



For sales or support:  
Controlled Air Design  
Raleigh, NC  
919 607 6765  
sales@controlledairdesign.com

# **Installation & Service Manual for AER Powered Bench Downdraft Table Collectors (APB Series)**

**Models  
APB-4250  
APB- 4276  
APB-48102**

*March 26th, 2008*

# Table of Contents

Disclaimer .....	3
Uncrating .....	4
Description & Operation .....	4
Optional Equipment .....	4
Applications - General .....	5
Installation .....	6
Installation continued .....	7
Figure 1 Motor & Transformer Connection Diagram .....	7
Figure 2 Control Timer .....	8
Installation continued .....	9
Ordering Replacement Parts .....	10
Maintenance .....	11
Troubleshooting .....	12
Specifications .....	13
Limited Warranty .....	14

## AER Powered Bench Downdraft Tables, APB Series

### Disclaimer

Although instructions and recommendations are included for installation of your **AER Powered Benched Downdraft Table Collector, APB Series**, the manufacturer does not assume responsibility for the installation of this equipment nor shall he be held liable for direct or consequential damages resulting from improper installation, application, maintenance or use.

The immense variety of contaminants make it impossible to list all of the potential hazards that may be encountered with air pollution control systems. It is therefore important that the application of the equipment be discussed with an AER Control Systems representative or application engineer prior to use. Additionally, users should consult and comply with all National and Local Fire, Electrical and /or other appropriate codes when determining the application, location and operation of any air pollution control equipment.

Collection of combustible or explosive materials and collection on flame or spark-generating operations may require specific system configurations (contact AER Control Systems LLC. Applications Engineering Department for questions and/or design assistance). The combined collection of combustible or explosive materials and contaminants from spark or flame generating operations, with a common collector or duct system, is not recommended, unless special design provisions have been made to the system (sparks or flames resulting from such operations may ignite the combustible or explosive material). Under no circumstances should anyone be allowed to discard a lighted cigarette, other burning materials, or refuse into an inlet hood or the duct of the collection system. It is the responsibility of the end user to comply with all applicable national, state, and local fire and safety codes.

This manual should be read completely before attempting Operation or Maintenance of this equipment. All work should be performed by qualified personnel according to local requirements.

### **WARNING**

**Failure to comply fully with the following instructions and local code requirements may increase your risk of physical injury due to fire, explosion or electrical shock.**

All data and dimensions in this manual have been thoroughly checked however, we cannot assume responsibility for possible errors or omissions. We reserve the right to change designs and/or specifications without notice.

## AER Powered Bench Downdraft Tables, APB Series

### SECTION 1

#### Uncrating

1. Remove banding and cardboard shipping carton and packing. The collector is shipped on a skid to allow for easy removal with a fork lift truck.
2. Attenuators and accessories are typically labeled and packed with the unit to be installed, Mounting hardware is included for mounting these items. Be sure to check all boxes for any miscellaneous parts or hardware items before discarding.
3. Inspect the exterior of the unit and accessories for shipping damage or shortages that may not have been noticed or recorded when the shipment was initially received; you have 30 days to notify AER Control Systems LLC. of any discrepancies. Contact the shipping company if any damage or shortages have occurred.

#### Description & Operation

The APB Series Collectors consist of a horizontally mounted filter module which houses the cartridge filters. Each cartridge has a filter media pack of 2 inch pleated media and is formed in the shape of a hollow cylinder. The interior of the cartridge cylinder is open to the pulse tank module, which periodically cleans the cartridges by compressed air, pulse jet flushing. Diaphragm valves are mounted to a compressed air reservoir tank and activated by an optional solenoid valve or a standard manual push button control valve. During operation a short blast of compressed air to the interior of one bank of filters results in media vibration and airflow reversal that back flushes collected contaminants off of the exterior surface of the filter bank. By alternating the compressed air cleaning of the filter banks, the system can continue to collect contaminants while cleaning takes place. The motor/blower module is located on the clean air side of the system after the pulse tank module and provides airflow for the collection system.

#### Optional Equipment

Special Filters  
Light Kit

Timer Pulse Control  
Attenuator

Smart Pulse w/ Downtime Pulse  
HEPA

## SECTION 2

### Applications - General

1. Dust & Fume - The **Vertical Cartridge Filtration System (VCF)** is designed for the capture and removal of **DRY** dust and/or fumes generated from sanding, grinding, welding and other industrial processes. The VCF cartridge collector is a modular system consisting of a filter media/cartridge filter module, collection trays and a final module containing the air reservoir tank and pulse-jet cleaning system, blower and motor. The unit can be arranged in a variety of configurations and can be equipped with specialized filters for application specific filtration requirements. The floor mounted collectors are designed primarily for direct ducted, source capture applications
2. Size - It is important that the proper size unit has been selected for the application. Too little airflow will not draw the contaminant into the filter and the unit will not be completely effective. Too much airflow may result in loss of efficiency or the unit will pick up large or heavy solid particles increasing the frequency of maintenance or filter replacement. Questions regarding proper unit sizing should be directed to your local AER Control Systems representative or the main office (toll free 866-265-2372)
3. Models - Model codes are utilized to identify the various unit configurations available. The model VCF (Vertical Cartridge Filtration) system uses a direct drive blower (sometimes called a plug fan) along with the number 750 and 1500. The 750 unit has a 1.5 HP direct drive motor and the 1500 unit has a 3HP direct drive motor and fan. The 750 has one cartridge filter and the 1500 is equipped with two cartridge filters.
4. Hopper and Drum Kits - Hopper and Drum kits are available on the Vertical Cartridge Filter units for applications that require greater dirt storage capacity.
5. Collars & Inlet Plenums - Ducted source capture units are provided with inlet collars and / or inlet plenum boxes for attaching ductwork or for direct mounting of mechanical arms.
6. Portable Units - The 750 and the 1500 is available with four casters for portability and an extraction arm can be added as an option.

## SECTION 3

### Installation

#### Assembly & Installation APB Series Downdraft Table

Standard Collectors are pre-assembled for the APBs. The APBs will have a manual motor starter and a qualified electrician connect the input power to the input side of this starter. The blower exhaust is at the rear of the Downdraft Table, it is very important not to block the discharge air, as a minimum please leave at least 15 inches of space if the table needs to be backed up to a wall. An optional upblast discharge plenum is available to change the direction of the air to blow upwards.

**The motor starter is factory wired for 460 volts 3 phase (unless otherwise specified on the purchase order) requiring only a qualified electrician to connect input power to the unit.**

A connection for clean, dry, compressed air is located at the front of the table just under the table top near the filter guage. This air quick connection is connected to the air reservoir tank. A 120-PSI relief valve to prevent tank over-pressurization and a condensate drain (check periodically) are provided and are pre-connected to the reservoir tank. The supply airline should be purged to remove any debris before connecting it to the unit to prevent damage to the pulse valves on the system. The supply compressed air line should be equipped with a manual shut-off valve, a filter/separator, air regulator, and a pressure gauge and located close to the APB system. If the unit is to be installed in an area where freezing temperatures or high humidity are to be expected, an air dryer capable of drying the compressed air to below the dew point must also be provided. If excessive moisture is present, check drain frequently or install an automatic drain.

# AER Powered Bench Downdraft Tables, APB Series

## SECTION 3

### Installation continued

All three-phase units are wired for the input voltage specified on the purchase order. Unless specified otherwise, standard units are wired for 460 volt, 3 phase, 60 Hz operation.

Motors used on the APB collectors are UL recognized and internal wiring is UL rated at 600-volts. Input power line protection is required for the motor and electrical components. Line load and current requirements are identified on the motor nameplate. Unless ordered with the machine, the power switch for operating the machine, any fusible disconnect, motor starter or controller are to be provided by the customer/user and located externally to the machine.

After electrical hook up it is important to verify that the fan rotation is correct. Incorrect rotation results in much lower airflow and increased noise. For standard three phase installations, changing connections of any two of the three input power lines will usually reverse fan rotation. Rotation direction can be found on the side and/or back of the motor.

If it becomes necessary to change the input voltage, the wiring diagram on the motor and transformer nameplates show the appropriate wire connections - these diagrams are also shown below:

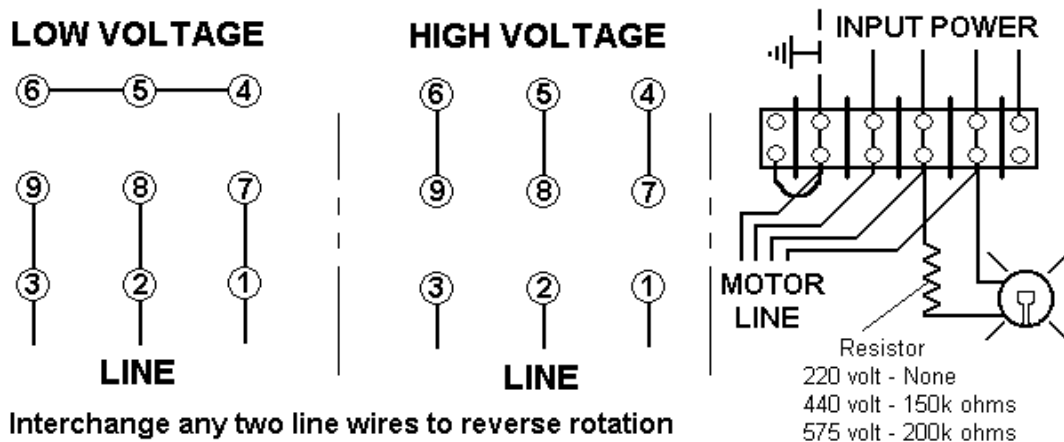
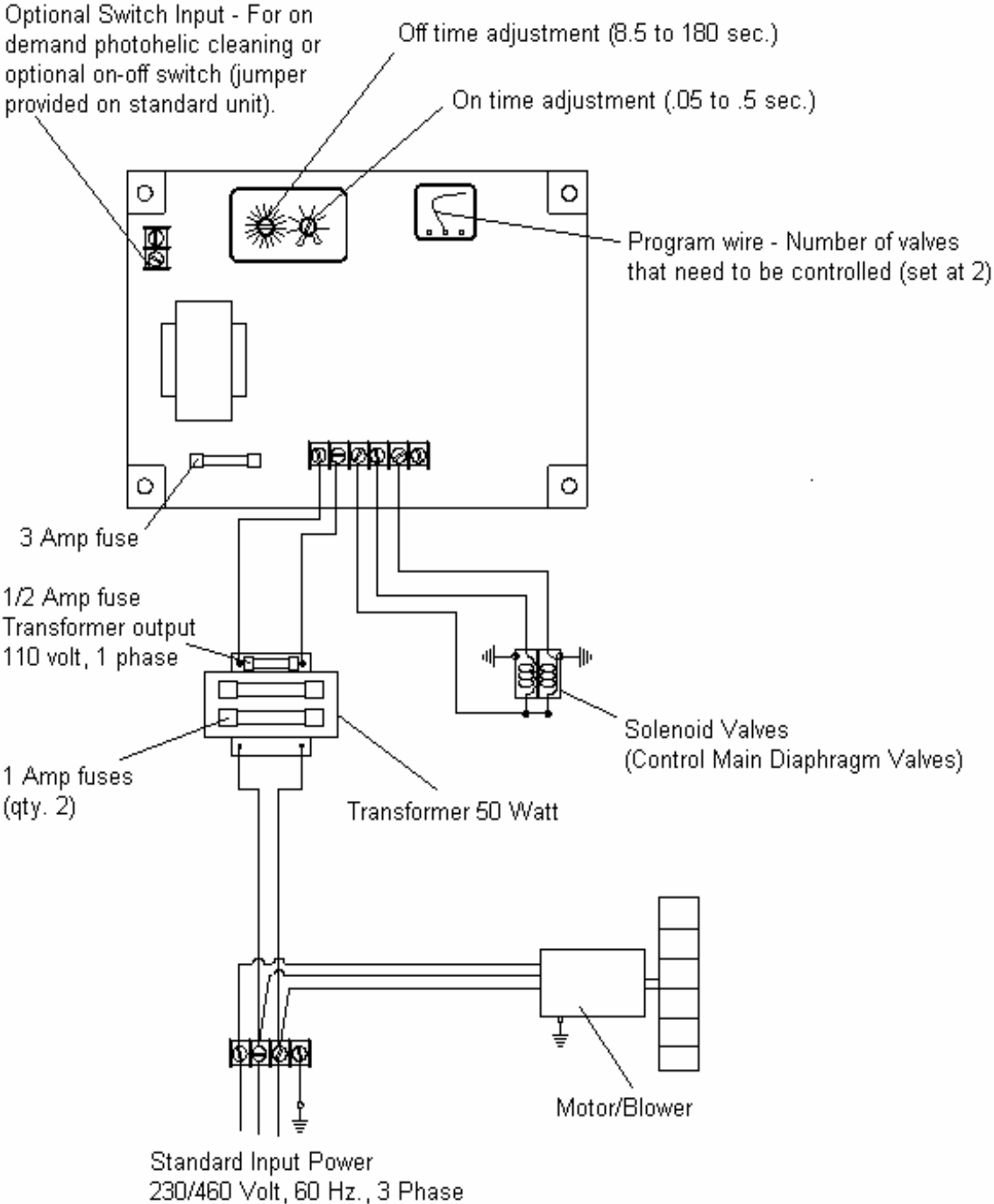


Figure 1 - Motor & Transformer Connection Diagram

### NOTE

A motor starter with overload protection must be provided by the User. Thermal overload heaters are installed in the external motor starter. Consult the starter manufacturer for recommended heater size for the installed motor.

# AER Powered Bench Downdraft Tables, APB Series



**Figure 2 - Control Timer**



## AER Powered Bench Downdraft Tables, APB Series

### SECTION 3

#### Installation continued

#### **WARNING**

**Permanent damage to the motor will be sustained if connected to voltages other than the normal operating voltage for which the unit is pre-wired.**

#### Control Systems

AUTOMATIC OPTIONAL CONTROLS for the APB series include an integrated, electrically operated pilot solenoid valve for each diaphragm valve. The solenoid valves are controlled by a solid-state sequential control timer that determines the order in which the solenoid valves are operated, the length of time that the valves remain open, and the time interval between each valve opening. The compressed air tank and valves are fully enclosed and located between the cartridges and the blower. The sequential control timer, input power connection, transformer and indicator light are contained in the electrical box mounted on front of the unit. The standard APB uses a manual push-button control for operating the diaphragm valve to pulse clean the cartridges.

#### **WARNING**

**Take special care when the electrical box is opened. When power is ON, the full line voltage can appear from any electrical point on the circuit board to the metal enclosure or to ground.**

#### Compressed Air Requirements

Air reservoir pressure should be set between 90-psig (the minimum pressure which will assure truly effective cleaning of the cartridges) and 105-psig (the maximum recommended working pressure of the valves and air reservoir).

**Note:** The air reservoir system has a 120-psig-relief valve.

The total consumption of compressed air is variable and is dependent upon the set points of the ON and OFF time of the timer and the air pressure in the reservoir at the time of the air pulse. When the ON timer is set at its recommended time of 0.1 second and the air reservoir pressure is at 100-psig, approximately 0.9 cubic feet of free air will be used per pulse. While the cartridges are being cleaned, the average usage rate in CFM of free air depends upon the setting of the OFF timer. If set at 30-second intervals (2 pulses per minute) the average usage rate during a cleaning cycle would be  $(0.9 \text{ cu. ft./pulse}) \times (2 \text{ pulses/minute}) = 1.8 \text{ CFM}$  of free air.

## AER Powered Bench Downdraft Tables, APB Series

### SECTION 4

#### Ordering Replacement Parts

Information required for prompt delivery of replacement parts will be:

1. Model and Serial Number
2. Part Number and Description

Contact your local AER Control Systems LLC. distributor for replacement parts. Use either our toll free telephone number or our website [www.aercontrolsystem.com](http://www.aercontrolsystem.com) to obtain the nearest AER Control Systems LLC. distributor's name and telephone number.

**1-866-265-2372**

Part Number	Description	Qty		
		APB42-50	APB-42-76	APB-48-102
1017-06	Blower Inlet Cone 315	1	-	-
1017-07	Blower Inlet Cone 355	Opt	1	-
1015-04	Blower Inlet Cone 15"	-	Opt	1
1016-06	Blower Wheel 315	1	-	-
1016-07	Blower Wheel 355	Opt	1	-
1031-01	Blower Wheel 15" - 7.5 HP	-	-	1
1001-17	Motor, 3HP	-	1	
1001-22	Motor, 5HP	-	-	1
1001-33	Motor, 7.5HP	-	-	-
1041-05	Cartridge Open/Closed 26" L	2	4	4
1041-06	Cartridge Open/Open 26" L	-	-	2
1217-01	Mini-Helic Filter Guage	1	1	1
1218-03	Diaphragm Soleniod Valve 1"	-	-	2
1218-01	Diaphragm Air Valve 3/4"	2	4	-
1220-01	Control Timer Board	Opt	Opt	Opt
1110-01	Pushbutton Relief	2	4	4
1089-01	Pressure Relief Valve	1	1	1
1233-11	Transformer, 50W	Opt	Opt	Opt
1224-22	1 amp Fuse	2	2	2
1224-18	1/2 amp Fuse	1	1	1

## AER Powered Bench Downdraft Tables, APB Series

### **SECTION 5**

#### **Maintenance**

#### **Operation & Maintenance**

Lubrication or other routine periodic preventative maintenance is not required. All that is needed is an occasional check of fasteners, hoses and clamps and an overall visual check of the unit . Periodic replacement of the cartridges is required when necessary and check/ draining of condensation from air reservoir. Draining can be done automatically if the drain is opened (slowly) while the tank is under pressure. Always empty the dust drawers before it fills completely. Do NOT allow the dust to collect to the point where it begins to over fill the drawers, since this would result in the dust being re-entered into the air stream, re-depositing on the cartridges and shortening their life.

#### **Cartridge Replacement APB Downdraft Table**

The pressure drop across the cartridges will eventually reach a point at which the airflow and suction are too low. At this time, the cartridges should be replaced as follows:

1. Shut off electrical power to the blower and control box via the motor starter.
2. Open the cartridge access door on the side of the filter cartridge module by turning the Tee handle until the spring is de-compressed on the inside of the door.
3. Slide the cartridges out on the track by grabbing the cartridge header and pulling toward you. Remove the cartridges for inspection or replacement.
4. Reinstall cartridges by sliding the cartridges into the cabinet on the track
5. Close the cartridge access doors and turn the Tee handle to compress the spring and to compress the gasketing on the cartridge access doors.

# Troubleshooting

Problem	Cause	Solution
Motor Fails to Start	No Power To Unit	Check overload heaters in starter and fuses, replace or reset if necessary. Check for proper wire connections to and from the starter and collector.
	Power to unit	Check wires from input electrical box on the collector to the motor. Check motor wiring. Check to see if motor is faulty.
Low airflow and/or suction	Blower is running backwards	Check rotation of blower. If running backwards, interchange 2 of the 3 input power leads (3 phase motors only).
	Cartridges are not being cleaned	Check air pulse system to see if it is working correctly. Check air pressure.
	Obstruction or blocked table top	Check table top for blockage.
Contaminant blowing out of the collector exhaust	Hole in the cartridge	Replace cartridge.
	Cartridge not properly installed	Check for correct cartridge orientation. Check cartridge gasket, gasket must seal around hole in tube sheet of cartridge cabinet. Check cartridge access door, knob should be tight for proper door and filter sealing
Unit is not pulsing, but motor is running	No power to timer board-option	Check for blown fuses, replace if necessary. Check transformer.
	Power is getting to timer board-option	Check to see if compressed air is on, and connected to unit. Check wiring from board to valve assembly. Check to see if valves are opening.
Unit is not pulsing, but motor is running (units with delay timer or Photohelic pulse option)-Optional	Not set properly	Check timer set points. Off time be set for a longer period than you expect. Check high and low pressure set points on the Photohelic gauge. High pressure set point may be set too high.
Unit pulses all of the time-Optional	Off time may be set too short.	Check timer board settings, Timer board is designed for pulse intervals every 8.5 sec to 3 minutes.
	Set times on the Photohelic Gauge option are not properly set	High Pressure and/or Low Pressure set points may be set too low.

## Specifications

Specifications	APB 4250	APB 4276	APB 48102
Nominal Airflow - CFM	2500/ 4000	4000/ 5050	5050
Filters - Qty.	2	4	4
Total Filter Area - Sq. Ft.	480	960	1440
Motor - HP	3/5	5/ 7.5	7.5
Motor Temp. Max - C	40	40	40
Compressed Air	90-105 psig	90-105 psig	90-105 psig
Tank Qty.	1	1	1
Tank Volume - Cu. Ft.	0.32	0.32	0.32
Diaphragm Valve	(2) .75 in.	(4) .75 in.	(4) .75
Program Timer: Off Time On Time	Manual - Pushbutton	Manual - Pushbutton	Manual - Pushbutton
Timer Input Power	N/A	N/A	N/A
Blower/Motor Type	Plug Fan	Plug Fan	Plug Fan
Wheel Diameter	12/14 inches	14/ 15 inches	15"
Speed	3450 RPM	3450 RPM	3450 RPM
Drive	Direct	Direct	Direct
HP	3/5	5/ 7.5	7.5
Voltage	190/380//230/460	190/380//230/460	190/380//230/460
Frequency - Hz	50/60	50/60	50/60
Phase	3	3	3
Frame - NEMA	56C/184TC	184TC	184TC
Power Factor	89/93	93/94	93/94
Efficiency	82.5/85.5	85.5/87.5	85.5/87.5
Start Current Amps (60Hz)	65.8/32.9 // 94/47	94/47 // 152/76	94/47 // 152/76
Full Load Amps (60Hz)	7.6/3.8 // 12/6	12/6 // 17.2/8.6	12/6 // 17.2/8.6
Insulation Class - Min.	F	F	F/F
Enclosure	TEFC	TEFC	TEFC
Service Factor	1.5	1.5	1.15/1.0
Duty Cycle	Continuous	Continuous	Continuous
Bearing Grease	Exxon POLYEX EM	Exxon POLYEX EM	Exxon POLYEX EM
Specification	UL & CSA Approved	UL & CSA Approved	UL & CSA Approved

## **Limited Warranty**

AER Control Systems LLC warrants all products sold only to purchasers for use in business or for resale, against defects in workmanship or materials under normal use, for one (1) year after the date of purchase from AER Control Systems LLC. Misapplication of the product, decomposition by reaction or chemical action and wear caused by abrasion will not constitute, or be considered as a defect. Warranty is void if the product has been subject to damage, unreasonable use, neglect, improper service, improper installation, or other causes not arising from defects in original materials or workmanship. Any part that is determined to be defective in material or workmanship and returned to an AER Control Systems LLC distributor or authorized service facility, as AER Control Systems LLC designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at AER Control Systems LLC's option. AER Control Systems LLC shall not be liable for any incidental or consequential cost, expenses, or damages resulting from any failure, defect, or malfunction of this product, liability is expressly disclaimed. AER Control Systems LLC's liability in all events is limited to and will not exceed, the purchase price of the product. Title and risk of loss pass to the buyer on delivery to the common carrier. If a product is damaged in transit, the recipient MUST make note of the damage upon receipt of the product and file a claim with the carrier. AER Control Systems LLC will make a good faith effort for prompt correction or other adjustment, with respect to any product that proves to be defective within the warranty period.

Collection of combustible or explosive materials and collection on flame or spark-generating operation any require specific system configurations (contact AER Control Systems LLC's Applications Engineering Department for questions and/or design assistance). The combined collection of combustible or explosive materials and contaminants from spark or flame generating operations, with a common collector or duct system, is not recommended, unless special design provisions have been made to the system (sparks or flames resulting from such operations may ignite the combustible or explosive material). Under no circumstances should anyone be allowed to discard a lighted cigarette, other burning materials, or refuse into an inlet hood or the duct of the collection system. It is the responsibility of the end user to comply with all applicable national, state, and local fire and safety codes. AER Control Systems LLC's liability for consequential and incidental damage resulting from a fire or explosion is expressly disclaimed.

Installation of suitable overload protection such as a motor starter, according to NEC guidelines, is required. Failure to provide proper overload protection will void warranty coverage on electrical components in the system. (Combination motor starters with fusible disconnect packages are available through your local AER Control Systems LLC representative). To ensure optimum collector performance, always use AER Control Systems LLC replacement filters.