



# AIR QUALITY ENGINEERING

*Tailored solutions from people who care*



## Air Quality Solutions for Commercial Kitchen Exhaust

▶ **SMOKEMASTER® Electronic Air Cleaner Owner's Manual**

SMOKEMASTER® from Air Quality Engineering, Inc., is a in-duct electronic air cleaning system with an optional self-washing mechanism. The SMOKEMASTER® will effectively remove a broad range of kitchen exhaust contaminants including grease, cooking smoke, dust, soot, and pollen, from the air.

SMOKEMASTER® comes in three standard electronic cell sizes; single (1 cell); dual (2 cells) and quad (4 cells), each is operated by high voltage power supplies to remove airborne contaminants at efficiencies as high as 99 percent and at rates starting at 1000 cfm. The optional dynamic wash system (AUTOCLEAN®) is state-of-the-art in maintenance free air cleaning.

The three standard SMOKEMASTER® sizes can be arranged in a variety of combinations such as stacked, and/or side-by-side and in a multitude of passes to achieve desired airflow capacity (CFM) and efficiency.

The optional AUTOCLEAN® wash cycle for the electronic cell(s) is controlled by the built in Programmable Logic Controller (PLC). Wash cycle times can be easily selected on the touch screen PLC for each day of the week. Also, the wash cycle may be manually started through the touch screen of the PLC. The duration of wash, rinse and dry time can all be changed on PLC menu.

**PLC has two independent advanced menu options:**

1. You can have the fan "on" or "off" during drying.
2. The unit can go to "sleep" mode after washing.

The optional HMI (Human Machine Interface) screen can be installed remotely in a convenient location. HMI screen is connected by Ethernet cable to one unit's PLC or to multiple units through the HMI's Ethernet switch. On the HMI screen the user can select any unit to modify the settings.

Max number of units per HMI is four. All settings used in the unit PLC are accessible (you can change them) from HMI screen.

**Before you get started, please review the following:**

Purchase Date: \_\_\_\_\_ Serial Number: \_\_\_\_\_

## Customer Technical Support:

To contact Air Quality Engineering, Inc. use:

Mail:	Air Quality Engineering, Inc. 7140 Northland Drive N. Minneapolis, MN 55428 USA	Phone:	1-800-328-0787 763-531-9823 Fax: 763-531-9900	e-mail:	info@air-quality-eng.com
		Web:			www.air-quality-eng.com

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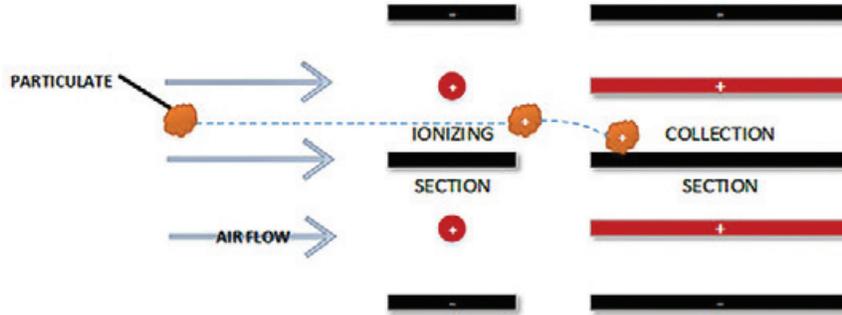
## Disclaimer

All statements, technical information and recommendations in this manual or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be representation or warranties concerning the products described. Specifications are subject to change without notice.

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## How Airborne Contamination is Removed

A process called "Electrostatic Precipitation" traps airborne contaminants. The fan draws particulate laden air successively through the prefilter, the cell ionizing section and the cell collector section. The ionizing section imparts an electrical charge to the individual particles that are then drawn by electrostatic forces to the oppositely charged collector plates. The electronic cells must be washed periodically to maintain efficient performance.

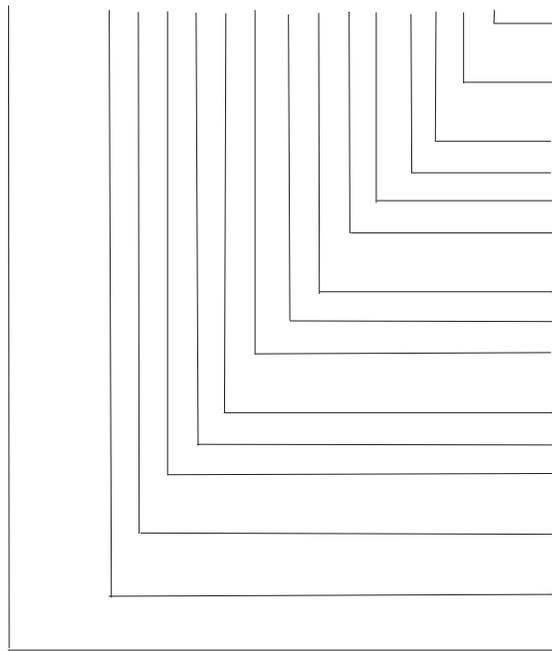


## Air Quality Engineering Kitchen Exhaust Air Purification Systems

### SMOKEMASTER® Model Number Explanation

#### SMOKEMASTER®

AUTOCLEAN® 2 2 2 H S L E O 1 F W B 7 2



Name is SMOKEMASTER® followed by AUTOCLEAN® or F; followed by 3 numbers; followed by between 1 to 5 letters; which can be followed by up to 1 number; which can be followed by up to 3 letters; followed by 2 numbers.

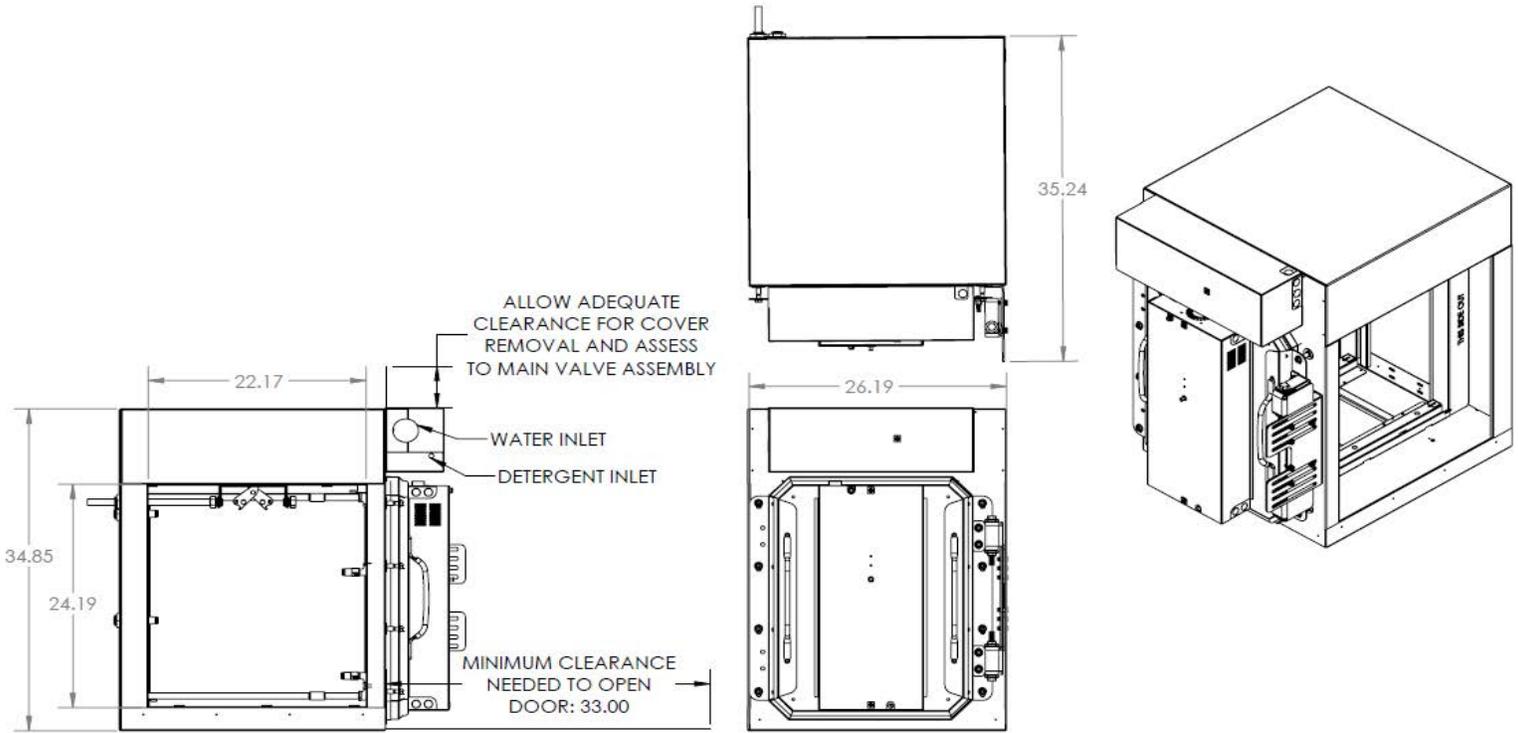
#### Options

- Power Requirements
  - 1 for 120v,1ph,60hz or 2 for 240v,1ph,60hz
- Listing
  - 7 for UL 710 & 867 listing or 8 for UL8782 listing
- B for with blower<sup>4</sup>
- W for rated for use with solid fuel appliances<sup>4</sup>
- F for factory pre-piped with fire suppression<sup>4</sup>
- Number of passes of odor control<sup>2 4</sup>
  - 1 or 2 for number of passes of odor control
- O for with odor control module<sup>2 4</sup>
- E for enclosed for outdoor placement<sup>1 4</sup>
- Flow Direction
  - L for left to right or R for right to left
- S for factory assembled and skid mounted<sup>1 4</sup>
- H for with high efficiency power supply<sup>4</sup>
- Number of passes of precipitator
  - 1, 2, or 3 for number of passes
- Number of cells high
  - 1, 2 or 3 for number of cells high
- Number of cells wide
  - 1, 2, 3, or 4 for number of cells wide
- Precipitator wash type
  - AUTOCLEAN® for automatic wash or F for manual wash

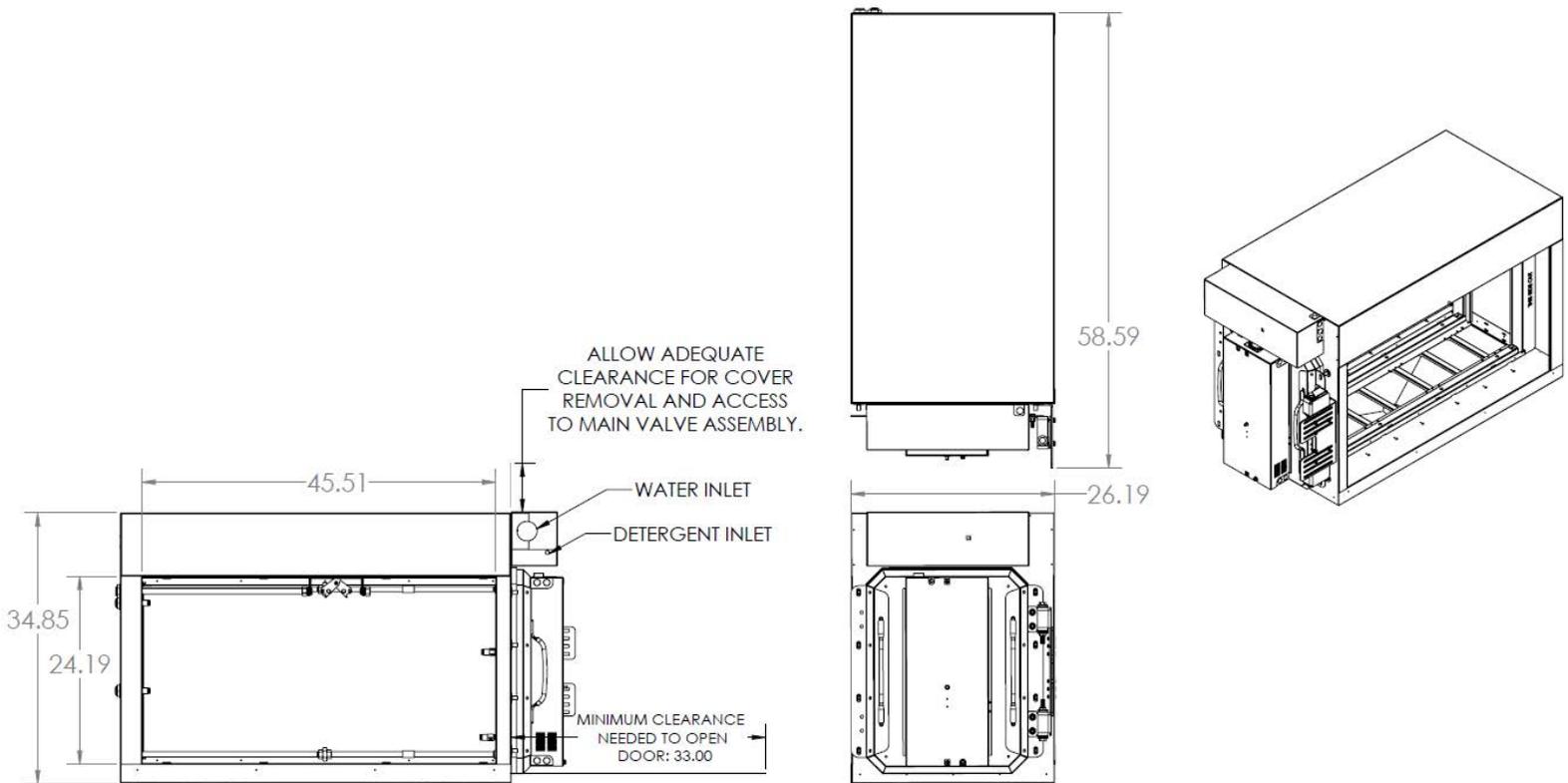
**Notes:** <sup>1</sup> Only included if unit is skid mounted  
<sup>2</sup> Only included if unit has odor control  
<sup>3</sup> Only Included if skid mounted and/or has odor control  
<sup>4</sup> Blank if Not Included

SMOKEMASTER® Dimensions

SMOKEMASTER® AUTOCLEAN® 11 (SINGLE CELL)

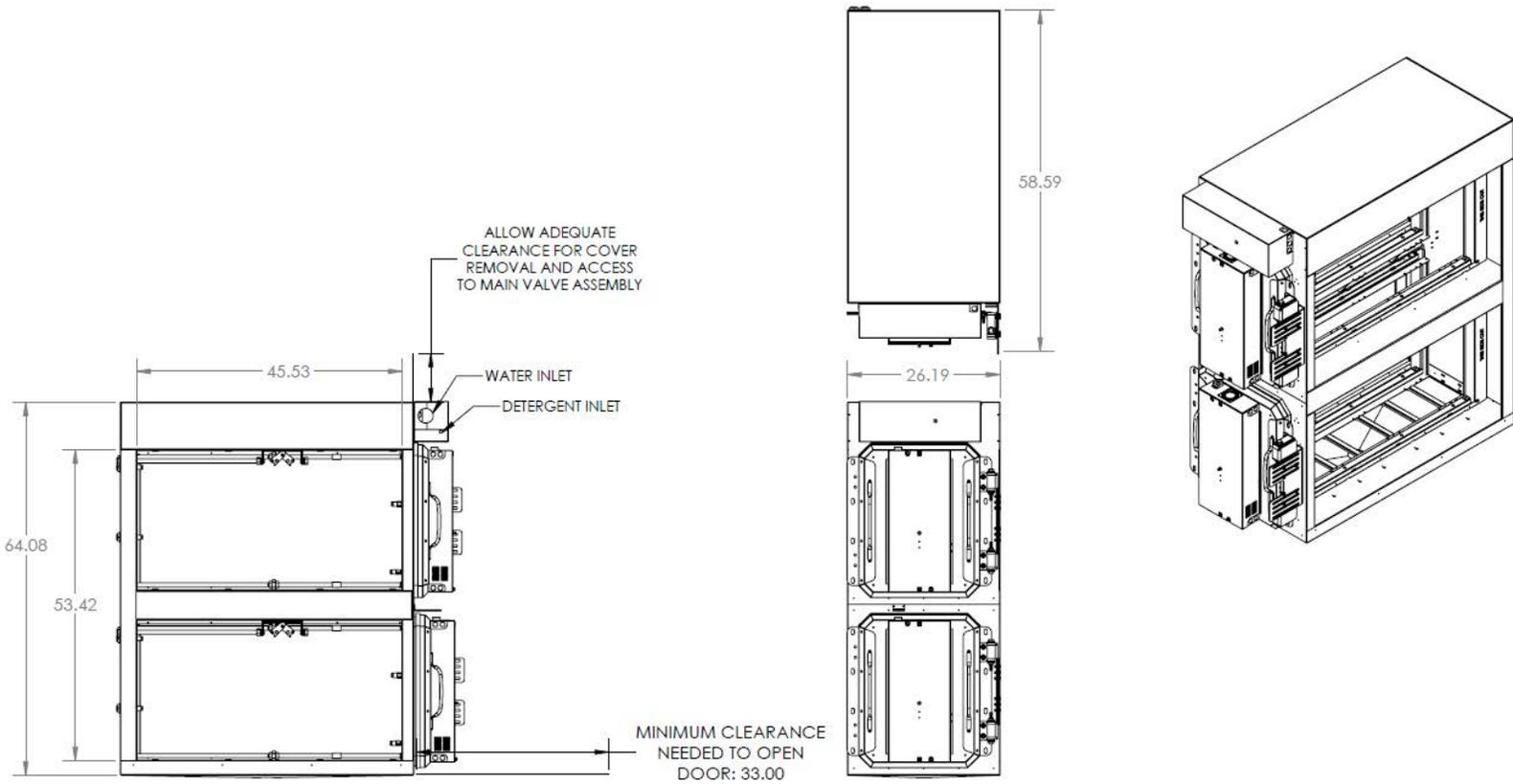


SMOKEMASTER® AUTOCLEAN® 21 (DUAL CELL)



SMOKEMASTER® Dimensions

SMOKEMASTER® AUTOCLEAN® 22 (QUAD CELL)



All measurements in inches.

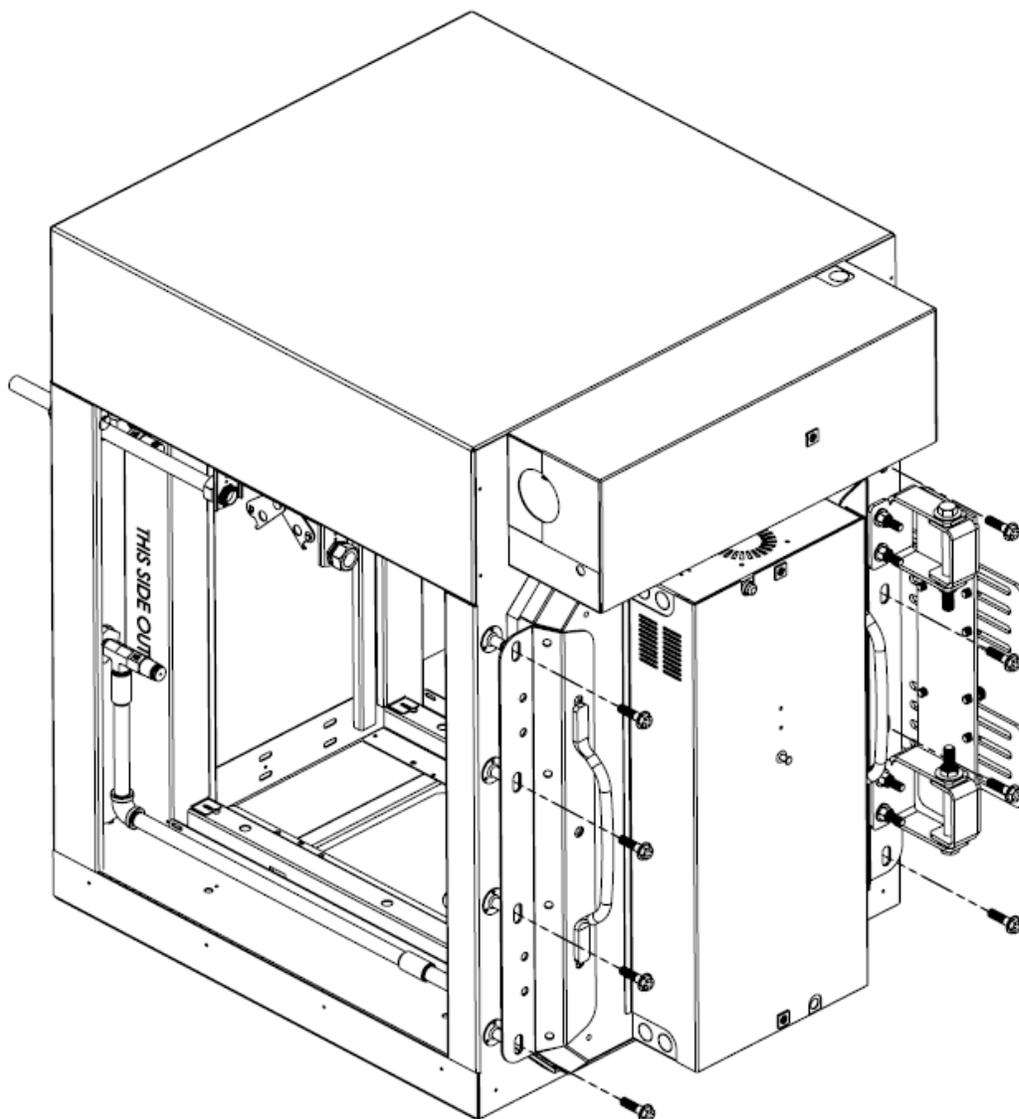
Metric Conversion	Formula
In. to mm	In. x 25.4
Lbs. to kgs.	Lbs. x .454
In. w.g. to kPa	In. w.g. x .2488
CFM to m <sup>3</sup> /h	CFM x 1.6992
Ft <sup>2</sup> to m <sup>2</sup>	Ft <sup>2</sup> x .0929

	Shipping Weight		Installed Weight	
	Lb.	Kg.	Lb.	Kg.
SMOKEMASTER® 11	300	136	250	114
SMOKEMASTER® 21	420	191	370	168
SMOKEMASTER® 22	670	304	600	273
SMOKEMASTER® AUTOCLEAN® 11	350	159	300	137
SMOKEMASTER® AUTOCLEAN® 21	470	214	420	191
SMOKEMASTER® AUTOCLEAN® 22	720	327	650	295

## AUTOCLEAN

### Door Removal Instructions:

- Use a 9/16" socket head and remove the 8 bolts as shown.
- Use the handle to slide the door back and swing open.



**- IMPORTANT -**

**THE SPECIFICATIONS GIVEN IN THIS PUBLICATION DO NOT INCLUDE NORMAL MANUFACTURING TOLERANCES.**

**THEREFORE, THIS UNIT MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, THIS PRODUCT IS TESTED AND CALIBRATED UNDER CLOSELY CONTROLLED CONDITIONS AND SOME MINOR DIFFERENCES IN PERFORMANCE CAN BE EXPECTED IF THOSE CONDITIONS ARE CHANGED.**

## Specifications

**Cabinet:**..... 16 gauge welded steel cabinet with a powder coat finish

**Instrumentation:**.....Indicator Light – indicates that the cells are energized properly

**Electrical Rating:**.....SMOKEMASTER® In-duct Electronic Air Cleaner-120V/240V, 60 Hz; or 220-240V, 50 Hz

**Ambient Temperature Rating:** ..... 131° F (55° C) Max; -4° F (-20° C) Outside of exhaust airflow

**Power Ratings:**..... 115V, 1.5 Amps; 230V, 0.75 Amps

**Pre/post Filter:**.....Single Cell: two 24" x 24" x 1" heavy duty aluminum mesh filters

Dual Cell: four 24" x 24" x 1" heavy duty aluminum mesh filters

Quad Cell: eight 24" x 24" x 1" heavy duty aluminum mesh filters

**Primary Filter Options:**.....Single Cell: one 24" x 24" x 10.75" or two 24" x 12" x 10.75" electronic cells

Dual Cell: two 24" x 24" x 10.75" or four 24" x 12" x 10.75" electronic cells

Quad Cell: four 24" x 24" x 10.75" or eight 24" x 12" x 10.75" electronic cells

**Optional Odor Control Filter:**.....Custom odor control modules available

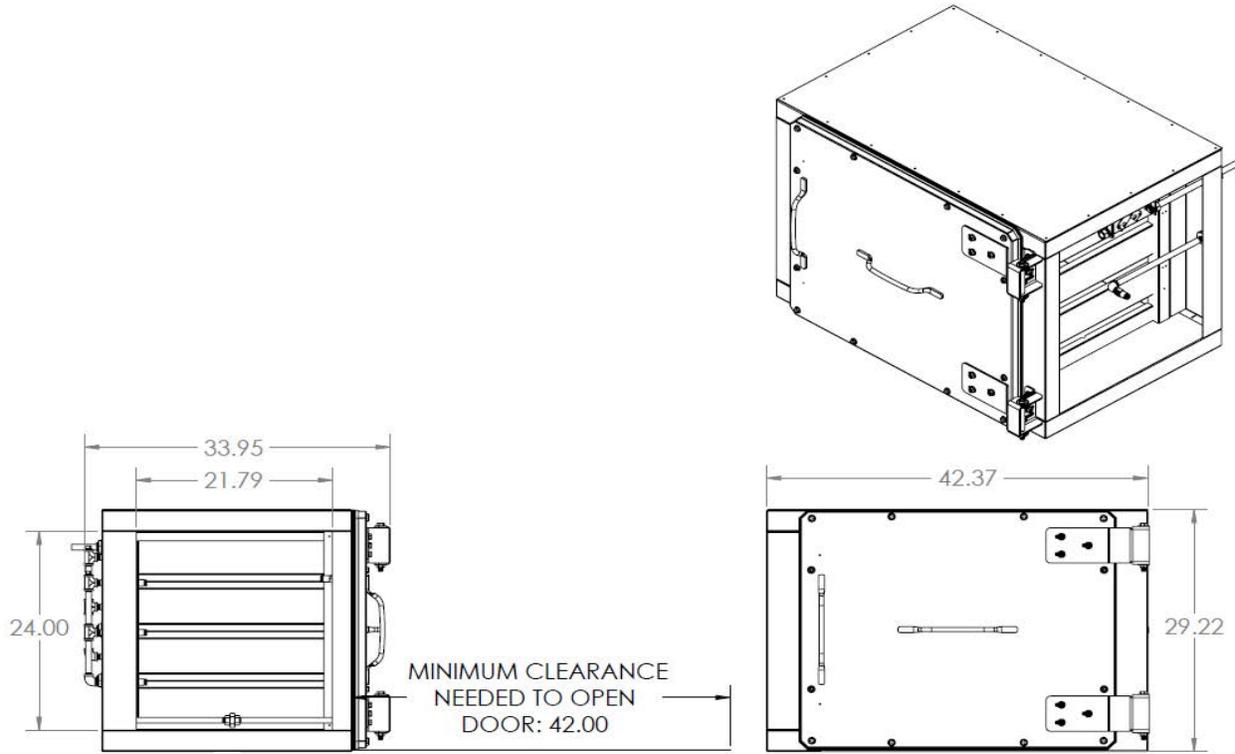
**Optional Blower Module:**.....Custom blower modules available

**Optional Enclosure and Mounting:**.....Optional factory assembly, skid mounting and outdoor enclosures are available

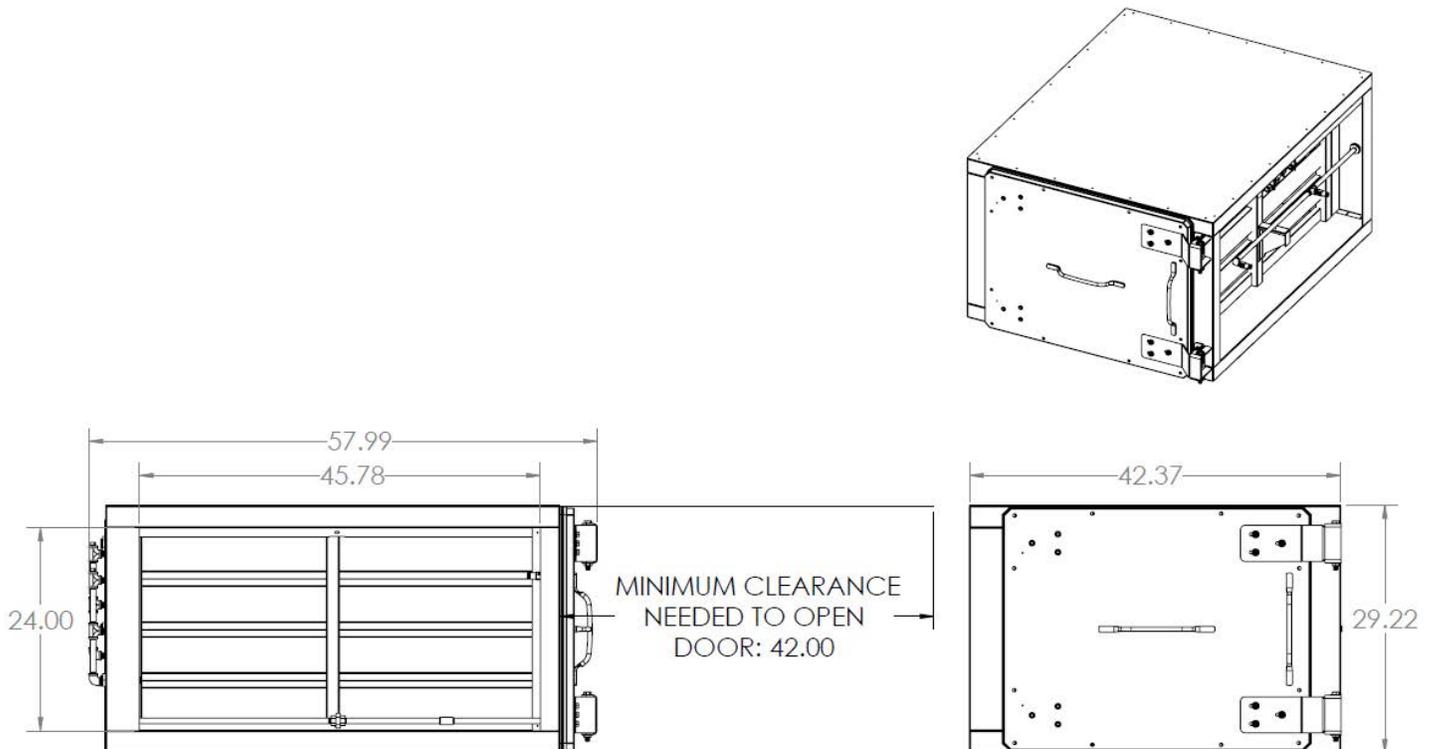
Air Quality Engineering, Inc. has a policy of continuing product improvement and reserves the right to make changes in design and specifications without notice.

## Odor Control Module Dimensions

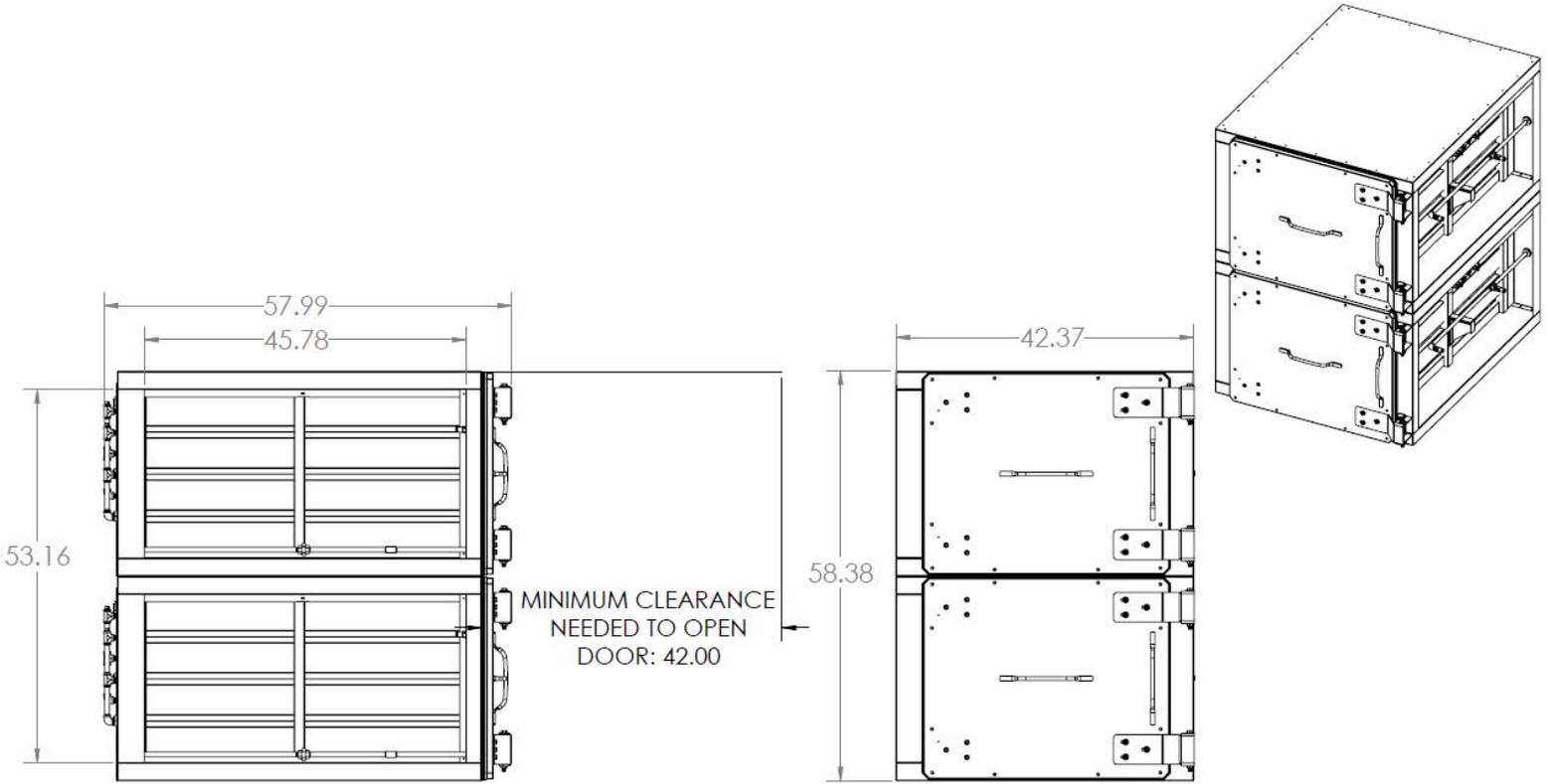
Odor Control Module for SMOKEMASTER® 11 (single cell)



Odor Control Module for SMOKEMASTER® 21 (dual cell)



Odor Control Module for SMOKEMASTER® 22 (Quad cell)



## Odor Control Module



THE AIR QUALITY ENGINEERING, INC. ODOR CONTROL MODULE IS A SIDE ACCESS HOUSING THAT CONTAINS REFILLABLE TRAYS OF SORBENT MATERIAL FOR ODOR CONTROL.

V-CONFIGURATION TRAYS ALLOW FOR HIGHER RESIDENCE TIME AND MORE SORBENT MASS FOR HIGHER EFFICIENCY, LONGER SERVICE LIFE AND LOWER PRESSURE DROP.

- Cleans the air of a wide variety of gaseous contaminants at a rate of 1,000 to 8,000 cfm.
- Wide variety of sorbent media available including virgin coconut shell, and potassium permanganate.
- Housings available in painted cold rolled steel.

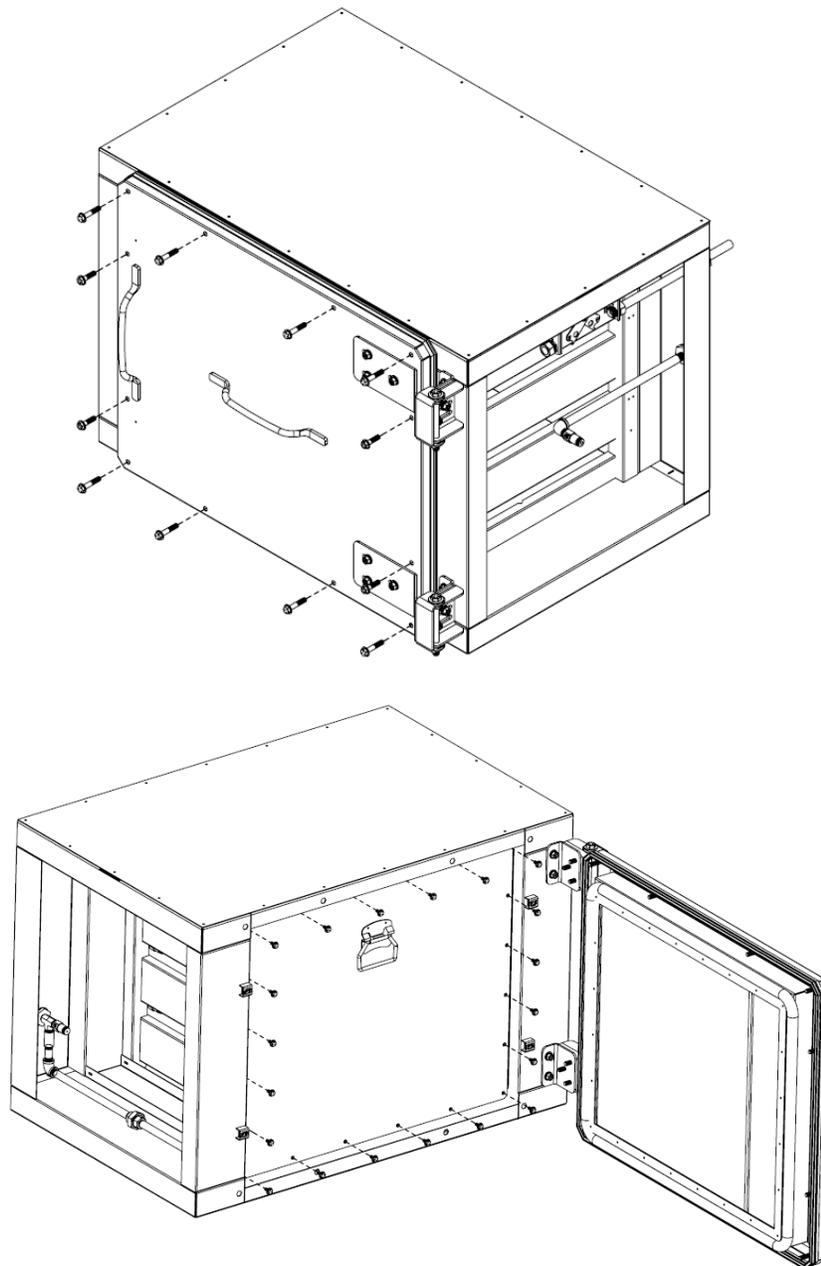
## Odor Control Module

### Door Removal Instructions:

- Use a 9/16" socket head and remove each screw securing the door.
- Use the handle to slide the door back and swing open.
- After moving the door, use a 1/4" Allen wrench and unscrew each bolt on the heat shield.

### Sorbent Media Panel Installation Instructions:

- Insert the 24"x24"x2" panels in a "V" configuration, ensuring that the foam gaskets on the front and back of the panels make contact with both the backside of the unit and the filter access door.



## Odor Module Specifications

### CABINET

CONSTRUCTION:	16 Gauge Steel.
DIMENSIONS:	For dimensions, see attached dimensional drawings above.
FINISH:	Durable exterior grade Thermoset TGIC powder coat.
CARBON WEIGHT:	<p>Modules paired with SMOKEMASTER® 11 (single cell) will contain 144 pounds of virgin coconut shell activated carbon. Different sorbent medias will result in differing weights.</p> <p>Modules paired with SMOKEMASTER® 21 (dual cell) will contain 288 pounds of virgin coconut shell activated carbon. Different sorbent medias will result in differing weights.</p> <p>Modules paired with SMOKEMASTER® 22 (quad cell) will contain 576 pounds of virgin coconut shell activated carbon. Different sorbent medias will result in differing weights.</p>
MEDIA PANELS:	<p>Modules paired with SMOKEMASTER® 11 (single cell) will have 8 bulk refillable trays, nominal dimensions 24" x 24" x 2".</p> <p>Modules paired with SMOKEMASTER® 21 (dual cell) will have 16 bulk refillable trays, nominal dimensions 24" x 24" x 2".</p> <p>Modules paired with SMOKEMASTER® 22 quad cell will have 32 bulk refillable trays, nominal dimensions 24" x 24" x 2".</p> <p>All carbon trays are 100% fill. There is no honeycomb "filler" used.</p>
PRESSURE DROP:	At maximum rated capacity, the estimated pressure drop through the carbon panels is 0.30" w.g. The standard MERV 14 safety filter at maximum rated capacity will have an initial pressure drop of approximately 0.65" w.g. with a recommended final pressure drop of 1.50" w.g.
PRE-FILTER	<p>Odor Control Modules come standard with a single nominal 4" prefilter track containing one 24"x24"x4" metal framed and separated MERV 14 safety filter per cell of the precipitator it is paired with (see below). These filters are manufactured and designed to handle the high velocity airflow and unique contaminant phase and type found in a kitchen exhaust airstream and should not be replaced with any other type of media. <b>Please note that this is a disposable filter; if airflow is reduced at the hood, it may indicate that the filter needs to be replaced.</b></p> <p>Modules paired with SMOKEMASTER® single cell will have 1 MERV 14 safety filter.</p> <p>Modules paired with SMOKEMASTER® dual cell will have 2 MERV 14 safety filters.</p> <p>Modules paired with SMOKEMASTER® quad cell will have 4 MERV 14 safety filters.</p>
FILTER ACCESS:	Side load track system with hinged access door.

## Introduction

Clean air is the subject of numerous laws and regulations. Typical requirements in the United States are those put out by the Occupational Safety and Health Administration (OSHA). Private groups, such as the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), have also published numerous recommendations.

Normally, clean air is defined in regulations and recommendations as air having a limited amount of contaminant in it, commonly expressed as parts per million or milligrams per cubic meter. Approved counteractions are intended to lower or eliminate the amount of contaminants in the air. One of the more common methods of achieving this goal is through the use of air cleaners.

## Air Cleaner Sizing

The SMOKEMASTER® air cleaner is sized according to the capacity (CFM) of the hoods in the kitchen and the desired efficiency. See Figure 3. Consult with the hood manufacturer to determine CFM needs and to select the proper SMOKEMASTER® model for your application.

### Airflow Recommendation with Pressure Drop and Efficiency Rating:

SMOKEMASTER® 11 (Single Cell)		SMOKEMASTER® 21 (Dual Cell)		SMOKEMASTER® 22 (Quad Cell)		Efficiency	Water Pressure Drop	
cfm	M3/ hr.	cfm	M3/ hr.	cfm	M3/ hr.	Percentage	In.	KPa
1000	1699	2000	3398	4000	6896	99	0.06	0.015
1500	2548	3000	5097	6000	10,194	99	0.12	0.030
2000	3398	4000	6796	8000	13,592	95	0.22	0.055

Efficiency ratings based on National Bureau of Standards Dust Spot Method and American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 52-76, using atmospheric dust.

**Figure 3 – SMOKEMASTER® Electronic Air Cleaner Capacity and Efficiency**

## Commercial Kitchen Exhaust Application Considerations

When deciding on the model type and number of air cleaners required for kitchen exhaust applications such as a restaurants, cafeteria's, café's, deli's Etc., several conditions must be considered. They are:

1. Contaminant level, the particulate and gas load of the airstream to be cleaned of smoke, grease, etc. High contaminant load conditions may require a higher efficiency affecting the model and number of electronic air cleaners selected.
2. Capacity, the cubic feet per minute (CFM) requirements of the exhaust hoods in the commercial kitchen.
3. Efficiency, the percent operating efficiency required or desired of the electronic air cleaner. The SMOKEMASTER® efficiency should be at a minimum of 95% for commercial kitchen exhaust.
4. Spacial restraint, the available length, width and height available at the installation site of the SMOKEMASTER® has to be considered when selecting a model.

Contact an Air Quality Engineering, Inc. Representative for assistance with commercial kitchen exhaust air purification sizing.

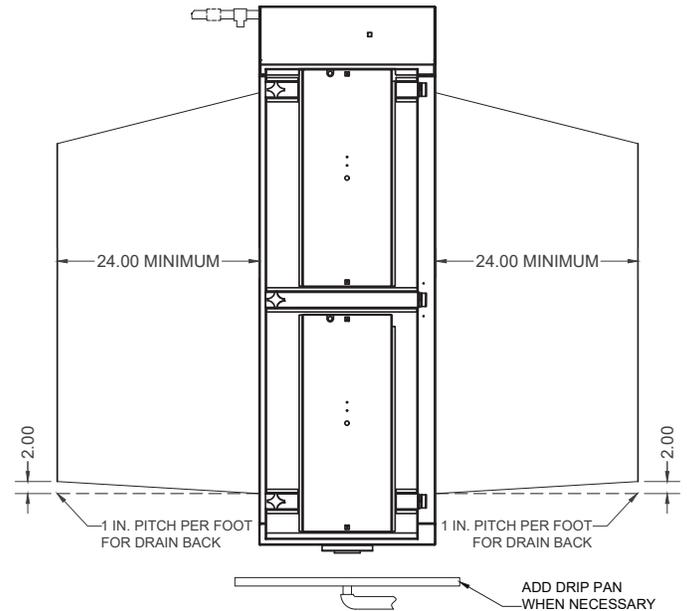
## Location and Position

Because grease duct systems vary greatly in arrangement and style, factors such as location, air distribution, transitions, etc., require careful consideration.

The SMOKEMASTER® cabinet must be mounted in a horizontal duct in an upright position with the washing manifold above the electronic cells. Locate the cabinet in the grease duct so that the face of the electronic cell is at right angles to the airstream.

## Central Detergent System for Multiple Air Cleaners

When the installation includes two, SMOKEMASTER® AUTOCLEAN® air cleaners, they can be positioned so that the wash detergent can be pumped from one centrally located tank. Maximum horizontal distance from air cleaner cabinet to detergent tank is 25 ft., maximum vertical distance is 7 ft.



**Figure 4 – Typical Installation**

## Transitions

When adapting the duct to fit the air cleaner, use gradual transitions in duct size to prevent turbulence and to increase efficiency.

Duct transitions should not exceed 20 degrees (about 4" per lineal foot) on each side of a fitting.

## Water Damage Protection

If the SMOKEMASTER® unit purchased includes the optional AUTOCLEAN® feature and the installation is going to be overhead, it is recommended that a sheet metal pan with a drain be placed under the entire SMOKEMASTER® cabinet being installed. This is important in case of water leaks in the piping, ductwork, or in the case of a plugged drain.

Make certain a drainpipe of sufficient size and slope is roughed-in to the bottom of the air cleaner cabinet at the planned location.

## - IMPORTANT -

**This section includes information on the sheet metal, plumbing and electrical installation.**

**Make certain each person involved with the installation is aware of the appropriate subsections in the manual.**

## - CAUTION -

**Do NOT connect the power source until after the air cleaner is completely assembled.**

**If the air cleaner must be turned on for an electrical check, be extremely careful in avoiding electrical shock. Also, take care to avoid the air cleaner's moving parts.**

## Unpacking

Remove all shipping cardboard and banding. Be sure to inspect the packaging material for accessories and/or additional supplies before discarding it.

## When Installing This Product

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. After installation is complete, check out product operation as provided in these instructions.

All components are individually packaged and/or shipped in one large box. Before proceeding, carefully open each carton and visually check for possible damage to the air cleaner components.

1. Cabinet with electronic cells inside.  
(Cells may be packed separately).
2. Water strainer.
3. Drain connection.
4. Accessories, if ordered.
5. If cells shipped separately, check inside unit cabinets for additional parts and accessories.

**If the air cleaner is installed in a location where water damage is possible, install a sheet metal pan with drain (not included) under the air cleaner cabinet and sloped ductwork.**

## Placement of the Air Cleaner

Depending on the placement of the air cleaner (roof top for example) a lifting crane might be necessary. Make sure that the air cleaner and components are properly supported before lifting.

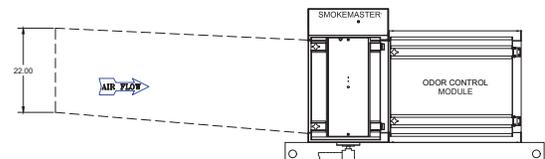
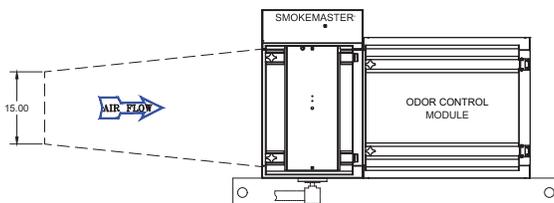
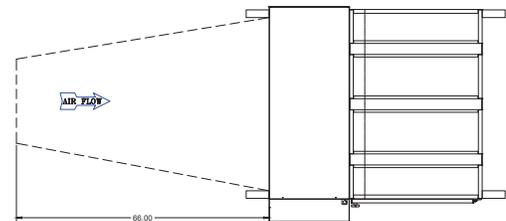
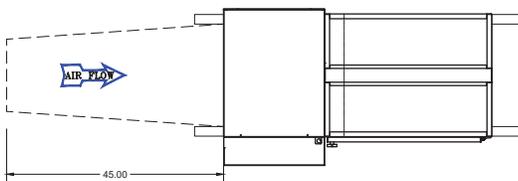
If placing on a rooftop make sure there is proper clearance between the rooftop and the air cleaner. This can be achieved with mounting beams (curbs or dunnage) or by keeping the lifting supports in place.

## Sheet Metal Installation

### Air Distribution, Transitions and Grease Duct

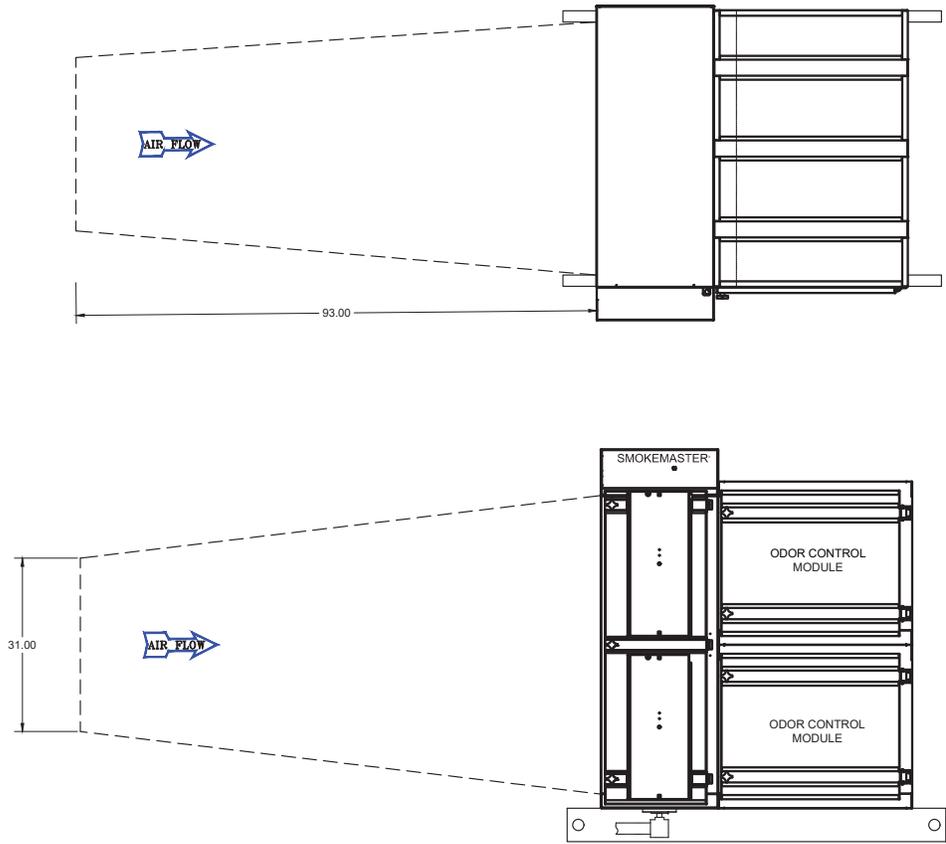
The SMOKEMASTER® operates most efficiently when all system air is delivered across the electronic cell at a uniform velocity. Make sure to allow for adequate straight duct runs directly before the unit inlet, avoid sharp turns directly into the air cleaner.

Gradual transitions to the SMOKEMASTER® cabinet are recommended in all ductwork larger or smaller than the cabinet opening. If transitions are used, they should not exceed 20 degrees (4" rise per linear ft.)



**2000 CFM Ducting Transition**

**4000CFM Ducting Transition**



**8000 CFM Ducting Transition**

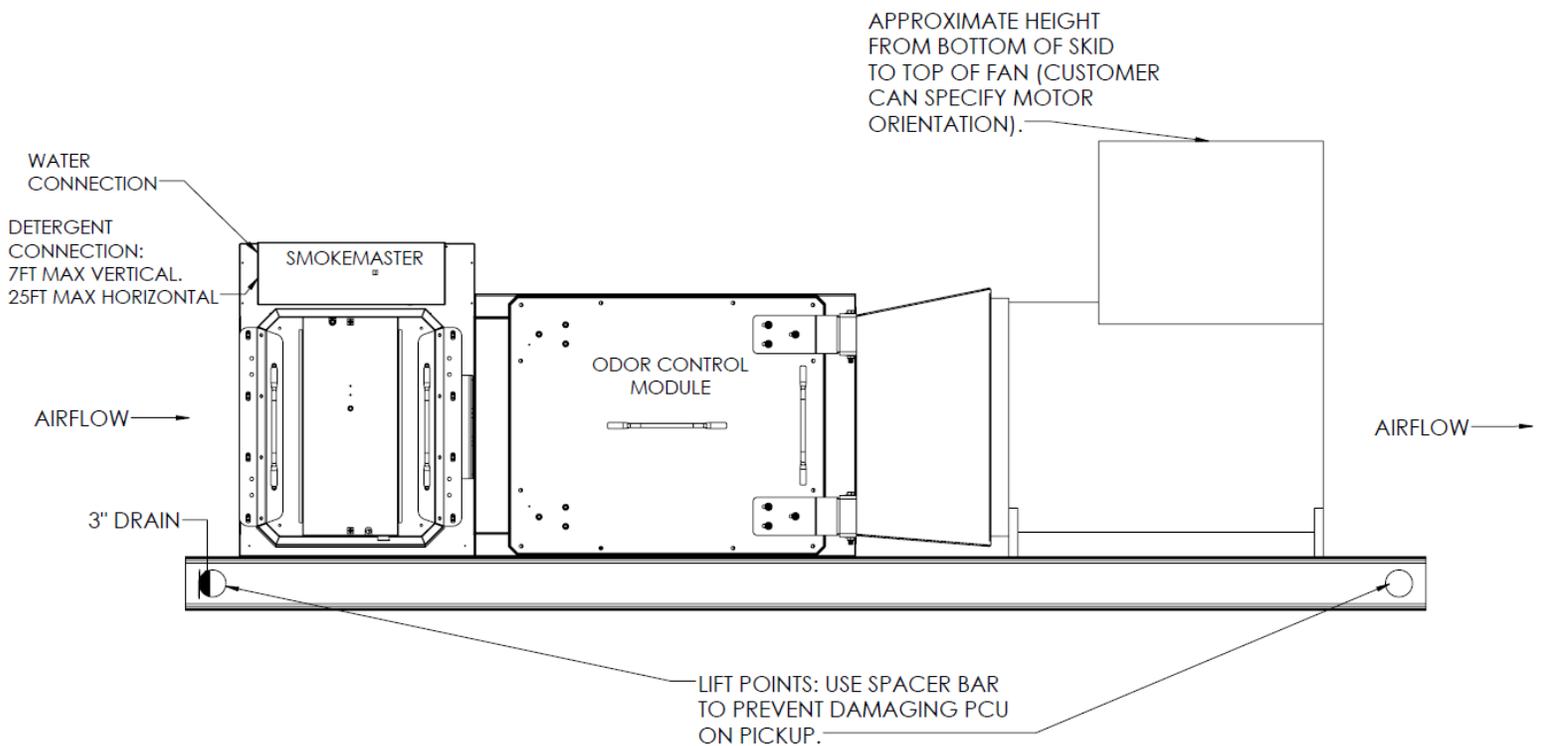
## Install the Air Cleaner

Mount the SMOKEMASTER® Air Cleaner as follows:

1. Fabricate and install the necessary transitions.
2. Set the cabinet in position.

**Note:** Field structural support design is the responsibility of the installer. Use lift points provided and spacer bars when lifting unit.

- a. Consult with a structural engineer if hanging from ceiling to ensure load will not exceed appropriate limits.
- b. If hanging brackets are used, make certain the brackets are strong enough to hold the cabinet and the cabinet is attached firmly to the brackets.
- c. Leave clearance above the control box to remove the cover and apply a wrench to the water strainer.



3. Ductwork preparation

- a. All grease duct should be handled in accordance with appropriate NFPA guidelines.
- b. Transitions and duct connecting to the SMOKEMASTER® system should be continuously welded per NFPA guidelines.

## Field Installation

The SMOKEMASTER® system is designed to come as a prefabricated system that is hooked to ducting on site. Connections for electrical, fire suppression, water, and detergent are supplied with final connection happening in field as well. However, field assembly can be offered upon request if it is required to allow for fitment within the building. This is especially likely for any PCU that is being placed in a preexisting structure. For that reason, these instructions are being provided.

1. Grind off paint at surfaces that are to be welded together.
2. If a stacked unit, drill drain hole in top of the bottom unit.
3. Solid weld the entire perimeter of the AC and odor mod to any adjoining parts of the ducting system.
  - a. If stacked, weld drain as well.

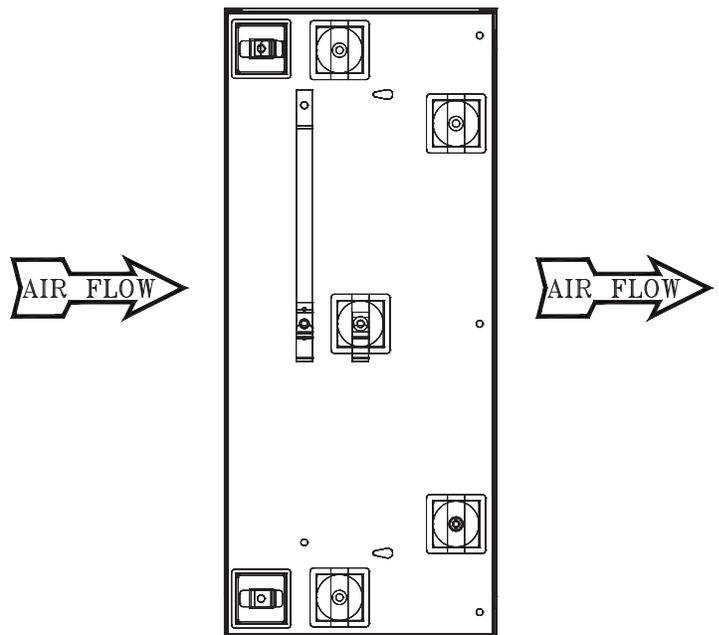
Some of the largest units we offer will require the fan and transition to be installed in the field.

1. Grind off paint on mating surface of transition.
2. Solid weld transition into place.
3. Place fan in line with transition.
4. Bolt fan to SMOKEMASTER® Skid.

**Note:** Any and all seals that cannot be welded are to use 3M 2000deg+ sealant to ensure proper seal. Sealant can be furnished by AQE upon request.

## Filter Placement

1. Open SMOKEMASTER® door by unscrewing all 8 latches with a 9/16" socket head. Then slide the door out and swing open.
2. Slide prefilters into shield channels and push all the way to the back of the cabinet.
3. Insert the electronic cells into the cabinet with THIS SIDE OUT label facing the door opening. Make certain the arrow stamped on the cell points downstream. See Figure 6.
4. Close and secure all latches on the door.



**Figure 6 – Correct Cell Orientation**

## Plumbing Installation (AUTOCLEAN® only)

Model	Recommended Minimum Water Pressure During Wash		Recommended Hot Water Tank Size (Minimum)		Hot Water Per Wash		Washes Per Unit of Detergent		Recommended Wash Water Temperature	Maximum Water Flow Rate @ 30 psi (206.8 kPa)	
	psi	kPa	Gallon	Liter	Gallon	Liter	Gallon	Liter		Gal / min	Liter / min
SMOKEMASTER® 11 (Single Cell)	25	172.4	40	151.4	35	132.5	20	5.3	125 to 160 deg F (52 to 71 deg C)	4	15.1
SMOKEMASTER® 21 (Dual Cell)	25	172.4	50	189.3	60	227.1	10	2.6		7	26.5
SMOKEMASTER® 22 (Quad Cell)	25	172.4	100	378.5	112	423.9	6	1.6		14	53.0

### Hot Water and Detergent Requirements

#### Connect the Hot Water Supply (AUTOCLEAN® only)

Plumbing must comply with applicable codes and regulations. The hot water supply line from the heater to the air cleaner should be 1/2" copper pipe for the SMOKEMASTER® single and dual cell, and 3/4" copper pipe for the SMOKEMASTER® quad cell.

1. Install the water strainer (supplied) in the hot water line ahead of the water valve. See Figure 8. The strainer protects the valves and washing jets from clogging.
2. Attach a pressure regulator valve (not provided) to the water strainer if water pressure is over 75 psi.
3. Connect backflow preventer if required by code.

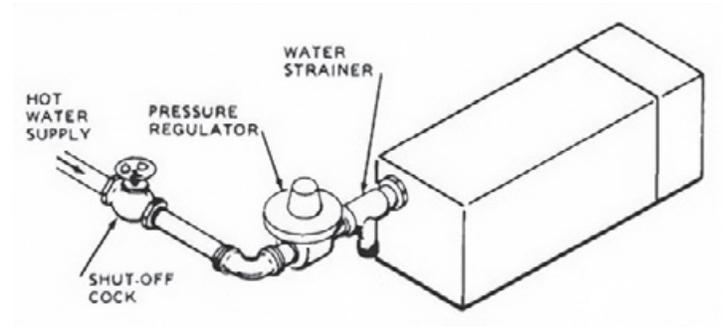


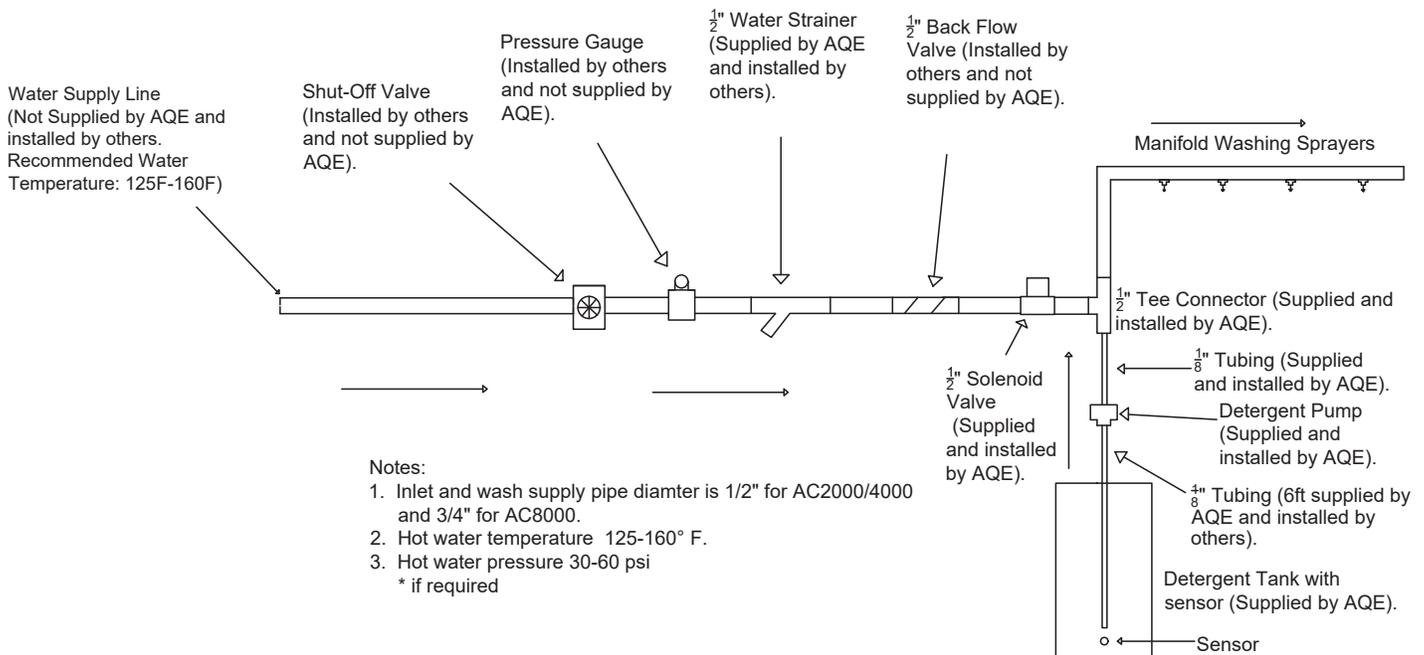
Figure 7a – Typical Installation for Hot Water Supply

## Connecting the Drain

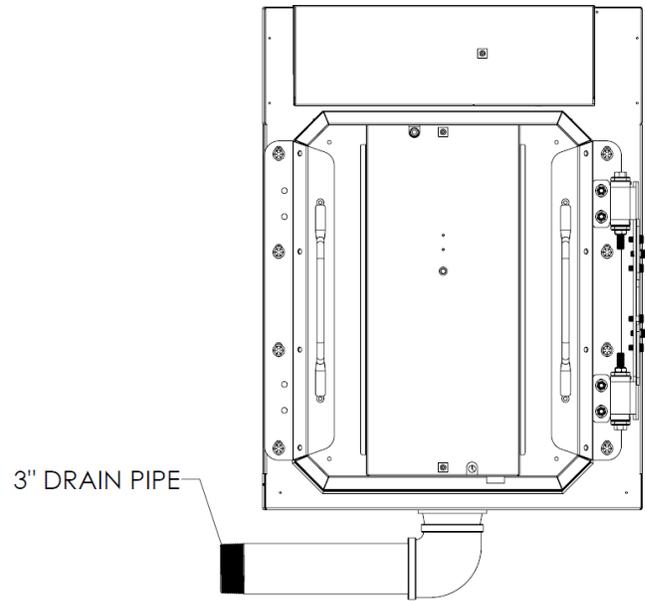
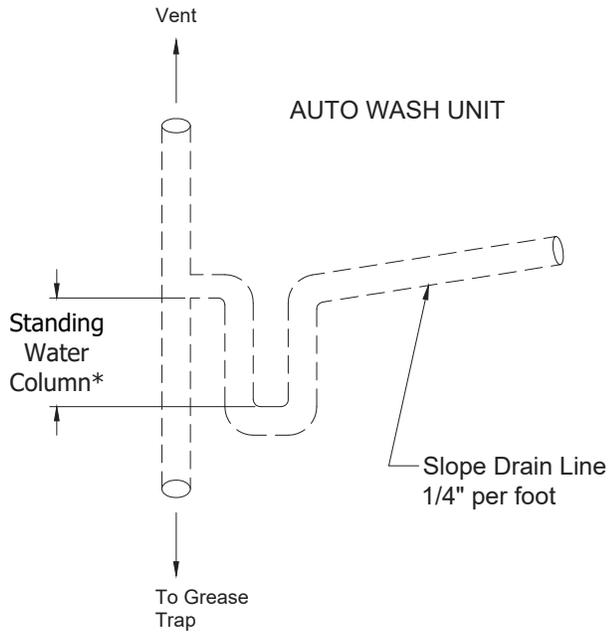
Connect the drain spud (3 inch) in the base of the SMOKEMASTER® cabinet to the waste drain. Use a water trap (P trap) or check valve to prevent sewer odor from entering the air cleaner base and spreading through the air system. See figure 7b below.

Also, terminate the drainpipe at a grease interceptor (grease trap) to intercept and capture grease and other solid materials before they enter the plumbing. See figure 9 on the next page.

Follow local codes. Tests may have to be performed to check total water quality after an air cleaner is installed.

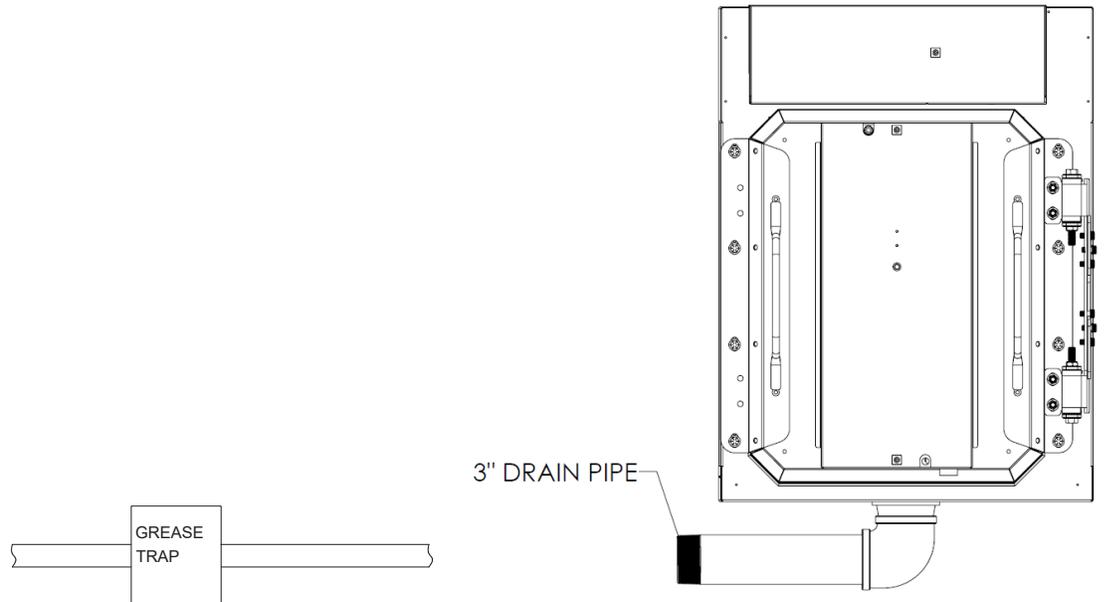


**Figure 7b – Plumbing Schematic**



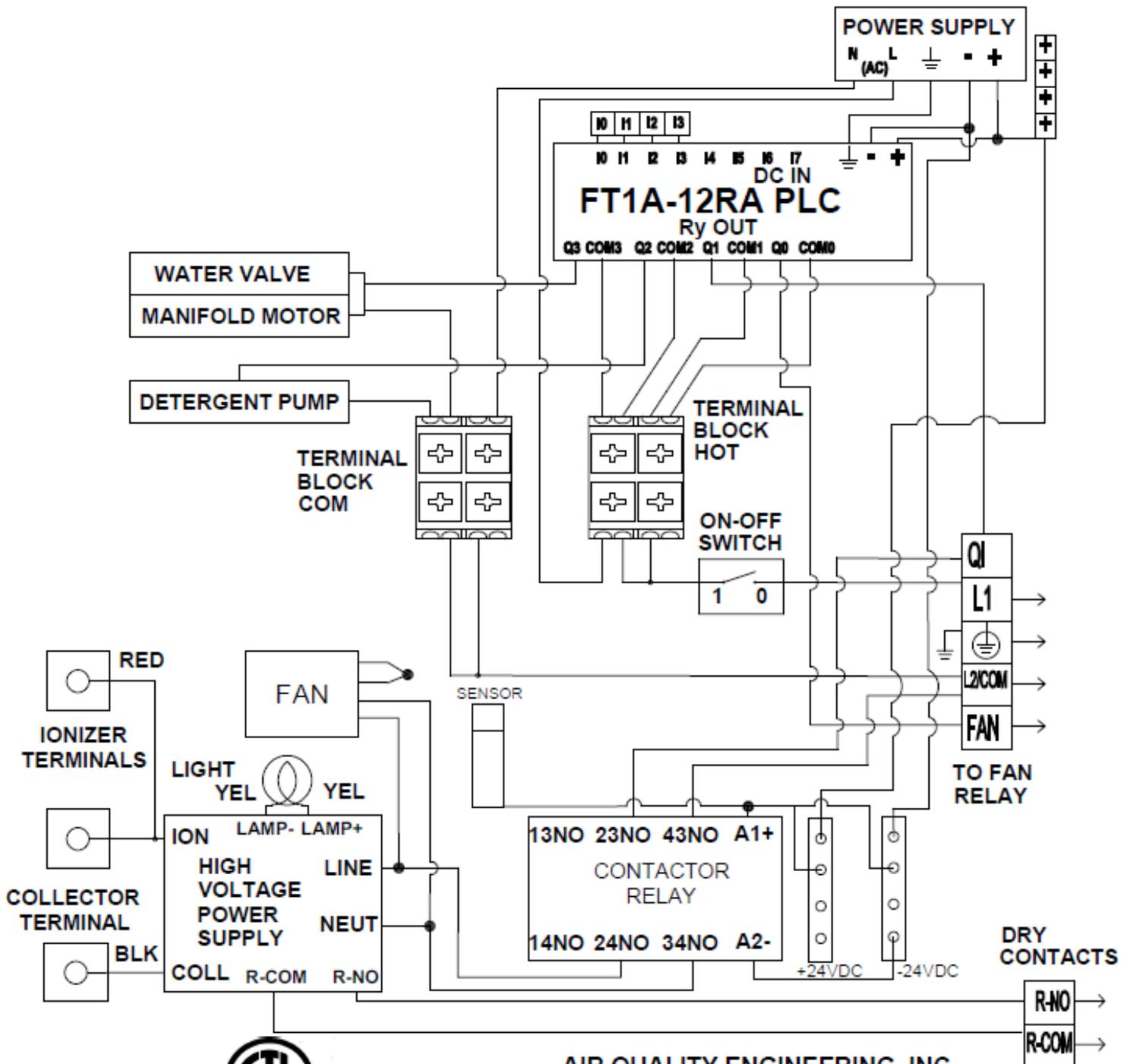
- Notes:
- \*Standing water column should be 1" taller than system TSP (typical 6 inches)

**Figure 8- P Trap Drainage**



GREASE TRAP (NOT SUPPLIED BY AQE AND INSTALLED OTHERS).

**Figure 9-Grease Trap**



**Intertek**  
45978  
CONFORMS TO  
STD UL8782

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WWW.AIR-QUALITY-ENG.COM

MADE IN USA

Figure 10 – Internal Wiring Schematic for SMOKEMASTER® AUTOCLEAN® 11 and 21 for 120/240VAC

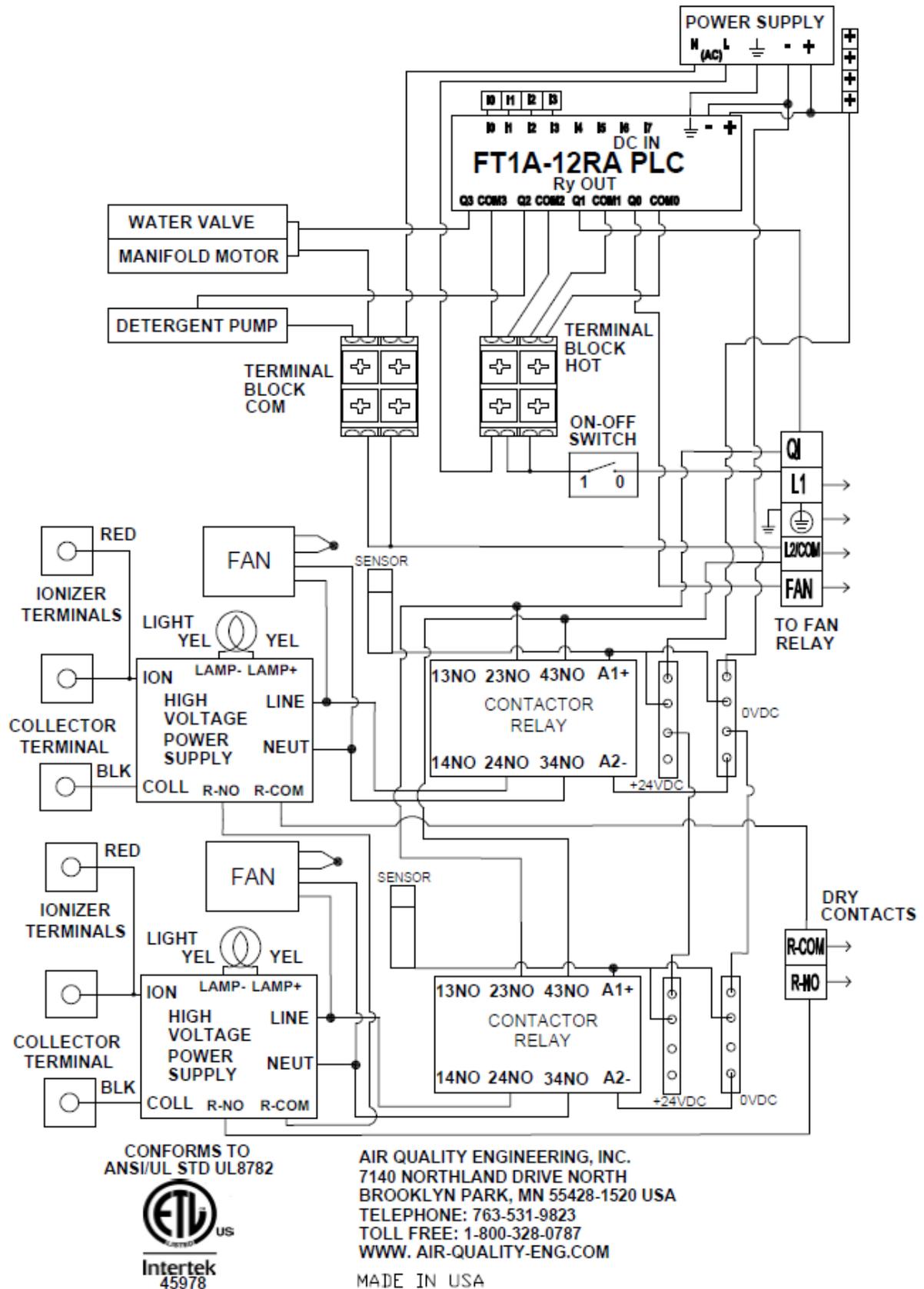


Figure 11 – Internal Wiring Schematic for SMOKEMASTER® AUTOCLEAN® 22 for 120/240VAC

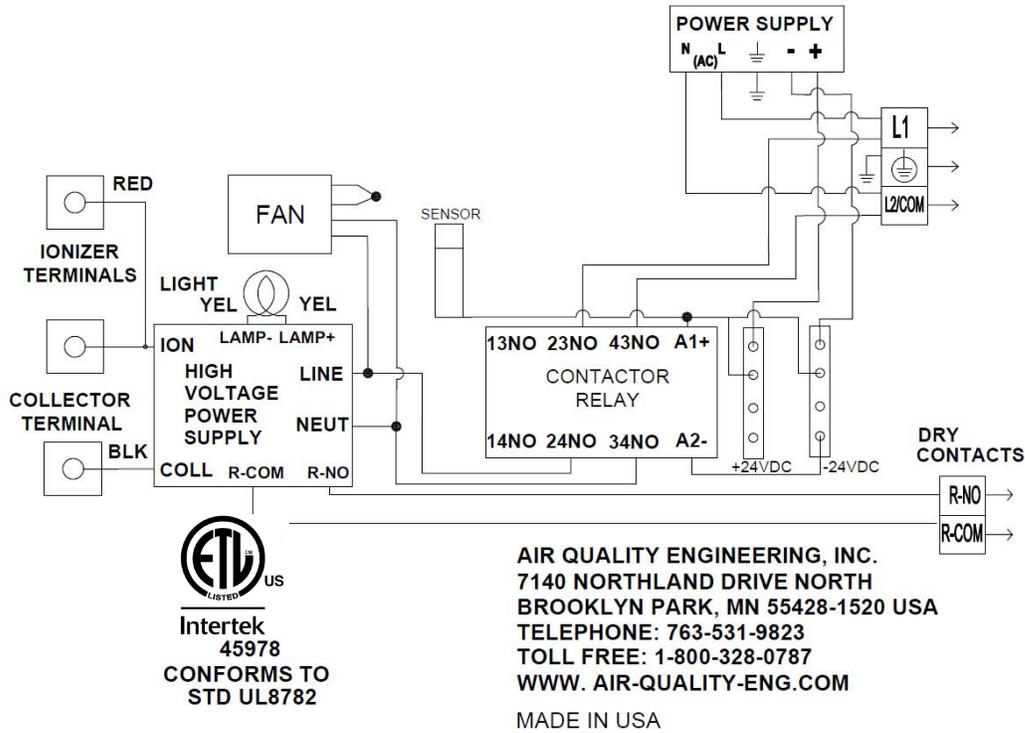


Figure 12 – Internal Wiring Schematic for SMOKEMASTER®11 and 21 for 120/240VAC

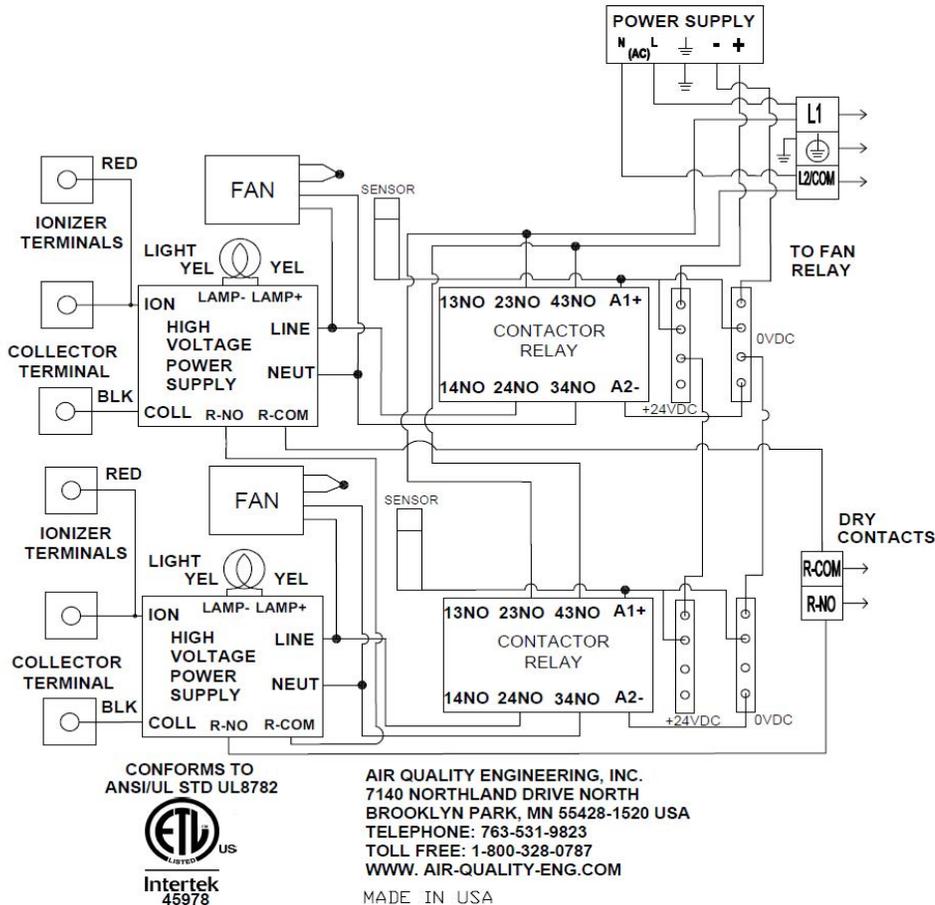
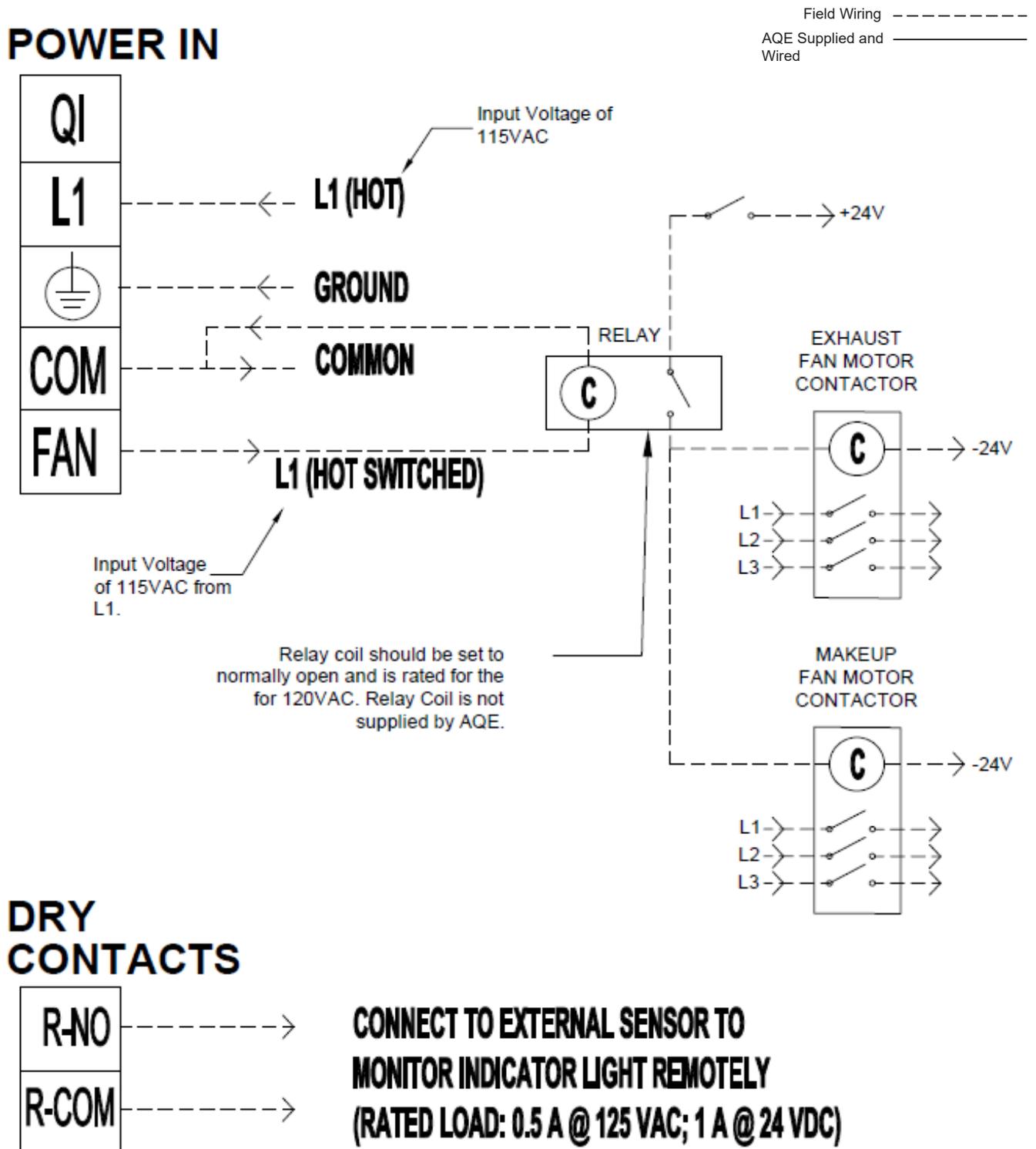


Figure 13 – Internal Wiring Schematic for SMOKEMASTER®22 for 120/240VAC

## Field Wiring

Each SMOKEMASTER® has their own wiring specification for connecting the fan in terms of voltage requirements. Use the diagram that adheres to your voltage.

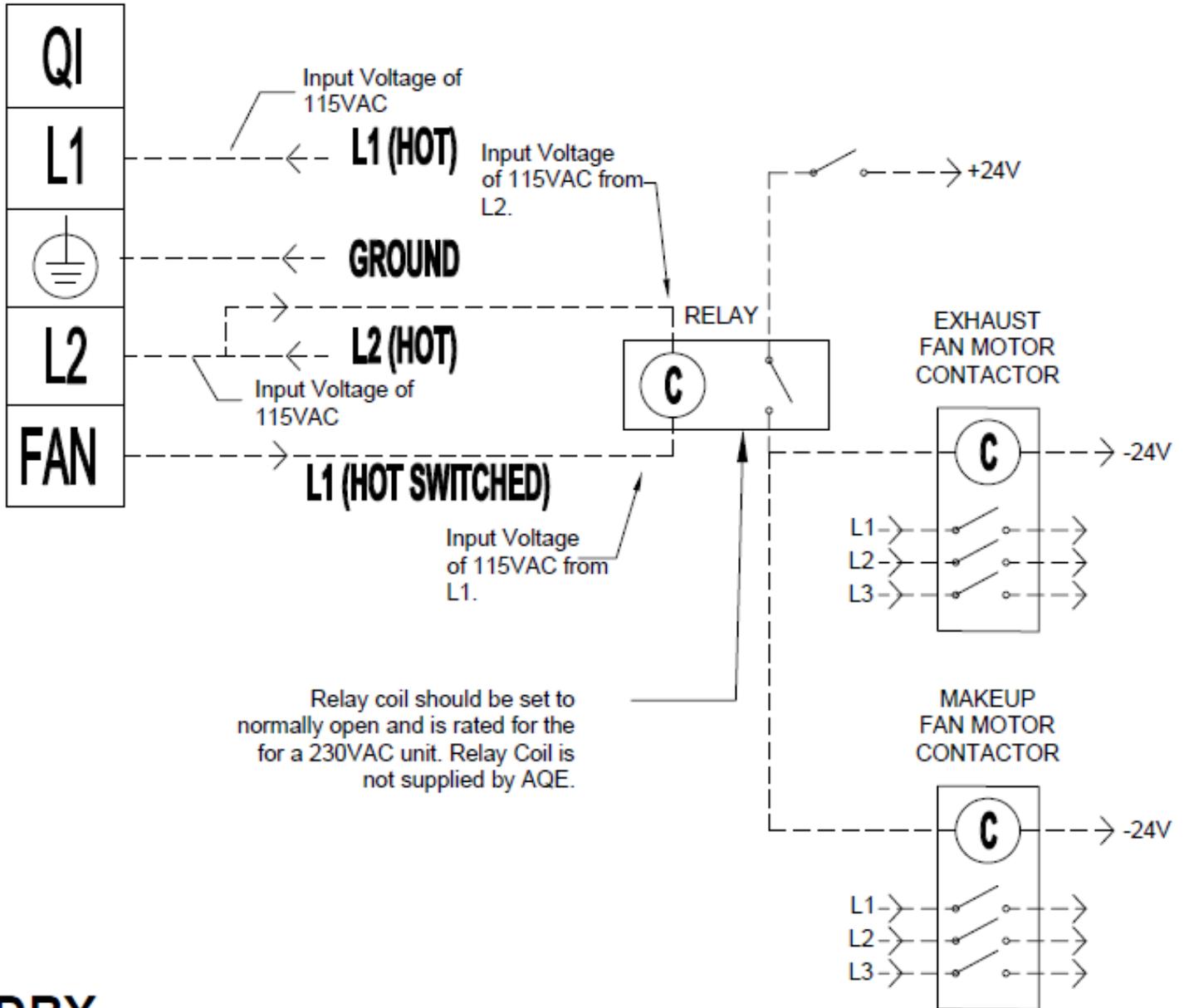
### 115VAC



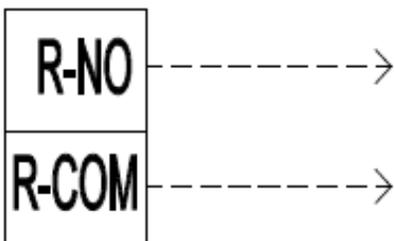
230VAC

## POWER IN

Field Wiring -----  
 AQE Supplied and Wired \_\_\_\_\_

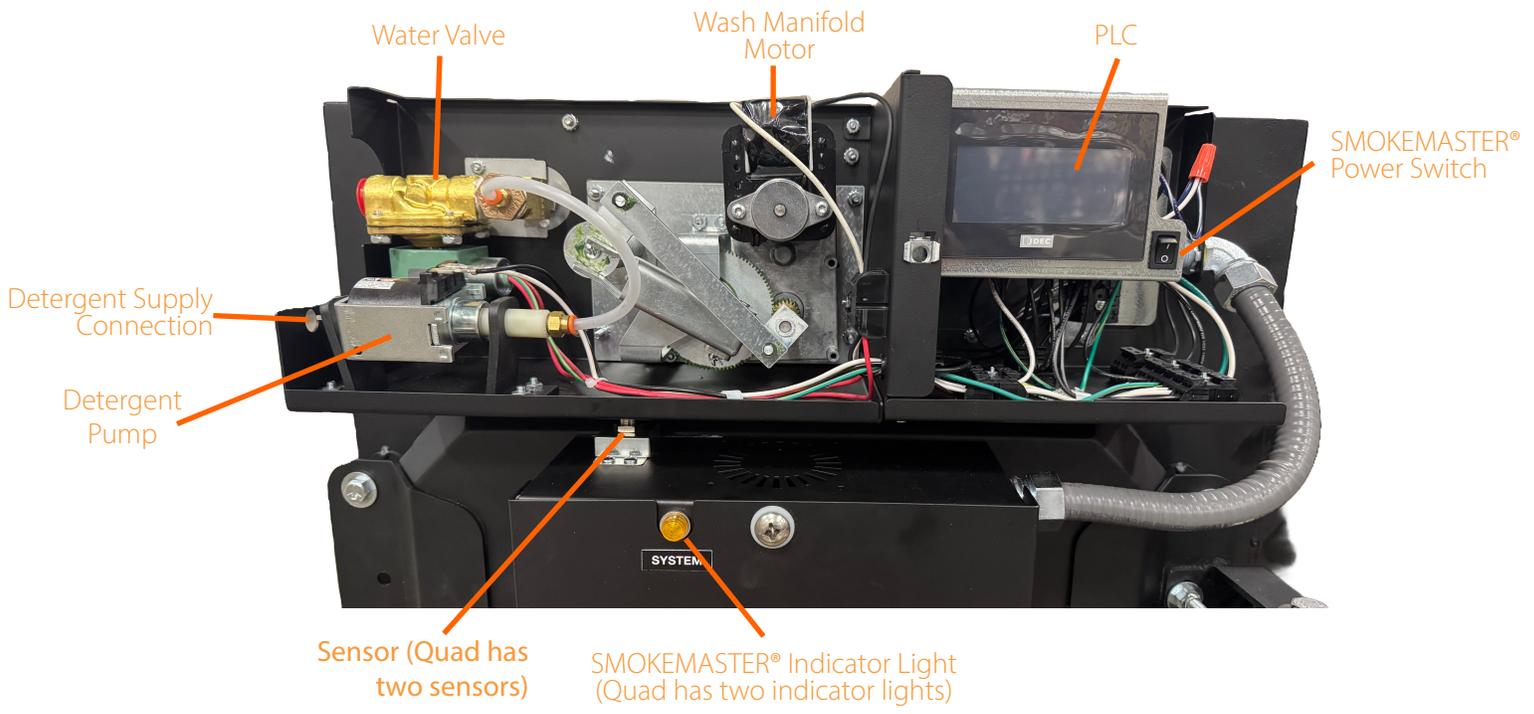


## DRY CONTACTS

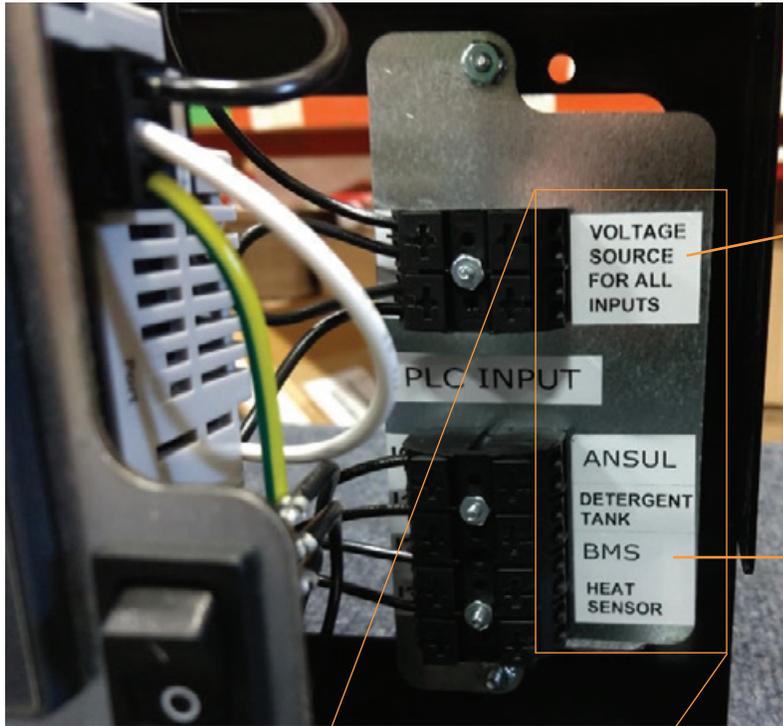


**CONNECT TO EXTERNAL SENSOR TO  
 MONITOR INDICATOR LIGHT REMOTELY  
 (RATED LOAD: 0.5 A @ 125 VAC; 1 A @ 24 VDC)**

Serial Number and Internal Wiring Schematic on Side Panel of Control Box



AUTOCLEAN®



24VDC Source for PLC Inputs

PLC INPUTS (Supply 24VDC to these inputs to trigger different events with the PLC)



SMOKEMASTER® Electrical Connections



## R-102 FIRE SUPPRESSION SYSTEM NOTES:

SMOKEMASTER® Unit	SMOKEMASTER® Nozzles Per Unit*	Odor Control Module Nozzles Per Unit*	Total Nozzles
SMOKEMASTER® 11 (Single Cell unit)	1Nx4	1Nx8 and 2Wx1	1Nx12 and 2Wx1
SMOKEMASTER® 21 (Dual Cell Unit)	1Nx4	1Nx8 and 2Wx2	1Nx12 and 2Wx2
SMOKEMASTER® 22 (Quad Cell Unit)	1Nx8	1Nx16 and 2Wx4	1Nx24 and 2Wx4

**Per Unit\*:** The number and type of nozzles will vary based on the type of configuration, including the number of units wide, the number of passes, or the number of units stacked.

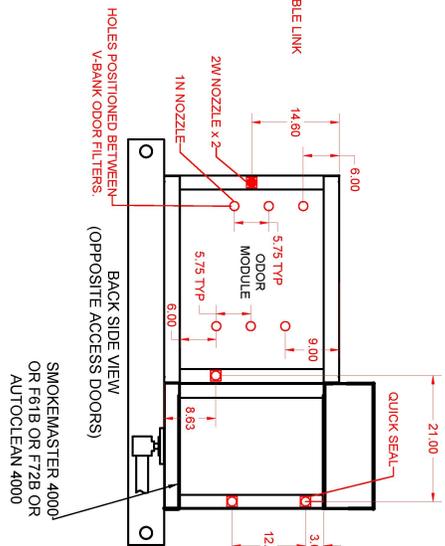
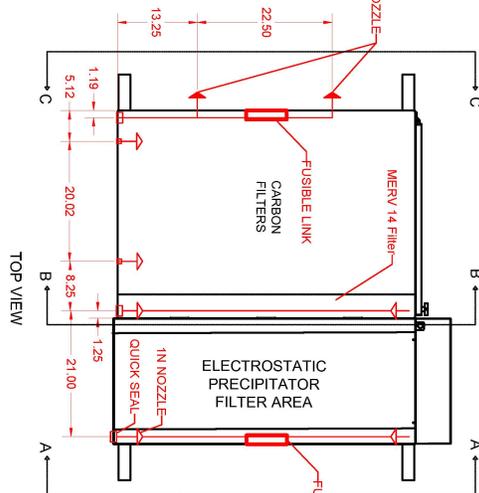
1. All discharge piping to follow the limitations and parameters per the current Ansul R-102 Manual (P/N: 418087).
2. For ductwork beyond the exhaust fan outlet additional protection is required in the form of nozzles and fusible links where appropriate.



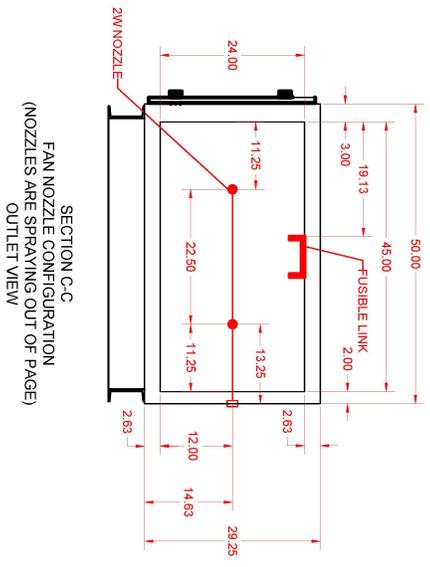
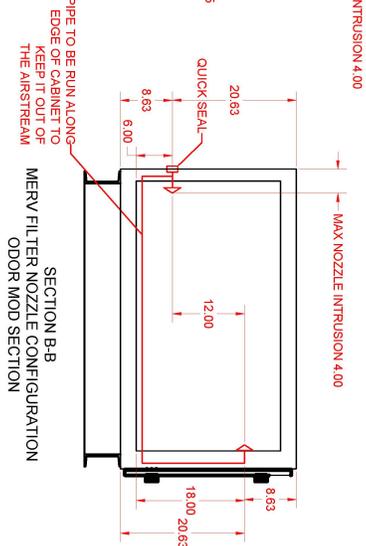
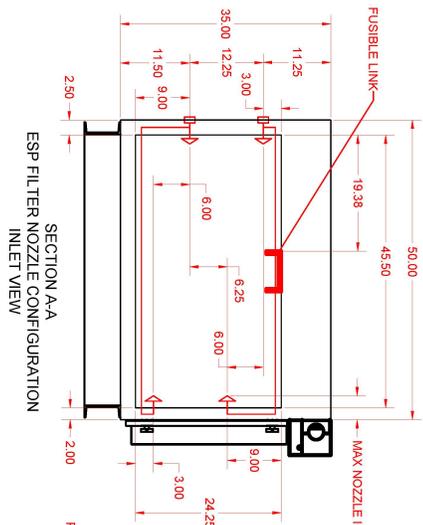
Odor Mod for SMOKEMASTER® 21 WITH ODOR CONTROL MODULE

R-102 FIRE SUPPRESSION SYSTEM NOTES:

1. TOTAL NOZZLES 14 (12 1N AND 2 2W)
- 1.1 4 IN NOZZLES AT AUTOCLEAN/F72 INLET
- 1.2 2 IN AT ODOR MODULE INLET
- 1.3 6 IN IN-BETWEEN CARBON MODULE V-BANK
- 1.4 2 2W NOZZLES AT OUTLET FOR FAN
2. ALL NOZZLE MANIFOLDS COME IN FROM BACK SIDE
- 2.1 THE SPRAY HEAD MANIFOLDS FOR THE ESP AND MERV14 SECTIONS ARE TO HAVE NOZZLE THAT FACE EACH OTHER WITH A SINGULAR EXIT OUT THE BACK OF THE PCU
- 2.2 THE NOZZLES FOR THE CARBON FILTER SECTION HAS NOZZLE THAT ONLY SPRAY TOWARDS THE FRONT OF THE UNIT.
3. ALL NOZZLES SHOULD PROTRUDE INTO THE PCU NO MORE THE 4IN. THERE IS NO MINIMUM PROTRUSION.
4. ALL NOZZLES SHOULD BE POSITIONED HORIZONTAL TO THE AIRFLOW EXCEPT 2W/FAN NOZZLE.
5. ALL DISCHARGE PIPING TO FOLLOW THE LIMITATIONS AND PARAMETERS PER THE CURRENT R-102 MANUAL (P/N: 418087).
6. A FUSIBLE LINK IS TO BE PLACED AT THE INLET AND OUTLET OF THE PCU AND PLACED NOMINALLY CENTER.
7. FOR DUCTWORK BEYOND THE EXHAUST FAN OUTLET ADDITIONAL PROTECTION IS REQUIRED IN THE FORM OF NOZZLES AND FUSIBLE LINKS WHERE APPROPRIATE.
8. ALL DIMENSIONS ARE NOMINAL AND GIVEN IN INCHES.
9. THE ODOR MODULE IS COMPOSED OF THE CARBON FILTER SECTION AND THE MERV14 SECTION AS SHOWN IN THE TOP VIEW.
10. IF UNIT IS CONFIGURED IN DOUBLE PASS SETUP WHERE TWO AUTOCLEANS OR ODOR MODULES ARE PRESENT DUPLICATE ALL THE 1N NOZZLES PLACEMENT FOR THAT MODULE.
- 10.1 THE 2W NOZZLES ARE ALWAYS AT THE OUTLET OF THE PCU REGARDLESS OF NUMBER OF PASSES OF THE OVERALL SYSTEM.



Flow Points				
Nozzle Type	Nozzle Flow Point	Nozzle Qty	Flow Pt	Total
1N	1	12		12
2W	2	2		4



RECOMMENDED ANSUL R-102 PIPING FOR SMOKEMASTER 4000 OR F61B OR F72B OR AUTOCLEAN 4000 AND ODOR CONTROL MODULE

Rev. 3  
Date: 9/14/23  
Approved by: AJN

Air Quality Engineering  
Phone (888) 883-3273  
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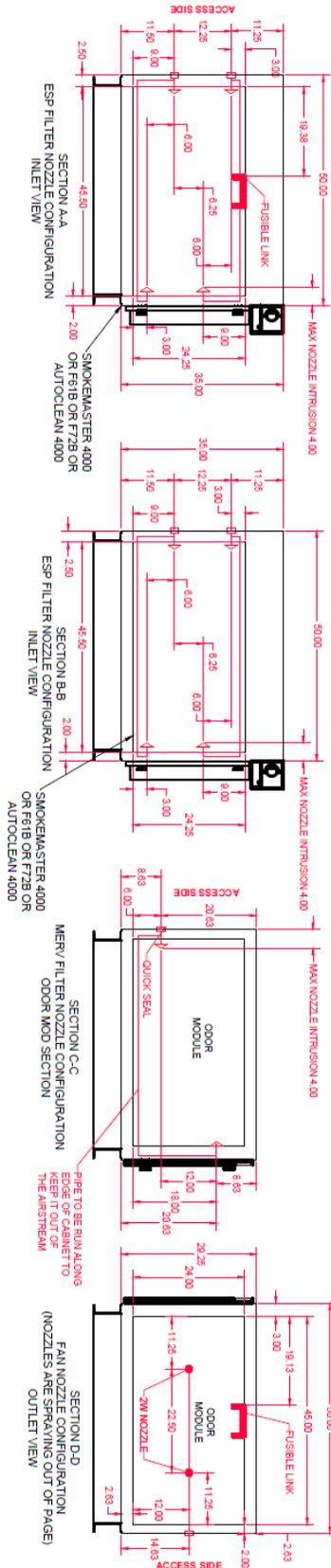
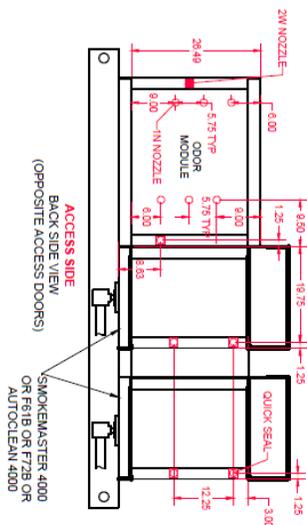
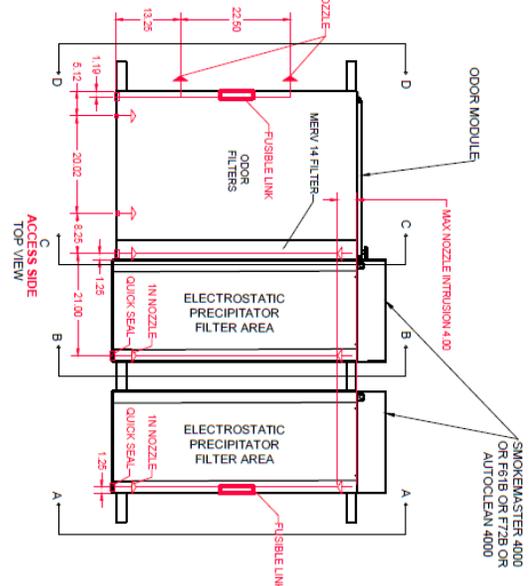


SMOKEMASTER® 21 DOUBLE PASS WITH ODOR CONTROL MODULE

**R-102 FIRE SUPPRESSION SYSTEM NOTES:**

1. TOTAL NOZZLES 18 (16 1IN AND 2 2W)
- 1.1. FIRST PASS OF SMOKEMASTER/AUTOCLEAN/F72/F61
- 1.1.1. 4 IN NOZZLES AT INLET
- 1.2. SECOND PASS OF SMOKEMASTER/AUTOCLEAN/F72/F61
- 1.2.1. 4 IN NOZZLES AT INLET
- 1.3. FIRST PASS OF ODOR MODULE
- 1.3.1. 2 IN NOZZLES AT INLET
- 1.3.2. 2 IN NOZZLES BETWEEN EACH ODOR MODULE V-BANK
- 1.3.3. 2W NOZZLE AT OUTLET FOR EACH ODOR MODULE
2. ALL NOZZLES ARE POSITIONED HORIZONTAL TO THE BACK SIDE OF THE UNIT
- 2.1. THE SPRAY HEAD MANIFOLDS FOR THE ESP AND MERV/14 SECTIONS ARE TO HAVE NOZZLE THAT FACE EACH OTHER WITH A SINGULAR EXIT OUT THE BACK OF THE PCU
- 2.2. THE NOZZLES FOR THE ODOR FILTER SECTION HAS NOZZLE THAT ONLY SPRAY TOWARDS THE FRONT OF THE UNIT
- 2.3. ALL NOZZLES ARE POSITIONED HORIZONTAL TO THE AIRFLOW EXCEPT THE 2W FAN NOZZLE
3. ALL NOZZLES PROTRUDE NO MORE THAN 4IN INTO THE PCU
4. ALL DISCHARGE PIPING TO FOLLOW THE LIMITATIONS AND PARAMETERS PER THE CURRENT R-102 MANUAL (PIN: 418087)
5. A FUSIBLE LINK IS TO BE PLACED AT THE INLET AND OUTLET OF THE PCU AND PLACED NOMINALLY CENTER
6. PROTECTION IS REQUIRED IN THE FORM OF NOZZLES AND FUSIBLE LINKS WHERE APPROPRIATE
7. ALL DIMENSIONS ARE NOMINAL AND GIVEN IN INCHES
8. IF THE UNIT IS CONFIGURED IN DOUBLE PASS SETUP WHERE TWO AUTOCLEANS OR ODOR MODULES ARE PRESENT, THE 1IN NOZZLES PLACEMENT WILL BE DUPLICATED FOR THAT MODULE
- 9.1. THE 2W NOZZLES ARE ALWAYS AT THE OUTLET OF THE PCU REGARDLESS OF NUMBER OF PASSES OF THE OVERALL SYSTEM.

Flow Points			
Nozzle Type	Nozzle Flow Point	Nozzle Qty	Total Flow Pt
1N		1	16
2W		2	4



ANSUL R-102 PIPING FOR  
SMOKEMASTER 4000 OR F61-B  
OR F72-B OR AUTOCLEAN 4000  
DOUBLE PASS AND ODOR  
CONTROL MODULE

AGE 4000CP OMAANSUL.DRW  
Rev. A  
Date: 6/7/2024  
Approved by: IK

Air Quality Engineering  
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SMOKEMASTER® 21 DOUBLE PASS WITH ODOR CONTROL MODULE DOUBLE PASS

**R-102 FIRE SUPPRESSION SYSTEM NOTES:**

1. TOTAL NOZZLES 26 (24 IN AND 2 2W)
- 1.1. FIRST PASS OF SMOKEMASTER/AUTOCLEAN/F728/91
- 1.1.1. 4 IN NOZZLES AT INLET
- 1.2. SECOND PASS OF SMOKEMASTER/AUTOCLEAN/F728/91
- 1.2.1. 6 IN NOZZLES AT INLET
- 1.3. FIRST PASS OF ODOR MODULE
- 1.3.1. 2 IN NOZZLES AT INLET
- 1.3.2. 6 IN NOZZLES IN-BETWEEN EACH ODOR MODULE V-BANK
- 1.4. SECOND PASS OF ODOR MODULE
- 1.4.1. 2 IN NOZZLES AT INLET
- 1.4.2. 6 IN NOZZLES IN-BETWEEN EACH ODOR MODULE V-BANK
- 1.4.3. 2 W NOZZLES AT OUTLET FOR FAN
2. ALL NOZZLE MANIFOLDS COME IN FROM BACK SIDE
- 2.1. ACCESS SIDE IS ON THE BACK SIDE OF THE UNIT.
- 2.2. THE SPRAY HEAD MANIFOLDS FOR THE ESP AND MERV 14 SECTIONS ARE TO HAVE NOZZLE THAT FACE EACH OTHER WITH A SINGULAR EXIT OUT THE BACK OF THE PCU
- 2.3. THE NOZZLES FOR THE ODOR FILTER SECTION HAS NOZZLE THAT ONLY SPRAY TOWARDS THE FRONT OF THE UNIT.
3. ALL NOZZLES ARE POSITIONED HORIZONTAL TO THE AIRFLOW EXCEPT THE NOZZLES PROTRUDE NO MORE THAN 4IN INTO THE PCU
4. ALL NOZZLES PROTRUDE NO MORE THAN 4IN INTO THE PCU
5. ALL DISCHARGE PIPING TO FOLLOW THE LIMITATIONS AND PARAMETERS PER THE CURRENT R-102 MANUAL (P/N 418887)
6. A FUSIBLE LINK IS TO BE PLACED AT THE INLET AND OUTLET OF THE PCU AND PLACED NOMINALLY CENTER.
7. FOR DUCTWORK BEYOND THE EXHAUST FAN OUTLET ADDITIONAL PROTECTION IS REQUIRED IN THE FORM OF NOZZLES AND FUSIBLE LINKS WHERE APPROPRIATE.
8. ALL DIMENSIONS ARE NOMINAL AND GIVEN IN INCHES.
9. IF THE UNITS IS CONFIGURED IN DOUBLE PASS SETUP WHERE TWO AUTOCLEANS OR ODOR MODULES ARE PRESENT, THE IN NOZZLES PLACEMENT WILL BE DUPLICATED FOR THAT MODULE.
- 9.1. THE 2W NOZZLES ARE ALWAYS AT THE OUTLET OF THE PCU REGARDLESS OF NUMBER OF PASSES OF THE OVERALL SYSTEM.

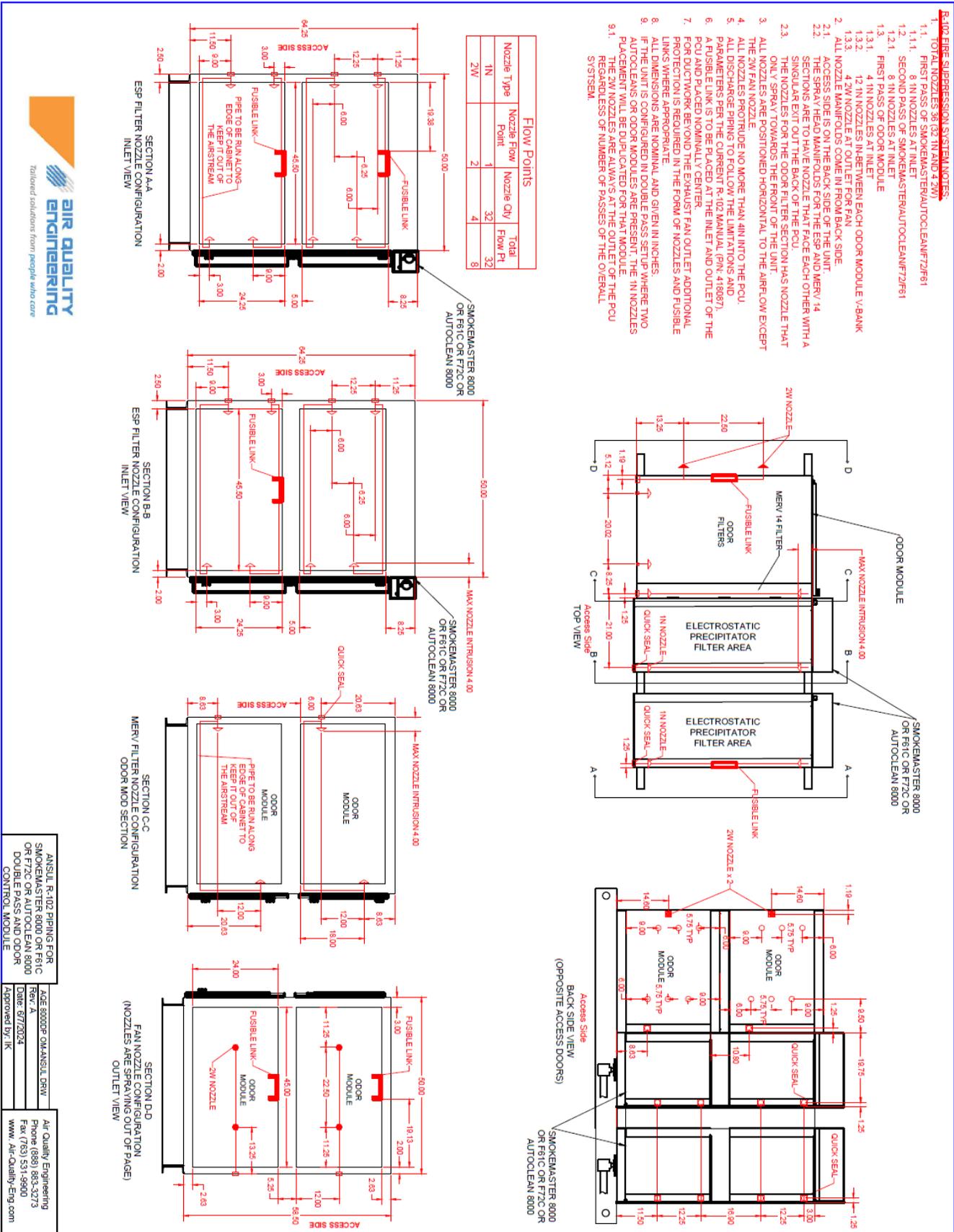
Flow Points			
Nozzle Type	Nozzle Flow Point	Nozzle Qty	Total Flow Pt
IN	1	24	24
2W	2	2	4

**ANSUL R-102 PIPING FOR SMOKEMASTER 4000 OR F728 OR F728 OR AUTOCLEAN 4000 DOUBLE PASS AND ODOR CONTROL MODULE DOUBLE PASS**

AGE 4000P-01Q-ANSUL DRW  
Rev. A  
Date: 6/7/2024  
Approved by: JK

Air Quality Engineering  
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SMOKEMASTER® 22 DOUBLE PASS WITH ODOR CONTROL MODULE



Tailored solutions from people who care

ANSI A-402 PIPING FOR SMOKEMASTER 8000 OR FTZC OR AUTOCLEAN 8000 DOUBLE PASS AND ODOR CONTROL MODULE

AGE 83000P OKANSILU DRW  
 Rev. A  
 Date: 6/7/2024  
 Approved by: JK

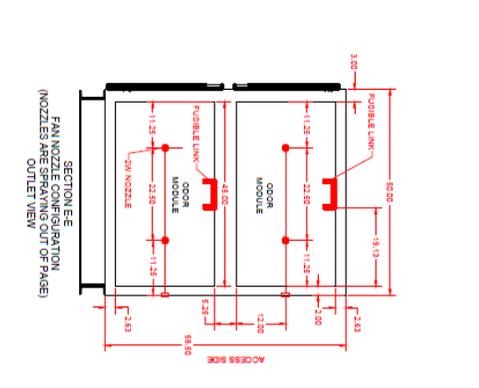
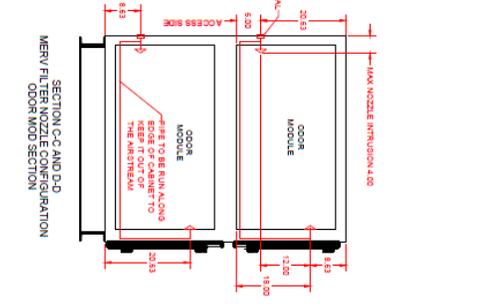
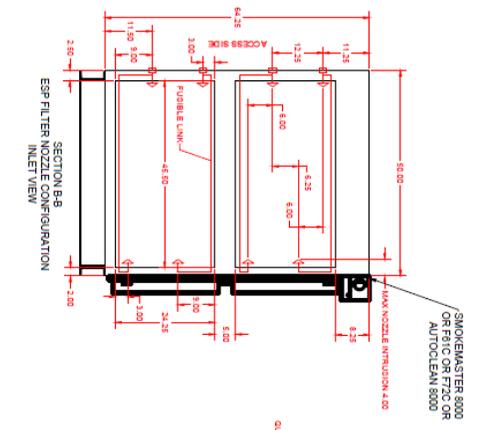
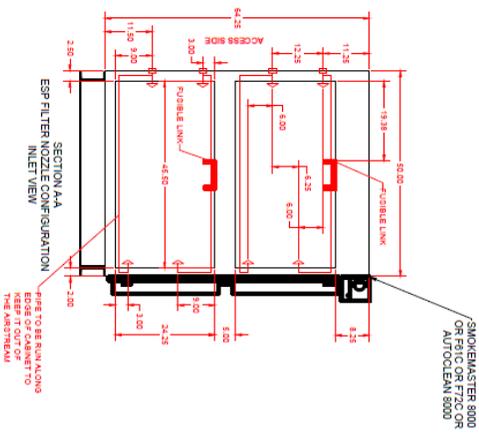
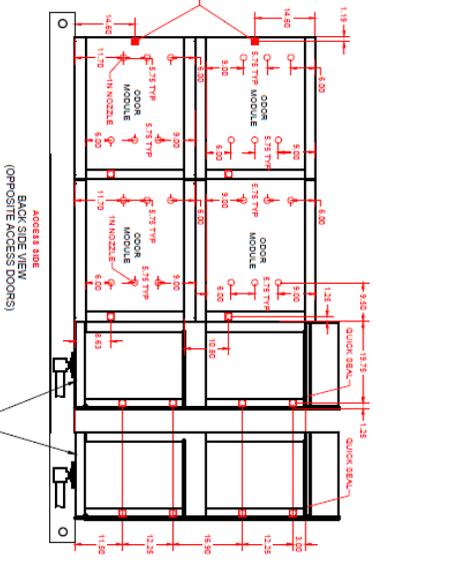
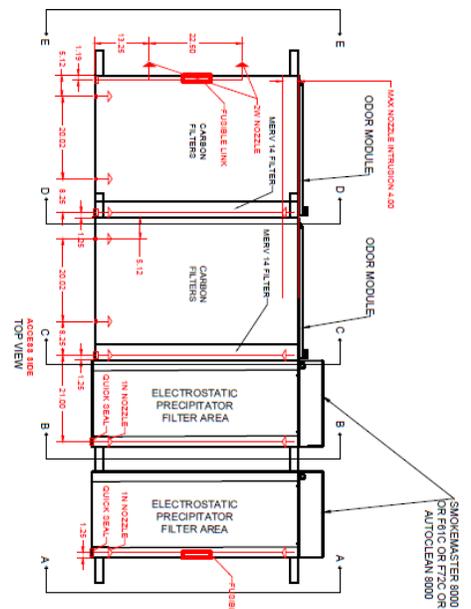
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SMOKEMASTER® 22 DOUBLE PASSWITH ODOR CONTROL MODULE DOUBLE PASS

- SMOKEMASTER SUPERSESSION SYSTEM NOZZLES**
1. TOTAL NOZZLES 22 (8 IN FAN AND 21W)
  - 11.1. FAN NOZZLES 8 (4 IN FAN AND 4 IN FAN)
  12. SECOND PASS OF SMOKEMASTER/AUTOCLEAN/F78R1
  - 12.1. 8 IN NOZZLES AT INLET
  - 13.1. FANS 4 (1 IN NOZZLE 53)
  - 13.2. 12 IN NOZZLES IN-BETWEEN EACH ODOR MODULE VSANK
  - 14.1. 4 IN NOZZLES AT INLET
  - 14.2. 4 IN NOZZLES AT INLET FOR EACH ODOR MODULE VSANK
  - 14.3. 4 IN NOZZLE AT OUTLET FOR FAN
  - 14.4. 4 IN NOZZLES AT OUTLET FOR FAN
  21. ACCESS SIDE IS ON THE BACK SIDE OF THE UNIT
  22. SECTION A TO HAVE NOZZLES ON THE EDGE EACH OTHER WITH A SINGULAR EXIT OUT THE BACK OF THE POU
  23. THE NOZZLES FOR THE ODOR FILTER SECTION HAS NOZZLE THAT ONLY SPRAY TOWARDS THE FRONT OF THE UNIT
  3. ALL NOZZLES POSITIONED HORIZONTAL TO THE AIRFLOW EXCEPT THE 21W FAN NOZZLE
  4. ALL NOZZLES POSITIONED NO MORE THAN 4IN INTO THE POU
  5. ALL DISCHARGE PIPING TO FOLLOW THE LIMITATIONS AND PARAMETERS PER THE CURRENT R-102 MANUAL (P/N 41887)
  6. FAN AND POU ARE POSITIONED IN THE CENTER OF THE POU AND PLACED NOMINALLY CENTER
  7. FOR DUCTWORK BEYOND THE EXHAUST FAN OUTLET ADDITIONAL PROTECTION IS REQUIRED IN THE FORM OF NOZZLES AND FUSIBLE LINKS WHENEVER THE UNIT IS GIVEN IN NOSES
  8. ALWAYS WEAR THE PROTECTIVE GEAR
  9. IF THE UNIT IS CONFIGURED IN DOUBLE PASS SETUP WHERE TWO AUTOCLEANS OR ODOR MODULES ARE PRESENT THE IN NOZZLES PLACEMENT WILL BE DUE TO THE PARTIAL MODULE
  - 8.1. REGARDLESS OF NUMBER OF PASSES OF THE OVERALL SYSTEM

Flow Points			
Nozzle Type	Nozzle Flow Point	Nozzle Qty	Total Flow Pt
1N	1	48	48
2W	2	4	8



ANNUAL R-102 SPRING FOR  
 SMOKEMASTER 8000 OR FTFC OR  
 FT2C OR FT3C OR FT4C OR  
 FT5C OR FT6C OR FT7C OR  
 FT8C OR FT9C OR FT10C OR  
 FT11C OR FT12C OR FT13C OR  
 FT14C OR FT15C OR FT16C OR  
 FT17C OR FT18C OR FT19C OR  
 FT20C OR FT21C OR FT22C  
 DOUBLE PASS  
 Approved by JK

DATE 07/2024  
 DATE 07/2024  
 DATE 07/2024  
 DATE 07/2024

Air Quality Engineering  
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## General Component Inspection

1. Check for proper orientation of the electronic cells, protective Impingers must be on both sides of the electronic cells. Airflow arrows must point downstream.
2. For AUTOCLEAN® Be sure the spray manifold is located in the cabinet with nozzles pointed toward the cells.
3. Be sure that the electronic cells and impingers are clean, dry and free of foreign objects.

## Check the Junction Box Connections

Check all electrical connections to make certain they are correct and complete. Refer to the hookup diagrams (Figures 10 & 11). The power ratings for these units are either 115VAC, 1.5 Amps or 230VAC, 0.75 Amps.

Also, make sure to check all field wiring for sensor hookups and fan.

## Connect the Detergent Tank (AUTOCLEAN® only)

1. Insert the plastic hose (supplied) over the plastic barb detergent pump connector.
2. Insert the hose into the stainless-steel pickup tube and then into the tank. Make certain the metal tube rests on the bottom of the tank.
3. Fill tank with AUTOCLEAN® detergent (do not dilute), close the top of the tank with the stopper provided to prevent debris from falling into the detergent.
4. Make low voltage connections to PLC input.

**Note:** A single detergent tank can feed up to two AUTOCLEAN® units. Maximum horizontal distance from the air cleaner to the detergent bottle is 25 ft., maximum vertical distance is 7 ft.

## Electrical Installation

All wiring must comply with applicable local codes and ordinances. Wires going into terminal blocks must be copper and 12-20 Ga.

The power supply to the SMOKEMASTER® air cleaner must be either 120V 60 Hz, or 220-240V, 50 Hz.

Refer to the SMOKEMASTER® nameplate for the proper voltage for your air cleaner.

## Check the Plumbing Connections

Check to be sure all plumbing work is complete. The hot water supply and detergent lines (AUTOCLEAN® only) are sealed with thread tape, tightened, and will not leak. Make sure the drain is fully sealed and connected to a grease trap.

## Check the Electronic Cells and the Power Supply

With all components in place and the access door closed turn on the electronic air cleaner.

Check the indicator light on the power door. It should be on. With the power supply energized, momentarily open the access door. When the door opens the indicator light should go out.

If the power supply and electronic cells do not check out properly in this procedure, refer to the **Troubleshooting** section for additional checks.

## Checklist for SMOKEMASTER® Kitchen Exhaust PCU Startup

- The installation order of the system in terms of airflow should be; SMOKEMASTER® first, then odor control module, and lastly the fan. The SMOKEMASTER® and odor control module are not designed to be under positive pressure, the fan must pull air through these units, do not push air through them.
- Each SMOKEMASTER® is wired properly.
- If ordered, the optional HMI is connected to each SMOKEMASTER® unit and each SMOKEMASTER® unit can be seen on the HMI display.
- Water is plumbed to each SMOKEMASTER® Unit if purchased with AUTOCLEAN® option.
- Ensure that drain is properly connected.
- Detergent line is connected with stainless dip tube on the end and inserted into detergent tank (applies to AUTOCLEAN® models only).
- When starting the fan for the first time it is best to empty the SMOKEMASTER® unit(s) of all the filters (electrostatic cells, pre/post filters, safety filters and carbon panels), this allows the fan to clear the duct of construction debris and welding slag. Once that is done reinstall the previously removed filters.
- Cells are installed with the handle closest to the door and the airflow arrow pointing in the direction of the airflow.
- Mesh prefilter(s) and postfilter(s) are installed in the SMOKEMASTER®.
- If odor control module was ordered make sure Safety Filter(s) and sorbent media panels are installed.
- All indicator lights for the SMOKEMASTER® are on steady when the PLC is switched to Air Cleaning mode, the doors are closed, and cells are installed. Occasional snapping is typical, however frequent flashing of the light and/or snapping is not typical. If this is the case make sure to run the system through one wash to ensure any debris is cleaned off the cells due to construction.
- If wired per Air Quality Instructions under normal operating conditions the SMOKEMASTER® should turn on and off at the same time as the fan when switching the PLC between paused mode and Air Cleaning mode.
- If the unit is installed outside there must be a weather enclosure over the SMOKEMASTER® electrical components. Also, provisions should be made to ensure water, drain and detergent lines are properly protected against freezing (by others).

**\*\*\*\*\* THE FOLLOWING STEPS ARE FOR AUTOCLEAN® ONLY \*\*\*\*\***

- Make sure the wash times are set on the PLC for each AUTOCLEAN® or the PLC is wired to an external system that will be triggering the wash. Do not wash all AUTOCLEAN® units at the same time and for stacked units wash the top unit first.
- Test the wash system to make sure it is running properly. Make sure to test the wash when the fan is running. The following is how the wash system should function:
  1. When the wash starts the fan and precipitator should turn off.
  2. About 30 seconds later the AUTOCLEAN® should turn the manifold motor on, the detergent pump on, and main water valve will open.
  3. About 90 seconds later the AUTOCLEAN® should turn off the detergent pump.
  4. About 4 minutes later the AUTOCLEAN® should turn everything off and close the main valve.
  5. When the AUTOCLEAN® is done washing the fan will turn on for about 40 minutes if the fan is turned on. This is to aid in drying if the AUTOCLEAN® needs to be washed during the restaurants operating hours. If the AUTOCLEAN® is washed during non-operating hours and there will be several hours after the wash has run before the restaurant opens the system can be left to drip dry.
  6. When the system is done drying the PLC will return to its last state unless Sleep after Wash option is turned on, which will make the AUTOCLEAN® go into paused mode when the wash is completed.
- While the AUTOCLEAN® is washing make sure there are no leaks near the main water valve and wash manifold motor.

## Check the Automatic Washing Cycle (AUTOCLEAN® only)

The wash cycle for the electronic cell is controlled by the built in Programmable Logic Controller (PLC).

Initiate a wash cycle manually making sure the four cycles are running properly. When you get to the dry cycle it can take up to an hour for the cells to dry with the fan on.

The four cycles of the wash are:

1. Shutdown (fan turns off along with the high voltage power supply) light off
2. Detergent (water valve is open, detergent pump and manifold motor are running)
3. Rinse (water valve is open and manifold motor is running) turns off)
4. Dry (fan is allowed to turn on)

**Note:** When the wash cycle is done the fan can be controlled as normal and the high voltage power supply (system light) turns on, or a SLEEP mode can be selected.

The manifold motor operates a cam and gear assembly to slowly move the manifold (water pipe and spray nozzles) during the wash cycle. Make sure there is complete coverage of the cells during a wash cycle.

**- CAUTION -**

**Always disconnect the power to the SMOKEMASTER® before working on or near the air cleaner.**

## When to Wash the Electronic Cells

To maintain peak performance and efficiency, the electronic cells and spray shields in the electronic air cleaner must be washed regularly. This washing is necessary to remove the dirt particles accumulated during the air cleaning process.

The cells and screens should be visually checked for dirt. Experience will probably be the best indicator of how often the cells and screens should be cleaned. For example, when operating in a thick smoke or particularly dirty atmosphere, the cells may need washing as often as every day of the week. If the dirt accumulation is light, the period between washings can be lengthened.

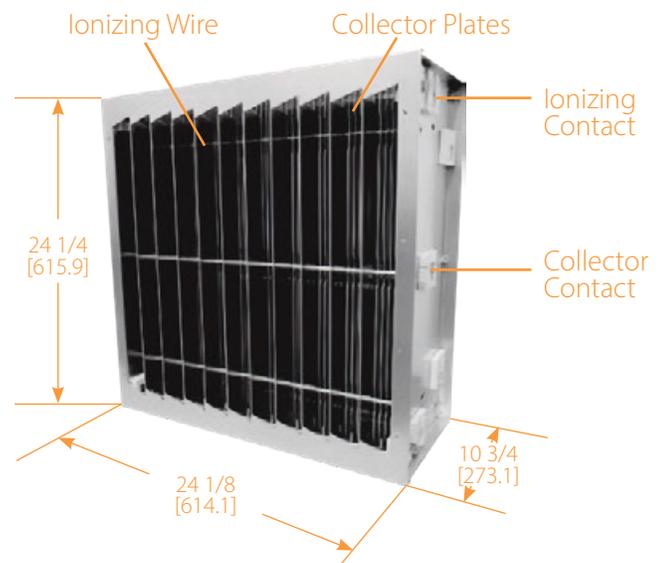
## Automatic Washing Cycle (AUTOCLEAN® only)

The cell wash cycle for the electronic air cleaner is controlled by a built-in Programmable Logic Controller. The washing assembly is operated by a motor.

Make sure that enough hot water is available for washing throughout the entire cycle. In installations with multiple electronic air cleaners, it may be necessary to stagger the timing of the wash cycles. This is to assure adequate water pressure and hot water for washing.

## Manually Starting a Wash Cycle (AUTOCLEAN® only)

See instructions on how to operate PLC at the end of this Owner's manual. While the cells in the electronic air cleaner are being washed, a musty, dirty odor combined with the characteristic odor of the detergent may be noticed. This is caused when the accumulated dirt on the cells is washed off by the detergent and hot water spray. It will disappear after the washing is complete.



**PN 38010, Electronic Cell Components. Dimensions in Inches [Millimeters Shown in Brackets].**

## - IMPORTANT -

### Replenish the Detergent Supply

**Replenish the detergent supply in the tank before it is completely empty.  
If detergent is allowed to dry in the bottom of the hose or tank, the hose may become plugged.**

**Note:** Maximum horizontal distance from the air cleaner to the detergent tank is 25 ft. [7.6 m]. Maximum vertical distance from the air cleaner to the tank is 7 ft. [2.2 m].

## Manually Cleaning

### Cleaning the Impingers

The impingers in front of the electronic cells help stop the large particles. It's a good idea to check these impingers periodically to be sure they are not overloaded.

At intervals of about one year, the impingers should be removed to clean off the accumulated dirt. An overloaded impinger can restrict the airflow.

### Washing the Cells Outside the Electronic Air Cleaner

After routine washing, a noticeable buildup may remain on some parts of the cells. This is normal and has only a negligible effect on performance.

Even if using the optional AUTOCLEAN® system the electronic cells should be removed from the cabinet periodically, every 1-2 years depending on contaminant load, and given an extra thorough washing. In many areas, professional cell cleaning services are available.

### Remove the Cells and the Impingers

1. Discharge cell by pressing test button or grounding out the collector contact.
2. Use care to avoid damage to the collector plates when handling and washing the cells.
3. Pull the handle to slide the cells out. Note the direction of the airflow arrows on the cells.
4. Pull the impinger out. Clean the dirt in the cell or impinger tracks.



## Manually Cleaning Cells

SMOKEMASTER® liquid detergent concentrate will be adequate to remove almost any type of grease, smoke, soot, dust, dirt, pollen, etc. AQE's detergent concentrate in a one gallon bottle is part number 45036, in a five gallon pail it is part number 45031, will remove the greases associated with commercial kitchen cooking operations.

### - CAUTION -

**Do not splash the cleaning solution in your eyes and avoid prolonged contact with your skin. Keep the detergent and solution out of the reach of children. Be sure to follow the cleaning solution label instructions for use or storage.**

1. Mix the cleaning solution according to the label instructions.
2. Soak the cells for the time indicated on the cleaning solution label.
3. Before removing the cells, slosh them around several times.
4. Set the cells aside to let the water drain. If the water draining from the cells feels slippery, they need more rinsing.
5. Inspect the cells for cleanliness. If any dirt remains, it probably indicates that the cells should be washed more frequently.
6. Repeat this soaking procedure, as needed, to get the cells clean.
7. Allow cells to dry before re-installing in the unit.

## Return the Electronic Cells and the Impingers to the Unit

1. Place the electronic cell so that the arrow on the handle-side of the cell points in the direction of the airflow.
2. Insert the impingers in the channels provided.
3. Close the power door.

## Odor Control Module

### Servicing panels with prefilled replacement panels:

1. Remove old media panels and dispose of properly.
2. Insert the 24"x24"x2" prefilled panels in a "V" configuration, ensuring that the foam gaskets on the front and back of the panels contact both the backside of the unit and the filter access door.
3. Close the door.

## Servicing panels with bulk replacement media:

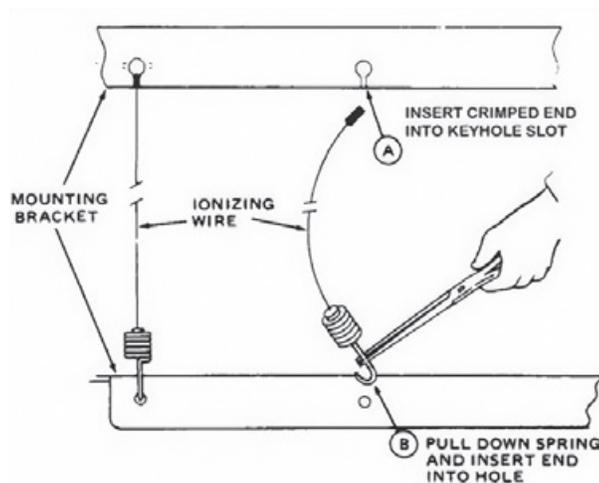
- If panels are damaged or otherwise unrefillable, contact AQE for replacement panels.
- On the side of the panel, there is a pull-out tray. Slide the tray out and dispose of the used sorbent media.
- Wash the panels with detergent and water after emptying and before refilling.
- Allow panels to dry and then refill the panels with fresh sorbent media. **Refill with #4 pelletized carbon or #4 pelletized potassium permanganate.**
- Insert the 24"x24"x2" panels in a "V" configuration, ensuring that the foam gaskets on the front and back of the panels contact both the backside of the unit and the filter access door.



## Ionizing Wire Replacement

The fine wire electrodes in the charging section of the electronic cell may break or become damaged. During operation, a broken or deformed wire generally causes a short to ground, possibly with visible arcing or sparking. This condition, or any other short in the charging section, is indicated by the status light on the power door. Broken wires must be replaced. Remove all parts of the broken wire and temporarily use the cell short of one wire until it can be replaced as directed below.

1. To replace the ionizing wires, remove the electronic cell from the cabinet and proceed as follows:
2. Remove all the broken wire from the cell mounting brackets. See Figure 12
3. Install the new wire. Insert the crimped end of the ionizing wire into the keyhole then hook the spring end into the mounting bracket hole.
4. Use long nose pliers and carefully pull the spring until the hooked end can be secured in the mounting bracket hole.



**Figure 12 – Method of Replacing the Ionizing Wire**

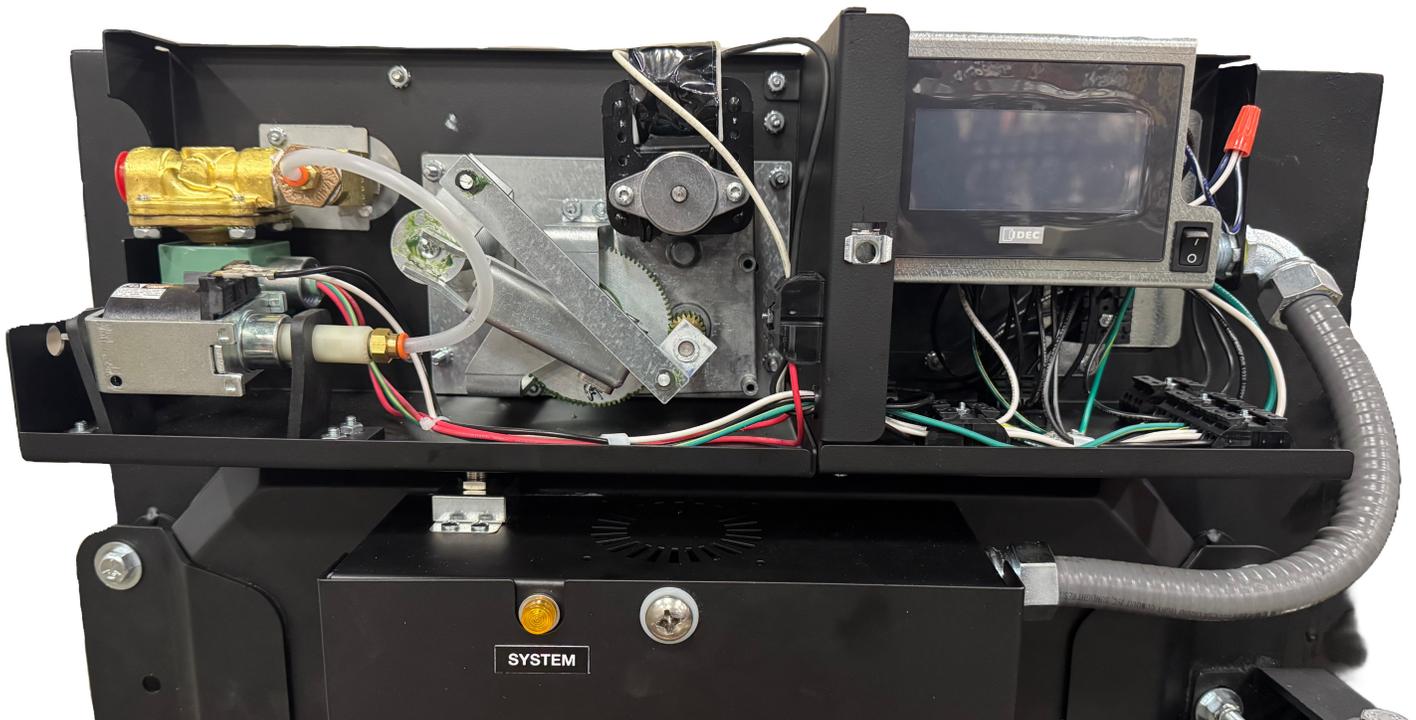
**- WARNING -**

**The following instructions are intended for qualified service personnel only. Dangerous line voltage circuits are exposed during this procedure. Disconnect the power before servicing the unit. Voltage may exceed 12,000 VDC.**

**Make sure the meter to be used has appropriate voltage rating.**

**Before beginning this section make sure to review the checkout and maintenance sections!**

**Make sure all wiring is connected properly – reference figures 10 and 11.**



**Figure 13–Control Box Components**

### Indicator Light Flickers / Unit Makes Zapping Noises

Some flicker is inherent in neon indicator lights and is not an indication that anything is wrong. If the indicator light blinks off and back on and is accompanied by a clicking or zapping noise that is frequent, it is an indication that the electronic collector cell(s) may be dirty or damaged. A wash cycle should be performed to clean the cell. An occasional blink or snapping is normal.

## Unit Makes Zapping Noises

If the wash cycle does not eliminate the noise remove the cells and investigate them looking for bent collector fins or a large particle stuck in a cell. Also check the contacts on the cells and inside the unit for a possible bad connection.

Remove any particles taking care not to bend the collector plates or break any ionizing wires.

Replace any missing or broken ionizing wires, reference the parts list for replacement.

If a collector plate is bent causing the arcing (bug zapper noise), one may attempt to bend the plate back to an original position with a duckbilled pliers. Care must be used as further damage can be caused by stretching the aluminum plates, which can render the cell unrepairable. Please contact Air Quality Engineering, Inc. at 1-800-328-0787 for assistance.

## Indicator Light is **NOT** On

Check to see if the wash system is operating. The indicator light should not be lit when the wash system is activated.

Check to see if the cell access door is closed properly. The indicator light will not be lit if the door is open, and the electronic cells will not be energized.

Be sure the electrical connections have been made properly per Figure 10 & 11.

Remove the electronic collector cell(s) and close the door. If the light comes back on, there is a short in at least one collector cell. A short can be a result of the cell(s) being excessively dirty, a large piece of contaminant shorting the fins, or a physical damage such as a collector fin being bent out of shape and touching an adjoining fin. The wash cycle may be run to clean the cells if they appear dirty. Visually inspect the cell for large particulate that may be bridging two adjoining collector fins or for physical damage. If damage is identified, repairs should only be performed by trained personnel as improper repairs may result in unrepairable damage. Please contact Air Quality Engineering, Inc. at 1-800-328-0787 for assistance.

If the indicator light does not come on with the cells removed and the door closed, use a voltmeter to confirm that there is indeed voltage at the input of the power supply. If there is voltage at the power supply, but no indicator light, the power supply should be replaced. The indicator light itself has a very low failure rate.

## Water Not Flowing (AUTOCLEAN® only)

Check to make sure the water valve is getting energized. One should hear a clicking from the solenoid when the PLC engages and disengages the solenoid. If this is not occurring one could check this by manually taking apart the hot water solenoid or a new assembly might have to be installed.

## Detergent Not Flowing (AUTOCLEAN® only)

During the detergent cycle the detergent pump should energize and pump from the tank and dispense from the manifold jets with the water. If the detergent is not being dispensed check for the following: If the detergent supply tank is empty. If the detergent supply tube is restricted. If the detergent pump is running. The detergent pump makes a significant amount of noise and should be audible while it is running.

If the pump is not running, check to make sure it is receiving voltage, If it does, but pump does not run, the pump may need to be replaced.

## Too Much Detergent Being Used (AUTOCLEAN® only)

The length of time the detergent pump is on during the wash cycle can be adjusted in PLC settings.

## Mechanical wash system not working or the nozzles are not turning or traversing along the cells, during the wash and rinse cycle. (AUTOCLEAN® only)

The manifold motor operates both the rotation and traversing motion of the jets. Check to see if the manifold motor is operating.

If the motor is still not operational check to see if it is getting voltage.

If no voltage is getting to the motor trace wiring back and find the break.

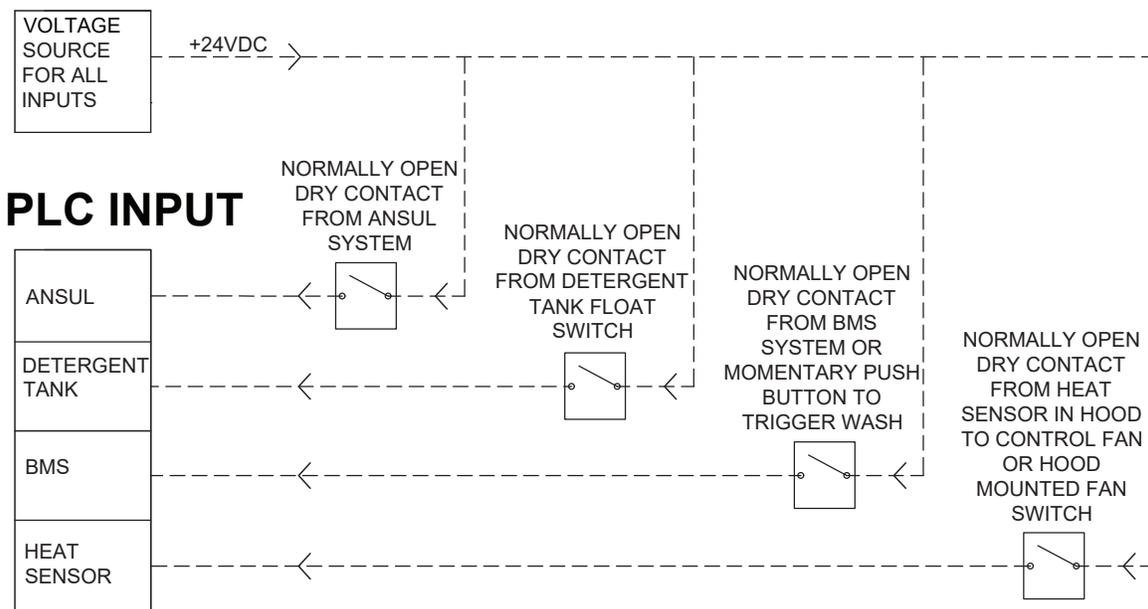
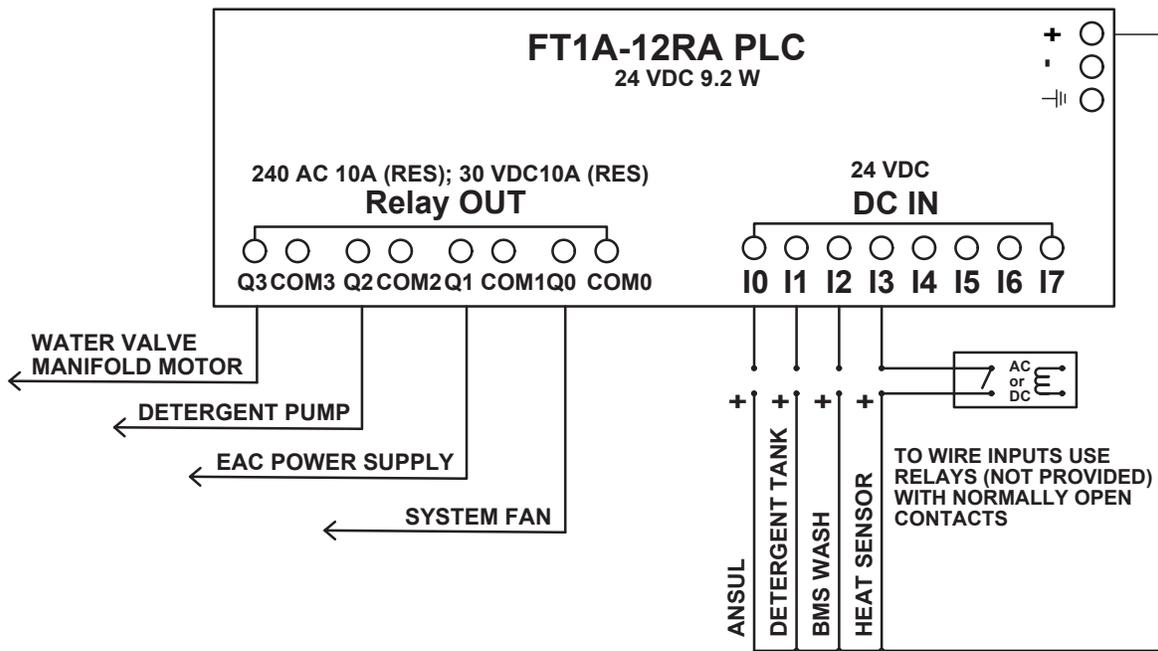
If voltage is getting to the motor and still no movement is coming from the motor the motor will need to be replaced.

Reference the parts list for replacement.

Make sure that the linkage is not being stopped by an obstruction.

## SMOKEMASTER® PLC Instructions Inputs:

- Heat Sensor.** Input from the hood controls, when connected it works as a trigger to power on the SMOKEMASTER® unit when the hoods activate due to their built-in heat sensors.
- BMS Wash.** When connected it allows the Building Management System to initiate a wash.
- Detergent Tank Sensor.** There is flashing warning to indicate a low detergent level in the tank.
- Ansul Control.** Input from the ANSUL controller. When connected it turns the fan on and everything else off if there is a fire detected.



**Please note, the detergent tank sensor is supplied by AQE, however, all other PLC input relays are neither supplied or installed by AQE.**

## Connecting the detergent tank to AUTOCLEAN®

**IMPORTANT: The tank must be located within 25 feet horizontal and 7 feet vertical of the AUTOCLEAN detergent pump.**

There are two connections; The detergent line pickup tube and the electrical connection to the low level switch



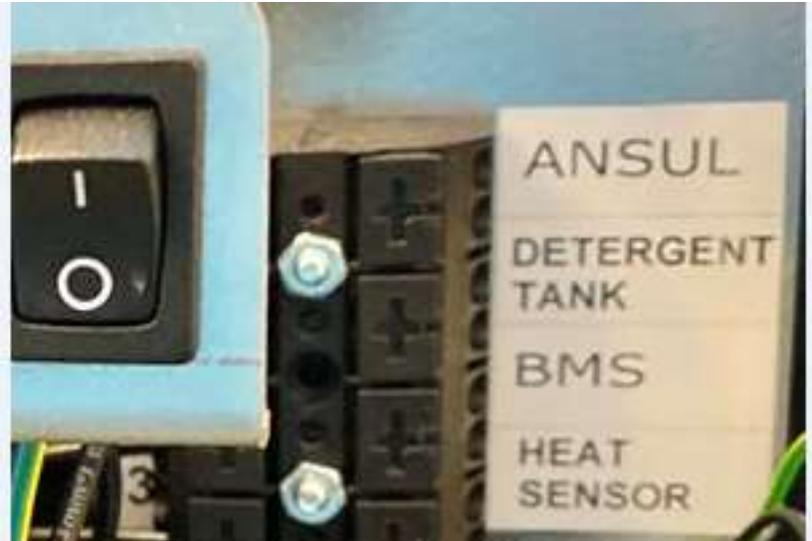
The clear pickup tube connects to the detergent pump on the unit, it is a push on connection (alligator type)



To wire the low level, run 24v power from the PLC voltage source on the unit to the low level tank switch



You then run 24v power from tank switch back to the PLC "Detergent tank" input.

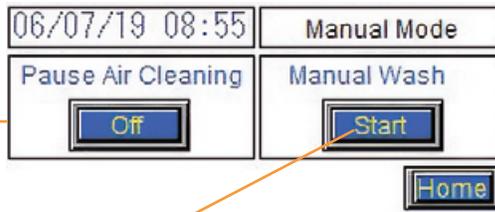
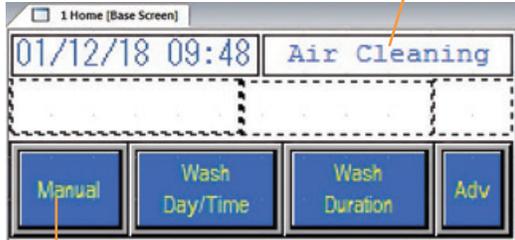


# SMOKEMASTER® PLC Instructions

## Manual Wash

### Home Screen

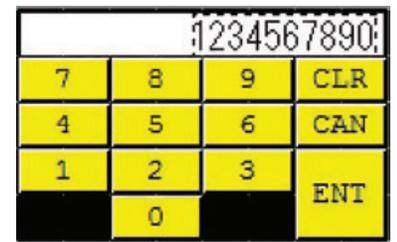
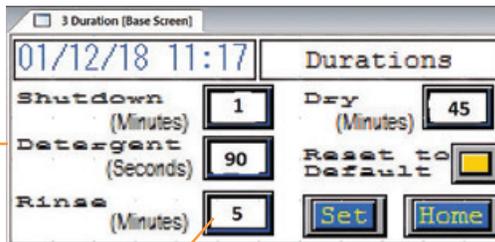
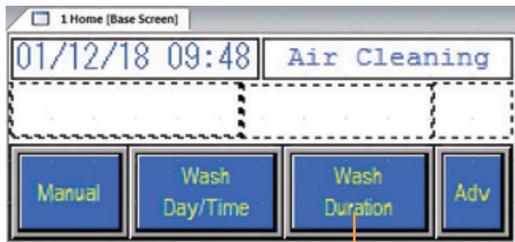
### Present Unit Mode



Touch "Manual" button to start wash manually.

Touch "Start" button to start manual wash. You will get a "Ready to Wash?" message. Touch "Ready" to start.

## Rinse Duration

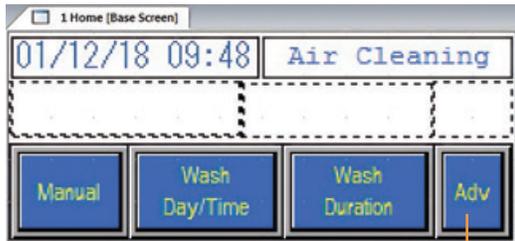


To change the duration of "Rinse" cycle for example, touch "Wash Duration" button in Home Screen. You will get this screen

Touch this button to change the amount of time it will rinse. The maximum number is 120 minutes. (Factory Default Settings Shown)

Enter the number and touch ENT

## Program Wash Day

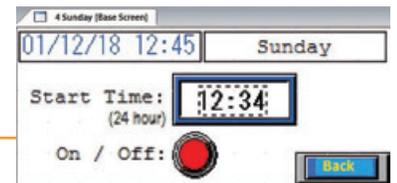
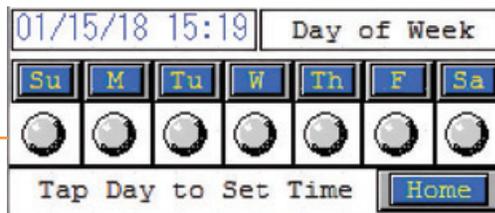


You have two independent advanced options:

1. You can have fan "On" or "Off" during drying.
2. The unit can go to "sleep" mode after wash.

You have "Resume Air Cleaning" button during sleep.

"Adv" button on home screen will bring this menu.



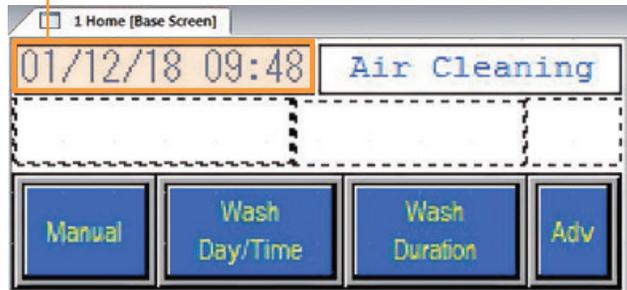
To program wash on the day of week touch "Wash Day/Time" button in Home Screen. You will get this screen.

Touch the blue rectangle button for the day of the week you want. You will get this screen.

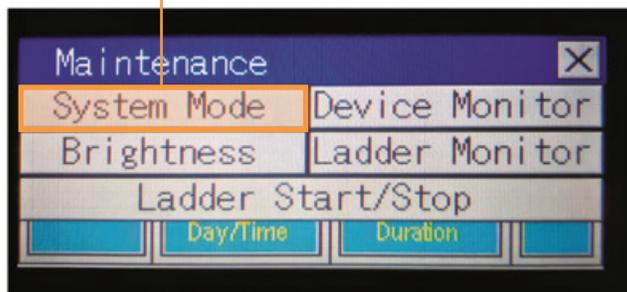
Enter time on 24 hour scale, touch On/Off button. It becomes green or on.

## SMOKEMASTER® Changing the PLC Clock Setting

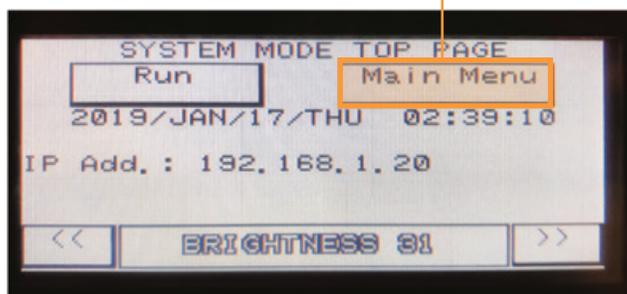
**Step 1**  
Touch and hold the top left side of the screen until the screen changes.



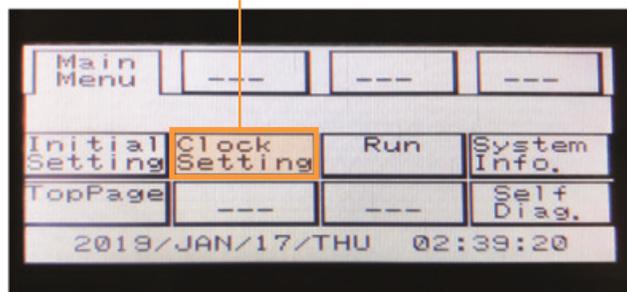
**Step 2**  
Select System Mode



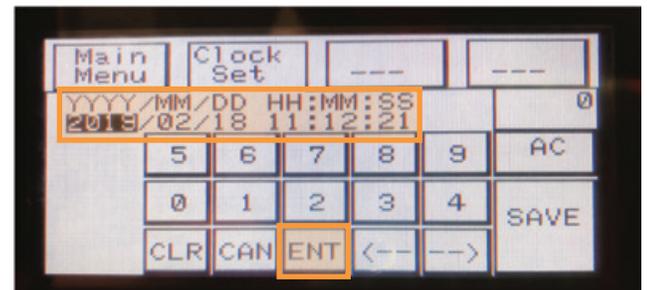
**Step 3**  
Select Main Menu



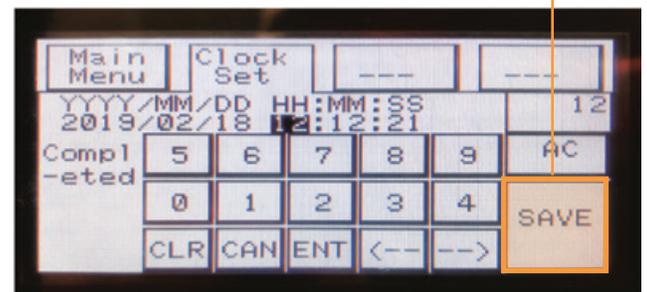
**Step 4**  
Select Clock Setting



**Step 5**  
Change Date and Clock  
Press ENT for every change



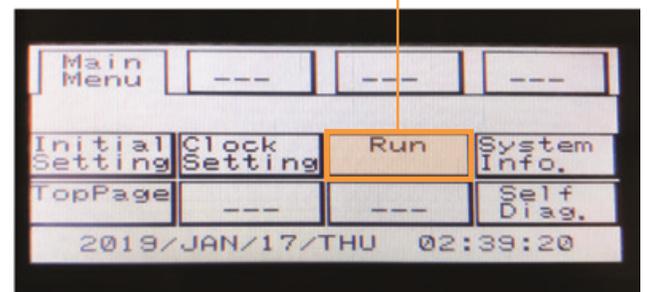
**Step 6**  
Select SAVE



**Step 7**  
Select Main Menu



**Step 8**  
Select Run





## SMOKEMASTER® Certificate of Warranty

### ONE-YEAR LIMITED WARRANTY

Air Quality Engineering, Inc. (AQE), warrants to the original purchaser, subject to the conditions below, that if the "Product" covered by this warranty should fail to perform by reason of improper workmanship or material, AQE will during the period of one (1) year from the date of original purchase either (i) replace the product or (ii) provide all necessary parts to repair the product without charge. The decision to replace the product or the necessary parts shall rest solely with AQE. This warranty is valid only under the following conditions:

#### Conditions

- 1. AUTHORIZATION:** The purchaser will contact AQE at (763) 531-9823 for authorization, returned goods number (RGA) and the shipping address. AQE will direct the purchaser to either return the necessary parts or the product at AQE's option.
- 2. PROPER DELIVERY:** The shipping, freight prepaid or delivery of the parts or the product to AQE in either its original carton or in a carton assuring similar protection of the product with the returned goods number (RGA) clearly displayed on the outside of the carton.
- 3. UNAUTHORIZED REPAIR:** A showing by the original purchaser that the product has not been altered, repaired or serviced by anyone other than an authorized service technician using genuine AQE parts.
- 4. UNAUTHORIZED PARTS:** A showing by the original purchaser that the product has had only genuine AQE parts and filters used in its operation and maintenance.
- 5. SERIAL NUMBER INTACT:** A showing by the original purchaser that the serial number has not been altered or removed.
- 6. MISUSE:** A showing by the original purchaser that the product has not been involved in an accident, freight damaged, misused, abused or operated contrary to the instructions contained in the Owner's Manual.

Air Quality Engineering, Inc.'s sole responsibility shall be to repair or replace the product within the terms stated above. AQE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, EXPRESS OR IMPLIED, APPLICABLE TO THIS PRODUCT. Some states do not allow the exclusion or limitation of consequential damages so this limitation may not apply to you.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED BEYOND THE ONE-YEAR DURATION OF THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts so the above limitation may not apply to you.

This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

**AIR QUALITY ENGINEERING, INC.**  
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**MINNEAPOLIS, MINNESOTA 55428-1520**

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## ▶ SMOKEMASTER® Electronic Air Cleaner Owner's Manual

Proudly designing and manufacturing the AUTOCLEAN® and SMOKEMASTER® in-duct commercial kitchen exhaust purification product lines for delivery in the United States and worldwide.

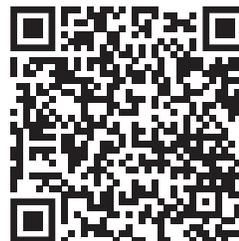


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