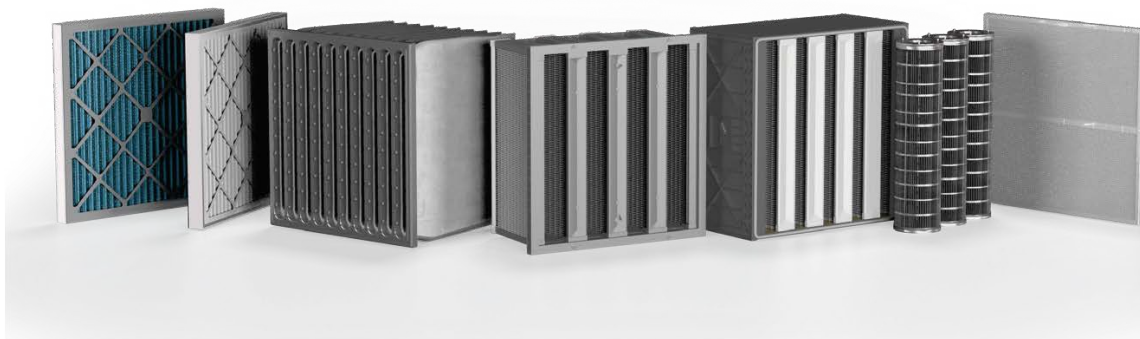
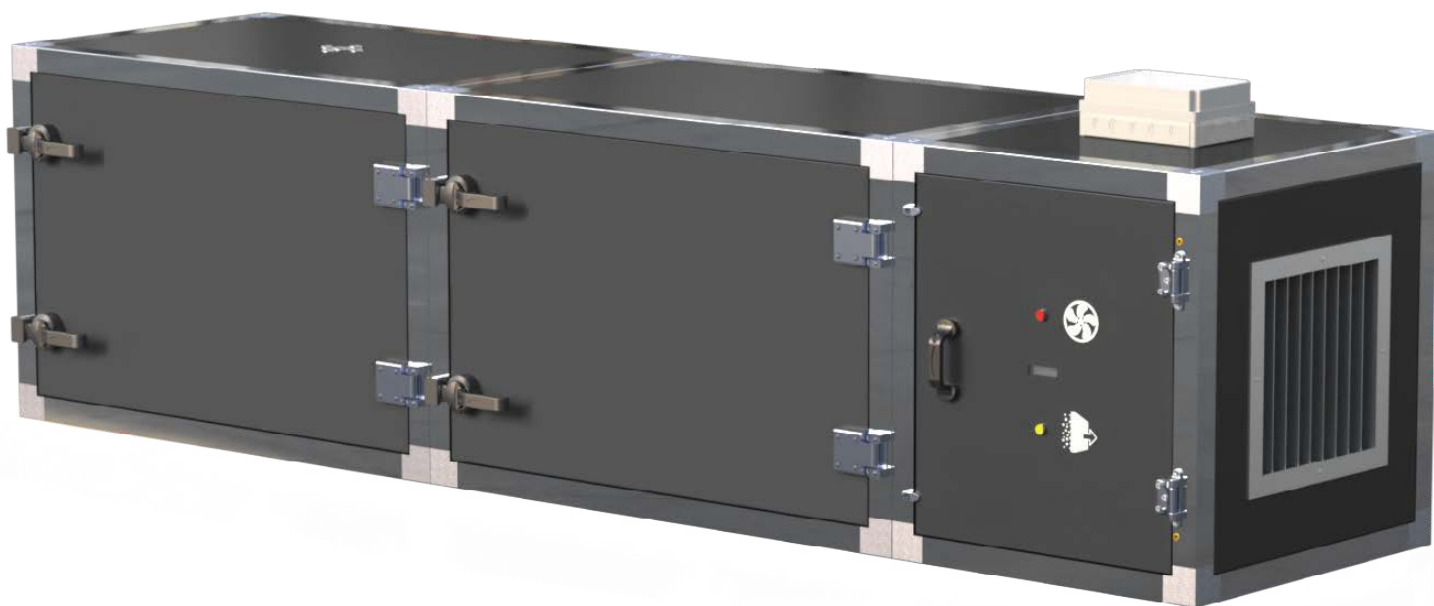


Technical Manual

Horizontal Air Cleaner



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SAFETY INSTRUCTIONS

Safety Instructions



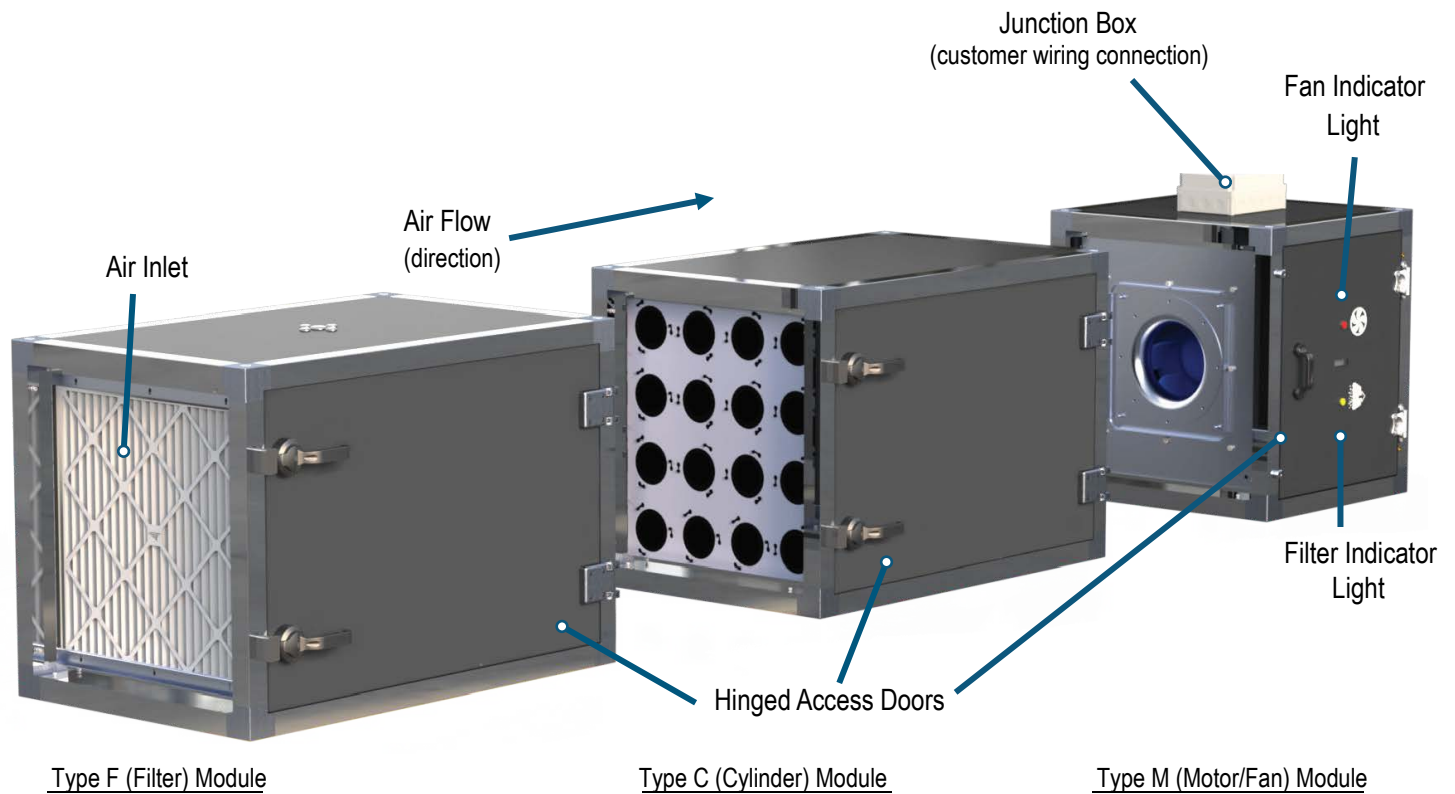
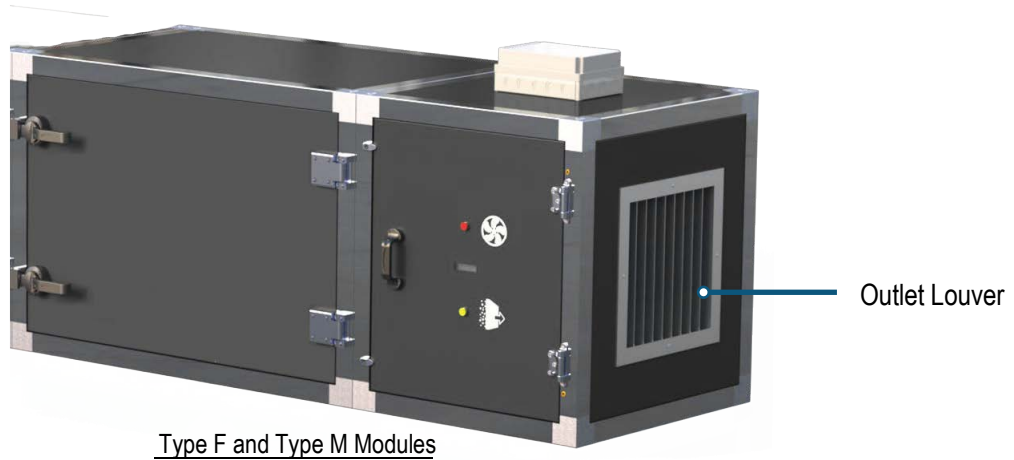
WARNING

SAFETY HAZARD! This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a Horizontal Air Cleaner product may result in personal injury and/or property damage. Terra Universal cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

- Before proceeding with installation, operation or maintenance, all safety and health protection decrees must be abided.
- Check the system for visible damages. If there is visible damage, inform your supervisor.
- During installation, testing, servicing, and troubleshooting of the Horizontal Air Cleaner, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.
- Never drill or grind through, weld to, or otherwise penetrate the interior or exterior of the filtration system, etc.
- Do not install a Horizontal Air Cleaner with a non-ducted return in the same space as a fossil fuel device. Hazardous vapors can be distributed downstream and equipment damage can result.
- To prevent shortening its service life, the Horizontal Air Cleaner should not be used during the finishing phases of construction. The low return air temperatures can lead to the formation of condensate. Condensate in the presence of chlorides and fluorides from paint, varnish, stains, adhesives, cleaning compounds, and cement creates a corrosive condition which may cause rapid deterioration of the cabinet and internal components.
- There are no general rules for recycling of used filters. Different rules exist on local level in all countries. Please contact the recycling company in your district and ask how to handle used filters.

SYSTEM INSTALLATION

SYSTEM IMAGE



SYSTEM LAYOUT AND DESIGN

The system is designed for areas that have high dust loads, fumes and aerosol particulate concentrations such as warehouse dust, oil mist, sports facilities, food and beverage, and other locations where source capture may be difficult. Terra Universal Filter cylinders are also an optional stage of filtration to control molecular contaminants.

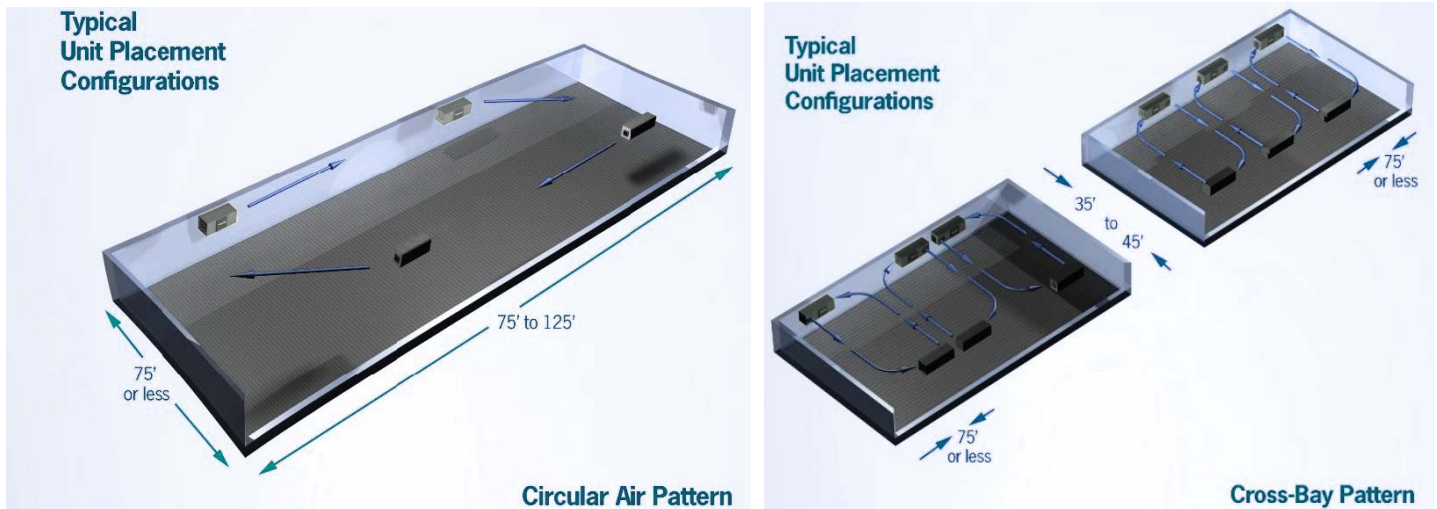
Optimal placement is based on two critical factors: (1) maintaining a minimum air change rate, and (2) setting the unit(s) in a proper pattern to continually mix the air and not allow for “dead spots” or areas where air is not directed to the inlet of an air cleaning device. The equipment should typically be used where source capture is difficult and where particle loading will allow the filters a four month or greater life.

The formula used to determine the total CFM required is as follows:

$$\frac{L \times W \times H \times AC/Hr}{60} = \text{Total CFM Required}$$

KEY: L = Length
W = Width
H = Height
AC/Hr = Air changes per hour
60 = Minutes per hour

Listed below are examples of typical unducted unit placements for a circular air pattern and a cross-bay air pattern:



Consult a Terra Universal representative to assist with proper system placement.

TOOLS REQUIRED TO ASSEMBLE YOUR HORIZONTAL AIR CLEANER

Your Horizontal Air Cleaner requires some field assembly prior to installation. We estimate approximately 1-2 hours and two persons to properly assemble each Horizontal Air Cleaner system (unpacking, layout and assembly). The heaviest piece of the assembly is the Type M (Motor/Fan) module; the CCH2000 model weighs 100 lbs., the CCH4000 model weighs 175 lbs. The mechanical assembly can be accomplished by workers with a moderate mechanical skill level. Connecting your Horizontal Air Cleaner to your facility's electrical system should be performed by a licensed electrician.

If you have questions regarding installation of your Horizontal Air Cleaner system, please contact Terra Universal Customer Service at 714-578-6000 (Hours 8:00A to 5:00P US Pacific Time) or Info@TerraUniversal.com.

We have included tools needed to properly assemble your Horizontal Air Cleaner. They are located in the Assembly Packet (found in the Type M (Motor/Fan) module).

Common tools needed to assemble your Horizontal Air Cleaner:

- 6mm hex wrench
- Small instrument flat blade screw driver

Terra Universal tools that would be helpful:

- 24mm Terra Universal Filter Cylinder wrench (needed for carbon cylinder installation and service)

Here is what you will find in your Assembly Packet:

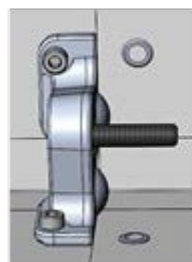
- (1) 4mm hex key wrench
- (4) 1/2-13 UNC x 1-1/2" hex head bolts
- (4) 1/2" flat washers
- (2) Module security strap brackets
- (1) 0.5ml tube of LOCTITE 242
- (6) Connector bolts
- (6) Connector nuts
- (6) Connector flat washers
- (1) Warranty Card

SYSTEM INSTALLATION AND PREPARATION

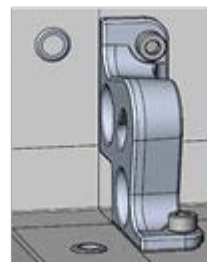
MODULE CONNECTIONS

Horizontal Air Cleaner systems are shipped as individual modules ready for assembly at your site. Individual modules are connected by factory installed connectors located in the corners of each module for all CCH2000 systems, and an additional center connector in each CCH4000 system. The module connectors consist of male and female halves, which are self-aligning and secured by a bolt, washer and nut (included in your assembly packet).

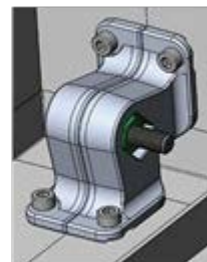
- A. If your Horizontal Air Cleaner is a two module (Type F + M) assembly, then connect the Type M (Motor/Fan) module to the Type F (Filter) module as described below.
- B. If your Horizontal Air Cleaner is a three module (Type F + C + M) assembly, then connect the Type M (Motor/Fan) module to the Type C (Cylinder) module, and the Type F (Filter) module is attached to the Type C (Cylinder) module as described below.



Male
Connector



Female
Connector



Completed
Connection

To Connect Modules Together:

1. Properly arrange the modules based on your specific ordered assembly (e.g. F + M (Filter module + Motor module) or F + C + M (Filter module + Cylinder module + Motor module)). Ensure the inlets and outlets of each module are oriented in the correct direction before assembling the modules together. Additionally, it is important that each access door is located on the same side (RH versus LH). For reference, please note that the access door hinges are located on the downstream (e.g. outlet) side of each module.
2. Locate the assembly kit that includes a bolt, nut and washer for each module connection.
3. Align the male and female connectors and fasten together using the supplied nut, bolt, washer and medium strength thread locker. Using a 6mm hex key (not furnished), hand tighten until snug. **IMPORTANT!** Do NOT use a drill or screw gun here. You may access the module connectors through the access doors or open ends of filter modules.
4. After all modules are properly connected in each corner, firmly tighten each corner fastener.
5. Locate the module security strap and installation bolts that are included in the assembly kit.

Note: If modules ever need to be separated, use a 6mm hex key to remove bolt from module connectors.

MODULE SECURITY STRAPS

Module security straps are included in the assembly packet for field installation. To install the security strap, follow the steps below:

1. After adjoining modules together, install security straps by aligning the metal strap with adjacent holes on the **bottom** of the unit.
2. Apply supplied medium strength thread locker to ½-13 UNC bolts and fasten security strap with ½-13 UNC bolt and washer. Torque ½-13 UNC to 25 ft-lbs.
3. A module security strap should be placed at all adjacent bottom corners.

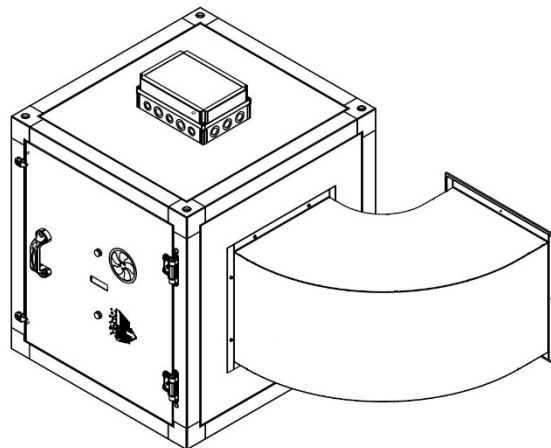


Module Security Strap

OPTIONAL 90° DIRECTIONAL DISCHARGE OUTLET INSTALLATION

If discharge greater than 45° is required, a 90° Directional Discharge Outlet will solve your problem. This part can be installed with new Horizontal Air Cleaners or after installation. For CCH2000 Horizontal Air Cleaner, use part number M21K00012 and for CCH4000, use M21K00013. The directional outlet can be mounted for discharge in four different orientations - 90° up, down, left or right. The following steps are needed to properly install this component:

1. Remove supplied outlet louver by removing its fasteners (save fasteners for Step 3).
2. Fasten directional outlet using its supplied fastener kit.
3. Reattach louver to directional outlet using the saved fasteners.



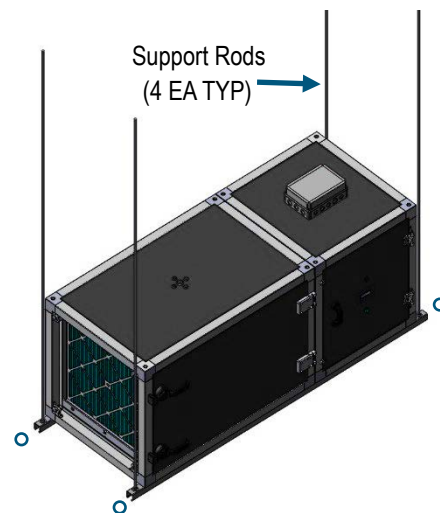
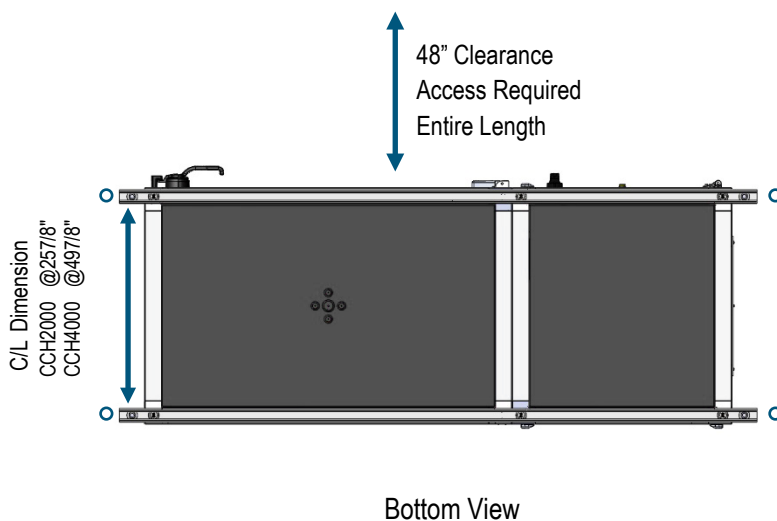
SYSTEM SUSPENSION HANGING POINTS

Strut Channel Method: The system is designed to be supported using strut channel (recommended Uni-Strut® P1000 1.625" x 1.625" channel) along the bottom of the housing, parallel to the long dimension and in-line with the corner rivet nuts. When installed in this manner, it is recommended to fasten the strut channel to the housing using ½-13 UNC x 1-1/2" Grade 8 bolts with washer and lock washer (not included) threaded into the bottom rivet nuts. The entire Horizontal Air Cleaner assembly may be suspended using Ø1/2" support rods with ½-13 UNC threads at each end. The support rods may be fastened with ½-13 UNC hex nuts with a jam nut and washer. For added protection, it is recommended to use eye-bolts in the top rivet nuts, with safety chains/wire connected to building structure overhead (refer to section Direct Threaded Rod Method).

A. Strut Channel Method

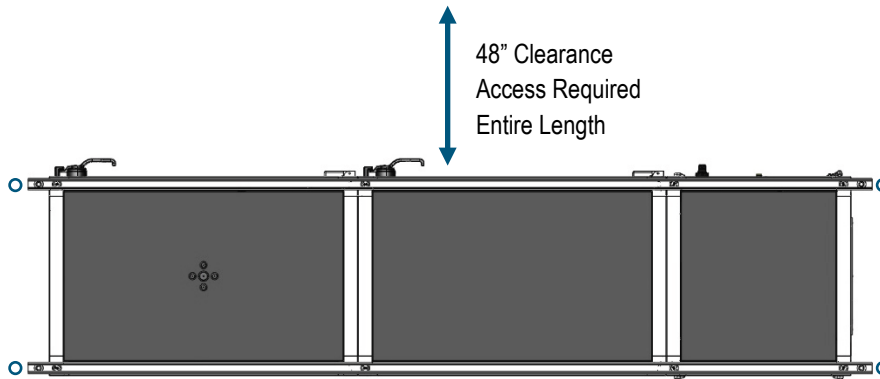
1. Type F (Filter) Module + Type M (Motor) Module:

- = Strut Channel Attachment Point (below unit)

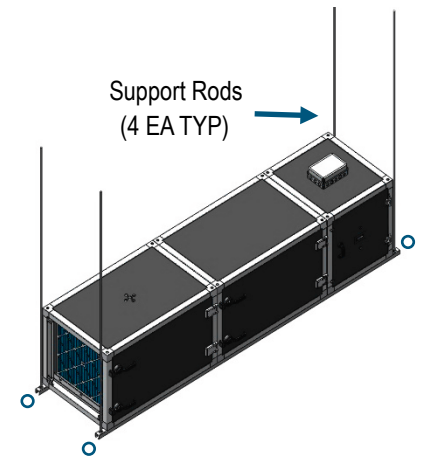


2. Type F (Filter) Module + Type C (Cylinder) Module + Type M (Motor/Fan)

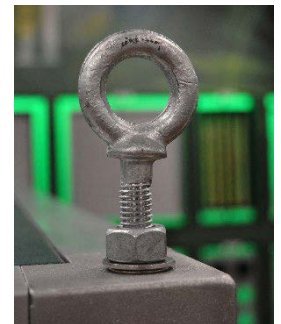
○ = Strut Channel Attachment Point (below unit)



Bottom View



Direct Threaded Rod Method: Alternatively, the system is designed to be suspended from the ceiling using $\frac{1}{2}$ -13 UNC threaded rod or eye-bolt, threaded into the rivet nuts located at the top corners of the modules. For a Type F (Filter) module and Type M (Motor/Fan) module combination, use four rods or eye-bolts to suspend the motor module and two rods or eye-bolts to suspend the filter module. For a Type F (Filter) module, Type C (Cylinder) module and Type M (Motor/Fan) module combination, use four rods or eye-bolts to suspend the motor module, two rods or eye-bolts to suspend the filter module, and two rods or eye-bolts to suspend the cylinder module. The rods or eye-bolts should be threaded in a minimum of one inch to fully engage the rivet nut. Secure each threaded rod or eye-bolts with a $\frac{1}{2}$ 13 UNC jam nut. Consult with local authorities for attaching $\frac{1}{2}$ -13 UNC threaded rod or eye-bolts to building/ceiling structure.



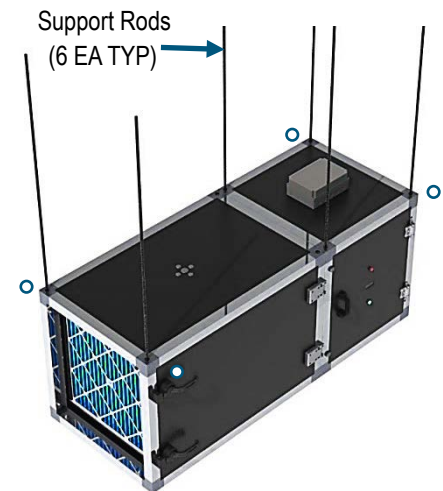
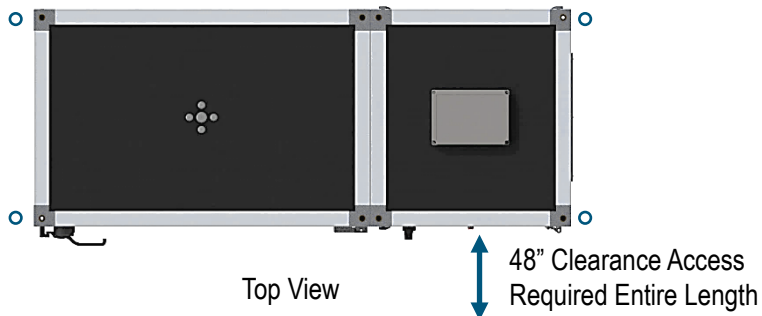
EyeBolt Install

All module corners, top and bottom, have an integrated rivet nut for attaching support or suspension system. Bottom rivet nuts can be utilized for a strut channel method of suspension.

B. Direct Threaded Rod Method

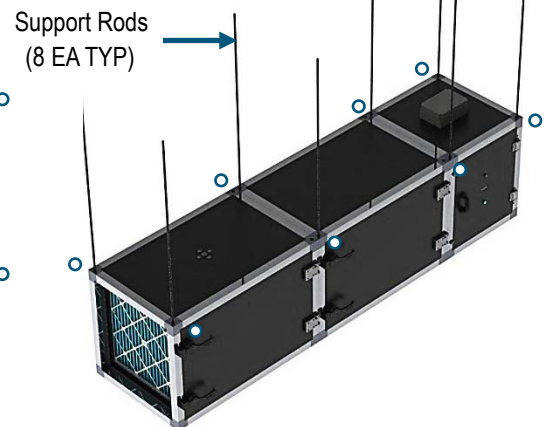
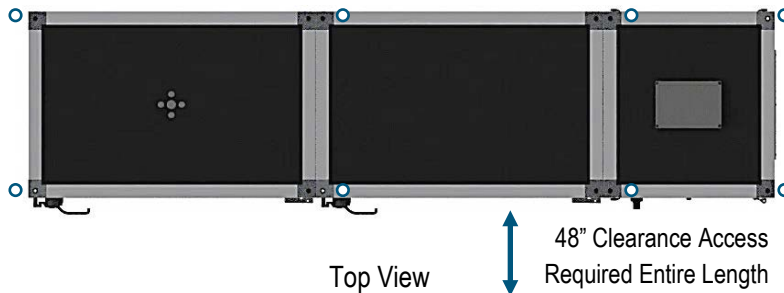
1. Type F (Filter) Module + Type M (Motor/Fan) Module

○ = Support Connection Location



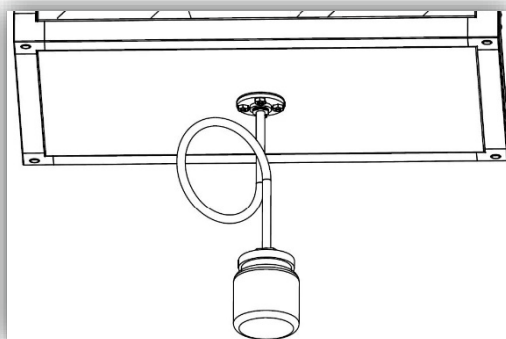
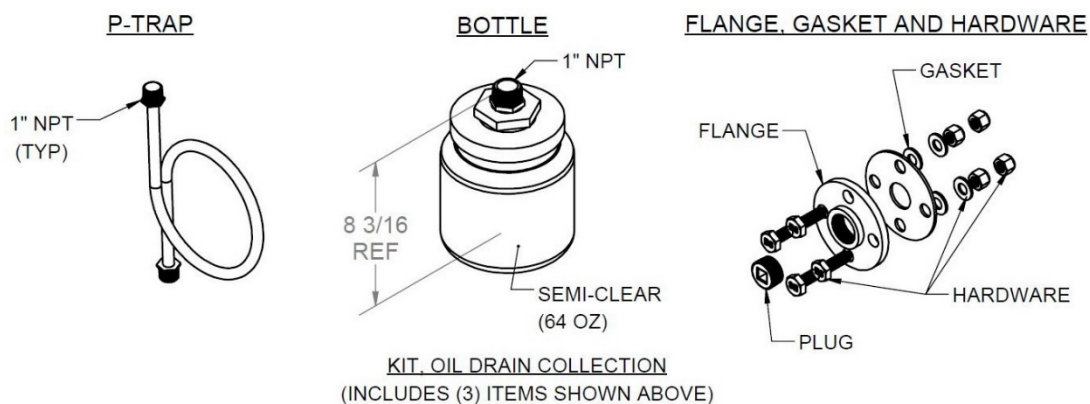
1. Type F (Filter) Module + Type C (Cylinder) Module + Type M (Motor/Fan) Module:

○ = Support Connection Location



OPTIONAL OIL MIST KIT INSTALLATION INSTRUCTION

1. Prefabricated holes with caps are located in the bottom pan of the filter module.
2. Remove caps and install flange, gasket and hardware to allow for oil drainage.
3. Connect P-Trap or collection bottle to the drain.
4. Connect P-Trap to customer supplied drain line.



Full Kit Installed

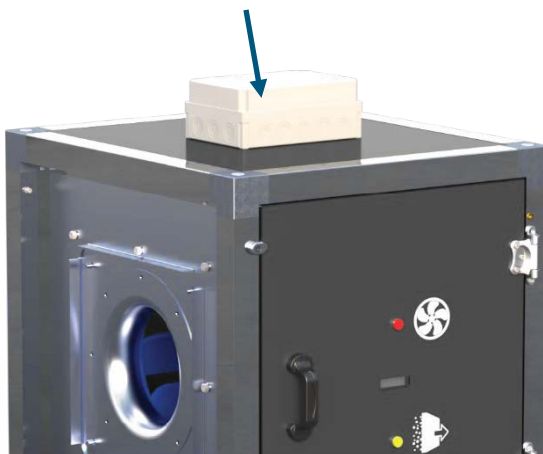
POWER INLET LOCATION

Locate the top-mounted junction box on the Type M (Motor/Fan) module. Refer to Type M (Motor/Fan) label attached to top of the Type M (Motor/Fan) module beside the junction box to determine the voltage for the fan motor. Apply correct inlet power (see wiring diagrams on following pages).

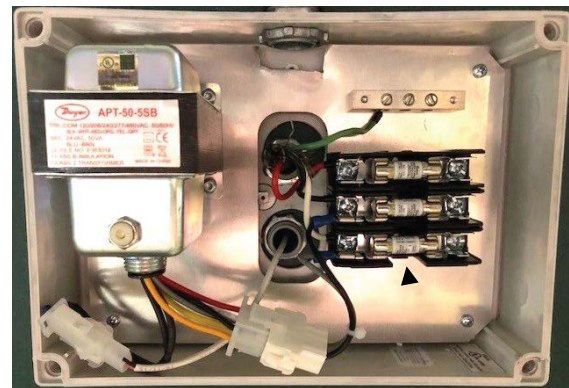
Follow local electrical codes for inlet power connection.

Once local power is energized, the Horizontal Air Cleaner system will power on and operate at factory set flow rate. Note, the fan indicator will momentarily illuminate red before illuminating green to indicate power and proper function.

Junction Box (customer wiring connection)



Inside Junction Box
with cover removed



Terminal Fuse Block:

Qty (2) Fuses for Single Phase Power

Qty (3) Fuses for Three Phase Power

VOLTAGE	480
PHASE	3
AMPS	4.0
HZ	50/60
WATTS	2500

POWER REQUIREMENTS

Type M Motor/Fan module:

Unit Model	Voltage	Maximum Power Consumption	Maximum Current Draw
CCH2000	240VAC/1PH	1335 Watts	5.6 Amps
CCH2000	240VAC/3PH	1977 Watts	5.0 Amps
CCH2000	480VAC/3PH	2500 Watts	3.2 Amps
CCH4000	240VAC/3PH	3618 Watts	9.2 Amps
CCH4000	480VAC/3PH	3420 Watts	4.6 Amps

FIELD WIRING SCHEMATICS

Safety Instructions



SINGLE PHASE TYPE M MODULE

Single Phase Horizontal Air Cleaner units are factory-wired for 240VAC. Additional voltage options available for single phase 200-277VAC motor modules are 208 and 277VAC.

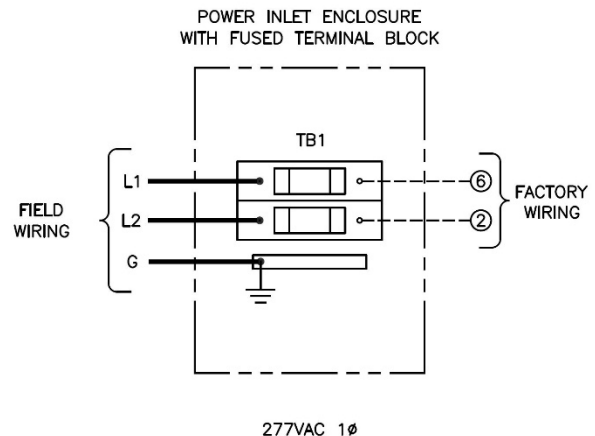
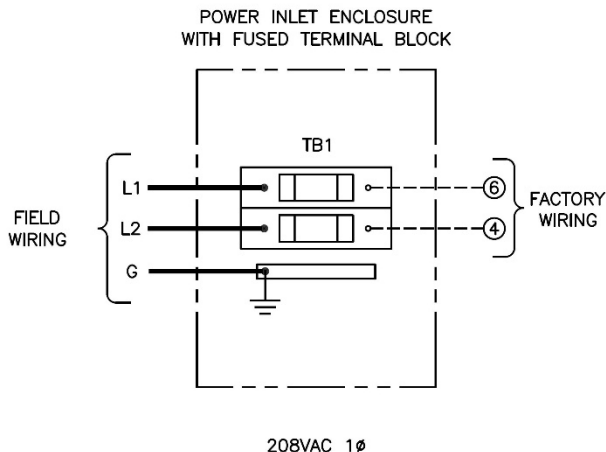
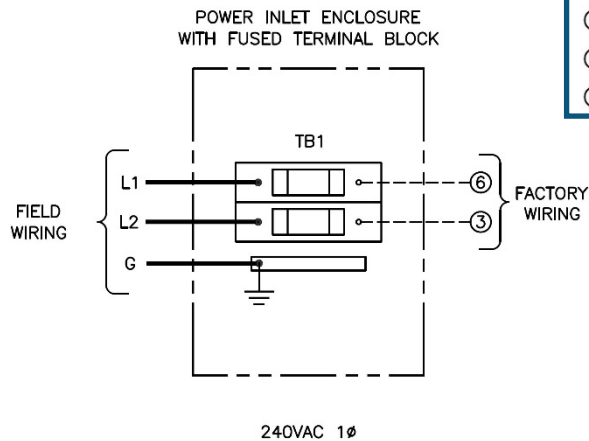
If the power supply is other than 240VAC / 1Ø, the units will need to be rewired for the correct supply voltage. Refer to wiring diagrams below for optional field rewiring.

Refer to the transformer wiring legend (right) for correct wire color when field wiring is required for voltages other than factory default.

AC POWER TRANSFORMER DIAGRAM LEGEND

①	480VAC	GRAY
②	277VAC	YELLOW
③	240VAC	ORANGE
④	208VAC	RED
⑤	120VAC	WHITE
⑥	COM	BLACK

SINGLE PHASE POWER WIRING DIAGRAMS



Safety Instructions



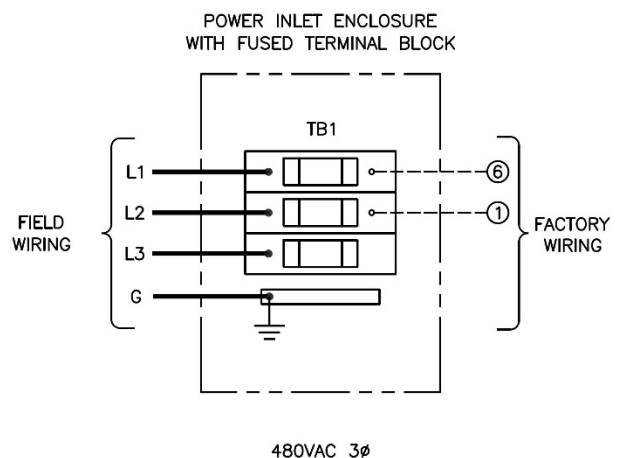
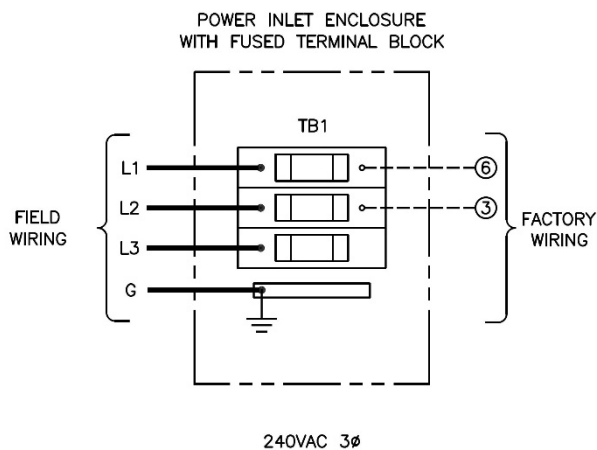
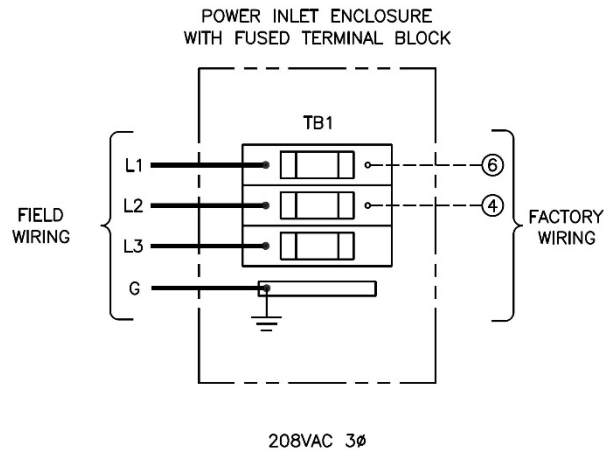
THREE PHASE TYPE M MODULES

Three Phase Horizontal Air Cleaner units are factory-wired for 240VAC for the 200-240VAC motor modules. Additional voltage option available for this motor module is 208VAC.

If the power supply is other than 240VAC / 3Ø, the units will need to be rewired for the correct supply voltage. Refer to wiring diagrams below for optional field rewiring.

There are no voltage options available for the 480VAC / 3Ø motor module. This unit will be wired directly from the factory for that voltage.

THREE PHASE POWER WIRING DIAGRAMS



OUTLET LOUVER SETUP

The supplied outlet louver is equipped with directional louvers to adjust exhaust airflow in both the vertical and horizontal directions. To adjust exhaust airflow in the vertical direction, manually adjust the horizontal louvers up or down. To adjust exhaust airflow in the horizontal direction, manually adjust the vertical louvers left or right. The adjustable outlet louver can adjust exhaust airflow from 0° to 45° in both the vertical and horizontal directions. Please use the optional 90° directional outlet attachment (see Optional Equipment for more information and part number) for exhaust airflow requiring redirection greater than 45°.

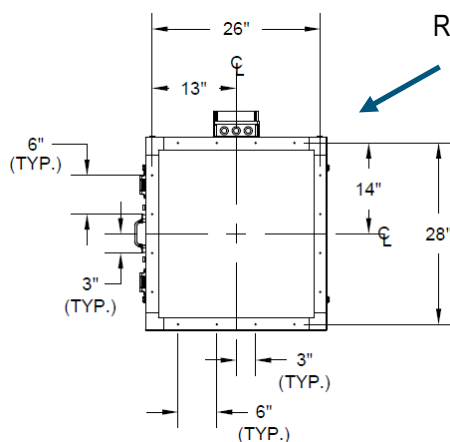
DUCTWORK CONNECTION

If a ductwork connection is required, please complete the following steps:

1. Ensure system power is OFF before proceeding. If adding ducting to the exhaust end, please follow steps 2 through 4, otherwise skip to step 5.
2. Remove the factory-installed outlet louver by removing fasteners.
3. Reach through the outlet louver opening to remove the internal end panel fasteners.
4. Place the end panel in a secure location for future use.
5. Attach ductwork to the outer perimeter 50mm tubular frame only, using self-drilling metal screws. Do NOT fasten ductwork to corner tubing connectors.
6. It is advised to use a gasketed ductwork connection to prevent air bypass.

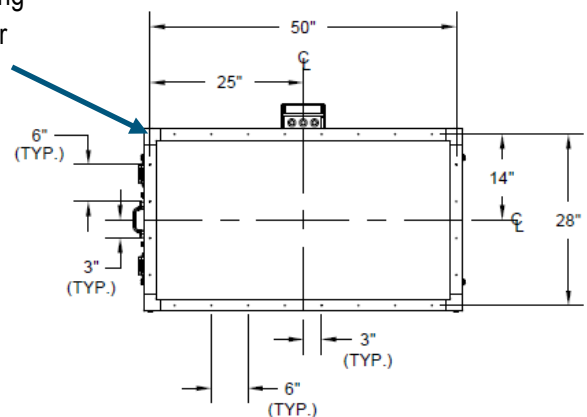


WARNING: Ensure attached ductwork is supported independently of the Horizontal Air Cleaner system.



CCH2000 OUTLET FLANGE DETAIL

Recommended fastener spacing
for ductwork to 50mm tubular
frame connection



CCH4000 OUTLET FLANGE DETAIL

SYSTEM CONTROL SETTINGS

FAN CONTROL PANEL ACCESS

Note: Opening this access door will release the safety switch and the fan motor will power OFF.

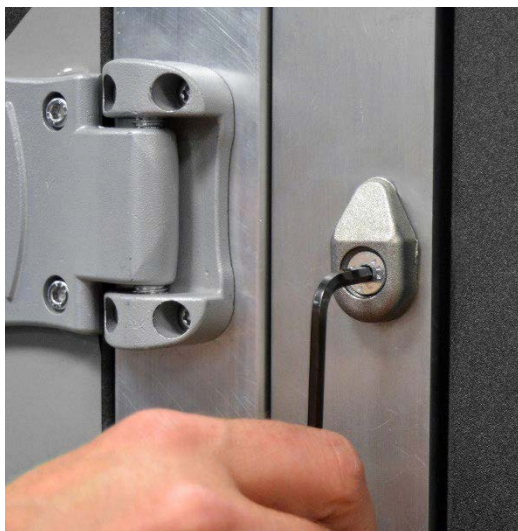
1. Use a 4mm hex key to loosen the two panel stops and rotate them 90° to release the fan door panel.
2. Swing open the fan door panel to gain access.
3. Reverse steps to fasten fan door panel closed.



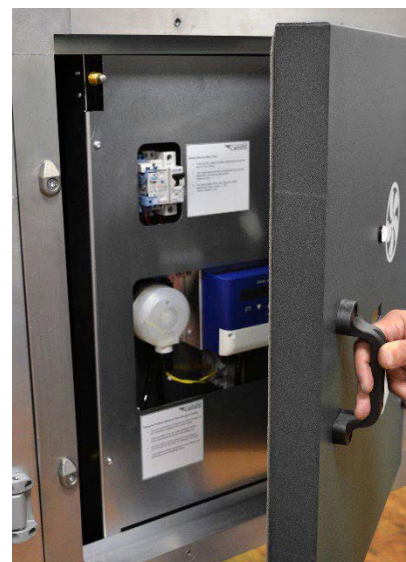
1 Locate Fan
Control Access Panel



2 Loosen Panel
Stops with Hex Key



3
Rotate Panel Stops to Open Position



4
Pull Open Access Panel

SETTING THE START-UP DELAY TIMER



View of Start-up Delay Timer

If multiple Horizontal Air Cleaners are installed in the same circuit, sequential starting is available. To set the delayed start-up sequence, each Horizontal Air Cleaner must be set up. Set up instructions:

1. Use a small flat blade screwdriver to adjust timer relay (left).
2. Timer function setting (bottom adjustment) should be set to display AI (on delay) in the window.
3. The range should be set to encompass the required delay time (2s, 20s, 2m, 20m, 2h, 24h). It is the top adjustment. Factory default is 20 seconds.
4. The actual delay time is set using the center adjustment (Blue timing trimmer). Range is 1 – 20 seconds). Factory default is 10 seconds.



AIRFLOW SETTING/PROGRAMMING INSTRUCTIONS

General information related to the controller operation. The following table illustrates the functional control buttons:

- | | |
|-------|--|
| P | Program key and open menu |
| ▼ | Menu selection, reduce value |
| ▲ | Menu selection, increase value |
| ▼ + ▲ | ESC-key combination, Escape = leave menu |
1. With unit in run mode showing "#### cfm" on line 1 and qV" on line 2 (normal display), press Esc (▼ + ▲ simultaneously).
 2. Unit will display "INFO". Press ▼ and "SETTING" will appear.
 3. Press P to show "#### cfm Setpoint 1".
 4. Press P again and "#### cfm" will begin to flash.
 5. Adjust the setpoint using the ▼ ▲ buttons.
 6. Press P again and numbers will stop flashing and the setpoint will be recorded into memory.
 7. Press Esc (▼ + ▲ simultaneously) and the display will show "SETTING".
 8. Press ▲ to show "INFO" and then P to return to run mode (actual flow).



View of Airflow Controller

FACTORY DEFAULT SETTINGS



WARNING: The following settings are used by Terra Universal to set up your Horizontal Air Cleaner for proper operation. The Owner is encouraged to avoid performing other Controller adjustments. Failure to do so may result in unsatisfactory operation or damage to your Horizontal Air Cleaner which may void the warranty.

Parameter	Description	CC2000H	CC4000H
Setting*			
Mode	Flow control with display	5.01	5.01
Setpoint 1	Default flow setting	2000 CFM	4000 CFM
Setpoint 2 (inactive)	Default flow setting	1500 CFM	3000 CFM
Pband	Adjusts stability	1500 CFM	3000 CFM
Min Uout	Minimum output voltage	0.0 V	0.0 V
Max Uout	Maximum output voltage	10.0 V	10.0 V
Base**			
Units	Units of measure	inch	inch
Measuring range	Pressure range	0 – 8.0 in.wg	0 – 8.0 in.wg
K-Factor	Flow correction factor	883	1830
Autozero	Zeroes sensor during setup	On	On
Offset	Allows offset to be programmed	0.000 in.wg	0.000 in.wg
* "Setting" parameters may be adjusted by customer to set airflow preferences.			
** "Base" parameters will likely never be accessed by customer. Parameters are listed for reference.			

INSTRUCTIONS FOR SETTING THE DIFFERENTIAL PRESSURE FOR FILTER CHANGEOUT INDICATION

1. Turn off control power by moving the Selector switch to the OFF position on the 24VAC breaker (indicator arrow shows green).
2. Remove switch cover by loosening single Phillips screw and pulling translucent cover straight out.
3. Use the knob to set the desired differential pressure (at red indicator) set point.
4. Once desired filter change-out differential pressure is set, replace the translucent cover, and tighten screw.

Note: Factory default setting for pressure switch is 2.0" w.g.



PRESSURE SETTING RECOMMENDATIONS BASED ON FILTER CONFIGURATION

Use the table to determine the recommended total system final pressure drop based on your filter combination.

Filters	Clean ΔP (in.w.g.)	Final ΔP (in.w.g.)	Selected final ΔPs (in.w.g.)
Prefilter pleats:			
30/30 24X24X2	0.31	1.00	
30/30 D9 24X24X2	0.30	1.00	
Bag filters:			
HFESMV11/24/24/22/L10-2L-CC Hiflo ES	0.28	1.00	
HFESMV11/24/24/30/L10-2L-CC Hiflo ES	0.26	1.00	
HFESMV13/24/24/22/L10-2L-CC Hiflo ES	0.40	1.00	
HFESMV13/24/24/30/L10-2L-CC Hiflo ES	0.34	1.00	
HFESMV14/24/24/22/L10-2L-CC Hiflo ES	0.45	1.00	
HFESMV14/24/24/30/L10-2L-CC Hiflo ES	0.41	1.00	
Cartridge filters:			
DU4V-ES-2424-MV13 Durafil	0.25	1.50	
DU4V-ES-2424-MV14 Durafil	0.27	1.50	
VGHF13-592x592x292-0/21 HEPA	1.14	2.00	
Molecular filters:			
HFZS-242421-10-85 Cityflo	0.56	1.50	
CFMV13/24/24/22/L10-2L-CC Cityflo XL	0.40	1.50	
CIZP-7I-242412-4V-21-00 CityCarb	0.52	1.50	
CC-CG26 CamCarb cylinders	0.63	0.63	
CC-CG35 CamCarb cylinders	0.59	0.59	
Dusting filters:			
30/30 24X24X4	0.27	1.00	
30/30 D9 24X24X4	0.27	1.00	
OPMV14 24X24X4 Optipac	0.60	1.00	
Oil mist prefilter:			
23.38x23.38x1.875 metal mesh oil mist filter	0.25	0.50	
			=
Add final pressure drops of selected filters and enter here>>>			
Set filter pressure sensor switch to this value. If pressure drop sum exceeds 4.0 in.w.g., set switch to maximum of 4.0 in.w.g.			
*NOTE: Factory default pressure switch setting is 2.0 in.w.g.			

OPERATING YOUR Horizontal Air Cleaner

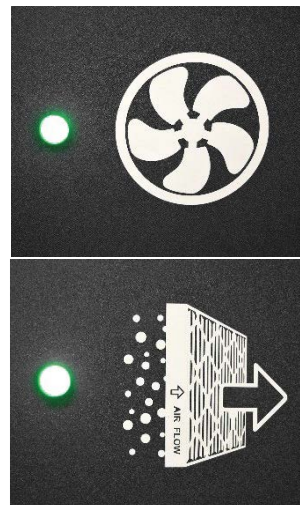
INDICATOR LIGHTS

FAN INDICATOR LIGHT

Indicates fan status by displaying a green LED for power ON, and a red LED for a fault condition present (See appendix for fault explanations). Upon powering on system, the LED will momentarily illuminate red before illuminating green to indicate power and proper function.

FILTER INDICATOR LIGHT

Indicates filter status by displaying a green LED indicating a proper operating condition, and a yellow LED indicating filter needs servicing. The yellow LED will illuminate once filter pressure drop exceeds the pressure differential setpoint. This indicates the filters are “spent” and need to be replaced with new filters as soon as possible. The filter service LED setting is controlled by the field adjustable pressure switch – please see “SYSTEM CONTROL SETTINGS” section of this manual for further explanation.



Safety Instructions



FILTER INSTALLATION

Warning: Do not install or replace filters when system is powered ON. Do not operate without the proper filters installed.

The system is designed to accommodate several filter combinations depending on your application.

FILTER MODULE CONFIGURATIONS

2" TRACK	FIRST 1" HEADER TRACK	SECOND 1" HEADER TRACK
None	22" or 30" Bag Filter	None
2" Prefilter	12" Deep Filter Cartridge	None
2" Prefilter	12" Deep Filter Cartridge	Up to 12" Deep Filter Cartridge
None	Up to 22" Deep Bag Filter	Up to 12" Deep Filter Cartridge

CYLINDER MODULE CONFIGURATIONS

CYLINDER TRACK	DOWNSTREAM FILTER TRACK	
Up to 24" Long Cylinders	4" Deep Dusting Filter Track	
Up to 18" Long Cylinders	1" Deep Header Track	

PREFILTER INSTALLATION

Note: Only use nominal 2" depth frame prefilters.

1. Ensure system is powered OFF.
2. Locate the filter module and open its access door using handles.
3. Locate 2" wide extrusion track on upstream side of module and push to slide the 2" prefilter into both top and bottom tracks.
4. Close the filter module access door and secure door handles.
5. Reverse steps for removing prefilter. Do not remove prefilter while system is powered and in operation.

When using prefilters in a CCH4000, a quantity of (2) prefilters are required.

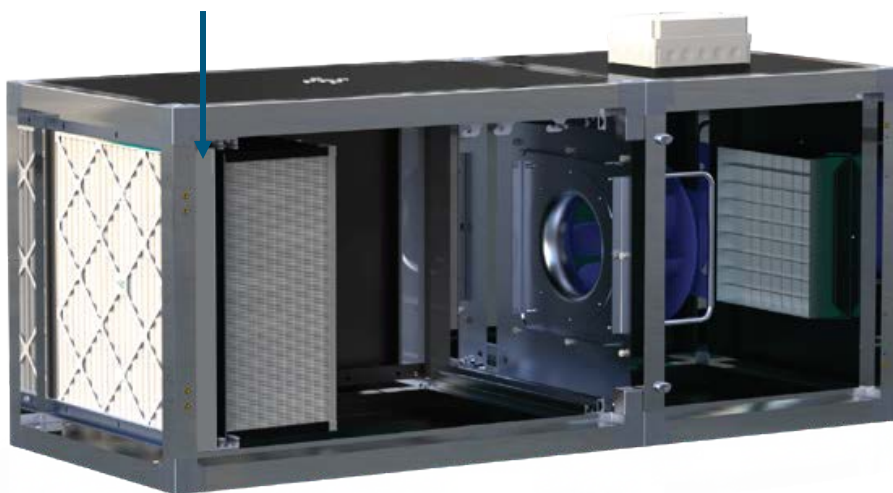
Ensure System is Powered OFF

This section considers installation and exchange of filters for your Horizontal Air Cleaner. To accomplish this, the power supply breaker with a lock-out feature is recommended. Alternatively, an appropriately sized disconnect switch (not supplied) may be installed for local control.



Insert Prefilter
into Tracks

→
Prefilter
Installed



OIL MIST / MOISTURE SEPARATOR (OPTIONAL) INSTALLATION*

1. Ensure system is powered OFF.
2. Locate the filter module and open access door using handles.
3. Locate 2" wide extrusion track on upstream side of module and push to slide the 2" oil mist or moisture separator into both top and bottom tracks.
4. Close the filter module access door and secure door handles.
5. Reverse steps for removing oil mist or moisture separator. Do not remove filter while system is powered ON and in operation.

When using oil mist or moisture separator in a CCH4000, a quantity of (2) oil mist or moisture separators are required. The supplied Oil Mist Eliminator filter is specially designed to work with your Horizontal Air Cleaner. The Oil Mist Eliminator is washable. It is recommended that this filter be cleaned every three (3) months (or more frequently depending on the oil mist load). To wash this filter, please use the following steps:

1. Remove the filter by following the steps above.
2. Wash the filter element with water and a heavy degreaser solution (e.g. Simple Green ®).
3. Thoroughly the element before placing in storage your service as the galvanized frame may rust.
4. Replace the filter as noted in Step 5 (above)

Terra Universal recommends that you have a full replacement set of filters on hand. You can exchange filters using your spare set. Once removed, you can put your Horizontal Air Cleaner back in service quickly and wash the dirty filters before replacing them at the next service interval.

(Note - inset prefilter install pictures above are applicable to oil mist and moisture separator install.)

* Note: Oil Mist Collection is an optional kit. Filters used for this optional kit are special. See oil mist accessories, found in the option equipment sales drawing, that are required when using the oil mist or moisture separator.

HOW TO SERVICE THE COLLECTED OIL MIST

1. Locate the Oil Mist Bottle under your Horizontal Air Cleaner.
2. The Oil Mist Collection Bottle is removed by turning the bottle counter-clockwise.
3. Empty the collected oil into an approved disposal container.
4. Replace the bottle by turning the bottle clockwise into the female threaded flange.

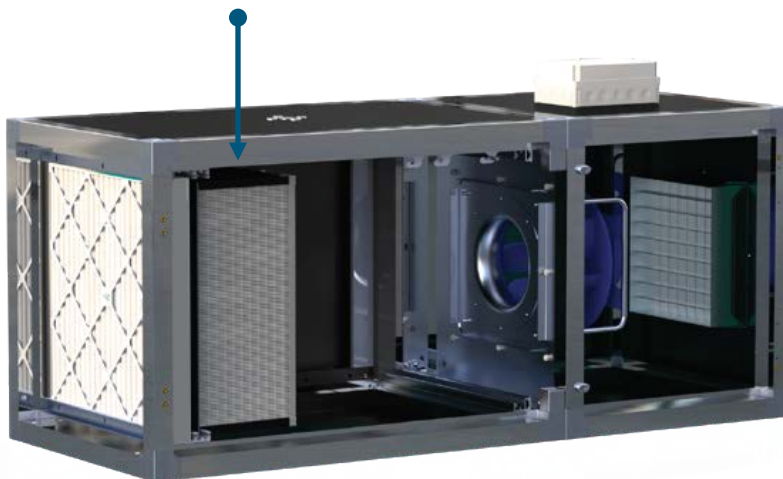
HEADERED FILTER INSTALLATION

Headered Rigid Filter Installation (e.g. Absolute VG-HF V-Bank, Durafil)

1. Ensure system is powered OFF.
2. Locate the filter module and open access door using handles.
3. The rigid filter can be installed in either the upstream or downstream 1" wide extrusion header track. Locate the 1" wide extrusion header track where rigid filter is to be installed and push to slide the header portion of the rigid filter into both top and bottom tracks.
4. Close the filter module access door and secure door handles.
5. Reverse steps for removing the rigid filter. Do not remove rigid filter while system is powered and in operation. Insert Filter into Tracks Filter Installed



When using rigid filters in a CCH4000, a quantity of (2) rigid filters are required.



GETTING THE MOST FROM YOUR Horizontal Air Cleaner

The Terra Universal Horizontal Air Cleaner is the best-in-class air cleaner on the market. It was specifically designed to operate with Terra Universal 5-Star filter products. To prevent poor performance, always replace spent filters with the same filters that came with your Horizontal Air Cleaner. Never use other filters (even other Terra Universal filters) without contacting Terra Universal Customer Service (Info@terrauniversal) to determine if performance may be compromised.

Headered Bag Filter Installation

1. Ensure system is powered OFF.
2. Locate the filter module and open access door using handles.
3. Locate the 1" wide extrusion header track on upstream side of module and push to slide the header portion of the bag filter into both top and bottom tracks.
4. Locate the support rod hanging in the top the module and remove from hanging supports.
5. Thread the support rod through all loops located on the top rear of the bag filter.
6. Insert support rod into corresponding hole located on the top of the back panel.
7. Place the support rod back into the appropriate hanging support hook, based on bag filter depth.
8. Close the filter module access door and secure door handles.
9. Reverse steps for removing the bag filter. Do not remove the bag filter while system is powered ON and in operation.

When using bag filters in a CCH4000, a quantity of (2) bag filters are required.



1

Install Filter into Tracks



2

Thread Support Rod
Through All Loops



3

Place Support Rod on
Hanging Supports



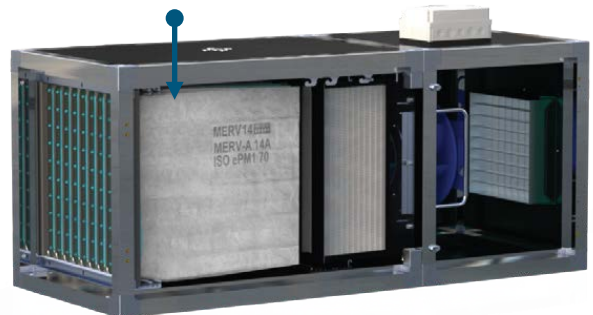
4

Ensure Support Rod
Threads Through All Loops



5

Filter Installed



CYLINDER FILTER INSTALLATION

1. Ensure system is powered OFF.
 2. Locate the cylinder module and open access door using handles.
 3. Locate the cylinder holding frame on the upstream side of the cylinder module.
 4. Insert cylinders into the holding frame starting with the back row. The CCH4000 has access doors installed on both sides and is required for cylinder installation due to depth of system.
- Caution:** When reaching into your Horizontal Air Cleaner **NEVER** place your weight onto the bottom pan.
5. Cylinders have three stainless steel bayonet stubs that are inserted into the holding frame and secure the cylinders into place.
 6. Align bayonet stubs with circular holes in holding frame and push gasket against holding frame.
 7. While pushing gasket against holding frame, manually rotate the cylinder in a clockwise motion approximately $\frac{1}{2}$ " to secure into place – if cylinder fails to fully engage, use a 24mm socket or Terra Universal Filter cylinder installation tool (sold separately).
 8. Repeat steps for the remaining canisters until all holding frame slots are filled.
 9. Close the cylinder module access door and secure door handles.
 10. Reverse steps for removing the cylinder filters. Do not remove cylinder filters while system is powered ON.



1

Identify SST Bayonet Stubs



2

Identify Holding Frame Mount



3

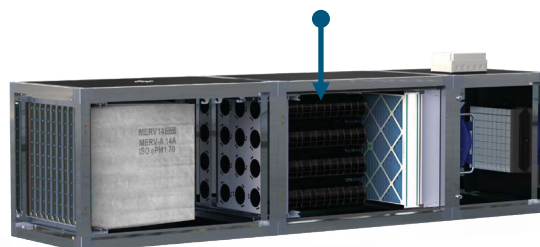
Insert Cylinder and Firmly Press
Against Holding Frame


4

Manually Rotate Cylinder
Clockwise to Secure into Place


5

Cylinder Filters Installed



Post Filter Installation

Note: Only use nominal 4" depth frame post filters.

1. Ensure system is powered OFF.
2. Locate the cylinder module and open access door using handles.
3. Locate 4" wide extrusion track on downstream side of module and push to slide the 4" post filter into both top and bottom tracks.
4. Close the filter module access door and secure door handles.
5. Reverse steps for removing post filter. Do not remove post filter while system is powered ON and in operation.

When using post filters in a CCH4000, a quantity of (2) post filters are required.



Insert Post Filter into Tracks



Filter Installed



STANDARD FEATURES

TIME DELAY RELAY FOR START-UP

Fan start delay timer permits staggered start of multiple units. Refer to the "SYSTEM CONTROL SETTINGS" section of this manual for directions on how to set/adjust.

EC MOTORIZED IMPELLER FANS

Fan is a backward curved impeller fan with an electronically communicated (EC) motor. EC motor offers low power consumption, quiet operation and easy servicing. Fan is capable of maintaining a minimum of 4" w.g. pressure at rated flow.

FAN SAFETY SHUT-OFF

When the system is operating, and the motor module access door is opened, the fan motor will automatically power OFF as a built-in safety function. NOTE: Backside access panel does not contain a safety shut-off. Take extra precaution to ensure system is powered off prior to opening backside access panel.

ADJUSTABLE PRE-SET DIGITAL SPEED CONTROL

Allows real-time flow adjustment based on specific application. Measures airflow and maintains the required flow setpoint over the life of the filters. This allows for a consistent flow as filters load with no need for adjustment. Digital readout indicating actual flow is visible through the fan module access door viewing window. Refer to the "SYSTEM CONTROL SETTINGS" section of this manual for directions on how to set/adjust flow controller.

ADJUSTABLE PRESSURE SWITCH

Allows for the user to adjust the filter pressure switch to indicate when filter servicing/changeout is needed. Use a medium-sized Phillips screwdriver to access pressure switch adjustment. Refer to the "SYSTEM CONTROL SETTINGS" section of this manual for directions on how to set/adjust.

EASY ACCESS SECURE DOOR HANDLES AND PANEL CLAMP STOPS

Filter and cylinder modules are equipped with easy-to-use secure door handles that allow access to inside modules without the need for a tool, yet also provides a secure panel closure. Secure panel clamp stops are provided on the motor module and can be operated using a 4mm hex key (furnished in the assembly kit) to loosen the (2) panel stops and rotate them 90° to release the door panel.



OPTIONAL EQUIPMENT

OIL MIST ACCESSORIES

Oil Drain Kit (part number M21K00008): Includes P-trap, collection bottle and flange/gasket/hardware. Kit is to be used to convert your Horizontal Air Cleaner to capture oil mist or moisture into a specially designed mist eliminator in the filter module. Refer to “System Installation and Preparation” section of this manual for kit installation instructions.

SILENCING ACCESSORIES

Silencing options are available if needed. Please see a Terra Universal sales representative, contact Terra Universal at 252-975-1141, or send an email to Info@TerraUniversal.com for further information.

ADJUSTABLE FEET

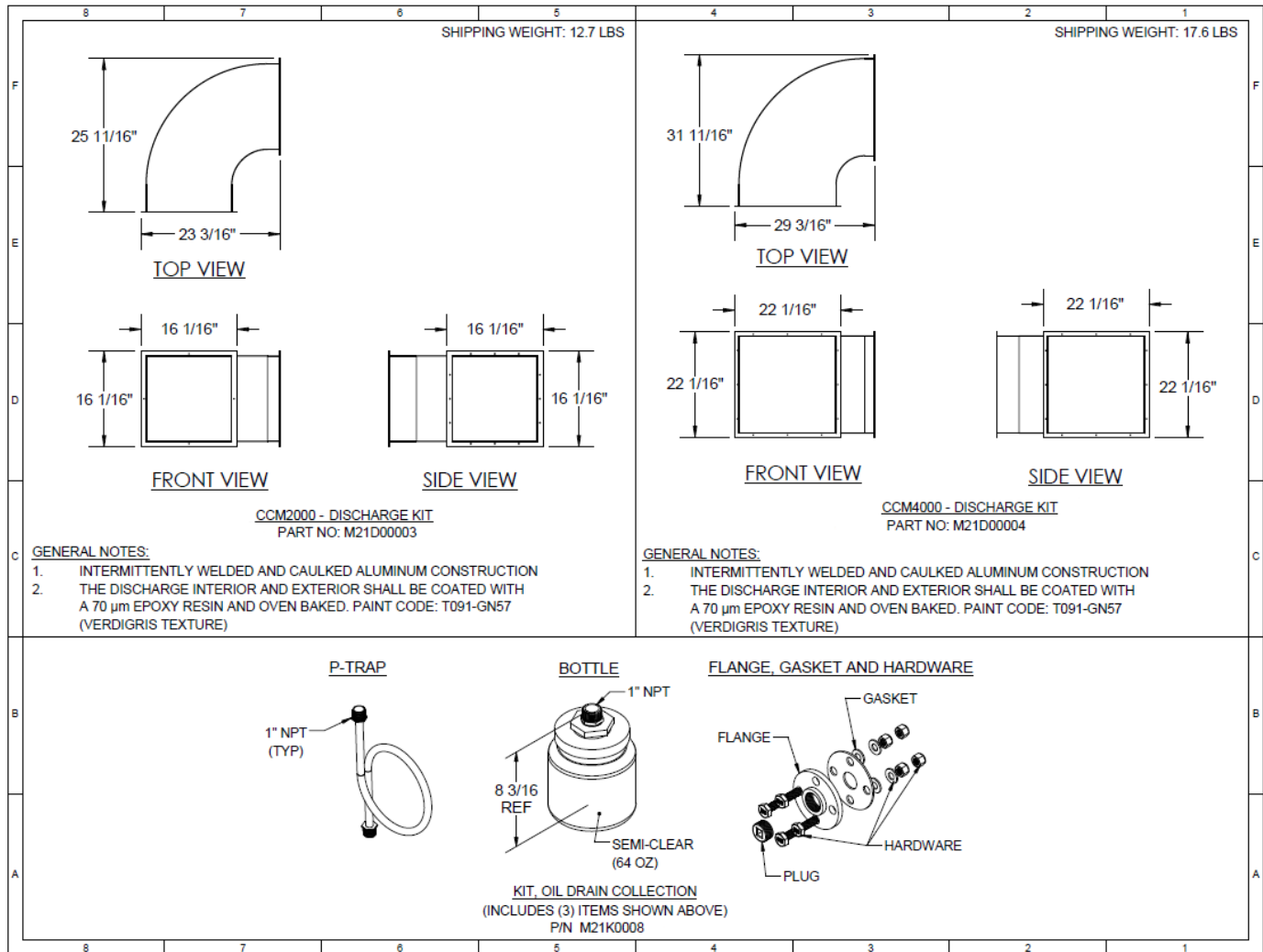
In lieu of suspension by hanging rods or eye-bolts, the system can be supported by adjustable feet (part number M21K00002 - 4 EA per kit) when placed on a level, structurally-sound platform. If footpads are required to be fastened down, use the mountable foot pad kit (part number M21K00011 - 4 EA per kit). The location of adjustable feet placement on the system is the same as the suspension rods and are located on the bottom of the unit.



90° DIRECTIONAL OUTLET

If directional discharge greater than 45° is required, part number M21K00012 is available for the CCH2000 and part number M21K00013 is available for the CCH4000. The directional outlet can be mounted for discharge in (4) different orientations - 90° up, down, left or right. Remove supplied outlet louver by removing fasteners. Fasten directional outlet using supplied fastener kit and reattach louver to directional outlet.

OPTIONAL EQUIPMENT SALES DRAWING



PERIODIC MAINTENANCE INSPECTIONS

Proper maintenance of the Horizontal Air Cleaner system is vital for proper operation and extended life of the system. To maintain optimum performance, it is necessary to replace filters when the performance no longer meets the required specification. To determine when filter change-out is required, the Horizontal Air Cleaner system is equipped with a filter indicator light that will illuminate a “yellow” LED color (indicating filters meet or exceed the differential pressure set point). Follow these guidelines for your system to perform at optimal operation.

1. Filters: When the pressure drop across the filters exceeds the pressure drop set point, the filter indicator light will illuminate a yellow LED. Disconnect power and refer to the “FILTER INSTALLATION” section of this manual for proper filter replacement and installation. Refer to the “SYSTEM CONTROL SETTINGS” section of this manual for instructions on setting the pressure switch. Refer to the table in for guidelines on how to determine recommended dirty pressure drops based on your specific filter configuration.
2. System:
The system should be periodically inspected, and routine maintenance checks and/or other planned surveillance should be conducted. Check each system for loose and/or damaged suspension hardware connections. Ensure indicator LEDs and digital airflow readouts are properly working and illuminated. Inspect the outlet louver for any dust, debris and/or obstruction. When using oil mist filter assembly, periodically inspect for proper drainage and unobstructed drain piping.

When placing an order for replacement filters, provide Terra Universal with the serial number, part number and housing model number. **The needed information can be found on the system module label located on the inside door panel of each module.** Refer to contact information below:

Terra Universal, Inc.
800 Raymond Ave.
Fullerton, CA 92831

Phone: (714) 578-6000
Email: Infor@terrauniversal.com

RECOMMENDED SPARE PARTS LIST

SPARE PARTS	
CF PART NO.	DESCRIPTION
M35003720	MOTOR MODULE ALUMINUM PANEL STOP ASSEMBLY
M35003721	MODULE CONNECTOR KIT (MALE, FEMALE, BOLT, NUT)
M32001269	1/8" x 1/2" BUNA-N ADHESIVE BACK GASKET (MODULE & DOOR)
M34003388	10A TIME DELAY FUSE (FOR ALL CCH UNITS DRAWING <10A)
M34003427	15A TIME DELAY FUSE (FOR CCH4000 200-240VAC/3PH)
M34003428	1A GLASS-TUBE FAST-ACTING FUSE (FOR 24VDC POWER SUPPLY)
M34003429	3A GLASS-TUBE FAST-ACTING FUSE (FOR 5VDC POWER SUPPLY)

TROUBLESHOOTING

TROUBLE SHOOTING		
SYMPTOM	POTENTIAL CAUSE	POTENTIAL SOLUTION
FILTER INDICATOR LIGHT IS YELLOW	FILTER DIFFERENTIAL SET POINT REACHED	IF FILTER IS DIRTY, REPLACE FILTER IF FILTER IS CLEAN, → CHECK THAT SETPOINT IS NOT SET BELOW CLEAN OPERATION DIFFERENTIAL PRESSURE → CHECK THAT PRESSURE LINES TO DIFFERENTIAL PRESSURE SWITCH ARE CONNECTED → CHECK THAT PRESSURE LINES AT STATIC TAPS ARE NOT UNPLUGGED
FAN INDICATOR LIGHT IS FLASHING RED	FAN MOTOR ERROR	REFER TO FAN MOTOR FAULTS KEY IN APPENDIX
FILTER/FAN INDICATOR LIGHTS NOT WORKING	5V POWER SUPPLY NOT WORKING	CHECK/REPLACE 3A FUSE (P/N M34003429)
CONTROL SYSTEMS NOT OPERATING	NO POWER TO CONTROLS	CHECK 24VAC CIRCUIT BREAKER ON PANEL; CHECK CIRCUIT BREAKER ON 24VAC TRANSFORMER
AIRFLOW BELOW SET POINT	EXCESS FAN STATIC PRESSURE	→ IF FILTER INDICATOR LIGHT IS ILLUMINATED, SEE TROUBLESHOOTING ABOVE → IF FILTER INDICATOR LIGHT IS NOT ILLUMINATED, CHECK FOR INLET AND OUTLET OBSTRUCTIONS
OIL NOT DRAINING	→ OIL COLLECTION BOTTLE IS FULL → OIL DRAIN IS PLUGGED → P-TRAP IS PLUGGED	→ EMPTY OIL COLLECTION BOTTLE → UNCLOG DRAIN → UNCLOG P-TRAP

FAN MOTOR FAULTS - KEY		
LED RED LASHES*	FAN STATUS INDICATOR	CAUSE
RED	SOLID RED	LINE VOLTAGE PROBLEM
GREEN	SOLID GREEN	NORMAL OPERATION WITHOUT FAULT
1 x	ONE RED FLASH	ENABLE CIRCUIT NOT COMPLETE
2 x	TWO RED FLASHES	TEMPERATURE MANAGEMENT ACTIVE
3 x	THREE RED FLASHES	HALL-IC ERROR
4 x	FOUR RED FLASHES	LINE FAILURE (ONLY FOR 3-PHASE MOTORS)
5 x	FIVE RED FLASHES	MOTOR BLOCKED
6 x	SIX RED FLASHES	IGBT FAULT - SHORT CIRCUIT
7 x	SEVEN RED FLASHES	UNDERVOLTAGE ERROR (DC)
8 x	EIGHT RED FLASHES	OVERVOLTAGE ERROR (DC)
9 x	NINE RED FLASHES	IGBT COOLING DOWN PERIOD
11 x	ELEVEN RED FLASHES	ERROR MOTOR START
12 x	TWELVE RED FLASHES	LINE VOLTAGE TOO LOW
13 x	THIRTEEN RED FLASHES	LINE VOLTAGE TOO HIGH
14 x	FOURTEEN RED FLASHES	ERROR PEAK CURRENT
17 x	SEVENTEEN RED FLASHES	TEMPERATURE ALARM

* CONSECUTIVE UNINTERRUPTED LED FLASHES

LED flashes may also be observed on the fan motor housing viewable through the outlet louver.