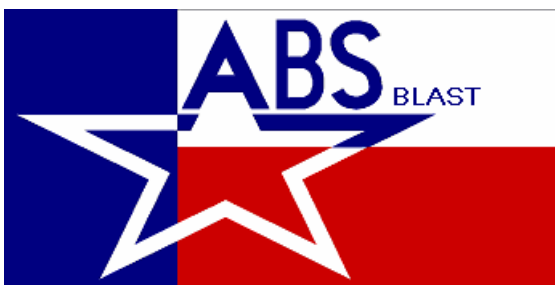
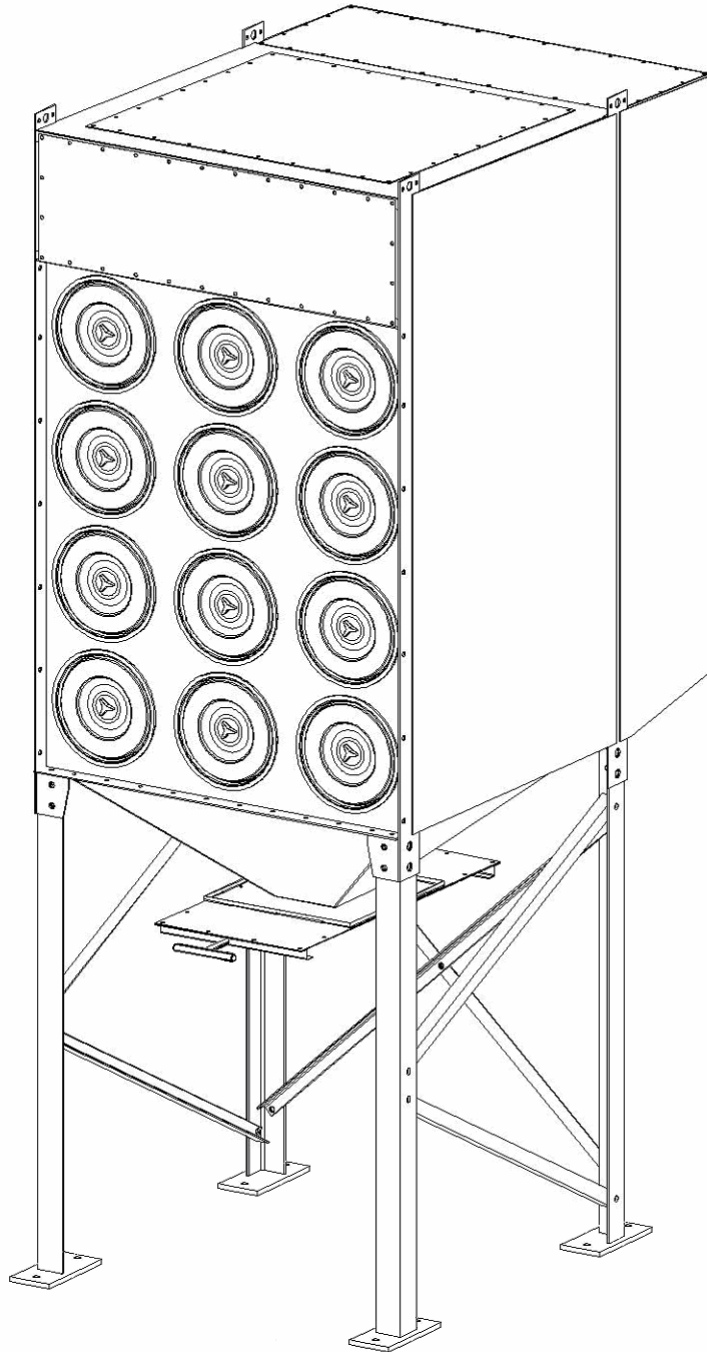


Abrasive Blast Systems

SECTION VII. DUST COLLECTOR OPERATION AND INSTALLATION



ABRASIVE BLAST SYSTEMS, LLC

(972) 205-9309

866-666-9309

www.ABSBLAST.com

Warning!

Dust Explosion Safeguard

Combustible materials can be the cause of serious fire hazards if present in dust-laden air. Special care should be taken that these conditions be avoided at all cost. It is recommended that all precautions be taken to avoid any kind of electrical spark, static electric spark, open flame, or heat in the vicinity of the dust if these conditions are unavoidable. Ensure that all electrical systems test and function properly. It is also recommended that an automatic fire suppression system be installed in the system. Please take note – discarding of cigarettes into the air stream can also cause filter or dust collector burnout. Please warn your employees to abstain from this practice. Ensure that you comply with all federal and state safety codes.

It is recommended that you consult the services of a licensed fire suppression systems expert to recommend and install the best system for your application when you have to operate under the above-mentioned conditions. Fire suppression is not the responsibility of the manufacturer.

DUST COLLECTOR OPERATION

Air Flow, dirty air in, clean air out

The dust collector consists of two main compartments with a divider plate between the chambers. These compartments are known as the **dirty** and **clean** air compartments.

Air Flow

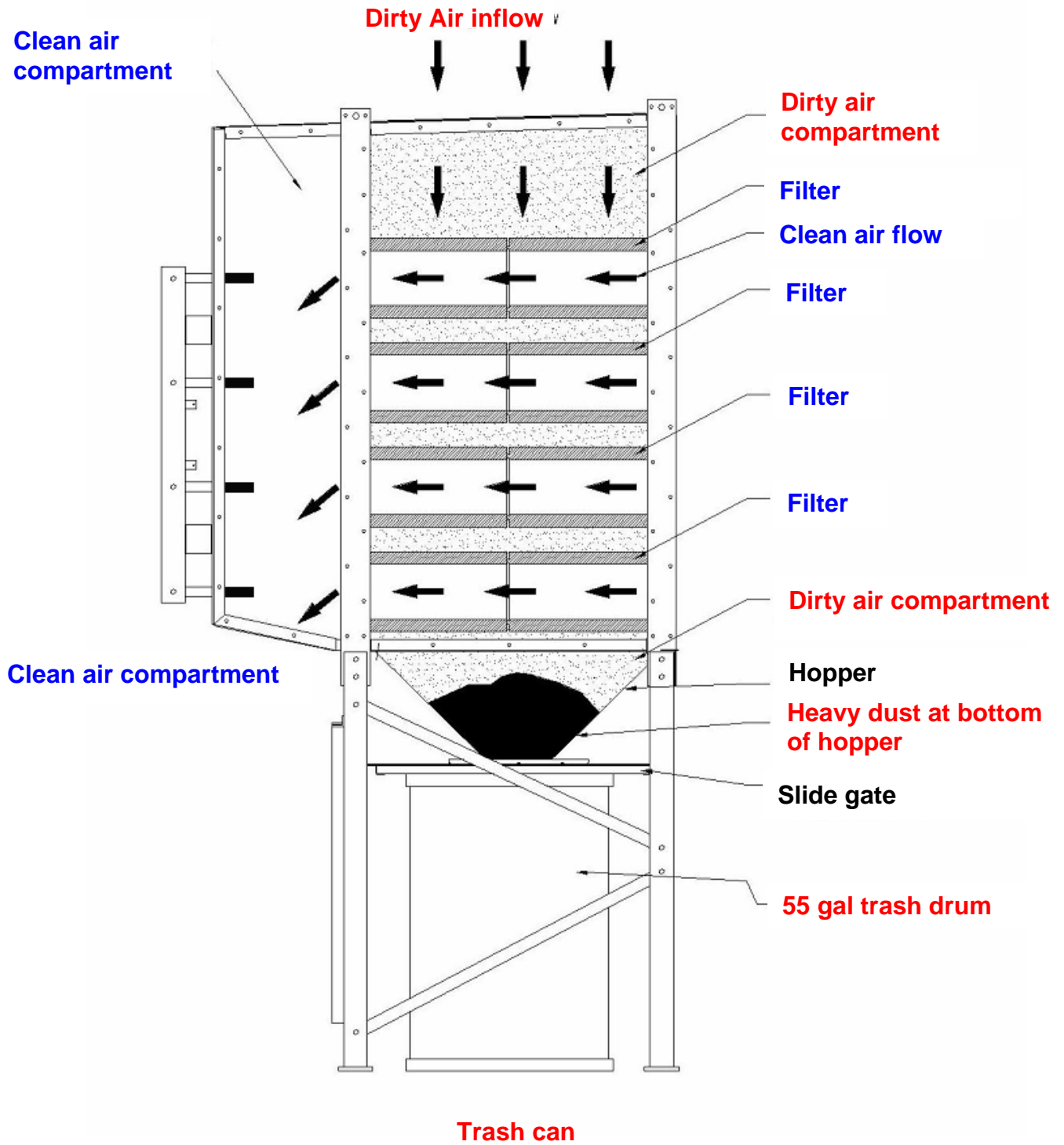
The fan is connected to the clean air compartment and sucks air through the dust collector from the dirty air compartment through the filters to the clean air compartment. The filters will collect fine dust particles in the air. The heavy particles will drop down into the collection hopper at the bottom of the dust collector.

A trash can (55 gallon drum) must be placed below the dust collector to remove the dust particles from the hopper.

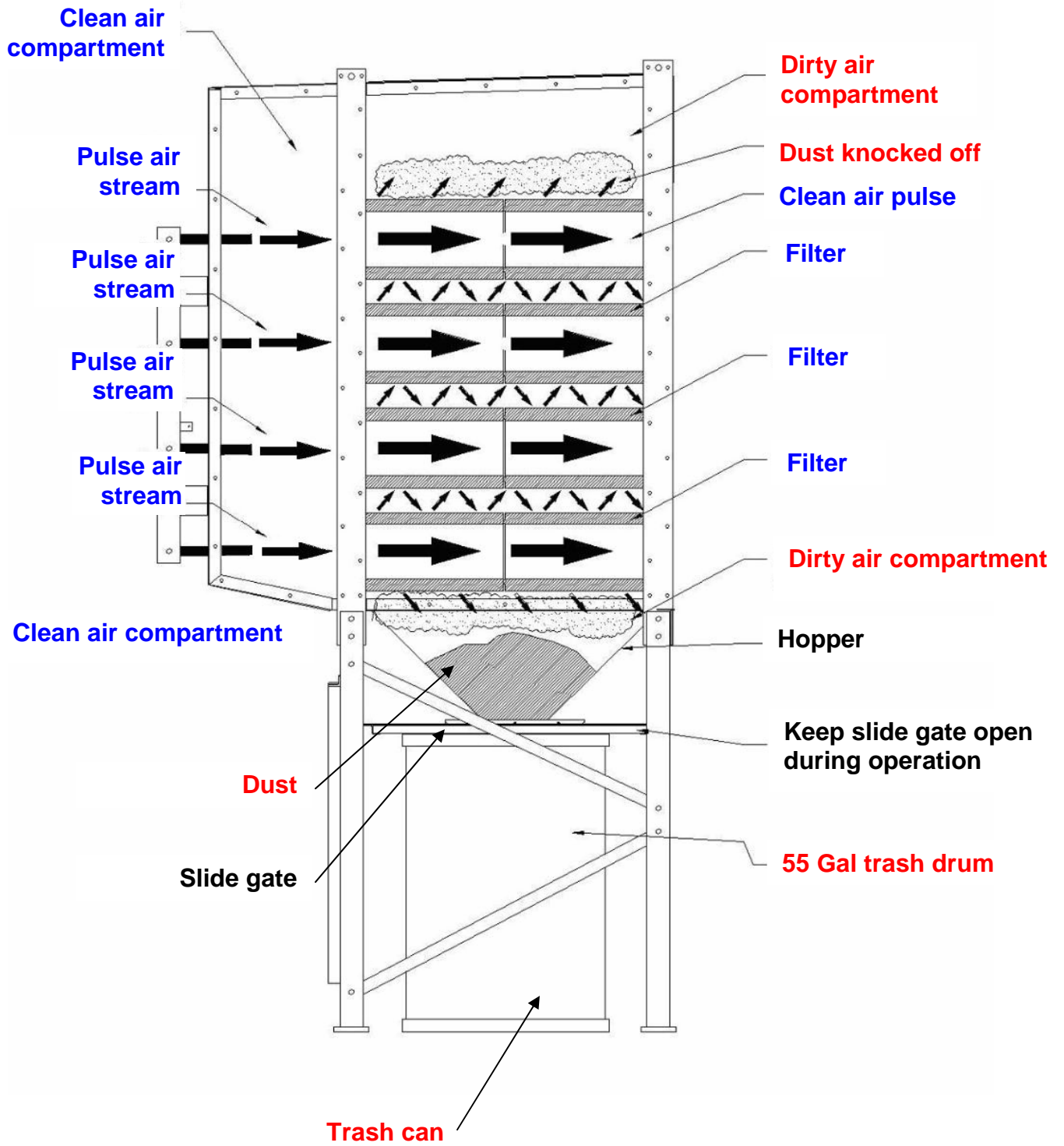
A slide gate is mounted at the bottom of the hopper. The slide gate should be kept in the open position at all times. It can only be closed during trash removal.

A drum cover, seal and flexible tube are available to connect the trash drum to the dust collector. This prevents dust spills during trash dumping.

AIR FLOW DIAGRAM



PULSE AIR FLOW DIAGRAM



PULSE CLEANING SYSTEM

The dust collector is equipped with a pulse air system to clean the filters. The filters will, over time, collect a layer of dust that will reduce the airflow and ultimately effect the cleaning efficiency. The pulse system is mounted at the back of the Dust collector. Each pair of filters has its own clean air pulsar system. The system operates by sending a strong burst of pressurized air down the center of the filters. This shock burst of energy knocks the dust cake off the filter allowing it to breathe again. The pulsar system is fully automated and would execute pulses when needed. The dust collector is fitted with a Photohelic Pulse Management System. This system monitors the pressure differential between the dirty and clean air sides of the collector and activates the pulsing system when the pressure differential reaches the set operational limits. The pulsar system will extend the life of your cartridges and optimize cleaning efficiency. A filter will ultimately reach the end of its life span when pulsing can no longer achieve the required pressure differential measurements. See the chapter on settings to obtain the correct values for differential values.

Delivery Inspection

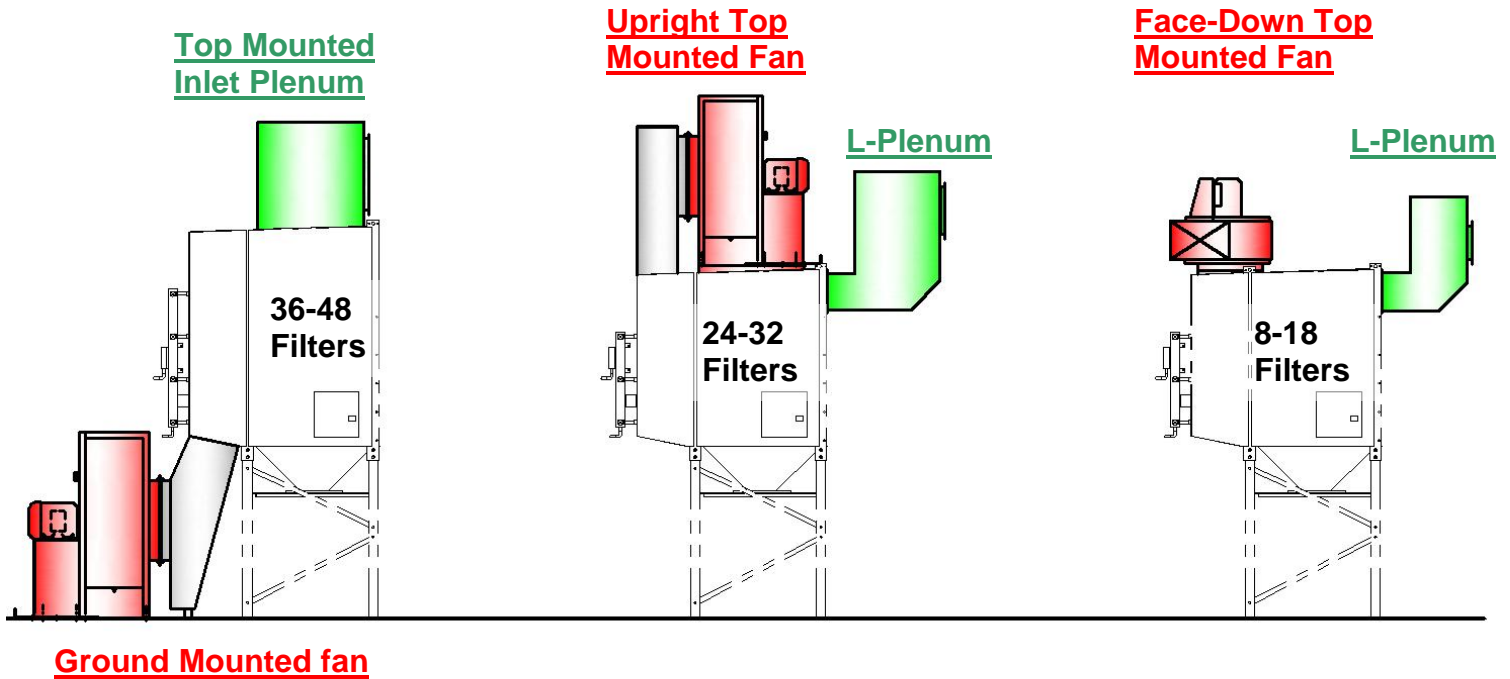
- Inspect the dust collector on arrival.
- Inform the shipping company of any possible damage to the dust collector immediately upon discovery.
- File a damage report and damage claim with the shipping company if needed.
- Make sure that the unit you took possession of is the unit that you ordered.
- Report any incomplete shipments to your shipping company.

Dust Collector Installation

- The dust collector must be installed and maintained properly by qualified technicians in order to operate at optimum levels.
- Contact the proper Environmental Protection Agencies in your area concerning the safety code regulations with regards to the safe installation and operation requirements in your area. If no codes are available, it is recommended to install according to the National Electric Code and to NFPA #70
- The dust collector must be mounted on a strong level surface or structure. The structure or concrete must be able to support the dust collectors weight, collected dust and other auxiliary equipment.
- The unit can also be hung from a steel structure that was approved by the proper authorities to carry the weight. A structural specialist familiar with the structural safety laws must be consulted in areas where high winds and seismic activities are known to occur. Make sure that you keep the dust collector away from high heat areas.
- Anchor bolts must extend at least two inches above the concrete surface.

FAN & INLET PLENUM CONFIGURATIONS

There are various ways in which dust collector fans and inlet plenums can be configured. All configurations are based on the fan size required and the practical size and placement constraints. The diagram below shows the three most commonly used configurations. Note how the “filter quantities” determine the fan and inlet plenum orientation. ABS Blast will assist you if you require a specialized configuration not shown below.



Large Dust Collector

Medium Dust Collector

Small Dust Collector

Environmental Safety Warning

Some areas have special requirements with regard to returning filtered air into facilities. Contact OSHA and determine if any such restrictions are applicable for your area or application.

OPERATION

Operating Principle & Use

The typical dust load for this type of dust collector is less than 2 grams per cubic foot. These dust collectors can be used to clean air for a variety of environments such as:

- Abrasive blast
- Grinding
- Powder paint applications
- Sand handling
- Welding
- Machining

Since the dirty air particles vary so much between different environments it is important to select the correct type of filter for your cleaning application.

Hemi-Pleat filter Cartridges are recommended for all non-rubbery fine dust collection applications.

Operation Requirements

These dust collectors cannot be used as **standard equipment** without the prior approval of a licensed Environmental Safety Control Officer in the following cleaning environments.

- Chemical conditions
- High temperature
- High humidity
- Explosive and flammable materials
- Hygroscopic dust
- High oil and hydrocarbon environments.

The above-mentioned cleaning environments require special attention to dust collector functionality, design, filter types and treatment and air humidity control.

ELECTRICAL Installation & Maintenance Safety Warning

All electrical power sources must be locked out prior to installation or maintenance work.

Classified hazardous air environments require enclosures rated for such conditions.

Only qualified electricians can perform installation and maintenance on this equipment and all work must comply with the proper national and local safety and operational codes.

ELECTRICAL

Electrical Installation and Maintenance Work

- The National Electric Code and NFPA #70 must be used for all electrical work such as electrical connections, wiring and grounding.
- Consult your local authorities to determine if there are any other electrical safety codes that pertain to your installation.
- Use the correct electrical rating and wiring diagram for installation. The electrical rating sign on the unit will display the required supply voltages.
- The dust collector must be equipped with a disconnect, matched to the units Voltage and Current rating as indicated on the electrical rating sign. The disconnect must be installed according to Part IX Article 430 of the National Electric Code, NFPA # 70 most up-to-date publication.

RIGGING

Rigging Information

Required tools and installation equipment:

Crescent wrench
End wrenches
Drill pins
Drill
Drill bits
Taper pin
Clevis pins & clamps
Crane/Forklift
Lifting slings
Pipe wrench
Socket wrench set
Spreader bar
Screwdriver
Pipe sealer

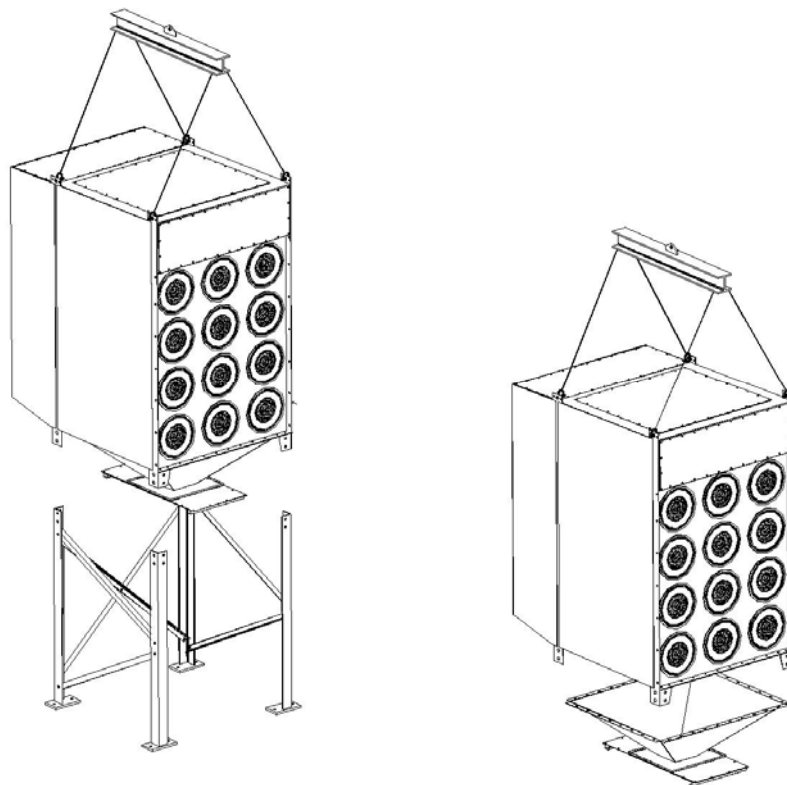
Hoisting Instructions

- Use all the available lifting holes.
- Do not use lifting hooks to lift the collector. Use clevis shackles and screw pins with slings.
- Using a spreader bar will distribute the weight and prevent damage to the unit.
- Only allow trained riggers to operate hoisting equipment.
- Make sure that your lifting equipment is capable of lifting the required load as specified on the unit drawing.
- Use Taper pins to align boltholes.
- Do not lift the assembled unit. Remove large assemblies such as the fan before lifting.

RIGGING

Warning: Rigging and installation

- Unsafe lifting and rigging practices can cause serious personal injury, death or damage to property.
- Use the correct lifting equipment and correct safety precautions during lifting and installation.
- Use a forklift or crane to lift and move the equipment.
- Keep the installation area and surrounding area clear from obstructions that can lead to accidents.



Installation

Hoist dust collector as shown.

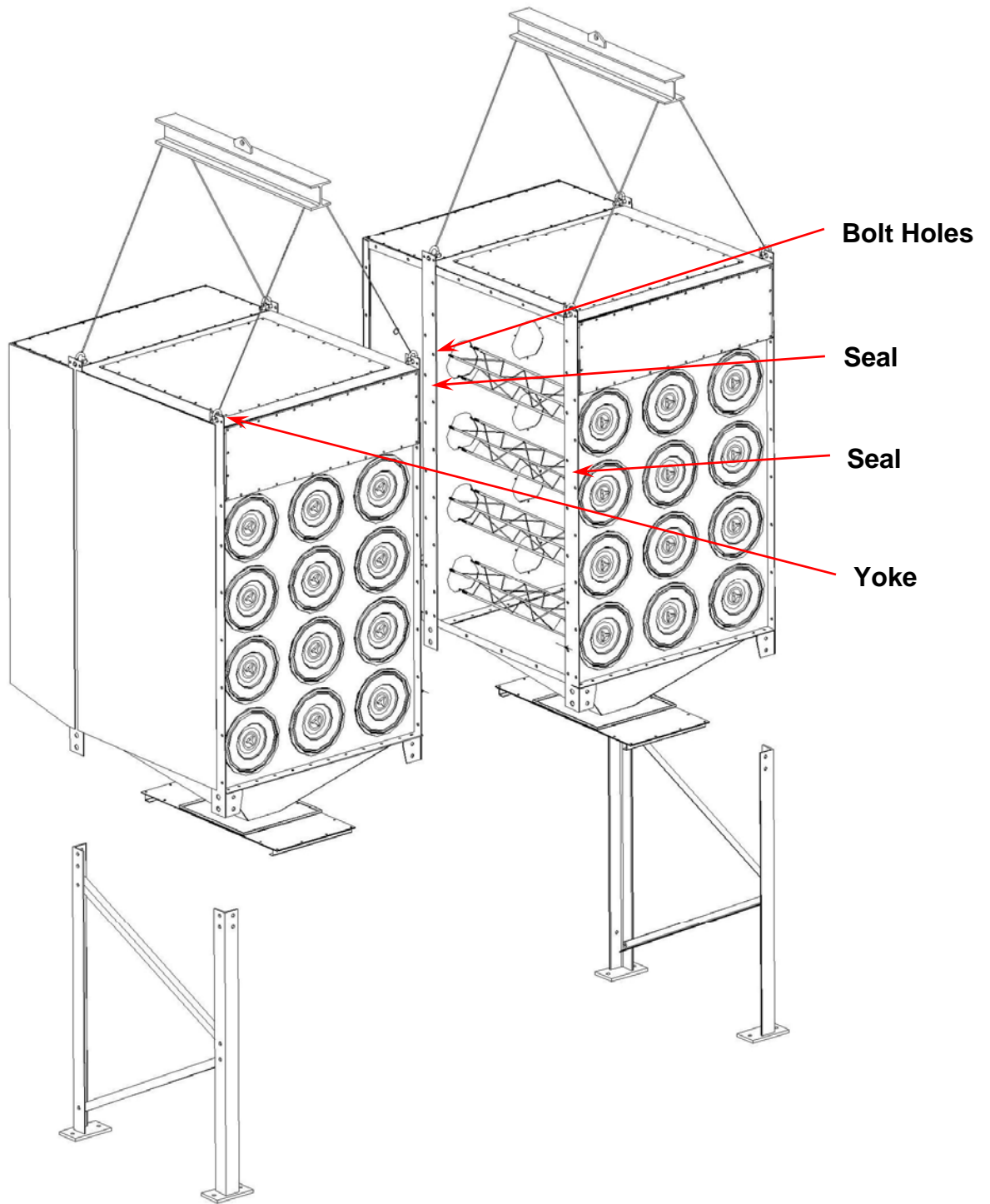
Seal hopper on the top rim with gasket or sealant.

Align bolt holes and bolt the hopper to the dust collector.

Attach the legs as shown

Move the dust collector into place and secure the dust collector to the mounting surface with epoxy anchor bolts.

ASSEMBLY



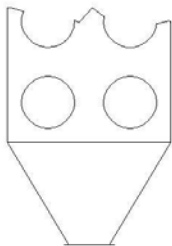
HOPPER INSTALLATION

Installation of the Dust Collector Hopper

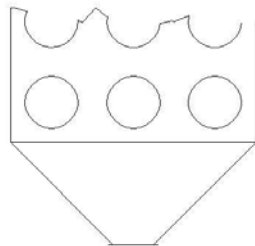
There are only 4 types of dust collector hoppers available, all of which dump into a small 13" hole. These hoppers include the following dust collector filter and segment arrangements.

- Double filter row one segment
- Triple filter row single segment
- 4x filter row double segment low drop hopper
- Double filter row single segment low drop hopper

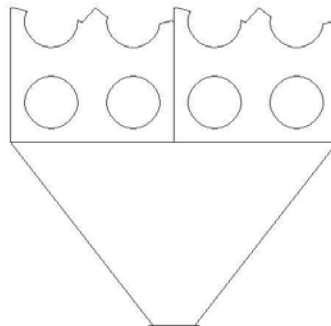
One DC segment across
two filter rows



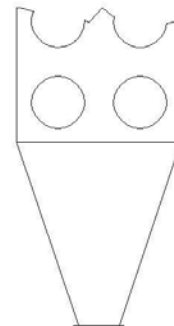
One DC segment across
three filter rows



Two DC segments across
four filter rows



One DC segments across
two filter rows with steep
sides



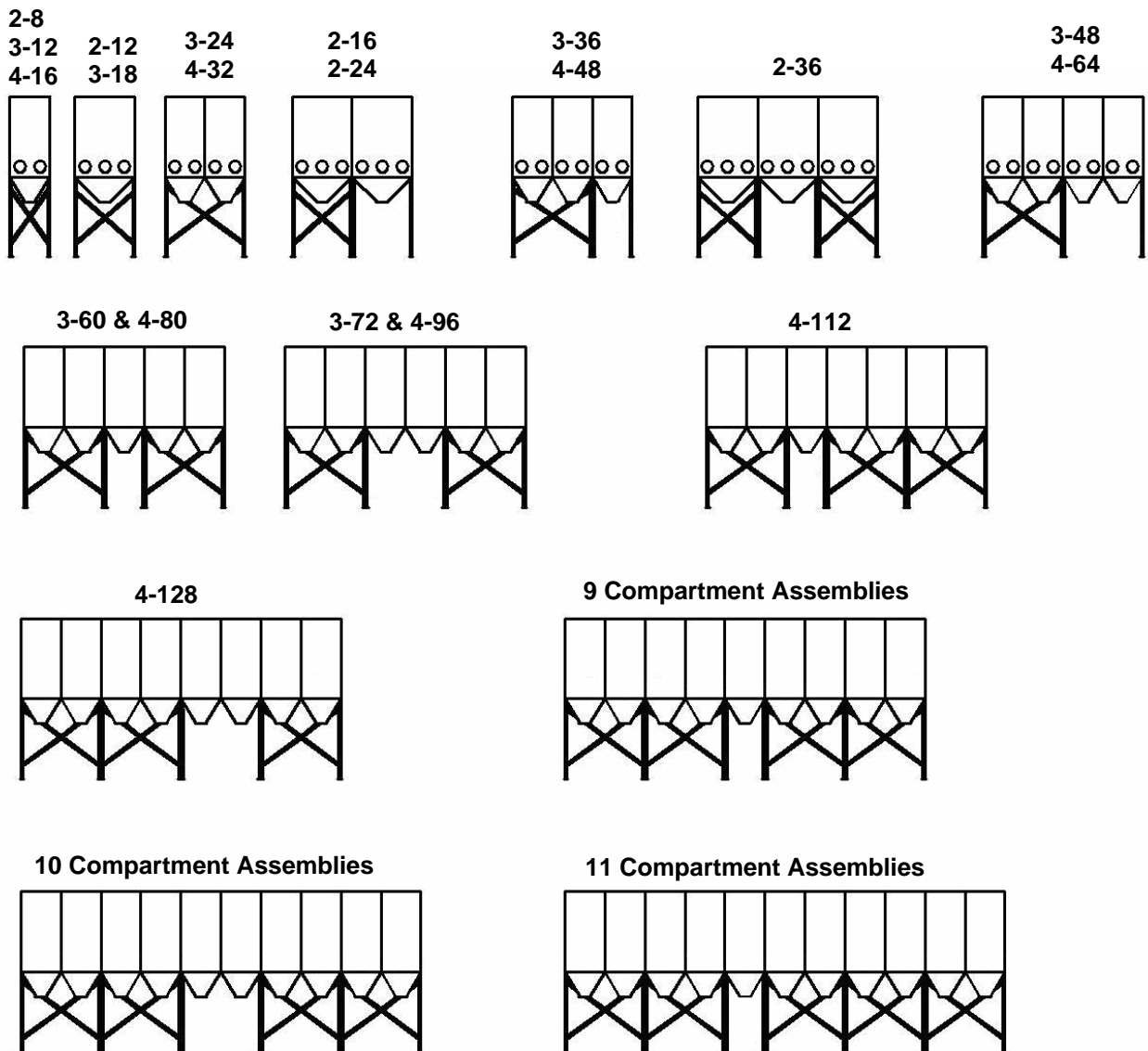
LEG INSTALLATION

Installation of the dust collector support legs

The dust collector legs were designed to withstand 100 mph winds and Seismic Zone 4 conditions. The drawing on the following page shows the correct leg layout for all hopper compartment combinations. The hopper legs are shipped unassembled with the hopper.

Follow the instructions to assemble the dust collector legs.

HOPPER LEG CONFIGURATIONS

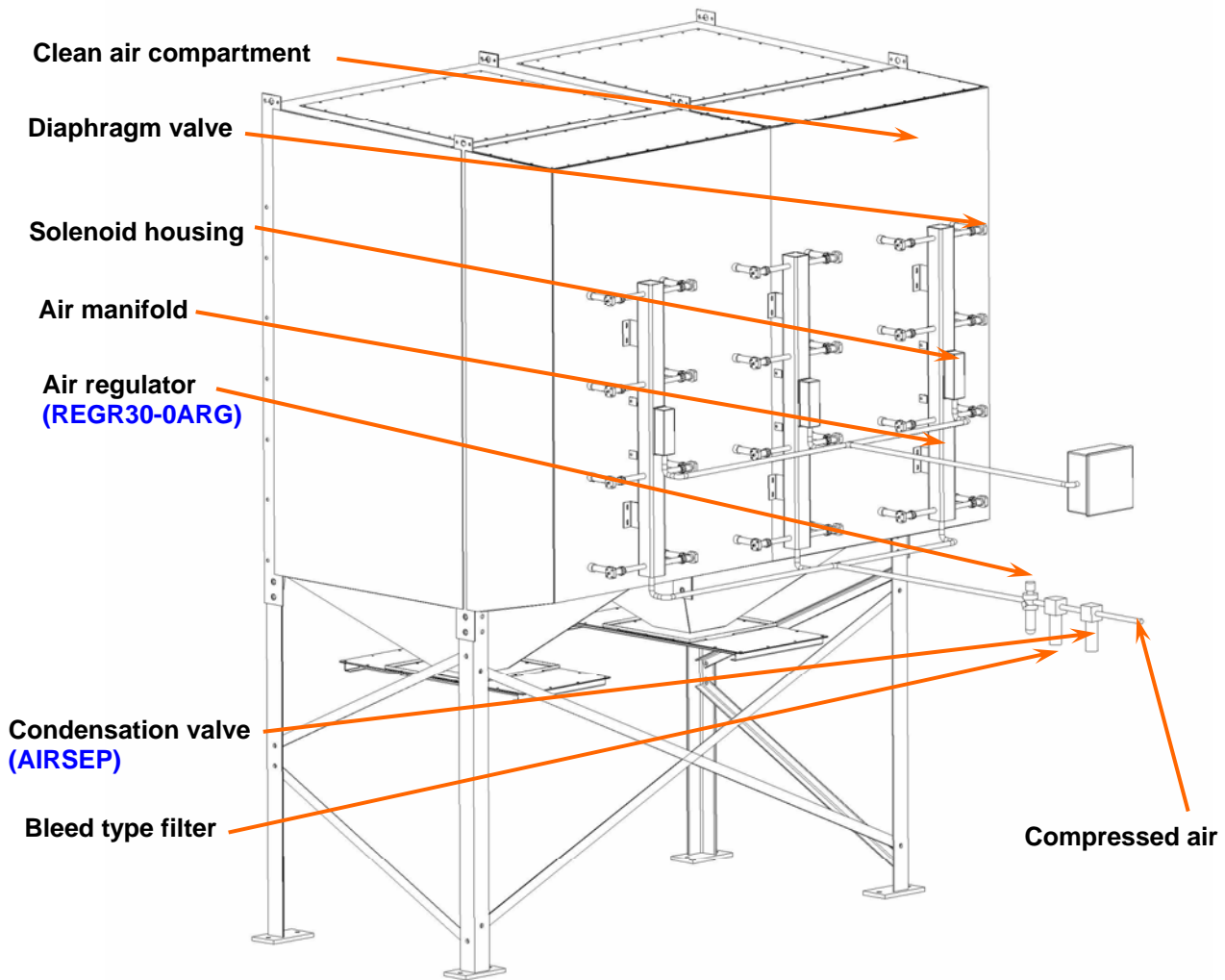


- Assemble the legs according to the drawing shown above. Do not assemble the legs to the collector at this time.
- Raise the dust collector with a crane and then lower slowly so that the bolt holes align properly.
- Taper pins are useful to align the holes for assembly. Use $\frac{3}{4}$ -10 X 2" bolts and required washers, lock washers and nuts.
- Raise the dust collector-leg assembly and lower it carefully into the correct mounting pad position.
- Level the dust collector in the pad and tighten all bolts and nuts at this time.
- Loosen the crane from the dust collector after the dust collector is secured into place.

Warning!

Ensure that the dust collector legs are secured properly and that all bolts and nuts are tightened adequately before allowing the dust collector weight to settle onto the legs before removing the crane.

COMPRESSED AIR HOOKUP



Setting Up Compressed Air

Thread-ceiling tape should be used on all compressed-air connections. The plastic pipe plug on the unit must be removed and connected to the compressed-air supply line.

A shut-off valve, bleed regulator with gauge, filter, and condensate valve must be installed on the compressed-air supply line.

Note: All compressed-air components must be determined to satisfy the maximum pressure and flow requirements of 10-20 scfm (depending on unit size) at 90-psi pressure. Never increase air pressure above 100-psi as this will result in unit damage.

Compressed-Air Equipment

1. Regularly check the function and operation of components in the compressed-air system. Replace any worn or dysfunctional components. Replace clean air compression filters regularly.
2. Drain water from the air system on a regular basis to prevent unit damage.
3. Periodically inspect the compressed-air tubing, solenoid valves and cleaning valves for leaks. Repair leaks if necessary.

START-UP

Start-Up

1. All electrical connections must be checked for tightness and good contact.
2. No loose items should be near the inlet or outlet of the unit.
3. Check that all service switches are in the “off” position and that all remote controls are wired properly into the system.
4. Make sure that all other accessories are installed correctly and bolted down properly.
5. Make sure that the slide gate below the hopper is in the “open” position and that the trash drum connection is sealed tightly. Excessive air flow will cause overload and cause system failure.
6. Turn the electrical power on at the main breaker.
7. Open the compressed-air supply valve and adjust the pressure to between 90-100 psig.
8. Quickly turn the fan motor power on and off to establish the rotation direction of the fan. Make sure that the fan turns in the same direction as the indicator arrow on the fan housing. **Reversal of rotation direction on a single-phased motor.** Instructions are given on the motor’s main plate on how to reverse the rotation direction on a single-phased power supply. **Reversal of rotation direction on a three-phased motor:** Shut the electric power off at the main breaker and switch the two leads around on the output side of the fan motor starter.
9. If the fan is equipped with a volume control damper, it can be used to adjust the airflow of the fan to the desirable flow volume. Warning: Additional airflow will reduce filter life and can cause electrical system problems and reduced motor life.

Procedural Checklist

1. Monitor dust collector performance.
2. Monitor exhaust for dust.
3. Monitor pressure differential over filters. This should not exceed 6” static pressure: wg.)
4. Monitor dust in trash drums and empty as needed.

Warning!

- It is important to keep the compressed air supply clean. Any moisture or oil will contaminate the filters and reduce the efficiency and life. It can also cause the malfunction of the pulse air system.
- Flush out all dirt from the air supply lines before connection to the unit.
- The air pressure must be turned off before any maintenance or service work is done on the system

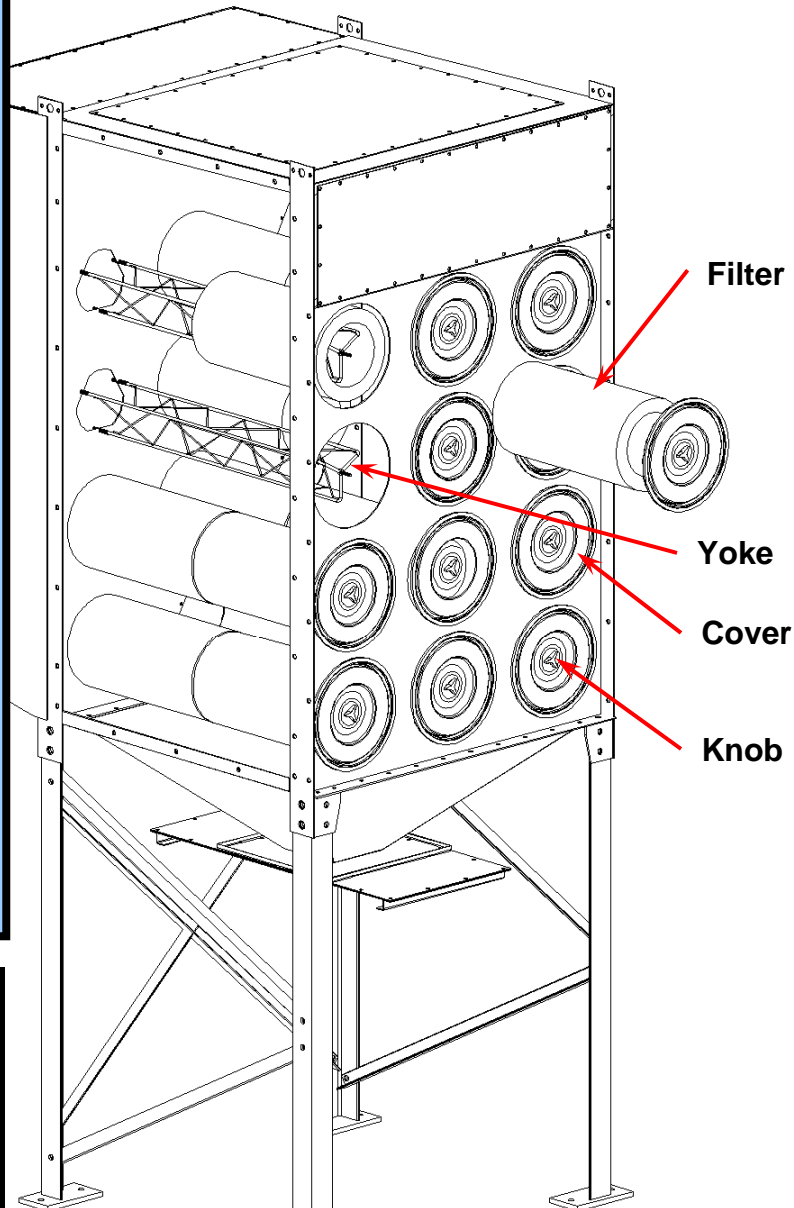
Warning!

Stay clear of the fan exhaust blow area to prevent injury from flying debris.

FILTER REPLACEMENT

Filter Removal

1. Shut electrical power off.
2. Remove the round access covers of the filters by twisting the knob in a counter clockwise direction. Always start with the top row of filters and work your way down.
3. Carefully dislodge the filter and rotate it half a turn so that excess dust will fall down into the hopper.
4. Remove the filter.
5. Discard properly.
6. Clean the sealing surfaces properly with a moist rag. Note: A clean sealing surface will result in a positive airtight filter seal.
7. Take this opportunity to clean out excess dust out of the discharge hopper.



Warning!

- Filters may be contaminated with hazardous material if they were used in such an environment. It is important to use the proper safety protection gear during removal/replacement of these filters.
- Filters gather a lot of dust during their lifetime and accumulate additional weight. Be careful and take precautions to avoid personal injury during the retrieval of these filters.
- Care should be taken not to drop the filters.
- Wear NIOSH approved respirator, gloves and safety glasses.

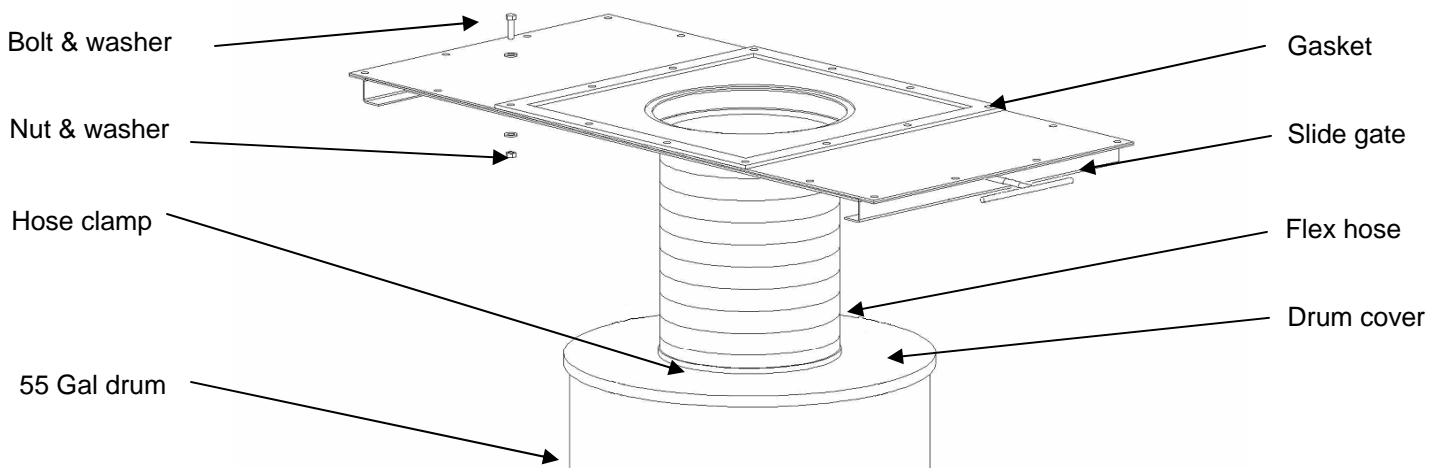
Replacement of Filters

1. Replace filter cartridges with the same type and model number as the previously discarded filters. Slide two replacement filters over each yoke. Take note that the filter gasket faces backwards into the unit towards the clean air chamber.
2. Clean the filter covers and tighten them onto the yoke thread. Make sure that the hand knob is tightened sufficiently to prevent air leakage. Replace gaskets on covers as needed to assure an airtight seal.
3. Turn electrical power supply and air pressure supply back on before starting the unit.

DISPOSAL OF DUST

Disposal of Dust

It is important that the dust collector unit be shut down during removal of dust collected in the trash drum. Close the slide gate so that excess dust will not fall from the hopper. Remove and empty the trash drum. Replace the trash drum. Open the slide gate again.
NOTE: Make sure that the drum cover gaskets form a tight seal to the 55 gallon drum top.



Installation of Trash Drum Cover, Flex hose and Gasket

1. The 1/8-inch gasket must be located between the slide gate and hopper flange.
2. Attach the slide gate to the hopper flange with 3/8-16 bolts, nuts and washers.
3. Place the drum cover on the 55-gallon drum and secure with provided fasteners.
4. The drum cover and slide gate must be connected with the flexible hose. Use hose clamps for this purpose.

55-Gallon Trash Drum

The trash removal system was designed for a standard 55-gallon drum. A drum cover is supplied which connects to the 55-gallon drum. A flexible hose connects the drum cover with the dust collector hopper. It is a good practice to place the trash drum on top of a pallet. This will allow you to use a forklift to remove the trash drum.

Warning!

It is important that the slide gate be kept in the open position when the fan is running. Closing the slide gate while the fan is running can cause severe damage to your trash drum and possibly dust collector discharge hopper.

EXPLOSION VENTS

Purpose of Explosion Vents

1. Explosion vents must be installed in such a way that it will safely direct blast away from areas where people can get hurt such as walkways, etc. Also direct it in such a way that it would not cause damage to buildings and property.
2. All explosion ventilation calculations are based on NFPA-68 1998 for exterior installation with no ducting or flow obstruction.
3. Explosion vents can only be used in negative pressure environments.
4. Please contact ABS if you require more information regarding explosion vents.

Explosion Ventilation Warning!

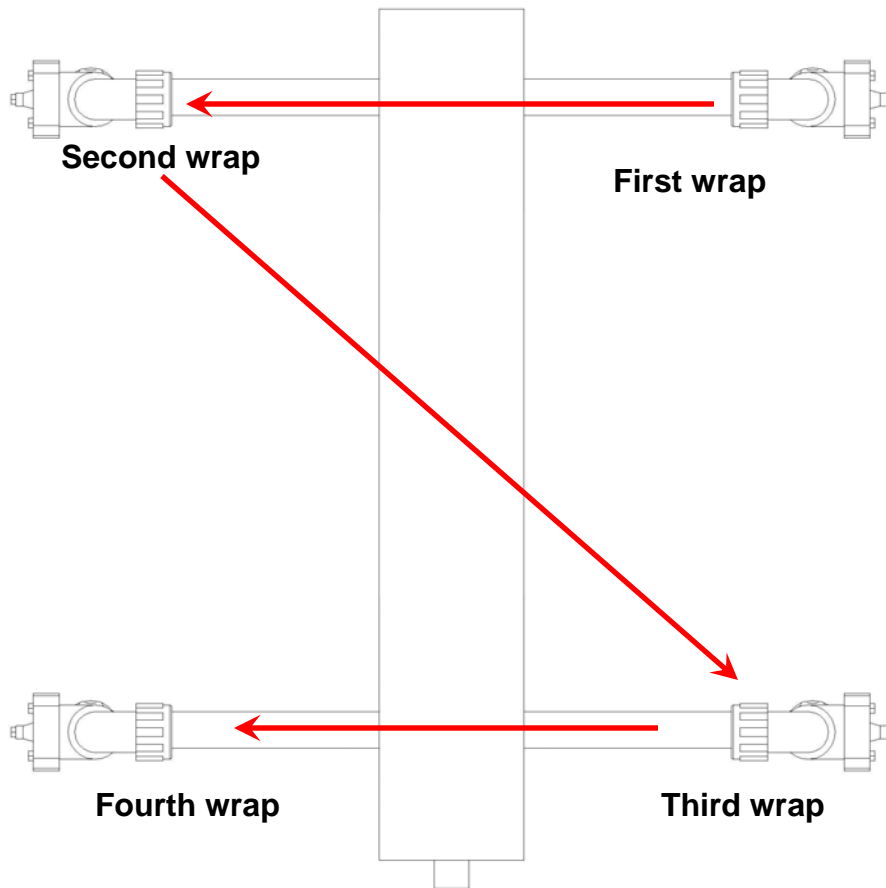
1. Explosion vents are designed for outside installations only.
2. All airborne discharge from the dust collector fitted with an explosion vent must be vented outside towards a safe area.
3. It is good practice to locate venting equipment outdoors and away from areas occupied by personnel.
4. Material discharge during venting can lead to death, personal injury or property damage.

COLD CLIMATE EQUIPMENT

Cold Climate Equipment

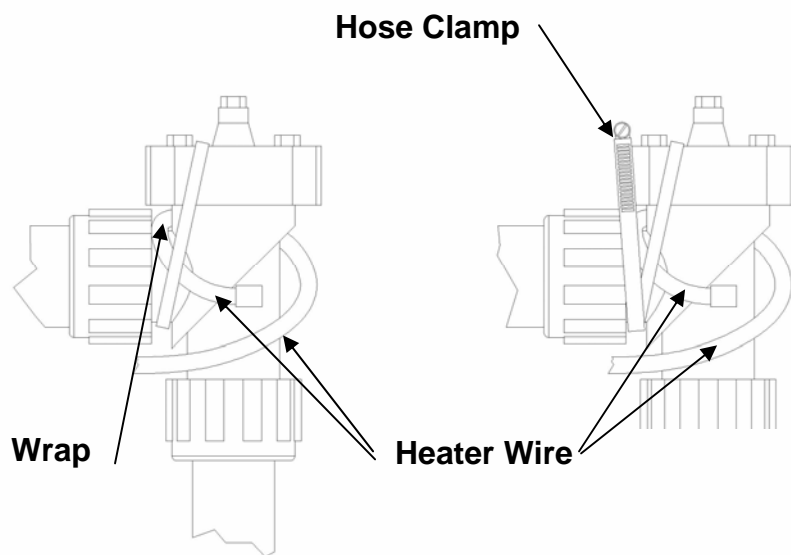
The cold climate kit was designed to provide heat to the solenoid valve system in cold climate conditions. Compressed air that contains moisture can result in freeze conditions that would lock up the solenoid valves. The unit consists of a heating element and a thermostat. The unit comes equipped with a factory-installed cold weather kit.

A heavy-duty kit is also available for applications where high levels of moisture will be present in the compressed air. This unit consists of the standard kit and also an additional heating wire to heat the solenoid valves from the outside. This kit does not come factory-installed but can be installed on site by the customer.

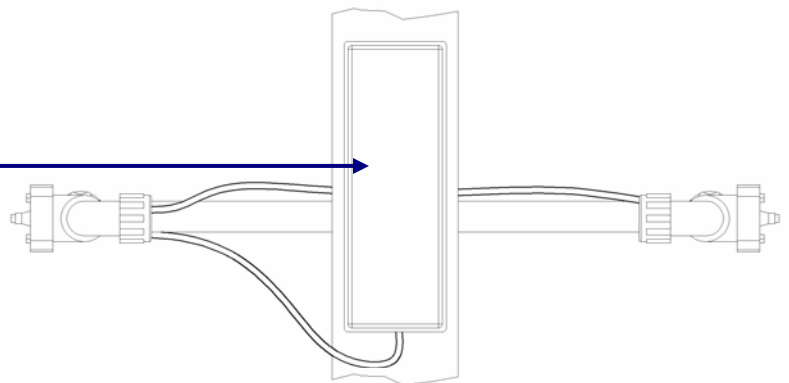


1. The heat cable must be connected to the main power supply according to the manufacturers' instructions.
2. Wrap the heat cable as indicated in the included diagram.
3. Start by wrapping the right-hand top solenoid valve and work your way over to the top left-hand top solenoid valve.
4. Continue to the right-hand second from top solenoid valve and then over to the left-hand second from top solenoid valve.
5. Remember to keep the heat cable tight.

6. Do a double wrap on the solenoid valve covers as shown in the included sketch.
7. Use a 3-in hose clamp to secure the double-wrap heat cable to the solenoid valve.
8. Continue wrapping all the valves as described in the above sequence.
9. The power connection kit needs to be assembled according to the manufacturers' guidelines.
10. A 1-in hole must be drilled in the back of the connection box.



11. The **connection box** can be attached to the manifold with two 8-in hose clamps.
12. The double-wrapped heat cable on the solenoid valves must be protected by wrapping it with 6-ft of pipe insulation tape.
13. The cables should be kept in place with cable ties.



PROBLEM SOLVING

Problem

Possible Reason

Cure

Dust coming from clean air outlet

Loose access cover

Holes in filters; filter damage; damage to end caps; damaged gaskets

Incorrectly installed filter cartridge

Access cover must be tightened properly. Make sure that gaskets seal properly.

Replace filters with intact gaskets. Also replace end caps if necessary.

Remove and replace filters with gaskets orientated properly.

Fan motor quit running after a while

Overload of electrical circuit

Incorrectly adjusted damper control on fan

Leakage through access doors

Faulty motor-starter installation

Ensure that the electrical power supply is adequate to run the fan motor under load.

Monitor airflow in ducting. Ensure that the motor current draw is within the rated specification of the manufacturer by adjusting the damper.

Seal access doors properly.

Verify that the motor-starter is functioning properly, and wired correctly. Replace is faulty.

Fan motor won't start

No electrical power on motor input

Electric power supply down

Inadequate electrical wiring to handle available voltage

Incorrect wiring

Incorrect wire size on motors

Trace electrical supply and check all the electrical leads for proper contact.

Verify correct voltage on electrical power supply. Trace for open circuit breaker or blown fuse. Switch contact breaker or replace fuse.

Install wiring that can handle the voltage.

Verify motor wiring for correct supply voltage and hook-up. Wire according to manufacturers' diagram and National Electric Code.

Correct by rewiring with wire to the specified gauge as per local and/or national codes.

The Digital Photohelic shows no display

Open circuit blown fuse
No electrical power supply on the control
Incorrectly connected or blocked hoses.

Replace the fuse if blown.
Verify the proper supply voltage.
Clear hoses not connected.

Inadequate airflow

Fan turns in the wrong direction
Open or leaking access doors
Restricted fan exhaust
Incorrectly adjusted timer
Timer failure
Leaking of compressed-air through pulsating valves
Hopper overfilled
No electrical power on pulsar unit
Insufficient compressed air
Dirty filter cartridges

The fan must turn in a clockwise direction when you stand behind the fan motor. Wire motor correctly so that fan will turn in the correct direction.
Ensure that all access covers are closed and sealed properly. Make sure that slide gate is sealed properly to drum.
Ensure that there are no objects in the fan airflow path that could restrict airflow. Make sure that the damper is set properly.
Consult timer-wiring diagram and ensure that the timer is wired correctly.
Check to see if the fuse on the timer is good. Replace if necessary. Also check that the supply voltage to the timer board is within spec. If no output voltage is available despite good supply voltage and good fuse, you will have to replace the timer board.
Shut down all electrical power supply to the unit. Decompress the compressed-air supply. Open pulsating valves by removing the cover and check for diaphragm tears, dirt or wear. Clean and/or replace worn components if necessary.
Remove dirt from dust collector by opening the slide gate in the hopper. Clean out hopper, remove trash.
Check the fuse and electrical supply voltage to the timer unit. Replace fuse if necessary.
Make sure that there is a minimum of 90-psig air pressures available.
Replace filter cartridges.

The Digital Photohelic can not be adjusted

Terminals for the pressure switch on the timer board were shortened out with a jumper cable

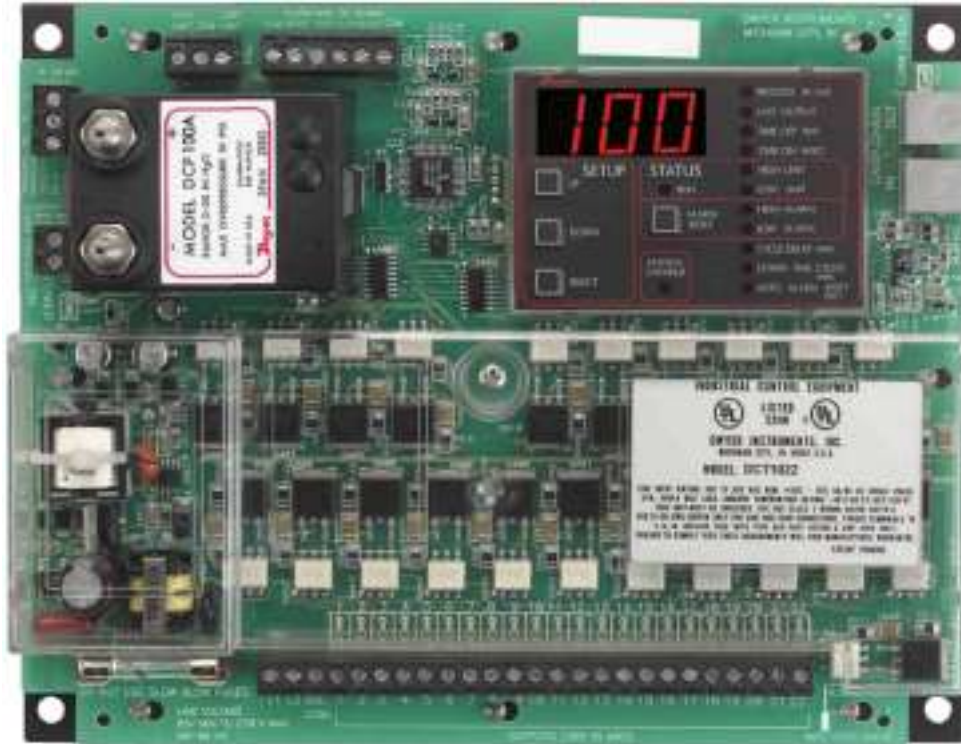
The jumper cable needs to be removed from the timer board.

TIMER CARD



Series DCT1000 Dust Collector Timer Controller

Specifications - Installation and Operating Instructions



Thank you for purchasing the DCT1000 Dust Collector Timer Controller. You have selected a state of the art dust collector timer control that will provide years of dependable operation and service.

The DCT1000 Dust Collector Timer Controller was designed to be used with pulse-jet type dust collectors for on-demand or continuous cleaning applications.

Continuous cleaning applications do not require external inputs and can be used for time based "on-demand" cleaning through use of the cycle delay feature.

For on-demand applications, the plug-in pressure modules (DCP100A/200A) can be used to take full advantage of all the features the DCT1000 offers, or an external pressure switch (such as the Dwyer Photohelic®) can be used for High/Low limit control.

As with traditional Dwyer products, the Dwyer DCT1000 was designed so that it is easy to use, thus allowing for a quick and easy start up for your dust control applications. The contents inside this installation and operating manual will guide you through the features of the DCT1000 and how they can be applied to get the most out of your dust control requirements.

SPECIFICATIONS

DCT1000 Timer Controller:

Output Channels: 6, 10, & 22 channels. Expandable to 255 channels using DCT1122 & DCT1110 channel expander boards.

Power Requirements: 85 to 270 VAC, 50 or 60 Hz.

Solenoid Supply: 3A maximum per channel.

Fuse: 3A @ 250 VAC. Low voltage control circuitry is isolated from the line voltage for system safety.

Temperature Limits: -40 to 140°F (-40 to 60°C).

Storage Temperature Limits: -40 to 176°F (-40 to 80°C).

On Time: 10 msec to 600 msec, 10 msec steps.

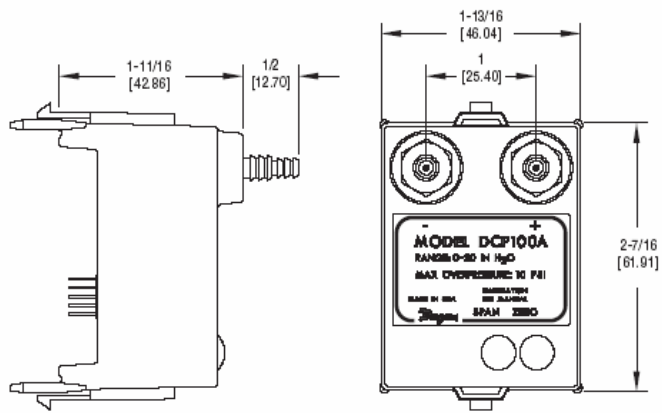
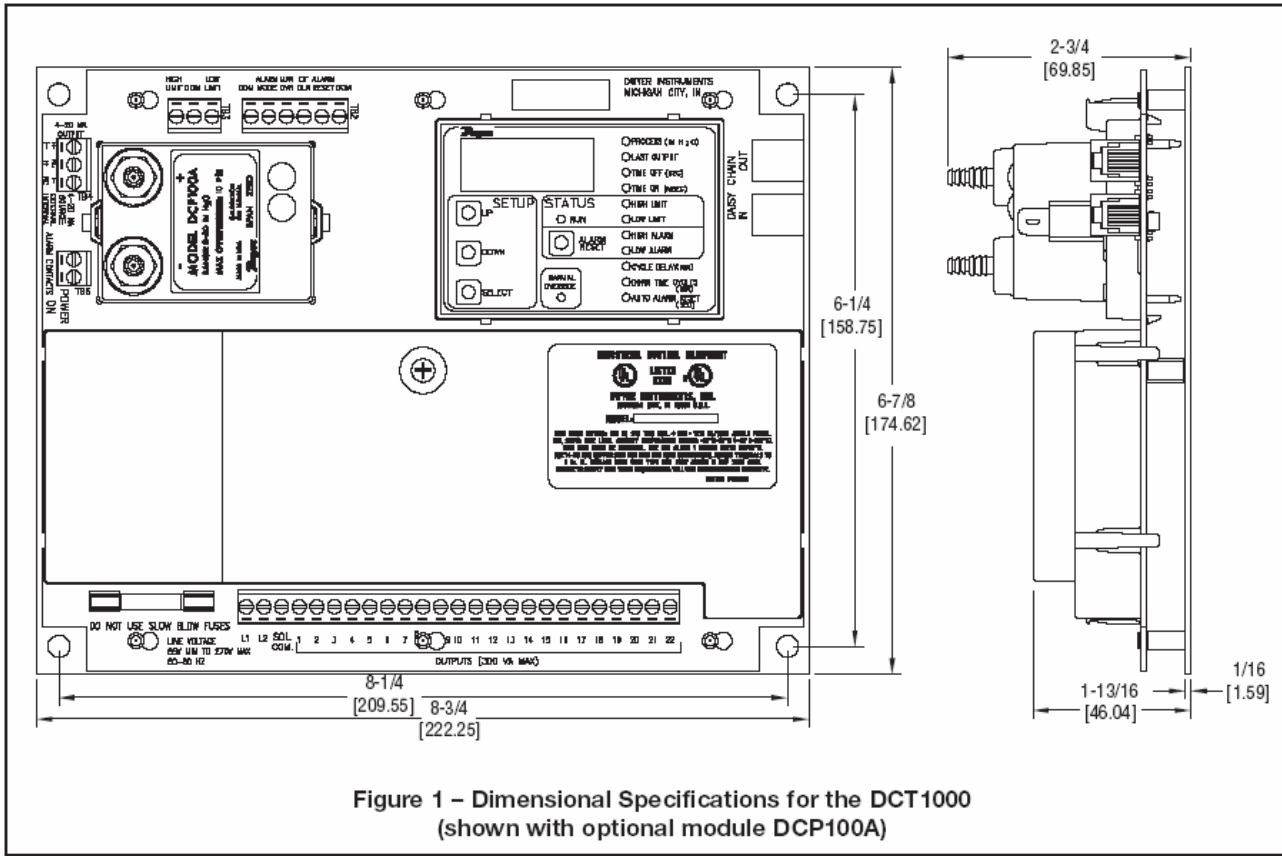
On Time Accuracy: ±10 msec.

Off Time: 1 second to 255 seconds, 1 second steps.

Off Time Accuracy: ±1 % of the value or ±50 msec, whichever is greater.

Weight: 1 lb 3.0 oz (538.6 g).

Agency Approvals: UL, cUL.



The DCP100A or DCP200A pressure modules are designed exclusively for use with the Dwyer DCT1000 Dust Collector Timer Controller boards for on-demand cleaning requirements. These series of modules are available in 10" w.c. [2.49 kPa] or 20" w.c. [4.98 kPa] ranges, which allow for differential process pressure measurement as indicated on the display of the master controller. An isolated 4-20 mA readout channel is provided for remote pressure display. The 4-20 mA output may be wired either for use with an external power supply and indicator or using the isolated on-board 24 volt power supply to power the loop.

SPECIFICATIONS


- Pressure Ranges:** 10" w.c. or 20" w.c.
- Temperature Limits:** -40 to 140°F (-40 to 60°C).
- Pressure Limit:** 10 psi (68.95 kPa).
- Pressure Limit (differential):** 10 psi (68.95 kPa).
- Accuracy:** ±1.5% F.S. @ 73°F (22.8°C).
- Output Signal:** 4-20 mA.
- Alarm Contacts:** 1.5A inductive load, 3A resistive load @ 30 VAC or 40 VDC.
- Process Connections:** Two barbed connections for use with 1/8" (3.18 mm) or 3/16" (4.76 mm) I.D. tubing.
- Weight:** 5.5 oz (155.9 g).

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Caution: Do not run control wires, communication cables, or other class 2 wiring in the same conduit as power leads. The system may malfunction if class 2 wiring is run together with power conductors.

1.0 Installing the DCT1000

 **Warning:** Always install and service this device with the power off and a lockout installed if required. Line voltages will be exposed at the power/output connector and at the fuse. For this reason, we have installed a plastic guard to protect the user from accidentally contacting line voltages.

Please note that the power guard serves as a safety feature and should not be removed under any circumstances.

For ease of installation and maintenance, the connectors and fuse have been left unprotected. The open frame design of the DCT1000 will require an enclosure that meets appropriate safety and local code requirements. For optimal performance, the enclosure should also protect the controller from dirt, water and direct sunlight. There are no special orientation requirements, and the controller mounts easily using the mounting holes on the factory installed base plate.

1.1 Power Requirements

The controller has a “universal” power supply that will allow operation on 120 VAC to 240 VAC power lines. The input voltage must be between 85 VAC and 270VAC either 50 or 60 Hz. No circuit changes are required when switching between these voltages. The solenoid loads, however, must be sized to accommodate the line voltage selected.

1.2 DCT1000 Terminal Connections

The line and solenoid connections are located at the lower edge of the board below the plastic guard. The terminal block is a “Euro” style connector system that clamps the wire within the connector body. The connector will accept wire sizes from 14 to 22 AWG. The wire should be stripped to no more than 0.25 inches to avoid shorts or expose line voltages creating a potential safety hazard. To assist you in determining the proper wire gauge required, a strip gauge is provided at the lower right corner of the board. The connector system used on the DCT1000 is specified for single connection but you can piggyback to a single lug provided that local codes allow for this and good workmanship practices are followed. To power up the master controller and the channel expander, connect line power to L1 and L2 (see Dimensional Specifications, Figure 1). Connect the solenoids between the selected output and the solenoid common. Solenoid common and L2 are internally connected. Switches connected to the control inputs at the top of the board must be isolated contacts connected only to the relevant terminal and to the common terminals. The following subparagraphs describe the external switch connections. Refer to figure 2 for switch connection illustration.

1.2.1 External Pressure Connection

The controller may be used with an external pressure limit switch or sensor to provide demand-cleaning operation. The high limit and low limit inputs may be used for this purpose. A simple on-off system can be established with a single pressure switch connected to the high limit input. Better control can be achieved with a high and low limit switch/gage such as the Dwyer Photohelic®. In this on-demand mode, time on, time off, and cycle delay may be programmed to define the cleaning cycle. A three pin terminal block (TB3) provides connection for external high and low limit switches (see Figure 2 on the next page). These switches must be isolated contacts. The common line must not be connected to equipment ground or protective ground, since these may introduce electrical noise and cause improper operation or possible damage to the control board. The operation of these inputs are summarized as follows (see next page):

Current Operation	Low Limit Switch	High Limit Switch	Next Operation
Hold	Open	Open	Hold
Hold or Run	X	Closed	Run
Hold	∅	Open	Hold
Hold	Closed	∅	Run
Run	Closed	≠	Run
Hold	Closed	∅	Run
Run	≠	Open	Hold
∅ Transition from open to closed			
≠ Transition closed to open			
X Either open or closed			

Note: If a DCP100A or DCP200A pressure module is installed in the master controller, the switching functions are ignored.

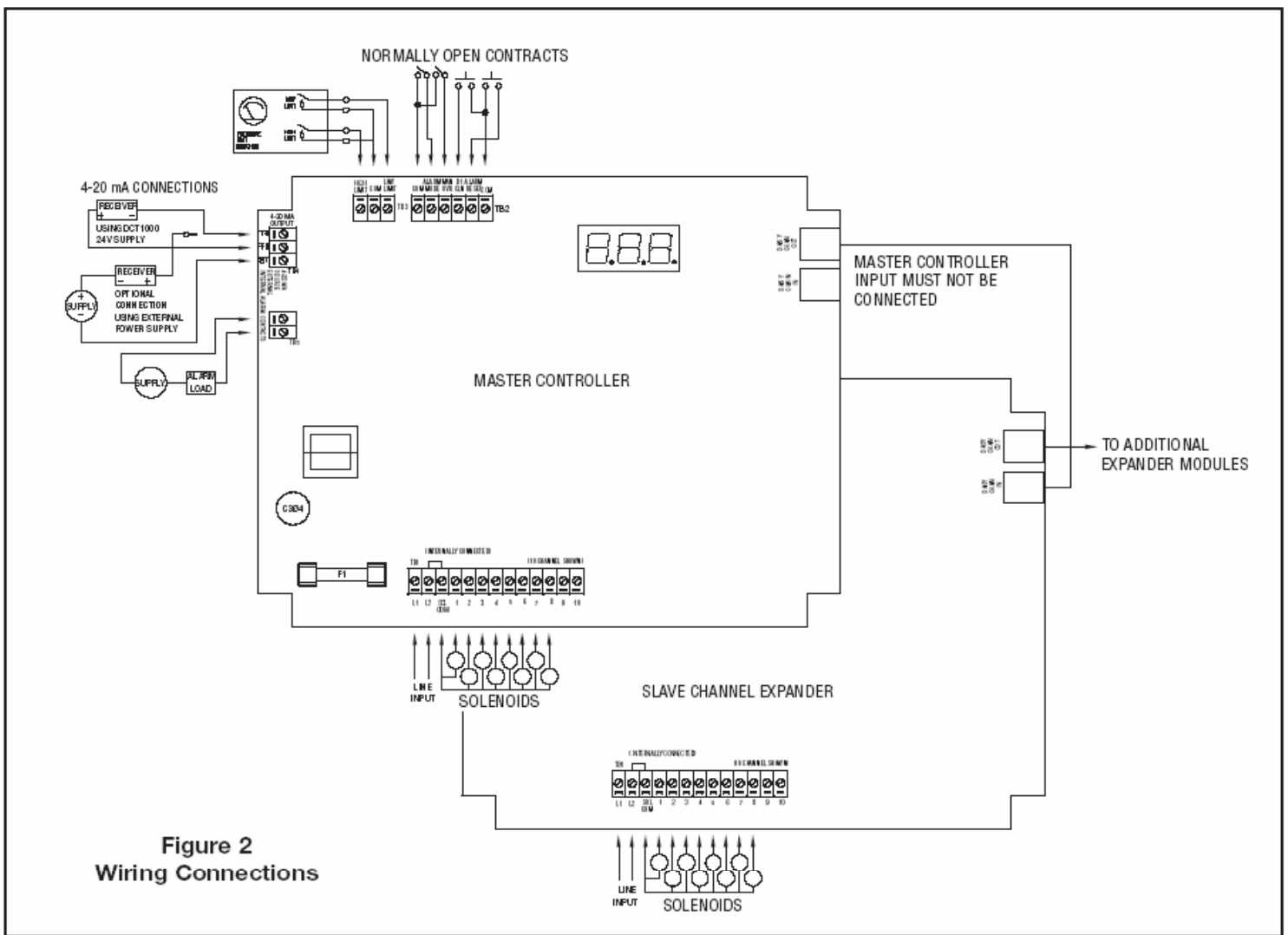


Figure 2
Wiring Connections

1.2.2 Manual Override Switch Connection

The manual override function allows the system to be set to the run mode regardless of other conditions. This mode is enabled when the manual override terminal and common are connected. It is disabled when they are disconnected. If the controller is to be run in continuous mode, a jumper wire may be wired across these terminals. When manual override is needed on a periodic basis, wire a SPST toggle switch between the manual override terminal and the common terminal.

1.2.3 Down Time Clean Connection

The down time clean operation forces the system into a run cycle for a programmed length of time between 0 – 255 minutes. The operation is initiated by connecting the down time clean terminal to a common terminal. This function is best accomplished through use of an external normally open switch.

1.2.4 Connecting Multiple Timer Boards

Both master controller boards and slave boards can have up to a maximum of 22 channels each. The system may be expanded up to 255 channels using master controller boards and slave boards. The DCT1000 will automatically detect the total number of channels involved and make their outputs available. You will note that both the master controllers and slave boards have a telephone style connector mounted on the upper right hand side of the board. These connectors are for use in systems requiring slave boards that must be daisy chained together to provide additional channel capability. For systems that require the slave boards, the master controller must not have any connection made to its daisy chain input unless it is designated as a slave control itself. (For larger systems requir-

ing more than three slave boards, a master controller must be used as the fourth slave board to satisfy power requirements.) This sequence would repeat itself until the limit of 255 channels has been reached. The cables used are not ordinary telephone style cables.



Caution: Do not use telephone jumper cables. These have a "twist" in the connection and may damage the controllers. Cables designed for use with the DCT1000 are available from Dwyer Instruments (Model DCAC02-2 ft., DCAC04-4 ft., etc.).

1.2.5 Continuous Cycle Mode

The master controller has several operating modes available for different applications. Starting with the most basic mode, it is capable of operating in a continuous cleaning cycle. This can be initiated by either placing a jumper between the high limit input and the common, or the manual override input to the common connection. Controlling this cycle are three setup parameters: time off, time on, and cycle delay. Time on and time off specifically deal with the solenoid on time and the time interval between the end of the on pulse and the start of the next. The cycle delay allows a delay of up to 255 minutes to be programmed between the end of one complete cleaning cycle and the beginning of the next. This allows additional options for defining a cleaning profile.

1.3 DCP Installation



Caution: Prior to installing the DCP100A/200A please review the operating specifications carefully.

Some operating systems, especially in pneumatic conveying applications, may see static pressure or vacuum conditions that exceed the capability of the DCP100A/200A pressure module. For these conditions there are a number of alternate Dwyer pressure products that can be used to meet your application requirements, all of which can be terminated to the Dwyer DCT1000 Dust Collector Timer Controller. For more information on these and other Dwyer products, please call us at (219) 879-8000, or visit us on the web at www.dwyer-inst.com or www.dust-controls.com.

1.3.1 Location

The system should be located in an enclosure that meets relevant safety standards and electrical codes. There are no other special orientation requirements as the pressure module is not orientation sensitive. Care should be observed when routing the air hoses to ensure that any potential condensation or moisture will not drain into the sensor. Where heavy condensation is present, a drip loop or an in-line filter should be installed to ensure long term operation.

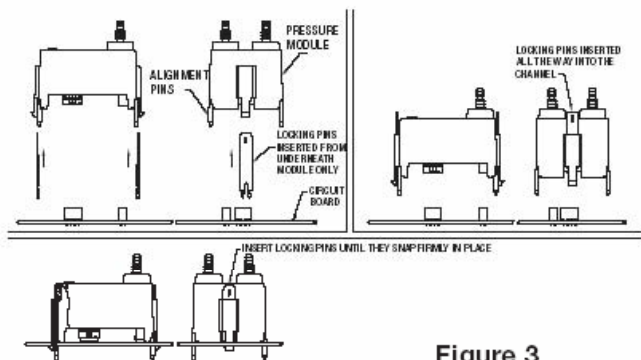


Figure 3
DCP Installation

1.3.2 Connecting DCP to Master Controller

The pressure module is attached to the Master Controller using integral connectors on both units. The insertion ports for the pressure module are located in the upper left quadrant of the DCT1000 Master Controller. The pressure module can be removed by compressing the retaining clips on each end of the module, then gently pulling the module out of the master controller board.

When inserting the module, the following procedure should be adhered to insure proper installation:

- Examine the bottom of the pressure module and note the orientation of the connectors.
- Align the module so that these connectors match the connector receptacles on the controller board.
- Orient the module with the four alignment pins over their respective mounting holes.
- Gently press the module into the connectors and snap the retaining clips on either end of the module into their slots.
- Always install and service this device with the power off and a lockout installed if required. "Hot" plugging the pressure module into an operating system may damage the system or cause the calibration parameters to be erased.

When installing or removing the module make sure to orient the module straight with board. Installing or removing the module at any angle may break the alignment pins.

1.3.3 Pressure Model Locking Pins

The DCP100A and DCP200A are supplied with locking pins to secure the module. In normal operation these are not required since the latching tabs are sufficient to secure the module even in a high vibration environment. However if the unit is to be shipped or used where severe mechanical shock could be encountered the locking pins ensure the module will not snap out of the board.

To install the locking pins, from underneath the module insert one pin behind each of the two latching tabs. Press these all the way into the channel. The ends of the tabs will extend through the slots at the top of these channels. Next insert the module in the board as described above, making sure it is properly aligned and snaps firmly in place. Press the exposed locking tabs down until the tab is seated behind the latch in the board. To remove the module, slide the locking tabs up using a small screw driver then remove the module as described above. See Figure 3.

1.3.4 DCP Connections

When a pressure module is installed, the 4-20 mA process signal and the alarm relay contacts are available. The 4-20 mA circuit is isolated from ground and other signals. The alarm relay contacts are isolated, normally open contacts. Pressure connections may be made to the stepped hose barbs with either 1/8" or 3/16" I.D. tubing.



Caution: Do not force the module into the connectors. Forcing the insertion may damage the connectors. Properly aligned, the module should snap into place.

1.3.5 DCP Maintenance

The pressure module should require very little maintenance under normal operational conditions. However, periodic calibration may be desirable to assure accuracy of the readings. The module may be removed and returned to the factory for calibration.

1.4 Alarm Mode Switch Connection

The auto alarm reset is controlled by the alarm mode switch connection. To enable the auto alarm reset the alarm mode input must be connected to a common connection. A jumper may be used when auto alarm reset is always active. A switch may be used if there are times that the auto alarm reset must be disabled. The switch must be an isolated contact and wired such that no connection is made between either of the wires and ground. See Figure 2 Wiring Connections.

1.4.1 Alarm Reset Switch Connection

The alarm may be reset either by pressing the Alarm Reset button on the control panel or by an external switch connected between the alarm-reset terminal and one of the common terminals. The alarm reset will only operate if the pressure module is installed and the pressure has returned to a normal condition. See Figure 2 Wiring Connections.

1.4.2 Connecting the 4-20 mA Loop

The pressure module provides an isolated 4-20 mA output, which may be used to remotely monitor the differential pressure across the dust bags or cartridges. The connection is made on the master control module at the terminal block designated for this signal. The connection is a 2-wire configuration with the option of using either an external 15 to 35 VDC power source or using the internal 24 VDC source. See Figure 2 Wiring Connections.

2.4 • High Limit [Only available when DCP connected]

The High Limit Setup, available only with a pressure module installed, sets the pressure at which the cleaning cycle will begin. This value may be between zero and the pressure module full scale pressure. Normally, the High Limit should be above the Low Limit. If, however, the High Limit pressure is set below the Low Limit, the cleaning cycle will begin when the High Limit is exceeded and stop when the pressure falls below the High Limit. The Low Limit in this case will have no effect. Pressing "SELECT" will change the system to the Low Limit Setup mode.

2.5 • Low Limit [Only available when DCP installed]

The operation of the Low Limit, available only with a pressure module installed, is identical to the High Limit except this value sets the pressure where the cleaning cycle will end. The upper settable value is the calibration pressure of the pressure module and the lower limit is zero. Pressing "SELECT" will change the system to the High Alarm Setup mode.

2.6 • High Alarm [Only available when DCP installed]

The operation of the High Alarm Setup is identical to the High and Low Limit Setup and is only available when a pressure module is installed. The High Alarm default is 0. The upper settable value is the full scale pressure of the pressure module and the lower limit is zero. Pressing "SELECT" will change the system to the Low Alarm Setup mode.

2.7 • Low Alarm [Only available when DCP installed]

The operation of the Low Alarm Setup is identical to the High and Low Limit Setup. The Low Alarm default is 0. The upper settable value is the full scale pressure of the pressure module and the lower limit is zero. Pressing "SELECT" will change the system to the Cycle Delay Setup mode.

2.8 • Cycle Delay (min)

The cycle delay inserts a delay time between the end of the last channel and the beginning of the first channel. This may be set to between zero and 255 minutes. The factory default is zero. Setting the value to zero will disable the delay. Pressing "SELECT" will change the system to the Down Time Cycles Setup mode.

2.9 • Down Time Cycles (min)

The Down Time Cycles setup will select a value between zero and 255 minutes. The factory default is one minute. Selecting zero will disable the operation. When the down time cycles is activated by shorting the down time cycles input to the common terminal, (see figure 2) the system will enter a forced cleaning mode for the programmed duration. *NOTE:* The cycle delay, if one is programmed, will not be inserted in the timing cycle. Pressing "SELECT" will change the system to the Auto Alarm Reset Setup mode, if a pressure module is installed, or to Process when no pressure module is available.

2.10 • Auto Alarm Reset (sec) [Only available when DCP installed]

The Auto Alarm Reset Setup, available only when a pressure module is installed, allows the auto alarm reset time to be selected. This value may be set between zero and 255 seconds. The factory default value is five seconds. When the auto alarm reset is enabled by shorting the auto alarm reset terminal to a common terminal, (See Figure 1) the alarm will be reset after the pressure returns to the normal range and the timeout has expired. Pressing "SELECT" will change the system to Process mode.

3.0 Maintenance Support and Diagnostics

We have also included a number of features that will aid maintenance personnel in diagnosing problems or verifying that the system is operating.

3.1 Restoring Factory Defaults

The DCT1000 has been programmed with factory default values that meet most industry operating conditions. In the event that you want to restore all of the parameters to the original factory default values:

- (1) Return the master controller to the process mode.
- (2) Press and hold both "UP" and "DOWN" buttons.

The display will indicate a 10-second countdown, at the end of which all parameters will be restored to factory defaults. Releasing the switches prior to the end of the count will stop the process and no modification will be made. Likewise, in each of the parameter setup modes, pressing and holding the "UP" and "DOWN" buttons simultaneously will reset the individual default value, leaving other settings unchanged.

3.2 Power Indicator

A power on LED indicator is provided at the center left edge of the board. This will be illuminated when the power supply is operating properly. If the power LED is not illuminated, the primary power may be off or there is a fault in the power circuit.

3.3 Active Channel Indicator

Located just above the solenoid terminations, you will find that each channel is provided with an LED that is illuminated when the triac switch is on. This allows a visual correlation between the channel being pulsed and the operation of the solenoid.

3.4 Comm Check Indicator

The comm check indicator can be found in the upper right hand corner of the slave and master controller board (just above the "out" terminal, a telephone style connector). This indicator is used for two purposes. First, on a master controller a brief flash once per second is produced to indicate that the system is operating. Second, this indicator is used to show when the communication check operation is performed on slave boards. The master controller will check each of the slave boards at a rate of about one inquiry per second, starting with the slave board connected directly to the master controller and ending with the last slave board in the chain. The master controller will flash its Comm Check LED for about 250 msec each time it makes a communication check. The external module selected for test will also flash its Comm Check LED for about the same time each time it is interrogated. Observing this test sequence will indicate that the communication between boards is operational. When a slave board powers up, the Comm Check LED will be illuminated continuously. It will be extinguished when the master controller has initialized its communication channel. This indicator then shows that a master controller is operating and that each slave board is responding properly on the daisy chain.

3.5 Error Codes

Error codes will be displayed on the three-digit display when certain faults occur. Most of these indicators are associated with the daisy chain communication, but certain error codes pertain to single board operation also. These codes are:

Display	Meaning	Action Required
Err 1	This is a "watchdog" reset that is enabled when the master controller isn't able to cycle through its operation.	Make sure all electrical connections are appropriately shielded so the master controller is not disrupted by noise.
Err 2	The pressure module has failed to respond to the request of the master controller.	The master controller will try to recover from the fault. If unsuccessful, replace the pressure module.
Err 3	Communication error in the daisy chain interface. This will only appear when the master controller is used in conjunction with a slave board.	Make sure the control cable used in the daisy chain interface is properly shielded from noise.
Err 4	The master controller has detected a change in module configuration or a fault in one of the modules.	Reinstall all modules in accordance with the instructions in the factory IOM.
Err 5	If the fault described in "Err 4" is not corrected, the master controller will reconfigure the modules that are responding properly and operate at a degraded condition.	Reinstall all modules. Contact factory if the problem persists.
Err 6	A message error affecting the software of the master controller or one of its modules.	Check the integrity of all connecting cables used to drive slave boards for additional solenoids. Also check the electrical grounding of the system installation.
Err 7	Indicates that one of the triac drivers are not functioning.	Return to factory for evaluation and repair.
Err 8	Internal Error.	Contact the factory.
Err 9	Unassigned message code.	Contact the factory.

4.0 Glossary of Terms

- **Run Mode:** The term used when the timer board is firing the solenoids.
- **Pressure Module:** The pressure measurement subsystem that includes the software and hardware for on-demand cleaning, alarms and signal retransmission of the process variable (i.e., the differential pressure across the dust bags).
- **Master Controller:** The primary timer board that contains all of the major features, connections for external inputs and power to drive the DCT1000 Dust Collector Timer Controller system.
- **Power Guard:** A plastic shield that covers the output triacs and other line voltage circuitry.
- **Demand Cycle Mode:** A process in which the run mode is enabled through the on-board pressure module or an external switch such as the Dwyer Photohelic®.
- **Euro Connector:** A "caged" connection used to terminate solenoids, incoming power, or external switches on the DCT1000.
- **Continuous Cycle Mode:** A time based cycling mode dependent on solenoid time on/off settings and time set between complete cycles.
- **Manual Override:** Allows the user to override the DCT1000 remotely or from the master controller panel through use of a switch or a wire jumper.
- **Slave Board:** A channel expander that is used in conjunction with the master controller to accommodate additional solenoids on larger dust collection systems. It can be recognized easily as it does not have the on-board display panel or the power supply present. A master controller may also be used as a slave board.



Installation, Safety, Operation & Maintenance Instructions And Parts List For Models HP-Series I & II, RBE, HDBI, HDAF, SQBI and SQAF Arrangement 4 Blowers

BLOWER SPECIFICATIONS

BLOWER SERIAL NUMBER: _____

MFG. DATE: _____

NOTE: The serial number above is a required reference for any assistance. It is stamped on the blower nameplate.

BLOWER SPECIFICATIONS:

Model: _____ **Arrangement:** _____ **Rotation:** _____ **Discharge:** _____

Wheel Size and Type: _____

BLOWER PERFORMANCE DATA: (If entered on order)

CFM: _____ **SP:** _____ (Inches of Water Gauge) **Motor BHP:** _____

Density: _____ **Altitude:** _____ (Ft. above S.L.) **Airstream Temperature:** _____ °F.

Fan RPM: _____ **Maximum Safe Fan RPM:** _____ **DO NOT EXCEED THIS RPM**

MOTOR DATA: (This section is completed only if the motor was supplied by Cincinnati Fan)

HP: _____ **RPM:** _____ **Voltage:** _____ **Phase:** _____

Hz: _____ **Frame Size:** _____ **Enclosure:** _____ **Efficiency:** _____

IF Motor is EXP, Class(es) & Group(s) are: _____

Manufacturers Model Number: _____ **CFV Part Number:** _____

ATTENTION: RECEIVING DEPARTMENT

All Cincinnati Fan products are packaged to minimize any damage during shipment. The freight carrier is responsible for delivering all items in their original condition as received from Cincinnati Fan. The individual receiving this equipment is responsible for inspecting this unit for any obvious or concealed damage. If any damage is found, it should be noted on the bill of lading before the freight is accepted and the receiver must file a claim with the freight carrier.

LONG TERM STORAGE NOTICE

If this blower will NOT be installed and put into operation within 30 days, refer to the "Long Term Storage Instructions" on pages 12 and 13. Failure to follow all applicable long term storage instructions, will void your warranty. This blower should be stored in doors in a clean, dry location. If it must be stored outside, refer to the "Long Term Storage Instructions".

⚠ DANGER



Hazardous voltage can cause electrical shock and death.



High speed rotating equipment can cause severe personal injury.



Lock out/Tag out to prevent personal injury BEFORE starting ANY service or inspection.



Avoid injury. NEVER operate without ALL required safety guards in place.



Avoid injury. You MUST read and understand all instructions in this manual BEFORE installing.

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I. GENERAL

A. Unpacking:

Be careful not to damage or deform any parts of the blower when removing it from the packaging container. **All the packaging material should be kept in the event the blower needs to be returned.**

Handling:

Handling of the blower should be performed by trained personnel and be consistent with all safe handling practices. Verify that all lifting equipment is in good operating condition and has the proper lifting capacity. The blower should be lifted using well-padded chains, cables or lifting straps with spreader bars. Some blower models have lifting eye locations provided in the blower base. **NEVER lift the blower by an inlet or discharge flange, motor shaft, motor eye bolt, or any other part of the blower assembly that could cause distortion of the blower assembly.**

B. Safety Instructions & Accessories:

1. Safety Instructions:

All installers, operators and maintenance personnel should read AMCA Publication 410-96, “**Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans**”. This manual is included with the blower. Additional copies can be requested by writing us at Cincinnati Fan, 7697 Snider Rd., Mason, OH 45040-9135

2. Sound:

Some blowers can generate sound that could be hazardous to personnel. It is the responsibility of the user to measure the sound levels of the blower and/or system, determine the degree of personnel exposure, and comply with all applicable safety laws and requirements to protect personnel from excessive noise.

3. Air Pressure and Suction:

In addition to the normal dangers of rotating machinery, the blower can present additional hazards from the suction or pressure created at the blower inlet or discharge. Suction at the blower inlet can draw materials into the blower where they become high velocity projectiles at the discharge and cause severe personal injury or death. It can also be extremely dangerous to persons in close proximity to the inlet or discharge as the forces involved can overcome the strength of most individuals.

WARNING

NEVER OPERATE A BLOWER WITH A NON-DUCTED INLET AND/OR DISCHARGE. IF THE BLOWER INLET AND/OR DISCHARGE IS NON-DUCTED, IT IS THE USERS RESPONSIBILITY TO INSTALL AN INLET AND/OR DISCHARGE GUARD.

4. Temperature:

Many blowers, blower components and all motors operate at temperatures that could burn someone if they come in contact with them. If this potential hazard could exist in your installation, steps must be taken by the user to protect anyone from coming in contact with this equipment.

5. Spark Resistance; (Per AMCA Standard 99-0401-86 and ISO 13499)

DANGER

NO GUARANTEE OF ANY LEVEL OF SPARK RESISTANCE IS IMPLIED BY SPARK RESISTANT CONSTRUCTION. IT HAS BEEN DEMONSTRATED THAT ALUMINUM IMPELLERS RUBBING ON RUSTY STEEL CAN CAUSE HIGH INTENSITY SPARKS. AIR STREAM MATERIAL AND DEBRIS OR OTHER SYSTEM FACTORS CAN ALSO CAUSE SPARKS.

6. Safety Accessories;

Guards:

All moving parts must be guarded to protect personnel. Safety requirements can vary, so the number and types of guards required to meet company, local, state and OSHA regulations must be determined and specified by the actual user or operator of the equipment.

NEVER start any blower without having all required safety guards properly installed. All blowers should be checked on a regular schedule, for missing or damaged guards. If any required guards are found to be missing or defective, the power to the blower should be immediately turned off and locked out in accordance with OSHA regulations. Power to the blower should **NOT** be turned back on until the required guards have been repaired or replaced.

This blower can become dangerous due to a potential "windmill" effect, even though all electrical power has been turned off or disconnected. The blower wheel should be carefully secured to prevent any rotational turning **BEFORE** working on any parts of the blower/motor assembly that could move.

7. Access or Inspection Doors:

DANGER

NEVER OPEN ANY ACCESS OR INSPECTION DOORS WHILE THE BLOWER IS OPERATING. SERIOUS INJURY OR DEATH COULD RESULT FROM THE AFFECTS OF AIR PRESSURE, AIR SUCTION OR MATERIAL THAT IS BEING CONVEYED. DISCONNECT OR LOCK OUT POWER TO THE BLOWER AND LET THE BLOWER WHEEL COME TO A COMPLETE STOP **BEFORE** OPENING ANY TYPE OF ACCESS OR INSPECTION DOOR.

II. INSTALLATION

A. Vibration:

Before any mounting method is selected, the user should be aware of the effects vibration will have on the blower, motor and other parts. Improper blower installation can cause excessive vibration causing premature wheel and/or motor bearing failure, that is not covered under warranty. Vibration eliminator pads, springs or bases should be properly installed to prevent any blower vibration from transmitting to the foundation, support structure or ducting.

WARNING

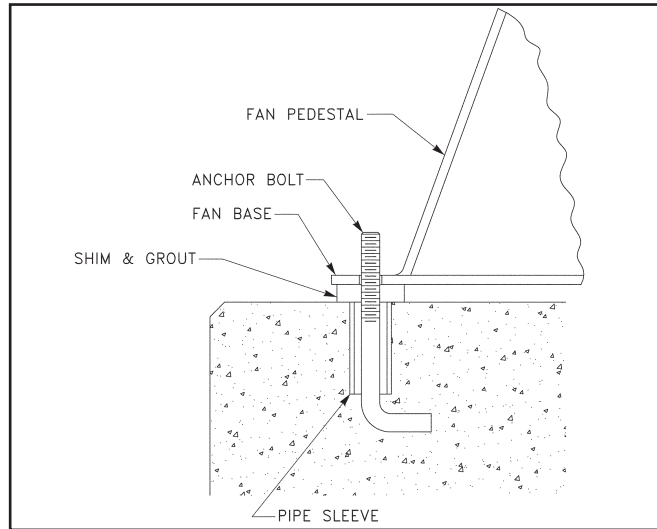
SHUT THE BLOWER DOWN IMMEDIATELY IF THERE IS ANY SUDDEN INCREASE IN VIBRATION.

B. Mounting Methods:

1. Floor Mounted Units;

Centrifugal blowers should be mounted on a flat, level, concrete foundation weighing 2-3 times the weight of the complete blower/motor assembly. It is recommended that the foundation be at least 6 inches larger than the base of the blower. The foundation should include anchor bolts such as shown in **Fig. 1** on page 4. Place the blower over the anchor bolts and shim under each bolt until the blower is level. After shimming, flat washers, lock washers and lock nuts should be tightened at each anchor bolt. Any gaps between the blower base and the foundation should be grouted. If the blower will be sitting on some type of vibration pads or mounts, follow the recommended mounting procedures supplied with the vibration elimination equipment.

Fig. 1



2. Elevated Units;

Improper mounting of elevated blowers can cause vibration problems. The structure that the blower/motor assembly will be mounted on must be strong enough to support at least 3 times the weight of the entire blower/motor assembly. **An insufficient support will cause excessive vibration and lead to premature wheel and/or motor bearing failure.** Bracing of the support structure must be sufficient enough to prevent any side sway. The entire structure should be welded at all connection joints to maintain constant alignment of the platform.

DANGER

THE IMPROPER DESIGN OF AN ELEVATED PLATFORM STRUCTURE COULD RESULT IN A RESONANT CONDITION, AND CONSEQUENTLY, CAUSE A LIFE THREATENING, CATASTROPHIC, STRUCTURAL FAILURE.

C. Duct Work Connections:

All duct connections to the blower should include flexible connectors between the ducting and the blower inlet and/or discharge. This will eliminate distortion, noise and vibration from transmitting to the duct and building. The connectors should be selected to handle the operating conditions for air volume and pressure that the blower will produce. **All ducting or accessories, added by the user, should be independently supported. DO NOT use the blower/motor assembly to support any additional weight.** Inlet and/or discharge duct elbows should be located a minimum of 2 blower wheel diameters from the blower. Any duct elbows located closer than 2 wheel diameters to the blower inlet or discharge **WILL** reduce the air performance and blower efficiency. Any duct elbows near the blower discharge should be in the **same rotational direction** as the **blower rotation**.

Non-Ducted Blower Inlet:

Any blower with no ducting on the inlet **must** have an inlet guard. The blower should be located so the blower inlet is, at least, 1 wheel diameter away from any wall or bulkhead to eliminate a reduction in air flow.

Non-Ducted Blower Discharge:

Any blower with no ducting on the discharge **must** have a discharge guard.

D. Safety Guards:

Cincinnati Fan offers guards, as optional, to keep your blower in compliance with OSHA safety regulations. These include inlet or discharge guards. Any blowers built with high temperature construction, a "heat slinger guard" is standard. It is the responsibility of the user to make sure this blower meets all local, state and OSHA safety regulations. If you have a specific guard requirement not covered by OSHA, please contact the local Cincinnati Fan sales office for assistance.

E. Dampers and Valves: (Airflow control devices)

If the blower is supplied with any type of air flow control device, it should be closed before initial start-up of the blower to minimize overloading of the motor. Any airflow control device, with bearings, should be maintained in accordance with the manufacturers instructions. Any air flow control device, with an automatic control mechanism, should be adjusted per the manufacturers recommendations.

F. Set Screw and Taper-lock Bushing Torque Values:

All blower wheel set screws are tightened to the proper torque prior to shipment. Some wheels may have taper-lock hubs and split, taper-lock bushings to secure the wheel to the motor shaft.

NOTE: Check all set screw or taper-lock bushing torques. Forces encountered during shipment, handling, rigging and temperature can affect factory settings. For correct torque values, see **Tables 1** and **2** below.

Table 1

SET SCREW TORQUE VALUES		
Diameter & Number of Treads/Inch	Hex Wrence Size (Across Flats)	Required Torque (Inch Pounds)
1/4-20	1/8"	65
5/16-18	5/32"	165
3/8-16	3/16"	228
7/16-14	7/32"	348
1/2-13	1/4"	504
5/8-11	5/16"	1104

Table 2

TORQUE VALUES FOR TAPER-LOCK BUSHINGS	
Taper-lock Bushing Size	Required Torque (Inch Pounds)
H	95
B	192
P	192
Q	350
R	350

CAUTION

Set screws should **NEVER** be used more than once. If the set screws are loosened, they **MUST** be replaced. Use only knurled, cup-point, set screws with a nylon locking patch.

III. ELECTRICAL

A. Disconnect Switches:

All blower motors should have an independent disconnect switch located in close visual proximity to turn off the electrical service to the blower motor. **Disconnects must be locked out in accordance with OSHA "lock out-tag out" procedures any time inspection or maintenance is being performed on the blower and/or motor assembly. The "lock out-tag out" procedure should be performed by a licensed electrician or authorized personnel.**

All disconnects should be sized in accordance with the latest NEC codes (National Electric Codes) and any local codes and should be installed only by a licensed electrician. "Slow blow" or "time delay" fuses or breakers should be used since the initial start-up time for the blower motor, although rare, can be up to 10 seconds.

B. Motors:

DANGER

ALL WIRING CONNECTIONS, INSPECTION AND MAINTENANCE OF ANY MOTOR MUST BE PERFORMED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH THE MOTOR MANUFACTURERS RECOMMENDATIONS, ALL ELECTRICAL CODES AND OSHA REGULATIONS. FAILURE TO PROPERLY INSTALL, MAKE WIRING CONNECTIONS, INSPECT OR PERFORM ANY MAINTENANCE TO A MOTOR CAN RESULT IN MOTOR FAILURE, PROPERTY DAMAGE, EXPLOSION, ELECTRICAL SHOCK AND DEATH.

- 1. DO NOT connect or operate a motor without reading the motor manufacturers instructions supplied with the blower.** The basic principle of motor maintenance is: **KEEP THE MOTOR CLEAN AND DRY.** This requires periodic inspections of the motor. The frequency of the inspections depends on the type of motor, the service and environment it will be subjected to and the motor manufacturers instructions.
- 2. Cleaning:** Cleaning should be limited to exterior surfaces only. **Follow motor manufacturers cleaning instructions.**
- 3. Lubrication:** Most small motors have sealed bearings that are permanently lubricated for the life of the motor. Some larger motors have grease plugs that should be replaced with grease fittings to perform re-lubrication. These motors, or any motor with grease fittings, should be lubricated in accordance with the motor manufacturers recommendations. Lubrication frequency depends on the motor horsepower, speed and service. **BE SURE** you use compatible grease and **DO NOT** over grease.
- 4. Location:** If the motor will be outside and subjected to the weather, it is recommended that a weather cover be installed to keep rain and snow off of the motor. No motors are guaranteed to be "watertight". Be careful to allow enough openings between the motor and the motor cover to let the motor "breathe". If the back end of the motor is covered, the cover should be no closer than 3" to the back of the motor for proper ventilation.

5. **Wiring Connections:** All wiring connections should be made for the proper voltage and phase as shown on the motor nameplate. Connections should follow the motor manufacturers recommendations as shown on the wiring schematic. This wiring diagram will be located on the outside of the motor, inside of the motor conduit box or on the motor nameplate. **Reversing some wires might be necessary to get the correct blower rotation.**
6. **Motors with Thermal Overload Protection:** If a motor is equipped with thermal overloads, the thermal overload must be wired per the wiring schematic to be operable. **There are 3 types of thermal overloads:**
- a. **Automatic:** These will automatically shut the motor down if the internal temperature exceeds the design limits.

⚠ DANGER

MAKE SURE YOU LOCK OUT THE POWER TO THE MOTOR BEFORE INSPECTING ANY MOTOR WITH AUTOMATIC THERMALS. WHEN THE THERMALS COOL DOWN, THEY WILL ALLOW THE MOTOR TO AUTOMATICALLY START UP AGAIN, UNLESS YOU HAVE LOCKED OUT THE POWER TO THE MOTOR.

- b. **Manual:** These motors will have a button on them. If the motor overheats, it will shut down. After you have inspected the motor and eliminated the over heating problem, you will need to “reset” it by pushing the button. **You should still lock out the power BEFORE inspecting the motor.**
 - c. **Thermostats:** This type of thermal is a temperature sensing device **ONLY**. If the motor overheats, the thermostats will open or close (depending on the type) and send a “signal” to the electrical box. **THEY WILL NOT TURN THE MOTOR OFF. These are pilot circuit devices that must be connected to the magnetic starter circuit.**
7. **EXPLOSION PROOF Motors:** No motor is explosion proof. Explosion proof (EXP) motors are designed so if there is an explosion **WITHIN** the motor, the explosion will be **CONTAINED INSIDE** the motor and not allowed to get out to the atmosphere. All explosion proof motors must be selected based on the atmosphere and/or the environment the motor will be operating in. Explosion proof motors are designed, rated, and labeled for their operating conditions based on Classes, Groups and “T” Codes. **The Class, Group and “T” Code of an EXP motor MUST be selected based on the atmosphere and/or environmental conditions the motor will be operating in. Consult the NEC (National Electric Code) and the NFPA (National Fire Protection Association) for the proper EXP motor Class, Group and “T” Code required for your specific application and location.**

⚠ DANGER

IF AN EXPLOSION PROOF MOTOR IS USED IN AN AREA CONTAINING VOLITILE LIQUIDS, GASES, FUMES OR DUST FOR WHICH THE MOTOR WAS NOT DESIGNED TO OPERATE IN, AN EXPLOSION AND/OR FIRE CAN OCCUR.

NOTICE:

- a. All EXP motors have some type of thermal overload as required by UL (Underwriters Laboratories). Refer to all of Section 6 above.
- b. All EXP motors are required to have the UL (Underwriters Laboratories) and CSA (Canadian Standards Association) listing numbers on the motor name plate or on a separate plate attached to the motor. The Class, Group and “T” Code the motor is designed for must also be listed.

8. **Normal Motor Operating Temperatures:**

Using your hand to test the normal running temperature of a motor can be a very painful experience;

The normal operating temperature of a fully loaded, open type, electric motor operating in a 70°F. (21° C.) ambient temperature is 174°F. (79° C.)

C. Maximum Blower Speed and Motor Speed Controllers:

If you will be using any type of motor speed controller with this blower, **DO NOT** exceed the **maximum safe blower speed**. Installing and using a speed control devise requires special training and certification as required by the speed control manufacturer. See the manufacturers instructions for proper use, installation and wiring connections for the maximum speed settings. It may also be necessary to “block out” some speeds to eliminate a resonant vibration problem. The maximum safe blower speed is shown on the data sheet shipped with the blower. If you have lost the data sheet, contact Cincinnati Fan or our sales office for your area. You must have the serial number from the **blower** name plate for us to determine the maximum safe blower speed. Cincinnati Fan will only extend the motor manufacturers warranty, when used with a speed controlling devise, if the motor has the words “**Inverter Duty**” marked on the motor name plate. If the motor does not have “**Inverter Duty**” marked on the motor name plate, and you have a motor failure, you will be required to contact the motor manufacturer for any service or warranty claims.

IV. INITIAL UNIT STARTUP

NOTICE: Failure to complete and document all the following pre-startup and both post-startup checks, listed in sections A (below) and B on page 8, could void all warranties.

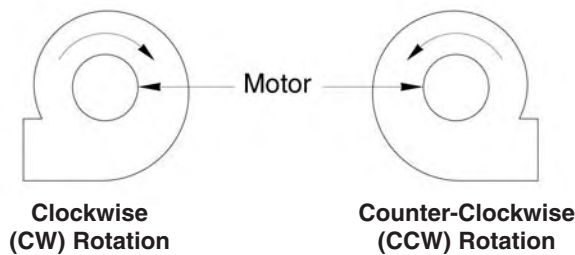
A. Pre-Startup & Post-Startup Checks: (Check blocks as each step is completed. Retain this for your records.)

A1. Pre-Startup Checks Completed By: _____ DATE: _____
 A2. 8 Hour, Post-Startup Checks Completed By: _____ DATE: _____
 A3. 3 Day, Post-Startup Checks Completed By: _____ DATE: _____

MAKE SURE POWER TO THE MOTOR IS LOCKED OUT BEFORE STARTING PRE-STARTUP OR POST-STARTUP CHECKS.

1. If possible, *CAREFULLY* spin the blower wheel by hand to ensure it rotates freely and no rubbing or clicking noise is heard.
2. Check all blower, foundation and duct work hardware to make sure it is tight.
3. Check all blower wheel set screws to make sure they are tight per **Table 1** on page 5.
4. If the wheel has a taper-lock bushing, make sure the bolts are tightened per **Table 2** on page 5.
5. Make certain there is no foreign material in the blower or duct work that can become a projectile.
6. Make sure any inspection doors in the duct work are securely bolted or locked.
7. Ensure all electrical power components are properly sized and matched for your electrical system.
8. Check that all required guards are properly secured.
9. Any dampers should be fully opened and closed to make sure there is no binding or interference.
10. If your blower is mounted on an elevated support structure, make sure the structure is welded at all the joint connections and the structure is properly braced to prevent "side sway".
11. Close any dampers to minimize load on motor. Especially on blowers with high temperature construction. **Never** subject a "cold" blower to a "hot" gas stream. If the blower will be handling "hot gases" greater than 150°F (65°C) it is imperative that the blower be subjected to a gradual rate of temperature increase, not to exceed 15°F/minute (8°C/minute). The same temperature limits are also important when the blower is experiencing a drop in temperature until the temperature drops down to 150°F (65°C). Only, when the entire blower has reached an equilibrium temperature of 150°F (65°C), or less, should the power be turned off.
12. Make sure the power source connections to the blower motor are per the motor manufacturers instructions.
13. Make sure the blower wheel is stationary prior to startup. **Starting a blower with a wheel that is rotating backwards can cause wheel damage.**
14. Apply power to the blower motor momentarily (i.e. "bump start") to check for proper blower wheel rotation. If the blower is rotating in the wrong direction, reconnect the motor leads per the motor manufacturers wiring schematic. **Blower rotation is determined by viewing the blower from the motor side of the blower, NOT from the inlet side.** After reconnecting the leads, repeat this step. **See Fig. 2 below.**

Fig. 2



15. Apply power to the blower motor and let it come up to full speed. **Turn off the power.** Look and listen for any unusual noise or mechanical abnormality while the blower wheel is still spinning. If any are noticed, lock out the power, wait for the blower wheel to come to a complete stop, locate the cause and correct it.
16. Unlock power and start the blower.
17. Measure, record and keep the following motor data for future reference and comparison:
(Single phase motors will only have L1 and L2 leads)

Amperage draw on each motor lead: L1 _____ L2 _____ L3 _____
 (Running amps **SHOULD NOT** exceed the motor nameplate amps for the voltage being operated on)

Voltage coming to motor leads: L1 _____ L2 _____ L3 _____
 (Should be about the same input voltage on all leads)

B. Vibration:

The blower was balanced at the factory to comply with ANSI/AMCA Standard 204-05, Category BV-3. However, rough handling in shipment and/or erection, weak and/or non-rigid foundations, and misalignment may cause a vibration problem after installation. After installation, the vibration levels should be checked by personnel experienced with vibration analysis and vibration analysis equipment.

NOTE:

The blower **SHOULD NOT** be operated if the vibration velocity of the fan exceeds **0.40 inches per second**, filter out, if the blower is rigidly mounted. If the blower is mounted on isolators or on an isolator base, it **SHOULD NOT** be operated if the vibration velocity of the blower exceeds **0.65 inches per second**, filter out.

Vibration readings for direct driven blowers should be taken on the motor at the top, sides and end as per **Fig. 3** below. After you have taken your vibration readings, write them down in the spaces below and keep for future comparison.

⚠ DANGER

If the blower is going to be conveying material, it is the users responsibility to periodically turn the blower off and lock out the power. The blower wheel should then be checked for material build-up and/or erosion. If material has built up on any parts of the wheel, it **MUST** be removed and cleaned before it is put back into service. If any parts of the wheel have been eroded, the wheel **MUST** be replaced. Failure to perform this inspection can cause excessive vibration that will damage the blower and/or motor bearings. When vibration becomes excessive, it will lead to complete blower failure that could cause property damage, severe personal injury and death. The user must determine the frequency of this inspection based on the actual circumstances of their operation, **BUT** checking the vibration readings should **NEVER** exceed a 12 month period. For the AMCA/ANSI standard for vibration limits, see Fig. 4 on page 9.

Fig. 3

VIBRATION METER PROBE POSITIONS

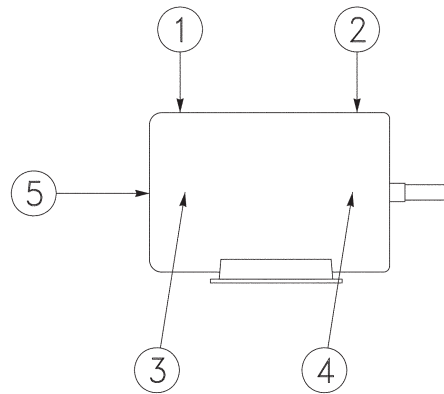
For Arrangement 4 Blowers

1	2	3	4	5
---	---	---	---	---

A _____

B _____

C _____

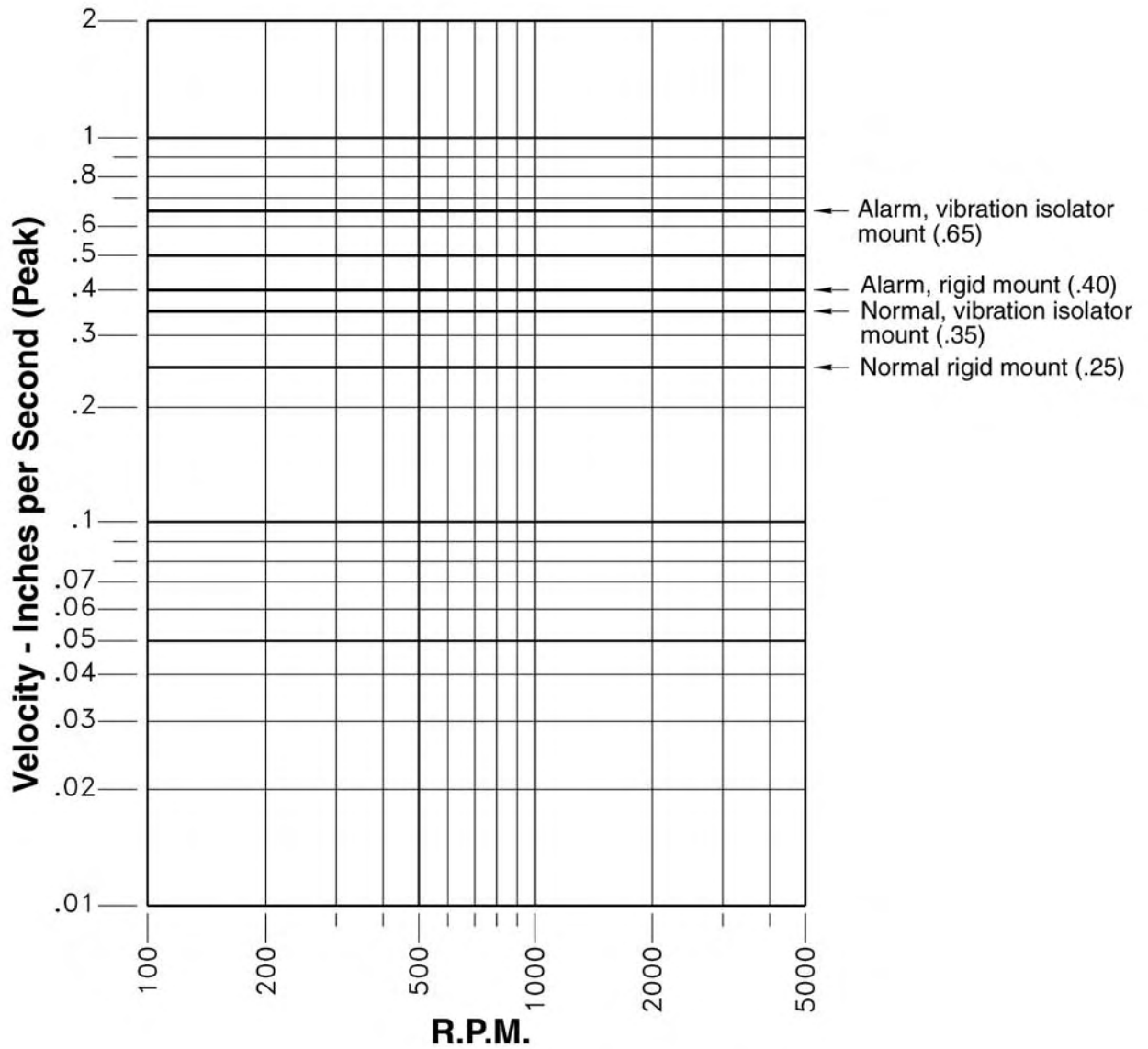


A Pre-Startup Readings taken by: _____ Date: _____

B 8 Hour Post-Startup Readings taken by: _____ Date: _____

C 3 Day Post-Startup Readings taken by: _____ Date: _____

Fig. 4 Vibration Severity Chart



V. ROUTINE INSPECTION & MAINTENANCE

Periodic inspection of all the blower parts is the key to good maintenance and trouble-free operation. The frequency of inspections must be determined by the user and is dependent upon the severity of the application. **BUT**, it should **NEVER** exceed a 12 month period. The user should prepare an inspection and maintenance schedule and make sure it is adhered to.

WARNING

BEFORE STARTING ANY INSPECTION OR MAINTENANCE, BE SURE BLOWER IS TURNED OFF, POWER IS LOCKED OUT AND THE BLOWER WHEEL HAS BEEN CAREFULLY SECURED TO PREVENT WIND MILLING. IF THE OPERATING CONDITIONS OF THE BLOWER ARE TO BE CHANGED (SPEED, PRESSURE, TEMPERATURE, ETC.) CONSULT CINCINNATI FAN, OR OUR SALES OFFICE FOR YOUR TERRITORY, TO DETERMINE IF THE UNIT WILL OPERATE SAFELY AT THE NEW CONDITIONS.

A. Hardware:

All blower and foundation hardware should be checked to make sure it is tight. Wheel set screws or taper-lock bushings should be tightened to the torque values shown in **Tables 1 and 2** on page 5.

NOTE: If any set screws have come loose, they must be thrown away and replaced. **NEVER** use set screws more than once. **Replace with knurled, cup-point set screws with a nylon locking patch.**

B. Motor Bearing Lubrication:

Most smaller motors have sealed bearings that never require re-lubrication for the life of the motor. For any motors with grease fittings, consult the motor manufacturers recommendations with reference to the lubrication frequency and the type of grease that should be used.

DO NOT over grease the motor bearings. Generally, 1-2 shots should be enough. Use a hand operated grease gun at no more than 40 PSI. **IF POSSIBLE, CAREFULLY lubricate the motor bearings while the motor is running.**

C. Wheel Balance:

All blower wheels are balanced at the factory. It is not uncommon that additional “trim balancing” is required after the blower is assembled. Trim balancing of the blower assembly, in the field, is typically always necessary for all replacement wheels. **After any wheel is installed, the final balance of the entire blower assembly should be checked.** Refer to **Section B** on page 8 and **Fig. 4** on page 9. Air stream material or chemicals can cause abrasion or corrosion of the blower parts. This wear is generally uneven and, over time, will lead to the wheel becoming unbalanced, causing excessive vibration. When that happens, the wheel must be rebalanced or replaced. The other air stream components should also be inspected for wear or structural damage and cleaned or replaced if necessary. **After cleaning any blower wheel, it should be balanced and then “trim balanced” on the motor shaft.**

There are two ways to balance a blower wheel:

1. Add balancing weights for fabricated aluminum, steel or stainless steel wheels:

Balance weights should be rigidly attached to the wheel at a location that will not interfere with the blower housing nor disrupt air flow. They should (if at all possible) be welded to the wheel. When trim balancing the wheel, **on the blower**, be sure to ground the welder **directly** to the blower wheel. Otherwise, the welding current will likely pass through the motor and damage the motor bearings.

2. Grinding off material for cast aluminum wheels: (on some models only)

If you are grinding on the wheel to remove material, be very careful not to grind too much in one area. That could affect the structural integrity of the wheel.

NOTE:

Removing any Backward Inclined or Airfoil wheel from the blower to clean it, requires special attention when reinstalling the wheel back into the blower housing. Make sure you reinstall the wheel so the proper wheel-to-inlet clearance is maintained. Failure to do this will affect the blowers airflow (CFM), static pressure (SP) capabilities and efficiency. Consult Cincinnati Fan or our local sales office for your area for assistance if necessary.

D. Vibration:

As mentioned previously in this manual, excessive vibration can cause premature motor bearing failure that could lead to catastrophic failure of the blower. After performing any routine maintenance, the vibration readings should be taken again. New readings should be taken (maximum every 12 months) and compared to the readings you recorded in **Figure 3**, on page 8, during the initial startup. **If any major differences are present, the cause should be determined and corrected before the blower is put back into operation.**

The most common causes of vibration problems are:

1. Wheel unbalance.
2. Mechanical looseness.
3. Poor blower inlet and/or discharge conditions.
4. Foundation stiffness.

E. Dampers and Valves: (Airflow control devices)

Turn off and lock out power to the blower motor. Any dampers or valves should be periodically inspected to make sure all parts are still operable within their full range and there is no interference with any other damper or blower components. Any bearings or seals should be checked for their proper function. The manufacturers maintenance instructions should be followed.

F. Safety Equipment & Accessories:

It is the users responsibility to make sure that all safety guards required by the company, local, state and OSHA regulations are properly attached and fully functional at all times. If any guards become defective or non-functional at any time, **the power to the blower MUST be turned off and locked out** until complete repairs and/or replacements have been made, installed and inspected by authorized personnel.

Any accessories used in conjunction with the blower should also be inspected to make sure they are functioning within their intended limits and design specifications. The manufacturers maintenance manuals should be referred to for correct maintenance procedures. These accessories include, but are not limited to, the following:

Shaft seals, inspection doors, vibration isolators or vibration bases, air flow or pressure measuring equipment, hoods, controls, special coatings, silencers, expansion joints, valves, flexible connectors and filters.

VI. ORDERING REPLACEMENT PARTS:

Under normal conditions, you should not need any spare or replacement parts for at least 24 months after shipment from Cincinnati Fan. That does not include any wear due to abrasion, corrosion, excessive temperatures, abuse, misuse, accident or any severe conditions the fan was not designed for.

NOTICE:

1. **If this blower is vital to any process that could cost you lost revenue, we strongly recommend that you keep a replacement blower wheel and motor at your location.**
2. **If this blower is vital for the safety of any people and/or animals, we strongly recommend that you keep a complete blower/motor assembly, as originally ordered, at your location.**

To order any parts or complete units, contact us for the name of our sales office for your area. Or you can find them on our website at: www.cincinnati-fan.com

WE MUST HAVE THE BLOWER SERIAL NUMBER FROM THE BLOWER NAME PLATE TO IDENTIFY PARTS CORRECTLY.

VII. TROUBLESHOOTING

DANGER

Troubleshooting should only be performed by trained personnel. Any potential electrical problems should only be checked by a licensed electrician. All safety rules, regulations and procedures MUST be followed. Failure to follow proper procedures can cause property damage, severe bodily injury and death.

Potential problems and causes listed below are in no order of importance or priority. The causes are only a list of the most common items to check to correct a problem. If you find the cause of a problem, **DO NOT** assume it is the **ONLY** cause of that problem. Different problems can have the same causes.

PROBLEM	CAUSE
Excessive Vibration	<ol style="list-style-type: none"> 1. Loose mounting bolts, wheel set screws, taper-lock hubs. 2. Worn or corroded blower wheel. 3. Accumulation of foreign material on blower wheel. 4. Bent motor shaft. 5. Worn motor bearings. 6. Motor out of balance. 7. Inadequate structural support. 8. Support structure not sufficiently cross braced. 9. Weak or resonant foundation. 10. Foundation not flat and level.
Airflow (CFM) Too Low	<ol style="list-style-type: none"> 1. Blower wheel turning in wrong direction (rotation). 2. Actual system static pressure (SP) is higher than expected. 3. Motor speed (RPM) too low. 4. Dampers or valves not adjusted properly. 5. Leaks or obstructions in duct work. 6. Filters dirty. 7. Inlet and/or discharge guards are clogged. 8. Duct elbow too close to blower inlet and/or discharge. 9. Improperly designed duct work 10. Blower wheel not properly located relative to the inlet bell (Models HDBI, HDAF, SQBI and SQAF only).
Airflow (CFM) Too High	<ol style="list-style-type: none"> 1. Actual system static pressure (SP) is lower than expected. 2. Motor speed (RPM) too high. 3. Filter not in place. 4. Dampers or valves not adjusted properly.

PROBLEM	CAUSE
Motor Overheating	<p>NOTE: A normal motor will operate at 174°F. See B-8 on page 6.</p> <ol style="list-style-type: none"> 1. Actual system static pressure (SP) is lower than expected. 2. Voltage supplied to motor is too high or too low. 3. Motor speed (RPM) too high or defective motor. 4. Air density higher than expected. 5. Motor wired incorrectly or loose wiring connections. 6. Cooling fan cover on back of motor is clogged. (Fan cooled motors only.)
Excessive Noise	<ol style="list-style-type: none"> 1. Wheel rubbing inside of housing. 2. Worn or corroded blower wheel. 3. Accumulation of foreign material on blower wheel. 4. Loose mounting bolts, wheel set screws, or taper-lock hubs. 5. Bent motor shaft. 6. Worn motor bearings. 7. Motor out of balance. 8. Motor bearings need lubrication. 9. Vibration originating elsewhere in system. 10. System resonance or pulsation. 11. Inadequate or faulty design of blower support structure. 12. Blower operating near “stall” condition due to incorrect system design or installation.
Fan Doesn't Operate	<ol style="list-style-type: none"> 1. Motor wired incorrectly. 2. Incorrect voltage supply. 3. Defective fuses or circuit breakers. 4. Power turned off elsewhere. 5. Motor wired incorrectly or loose wiring connections. 6. Defective motor.

VIII. LONG TERM STORAGE INSTRUCTIONS: (Storage exceeding 30 days after receipt of equipment)

NOTE: Failure to adhere to these instructions voids all warranties in their entirety.

1. Storage site selection:
 - a. Level, well-drained, firm surface, in clean, dry and warm location. Minimum temperature of 50°F (10°C).
 - b. Isolated from possibility of physical damage from construction vehicles, erection equipment, etc.
 - c. Accessible for periodical inspection and maintenance.
2. The blower should be supported under each corner of its base to allow it to “breathe”. Supports (2 x 4's, timbers, or railroad ties) should be placed diagonally under each corner.
3. If the equipment is to be stored for more than three (3) months, the entire blower assembly must be loosely covered with plastic, **but not tightly wrapped**.
4. Storage Maintenance:

A periodic inspection and maintenance log, by date and action taken, must be developed and maintained for each blower. See example below. Each item must be checked monthly.

EXAMPLE:

Storage / Maintenance Schedule Log

ITEM	ACTION	DATES CHECKED
1	Re-inspect units to insure any protective devices used are functioning properly. Check for scratches in the finish which will allow corrosion or rust to form.	
2	Rotate wheel a minimum of 10 full revolutions to keep the motor bearing grease from separating and drying out. <i>This is a critical step.</i>	

Long Term Storage instructions continued on page 13.

5. General Motor Procedure:

If the motor is not put into service immediately, the motor must be stored in a clean, dry, warm location. Minimum temperature of 50°F. (10°C,). Several precautionary steps must be performed to avoid motor damage during storage.

- a. Use a “Megger” each month to ensure that integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
- b. **DO NOT** lubricate the motor bearings during storage. Motor bearings are packed with grease at the factory.
- c. If the storage location is damp or humid, the motor windings **must** be protected from moisture. This can be done by applying power to the motor’s space heaters, (IF AVAILABLE) while the motor is in storage. If the motor does not have space heaters, storing it in a damp or humid location will, very quickly, cause internal corrosion and motor failure which is not warranted.

NOTE:

For specific storage instructions, for the actual motor and any accessory parts that were supplied, refer to the manufacturer’s instructions for the motor and other accessory items that were shipped with the blower.

IX. LIMITED WARRANTY:

Cincinnati Fan & Ventilator Company (Seller) warrants products of its own manufacture, against defects of material and workmanship under normal use and service for a period of eighteen (18) months from date of shipment or twelve (12) months from date of installation, whichever occurs first. This warranty does not apply to any of Seller's products or any part thereof which has been subject to extraordinary wear and tear, improper installation, accident, abuse, misuse, overloading, negligence or alteration. This warranty does not cover systems or materials not of Seller's manufacture. On products furnished by Seller, but manufactured by others, such as motors, Seller extends the same warranty as Seller received from the manufacturer thereof. Expenses incurred by Purchaser's in repairing or replacing any defective product will not be allowed except where authorized in writing and signed by an officer of the Seller.

The obligation of the Seller under this warranty shall be limited to repairing or replacing F.O.B. the Seller's plant, or allowing credit at Seller's option. **THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND OF ALL OTHER OBLIGATIONS AND LIABILITIES OF THE SELLER. THE PURCHASER ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE TO PURCHASER OR RELIED UPON BY PURCHASER WITH RESPECT TO THE QUALITY OR FUNCTION OF THE PRODUCTS HEREIN SOLD.**

Removal of the Seller's nameplate or any generic fan nameplate containing the fan serial number voids all warranties, either written or implied. Failure to complete and document all the pre-startup and post startup checks and perform the suggested routine maintenance checks voids all warranties, either written or implied.

LIMITATION OF LIABILITY:

Notice of any claim, including a claim for defect in material or workmanship, must be given to Seller in writing within 30 days after receipt of the equipment or other products. Seller reserves the right to inspect any alleged defect at Purchaser's facility before any claim can be allowed and before adjustment, credit, allowance replacement or return will be authorized. See **RETURNS** below. Seller's liability with respect to such defects will be limited to the replacement, free of charge, of parts returned at Purchaser's expense F.O.B. Seller's plant and found to be defective by the Seller.

IN NO EVENT WILL SELLER BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, INCLUDING WITHOUT LIMITATION DAMAGES FOR INJURY TO PERSONS OR PROPERTY, LOST PROFITS OR REVENUE, LOST SALES OR LOSS OF USE OF ANY PRODUCT SOLD HEREUNDER. PURCHASER'S SOLE AND EXCLUSIVE REMEDY AGAINST SELLER WILL BE THE REPLACEMENT OF DEFECTIVE PARTS AS PROVIDED HEREIN OR REFUND OF THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS, AT SELLER'S SOLE OPTION. SELLER'S LIABILITY ON ANY CLAIM, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, FOR ANY LOSS OR DAMAGE ARISING OUT OF OR IN CONNECTION WITH PURCHASER'S ORDER OR THE PRODUCTS OR EQUIPMENT PURCHASED HEREUNDER, SHALL IN NO CASE EXCEED THE PURCHASE PRICE OF THE EQUIPMENT GIVING RISE TO THE CLAIM.

RESPONSIBILITY:

It is the understanding of the Seller that Purchaser and/or User will use this equipment in conjunction with additional equipment or accessories to comply with all Federal, State and local regulations. The Seller assumes no responsibility for the Purchaser's or Users compliance with any Federal, State and local regulations.

RETURNS:

Cincinnati Fan & Ventilator Company assumes no responsibility for any material returned to our plant without our permission. An **RMA** (Return Material Authorization) number must be obtained and clearly shown on the outside of the carton or crate and on a packing slip. Any items returned must be shipped freight prepaid. Failure to comply will result in refusal of the shipment at our receiving department.

DISCLAIMER

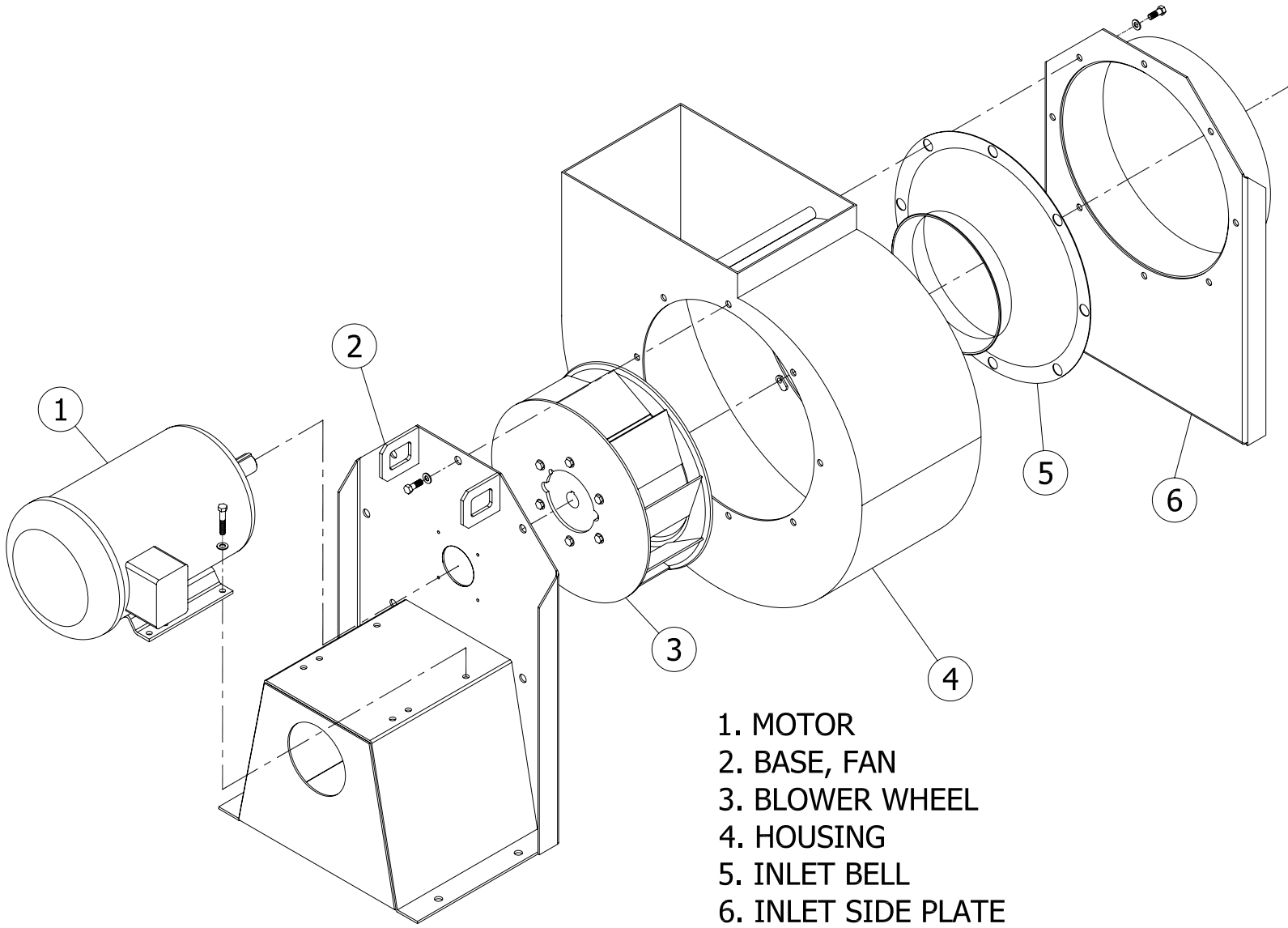
This manual, and all its content herein, is based on all applicable known material at the time this manual was created. **Any parts of this manual are subject to change at any time and without notice.**

If any statements, diagrams and/or instructions contained herein, **for components not manufactured by the Seller**, conflict with instructions in the manufacturer's manual (i.e.: motors, dampers, etc.), the instructions in the manufacturer's manual, for that component take precedent.

Should you want the latest version of this manual, please contact us or our sales office for your area. Or, you can print a current version by going to our website at: www.cincinnati-fan.com



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E-Mail: sales@cincinnati-fan.com



HDBI & HDAF ARRANGEMENT 4

The drawing shown above is a representation of the basic model blower or fan purchased on the serial number shown on page 1. It does not include any optional or accessory parts or any special construction features that might have been supplied with the original order.

SPECIFICATION SHEET

CFV NO. 811589		PAGE 1	
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MARKS 0814-04	
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	REP. ORDER NO. A08383
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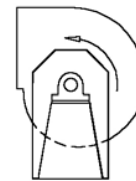
QTY.	DESCRIPTION				MODEL	ROT	DISCH	ARR	WHEEL/PROP	INLET	
1	HEAVY DUTY BI BLOWER				HDBI-270	CCW	TH	4	HDBI 100%		
MOTOR DATA	HP	RPM	PH	CYCLE	VOLTAGE	FRAME	ENCLOSURE	SUPPLIED BY	INSTALLED BY		
	25	1750	3	60	230/460V	284T	TEFC	CFV	CFV		
	CFV MOTOR PART NUMBER 37706S								GROOVES	FXD/ADJ	BELT
FAN DATA	DENSITY	TEMP.	ALTITUDE	CFM	SP	RPM	BHP	MOTOR SHEAVE		BUSHING	
AT OPERATING CONDITIONS	.071	86°F	335	13940	6.000	1750	19.800				
MOTOR VENDOR MODEL NUMBER	1LE29312CB116AA3								FAN SHEAVE		BUSHING

Complete Motor Description:

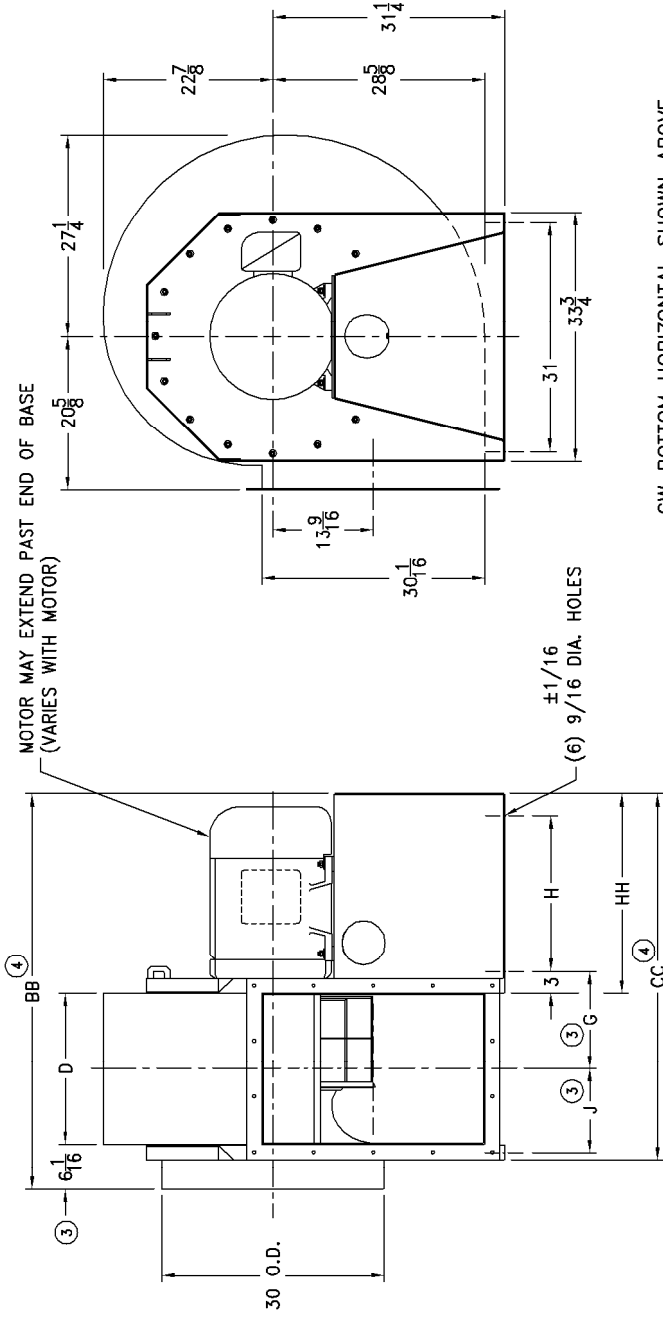
MTR, 25 HP, 1750 RPM, 3PH, 60Hz, 230/460V, TEFC, EPAct Eff, FM, 284T, 1.15 SF, F Insul., 40C Amb., F1 Box, Cast Iron Frame, RGZP TYPE, Siemens

Maximum allowable wheel speed at 70°F is 2476 RPM

- CLASS II/III/IV WHEEL CONSTRUCTION
- DRILL DISCHARGE FLANGE STANDARD
- DRAIN
- TEFLON SHAFT SEAL
- LIGHT DESERT TAN ENAMEL PAINT



CCW TH



CW BOTTOM HORIZONTAL SHOWN ABOVE

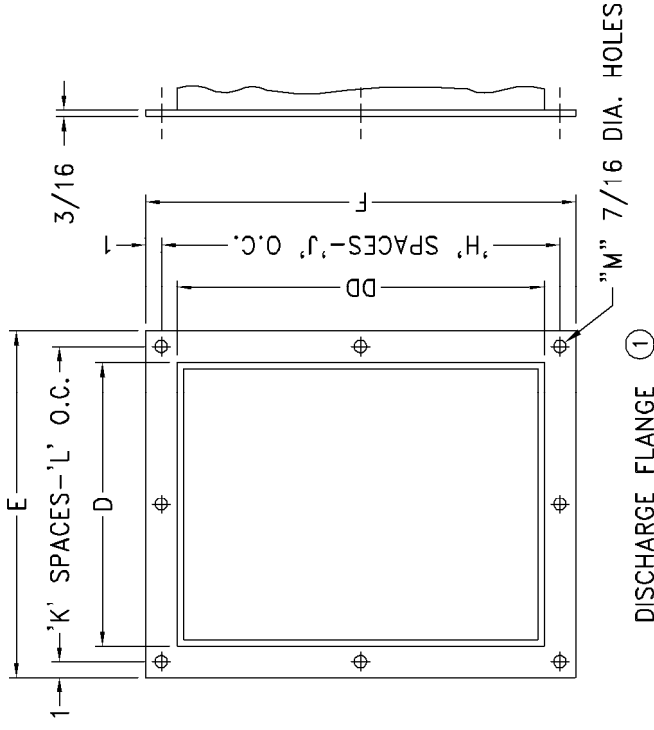
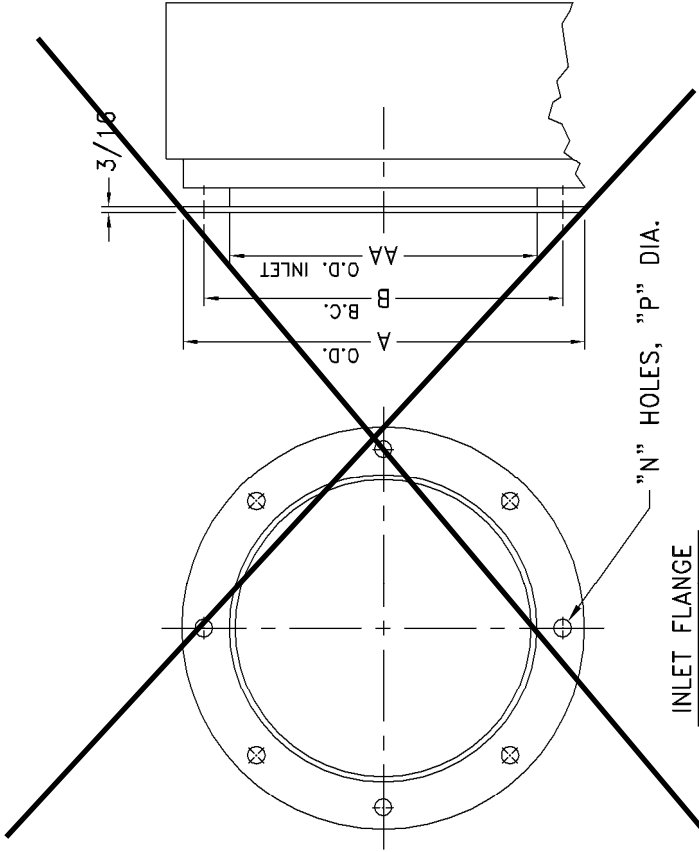
STANDARD BASES (SMALL)					
MOTOR FRAME 213T-256T					
H	HH	BB	CC	WEIGHT *	
44	40	40	40	690	
43 1/2	39 1/2	39 1/2	39 1/2	685	
42 15/16	38 15/16	38 15/16	38 15/16	680	
42 7/8	38 7/8	38 7/8	38 7/8	675	
41 7/8	37 7/8	37 7/8	37 7/8	670	
41 3/8	37 3/8	37 3/8	37 3/8	665	
40 13/16	36 13/16	36 13/16	36 13/16	660	
40 5/16	36 5/16	36 5/16	36 5/16	655	
39 3/4	35 3/4	35 3/4	35 3/4	650	
39 1/4	35 1/4	35 1/4	35 1/4	645	
38 11/16	34 11/16	34 11/16	34 11/16	640	

LARGE BASES					
MOTOR FRAME 284T-326T					
H	HH	BB	CC	WEIGHT *	
53 1/2	49 1/2	49 1/2	49 1/2	730	
53	49	49	49	725	
52 7/16	48 7/16	48 7/16	48 7/16	720	
51 15/16	47 15/16	47 15/16	47 15/16	715	
51 3/8	47 3/8	47 3/8	47 3/8	710	
50 7/8	46 7/8	46 7/8	46 7/8	705	
50 5/16	46 5/16	46 5/16	46 5/16	700	
49 13/16	45 13/16	45 13/16	45 13/16	695	
49 1/4	45 1/4	45 1/4	45 1/4	690	
48 3/4	44 3/4	44 3/4	44 3/4	685	
48 3/16	44 3/16	44 3/16	44 3/16	680	

% WIDTH	D	G	J
100%	20 7/16	15 1/4	11 5/16
95%	19 15/16	14 31/32	11 1/32
90%	19 3/8	14 1/16	10 3/4
85%	18 7/8	12 7/16	10 1/2
80%	18 5/16	12 5/32	10 7/32
75%	17 13/16	11 29/32	9 31/32
70%	17 1/4	11 5/8	9 1/16
65%	16 3/4	11 3/8	9 7/16
60%	16 3/16	11 3/32	9 5/32
55%	15 11/16	10 27/32	8 29/32
50%	15 1/8	10 9/16	8 5/8

NOTES:

- FANS ARE ROTATABLE IN 45° INCREMENTS.
- DISCHARGE FLANGE IS STANDARD.
- ADD 1/8" FOR AMCA "C" CONSTRUCTION FANS AND/OR DOWNBLAST DISCHARGE POSITION.
- ADD 1/4" FOR AMCA "C" CONSTRUCTION FANS AND/OR DOWNBLAST DISCHARGE POSITION.
- WEIGHT DOES NOT INCLUDE MOTOR OR OPTIONS.



INLET

SIZE	A O.D.	B B.C.	N	AA DIA.	P
120	16	14-3/8	8	13-1/4	7/16
130	17-3/4	15-15/16	8	14-5/8	7/16
150	19-1/4	17-1/2	8	16-1/8	7/16
160	21-1/8	19-3/8	8	18	7/16
180	23-1/2	21-1/2	12	20	7/16
200	25-1/2	23-1/2	12	22	7/16
220	28-1/8	26-1/8	12	24-5/8	7/16
240	30-3/4	28-3/4	16	27	7/16
270	33-3/4	31-5/8	16	30	7/16
300	37-1/4	35-1/4	16	33-1/2	7/16
330	40-5/8	38-3/4	16	36-3/4	1/2
360	43-5/8	42	16	40	1/2

DISCHARGE

D	E	F	H	J	K	L	M	DD
9-3/8	13-3/8	17-11/16	2	7-27/32	2	5-11/16	8	13-3/4
10-3/8	14-3/8	19-3/16	2	8-19/32	2	6-3/16	8	15-1/4
11-3/8	15-3/8	20-3/4	3	6-1/4	2	6-11/16	10	16-13/16
12-1/2	16-1/2	22-7/16	3	6-13/16	2	7-1/4	10	18-7/16
13-7/8	17-7/8	24-1/2	3	7-1/2	2	7-15/16	10	20-3/8
15-1/4	19-1/4	26-3/8	3	8-1/8	3	5-3/4	12	22-3/8
16-7/8	20-15/16	28-7/8	4	6-23/32	3	6-5/16	14	24-7/8
18-9/16	22-5/8	31-3/8	4	7-11/32	3	6-7/8	14	27-3/8
20-7/16	24-1/2	34-1/8	4	8-1/32	3	7-1/2	14	30-1/16
22-3/4	26-3/4	37-5/8	5	7-1/8	3	8-1/4	16	33-9/16
24-7/8	28-7/8	40-7/8	7	5-9/16	5	5-3/8	24	36-3/4
27-1/4	31-1/4	44-1/4	7	6-1/32	5	5-27/32	24	40-1/4

NOTE:
 ① NOT AVAILABLE ON ANY MODEL FOR DOWNBLAST, BOTTOM ANGULAR DOWN OR TOP ANGULAR DOWN DISCHARGE POSITIONS.
 DISCHARGE FLANGE IS STANDARD ON SIZES -270 THRU -360.