer Unit). The standard work surface is a nonconductive formica laminate top which dissipates electrostatic charges and avoids the potentially damaging effects of ESD. You may also select a vented polypropylene top for improved laminar flow or a stainless steel top which is ideal for use in a wet processing station. Refer to Terra Catalog No. 105 for complete details on the various workstations.

Vibration-Free Work Station

This Vibration-Free Work Station fits directly under the Vertical Laminar Flow Station. It eliminates up to 90% of all building vibrations and is ideal for use in delicate microscope operations. It comes with pneumatic vibration-free mounts, nonconductive, static-dissipative, stainless steel or Ultra-Clean stainless steel benchtops, frame, mounting brackets for the optional Cleanroom Drawer unit (see separate description) and a built-in pneumatic controller to simplify levelling. See Terra Catalog No. 105 for complete details on Vibration-Free Work Stations.

Modular Cleanroom Drawers

Three sizes can be mounted on either side of the bench. Available in durable, dent-resistant white plastic or stainless steel; plastic models feature rounded corners inside and outside for easy cleaning. Smooth, quiet slides ensure a flush, noncontaminating pull that won’t interfere with material handling. Inside dimensions are 14"W x 15"D. For added security of drawer contents, Cleanroom Drawer Locks (Catalog No. 1700-97) are also available. See Terra Catalog No. 105 for complete specifications and ordering information.

AirGard® Air Velocity Meter (Cat. No. 6704-65)

Monitors air velocity (70 - 250 ft/sec; 0.35 - 1.25 m/sec) to ensure laminar flow efficiency. LCD display shows constant digital reading of face velocity; and LED and audible High/Low alarms indicate when air speed falls below user selectable level. Includes flush mounting on specified hood. See Terra Catalog 105 for full information.

Ionizers

A 4" space under the HEPA filter accommodates optional ionizing equipment for complete static safety.

An ionizing bar houses nozzles that emit balanced streams of positive and negative ions downward to safely neutralize any static imbalances that may exist in the work area. See Terra Catalog No. 105 for ordering information.

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Power Strip
(Catalog No. 2004-31)

Four outlet strip includes master on/off switch, 15-amp circuit breaker.

HEPA Filter/Fan Units

For Vertical Laminar Flow Station (Working Surface Dimensions)	(Quantity)HEPA Filter/Fan Unit(s) (110VAC; add "-220" for 220VAC models)
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