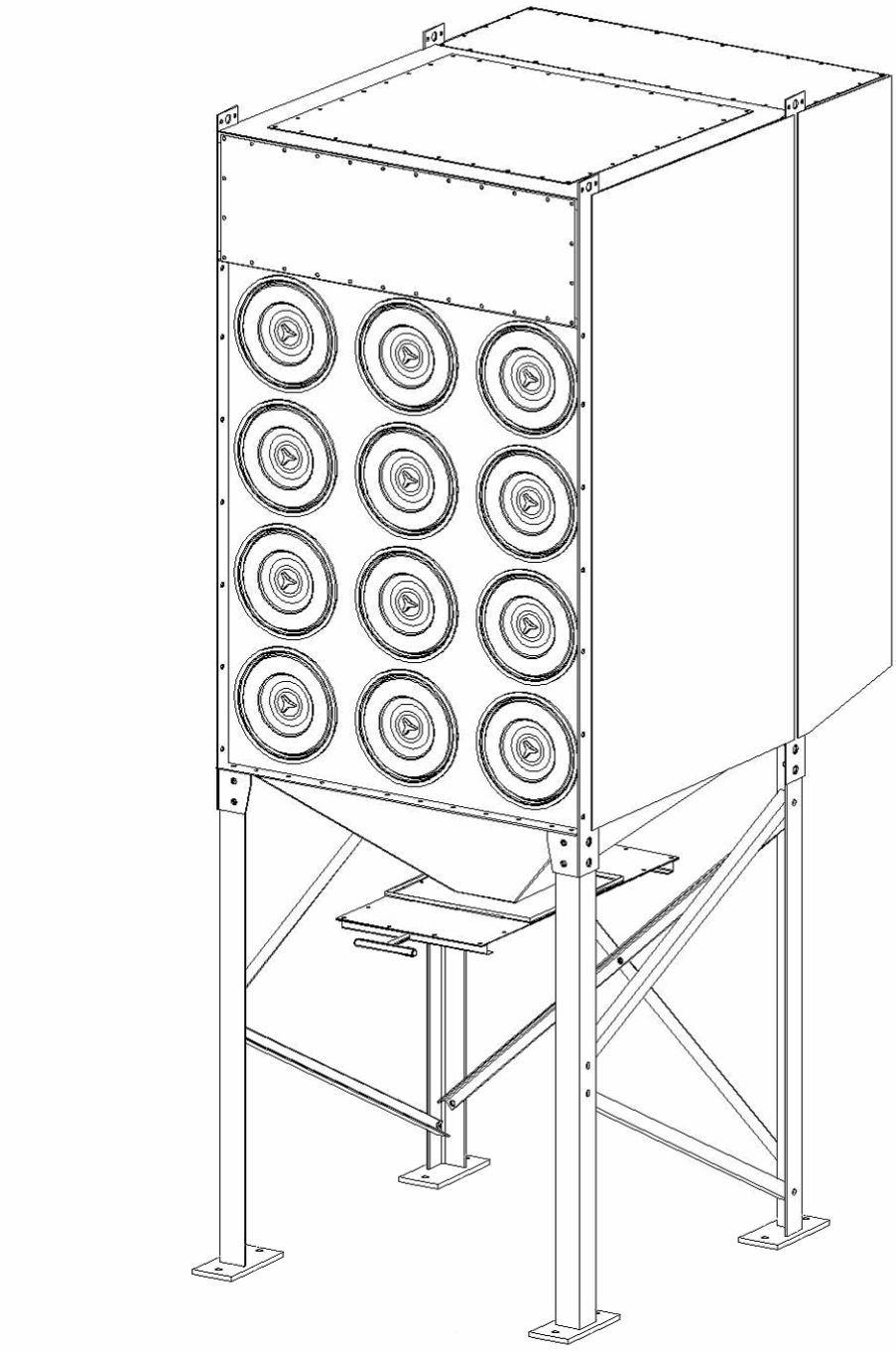
Abrasive Blast Systems

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 that. 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

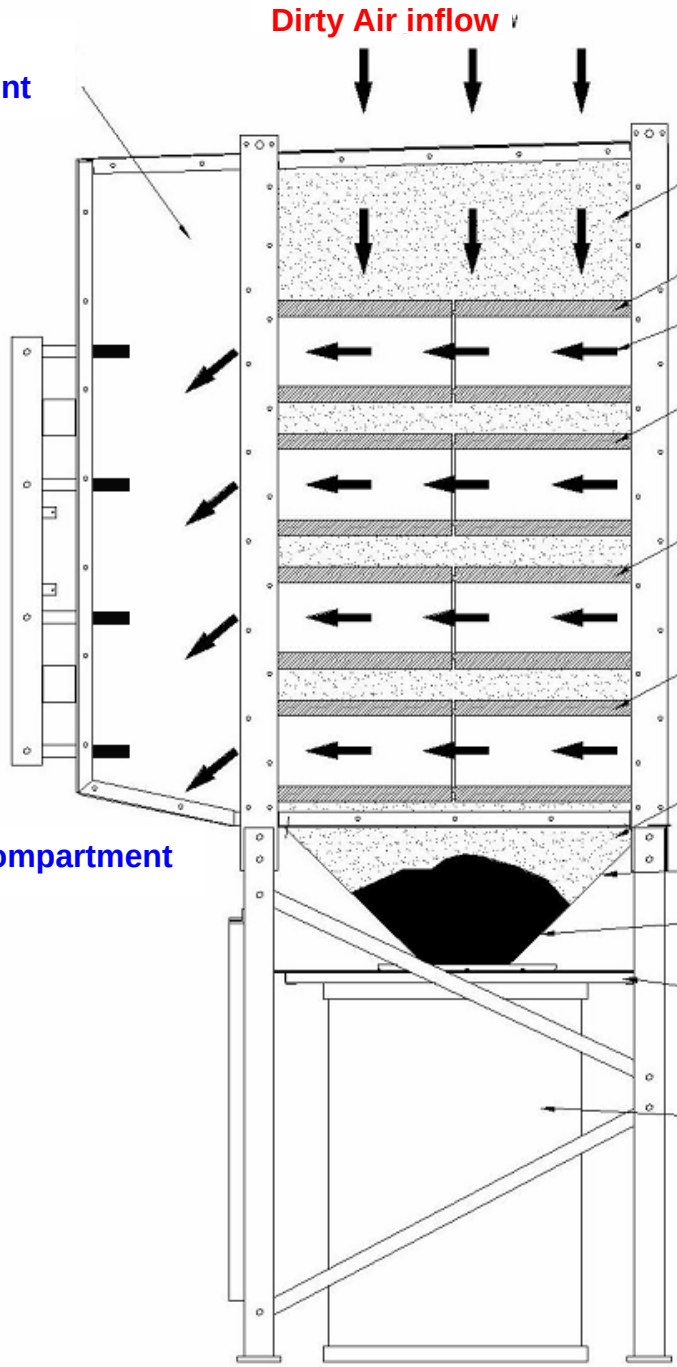
The fan is connected to the clean air compartment and sucks air through the dust collector from the dirty air compartment through the filters to the clean air compartment.
The filters will collect fine dust particles in the air. The heavy particles will drop down into the collection hopper at the bottom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

A trashcan (55 Gallon drum) can be placed below the dust collector to remove the dust particles from the hopper.

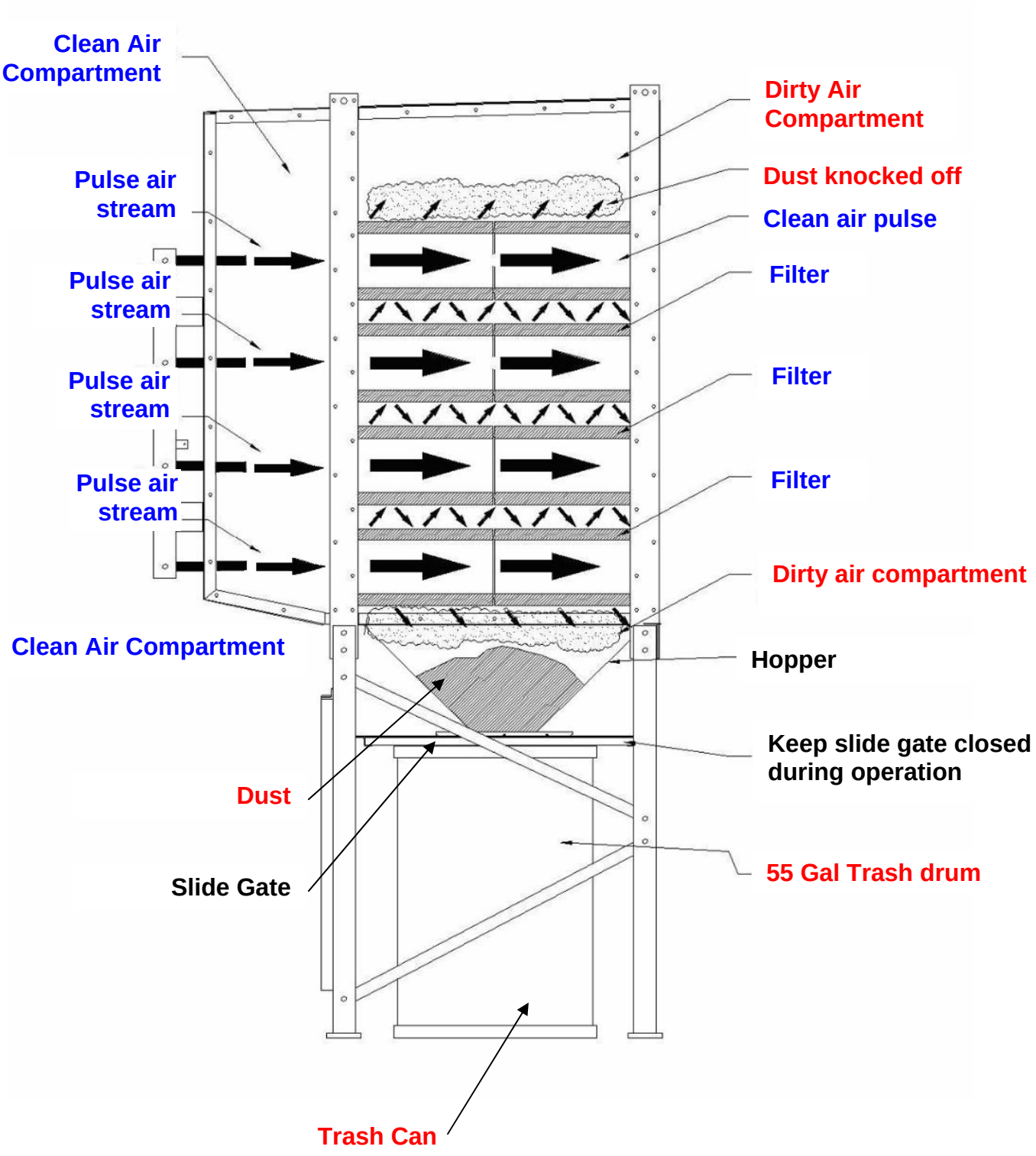
A Slide gate is mounted at the bottom of the hopper preventing air from entering the dust collector during normal operation. The slide gate should be kept in the closed position at all times. It can only be opened during trash removal when the Dust collector is turned off. **Remember to shut the fan down before opening the slide gate**.

A drum cover, seal and flexible tube is 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 or Magnahelic pulse management system. This system monitors the pressure differential between the dirty and clean airsides 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 effeminacy. 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 Test and 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 NFPA #70

.

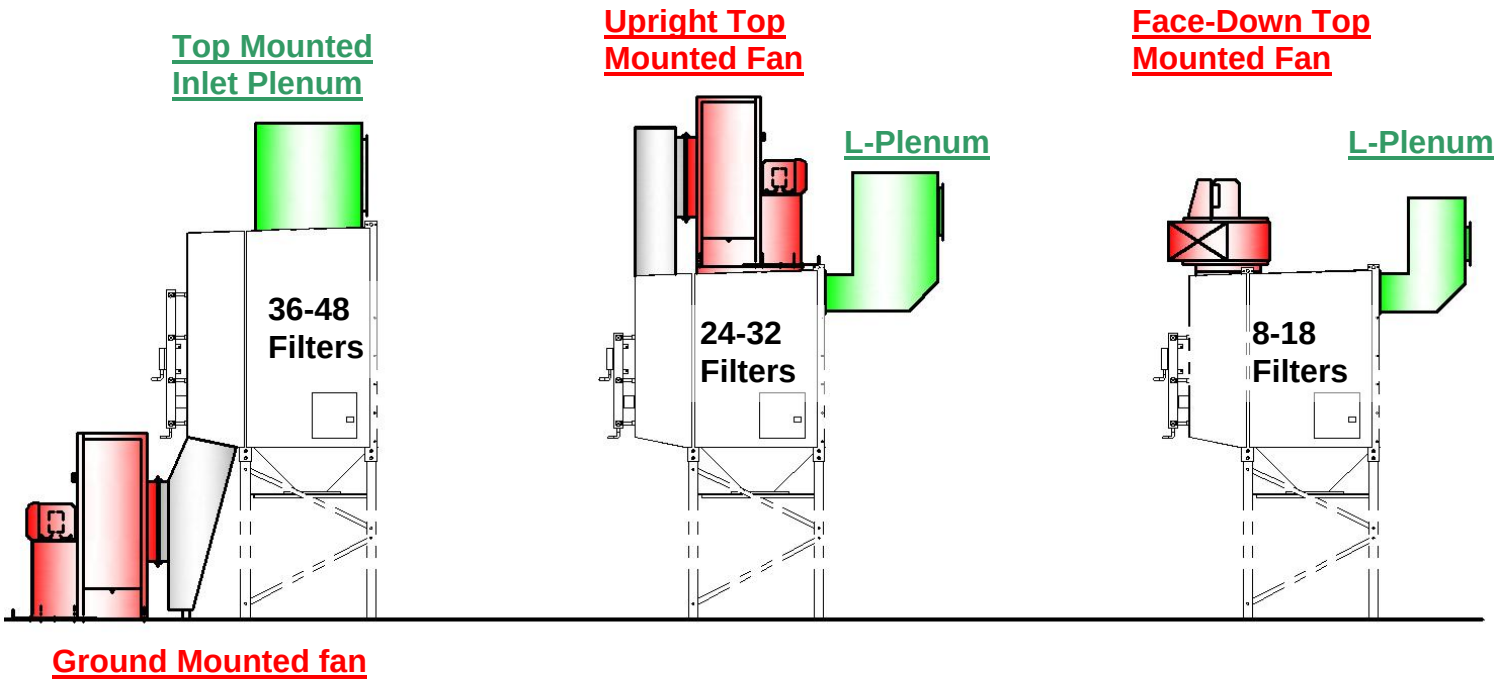
- The dust collector must be mounted on a strong level surface or structure. The structure or concrete must be able to support the Dust Collectors weight, collected dust and other auxiliary equipment.

- 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:

- Power paint applications
- Mixing
- Blending
- Abrasive blast
- Grinding
- Pan coating
- Sand handling
- Welding
- Machining

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

1. Ultra Web filter cartridges are recommended for all non-rubbery fine dust collection applications.

2. Open pleat filters are recommended for all rubbery dust types.

3. Most of the other types of non-standard dust collection application requires special filters or customized dust collector designs. Contact ABS if you have a specialized dust extraction requirement that needs to be met.

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 abovementioned 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 NFPA #70 code 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 wiring diagram will indicate the number of wires needed for remote and main power wiring.
- 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

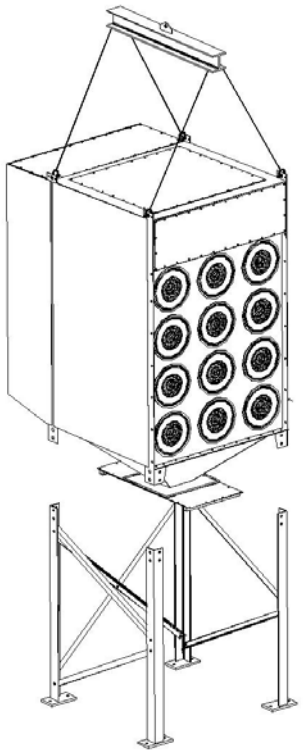
Hoisting instructions

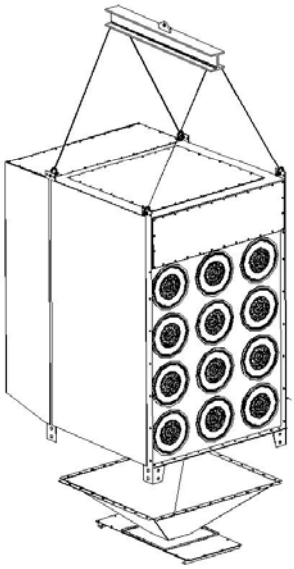
- Use all the available lifting holes.
- Do not use lifting hooks to lift the collector. Use clevis shackles and screw pins with slings.
- Using a spreader bar will distribute the weight and prevent damage to the unit.
- Only allow trained riggers to operate hoisting equipment.
- Make sure that your 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.

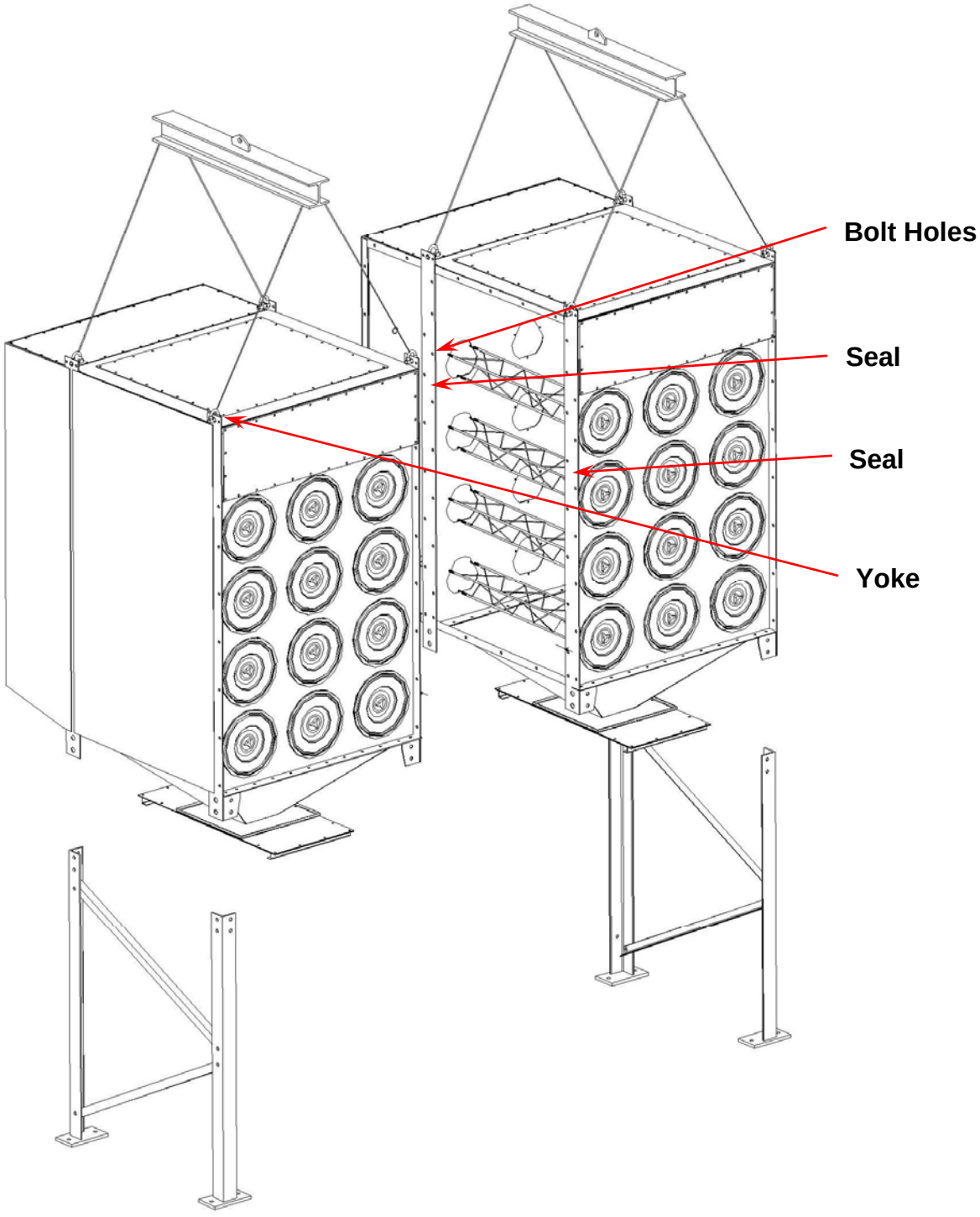




Installation

Hoist Dust collector as shown.
Seal hopper on the top rim with gasket or sealant.
Align boltholes and bolt the hopper to the Dust Collector
Attach the legs as shown
Move the Dust Collector in place and secure the DC to the mounting surface with chemical anchor bolts.

ASSEMBLY

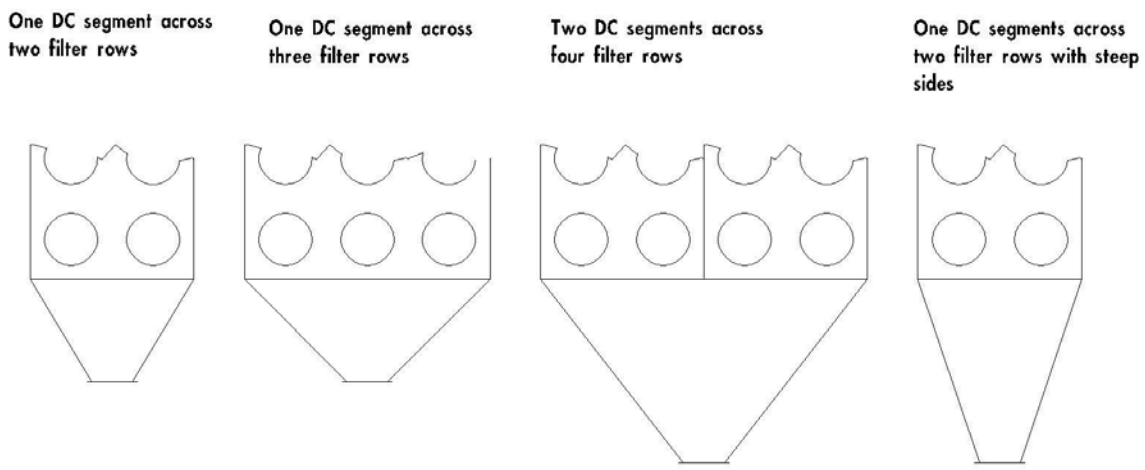


HOPPER INSTALLATION

Installation of the Dust Collector Hopper

There are only 4 types of Dust Collector hoppers available, all off which dump into a small 10” 10” 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



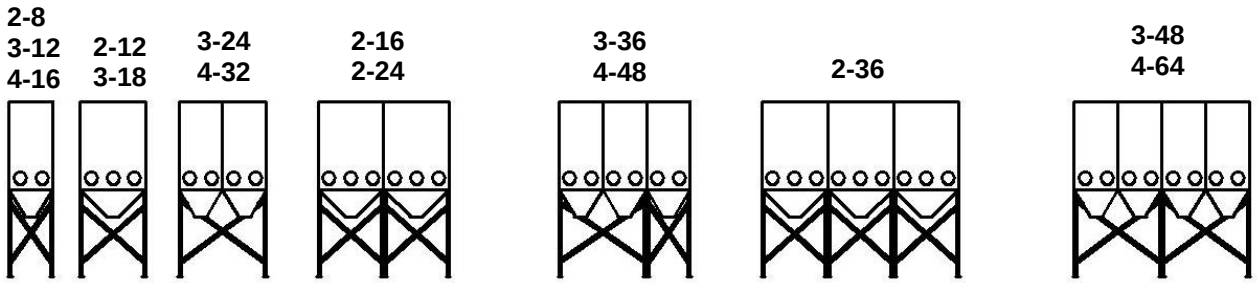
LEG INSTALLATION

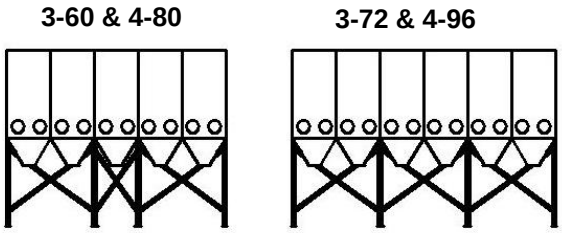
Installation of the Dust collector support legs

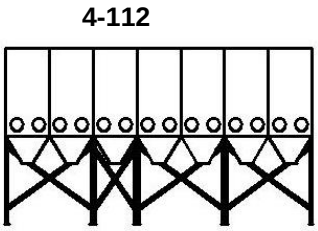
The dust collector legs were designed to withstand 100 mph winds and Seismic Zone 4 conditions. The drawing on the following page shows the correct leg layout for all of all hopper compartment combinations. The hopper legs are shipped unassembled with the hopper.

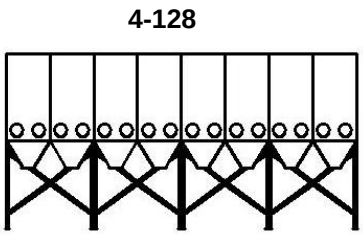
Follow the instructions to assemble the Dust Collector legs

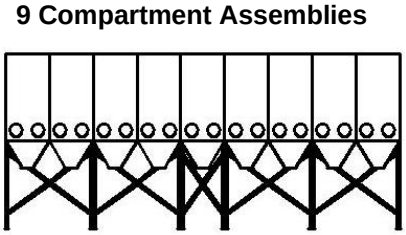
HOPPER LEG CONFIGURATIONS

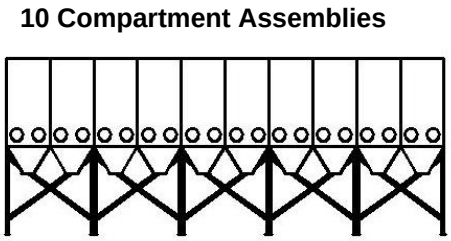


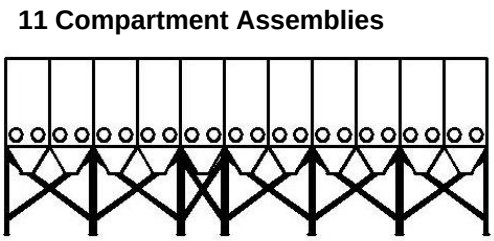










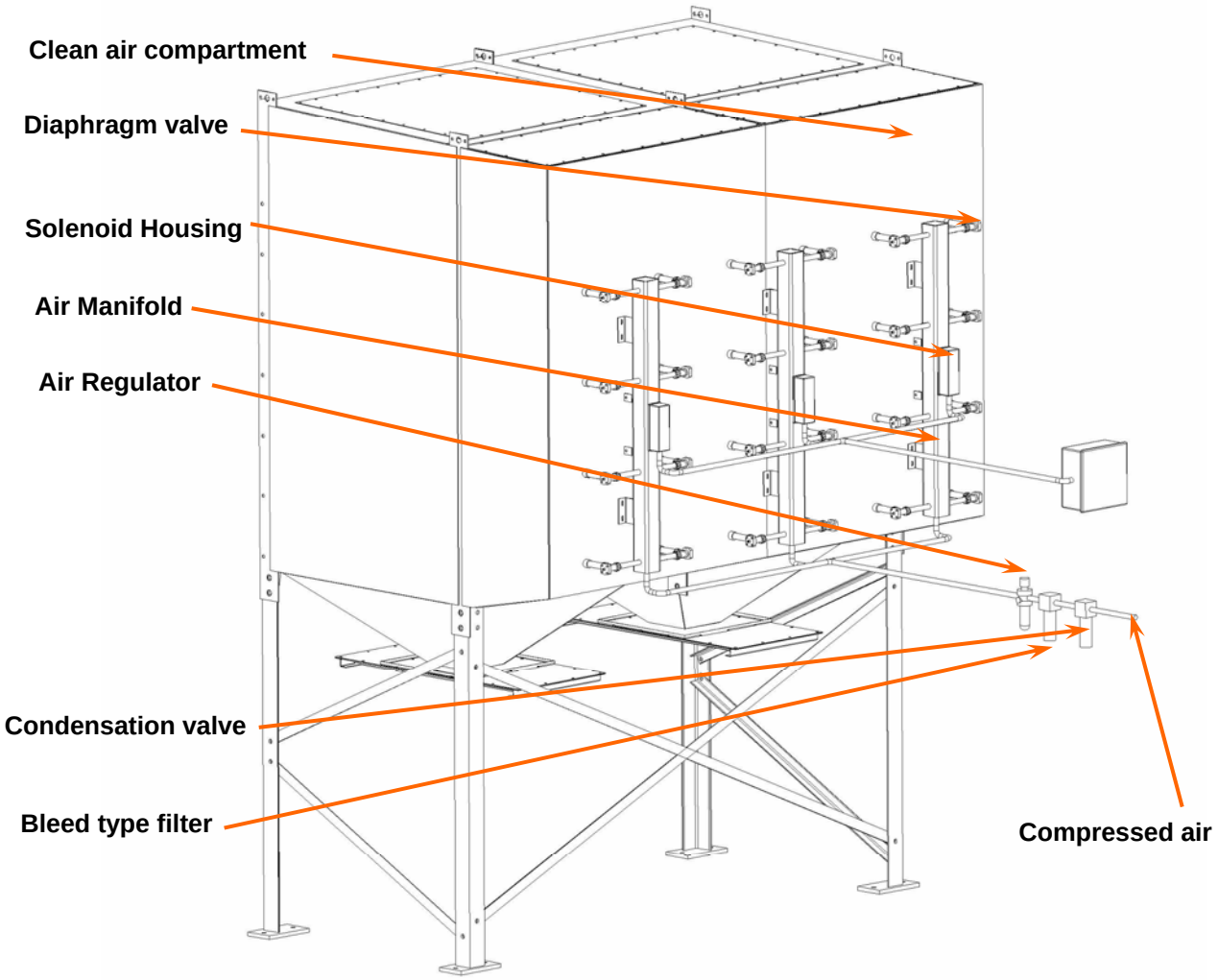


- Assemble the legs according to the drawing shown above. Do not assemble the legs to the collector at this time.
- Raise the dust collector with a crane and then lower slowly so that the boltholes align properly.
- Taper pins are useful to align the holes for assembly. Use ¾ -10 X 2” bolts and required 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 by removing the crane support.

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 gage, 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

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 “closed” 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 turn direction of the fan. Make sure that the fan turns in the same direction as the indicator arrow on the motors base plate. **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 reduce life.

Procedural checklist

1. Monitor dust collector performance.
2. Monitor exhaust for dust.
3. Monitor pressure differential over filters.
4. Monitor dust.

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**

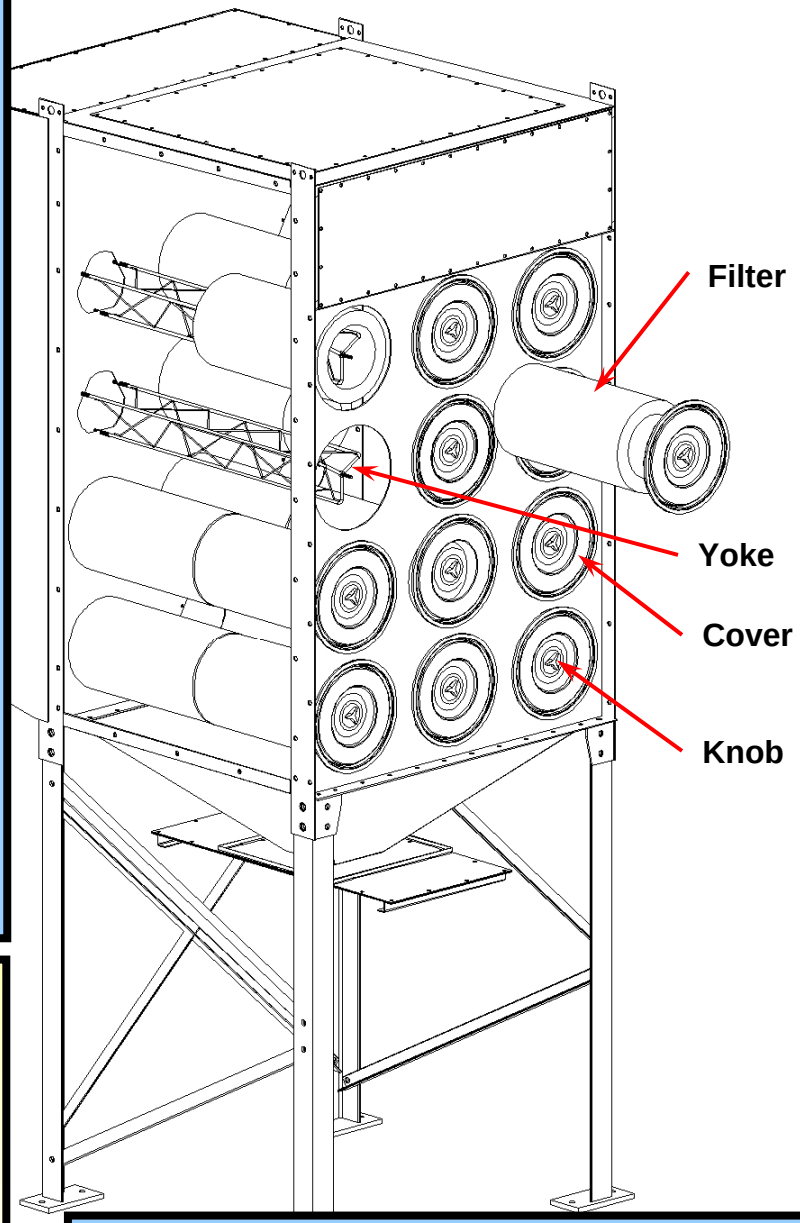
Warning!

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

FILTER REPLACEMENT

Filter Removel

1. Shut electrical power off.
2. Remove the round excess 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 ceiling surfaces properly with a moist rag. Note: A clean ceiling 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 avoid personal injury during the retrieval of these filters.
- Care should be taken not to drop the filters.

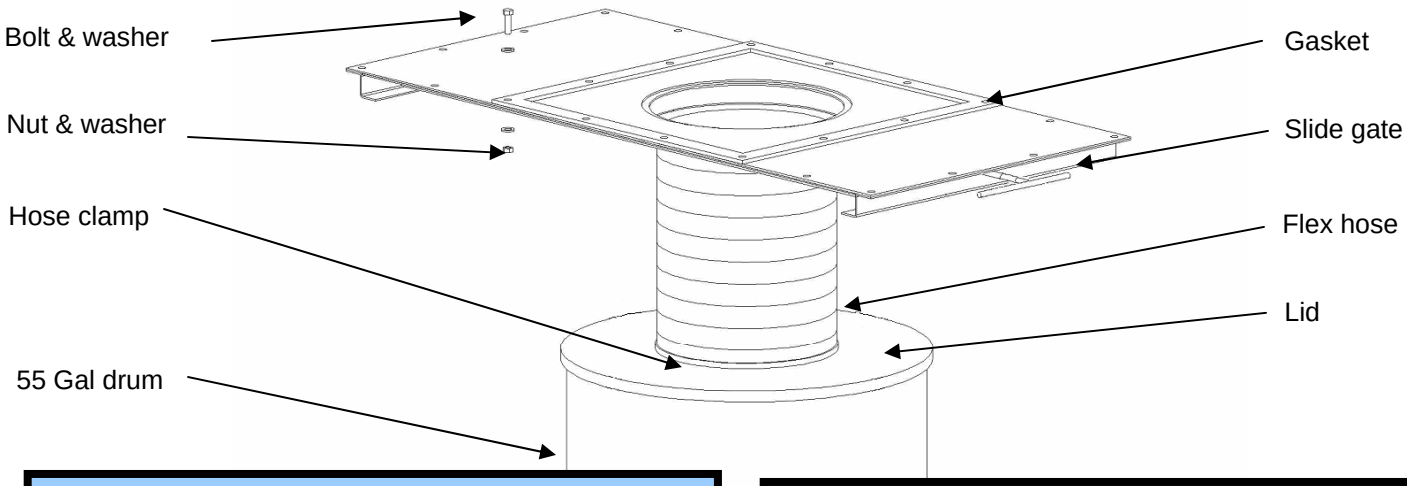
Replacement of filters

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.
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.
Open the slide gate so that excess dust can fall from the hopper into the trash drum.
Close slide gate again.
Remove and empty the trash drum.
Replace the trash drum.
Re-secure the ceiling devices onto the trash drum.



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 closed position when the fan is running. Opening 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!

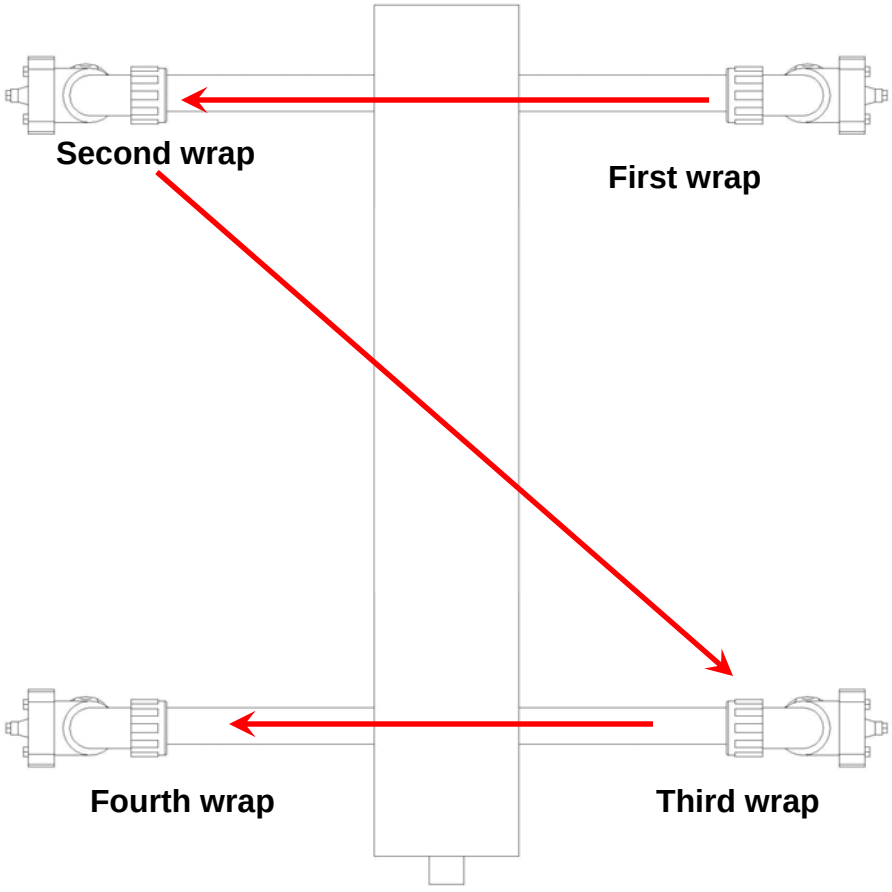
1. Explosion vents are designed for outside installations only.
2. All airborne discharge from the dust collector fitted with and explosion vent must be vented outside towards a safe area.
3. It is good practice to locate venting equipment outdoors and away from areas occupied by personnel.
4. Material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

COLD CLIMATE EQUIPMENT

Cold Climate equipment

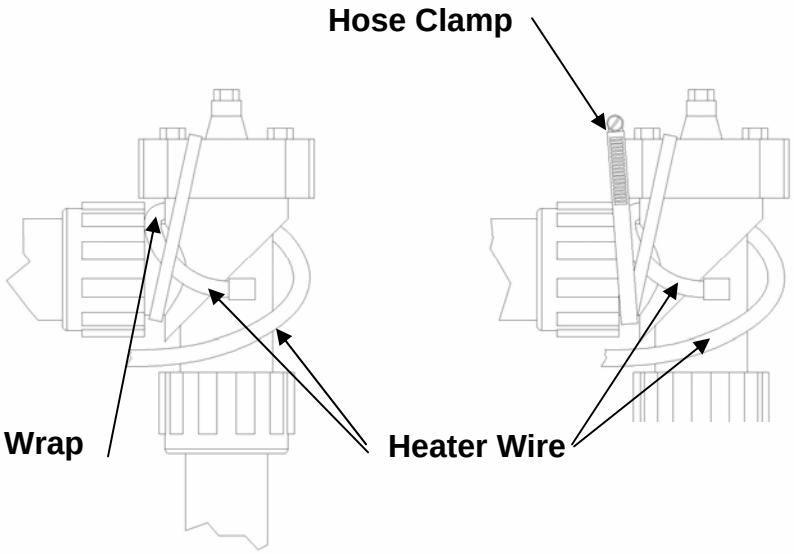
The cold climate kit was designed to provide heat to the solenoid valve system in cold climate conditions. Compressed air that contains moisture can result in freeze conditions that would lock the solenoid valves up. The unit consists of a heating element and a thermostat. The unit comes equipped with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

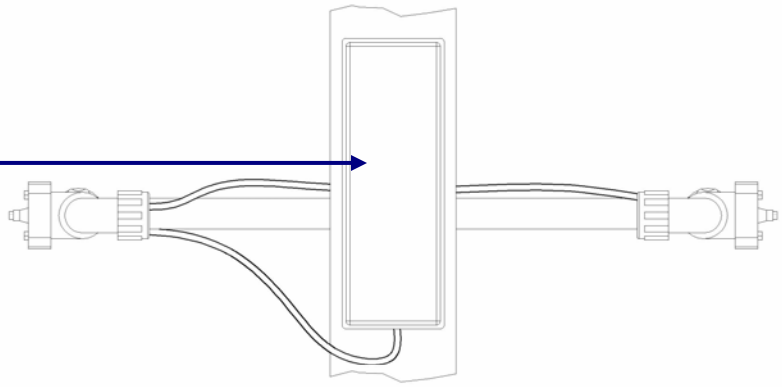


1. The heat cable must be connected to the main power supply according to the manufacturers' constructions.
2. Wrap the heat cable as indicated in the included diagram.
3. Start by wrapping the right-hand top solenoid valve and work your way over to the top left-hand top solenoid valve.
4. Continue to 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 doors must be tightened 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 Discharge on hopper is open Incorrectly adjusted damper control on fan Leakage through access doors Faulty motor-starter	Ensure that the electrical power supply is adequate to run the fan motor under load. Ensure that the slide gate is closed. 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
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.

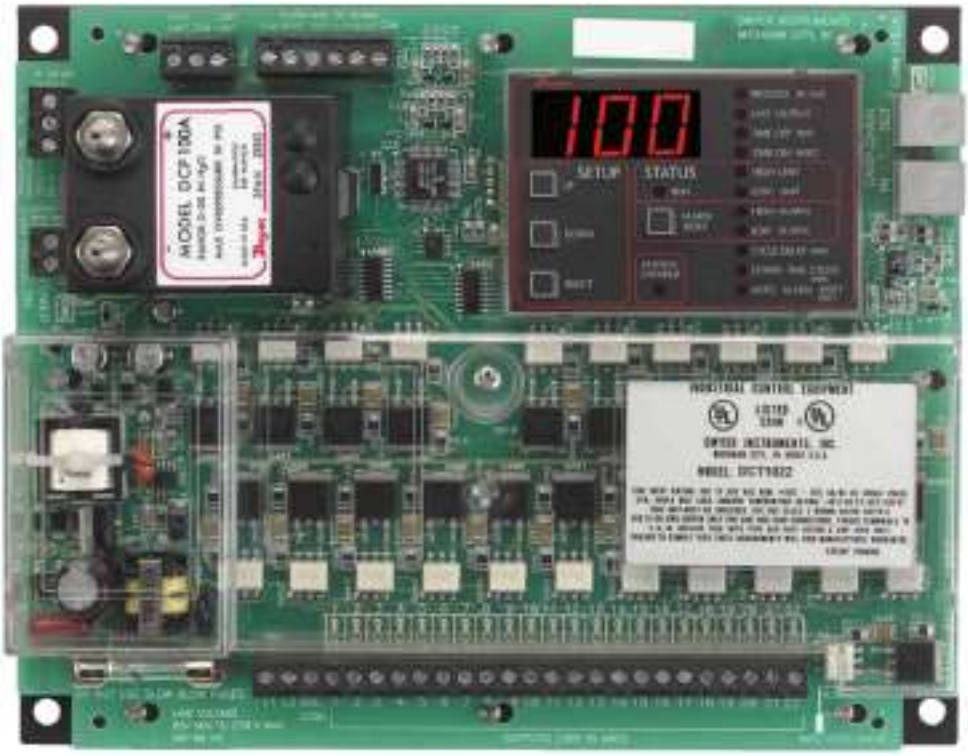
The Delta P control shows no display	Open circuit blown fuse No electrical power supply on the control	Replace the fuse if blown. Verify the proper supply voltage.
Inadequate airflow	Fan turns in the wrong direction Open or leaking access doors Restricted fan exhaust Incorrectly adjusted timer Timer 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 doors are closed and sealed properly. Make sure that slide gate is closed and sealed properly. Ensure that there are no objects in the fan airflow path that could restrict airflow. Make sure that the damper valve 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 speck. 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 and close slide gate again. 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.
Warning light stays on	Compressed air system leaking or plugged Excessive pressure loss Incorrectly set warning point	Verify that the compressed-air system is free of air leaks, dirt and kinks in the tubing that could restrict airflow. Verify that the available compressed air meets the minimum speck of 90-psig. If the filters have reached the end of their life, they will have to be replaced at this time. Reset warning point to a higher value.

Pulsar cleaning system continues	Insufficient compressed air to solenoid valves due to air leakage or disrupted flow Incorrect low and high-pressure differential set points Pressure switch and timer board not wired correctly	Ensure that there are no leaks or kinks in the compressed air supply lines to the solenoid valves. Readjust low and high set points in accordance to the filter life span of your filter. The older the filters, the higher the setting needs to be. Wire pressure switch and timer board according to the wiring diagram.
	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.

DWYER INSTRUMENTS, INC. I Phone: 219/879-8000
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A. I Fax: 219/872-9057

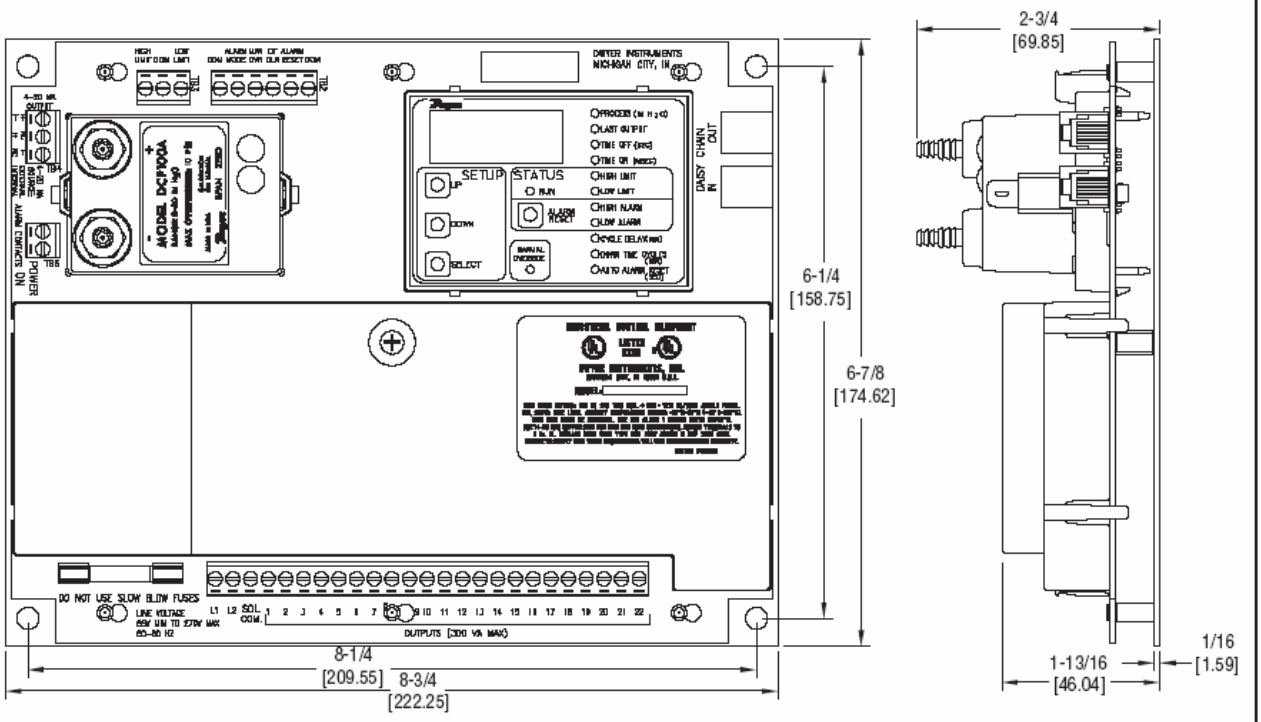
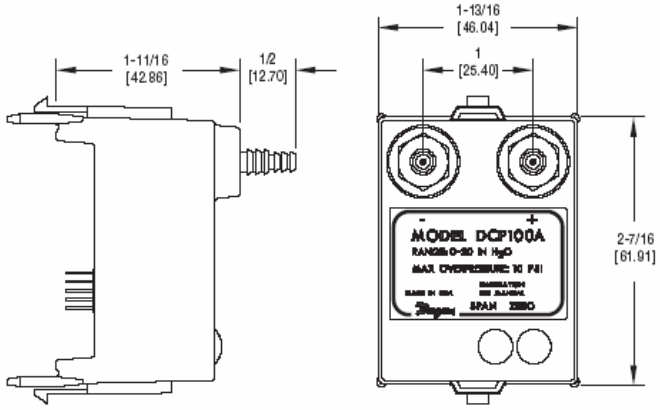


Figure 1 – Dimensional Specifications for the DCT1000 (shown with optional module DCP100A)



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).

Table of Contents

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.

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.

1.1 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	Ø	Open	Hold
Hold	Closed	Ø	Run
Run	Closed	≠	Run
Hold	Closed	Ø	Run
Run	≠	Open	Hold

Ø 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.*

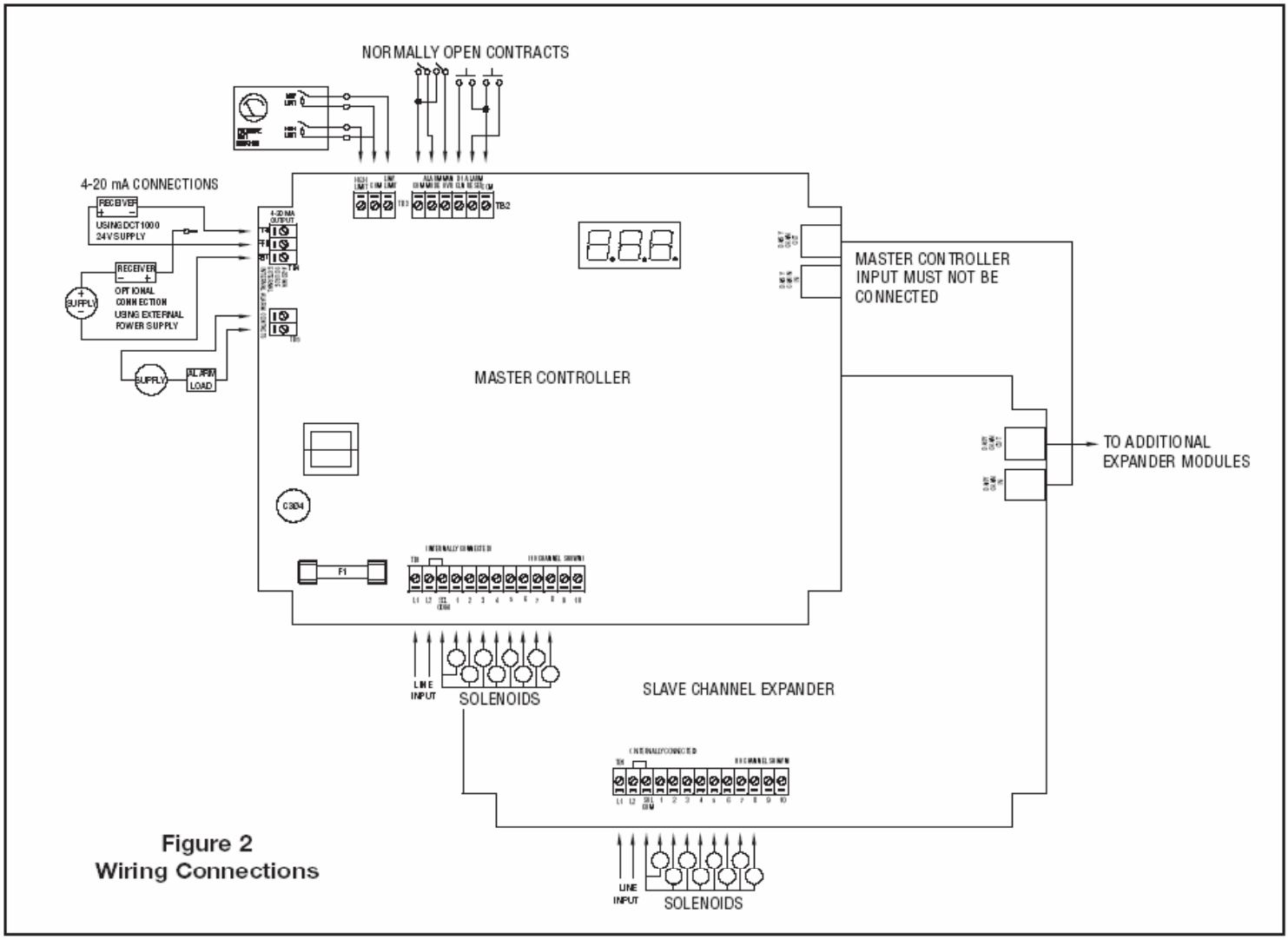


Figure 2
Wiring Connections

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 requiring 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.

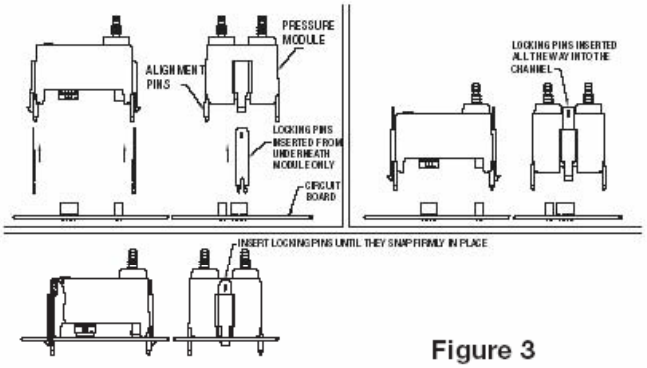


Figure 3
DCP Installation

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.

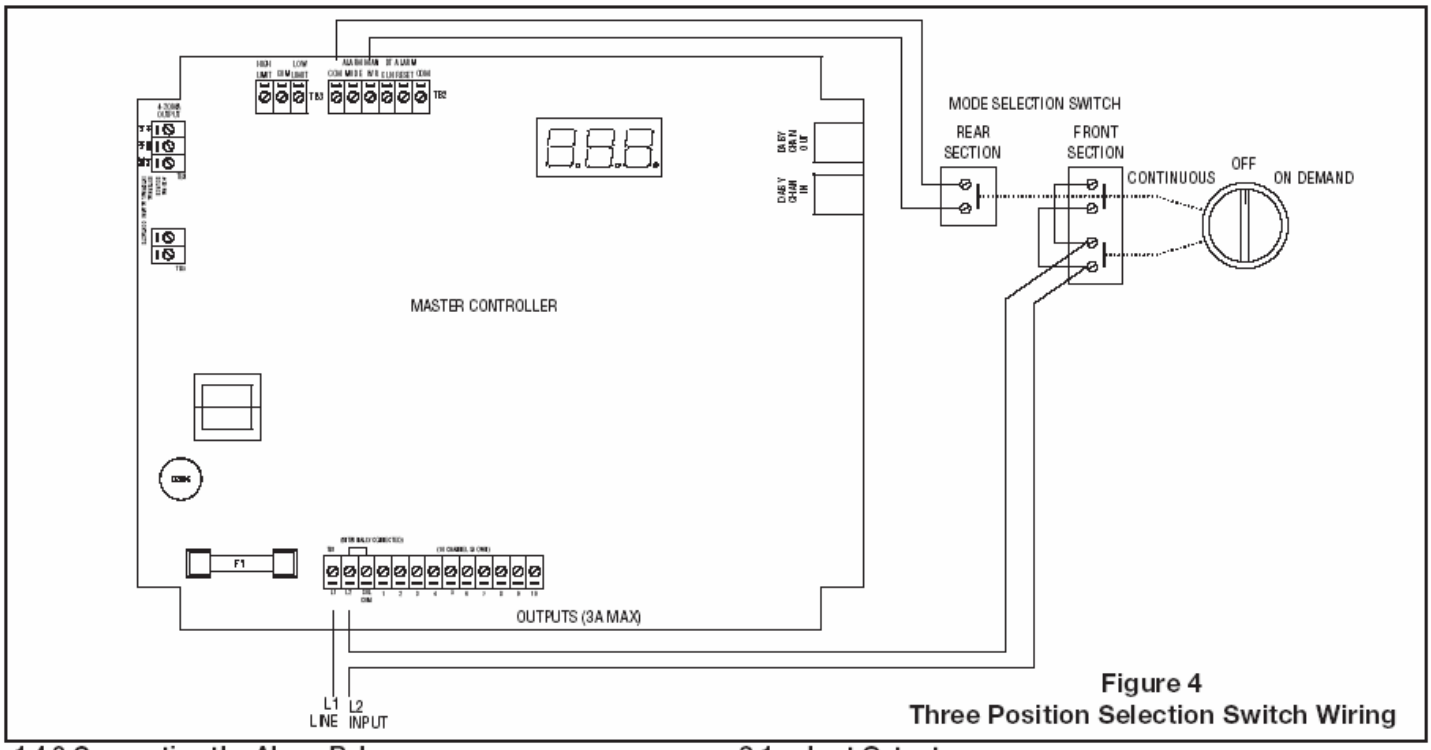


Figure 4
Three Position Selection Switch Wiring

1.4.3 Connecting the Alarm Relay

With the pressure module installed, a relay contact is provided for controlling an external alarm. This relay is a single form-A contact. It is activated when either the high alarm threshold is exceeded, or the pressure drops below the low alarm threshold. The connection is made at the two-pin connector TB5. See Figure 2 Wiring Connections

1.5 Three Position Selection Switch Wiring

An optional mode selection switch is available with the weather-proof enclosure. With this switch the user may select either continuous cleaning, on-demand cleaning, or off. This switch is supplied factory wired as shown in Figure 4. The switch has a front and rear section. The front section, consisting of two independant contacts, controls the power to the board. These contacts must be wired in parallel as shown in the diagram. The rear section controls the manual override, which when closed will force the system into a continuousmuct be reconneccted, follow the wiring diagram.

Caution: Do not interconnect the low voltage manual override leads with the power leads. This will destroy the control board as well as pose a serious shock hazard

2.0 Programming the DCT1000 Master Controller

We've made it easy to navigate the DCT1000. Menu items can be accessed simply by pressing the "SELECT" button. The menu item that you are currently accessing is indicated by the illumination of an LED. To change menu items, all you have to do is push "UP" to increase a value or push "DOWN" to decrease a value. There are no keystrokes that you need to memorize, special combinations, or passwords that are required.

The master controller is equipped with an on board display and programming information center. The controller will power-up with the process indicator illuminated. If a pressure module is installed, the display will indicate the measured pressure in inches of water (w.c.); otherwise it will normally be blank.

2.1 • Last Output

The Last Output setup selects the last channel to be activated. When first selected, the display will flash the last output available in the system. With single board installations, this will be the number of channels installed, typically 6, 10 or 22. This value becomes more important when multiple modules are installed. The last output value flashed will be the sum of all channels available in the system.

After the last available channel indication has completed, the currently programmed last channel value is displayed. This value may be changed using the "UP" and "DOWN" buttons. The minimum value is one while the maximum value is the maximum number of installed channels, including all expansion modules.
The default value is the maximum number of channels. Pressing "SELECT" will change the setup mode to Time Off Setup.

2.2 • Time Off (Sec.)

Time off defines the period of time between solenoid activations when no channels are enabled. This may be set between one second and 255 seconds. The factory default is 10 seconds. The display will show the current time off setting when the time off setup mode is entered. The value may be changed using the Up and Down buttons. Pressing both "UP" and "DOWN" simultaneously and holding for approximately four seconds will restore the default value of 10.

2.3 • Time On (msec)

Time On Setup sets the solenoid on time. The display will indicate the currently programmed time on setting. This is measured in milliseconds. Using the "UP" and "DOWN" buttons, the value may be changed. The value may be set between 10 msec and 600 msec in 10 msec increments. Pressing the "UP" and "DOWN" buttons simultaneously for approximately four seconds will restore the factory default value of 100 msec. Pressing the "SELECT' button will advance the setup mode to the High Limit setup if the pressure module is installed. With no pressure module, it will step to Cycle Delay Setup.

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.

Still need help? Please feel free to contact one of our customer service representatives at 219-879-8000 or visit us on the web at www.dwyer-inst.com or www.dust-controls.com. Thank you for choosing Dwyer Instruments.

 Printed U.S.A. 11/04 FR#443123-00 Rev. 2

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000
Fax: 219/872-9057
www.dwyer-inst.com
e-mail: info@dwyer-inst.com