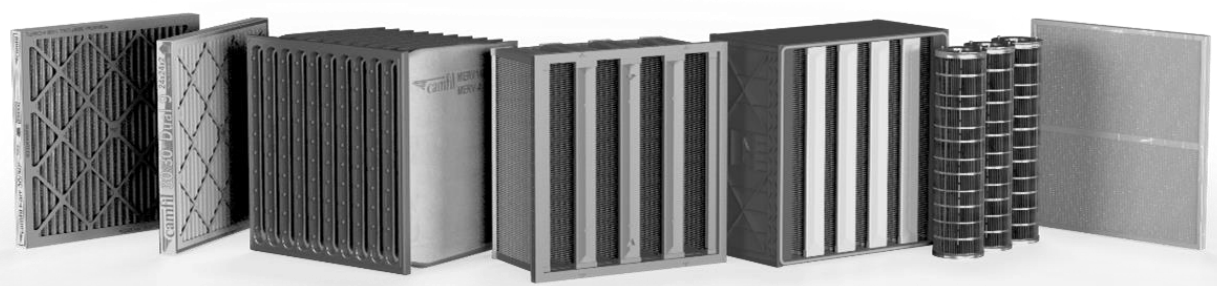




Installation, Operation, and Maintenance Manual CamCleaner Horizontal System





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Table of Contents

Product Information	3
Usage, Safety, Technical, Assembly Tools, Shipped Loose Components	3
System Installation	4
System Image	4
System Layout	5
System Installation and Preparation: Module Connections	5
Module Security Straps	6
Optional 90° Directional Discharge Outlet	6
System Suspension Hanging Points	6
Optional Oil Mist Kits	9
Power Requirements	10
Power Inlet Location	11
Field Wiring Schematics	12
Outlet Louver Setup	14
System Control Settings	15
Fan Control Access Panel	15
Setting the Start Up Delay Timer	15
Air Flow Setting/Programming Instructions	16
Factory Default Settings	16
Setting the Differential Pressure for Filter Changeout Indication	16
Pressure Setting Recommendations Based on Filter Configuration	17
Operating Your CamCleaner	18
Indicator Lights	18
Filter Installation	18
Standard Features	23
Spare Parts List	23
Optional Equipment	24
Maintenance Inspection	25
Warranty & Product Registration	25
Troubleshooting	26
Contact Information	28

Disclaimer

Camfil is committed to providing air filtration products which meet or exceed our customer's expectations. We are dedicated to a corporate-wide policy of continual improvements as a means of ensuring our leadership position in the air filtration marketplace. Before proceeding with installation, operation, or maintenance, review manual and all safety procedures with your company's safety personnel.

Usage

The CamCleaner Horizontal 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. Camfil CamCarb cylinders are an optional stage of filtration to control molecular contaminants.

Safety Instructions

All safety and health protection decrees must be abided. Prior to installation, operation or maintenance, review this Manual and all safety procedures with your company's safety personnel. Incorporate your safety personnel's amendments so that you have the entire process in mind before beginning.

Any attempt to repair a CamCleaner product may result in personal injury and/or property damage. Camfil cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

WARNING: During installation, servicing, and troubleshooting, 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 injury.

Caution: Never drill or grind through, weld to, or otherwise penetrate the interior or exterior of the filtration system.

Recommended Placement

Do not install a CamCleaner 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. See page 5 for optimal placement criteria.

Tools Required for Assembly

Your CamCleaner requires field assembly prior to installation. We estimate 1-2 hours and two persons to properly assemble each CamCleaner system. The heaviest piece 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 the CamCleaner to your facility's electrical system should be performed by a licensed electrician. Contact Customer Service at 252.975.1141 or Sales-WA@camfil.com for assembly or installation questions.

Shipped Loose Components

If you are missing items, contact Sales-WA@camfil.com.

These parts are in the Assembly Packet (shipped inside the Type M (Motor/Fan) module)	Common Tools Needed to Assemble Your CamCleaner
<ul style="list-style-type: none"> • (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 	<ul style="list-style-type: none"> • 6mm hex wrench • Small instrument flat blade screwdriver <p>Camfil tools that would be helpful:</p> <ul style="list-style-type: none"> • 24mm CamCarb cylinder wrench (needed for carbon cylinder installation and service)

Technical Data

CamCleaners are available in multiple configurations. Reference data sheet or submittal drawings for more information.

Note: To prevent shortening its service life, the CamCleaner 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.

Warranty

See page 25 for product warranty and registration.

Unpacking Instructions

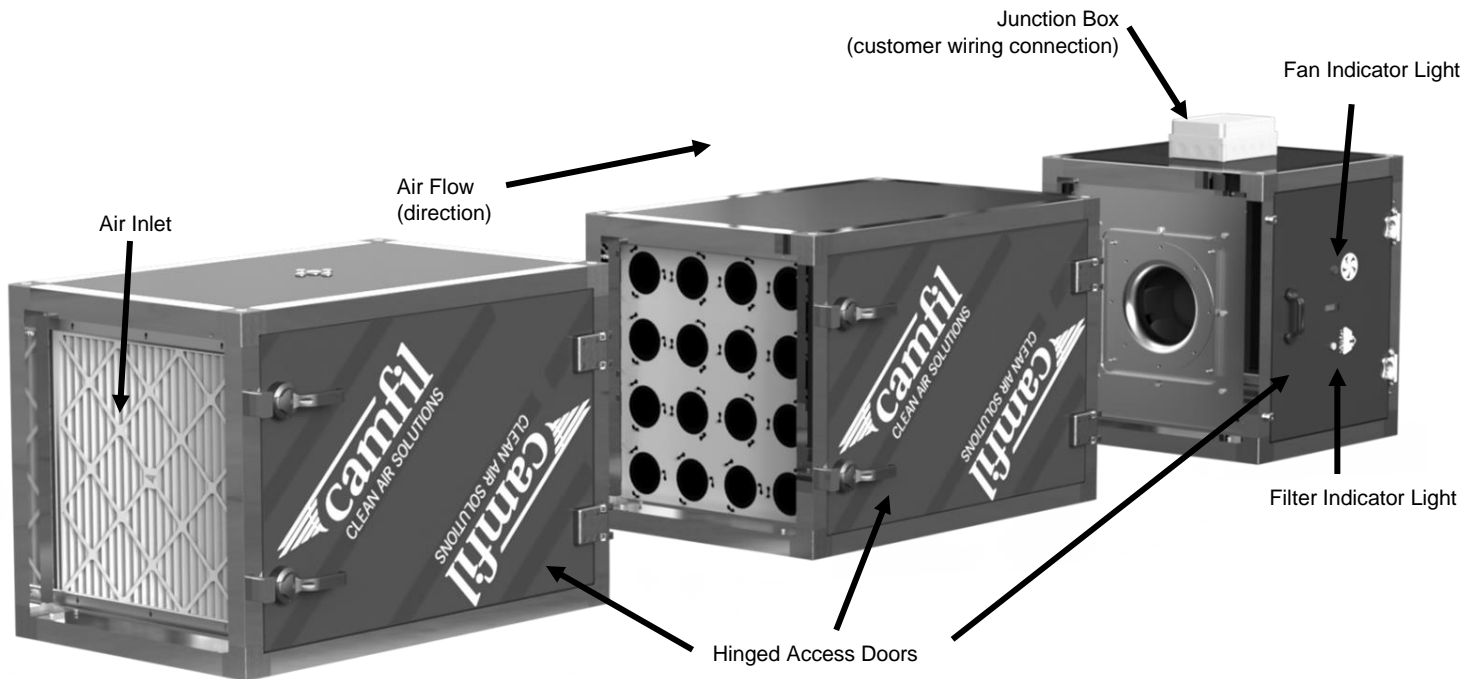
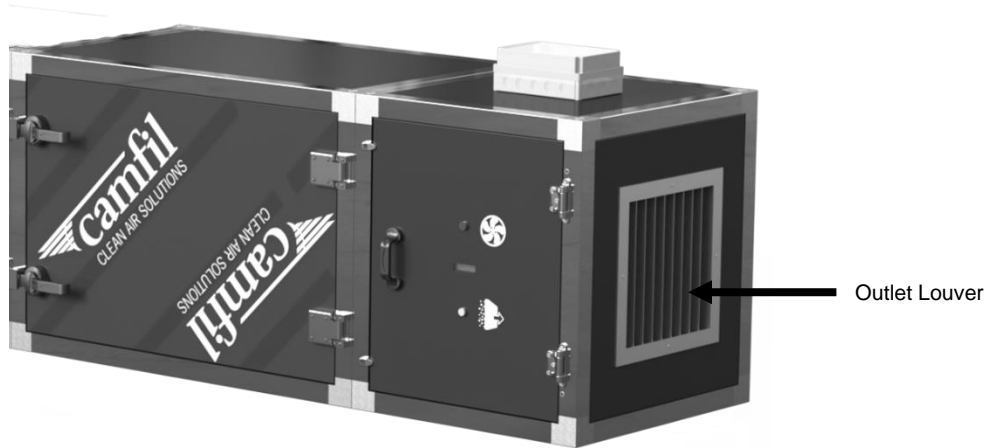
Remove the CamCleaner from the packaging. Check the system for visible damages and locate the shipped loose components (in Type M Motor/Fan module). If there is visible damage, inform your supervisor.

Filter Disposal

There are no general rules for recycling of used filters. Different rules exist on the local level in all countries. Contact your Safety Officer for the filter disposal policy in your company's safety manual. Otherwise, contact the recycling company in your district for disposal requirements.

System Installation

System Image



Type F (Filter) Module

Type C (Cylinder) Module

Type M (Motor/Fan) Module

System Layout

Optimal placement is based on two critical factors: (1) maintaining a minimum air change rate, and (2) placement in a proper pattern to continually mix the air and not allow for “dead spots,” where air is not directed to the air inlet. Place equipment where source capture is difficult and particle loading will allow the filters a four month or greater life cycle.

Formula to determine total CFM

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

Key:

L = Length

W = Width

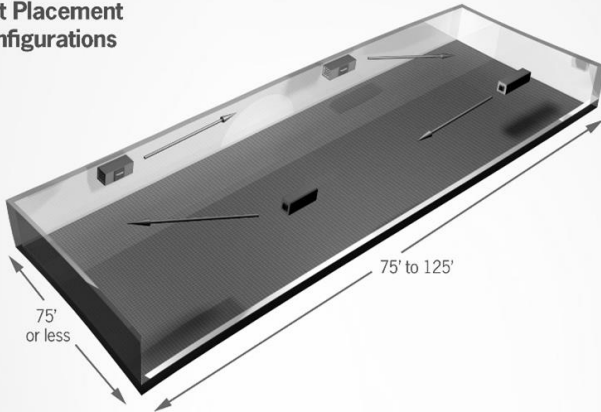
H = Height

AC/Hr = Air changes per hour

60 = Minutes per hour

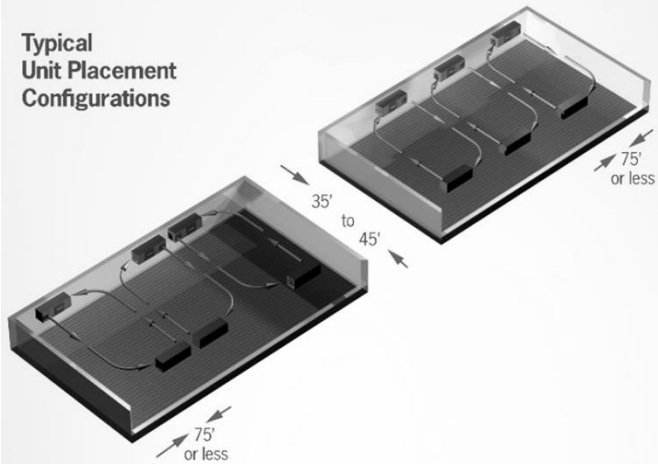
Illustrations of unducted unit placements for a circular air pattern and a cross-bay air pattern

Typical Unit Placement Configurations



Circular Air Pattern

Typical Unit Placement Configurations



Cross-Bay Pattern

Consult a Camfil representative to assist with proper system placement.

System Installation and Preparation

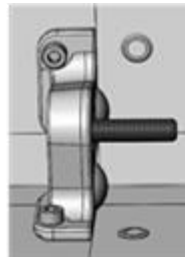
Module Connections

CamCleaner systems are shipped as individual modules ready for assembly. The modules are connected by factory installed connectors located in the corners for CCH2000 with an additional center connector in CCH4000 systems. The module connectors consist of male and female halves, which are self-aligning and secured by a bolt, washer and nut (in assembly packet, see page 3).

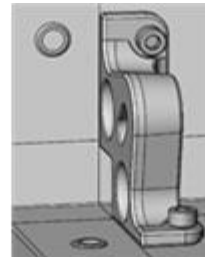
If your CamCleaner is a two module (Type F + M) assembly, connect the Type M (Motor/Fan) module to the Type F (Filter) module as described on page 6.

If your CamCleaner is a three module (Type F + C + M) assembly, connect the Type M (Motor/Fan) module to the Type C (Cylinder) module. The Type F (Filter) module is attached to the Type C (Cylinder) module as described on page 6.

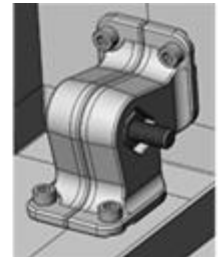
Male Connector



Female Connector



Connected



Connect Modules Together

Properly arrange the modules (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. **Important:** ensure each access door is located on the same side (RH versus LH). For reference, the access door hinges are located on the downstream (e.g. outlet) side of each module.

Locate the assembly kit that includes a bolt, nut, and washer for each module connection.

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.** You may access the module connectors through the access doors or open ends of filter modules.

After all modules are properly connected, firmly tighten each corner fastener.

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

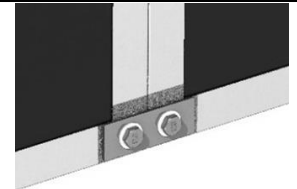
Module security straps are included in the assembly packet for field installation. To install the security strap, follow these steps.

Module Security Strap

After adjoining modules together, install security straps by aligning the metal strap with adjacent holes on the **bottom** of the unit.

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.

A module security strap should be placed at all adjacent bottom corners.



Optional 90° Directional Discharge Outlet Installation

A 90° Directional Discharge Outlet is available if discharge greater than 45° is required. This part can be installed with new CamCleaners or retrofitted after installation and mounted in four different orientations - 90° up, down, left or right.

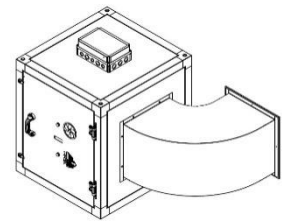
Remove supplied outlet louver by removing its fasteners. (save fasteners for Step 3)

Fasten directional outlet using its supplied fastener kit.

Reattach louver to directional outlet using the saved fasteners.

Part Numbers

CCH2000, M21K00012
CCH4000, M21K00013



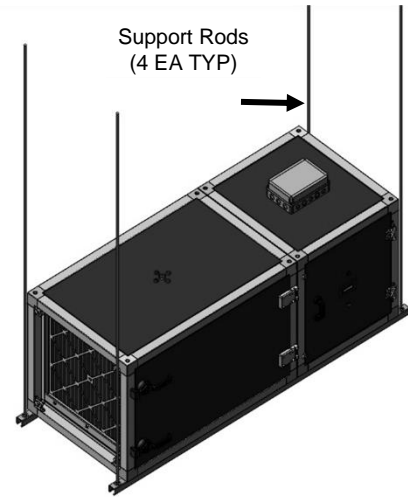
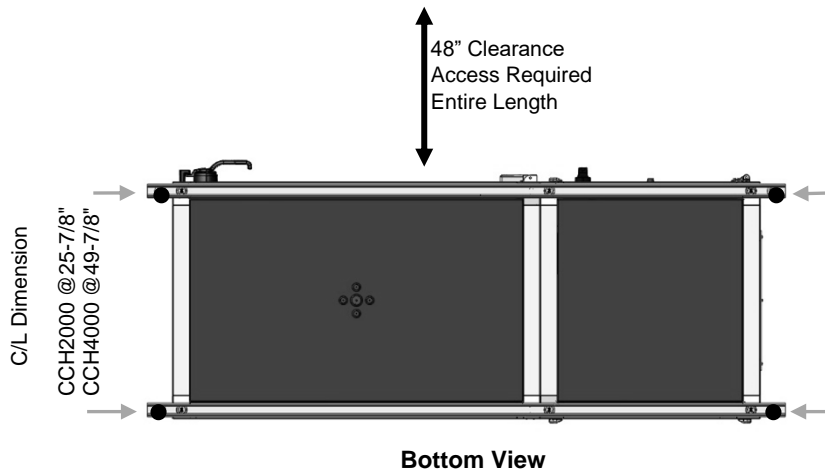
System Suspension Hanging Points

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 1/2-13 UNC x 1-1/2" Grade 8 bolts with washer and lock washer (not included) threaded into the bottom rivet nuts. The CamCleaner assembly may be suspended using Ø1/2" support rods with 1/2-13 UNC threads at each end. The support rods may be fastened with 1/2-13 UNC hex nuts with a jam nut and washer. See illustrations on page 7. For added protection, use eye-bolts in the top rivet nuts, with safety chains/wire connected to building structure overhead (see Direct Threaded Rod Method page 8).

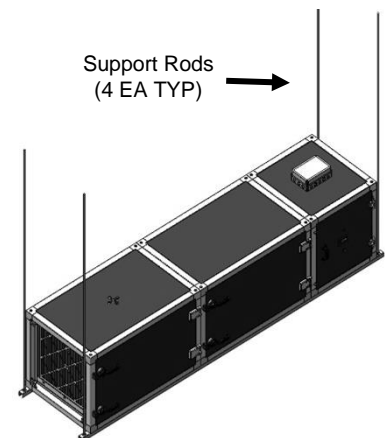
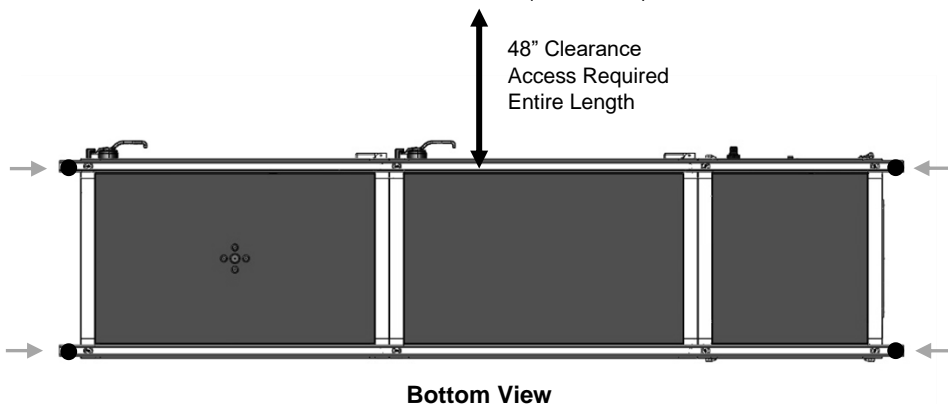
1. Type F (Filter) Module + Type M (Motor) Module

→● = Strut Channel Attachment Point (below unit)



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

→● = Strut Channel Attachment Point (below unit)



Direct Threaded Rod Method

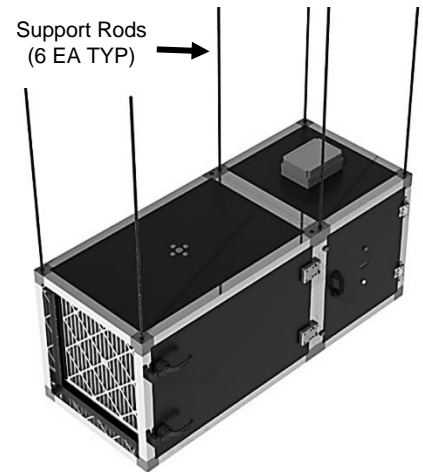
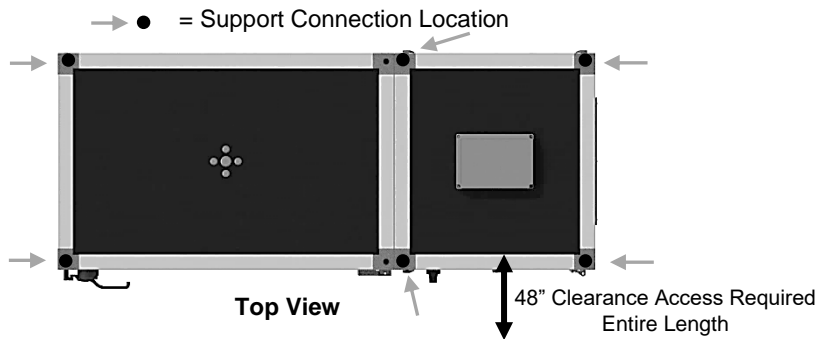
Alternatively, the system is designed to be suspended from the ceiling using 1/2 -13 UNC threaded rod or eye-bolt, threaded into the rivet nuts located at the top corners of the modules. For a Type F (Filter) module and Type M (Motor/Fan) module combination, use four rods or eye-bolts to suspend the 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-bolt with a 1/2 -13 UNC jam nut. Consult local authorities for attaching 1/2 -13 UNC threaded rod or eye-bolts to building/ceiling structure.

Eye-Bolt Install

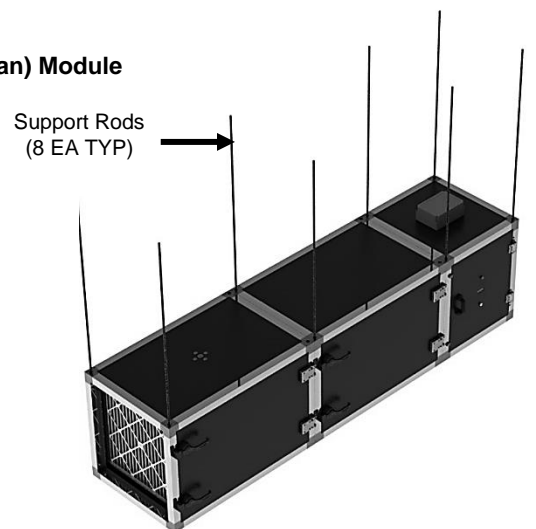
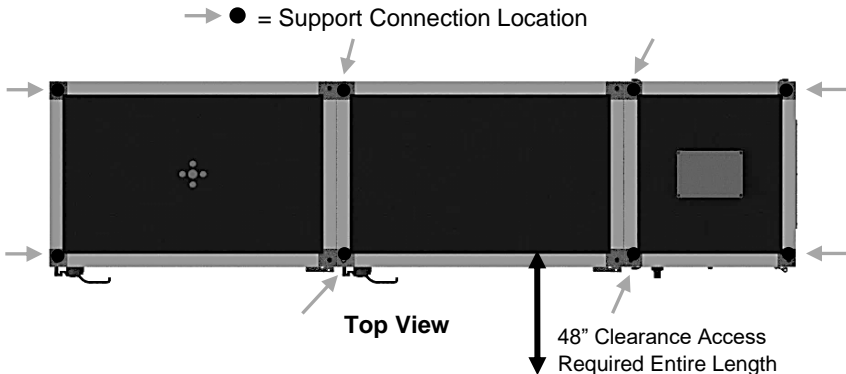


All module corners, top and bottom, have an integrated rivet nut for attaching support or suspension system. Bottom rivet nuts can be utilized for a strut channel method of suspension.

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

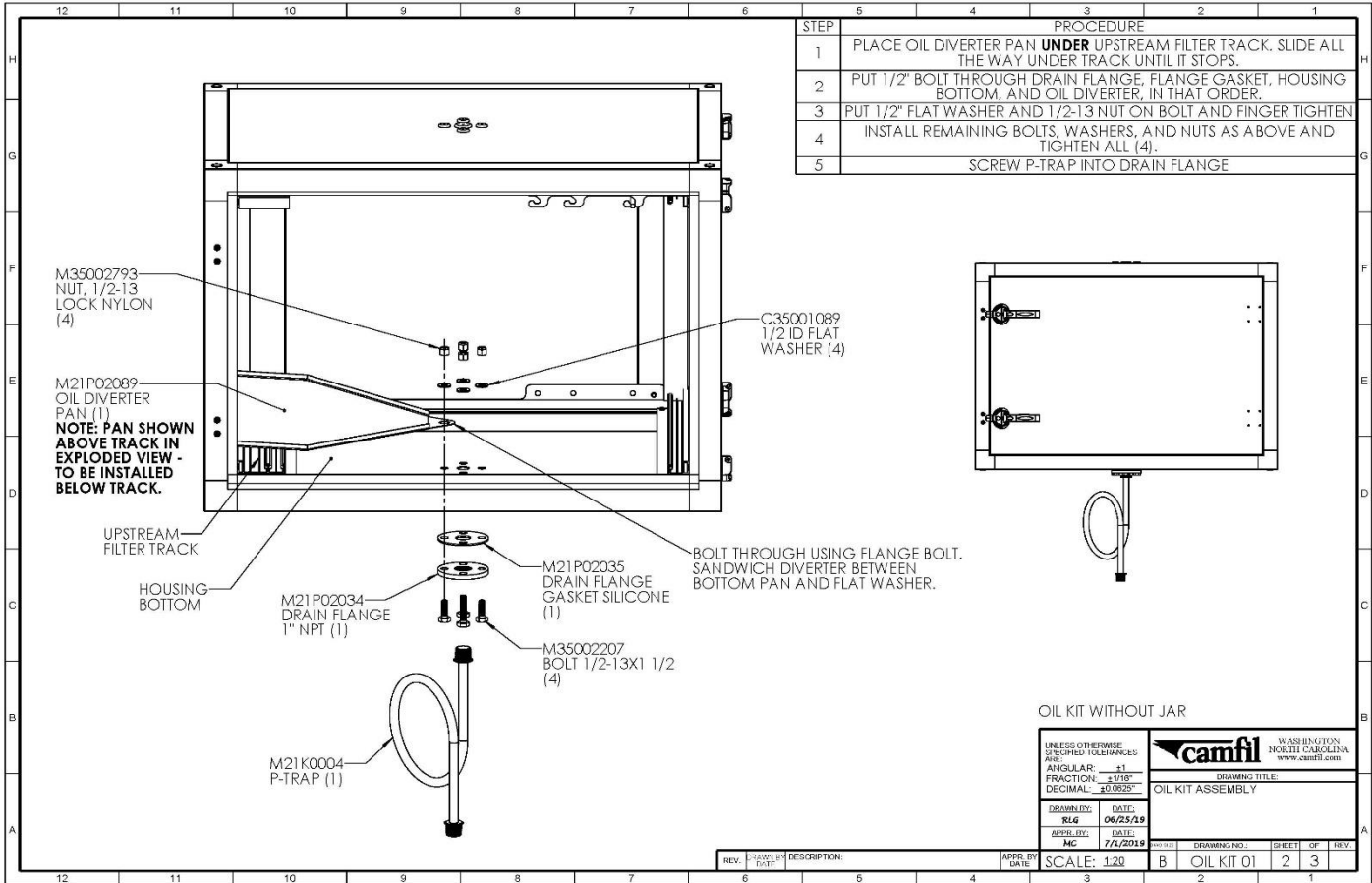


2. Type F (Filter) Module + Type C (Cylinder) Module + Type M (Motor/Fan) Module



Optional Oil Mist Kits P/N M21K00008

Oil Kit Assembly Without Jar Installation Instructions



Optional Oil Mist Kits P/N M21K00008

Oil Kit Assembly Without P-TRAP Installation Instructions

STEP	PROCEDURE
1	PLACE OIL DIVERTER PAN UNDER UPSTREAM FILTER TRACK. SLIDE ALL THE WAY UNDER TRACK UNTIL IT STOPS.
2	PUT 1/2" BOLT THROUGH DRAIN FLANGE, FLANGE GASKET, HOUSING BOTTOM, AND OIL DIVERTER, IN THAT ORDER.
3	PUT 1/2" FLAT WASHER AND 1/2-13 NUT ON BOLT AND FINGER TIGHTEN
4	INSTALL REMAINING BOLTS, WASHERS, AND NUTS AS ABOVE AND TIGHTEN ALL (4).
5	SCREW 1" NIPPLE INTO DRAIN FLANGE
6	SCREW THROUGH-WALL FITTING ONTO NIPPLE
7	PUT JAR LID ON THROUGH-WALL FITTING AND SECURE WITH NUT
8	SCREW JAR ONTO JAR LID

Labels:
M35002793 NUT, 1/2-13 LOCK NYLON (4)
M21 P02089 OIL DIVERTER PAN (1) **NOTE: PAN SHOWN ABOVE TRACK IN EXPLODED VIEW - TO BE INSTALLED BELOW TRACK.**
UPSTREAM FILTER TRACK
HOUSING BOTTOM
M21 P02034 DRAIN FLANGE 1" NPT (1)
M21 P02035 DRAIN FLANGE GASKET SILICONE (1)
M34002950 NIPPLE 1" NYLON (1)
M34002951 JAR, SEMI-CLEAR (1)
M35002207 BOLT 1/2-13X1 1/2 (4)
M34002949 THROUGH-WALL FITTING 1" NPT (1)
C35001089 1/2 ID FLAT WASHER (4)
BOLT THROUGH USING FLANGE BOLT. SANDWICH DIVERTER BETWEEN BOTTOM PAN AND FLAT WASHER.

Oil Kit Without P-Trap

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: ANGULAR: ± 1 FRACTION: ± 0.18 DECIMAL: ± 0.0025	camfil WASHINGTON, NORTH CAROLINA www.camfil.com
DRAWING NO: RLG DATE: 06/25/19 APPROVED BY: MC DATE: 7/2/2019	DRAWING TITLE: OIL KIT ASSEMBLY
SCALE: 1:20	DRAWING NO: B SHEET: 1 OF: 3

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

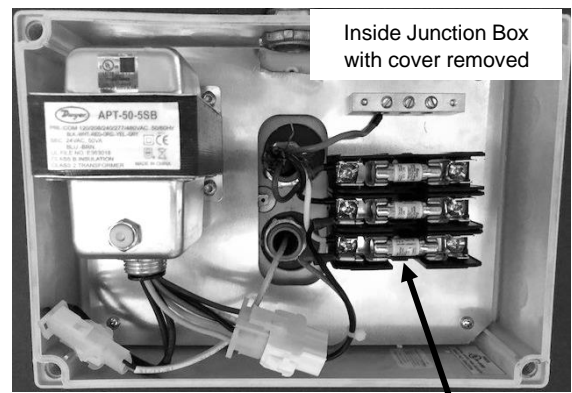
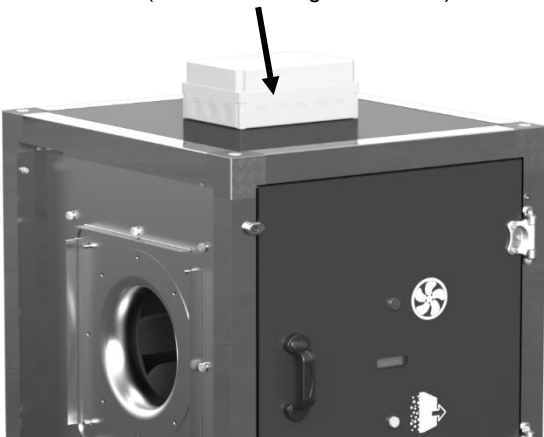
Power Inlet

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).

Note: Follow local electrical codes for inlet power connection.

Once local power is energized, the CamCleaner 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

Type M (Motor/Fan) Label Example

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

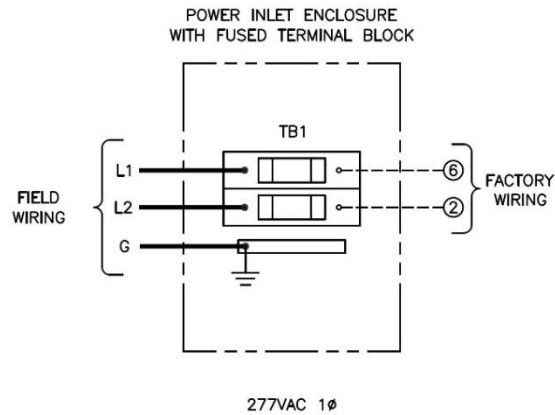
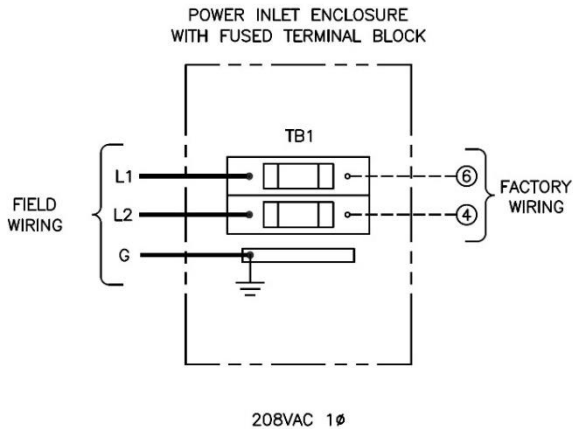
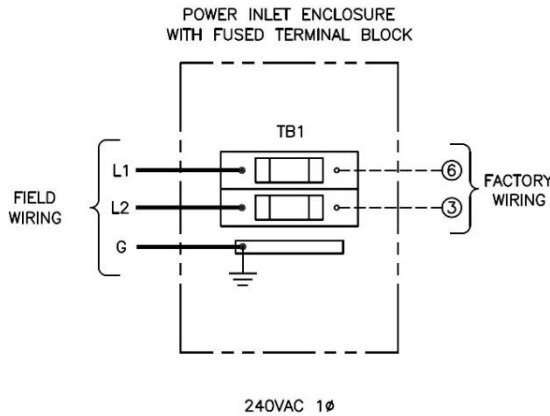
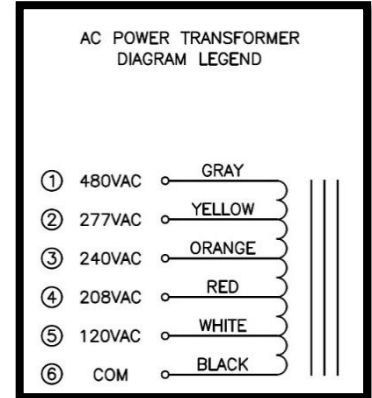
Field Wiring Schematics

Single Phase Type M (Motor/Fan) Module

Single Phase CamCleaner units are factory-wired for 240VAC. The 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.

Single Phase Power Wiring Diagrams

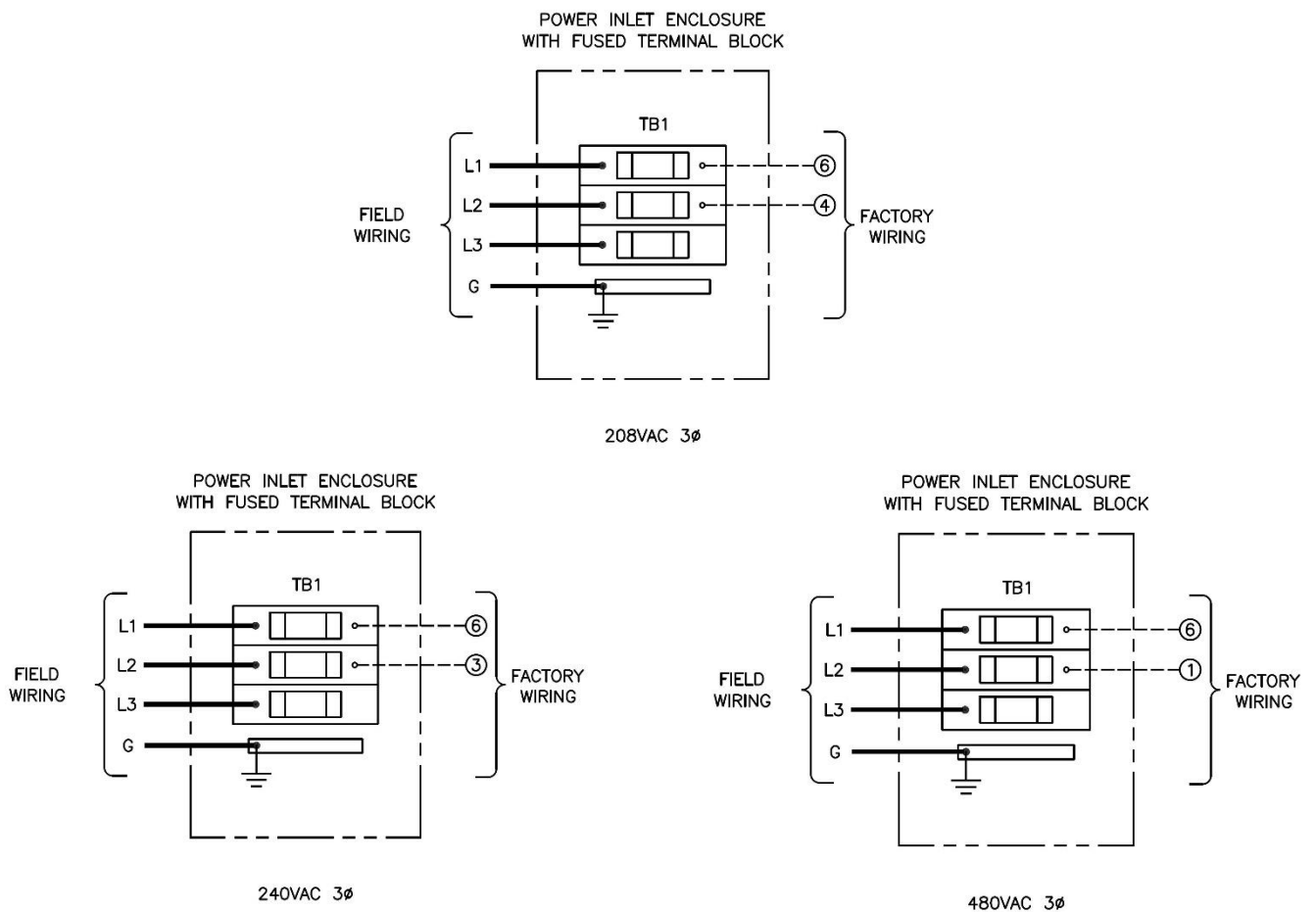


Three Phase Type M (Motor/Fan) Modules

Three Phase CamCleaner units are factory-wired for 240VAC for the 200-240VAC motor modules. The 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 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 page 24, Optional Equipment) for exhaust airflow requiring redirection greater than 45°.

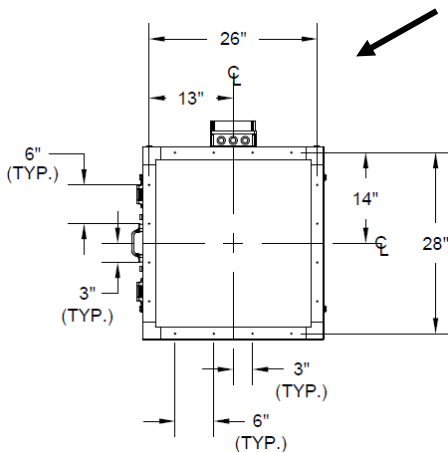
Ductwork Connection

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

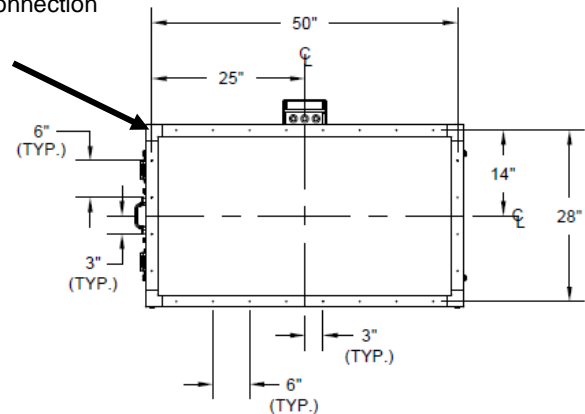
1. Ensure system power is OFF before proceeding.
If adding ducting to the exhaust end, please follow steps 2 through 4, otherwise skip to step 5.
2. Remove the factory-installed outlet louver by removing fasteners.
3. Reach through the outlet louver opening to remove the internal end panel fasteners.
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 CamCleaner system.

Recommended fastener spacing for ductwork to 50mm tubular frame connection



CCH2000 Outlet Flange Detail



CCH4000 Outlet Flange Detail

System Control Settings

Fan Control Access Panel

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

<p>Locate fan control access panel.</p>	<p>Loosen panel stops with 4mm hex key.</p>
<p>Rotate panel stops to open position.</p>	<p>Pull open access panel. Reverse steps to fasten door panel.</p>

Setting the Start Up Delay Timer

If multiple CamCleaners are installed in the same circuit, sequential starting is available.

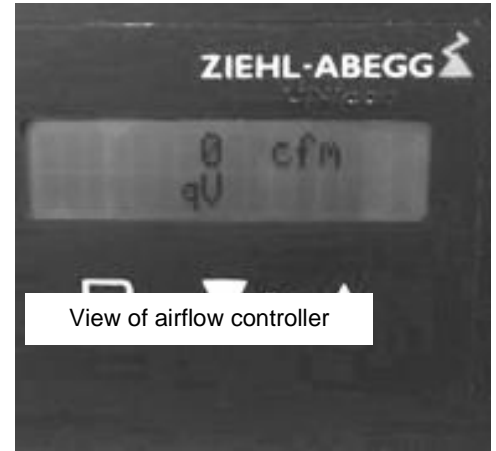
<p>View of Start-Up Delay Timer</p>	<p>To set the delayed start-up sequence, each CamCleaner must be set up.</p> <p>Use a small flat blade screwdriver to adjust timer relay (left).</p> <p>Timer function setting (bottom adjustment) should be set to display AI (on delay) in the window.</p> <p>The range 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.</p> <p>The actual delay time is set using the center adjustment (Blue timing trimmer). Range is 1 – 20 seconds. Factory default is 10 seconds.</p>	<p>24VAC Breaker Switch</p> <p>Start-Up Delay Timer</p> <p>Airflow Controller</p> <p>Pressure Switch</p>
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Air Flow 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).



Factory Default Settings

WARNING: The following settings are used by Camfil to set up your CamCleaner 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 CamCleaner, 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 straight out.
3. Use the knob to set the desired differential pressure (at red indicator) set point.
4. Once the filter change-out differential pressure is set, replace the 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 ΔP s (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-71-242412-4V-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.			

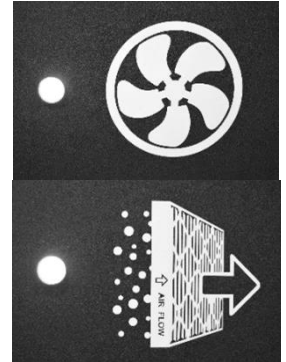
Operating Your CamCleaner

Fan Indicator Light

Green LED indicates power ON and the red LED for a fault condition present (See pages 26-27). When powering on, the LED will momentarily illuminate red before green to indicate power and proper function.

Filter Indicator Light

Green LED indicates a proper operating condition and the yellow LED indicates servicing needs. The yellow LED will illuminate once filter pressure drop exceeds the pressure differential setpoint. The filters need to be replaced as soon as possible. The filter service LED setting is controlled by the field adjustable pressure switch (See System Control Settings page 16).



Filter Installation

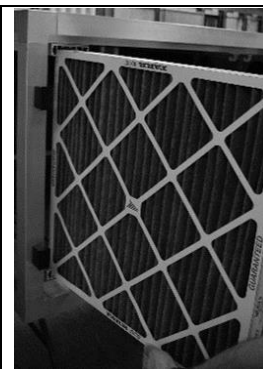
WARNING: Do not install or replace filters when system is powered ON. To ensure the system is OFF, the lock-out feature on the power supply breaker is recommended. Alternatively, an appropriately sized disconnect switch (not supplied) may be installed for local control. Do not operate without the proper filters installed. The CamCleaner is designed to accommodate various filter combinations.

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.
Ensure system is powered OFF.
Locate the filter module and open its access door using handles.
Locate 2" wide extrusion track on upstream side of module and push to slide the 2" prefilter into the top and bottom tracks.
Close the filter module access door and secure door handles.
Reverse steps for removing prefilter. Do not remove prefilter while system is powered ON and in operation.
Quantity of (2) prefilters are required for CC4000 models.

Insert into tracks



Installed



Prefilter Installation Image



GET THE MOST FROM YOUR CAMCLEANER

The Camfil CamCleaner is the market's best-in-class air cleaner. It was specifically designed to operate with Camfil 5-Star filter products. To prevent poor performance, always replace spent filters with the same filters that came with your CamCleaner. Never use other filters (even other Camfil filters) without contacting Customer Service at Sales-WA@camfil.com.

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 CamCleaner. The Oil mist eliminator is washable. It is recommended that this filter be cleaned every (3) months (or more frequently depending on the oil mist load). Washing instructions:

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 dry the element before placing in storage as the galvanized frame may rust.
4. Replace the filter as noted in Step 5 (above).
Camfil 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 CamCleaner back in service quickly and wash the dirty filters before replacing them at the next service interval.


Prefilter install pictures on page 18 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 page 24 for required oil mist accessories.

How to Service the Collected Oil Mist

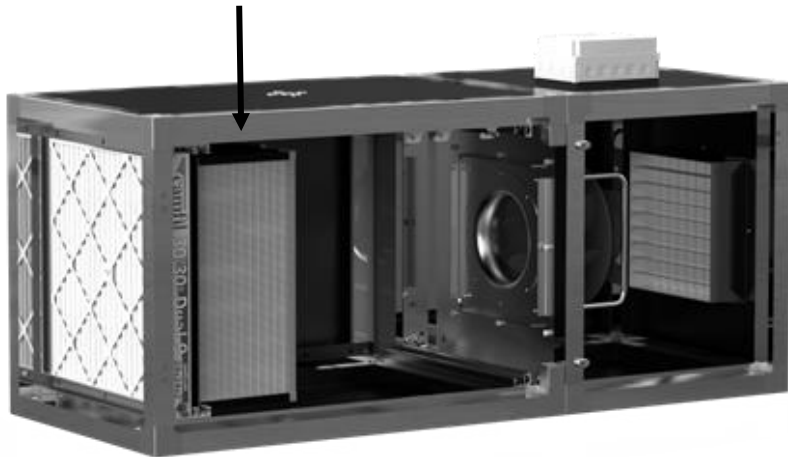
1. Locate the Oil mist bottle under your CamCleaner.
2. The Oil mist collection bottle is removed by turning the bottle counter-clockwise.
3. Empty the collected oil into an approved disposal container.
4. Replace the bottle by turning the bottle clockwise into the female threaded flange.

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

Ensure system is powered OFF.	
Locate the filter module and open its access door using handles.	
The rigid filter can be installed in either the upstream or downstream 1" wide extrusion header track. Locate the 1" wide extrusion header track and push to slide the header portion of the rigid filter into both top and bottom tracks.	
Close the filter module access door and secure door handles.	
Reverse steps for removing the rigid filter. Do not remove filter while system is powered and in operation.	
Quantity of (2) rigid filters are required for CC4000 models.	

Insert into tracks

Installed



Headered Bag Filter Installation (e.g. Hi-Flo® ES, City-Flo®)

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.

See page 21 for illustration.

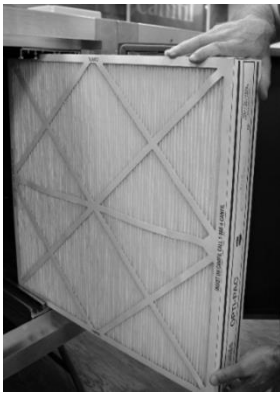
Headered Bag Filter Installation

<p>Install filter into tracks.</p>	<p>Thread support rod through all loops.</p>	<p>Place support rod on hanging supports.</p>
<p>Ensure support rod threads through all loops.</p>	<p>Filter installed.</p>	

Post Filter Installation (e.g. 30/30[®], Opti-Pac[®])

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

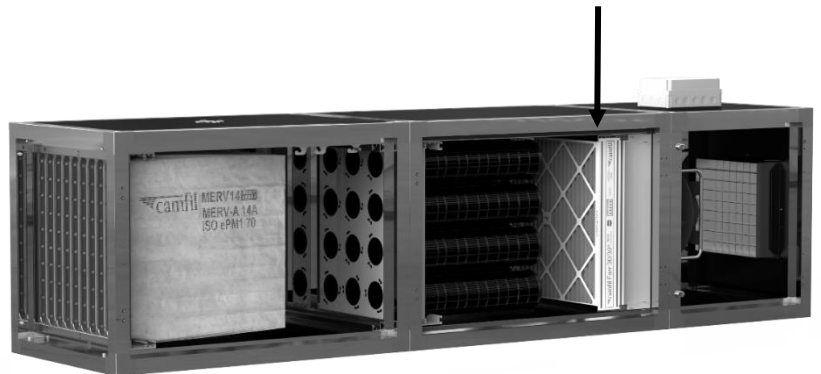
1. Ensure system is powered OFF.
 2. Locate the cylinder module and open access door using handles.
 3. Locate 4" wide extrusion track on downstream side of module and push to slide the 4" post filter into both top and bottom tracks.
 4. Close the filter module access door and secure door handles.
 5. 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



Cylinder Filter Installation (e.g. CamCarb CG)

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 CamCleaner, **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 1/2" to secure into place. If cylinder fails to fully engage, use a 24mm socket or CamCarb 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 and in operation.

<p>Identify SST bayonet stubs</p>	<p>Identify holding frame mount</p>	<p>Insert cylinder and firmly press against holding frame</p>
<p>Manually rotate cylinder clockwise to secure into place</p>	<p>Cylinder filters installed</p>	

Standard Features

Time Delay Relay For Start-Up

Fan start delay timer permits staggered start of multiple units. See System Control Settings on page 15 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 Preset 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 System Control Settings on page 16 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. See System Control Settings on page 16 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 inside modules without the need for a tool, yet provides a secure panel closure. Secure panel clamp stops are provided on the motor module and can be loosened using a 4mm hex key (in assembly kit) and rotated 90° to release the door panel.

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)

Optional Equipment

Oil Mist Accessories

Oil Drain Kit (part number M21K00008): Includes P-trap, collection bottle and flange/gasket/hardware. This kit allows the CamCleaner to capture oil mist or moisture into a specially designed mist eliminator in the filter module. See pages 9-10 for installation instructions.

Silencing Accessories

Silencing options are available if needed. Send inquiries to Sales-WA@camfil.com.

Adjustable Feet

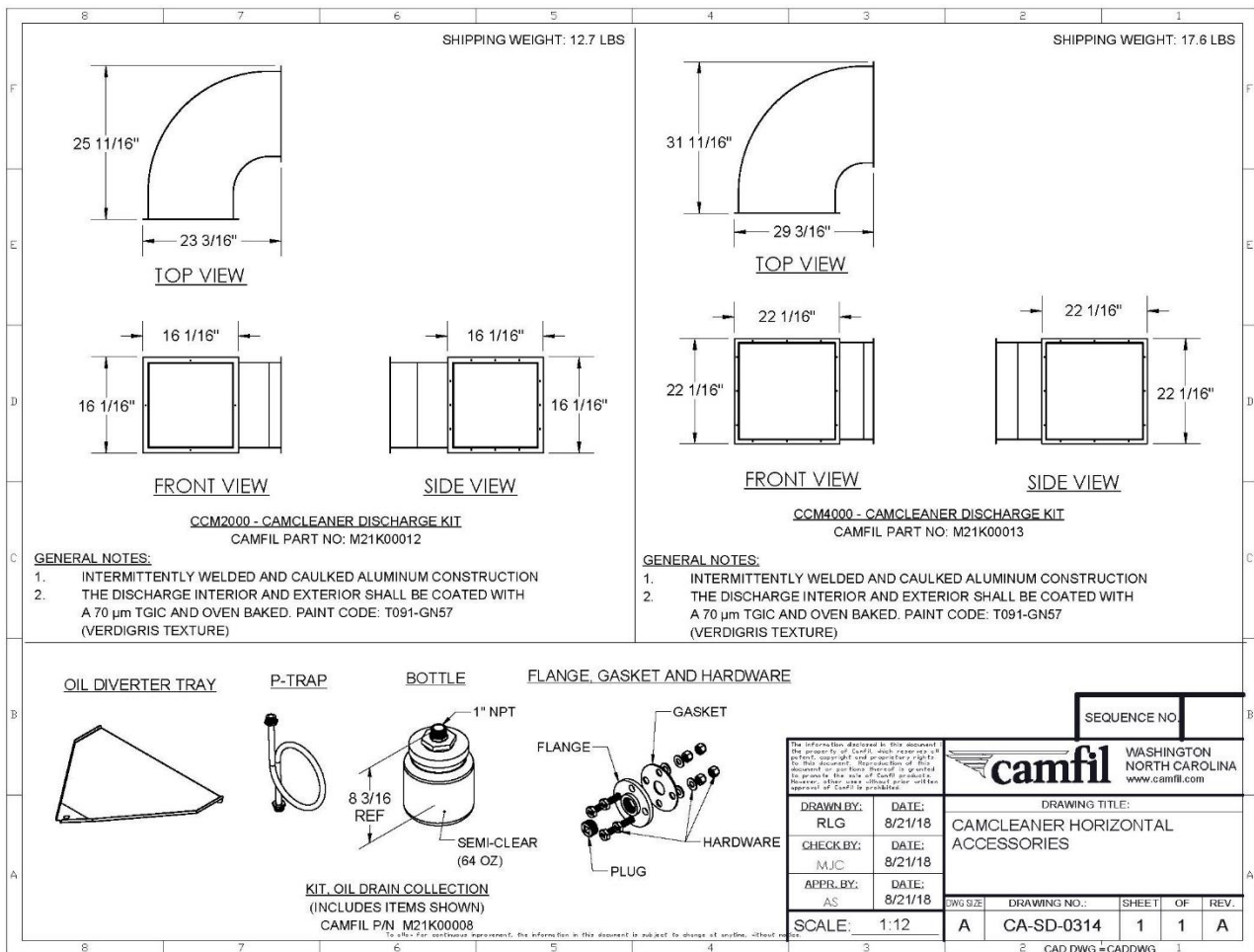
In lieu of suspension options, the system can be supported by adjustable feet (part number M21K00002 - 4 EA per kit) when placed on a level, structurally-sound platform. If footpads are required to be fastened down, use the mountable foot pad kit (part number M21K00011 - 4 EA per kit).



90° Directional Outlet

If directional discharge greater than 45° is required, part number M21K00012 is available for the CCH2000 and M21K00013 is available for the CCH4000.

Optional Equipment Sales Drawing



Periodic Maintenance Inspection

Proper maintenance of the CamCleaner system is vital for 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. The CamCleaner system filter indicator light will illuminate a yellow LED color when filter replacement is required.

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 Filter Installation on pages 18-22 for proper filter replacement. Refer to System Control Settings on page 16 for instructions on setting the pressure switch. Re for guidelines on how to determine recommended dirty pressure drops based on your specific filter configuration.

System: The system should be periodically inspected, and routine maintenance checks 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 Camfil 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.**

Warranty

Warranty: Camfil USA, Inc. (seller), warrants that all manufactured items shall be merchantable, free from defects in workmanship and material, and shall conform to Camfil USA, Inc. published specifications and submittal drawings included in the purchase agreement. The term of this warranty shall be one year from date of shipment from Camfil. There are no other warranties that extend beyond this description.

Liability: Regarding defective product, Camfil USA, Inc. shall repair, replace or refund the purchase price at seller's election, provided the products are returned with seller's written authorization. Under no circumstances (whether or not foreseeable) shall seller be obligated for consequential or incidental damages, losses or expenses in connection with, or by reason of, any breach. Seller's liability is limited to the purchase price of the product(s) plus common carrier freight costs to and from seller's manufacturing facility. The remedies expressed are exclusive.

Terms: No other claims other than explicit written claims shall be recognized. Written claims must be received by seller within one year from the date of shipment. Repairs made without prior consultation and authorization by Camfil USA, Inc. may void this warranty.

Register Your CamCleaner

Step 1: Record Model and Serial Numbers

The model number is located on your Order Acknowledgement sent by Customer Service.

The serial numbers are located on the label inside each of the module doors.

Model Number: _____

Serial Number(s): _____

Date of Purchase: _____



Step 2: Register Your Product

Locate the Camfil Product Warranty Card (in assembly packet inside the motor module). Complete the required information **for each model** (system). Return within 30 days of receipt to:

Camfil USA, Inc.
200 Creekside Drive
Washington, North Carolina, USA 27889

Troubleshooting

TROUBLE SHOOTING		
SYMPTOM	POTENTIAL CAUSE	POTENTIAL SOLUTION
FILTER INDICATOR LIGHT IS YELLOW	FILTER DIFFERENTIAL SET POINT REACHED	<p>IF FILTER IS DIRTY, REPLACE FILTER</p> <p>IF FILTER IS CLEAN,</p> <ul style="list-style-type: none"> → 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	<ul style="list-style-type: none"> → 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	<ul style="list-style-type: none"> → OIL COLLECTION BOTTLE IS FULL → OIL DRAIN IS PLUGGED → P-TRAP IS PLUGGED 	<ul style="list-style-type: none"> → EMPTY OIL COLLECTION BOTTLE → UNCLOG DRAIN → UNCLOG P-TRAP

FAN MOTOR FAULTS - KEY		
LED RED FLASHES*	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.



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Laval, Quebec • Conover, North Carolina • Washington, North Carolina • Concord, Ontario

Worldwide Manufacturing Locations

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Camfil has a policy of continuous research, development and product improvement. We reserve the right to change designs and specifications without notice.